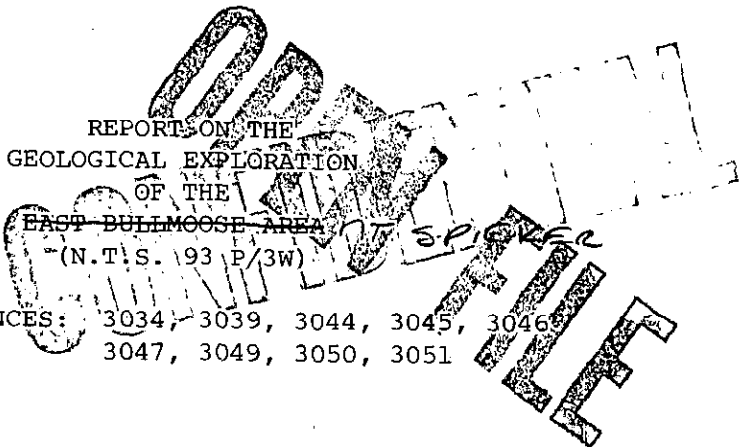


REPORT ON THE
GEOLOGICAL EXPLORATION
OF THE
EAST BULLMOOSE AREA
(N.T.S. 93 P/3W)



COAL LICENCES: 3034, 3039, 3044, 3045, 3046,
3047, 3049, 3050, 3051

by

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For
NICHIMEN RESOURCES LIMITED
AND
BRAMEDA RESOURCES LIMITED

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FOREWORD

The geological exploration was carried out in the East Bullmoose Area in August and September of 1976.

The purpose of this year's exploration was to assess the geological situation of the coal seams in the whole area by investigating the southern part of the area where the exploration work was not done last year, and by putting together the results of both year's exploration.

Mitsui Mining Co., Ltd. sent two geologists to the area for about one month and prepared this report for Nichimen Resources Ltd. The report consists of two sections; that is, the results of 1976 exploration and the summary of the exploration work of both years.

The field work and the preparation of the report were made by T. Shima and K. Kinoshita.

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I. EXPLORATION IN 1976

I-1. Purpose of the Exploration

The southern part of the area was excluded from the exploration work in 1975, because of poor outcrop and not enough time to investigate whole area. However, it was anticipated that the coal seams of Gates Member had a trend of thickening to the south and that Bird Seam was present widely and gently in the southeastern part.

Based on the above anticipation, the exploration of this year was planned to concentrate in the southern part for the purpose of getting geological informations of whole area, which could be required for evaluating the coal potential of the area. The investigated area in each year is shown on the map 76-02.

I-2. Actual Exploration Work

The exploration work was carried out during August and September.

Mapping was mainly made on the southern mountain and along the access road in a scale of 1 inch to 400 feet and were compiled in a scale of 1 inch to 1,000 feet.

Two trenches were excavated for D, C and B seams of Gates Member, T-3 in the western side and T-4 in the eastern side.

The following three drill holes of 1,360 feet in total footage were carried out by Connors Drilling Ltd. and

cores of NQ size (1 7/8") were taken from every hole.

DRILL HOLES IN 1976

Hole No.	Coordinate (ft.)	Elevation (ft.)	Depth (ft.)	Coal Seams
EB-4	(1, 928N 126, 895E	4, 728	378	Bird Group
EB-5	(1, 208N 121, 650E	5, 043	466	C. B. A.
EB-6	(90N 122, 827E	5, 027	516	D. C. B. A.

Each hole was tested by gamma ray-neutron and sidewall density logging which were helpful to estimate the thickness of coal seams, as the core recoveries of coal seams were very poor.

I-3. Results of the Exploration

I-3-1 Geological Structure

The investigated area shows a synclinal structure in general like the northern part. As this year's work exposed the broad and gentle folding structure, the depth of the coal seams at the synclinal bottom became to shallower than previously anticipated. The steepest dips of the both wings are 45 degrees in the east and 60 degrees in the west, and several minor foldings are associated in the west wing.

In the eastern part of the investigated area, the stratigraphically lower Formations than Lower Gates Member are distributed with almost flat dips.

I-3-2 Coal Seams

The coal seams of Gates Member were observed in two trenches and two drill holes, while those of Gething Formation were observed only in EB-4. The depth and the thickness of coal seams are shown on TABLE-1.

Coal Seams of Gates Member

B Seam has the thickness of more than 13 feet through the investigated area. Maximum thickness is 18.1 feet in T-3.

Measured thickness of C Seam is more than 11 feet, however, partings are increasing to the west.

D Seam is more than 11 feet thick in the eastern part. However, the parting in the middle part of the seam is getting thicker to the northwest, while the upper coal ply become thinner to the same direction. The thickness is only 6.5 feet in T-3.

The thickness of A Seam is less than 5 feet.

Coal Seams of Gething Formation

Upper Bird Seam was repeated by a fault in EB-4 and the thickness of each section shows 7.7 feet and 10.6 feet respectively. The thickness of Lower Bird Seam is 6.2 feet in EB-4.

I-3-3 Coal Quality

The analysis report by Commercial Testing and Engineering Co. is attached at the end of the volume

Table - 1

COAL SEAMS IN DRILL HOLES

Hole No.	Seam	Depth (ft.)	Seam Thickness		Core Recovery (%)
			Apparent (ft.)	True (ft.)	
EB-5	C	214.0 - 229.7	15.70	12.56	52.5
	B	379.6 - 396.0	16.40	13.12	29.9
	A	448.6 - 454.5	5.90	4.90	32.2
EB-6	D	205.8 - 223.2	17.40	14.48	63.8
	C	283.8 - 298.0	14.20 ✓	11.54	76.1
	B	438.6 - 457.1	18.50	15.14	44.1
	A	500.0 - 505.05	5.05	4.39	46.5
EB-4	Bird				
	Upper(A)*	249.6 - 257.3	7.70	✓7.70	66.2
	Upper(B)*	286.1 - 296.7	10.60 ✓	10.60	12.3
	Lower	339.3 - 345.5	6.20	6.20	50.8

* Upper Bird Seam was repeated by a fault in EB-4. (A) : above fault

(B) : below fault

and analytical results of the better recovered samples are picked up on TABLE-2 from the above report.

The following difference are observed when compared with the previous results.

- (1) Ash content of raw coal are higher and separating yields are lower in D and C Seams, because the both samples include the major partings in the middle of the seams.
- (2) F.S.I. of D and C seams are lower, while those of Upper and Lower Bird Seams are higher.
- (3) Phosphorus content of C Seam is relatively high.
- (4) Sulphur content of Upper Bird Seam is 1.68 (3.28 in raw coal) which is remarkably high.

Table - 2

TEST RESULTS OF DRILL CORE SAMPLES

Seam	D	C	B	A	Upper Bird	Lower Bird
Hole No.	EB-6	EB-6	EB-6	EB-5	EB-4	EB-4
<u>Raw Coal</u>						
Ash (%)	27.78	35.14	10.82	11.94	9.08	5.74
<u>Clean Coal(S.G.1.6)</u>						
Yield (%)	71.4	61.3	87.2	92.5	91.7	96.4
Ash (%)	11.85	9.84	7.15	9.58	6.24	4.06
V.M. (%)	25.64	24.74	25.32	22.22	19.92	19.98
F.C. (%)	62.51	65.42	67.53	68.20	73.84	76.06
BTU	13,504	13,820	14,316	14,044	14,674	14,995
Sulph. (%)	0.42	0.43	0.24	0.40	1.68	0.55
Phos. (%)	0.09	0.16	0.07	-	0.08	0.02
F.S.I.	6	4 1/2	6 1/2	7 1/2	8	8 1/2
Max. Fluid. (d. d. p. m.)	728	351	477	-	130	25
H.G.I.	79	76	87	-	94	95
Core Recovery (%)	63.8	76.1	44.1	32.2	66.2	50.8

Analysis by Commercial Testing & Engineering Co.

II. SUMMARY OF EXPLORATION RESULTS IN 1975 AND 1976

The geological exploration during these two years could be said to be in a preliminary stage and there remained some uninvestigated area. However, the outline of the geological situation of the coal seams in the main part of the area was reasonably clarified. The following is the summarized description of the both year's exploration results.

II-1. Stratigraphy

The strata distributed in the area are correlated to Cadomin Formation of Bullhead Group as the lowest horizon and Boulder Creek Member (Commotion Formation) of Fort St. John Group as the top horizon which belong to the Lower Cretaceous in age. The major coal seams are present in Gething Formation and in Gates Member of the Commotion Formation.

The general stratigraphic section and brief description of each Formation are shown on Fig. -1.

II-2. Geological Structure

In the eastern part of the property, as the indication of run of the major thrust fault with northwest trend was previously given which seemed to be accompanied with disturbed zone with variable dips of strata, the exploration was concentrated in the west of the fault.

In the view of the geological structure, the investigated area is divided into two units; northeast and southwest blocks.

GENERAL STRATIGRAPHIC SECTION
IN THE EAST BULLMOOSE AREA

Fig. 1

Group	Formation (Thickness)	Coal Seam	Columnar Section	Description
FORT ST. JOHN G.	Commotion F.			Boulder Creek M. (500 ft.+)
				Hulcross M. (470 - 520 ft.)
				Gates M. (Upper) (520 - 600 ft.)
				Gates M. (Lower) (550 - 620 ft.)
	Moosebar F. (300 - 350 ft.)			
BULLHEAD G.	Gething F. (500 ft.+)	BIRD SKEETER CHAMBALES		
	Cadomin F.			

The northeast block has flatlying or gently dipping structure of less than ten degrees. The main coal seam in this block is Bird Seam and the coal seams of Gates Member are not observed yet, although the sandstone cliff below A seam is seen at the high elevation (approx. 6100 ft.) of Mt. Spieker. The southwest block shows broad synclinal structure with northwest axial trend. Within the block, strata are undulated by several minor foldings. Gentle dipping areas of less than ten degrees are found only in two places; one is around EB-1 and EB-4, and the other is near the F and G creeks. The dips of the strata in other places varies to 60 degrees in maximum.

Only two faults were observed. One was on the road near the camp and the other was in EB-4. Nevertheless, there remained an ambiguity if the coal seam may be faulted near folding axes.

II-3. Coal Seams

II-3-1 Coal Seams of Gething Formation

Bird Seam Group

Upper Bird Seam is usually thicker than Lower Bird Seam. The average thickness is 8.5 feet, although it is fairly variable. In EB-3 and at the outcrop close to EB-3, the thickness of the seam are only 1.2 feet and 3.2 feet, which may indicate the thinning trend to the western part. Lower Bird Seam, in a different way from Upper Bird Seam, is 8.1 feet thick in EB-3, while the thickness measured in the other area are less than 6 feet. The interval between these two seams varies from 11 ft. to 42 ft., and a few thin coal seams come to appear in the thicker interval. It seems

that Bird Seam Group fairly vary their thickness, their interval and the lithological facies of the interval. Therefore, it is required to make clear these variations and continuity of the seams. The variation of Bird Seam Group is shown on Fig. -3.

Skeeter Seam

This Seam is 5 to 8 feet thick in the extreme western outcrops of the area, but the thickness measured in the other area are less than 5 feet. The area where the seam is relatively thick seems to be limited locally in the western part.

Chambalain Seam

This seam is very thin in the area and shows the maximum thickness of about only two feet in E Creek.

Middle Seam

This seam, which was observed at only one out crop, is situated approximately 500 feet below Low Bird Seam and has the thickness of 4 to 5 feet.

II-3-2 Coal Seams of Gates Member

A Seam

Although this coal appears to have the best quality among Gates Coals, the thickness is less than 5 feet which is insufficient for economical mining.

B Seam

This is the most prominent coal seam in this area. The seam is widely distributed through the area with the

average thickness of 14.9 feet. The seam is thicker in the south than in the north.

C Seam

This seam has the average thickness of 13 feet in the southern half of the area, however, the thinning trend is found toward northwest. The seam has a shale parting of about one foot in the middle part and other thin partings near the top. The roof, weak shale containing carbonaceous materials, is not good condition.

D Seam

This seam is 11.5 - 14.5 feet thick in the eastern part including shale parting of 1.5 feet in the middle part. The parting is getting thicker toward west and the upper coal ply becomes thinner to the same direction. The thickness of the lower coal ply is 5 to 6 feet which is insufficient for economical mining.

The variations of C and D Seams are shown on Fig. 2.

II-4. Coal Reserves

In the previous report, only the reserves of B Seam and Bird Seam were calculated and the southern part was excluded from the calculation. In the present report, reserves of C and D Seams were newly added and those of B and Bird Seams were revised through whole area.

The Criteria of Reserve Calculation

- (1) The calculation was made on a clean coal basis, that is, the coal thickness (excluding partings) and specific

gravity of 1.35 were used in the calculation process.

- (2) Calculated reserves are those of D, C, B and Bird Seams which have the thickness of more than 8 feet. Skeeter, Lower Bird and A Seams, which average thickness are less than 6 feet, were excluded from the calculation.
- (3) B Seam was calculated in the whole area. C Seam was calculated in the area of more than 8 feet thick. In D Seam, the area where the coal/seam thickness ratio was less than 65% was excluded from the calculation. Upper Bird Seam is considered to be thin in the western part, and the reserves of this part was calculated separately which was indicated as additional reserves.
- (4) The oxidized zone was inferred down to 100 feet below the surface and was excluded from the reserves. The reserves was separately calculated in categories of over or less than 1,500 feet cover.

Theoretically minable Reserves in Place

The reserves in the area is summarized on TABLE-3, and the reserves of each seam are shown on TABLE-4 - TABLE-7.

The reserve distribution is summarized as follows.

- (1) Reserves of Gates Coal Seams
 - (a) Most of the reserves is present above 1,500 feet cover line.
 - (b) Major portion (85%) of the reserves is in the steeper area with the dips of more than 10 degrees.

- (c) About 90 million tons among the total reserves of 124 million tons are concentrated in the southern half of the area.
- (2) Reserves of Upper Bird Seam
- (a) The total reserves are estimated to be 68 million tons which exclude the reserves of western part where the seam considered to be thin.
- (b) One thirds of the total reserves are in the deeper part than the 1, 500 feet cover line.
- (c) Among the reserves above 1, 500 feet cover (45 million tons), major portion is distributed in the flat area with the dips of less than 10 degrees.

Recoverable Reserves

In the present stage, it would be premature to determine the recoverable clean coal tonnages. In this report, the calculation of the recoverable reserves of Gates coals was made an attempt by using the geological safety factor and regional recovery factor arbitrarily.

Seams	Theoretical Resv. in Place (M. T. x 10 ³)	Geological Factor (%)	Regional Rec. Factor (%)	Recoverable Reserves (M. T. x 10 ³)
D. C. B.	123, 954	75	45	41, 834

Strippable Coal Reserves

It is difficult to find large quantity of the strippable reserves in this area, because both of the dips of major coal seams and the slope of the surface are fairly steep at the most part.

Within the investigated area, only one block near EB-1

THEORETICALLY MINABLE RESERVES IN PLACE - SUMMARY

Seam	Depth from Surface (Ft)	Seam Thick. (Ft)	Coal Thick. (Ft)	Theoretical Reserves		
				Flat Area ⁽²⁾ (M.T.x10 ³)	Steeper Area ⁽²⁾ (M.T.x10 ³)	Total (M.T.x10 ³)
D	above 1500'	13.10	9.80	2,028	14,607	16,635
C	above 1500'	12.90	10.10	2,143	24,173	26,316
	above 1500'	9.00	6.60	265	3,279	3,544
	Sub-total			2,408	27,452	29,860
B	above 1500'	14.90	14.20	9,450	61,328	70,778
	below 1500'	14.90	14.20	4,003	2,648	6,681
	Sub-total			13,843	63,979	77,459
Total				17,919	106,035	123,954
Bird (Upper)	above 1500'	8.50	8.20	32,752	12,443	45,195
	below 1500'	8.50	8.20	4,049	18,988	23,037
Total				36,801	31,431	68,232
	above 1500'			46,638	115,830	162,468
	below 1500'			8,082	21,636	29,718
Grand-total				54,720	137,466	192,186
Additional Reserves (1)						
Bird (Upper)	above 1500'	8.50	8.20	0	11,330	11,330
	below 1500'	8.50	8.20	0	12,660	12,660
Total					23,990	23,990

Notes (1) The Upper Bird Seam is considered to be thin in the western part. Therefore, the reserves of this part are calculated separately from others.

(2) Flat Area : The area with the dips of less than 10 degrees (approx.)
 Steeper Area : The area with the dips of more than 10 degrees (approx.)

Table - 4

D SEAM RESERVES

Block No.	Seam Thick. (Ft)	Coal Thick. (Ft)	Plane Area (Ft ² ×10 ³)	Dip (deg)	Dip Area (Ft ² ×10 ³)	Theoretical Coal Reserves (M.T.×10 ³)
A - 2	13.10	9.80	877	27	983	368
A - 3	13.10	9.80	6,539	26	7,278	2,722
Sub-total			7,416		8,261	3,090
B - 2	13.10	9.80	1,913	13	1,962	734
B - 3	13.10	9.80	8,651	35	10,563	3,951
B - 4	13.10	9.80	7,303	25	8,055	3,013
Sub-total			17,867		20,580	7,698
C - 2	13.10	9.80	7,206	10	7,314	2,736
C - 4	13.10	9.80	2,457	32	2,897	1,083
Sub-total			9,663		10,211	3,819
G - 1	13.10	9.80	5,401	5	5,423	2,028
Total			40,347		44,475	16,635

Table - 5

C SEAM RESERVES

Block No.	Seam Thick. (Ft)	Coal Thick. (Ft)	Plane Area (Ft ² x10 ³)	Dip (deg)	Dip Area (Ft ² x10 ³)	Theoretical Coal Reserves (M.T.x10 ³)
A - 2	12.90	10.10	919	27	1,031	398
A - 3	12.90	10.10	6,381	26	7,102	2,741
Sub-total			7,300		8,133	3,139
B - 1	12.90	10.10	2,263	20	2,407	929
B - 2	12.90	10.10	1,260	13	1,293	499
B - 3	12.90	10.10	8,580	35	10,476	4,044
B - 4	12.90	10.10	8,199	25	9,044	3,491
Sub-total			20,302		23,220	8,963
C - 1	12.90	10.10	1,068	15	1,105	427
C - 2	12.90	10.10	9,099	10	9,235	3,565
C - 3	12.90	10.10	8,432	35	10,296	3,974
C - 4	12.90	10.10	8,142	32	9,599	3,705
Sub-total			26,741		30,235	11,671
D - 3	12.90	10.10	897	30	1,036	400
G - 1	12.90	10.10	5,530	5	5,552	2,143
Total			60,770		68,176	26,316
A'- 2	9.00	6.60	1,260	27	1,414	356
A'- 3	9.00	6.60	3,058	26	3,404	858
B'- 1	9.00	6.60	3,922	20	4,173	1,052
C'- 1	9.00	6.60	1,504	15	1,556	392
C'- 3	9.00	6.60	1,194	38	1,515	382
D'- 3	9.00	6.60	820	30	947	239
G'- 1	9.00	6.60	1,046	5	1,050	265
Sub-total			12,804		14,059	3,544
Grand-total			73,574		82,235	29,860

Table - 6

B SEAM RESERVES

Block No.	Seam Thick. (Ft)	Coal Thick. (Ft)	Plane Area (Ft ² x10 ³)	Dip (deg)	Dip Area (Ft ² x10 ³)	Theoretical Coal Reserves (M.T.x10 ³)
A - 1	14.90	14.20	8,996	40	11,740	6,375
A - 2	14.90	14.20	3,228	27	3,622	1,967
A - 3	14.90	14.20	10,781	26	11,999	6,515
A - 10	14.90	14.20	2,030	28	2,299	1,249
Sub-total			25,035		29,660	16,106
B - 1	14.90	14.20	8,886	20	9,454	5,134
B - 2	14.90	14.20	1,700	13	1,745	947
B - 3	14.90	14.20	10,457	35	12,768	6,933
B - 4	14.90	14.20	7,611	25	8,395	4,558
B - 10	14.90	14.20	1,166	15	1,206	655
Sub-total			29,820		33,568	18,227
C - 1	14.90	14.20	4,779	15	4,946	2,686
C - 2	14.90	14.20	7,979	10	8,099	4,398
C - 3	14.90	14.20	11,877	35	14,501	7,874
C - 4	14.90	14.20	8,208	32	9,677	5,255
C - 10	14.90	14.20	1,324	15	1,370	744
Sub-total			34,167		38,593	20,957
D - 1	14.90	14.20	8,217	17	8,595	4,667
D - 2	14.90	14.20	3,178	25	3,505	1,903
D - 3	14.90	14.20	3,374	30	3,897	2,116
Sub-total	14.90	14.20	14,769		15,997	8,686
F - 1	14.90	14.20	7,907	7	7,970	4,328
F - 10	14.90	14.20	7,354	8	7,428	4,033
Sub-total			15,261		15,398	8,361
G - 1	14.90	14.20	9,396	5	9,434	5,122
Total			128,448		142,650	77,459

Above 1500' cover 70,778 M.T.x10³Below 1500' cover 6,681 M.T.x10³

Table - 7

BIRD SEAM RESERVES

Block No.	Seam Thick. (Ft)	Coal Thick. (Ft)	Plane Area (Ft ² x10 ³)	Dip (deg)	Dip Area (Ft ² x10 ³)	Theoretical Coal Reserves (M.T.x10 ³)
A - 1	8.50	8.20	6,970	37	8,726	2,731
A - 2	8.50	8.20	5,294	36	6,543	2,048
A - 3	8.50	8.20	3,325	35	4,060	1,271
A - 4	8.50	8.20	5,446	23	5,914	1,851
A - 10	8.50	8.20	3,873	35	4,728	1,480
A - 11	8.50	8.20	4,748	26	5,284	1,654
A - 12	8.50	8.20	9,125	24	9,992	3,127
Sub-total			38,781		45,247	14,162
B - 1	8.50	8.20	6,143	37	7,691	2,407
B - 2	8.50	8.20	5,227	40	6,821	2,135
B - 10	8.50	8.20	9,737	28	11,032	3,453
B - 11	8.50	8.20	28,004	19	29,628	9,274
Sub-total			49,111		55,172	17,269
F - 1	8.50	8.20	29,216	3	29,245	9,154
F - 10	8.50	8.20	3,657	7	3,686	1,154
F - 11	8.50	8.20	5,736	5	5,759	1,803
Sub-total			38,609		38,690	12,111
G - 1	8.50	8.20	33,966	3	34,000	10,642
H - 1	8.50	8.20	35,908	5	36,051	11,284
H - 2	8.50	8.20	5,299	7	5,342	1,672
H - 10	8.50	8.20	3,050	3	3,053	956
H - 11	8.50	8.20	435	3	435	136
Sub-total			44,692		44,881	14,048
Above 1500' cover						45,195
Below 1500' cover						23,037
Total			205,159		217,990	68,232

Additional Reserves *

C - 1	8.50	8.20	6,160	25	6,795	2,127
C - 2	8.50	8.20	5,001	40	6,526	2,043
C - 3	8.50	8.20	2,846	42	3,828	1,198
C - 10	8.50	8.20	12,792	27	14,352	4,492
C - 11	8.50	8.20	8,095	24	8,864	2,774
C - 12	8.50	8.20	16,796	13	17,233	5,394
Sub-total			51,690		57,598	18,028
D - 1	8.50	8.20	3,457	25	3,813	1,194
D - 2	8.50	8.20	2,103	33	2,507	785
D - 3	8.50	8.20	1,424	30	1,645	515
Sub-total			6,984		7,965	2,494
E - 1	8.50	8.20	2,900	17	3,034	950
E - 2	8.50	8.20	3,798	29	4,341	1,359
E - 3	8.50	8.20	3,433	22	3,704	1,159
Sub-total			10,131		11,079	3,468
Above 1500' cover						11,330
Below 1500' cover						12,660
Total			68,805		76,642	23,990

* See the "Note" of TABLE - 3

is expected to have some strippable reserves where three Gates Seams have the thickness of more than 11 feet and the dips of the seams and the slope of the surface are both gentle. The roughly estimated strippable reserves is approximately four million tons. The overburden (m³)/clean coal (MT.) ratio is about 8, and the maximum depth from the surface is about 500 feet in this calculation.

In the uninvestigated area, the flat top area of Mt. Spieker appears to have some potentiality of strip mining, where the top sandstone of the Lower Gates Member is exposed along the 6,100 feet contour line. However, any coal seams above that elevation are not observed yet, and, even if thick coal seams are present, there would be some problems; weathering effect, topographic condition, etc.

II-5. Coal Quality

The average value of the analyses for two years is shown on TABLE-8. The weighted average by reserves of D. C. and B Seams is as follows.

Yield	73.7(%) (for the float of S.G.1.5)
Ash	7.32 (%)
Volatile	25.18(%) (27.17 in d.a.f. basis)
Fixed Carbon	67.50(%)
Sulphur	0.32(%)
Phosphorus	0.07(%)
F.S.I.	6 1/2
Max. Fluidity	480 (d. d. p. m.)

The sulphur content of Upper Bird Seam is ranging from 0.53% in EB-1 to 1.68% in EB-4. It is required to clarify the way of the variation in the future investigation.

Table - 8

AVERAGE COAL QUALITY

Seam	Raw Coal Ash (%)	Clean Coal (Dry basis)								
		S.G.	Yield (%)	Ash (%)	V.M. (%)	F.C. (%)	S. (%)	P. (%)	F.S.I.	Max. Fluidity (d. d. p. m.)
D	20.77	1.5	66.7	8.50	26.41	65.09	0.44	0.08	6 - 8	85 - 1,230
C	28.82	1.5	59.3	8.48	25.05	66.47	0.47	0.09	4 1/2 - 8	71 - 275
B	12.51	1.5	80.7	6.62	24.97	68.41	0.24	0.06	6 1/2	119 - 477
Up. Bird	8.50	1.6	94.1	5.90	19.55	74.55	1.11	0.05	4 - 8	130
Lo. Bird	4.88	1.6	95.5	3.38	21.14	75.48	0.51	0.03	6 1/2 - 8 1/2	3 - 25

III. CONCLUSION AND RECOMMENDATION

The geological situation of the coal seams is summarized as follows.

- (1) The main coal seams in the area are those of Gates Member. B Seam is widely distributed through the area with the average thickness of about 15 feet. Both C and D Seams are more than 10 feet in the southern part.
- (2) Gates coal seams are distributed in a broad synclinal structure with undulated dips. The dips of the coal seams are varied from zero to 60 degrees.
- (3) The theoretically minable reserves in place of the Gates coal seams is estimated to 124 million tons. Most of the reserves is distributed in the area with the dips of more than 10 degrees.
- (4) Among the coal seams of Gething Formation, Upper Bird Seam is thickest with the average thickness of 8.5 feet. However, it shows a considerable lateral change and is considered to be thin in the western part.
- (5) Among the theoretical reserves of Upper Bird Seam, the reserves above 1,500 feet cover line is 45 million tons which is mainly distributed in the gently dipping area.
- (6) There is not a large amount of strippable coal reserves in the investigated area. Only the reserves of about

4 million tons is estimated around EB-1.

- (7) The coal quality is, in general, of low ash, medium volatile, low sulphur and high F.S.I. with coking property. However, the further investigation is required on the high sulphur content of Upper Bird Seam.

Taking the above situation into consideration, the followings should be noted on the further exploration study.

- (1) The more detailed exploration is required to determine the recoverable reserves for developing coal mine. However, the study of minability would be necessary before going into next stage of exploration.
- (2) The further exploration work should put the stress on to confirm the variation of the thickness of each Seam and that of sulphur content of Upper Bird Seam.
- (3) The eastern area should be investigated roughly to assess the coal situation of the area considering potentiality of strip mining.