1978 REPORT OF EXPLORATION ACTIVITIES ON THE BRI - DOWLING CREEK PROPERTY

Coal Licence Nos. 3634 to 3654

In The Liard Mining Division

32 Miles Northwest of Chetwynd B. C.

55° 58'N, 122° 17'W

Owned by: Utah Mines Ltd.

By

R.B. Anderson & A.T. Armstrong

Of

Utah Mines Ltd.

1600 - 1050 West Pender St.

Vancouver, B. C.

V6E 3S7

Work Performed Between May 26th and October 20, 1978

TABLE OF CONTENTS

FOR FURTHER ~~ANALYTICAL~~ DATA REFER TO CONFIDENTIAL COAL ANALYSIS FILE.

Geophysical Logs (5)

ILLUSTRATIONS

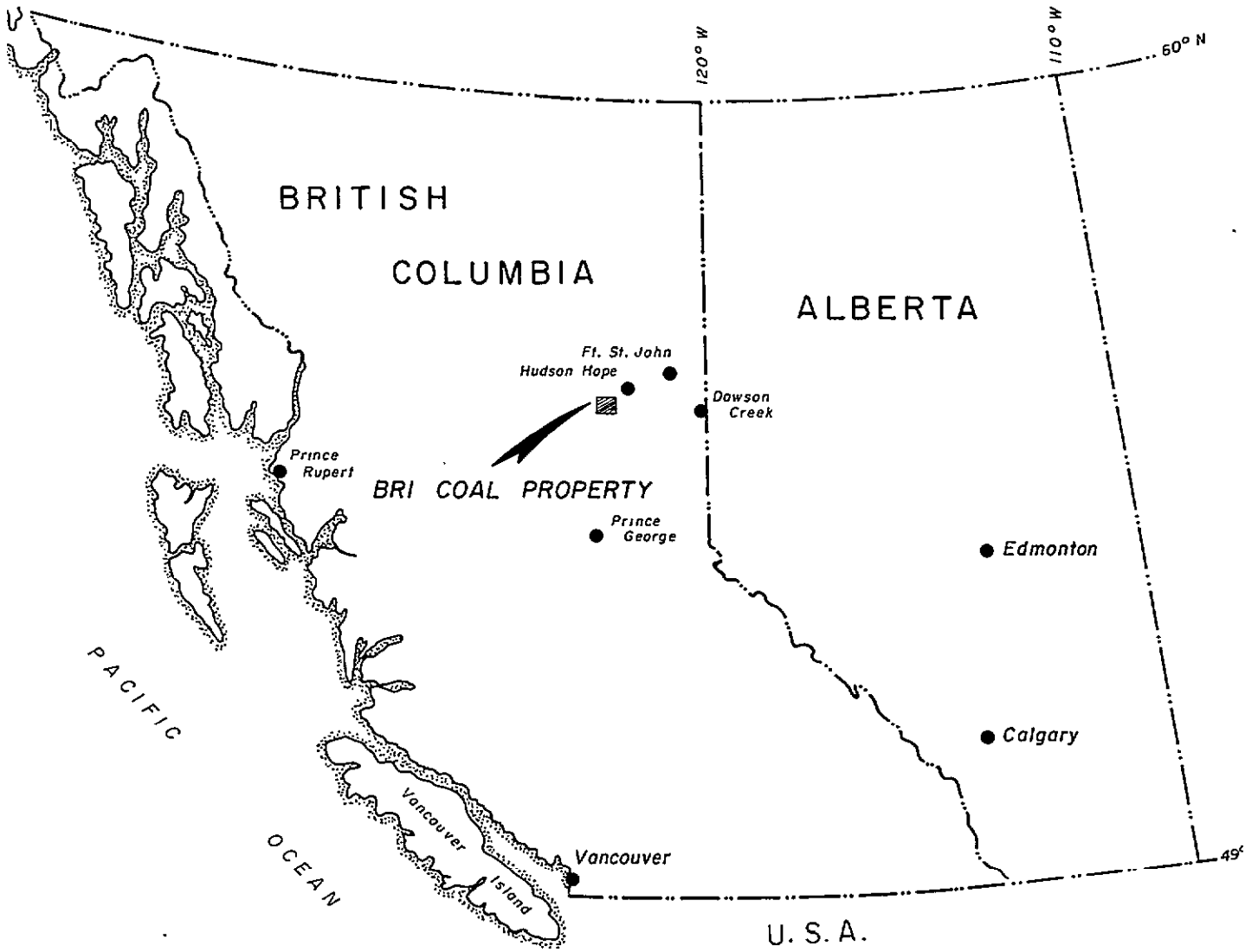
ABSTRACT

Utah Mines Ltd. became the owner of the Bri Coal Licences through an option agreement formed with Bri Coal Mining Ltd., Bow River Resources Ltd. and Rainier Energy Resources Ltd. in May of 1978. The property comprises 21 contiguous coal licences numbered 3634 to 3654, located in the Peace River area of the Liard Mining Division. An exploration program was formulated for the 1978 field season both to fulfill the work commitment prescribed in this agreement and to provide additional data to better assess the economic potential of the property. Five widely spaced diamond drill holes and further surface exploration were planned in order that these obligationsand objectives might be met.

Geological mapping and chain and compass road surveys were undertaken at various times between May 26, 1978 and October 20, 1978. Five holes comprising 1829.1 metres of diamond drilling were completed between June 21, 1978 and August 29, 1978. Data collected during this program has made possible a better understanding of the geology of the property and has aided in the definition of areas of significant economic potential.

PROPERTY AND TITLE

The Bri Coal Property comprises 21 contiguous coal licences numbered 3634 to 3654 inclusive. These licences encompass 4864 hectares (rounded upward from, more precisely, 4854.23 hectares). They lie within the area commonly referred to as the "Northeast Coal Block" in the Liard Mining Division. (See Fig. 1, page 2)



UTAH MINES LTD.

BRI COAL PROJECT

LOCATION MAP

0 100 200 300 400

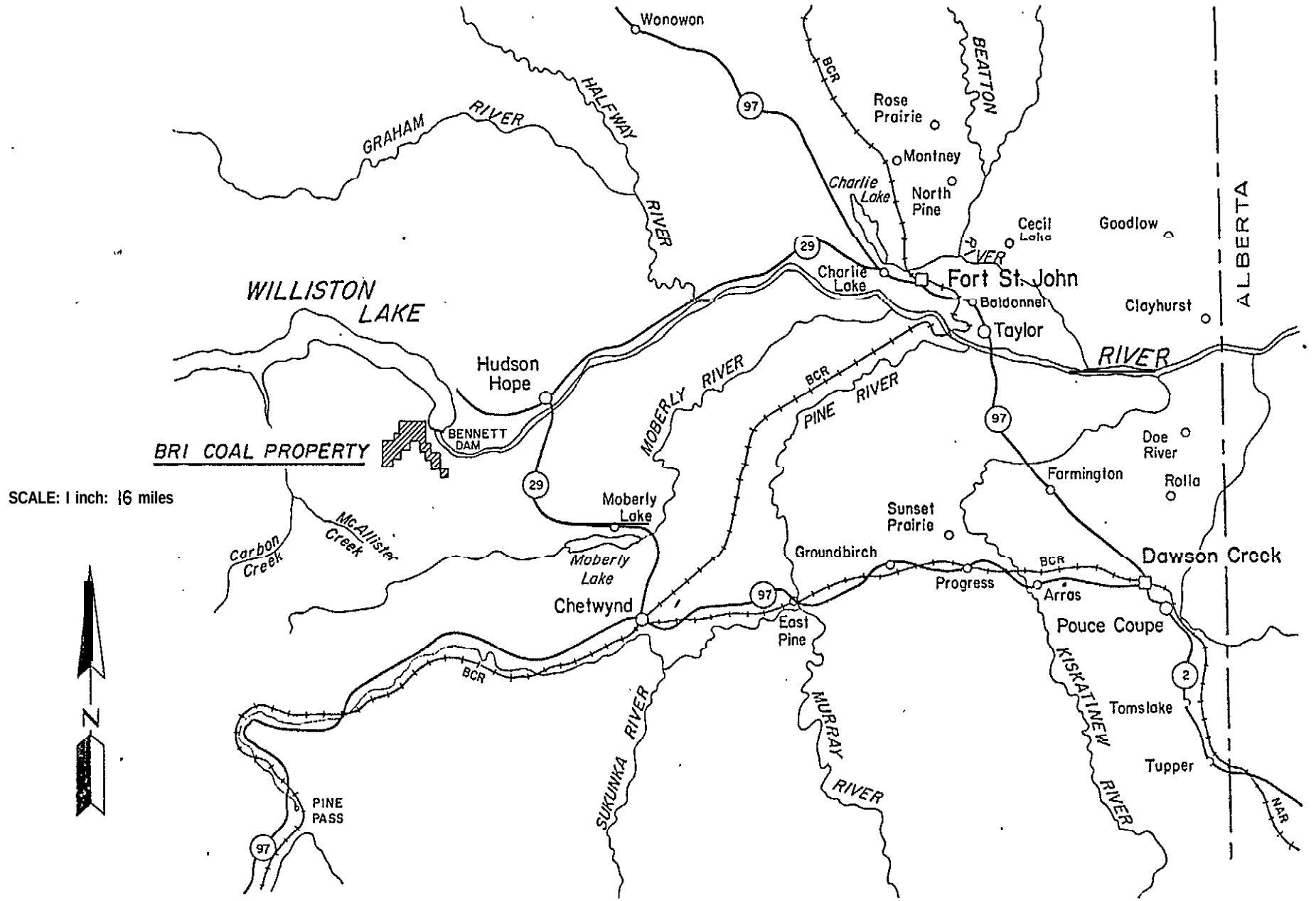
SCALE IN MILES

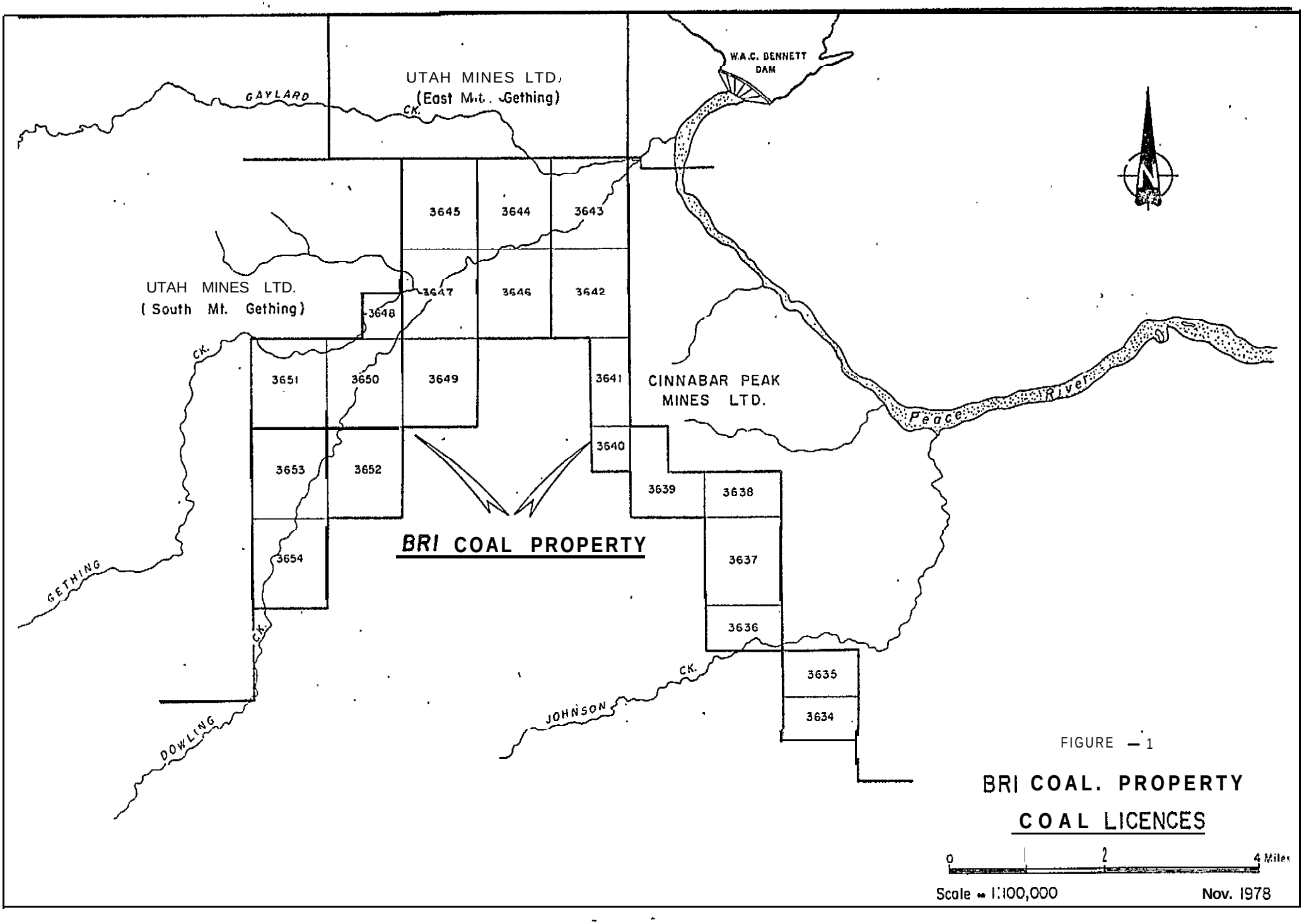
FIGURE – 2

FIGURE – 3

REGIONAL MAP

BRI COAL PROPERTY




UTAH MINES LTD.
(East Mt. Gething)
UTAH MINES LTD.
(South Mt. Gething)
CINNABAR PEAK
MINES LTD.
W.A.C. BENNETT
DAM
GAYLARD
CK.
GETHING
CK.
DOWLING
CK.
JOHNSON
CK.
Peace River
3645
3644
3643
3647
3646
3642
3648
3651
3650
3649
3641
3653
3652
3640
3639
3638
3654
3637
3636
3635
3634
BRI COAL PROPERTY
FIGURE — 1
BRI COAL. PROPERTY
COAL LICENCES
0
2
4 Miles
Scale = 1:100,000
Nov. 1978

The property is bounded on the east and north by licences of Cinnabar Peak Mines Ltd., on the west and north by the South Mount Gething licences of Utah Mines Ltd. and on the north by the East Mount Gething licences of Utah Mines Ltd. To the south, the coal rights remain with the crown.

During the spring and summer of 1971, Texacal Resources Ltd. (Incorporated 1967 under British Columbia charter as Bayland Mining Ltd. - name changed to Texacal Resources Ltd. on a share for share basis, March 1970) acquired a 60% interest in 27 contiguous coal licences covering the area of the present Bri Coal Property. The name Texacal Resources Ltd. was changed to Rainier Energy Resources Ltd. in May of 1974 on the basis of one new share for five old shares. The remaining 40% interest in the property was acquired by Hogan Mines Ltd. (Incorporated 1965 under British Columbia charter). In January of 1972, the name Hogan Mines Ltd. was changed to Bow River Resources Ltd. on the.basis of one new share for five old shares.

The 1974 Coal Act required that coal licence holders adjust their properties so that the boundaries would conform to the National Topographic System grid. Thus, the present 21 licences approximately cover the area of the original 27 licences. (See figure 1, p. 2)

On the 19th day of March, 1976, Bow River Resources Ltd. and Rainier Energy Resources Ltd. formed an operating agreement with Bri Coal Mining Ltd. This agreement called for the transfer of 50% of the interest in the licences to Bri Coal Mining Ltd. No action was taken on the transfer of this

interest. Subsequently, in January of 1977, 85% of the shares of Bri Coal Mining Ltd. were acquired by Mr. H. Hansen and Miss F. P. McNeil of Chetwynd, B.C. while the remaining 15% of the shares are held by Mr. Hoon Kwak of Vancouver, B.C. Application was eventually made to transfer 50% of the interest in the licences to Bri Coal Mining Ltd.. but the formation of an agreement with Utah Mines Ltd. precluded this action.

Utah Mines Ltd. is the present owner and operator of the Bri Coal Licences under an agreement formed with Bri Coal Mining Ltd., Bow River Resources Ltd. and Rainier Energy Resources Ltd., dated the 11th day of May, 1978. The bill of sale itemizing these licences is dated the 15th day of May, 1978. Transfer of ownership was effected. by Ministry of Mines and Petroleum Resources, ministerial approval on the 14th day of June, 1978.

LOCATION AND ACCESS

The Bri Coal Licences are arranged in a "horseshoe" 'configuration, approximately centred on 55° 58'N; 122° 17'W. They lie within the area covered by the National Topographic System designation 93-O-16, E & W. The northeast corner of the property lies approximately 3 km. southwest'from W.A.C. Bennett Dam and, in general, the property lies to the southwest of Peace River Canyon. Vancouver lies 772 km. nearly due south. Highway 29, linking Chetwynd, Hudson's Hope and Fort St. John passes within 20 km.to the east of the property. (Refer to figures 1, page 2 ; 2, page 5 ; 3, page 6)

Access to much of the property is now readily gained by using Canfor's Johnson Creek Road from Highway 29, 19 km. south from Hudson's Hope. Alternately, the property can be reached by paved road west from Hudson's Hope to W.A.C. Bennett Dam and the Utah Mines Ltd. road from the dam to Johnson Creek Road. A network of logging access and haulage roads provide good access to most areas of the northern part of the property. The southeastern licences are accessible at several locations by road while the south-western licences remain accessible either on foot or by helicopter.

EXPLORATION OF THE BRI COAL PROPERTY

i) Previous Exploration

During previous exploration programs, greater than 8,000 feet of diamond drilling was completed in 17 holes. Of these 17 holes, 13 penetrated into the coal-bearing Gething Formation. They lie within a roughly east-northeast trending band through the central area of the northern group of licences. In conjunction with sections measured in Peace River Canyon and along creeks in the area, they indicate a potentially significant thickness and extent for the "Trojan" coal seam. With the exception of D.D.H. 71-l these drill holes tested only the top 150 feet to 450 feet of the Gething Formation over a relatively small area. They provide little or no information on other potentially interesting coal seams.

D.D.H. 71-1 was drilled near the northeast corner of the property, close to Peace River Canyon and Gething Creek Canyon. Because of their close proximity to each other and their distance from much of the property, sections of the Gething Formation found in Peace River Canyon, Gething Creek, 'Track Creek and Gaylard Creek as well as the section penetrated by D.D.H. 71-1 should not be considered indicative of the Gething Formation throughout the property. Since abrupt change in thickness is characteristic of coal. seams in the area, past exploration aid not disprove the presence of significant coal seams below the "Trojan" seam. Similarly, past exploration did not adequately explore the "Trojan" seam over the full extent of the property.

ii) 1978 Exploration Program

The 1978 exploration program, formulated for the Bri Coal Propexty was intended to more adequately test the property for economically significant metallurgical grade coal. To test the continuity, thickness, character and configuration of the "Trojan" seam over a much broader area was of particular importance. At the same time it was also considered important to test as much of the Gething Formation as possible for other economically significant coal seams. Five widely spaced diamond drill holes were planned in order that these objectives might be achieved.

Exploration activities on the Bri Coal Licences spanned the period from May 26, 1978 to October 20, 1978 but were largely concentrated between June 21, 1978 and

August 29, 1978 during which time, drilling was in progress. As well as diamond drilling, geological mapping and chain and compass road surveys were undertaken at various times during the field season.

Diamond drilling activities commenced on the Bri Coal Licences on June 21, 1978 with the arrival in Hudson's Hope of Mr. Wayne Castle of Canadian Longyear Ltd. to assess and organize the program. On June 24, 1978 a unitized Longyear 44 diamond drilling rig and related equipment and supplies were delivered by Canadian Longyear Ltd. to the site of D.D.H. BC-78-l. The drilling crew included Wayne Castle (runner, foreman), Marc Bouchard (runner), Mike Rennie (helper) and Gordon Peterson (helper); later replaced by Gary Rohrback.

The Longyear 44 was used to drill the first three holes on the Bri Coal Licences (ie. BC-78-1, BC-78-2, BC-78-3). These holes were located and drilled in areas accessible by logging roads. Site preparation, drill moves and site cleanup were undertaken and completed by P & P Demeulemeester Ltd. using a D-7 Caterpillar tractor. Reclamation was completed subsequent to site cleanup by Utah Mines Ltd. personnel.

On August 5, 1978 a Longyear 38 diamond drilling rig, previously stored at Hudson's Hope, was mobilized to mile 26 landing on Canfor's Johnson Creek Road for movement by helicopter to site BC-78-4, south on Dowling Creek. This drill move was accomplished using an Associated Helicopters Ltd. Bell 212/15. The move

from site BC-78-4 to site BC-78-5, further south on Dowling Creek, was accomplished using an Okanagan Helicopter Bell 205. Maple Leaf Helicopters Ltd. supplied Bell 206 Jet Rangersfor daily crew changes and the movement of supplies and drill core to and from'the drill sites.

The slashing of drill sites BC-78-4 and BC-78-5, preparatory to moving the drill in, was completed by Norm Sawchuck of North Star Fabricating and Contracting Ltd.

The drill casings were left in the ground at sites BC-78-4 and BC-78-5 so that these holes might be deepened in the future. BC-78-5 required two grout plugs to stem the flow of water and both holes were sealed with valved caps. The planned diamond drilling program on the Bri Coal licences was completed on August 29, 1978 and the drilling rig and related equipment were removed from the property, again using an Okanagan Helicopters Bell 205.

In total, 1829.1 metres of diamond drilling were completed in five holes. The core was logged by R.B. Anderson and A.T. Armstrong of Utah Mines Ltd., Vancouver, B.C. (descriptive lithologic logs are bound in this report as appendix i ; graphic lithologic logs are included in the map pocket). Mechanical logs consisting of gamma-ray and density logs were run in each hole by Utah Mines Ltd. personnel using a Gearhart-Owen, Model 06-3200 Widco Logger and a combination down hole tool (geophysical logs are included in the map pocket).

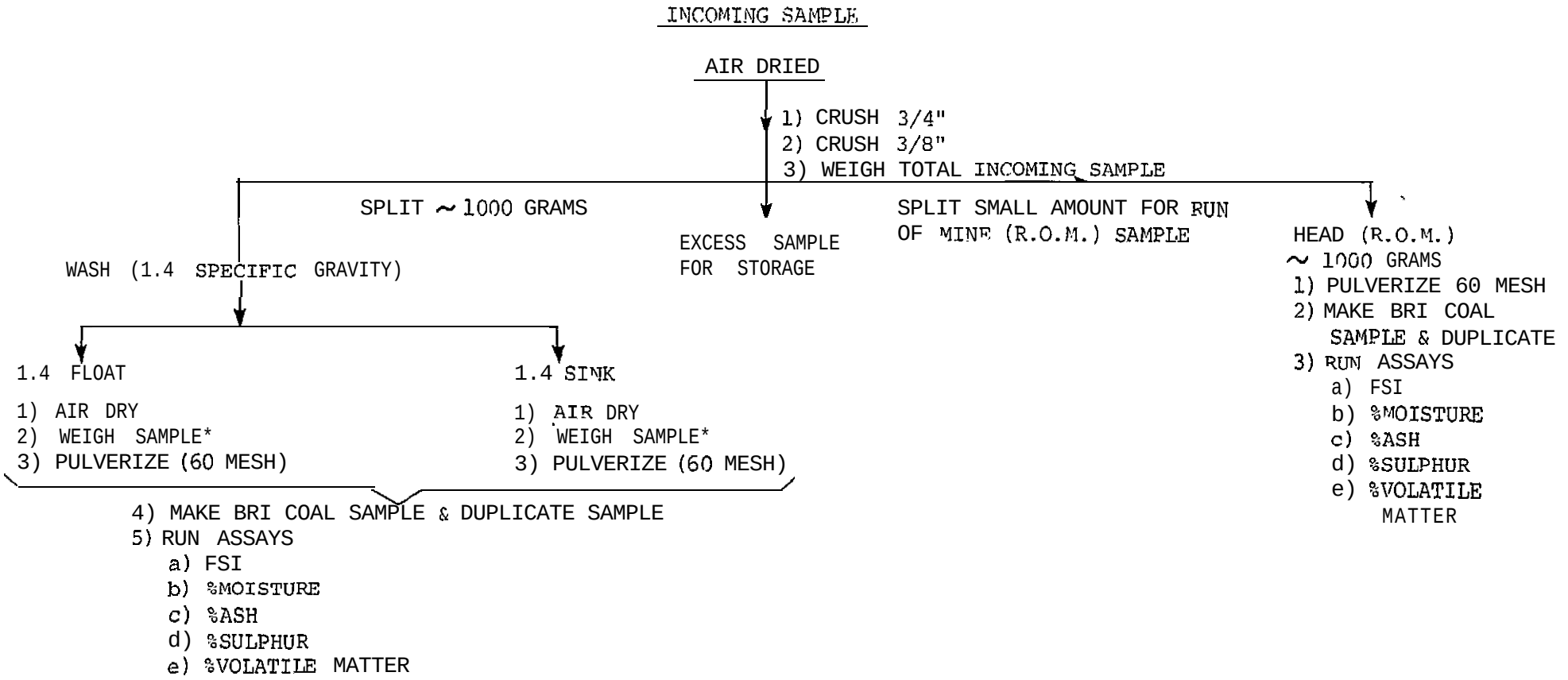
Forty-one samples were taken from the core recovered from these five holes. The samples were submitted for analysis to the Utah International Inc. Minerals Laboratory at 1190 Bordeaux Drive, Sunnyvale, California, 94086. Tests were performed on each sample using procedures outlined in the laboratory flow chart on the following page (table 1). On completion of the 1978 field program, the core was shipped to the Charlie Lake core storage facility of the British Columbia Ministry of Mines and Petroleum Resources.

PHYSIOGRAPHY

The Bri Coal Property is situated toward the eastern margin of the Rocky Mountain Foothills. (See Map, figure 4, page 13) Folding and faulting in the area is much less pronounced than that found further to the west but is certainly distinctly different from the gently dipping formations of the Alberta Plateau to the east. Major fold axes and thrust faults trend in a northerly to northwesterly direction with thrusts dipping to the southwest. Bedrock structure and lithology is commonly reflected by the topography.

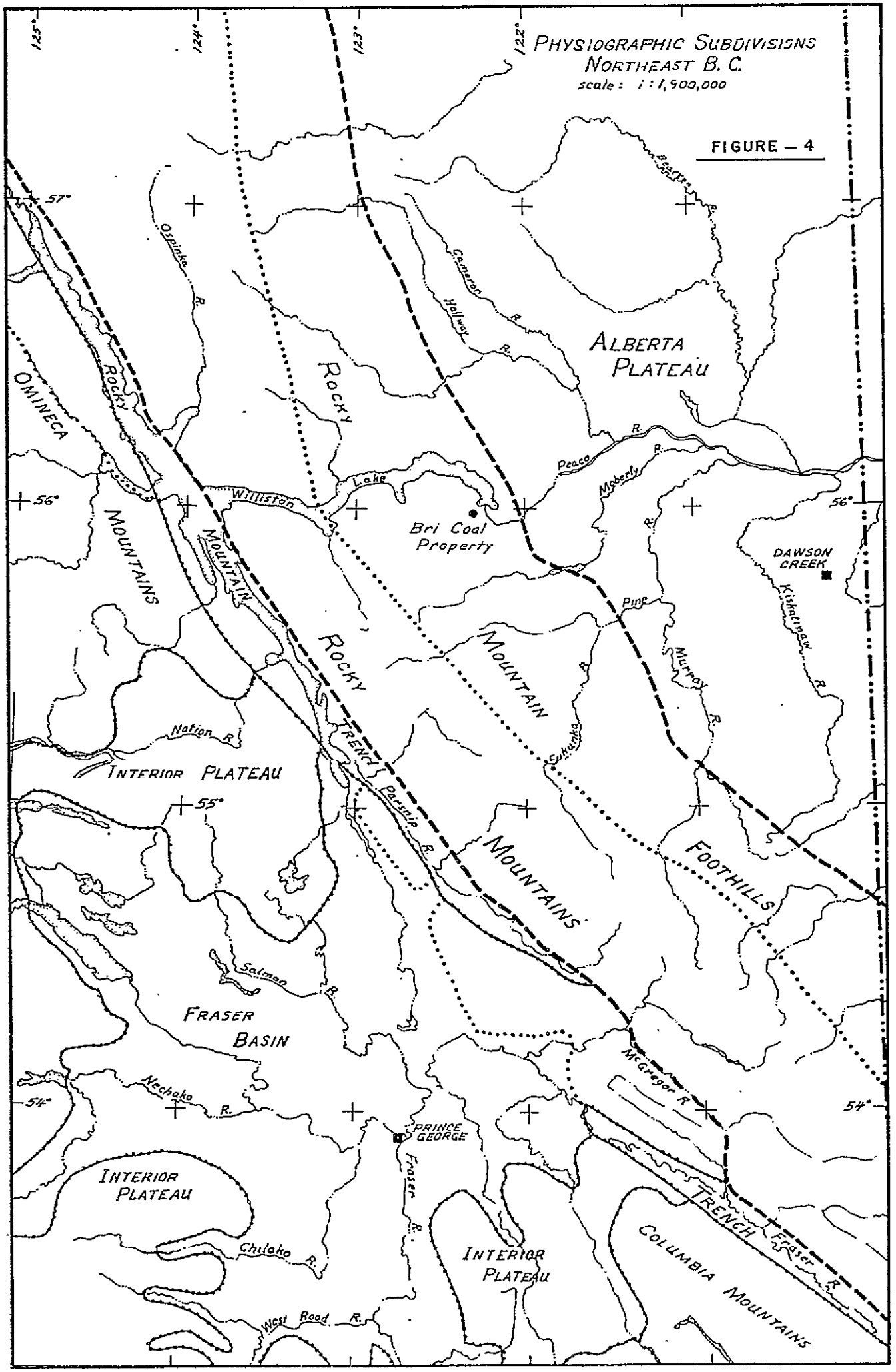
Topographic relief in the immediate area of the Bri Coal Property is moderate. The lowest elevations, found in creek' valleys, are in the order of 600 metres above sea level while the elevations of the hills and ridges rarely exceed 1200 metres above sea level. Creek valleys range in form from the deeply incised canyon of Gething Creek below its confluence with Dowling Creek to the broad, gravel floored valley of Dowling Creek above this confluence. In areas of thick till cover, creeks have cut rapidly through the overburden to

FLOW CHART FOR ANALYSIS OF DIAMOND DRILL HOLE SAMPLES



*WEIGHT RECOVERY OF COAL INSIDE SAMPLE

TABLE – I


PHYSIOGRAPHIC SUBDIVISIONS
NORTHEAST B. C.
scale : 1 : 1,900,000
FIGURE – 4
125°
124°
123°
122°
57°
56°
55°
54°
Osilinka R.
Cameron R.
Halfway R.
Beatton R.
ALBERTA PLATEAU
ROCKY MOUNTAINS
OMINECA MOUNTAINS
Peace R.
Williston Lake
Bri Coal Property
Moberly R.
DAWSON CREEK
Kiskatinaw R.
Pine R.
Murray R.
Muskwa R.
Nation R.
INTERIOR PLATEAU
ROCKY MOUNTAIN TRENCH
MOUNTAIN
Parsnip R.
FOOTHILLS
Salmon R.
FRASER BASIN
Nechako R.
PRINCE GEORGE
McGregor R.
Fraser R.
TRENCH
INTERIOR PLATEAU
Chilako R.
West Road R.
COLUMBIA MOUNTAINS

bedrock, leaving steep, slide prone valley walls. Hill tops and ridge crests are broad and rounded and dip slope surface are common.

GEOLOGY

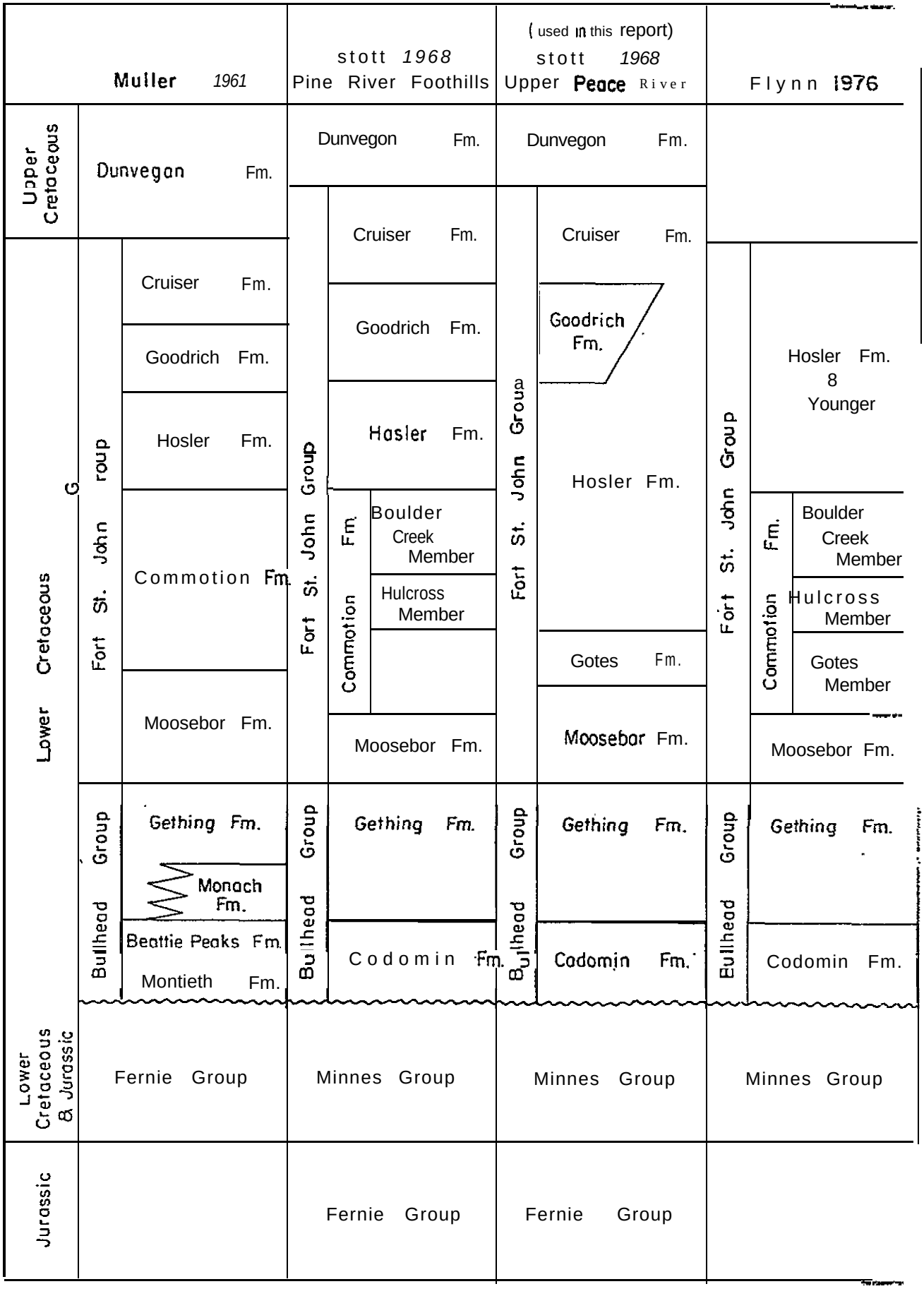
General and Local Geology

The Bri Coal Property is underlain by folded rocks of Lower Cretaceous age. (See table 2, page 14) The eastern arm of the horseshoe shaped licence group straddles a synclinal axis while the more westerly licences iie between this synclinal axis and an adjacent anticlinal axis, These axes trend slightly west of north and plunge gently to the south. Folding is broad and gentle with bedding dip angles generally less than 15 degrees although several dip angles greater than 15 degrees have been measured along Dowling Creek. Significant faulting is not in evidence on the property but numerous slip planes were observed in drill core. These probably occurred as an accommodation of stresses produced during folding. (See figure 5, page 16) .

Lower Cretaceous Bullhead Group and Fort St. John Group sediments comprise the bedrock throughout the property. Stott (1968, p.7) considers these two groups to form a complete nonmarine to marine sequence.

> The basal succession of Lower Cretaceous coal-bearing sediments and massive conglomerates is included in the Bullhead Group. The overlying Lower Cretaceous marine sediments with tongues of carbonaceous, sandy sediments

TABLE – 2


Muller 1961
stott 1968 Pine River Foothills
(used in this report) stott 1968 Upper Peace River
Flynn 1976
Upper Cretaceous
Lower Cretaceous
Dunvegan Fm.
Dunvegon Fm.
Cruiser Fm.
Goodrich Fm.
Hosler Fm.
Commotion Fm.
Moosebor Fm.
Boulder Creek Member
Hulcross Member
Gotes Fm.
Gotes Member
Fort St. John Group
Bullhead Group
Gething Fm.
Monach Fm.
Beattie Peaks Fm.
Montieth Fm.
Codomin Fm.
Hosler Fm. & Younger
Lower Cretaceous & Jurassic
Fernie Group
Minnes Group
Jurassic

are included in the Fort St. John Group. The lower part of the sequence records widespread fluvial conditions that developed after initial deposition of conglomeraticsediments. The upper part records the complex intertonguing of marine transitional, and flood plain environments along the coast-line of the Early Cretaceous epicontinental sea.

This Lower Cretaceous sequence lies unconformably on strata of the Lower Cretaceous and earlier, Minnes Group.

The change from the argillaceous recessive beds and fine-grained sandstone beds of the Minnes Group to the resistant and prominent conglomeratic beds of the Cadomin Formation (Stott, 1968, pp. 14-22) of the Bullhead Group is abrupt.' In the general area of the Bri Coal Property, the Cadomin Formation is most commonly a sequence of massive to coarsely crossbedded, coarse-grained sandstone beds containing lenses and bands of pebbles (Stott, 1968, pp. 14-22). The typical massive conglomerate found south of Pine River does not appear to be present in this area. The Cadomin Formation does not outcrop on the Bri Coal Property but may be presumed to underly the entire property at depth.

The oldest unit outcropping on the property is the Gething Formation. The character of the Gething Formation underlying the property is typical: as described by Irish, (1970, p. 68) a sequence of "interbedded, grey-and buff-weathering, medium-to fine-grained, grey to dark brown sandstone, grey to black shales, dark siltstones and coal seams."

These sediments represent deposition in an aggrading flood plain environment. Some of the fine-grained sandstones may represent bar finger and levée deposits and others may represent flood plan splay deposits (Stott, 1968, p. 111). Sedimentary features attributable to these types of deposits are present in drill core and outcrop on the Bri Coal Property. Stott (1968, p. 111) lists some of the features found in sandstones: well sorted nature but often containing considerable matrix, festoon crossbeds, laminae of plant debris and thin layers of silt and clay.

The finer silts and clays represent deposition from water in areas practically devoid of current on the flood plain proper (stott, 1968, p. 112). They accumulated between the river channels and the swamp and forest areas. The swamp and forest areas are the source of the present coals and are thought to be of several differing occurrences. stott, (1968, p. 112) suggests some may have originated in abandoned river channels, some paralleling major river channels and some on deltas.

Work by Stott (1969, p. 4) indicates a minimum thickness of 1600 feet for the Gething Formation in this area. The total thickness approaches 1800 feet if a postulated fault is absent. This formation contains the metallurgical grade coals which are explored for throughout the Northeast Coal Block and are the target of exploration activities on the Bri Coal Property.

The lower contact of the Gething Formation is placed at the top of the uppermost thick conglomerates and coarse-grained sandstones of the Cadomin Formation (Stott, 1969, p. 4). Irish, (1970, p. 68) has noted that, "in Peace River Canyon, coarse sandstones of the Cadomin Formation grade laterally

into interbedded coal, sandstone and shale of the Gething Formation and therefore these formations are in part lateral equivalents." Because of the close proximity of the Bri *Coal* Property to Peace River Canyon, this form of contact relationship may be assumed to occur underlying the property.

The Bullhead Group is overlain by marine sediments of the Fort St. John Group. The Fort St. John Group in the Upper Peace River area comprises, from oldest to youngest, the Moosebar Formation, the Gates Formation, the Hasler Formation, the Goodrich Formation and the Cruiser Formation. In the immediate vicinity of the property, the Gates Formation retains formation status whereas, in the Pine River area'it is considered to be a member of the Commotion Formation (Stott, 1968, pp. 65-77) (see table 2, page 15). All formations of the Fort St. John Group are apparently represented within the boundaries of the property, (Flynn, 1976; Muller, 1961; Stott, 1968) although only the Moosebar Formation and the Gates Formation were mapped during the 1978 field season. With the exception of a small area to the west and northwest which is underlain by Gething Formation sediments, the property is largely underlain by Fort St. John Group sediments.

The Moosebar Formation of the Fort St. John Group directly overlies the Gething Formation. Often a thin pebbly sandstone lies abruptly on carbonaceous Gething sediments and the lower part of the Moosebar Formation is typically strongly glauconitic. D.D.H. BC-78-1 penetrated approximately 490 metres of Moosebar sediments. Bedding dips in the area are very shallow, therefore the apparent thickness closely approximates the true thickness. No faulting was observed

in the drill core and the numerous slip surfaces present would not provide significant thickening. Since the upper contact with the Gates Formation was not precisely defined, 490 metres represents a minimum thickness at the drill site. It also indicates a greater thickness than has been previously described for the Moosebar Formation (Stott, 1968, pp. 47-54).

The Moosebar Formation consists mainly of dark grey to black, rubbly to blocky shales. Ironstone concretions occur in bands at various levels in the section. Toward the top of the formation, the shales become gritty and thin beds of fine-grained sandstone and siltstone are present. Stott (1968, p. 51) consider that the upper boundary with the Gates Formation should be "drawn at the base of the first thick succession of sandstone".

Sediments of the Gates Formation were penetrated at the top of D.D.H. BC-78-1 and mapped along Johnson Creek Road eastward from this drill site. They consist of interbedded grey to brownish-grey, often green weathering, fine-grained sandstone, dark grey shales, and grey to brownish-grey siltstone. Beds were observed ranging from a few centimetres to greater than two metres in thickness. Formations overlying the Gates Formation were not observed but occur at higher elevations on the eastern licence group. Here, the thickness of sediments overlying the Gething Formation is too great to warrant exploration for coal.

DRILL HOLE DATA, DESCRIPTIONS AND ANALYTICAL DATA

D.D.H. BC-78-1'

Location: Adjacent to a logging access road approximately 500 metres south from mile 21.5 on Johnson Creek Road.
- McElhanney coordinates: 6,201,200mN x 546,280mE
- Coal Licence No. 3654

Elevation: 815m

Orientation: vertical

Date Collared: June 27, 1978

Date Completed: July 18, 1978

Overburden Depth: 7.62m

Casing Depth: 32.92m

Final Depth: 672.39m

Triconed in Bedrock: 61.87m

Formations Encountered:

0 to 7.62m overburden
7.62m to 90.70m? Gates Fm.
90.70m?to 591.65m Moosebar Fm.
591.65m to 672.39m Gething Fm.

Coal Seams Sampled:

Sample No.	Seam Name	Interval	Thickness core	Thickness density log
1		594.18m to 595.12%	0.94m	0.98m
2		636.42m to 637.27m	0.85m	0.94m
3		641.79m to 642.28m	0.49m	0.61m
4		642.76m to 643.46m	0.70m	0.58m
5		648.43m to 649.33m	0.90m	0.94m
6		653.61m to 654.10m	0.49m	0.64m
7		668.76m to 669.25m	0.49m	0.61m

Comments : Site BC-78-1 was cleaned up and the ground surface recontoured on July 20, 1978. The disturbed area was sown

with the grass seed mixture recommended by the Reclamation Branch of the British Columbia Ministry of Mines and Petroleum Resources for forested areas *in* the Northeast *Coal.* Block on July 29, 1978.

Below 7.62 metres of overburden, D.D.H. BC-78-1 penetrated 584.3 metres of Fort St. John Group marine sediments. These. sediments included 83.08 metres of often carbonaceous interbedded fine-grained, light to medium grey sandstones. medium grey siltstones and dark grey mudstones assigned to the Gates Formation. Bedding angles to the core axis of 78° and 85° were noted.

The Gates Formation overlies 500.95 metres of dark grey shales of the Moosebar Formation. In the upper part of the Moosebar Formation the shales tend to be silty and contain thin beds of siltstone and very fine-grained sandstone. Slickensided slip planes are common throughout the formation. Fracturing is platy to concoidal, producing blocky fragments which break into finer and finer pieces as the shale dehydrates. Several thin bentonitic ash bands were observed. In the lower part of the formation, pyrite replaced organic debris and pyrite nodules were noted. The contact of the Moosebar Formation shales with the underlying Gething Formation of the Bullhead Group is abrupt and distinct.

The Gething Formation was encountered at 591.65 metres below the surface and the upper 80.74 metres of the formation were cored. The sediments encountered are typical of the formation. These include interbedded and interlaminated fine-to medium-grained, light to 1 ight medium grey sandstones, medium grey siltstones dark grey mudstones and coal,

The sandstones are commonly thin bedded and crossbedded and have carbonaceous debris on bedding surfaces. Some contain mudstone laminations and clasts and coal streaks and some display normal graded bedding. Mudstones *are* most often dark grey in' colour and homogeneous in appearance. Variable amounts of silt may be present. Many, particularly those in contact with coal are black and coal streaked and contain carbonaceous plant debris. Load casts and wormburrows are present in some mudstones. Silt&ones, ranging from sandy siltstone to muddy siltstone, display the sedimentary features of both sandstones and mu&tones. Very fine bedding and crossbedding and bioturbation and worm burrows are very common. Bedding *varies* from regular and planar to disturbed and convoluted. Composition is widely variable; thus the colour and texture are widely variable. Siltstone is often in&-laminated with mudstone producing *a* distinctive light to' dark banded rock.

Bedding encountered in the Gething sediments ranges in orientation from 75^{o} to 85^{o} to the vertical core axis, with 80^{o} being the most common orientation. This conforms well with bedrock dips measured on outcrop in the area. Fracturing is of minor importance but was noted in several beds acco-mpanied by fine calcite veining.

Sixteen coal seams were intersected in D.D.H. BC-78-l. Re-covery of coal core was generally good although grinding of the upper contact occurred in several *seams* and parts of seams were recovered as fine fragments. Seam thicknesses ranged from 0.015 metres to 0.94 metres. Seven samples were

taken of seams greater than 0.49 metres in thickness. Sample NO. 2 comprises two seams of 0.52 metres and 0.27 metres separated by an 0.06 metre split. Three seams were, in part, composed of bone coal but, in general, the coals were bright and black. They often displayed bandinq of vitrain and durain components and were often strongly cleated.

BRI COAL - DOWLING CREEK

Hole DC-78-L

Head Analyses

Sample No.	Depth	Thickness	Grams Received	% H_2O	% Ash	% S	% VM	% FC	Btu	FSI	% Ash	x.5	% VM	% FC	Btu
			Air Dry Basis								Moisture Free Basis				
1	1949.4	3.1	3475	1.08	31.56	0.63	20.90	46.46	10170	6 1/2	31.90	D.64	21.13	46.97	10281
2	2088.0	2.8	3441	1.04	45.24	0.43	17.87	35.85	7594	1,	45.71	0.43	18.06	36.23	7674
& 4	2105.6	3.9	2865	0.87	11.11	0.62	25.55	62.47	13519	9	11.21	0.63	25.77	63.02	13638
5	2127.4	2.95	3220	1.07	6.84	0.82	22.71	69.38	14214	8	6.91	0.83	22.96	70.13	14368
6	2144.4	1.6	1092	0.98	20.94	0.86	20.40	57.68	11063 6151 7940	6 1/2	21.15	0.87	20.60	58.25	11745,
7	2194.1	1.6	1585	0.93	6.40	1.10	21.45	71.22	14281	6	6.46	1.11	21.65	71.89	14415

BRI COAL - DOWLING CREEK

Hole BC-78-1

Single Gravity Tests

roduct and p. Gr.	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% PC	Btu	% Distribution Ash	S	VM	FC	Btu
ample #6 3/8" x 0												
.400 F	66.77	8	3.91	1.08	22.87	73.22	15009	11.98	80.65	74.13	84.86	84.71
.400 S	33.23	1	57.71	0.52	16.04	26.25	5443	88.02	19.35	25.87	15.14	15.29
otal	100.00.		21.79	0.89	20.60	57.61	11831	100.00	100.00	100.00	100.00	100.00
ample #7 3/8" x 0												
.400 F	92.71	6	4.79	1.05	21.79	73.42	14707	65.74	87.97	93.67	94.96	94.87
.400 S	7.29	3 1/2	31.74	1.82	18.72	49.54	10109	34.26	12.03	6.33	5.04	5.13
otal	100.00		6.75	1.11	21.57	71.68	14372	100.00	100.00	100.00	100.00	100.00

D.D.H. BC-78-2

Location: At approximately mile 24.5 on Johnson Creek Road on the road right-of-way.
- McElhanney coordinates: 6,203,426mN x 544,580mE
- Coal Licence No. 3646

Elevation: 758m

Orientation: Vertical

Date Collared: July 21, 1978

Date Completed: July 27, 197%

Overburden Depth: 7.62m

Casing Depth: 29.87m

Final Depth: 343.2m

Triconed in Bedrock: 7.62m to 101.5m

Formations Encountered:

0 to 7.62m		Overburden
7.62m to 274.02m		Moosebar Fm
274.02m to 343.20m		Gething Fm

Coal Seams Sampled:

Sample No.	Seam Name	Interval	Thickness core	Thickness density l
8		275.33m to 275.79m	0.46m	0.61m
9		302.06m to 302.85m	0.79m	0.76m
10		320.38m to 320.84m	0.46m	0.49m
11		321.99m to 322.48m	0.49m	0.55m

Comments: Drill site BC-78-2 was cleaned up and the ground surface was recontoured on July 29, 1978. The site was then sown with the grass seed mixture recommended by the Reclamation Branch of the British Columbia Ministry of Mines and Petroleum Resources for forested areas of the Northeast Coal Block.

The Lower Cretaceous Moosebar Formation was encountered below 7.62 metres of overburden. An interval of 93.88 metres of the formation, to a depth of 101.5 metres below the collar was penetrated using tricone drilling equipment. No core was recovered. Below this, a further 172.52 metres of the Moosebar Formation was cored.

The cored sediments are typical of the lower part of the Moosebar Formation. They are entirely dark grey to *black* massive shales which disintegrate to fine blocky fragments as the rock dehydrates. Pyrite nodules are common and range up to 0.01 metres in diameter toward the base. Occasional layers of sideritic concretions are present up *to* 0.15 metres thick. The shales *are* strongly glauconitic and green in colour toward the base where they grade to coarse-grained. sandstone over an 0.15 metre interval.

The upper contact of the Gething Formation *was* encountered at 274.02 metres below the collar. The upper part of the formation *was* cored over 69.18 metres to *a* depth of 343.28 metres. The formation comprises an interbedded and inter-laminated non-marine, flood plain sequences of sandstones, siltstones, and mudstones containing numerous coal seams-

The sandstone beds *are* generally light to medium grey in colour but, may be darker where silt or mud is present. Most are fine- to medium-grained and display thin bedding and fine crossbedding. One thick sandstone bed, thought to represent a channel deposit, is coarse-grained, coarsely bedded and crossbedded and contains mud clasts and irregular *coal* streaks. The mudstdne laminations and beds most often are grey to black, massive and homogeneous. Some *are* coal streaked and

some contain thin laminae and lenses of siltstone. Siltstones ranging from sandy siltstone to muddy siltstone vary widely in colour and character depending on their composition. They are thinly laminated and often finely crossbedded. Laminations range from well defined and planar to strongly disturbed and convolute. Worm burrows are common in the finer sediments and carbonaceous plant debris occurs throughout the formation, Several surfaces displaying scouring or load casts were noted,

Bedding ranges 'in orientation from 75° to 80° to the vertical core axis. Individual orientations of 60° and 70° were noted but, probably represent surfaces of large scale crossbeds or foreset beds. Minor faults were noted at 299.56 metres and 307.24 metres below the collar.

Fourteen coal seams were intersected in D.D.H. BC-78-2, ranging in thickness from 0.03 metres to 0.79 metres. Four seams greater than 0.45 metres in thickness were sampled and submitted for analysis. Coal recovery was generally good with loss restricted to the upper contact areas and some strongly fragmented areas. The coals were widely variable in character. Luster ranged from dull to bright with one seam having a .&metallic appearance. Colour ranged from dark brownish grey to black. Fine-grained pyrite was noted in several seams and several seams displayed variable banding and cleat development.

BRI COAL - DOWLING CREEK

Hole BC-78-2

Head Analyses

Sample No.	Depth	Thickness.	Grams Received	%	Air 01-y Basis H_2O	% Ash	% S	% VM	% FC	Btu	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu
8	903.3	1.5	1360	0.80	12.50	4.53	28.19	58.51	7384 13281	8 1/2	12.60	4.57	28.42	58.98	13388
9	991 .0	2.6	2040	1.10	24.52	0.60	21.19	53.19	6153 11067	5 1/2	24.79	0.61	'21.43	53.78	11190
10	1051.1	1.5	1117	0.86	22.71	0.57	24.97	51.46	6203 11157	2 1/2	22.91	0.57	25.19	51.90	11254
11	1056.4	1.6	1227	0.96	13.31	0.68	25.58	60.15	7276 13087	9	13.44	0.69	25.83	60.73	13214

D.D.H. BC-78-3

Location: Within a logging landing approximately 200m west from mile 27.5 on Johnson Creek Road.

- McElhanney coordinates: 6,205,570mN x 543,060mE
- Coal Licence No. 3645

Elevation: 818m

Orientation: Vertical

Date Collared: July 30, 1978

Date Completed: August 3, 1978

Overburden Depth: 44.20m

Casing Depth: 42.98m

Final Depth: 236.52m

Formations Encountered:

0	to 44.20m	Overburden
44.20m	to 236.52m	Gething Fm.

Coal Seams Sampled:

Sample No.	Seam Name	Interval	Thickness core	Thickness density log
12		61.68m to 62.0m	0.32m	0.61m
22		79.28m to 79.86m	0.58m	0.88m
23		91.01m to 91.63m	0.62m	0.61m
13		97.84m to 98.25m	0.41m	0.49m
14		112.26m to 112.82m	0.56m	0.55m
15		130.58m to 131.37m	0.79m	0.79m
16		144.05m to 144.54m	0.49m	0.49m
17-1		165.75m to 165.83m	0.08m	1.19m
17-2		165.92m to 166.64m	0.72m	1.19m
18-1		174.32m to 174.53m	0.21m	0.15m
18-2		174.83m to 175.62m	0.79m	0.70m
19		211.41m to 212.0m	0.59m	0.67m
20		216.50m to 216.99m	0.49m	0.37m
21		224.41m to 225.02m	0.61m	0.55m

Comments: Site X-78-3 was cleaned up and recontoured on Oct. 1, 1978. On Oct. 2, 1978 the site was sown with the grass seed mixture recommended by the Reclamation Branch of the British Columbia Ministry of Mines and Petroleum Resources for forested-areas of the Northeast Coal Block,

In D.D.H. BC-78-3, sediments of the Gething Formation were encountered beneath 44.20 metres of overburden. The formation was cored from 44.20 metres to 236.52 metres below the collar, Throughout this interval, a sequence of interbedded and interlaminated sandstones, siltstones, mudstones and coal seams typical of non-marine flood plain deposition, was penetrated.

The sandstone beds encountered in D.D.H. BC-78-3 are only a small component of the sedimentary sequence. Most are fine-grain&, light grey, thinly bedded and finely crossbedded. Mud clasts and carbonaceous plant debris are present in some sandstone units. Thin sandstone laminations often occur interlaminated with mudstone and siltstone and sand occurs as a minor component in other sediments.

Most of the sediments encountered in D.D.H. BC-78-3 are siltstones and mudstones or combinations of the two. Mudstones are dark grey to black, generally massive and homogeneous. They often contain carbonaceous plant debris and may be coal streaked near coal seams. Siltstones are widely variable in colour from light grey to dark grey. They are thin bedded and many display fine complex crossbedding.

Bedding in the upper part of the hole ranges in orientation from 70° to 76° to the vertical core axis. *Toward the* bottom of the hole, bedding orientation flattens to 77° to 82° to the vertical core axis. This change in orientation may be structurally produced or may be the result of slight bending of the drill hole toward an orientation perpendicular to the bedding.

A total of 36 coal seams were cored. Of these, 14 samples were taken comprising.17 seams. Most samples were of seams greater than 0.49 metres in *thickness* but samples of several thinner seams were taken where these form *a* part of *a* split seam or where the density log indicated a seam thickness substantially greater than that measured from drill core. Recovery of coal core was generally good but *recoveries'* as low as 10% were recorded. Most coals *are* bright-and black. Some seams exhibit banding of bright and dull coals and *a* few seams are largely composed of dull and dirty coal, Samples 17.2, 21 and 22 are each composed of two coal. seams separated by a thin mudstone split.

BRI COAL'- DOWLING CREEK

Hole BC-78-3

Head Analyses

Sample NO.	Depth	Thickness	Air Dry Basis: Grams Received	Air Dry Basis: % H_2O	Air Dry Basis: % Ash	Air Dry Basis: % S	Air Dry Basis: % VM	Air Dry Basis: % FC	Air Dry Basis: Btu	Air Dry Basis: FSI	Moisture Free Basis: % Ash	Moisture Free Basis: % S	Moisture Free Basis: % VM	Moisture Free Basis: % FC	Moisture Free Basis: Btu
i2	202.35	1.05	1304	1.37	24.64	0.89	20.90	53.09	6278 11292	5	24.98	0.90	21.19	53.83	11449
i3	321.0	1.35	1372	1.30	7.24	0.79	19.56	71.90	7810 14048	1 1/2	7.33	0.80	19.82	72.85.	14233
14	368.3	1.85	970	1.32	7.71	0.76	20.86	70.11	7729 13901	1 1/2	7.81	0.77	21.14	71.05	14087
15	428.4	2.60	1926	1,60	4.90	0.91	19.09	74.41	7941 14283	1	4.98	0.92	19.40	75.62	14515
16	472.6	1.60	984	1.12	3.57	1.27	19.61	75.70	8128 14618	1	3.61	1.28	19.83	76.56	14784
17	543.8	2.60	2904	I.19	14.70	0.78	23.42	60.69	6882 12377	1	14.88	0.79	23.70	61.42	12526
18"	571.9	3.30	5580	1.43	10.64	0.67	20.30	67.63	7316 13158	0	10.79	0.68	20.60	68.61	13349
19	693.6	1.95	1951	1.35	9.06	0.71	20.90	68.69	7463 13422	2	9.18	0.72	21.19	69.63	13606
20	710,3	1,6	675	1.21	3.54	0.78	18.50	76.75	8201 14750	1 1/2	3.58	0.79	18.73	77.69	14931
21	736.25	2.0	975	0.90	20.28	0,89	25.15	53.67	6112 10993	1/2	20,46	0.90	25.38	54,16	11093
22	260.1	1,9	1917	0.87	26,38	2.78	30,11	42.64	5491 9876	2	26.61	2.80	30.37	43.02	9963
23	298.6	2.05	1287	0.81	21.03	0.90	29.41	48,75	6113 10994	2 1/2	21.20	0.91	29.65	49.15	11084

* 2225 grams of siltstone removed from drill core leaving 3355 grams of coal. Siltstone was one foot in length,

D.D.H. BC-78-4

Location: Approximately 300 metres west from a point on Dowling Creek 2700 metres southwesterly from the confluence of Gething and Dowling Creeks.

- McElhanney coordinates: 6,201,650mN x 540,940mE
- Coal Licence No. 3650

Elevation: 752m

Orientation: Vertical

Date Collared: August 9, 1978

Date Completed: August 16, 1978

Overburden Depth: 47.85m

Casing Depth: 47.85m

Final Depth: 300.84m

Formations Encountered:

0	to 47.85m	Overburden	
47.85m	to 168.52m	Moosebar	Fm
168.52m	to 300.84m	Gething Fm	

Coal Seams Sampled:

Sample No.	Seam Name	Interval	Thickness core	Thickness density	Thickness log
24		181.36m to 183.19m	1.83m	1.83m	S
25		198.70m to 199.34m	0.64m	0.67m	
26		211.07m to 212.01m	0.94m	1.13m	T
27		213.76m to 214.49m	0.73m	1.07m	T
28		229.76m to 232.11m	2.35m	2.16m	
29		250.38m to 251.77m	1.39m	1.68m	
30		280.48m to 281.55m	1.07m	1.28m	
31		293.28m to 293.83m	0.55m	0.61m	
32		294.74m to 295.84m	1.10m	0.70m	
33		297.33m to 297.94m	0.61m	0.67m	

Comments: D.D.H. BC-IS-4 was drilled at a slashed helicopter accessible site approximately 50m x 100m in size. Felled trees were limbed and bucked into short lengths to conform to British Columbia Forest Service standards and the site was cleaned up on completion of the drilling. Since it was considered probable that tbis hole would be deepened in the future , the casing was left in the ground and capped and the hand-dug mud sump was left open.

Overburden depth at site BC-78-4 is 47.85 metres." Below the overburden, 120.67 metres of the Moosebar Formation was penetrated to a depth of 168.52 metres. The formation is largely dark grey to black,, homogeneous mudstone. This mudstone disintegrates to fine blocky fragments as it dehydrates. In places the mudstone contains a minor silt component. Glauconite and pyrite replaced organic debris occur toward the base of the formation and at the base, silty mudstone grades downward to a pebble rich sandy mudstone.

Below the Moosebar Formation, 120.32 metres of the Gething Formation was cored, to a depth of 300.84 metres. The Gething Formation comprises a carbonaceous, non-marine flood plain sedimentary sequence. Sandstones, siltstones, mudstones and coal seams occur interbedded and interlaminated.

Grain size of the sandstone units encountered in D.D.H. BC-78-4. ranges from fine to coarse. In some units, bedding is graded, in some, grain size is uniform with individual laminations definedby carbonaceous debris on the bedding surfaces and in some, adjacent laminations are of different grain size. Most

sandstones are light grey but may be darker if silt or mud is present. Bedding is often well defined and planar but may also be wavy, crossbedded, distorted or convolute, Carbonaceous plant debris and coal clasts are common.

Mudstones are dark grey to black and generally homogeneous. Silt is often present as a minor component either dispersed throughout or as thin laminations and lenses. Mudstone and siltstone often form finely interlaminated sequences while discrete siltstone beds are rare. Interlaminated siltstone and mudstone units display various styles of crossbedding, planar to disturbed or convolute bedding, worm burrows. scour channels and load casts.

D.D.H. BC-78-4 intersected 25 coal seams within the Gething Formation. Ten samples, which included twelve of these seams were taken for analyses. Sample No. 25 included two coal seams of 0.08 metres and 0.55 metres in thickness, separated by a 0.03 metre sandstone split. Sample No. 26 included two coal seams of 0.52 metres and 0.35 metres in thickness, separated by a 0.06 metre sandstone split. Sample No. 29 contained a 0.06 metre bentonite split and Sample No. 31 contained a thin shale split. The coal seams varied considerably in character from largely durain to largely vitrain with many seams being banded. Sample No. 32 contained an upper bench of submetallic boney *coal.* Cleat was well developed in some seams.. Recovery of coal core was generally good although a few seams were badly crushed and recovery was minimal.

BRI COAL - DOWLING CREEK

Hole BC-78-4

Head Analyses

Sample No.	Depth	Thickness	Grams Received	% H_2O	% Ash	% S	% VM	% FC	Btu	FSI	m	u	% VM	% FC	Btu
			Air Dry Basis									Moisture Free Basis			
24	595.0	6.0	5002	1.18	2.21	0.69	24.47	72.14	8312 14869	7 1/2	2.24	0.70	24.76	73.00	15047
25	651.9	2.1	2718	1.13	39.81'	0.53	18.45	40.61	4794 8622	2	40.26	0.54	18.66	41.08	8721
26	692.5	3.1	2831	0.87	26.78	0.72	23.05	49.30	5987 10768	8 1/2	27.02	'0.73	23.25	49.73	10863
27	701.3	2.4	1553	0.81	5.21	0.86	25.93	68.05	8074 14521	8 1/2	5.25	0.87	26.14	68.61	14640
28	753.8	7.7,	7913	1.09	25.12	0.55	19.62	54.17	6158 11076	1 1/2	25.40	0.56	19.84	54.76	11198
29	821.45	4.55	4898	0.88	15.18	0.75	21.66	62.28	7002 12594.	4 1/2	15.32	0.76	21.85	62.83	12706
30	920.2	3.5	3906	0.78	12.20	0.84	27.14,	59.88	7323 13171	'9	12.30	0.85	27.35	60.35	13275
31	'962.2	1.8	1870	0.81	4.77	0.98	23.45	76.97	8103 14574	7 1/2	4.81	0.99	23.64	71.55	14693
32.	967.0	3.6	5195	1.02	49.68	0.45	13.02	36.28	4048. 7282	1 1/2	50.19	0.45	13.16	36.65	7357
33	975.5	2,0	1682	0.79	15.34';	0,74	17.94	65.93	7130 12824	2	15.46	0,75	18.08	66.46	12926

D.D.H. BC-78-5

Location: Approximately 100 metres west from a point on Dowling Creek, 7650 metres south-southwesterly from the confluence of Dowling and Gething Creeks.
- McElhanney coordinates: 6,197,065mN x 539,200mE
-'Coal Licence No. 3654

Elevation: 828m

Orientation: Vertical

Date Collared: August 23, 1978

Date Completed: August 29, 1978

Overburden Depth: 22.56m

Casing Depth: 22.56m

Final Depth: 276.15m

Formations Encountered: 0 to 22.56m Overburden
22.56m to 276.15m Gething Fm

Coal Seams Sampled:

Sample No.	Seam Name	Interval	Thickness core	Thickness density log
34		44.84m to 45.63m	0.79m	0.73m
35		47.95m to 48.86m	0.91m	0.67m
36		60.08m to 60.69m	0.61m	0.61m
37		192.33m to 193.00m	0.67m	0.67m
38		222.81m to 223.60m	0.79m	0.85m
39		265.91m to 266.25m	0.34m	0.46m
40		266.40m to 266.67m	0.27m	0.15m
41		272.64m to 273.13m	0.49m	0.49m

Comments: D.D.H. BC-78-5 was drilled at a slashed helicopter accessible site approximately 35m x 140m in size. Felled trees were limbed and bucked into short lengths to conform

to British Columbia Forest Service standards and the site was cleaned up on completion of the drilling. Since it was considered probable that this hole would be deepened in the future, the casing was left in the ground and capped and the hand-dug mud sump was left open. A significant flow of water was encounted while drilling this hole, Two grout plugs were installed to stem the flow.

The Gething Formation was encountered below the overburden at a depth of 22.56 metres. The formation was cored for 253.59 metres to a depth of 276.15 metres, where the hole was stopped. The drilling encountered a sequence of-non-marine, flood plain sediments composed of often carbonaceous sandstones, siltstones and mudstones with interbedded coal seams.

Sandstone forms a very prominent component of the sedimentary sequence encountered in D.D.H. BC-78-5. Discrete sandstone units comprise 69.82 metres of the cored section. Sandstone also commonly occurs interlaminated with siltstone and mud-stone. Two distinct types of sandstone are present and several sandstone units display characteristics of each type-

Most sandstone units are fine- to medium-grained and light to light medium grey. Bedding is generally-thin and ranges in form from planar to convolute. Crossbedding is common and graded bedding occurs occasionally. Bedding is often defined by carbonaceous debris on the bedding surfaces. These sandstones are thought to originate as bar finger sands, levée deposits or flood plain splay deposits.

Four sandstone units were cored which probably originated as river channel deposits. They are light grey to white and composed of coarse-grained, well sorted sand. Bedding is coarse to massive with *crude grading* present in some beds. Mud clasts, mud laminations, coal clasts and carbonaceous debris are common. Three of these sandstone units form abrupt irregular contacts with underlying coal seams and two contain numerous pebble bands and conglomeratic beds. Several other sandstone units have features common to these high energy river deposits, but also have features found in lower *energy* environments. They may represent channel deposits in *a* part' of a river having a very low stream gradient.

Siltstone and mudstone occur as discrete units, as inter-laminated sequences occasionally with associated sandstone laminations and as mixtures of varying composition. The mudstones are dark grey to black and often contain abundant carbonaceous plant debris. Siltstones *vary* from light medium to dark medium grey depending on the matrix composition and content. Bedding ranges from planar *to* convolute. Cross-bedding of various styles is common as are ripple marks, worm burrows, small scale, scour channels and load casts. These sediments represent deposition from water under low energy or stagnant conditions.

Twenty-six coal seams ranging from 0.06 metres to 0.91 metres in thickness were cored in D.D.H. BC-78-5. Of these, eight seams were removed for analysis. The coals encountered were generally bright, black, vitrain rich and well cleated. Some

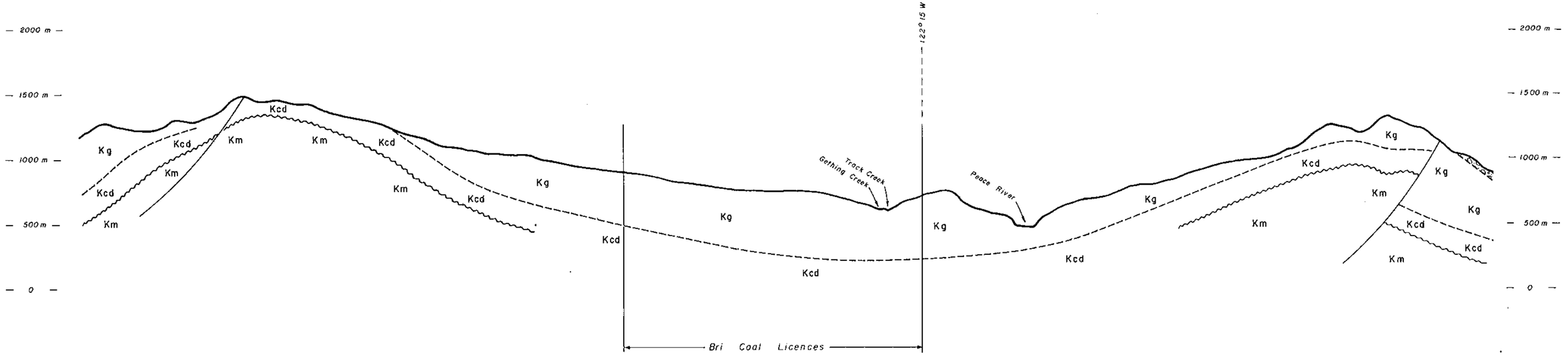
seams displayed banding produced by alternating layers and lenses of vitrain and durain coals. Fine-grained pyrite was noted in Sample No. 35. Seven of the coal seams encountered were capped by carbonaceous and coal streaked sandstones. These sands undoubtedly removed organic material by scouring and channeling during deposition and thereby reduced the coal thickness locally. Coal core recovery was often very poor in this hole. Water invasion was a major problem and caused continuous dilution of the drilling mud-'

BRI COAL - OOWLING CREEK

Hole BC-78-5

Head Analyses

Sample No.	Depth	Thickness	Air Dry Basis								Moisture Free Basis				
			Gram Received	%	H_2O	% Ash	% S	% VM	% FC	Btu	FSI	% Ash	% S	% VM	% FC	Btu
34	147.1	2.6	1164	1.22	A.10	0.77	21.88	72.80	8082 14536		1	4.15	0.78	22.15	73.70	14716
35'	157.3	3.0	1661	0.97'	20.17	0.72	27.51	51.35'	6158 11076		1	20.37	0.73	27.78	51.85	11184
36.	197.1	2.0	782	1.68	13.56	0.91	22.41	62.35	6993. 12578		1. .	13.79	0.93	22.79	63.42	12793
37	631.0	2.2,	1986	0.88	42.58	0.59	13.21	43.33	4688 8431		1	42.96	0.60	13.33	43.71	8506
38	731.0	2.6	2920	1.04	4.48	0.63	17.14	77.34	8080 14532		1	4.53	0.64	17.32	78.15	14695
39	872.4	1.1	1592	0.58	45.31	0.47	11.87	42.24	4575 8228		1	45.57	0.47	11.94	42.49	8276
40	874.0	0.9	266	0.70	7.78	0.75	22.45	69.07	7697 13843		4	7.83	0.76	22.61	69.56	13941
41	894.5	1.6	1312	0.55	47.93	d.52	12.98	38.54	4371 7861		3 1/2	48.20	0.52	13.05	30.75	7904



STRATIGRAPHY

- Quaternary Alluvium
- Kg — Gething Formation
- Kcd — Cadomin Formation
- Km — Minnes Group
- Unconformity

FIGURE — 5

UTAH MINES LTD.

BRI COAL PROJECT

EAST — WEST SECTION

@ 55° 59' 30" NORTH

Horizontal Scale — 1:50,000
Vertical Scale — 1:25,000

December 1978

CORRELATION OF COAL SEAMS

The contact between the Moosebar Formation and the Gething Formation forms the most precisely correlatable horizon on the Bri Coal Property. The change in rock types from black marine shales of the Moosebar Formation to the mixed alluvial sediments of the Gething Formation is easily recognized. Diamond drill holes BC-78-1, BC-78-2 and BC-78-4 each penetrated this contact and therefore, the Gething sediments encountered in each of these holes represent a segment of the Gething Formation from the top downward.

The sediments penetrated in diamond drill holes SC-78-3 and BC-78-5 must necessarily represent segments of the Gething Formation lower in the section as the upper contact of the Gething Formation with the overlying Moosebar Formation was not encountered. The sedimentary sequence cored in D.D.H. BC-78-3 is thought to be from the middle part of the Gething Formation with the top of cored sequence occurring approximately 145 metres stratigraphically below the Gething-Moosebar contact. The ground location of the drill site between the mapped contacts of the Gething Formation with the underlying Cadomin Formation and the overlying Moosebar Formation also indicates a mid-section position for this sequence,

The sedimentary sequence cored in D.D.H. BC-78-5 is thought to be an upper to middle segment of the Gething Formation beginning approximately 107 metres below the Gething-Moosebar contact. Samples 34 and 35 taken at the top of this section have been tentatively correlated with the "Little Mogul" and "Mogul" seams respectively.

Extensive channel sand deposition at site BC-78-5 has undoubtedly disrupted coal swamp deposition resulting in a coal depleted stratigraphic section.

Seam names have been assigned to many of the coal seams sampled but in some cases these must be considered rather speculative. These names are included with drill hole data and have been applied to the Bri Coal Correlation Chart (included in the map pocket) and the chart entitled Tentative Coal Seam Correlation Between Bri Coal Drill Holes and Measured Sections (included in the map pocket).

In the Peace River Area, where coal seams are considered to be highly variable in thickness and discontinuous in extent, the sizeable distance between drill holes precludes positive correlation of coal seams. Many thin seams were not sampled and some of these may represent the thinning edges of seams that are more prominent elsewhere. The general character of the sedimentary section encountered in each drill hole is somewhat variable and in D.D.H. BC-78-5 is distinctly different from the other sections. Analytical data and mechanical logs aid in the correlation of some seams and indicate possible problems with other correlations. Further drilling will undoubtedly provide additional information which will permit more positive correlation of coal seams underlying the Bri Coal Property.

CONCLUSIONS AND RECOMMENDATIONS

The western and northern coal licences of the Bri Coal Property have the greatest potential for producing economically mineable coal. The great thickness of Fort St. John Group massive sediments overlying the Gething Formation on the eastern coal licences and the irregular configuration and limited area1 extent of these licences makes further expenditures on work in this area unattractive.

Coals occurring near the top of the Gething section have potential as medium volatile, low sulphur coking coals. The "Superior", "Trojan", "Titan", "Falls" and "Gething" seams occur in this segment of the Gething section. F.S.I. values range from one to nine with 13 samples having values- greater than 5%. Ash content is often high but a 1.4 S.G. float separation give an acceptable product. B.T.U. values for the 1.4 S.G. float samples range from 14,275 BTU/lb. to 15153 . BTU/lb. and only three samples produced sulphur, concentrations greater than one percent. Further drilling through the Gething-Moosebar contact'into the upper part of the Gething Formation would facilitate bettter correlation of these seams *and pro-* vide additional samples for analysis.

Interpretation of field work and diamond drilling data indicates that the Gething-Moosebar contact lies *a* substantial distance east of *its* previously plotted position. In D.D.H. BC-78-5, bedding dip angles of approximately 30° and the tentative correlation of the uppermost coal seams with the "Little Mogul" and "Mogul" seams suggests that the Gething-Moosebar contact could lie as much as 250 metres to the *east* of this site. The projection of the Gething-Moosebar contact (assum- *ing* a continuous bedding dip angle of 20° to the east-southeast)

brings this contact to the bedrock-overburden interface approximately 360 metres to the west-northwest of D.D.H. BC-78-4 and approximately 1000 metres east of the previously plotted location. Additional drilling, through the Gething-Moosebar contact in the areas between D.D.H. BC-78-4 and D.D.H. BC-78-5 and to the north and west of D.D.H. BC-78-4 is of particular importance both in defining this contact and providing additional data on the character and extent of the coal seams in the upper part of the Gething Formation underlying the property.

Additional geological mapping is also recommended on the Bri Coal. Property. Mapping of the valleys of creeks flowing westward into Dowling Creek and the slopes to the east of Dowling Creek might aid in establishing more precisely the Gething-Moosebar contact. Detailed mapping in the canyons of Track Creek, Gething Creek and Gaylard Creek would facilitate more accurate location of this contact on the northern licences. Where possible, the accurate location of previous drill holes should be undertaken.

REFERENCES

Chang, William B.,

1976: Summary Report of Field Activities and Previous Work, Bri Coal Property (unpublished report).

Dyson, I.P.,

1972: Preliminary Report, Peace River Coal Project. (unpublished report)

1976: Peace River Coal Project, of Bow River Resources Ltd. & Rainier Energy Resources Ltd. (unpublished report)

Holland, Stuart S.,

1976: Landforms of British Columbia, A Physiographic Outline: British Columbia Department of Mines and Petroleum Resources, Bulletin 48.

Hughes, J. E.,

1964: Jurassic and Cretaceous Strata of the Bullhead Succession in Peace and Pine River Foothills; British Columbia Department of Mines and Petroleum Resources, Bulletin 51.

Irish, E. J. W.,

1965: Geology of the Rocky Mountain Foothills, Alberta (between latitudes 53° 15' and 54° 15'); Geological Survey of Canada, Memoir 334.

1968: Structure of the Northern Foothills and Eastern Mountain Ranges, Alberta and British Columbia, (between latitudes 53° 15' and 57° 20') Geological Survey of Canada, Bulletin 168.

1970: Halfway River Map-Area, British Columbia; Geological Survey of Canada, Paper 69-11.

le Nobel, D. N.,
1977 : Coal Submittal; Gething-Dowling Creek Coal Licences; (private company memo)
1977:. Bri Coal; (private company memo)
'1977: 1977 Report of Exploration Activities on the . . East Mount Gething Property; (unpublished report)

Messineo, J. R.,
1977 : Bri Coal Company (private company memo)

Muller, J. E.,
1959: Geology, Pine Pass, British Columbia; -Geological Survey of Canada Map 11-1961.

Roberts, N. Eric,
1977: Peace River Coal Project of Bow River Resources Ltd./Rainier Energy Resources Ltd. and Bri Coal Mining Ltd. (unpublished report)

Stott, D. F.,
1968: Bullhead and Fort St. John Groups, Rocky Mountain Foothills; Geological Survey of Canada Bulletin 152.
1969: The Gething Formation at Peace River Canyon, British Columbia; Geological Survey of Canada Paper 68-28.

will, R. K.,
1977: Bri Coal Submittal (private company memo)

CERTIFICATION

I, ROBERT BRENT ANDERSON, of 5131 Clarendon Street, Vancouver, British Columbia, do hereby certify that:

I am a graduate of the University of British Columbia, with a Bachelor of Science Degree in Geology, 1970.

Since graduation I have been engaged in Mineral and Coal Exploration in British Columbia, Yukon, Alberta and Montana for Utah Mines Ltd.

I am a Fellow of the Geological Association of Canada and of the Canadian Institute of Mining and Metallurgy.

R. B. Anderson

January 9, 1979
Vancouver, B. C.

R. B. Anderson
Senior Geologist

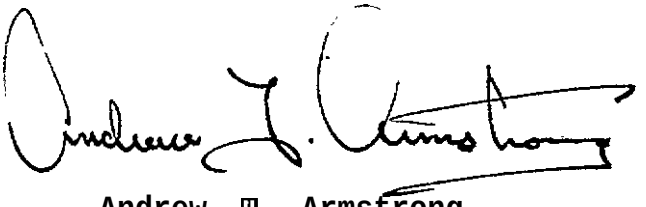
CERTIFICATION

I, ANDREW T. ARMSTRONG of #105 - 4001 Mount Seymour Parkway, North Vancouver, British Columbia, do hereby certify that:

I was-granted a Bachelor of Science Degree in 'Geology by the University of British Columbia in 1970.

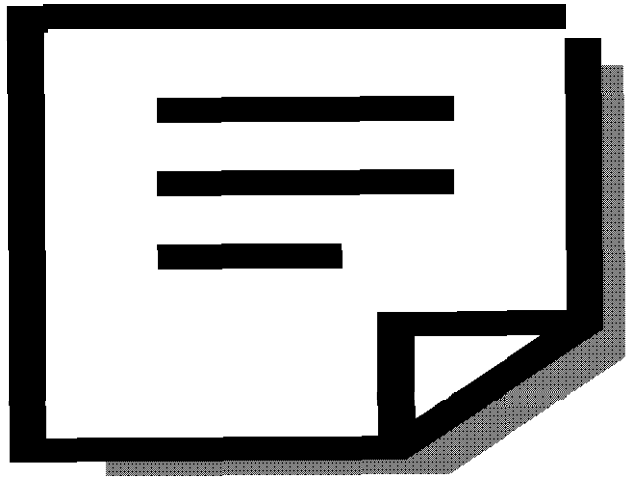
I have been continuously employed in various mining exploration activities from May 1970 to the present, throughout British Columbia.

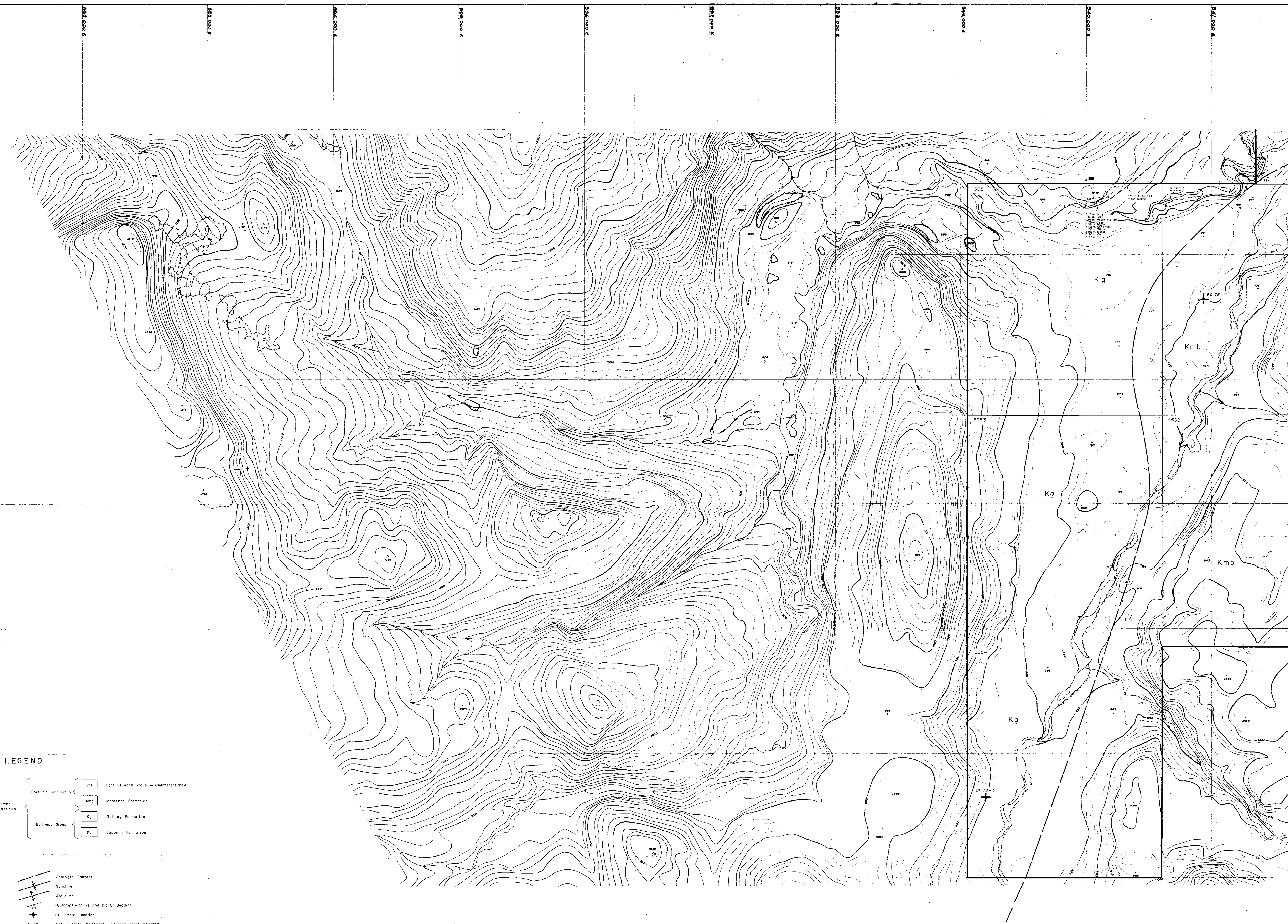
I am an Associate of the Geological Association of Canada.



Vancouver, B. C.

Andrew T. Armstrong
Geologist





6,198,000 N

LEGEND

Lower Cretaceous	Fort St. John Group	Kfsj	Fort St. John Group — Undifferentiated
		Kmb	Moosebar Formation
	Bullhead Group	Kg	Gething Formation
		Kc	Cadomin Formation

6,197,000 N

Geologic Contact
Syncline
Anticline
20 (Outcrop) – Strike And Dip Of Bedding
Drill Hole Location
X 2.0 Coal Outcrop, Measured Thickness Where Indicated
Outcrop
Access Road
3652 Coal Licence Number

6,196,000 N

467

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

BRI COAL PROJECT

BEDROCK GEOLOGY AND DRILL HOLE LOCATIONS

Work by: R B Anderson, A Armstrong	Date: January 1979	NTS Ref. 94 B/1, 93 O/16
Drawn by: T Drews	Revised:	Scale – 1:10,000

MAP — 2

PR - BRI - DOWLING CR 78(2)A.

467

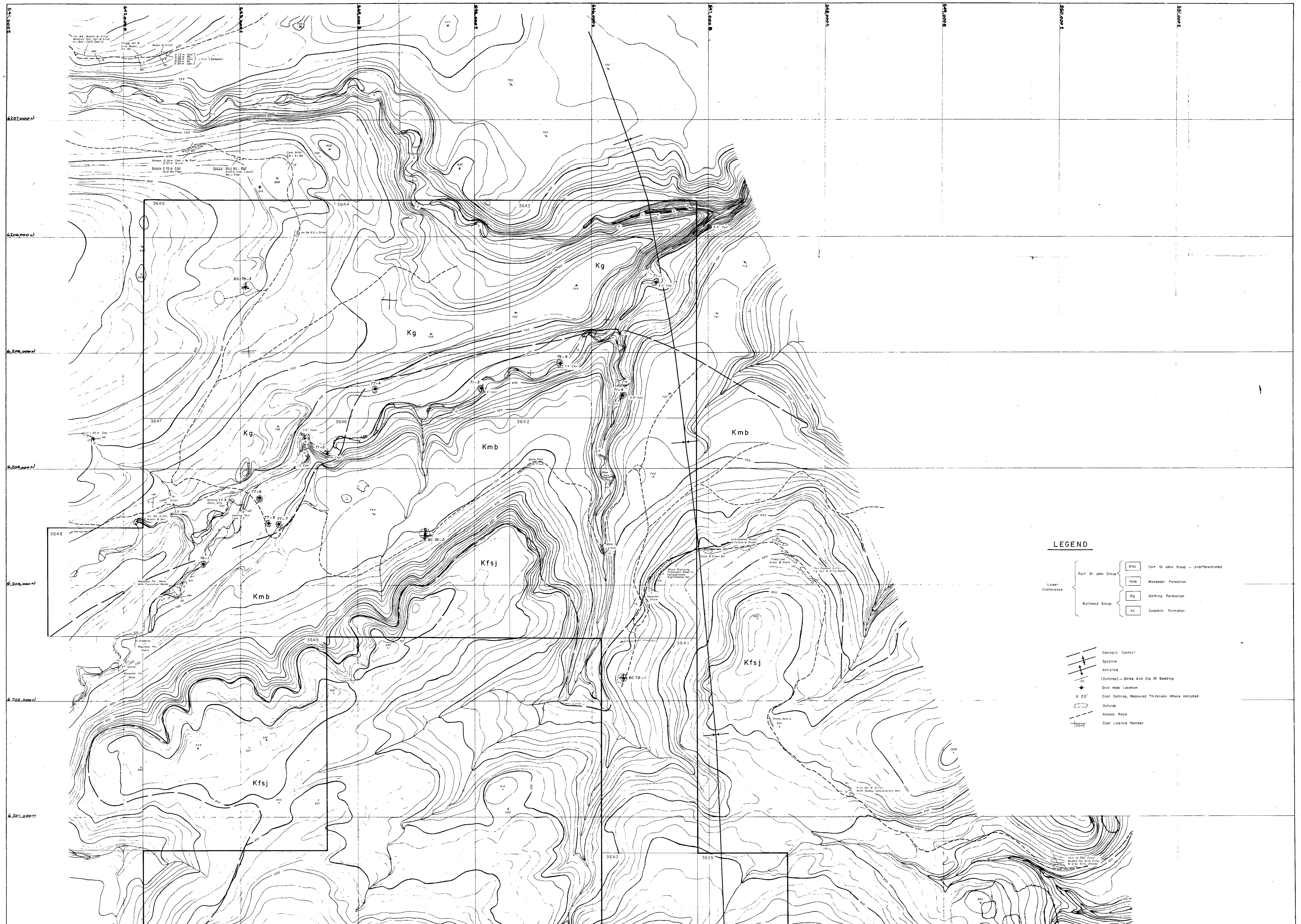
Scale and elevation datum based on limited ground control resulting in good relative, but uncertain absolute map accuracy.
Compiled from aerial photography at an approximate scale of 1 inch equals 5280 feet flown in 1970

UTAH MINES

PRELIMINARY RECONNAISSANCE TYPE MAPPING

McElhanney
McElhanney Surveying & Engineering Ltd
1200 West Pender Street, Vancouver B.C, Canada

Scale - 1:10,000	
Contour Interval - 10 Metres	
Date - June 16, 1978.	
Job No. - 06298 - 4	
Sheet No. - 2	



467

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

BRI COAL PROJECT

BEDROCK GEOLOGY AND DRILL HOLE LOCATIONS

Work by: R.B. Anderson, A. Armstrong	Date: January 1979	NTS Ref. 94 B/1, 93 O/16
Drawn by: T. Drews	Revised:	Scale - 1:10,000

MAP — 4

PR - BRI - DOWLING CR. 78(2)A.

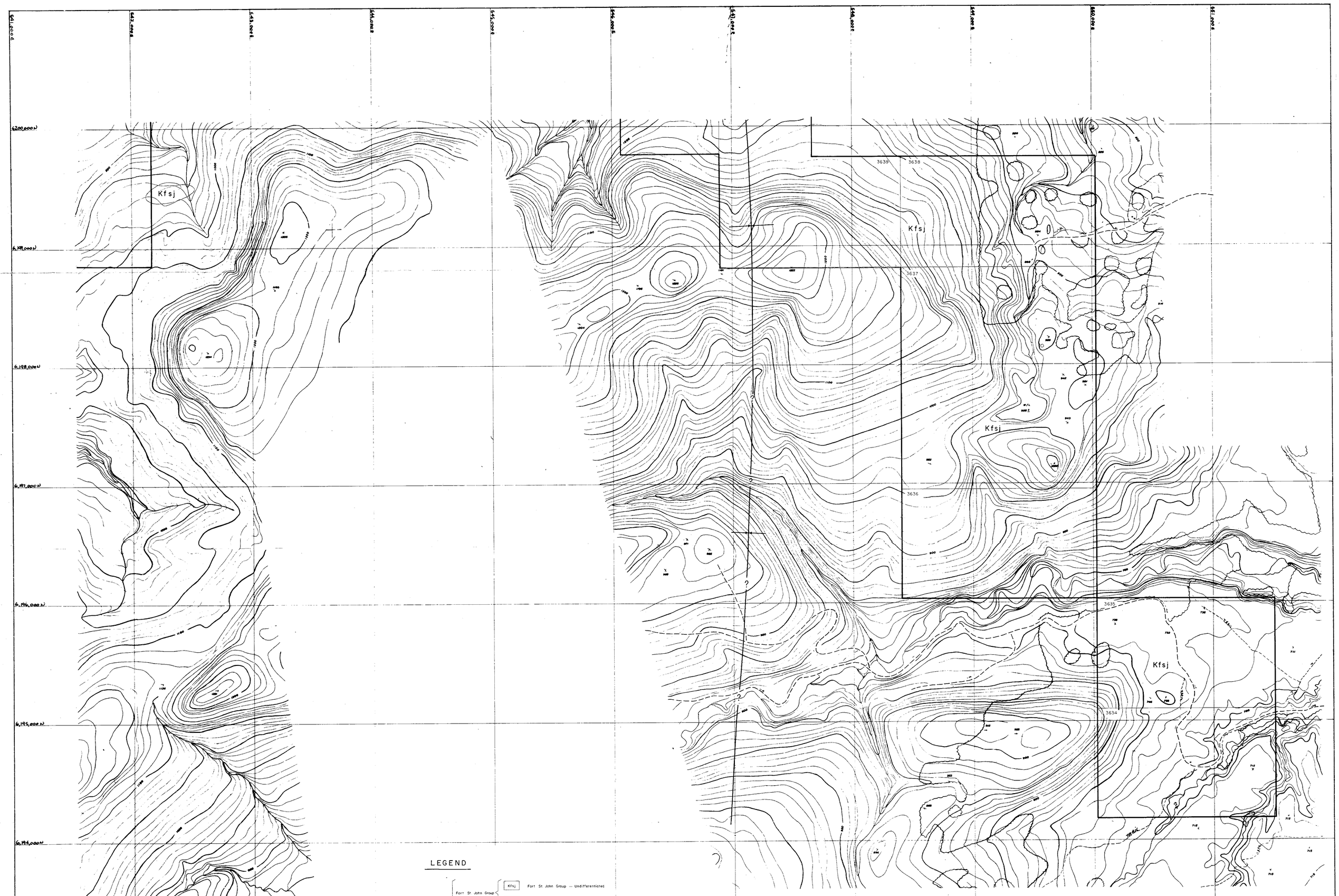
Scale and elevation datum based on limited ground control resulting in good relative, but uncertain absolute map accuracy.
Compiled from aerial photography at an approximate scale of 1 inch equals 5280 feet flown in 1970

UTAH MINES

78-2

PRELIMINARY RECONNAISSANCE TYPE MAPPING

McElhanney Surveying & Engineering Ltd, 1200 West Pender Street, Vancouver B.C., Canada	Scale - 1:10,000
	Contour Interval - 10 Metres
	Date - June 16, 1978.
	Job No - 06298-0
	Sheet No. - 4



LEGEND

Lower Cretaceous — Fort St John Group	Kfsj	Fort St John Group — Undifferentiated
	Knb	Moosebar Formation
Bullhead Group	Kg	Gething Formation
	Kc	Cadomin Formation

- Geologic Contact
- Syncline
- Anticline
- (Outcrop) – Strike And Dip Of Bedding
- Drill Hole Location
- X 2.0' — Coal Outcrop, Measured Thickness Where Indicated
- Outcrop
- Access Road
- 3635 — Coal Licence Number

Scale and elevation datum based on limited ground control resulting in good relative, but uncertain absolute map accuracy.
Compiled from aerial photography at an approximate scale of 1 inch equals 5280 feet flown in 1970

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

BRI COAL PROJECT

BEDROCK GEOLOGY AND DRILL HOLE LOCATIONS

Work by: R.B. Anderson, T. Stoltenberg	Date: January 1979	NTS Ref: 94 B/1, 93 O/16
Drawn By: T. Drews	Revised:	Scale: 1:10,000

MAP – 5

PR-BRI. DOWLING CR. 78(2)A.

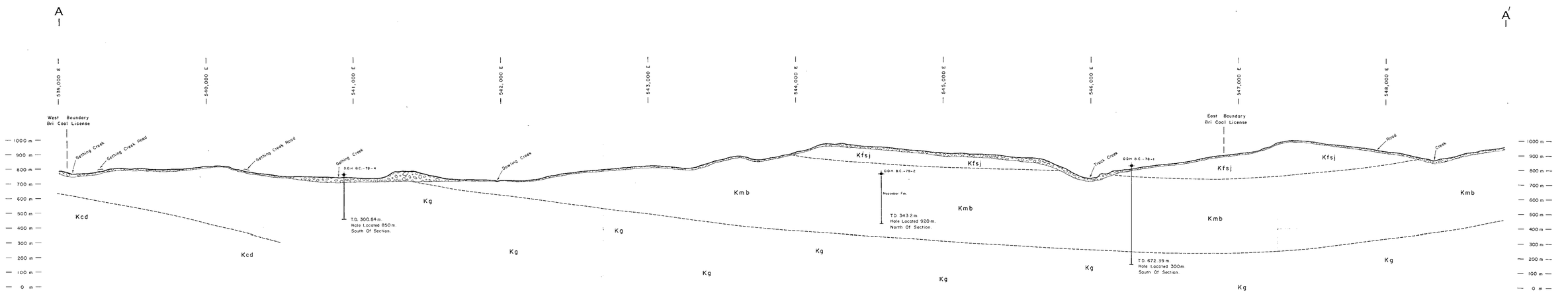
467

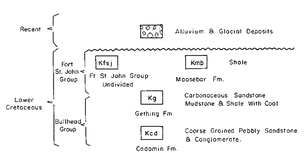
UTAH MINES

PRELIMINARY RECONNAISSANCE TYPE MAPPING

McElhanney Surveying & Engineering Ltd.
1200 West Pender Street, Vancouver B.C., Canada

Scale	1:10,000
Contour Interval	10 Metres
Date	June 18, 1978.
Job No.	08292-4
Sheet No.	5





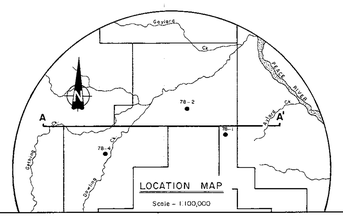


FIGURE - 6

467

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

BRI COAL PROJECT

EAST — WEST SECTION

@ 6,202,500 N (McElhanney Coordinates)

LOOKING NORTH

Work by: A. Armstrong	Date: Dec. 1978	NTS Ref.
Drawn by: T. Drews	Revised:	Horizontal Scale - 1:10,000
		Vertical Scale - 1:10,000

PR - BRI - DOWLING CR. 78(2)A

VERTICAL SCALE

0
100'
200'
300'
400'
500'
600'
700'
800'
900'
1000'
1100'
1200'
1300'
1400'
1500'
1600'
1700'
1800'
1900'
2000'
2100'

MOOSEBAR FORMATION

BC 78-4 — TITAN ? — GETHING — LITTLE MOSAL ? MOSAL ?

BC 78-5 — LOUISE ? — FERRO – POINT ? — QUENTIN ? — GRANT – KING ? — RIVERSIDE ?

BC 76-1 — TROJAN

BC 77-5

BC 77-6

BC 77-7

BC 78-3 — WENDY ? — CASTLE – POINT ? — MILLIGAN ?

BC 71-2

BC 78-2

BC 77-4

BC 71-3 — SUPERIOR ? — TROJAN ? — TITAN — FALLS

BC 76-4

BC 71-4

BC 71-1

GETHING CREEK — LITTLE MOSAL — MILLIGAN — FERRO – POINT

WEST BANK — QUENTIN — INDEX — RIVERSIDE

EAST BANK — KNIGHT ? — TWIN ? — BORING ? — MURRAY ?

BC 78-1 — SUPERIOR — TROJAN — TITAN — FALLS — GETHING — MOSAL — CASTLE – POINT — LOUISE

ATLARD CREEK

DAM SITE #1

NORTH SHORE

MOOSEBAR CREEK — LITTLE MOSAL — CASTLE – POINT — MILLIGAN — WENDY

JOHNSON & COALBED CREEKS

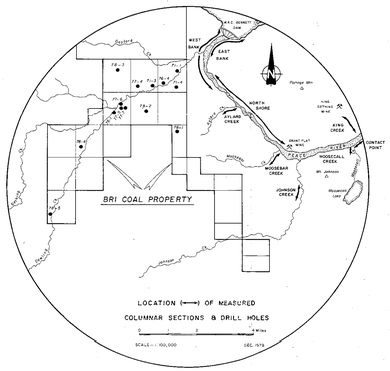
MOUNT JOHNSON

LOWER MOOSECALL CREEK

CONTACT POINT

KING CREEK — QUENTIN — GRANT – KING

CADOMIN FORMATION



LEGEND

Inches / Centimetres
- Coal Seam With Thickness
- Coal Seam In Drillhole Less Than 12" Thick
- Covered Interval
- Sandstone

NOTES

1. Most Coal Seams in Outcrop Less Than 12 Inches Have Been Omitted.
2. Thickness For Seams in Drillholes Are Intersection Thicknesses.

FIGURE – 7

467

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

BRI COAL PROJECT

TENTATIVE COAL SEAM CORRELATION BETWEEN BRI COAL DRILL HOLES AND MEASURED SECTIONS

Work By R.B. Anderson & R.A. Armitage	Date : Dec. 1978	NTS Ref
Drawn By T. Drew	Revised	Vertical Scale = 1" = 100'

PR. - BRI - DRILLING CR. 78(a)A

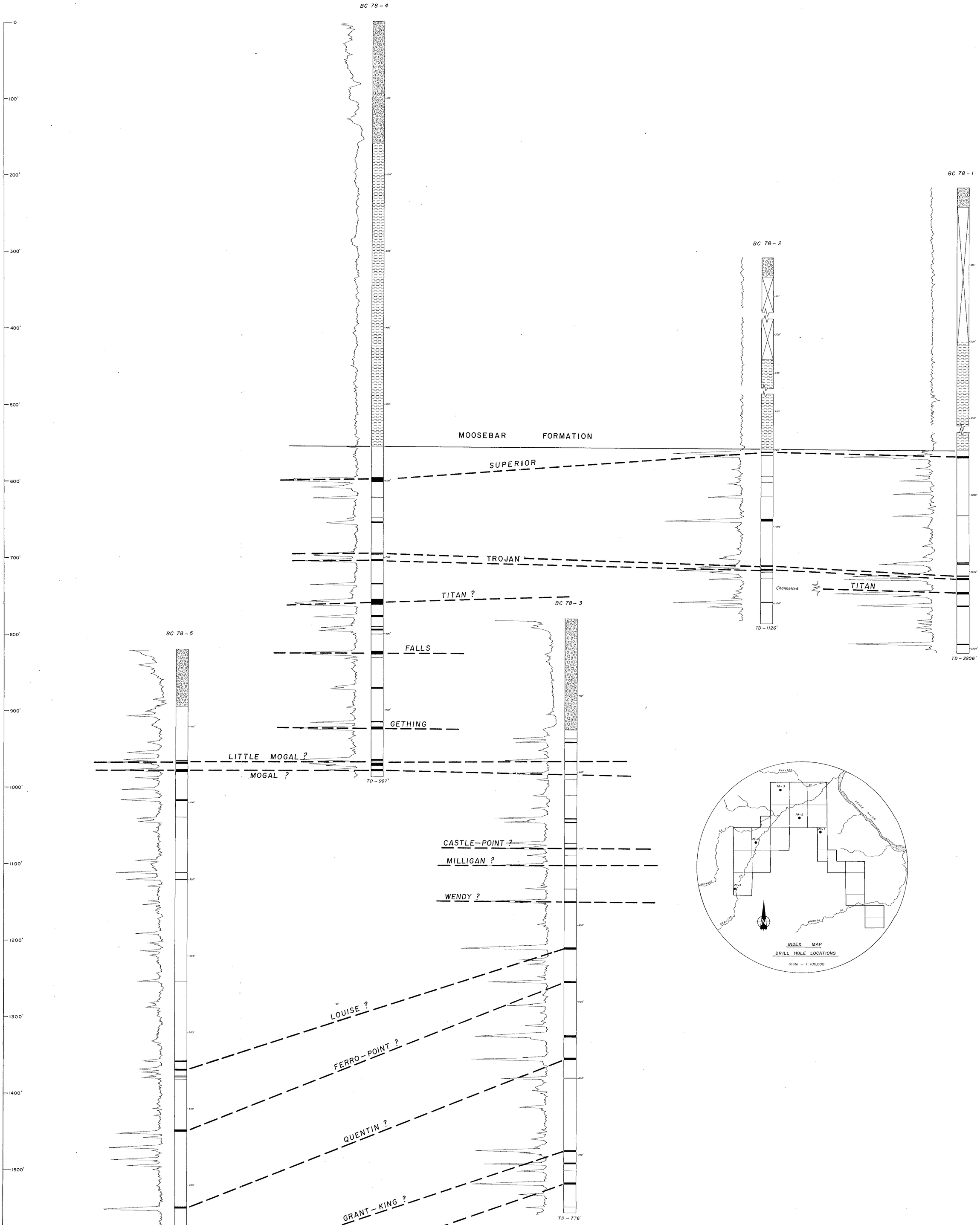


FIGURE –8

467

UTAH MINES LTD. EXPLORATION DEPARTMENT VANCOUVER BRITISH COLUMBIA		
BRI COAL PROJECT		
BRI COAL SEAM CORRELATION BRI DRILL HOLES BC 78–1 to 5		
Work by: R.B. Anderson & A. Amatzoua	Date: Dec. 1978	NTS Ref.
Drawn by: T. Drews	Revised:	Vertical Scale – 1" = 40'

PR. - BRI - DOWLING CR. 78(2)A.

PR. BRI-DOWLING CR. - 78(3)A.

467

WELL COMPLETION REPORT

BRI-DOWLING CREEK Prospect

Hole NO. BC-78-1

Location: Track Ck. 6,201,200 meters N., 546,280 meters E

Gr. Elev.: 2674' (815 meters)

Province British Columbia

Surface Owner Crown Coal Lic. ~~Option~~ No.

Spudded June 27, 1978 Completed July 18, 1978

Depth: 2206' Air to Water (Mud) to 2206'

Hole Size: 3,782 Bits: Surface tri-cone (4.75)

Main Hole diamond inserts (3.782)

Cored: (Yes) (No); intervals 203' to 2206' (wireline, convention)

Core Head: ( ), I.D. 2.5", O.D. 3.782, Mfgr. Longyear

Logs Run: E-Log ( ), Gamma Ray (X), Other Density

Mfgr. Gearhart-Owens

Logging Co. Utah Mines Ltd.

Chemicals:

Lost Circulation at depth(s) ; Regained (Yes) (No)

Noticeable Water Invasion: (No) (Yes); Intervals

Noticeable Gas Invasion: (No) (Yes); Intervals

Casing: Depth 108'; Diameter HW 4.5" Recovered (Yes) (No)

Plugged: (Yes) (No); if no, explain

If hole plugged by other than contractor, give name and address

Invoice Number for above

Contractor: Name & Address Canadian Longyear Ltd.

Samples and Core Description by: R.B. Anderson & A.T. Armstrong

Report Prepared by: R.B. Anderson Date July 21, 1978

Comments:

CORE DESCRIPTION

HOLE # B.C. 78-1 AREA DOWLING CK. - TRACK CK.

FROM 228.0 TO 252.7 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
228.0	228.7	INTERLAMINATED SILTSTONE - mudstone, crossbedded, local casted
228.7	230.5	SANDSTONE - light gray, fine grained occasional mudstone streaks minor clasts
230.5	230.8	INTERLAMINED MUDSTONE/SILTSTONE - medium gray, local casts
230.8	231.2	SILTY SANDSTONE - light-medium gray, carbonaceous debris, thin carbonaceous laminated
231.2	231.5	INTERLAMINATED SILTSTONE - mudstone, medium gray-dark medium gray carbonaceous debris
231.5	233.8	SANDSTONE - fine grained, light medium gray, carbonaceous debris occasional mudstone laminated (thin) pyrite on fractures
233.8	234.1	INTERLAMINATED MUDSTONE - siltstone, medium gray to dark medium gray load flute casts
234.1	234.3	SANDSTONE - light medium gray, medium grained occasional mud clasts and worm burrows
234.3	234.5	INTERLAMINATED MUDSTONE & SILTSTONE - medium gray to dark medium gray bioturbated base
234.5	236.2	SANDSTONE - light gray fine grain bed at 85° to core axis, minor carbonaceous laminated
236.2	238.1	INTERLAMINATED MUD-SILTSTONE - predominantly silty distorted bed and load casting-large mudcasts near base sandy toward base
238.1	238.9	SANDSTONE - fine - coarse grain , light gray, coarser toward base, carbonaceous film near base
238.9	239.4	SILTSTONE - medium gray, muddy, distort bedding, sand clasts at base
239.4	239.8	MUDSTONE - dark gray, thin siltstone laminated at base
239.8	240.8	SANDSTONE - light gray, medium grain, occasional mud clasts
240.8	244.0	INTERLAMINATED MUDSTONE - siltstone - carbonaceous debris throughout, distort bedding, bioturbated 242-242.2 siltstone lens
244.0	244.3	SANDSTONE - fine grain, light gray
244.3	245.4	INTERLAMINATED MUDSTONE-SILTSTONE - distorted bedding, carbonaceous debris throughout medium gray to medium dark gray
245.4	245.8	SANDSTONE - fine-medium gray, light gray
245.8	251.0	INTERLAMINATED MUDSTONE-SILTSTONE medium gray-medium dark gray bioturbated, carbonaceous debris, minor nodules, distorted bedding
251.0	252.7	SANDSTONE - light medium gray, coarse bedded

CORE DESCRIPTION

HOLE # B.C. 78-1 AREA DOWLING CK. - TRACK CK.

FROM 2 i2.7 TO 1945.4 BY R.B. Anderson - A.T. Armstro

FROM	TO	DESCRIPTION
252.7	254.7	INTERLAMINATED MUDSTONE-SILTSTONE - light medium gray, coarse bedded
254.7	255.3	SANDSTONE - medium grain, light gray, carbonaceous debris on bedding surfaces
255.3	255.5	INTERLAMINATED MUDSTONE-SILTSTONE - medium gray to medium dark gray ***siltstone*** is crossbedded
255.5	256.6	SILTY SANDSTONE - light medium gray, carbonaceous debris throughout
256.6	257.1	SILTSTONE - light medium gray, occasional mudstone laminated siderite lens at 256.7'- 256.8'
257.1	280.2	INTERLAMINATED MUDSTONE-SILTSTONE - light gray-dark medium gray, carbonaceous debris throughout, distorted bedding. fe stone nodules at 259.3' pyrite nodules at 261.5' - siderite lens at 266.7', at 268.1', 270.9', 212.9'. 272.7' - 273.0'
280.2	280.5	MUDSTONE - dark gray, gritty
280.5	295.5	INTERLAMINATED MUD-SILTSTONE - (same as above) predominantly muddy at 290.7' fe stone band - unit is very finely beaded
295.5	1941.4	MOOSEBAR F.M.: --Shale - dark gray to black, gritty, 10 - 20% silt fraction - massive, no apparent bedding numerous slips at 45° to core axis throughout at 1/5 feet interval calcite tension fractures at 45° to core axis decreasing silt fraction downward occasional pyrite replace debris bands light grained pyrite and pyrite nodules at base
1941.1	1942.7	GETHING FM -Siltstone-medium brownish grav-occasional sandstone clasts
1942.7	1943.0	COAL - 0.3' bright, black, shiny, blocky fractured, minor pyrite on deat and minor calcite 20% 80%
1943.0	1943.4	CARBONACEOUS MUDSTONE - dark gray, occasional thin coal streaks
1943.4	1944.2	INTERLAMINATED MUD-SILTSTONE - medium grav-medium dark gray distorted bed loac casting
1944.2	1944.6	MUDSTONE - dark gray - occasional coal streaks
1944.6	1945.4	INTERLAMINATED MUD-SILTSTONE - fine grained sandstone distorted bed. occasional coal clasts & streaks, coal smeared frost at 50° to core axis

CORE DESCRIPTION

HOLE # B.C. 78-l AREA DOWLING CK. - TRACK CK.

FROM 1945.4 TO 1989.3 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
1945.4	1948.3	SILTSTONE - medium gray, occasional thin coal streaks, weakly crossbedded, minor worm borrows at 1947.8', sandy towards base
1948.3	1949.4	CARBONACEOUS MUDSTONE - dark gray to black thin coal debris streaks
1949.4	1952.5	COAL - 3.1 feet sample #1 - bright, black, blocky, cleated
1952.5	1953.2	CARBONACEOUS MUDSTONE - thin coal streaks
1953.2	1962.2	INTERLAMINATED MUDSTONE-SILTSTONE - predominantly mudstone - thin laminated at top coarser laminated at base
1962.2	1964.3	SILTSTONE - medium light gray - occasional thin mudstone laminated small scale crossbeds
1964.3	1964.8	INTERLAMINATED SILTSTONE-MUDSTONE - light medium gray-dark gray predominantly siltstone - coal streaks at base
1964.8	1965.5	COALY MUDSTONE - dark gray to black - thin coal streaks (core loss about 0.5')
1965.5	1968.5	CARBONACEOUS MUDSTONE - dark gray to black, silty at base
1968.5	1974.9	INTERLAMINATED MUDSTONE-SILTSTONE-SANDSTONE - thinnly laminated predominantly mudstone, light medium gray to dark gray - disturbed bedding , sand filled load casts
1974.9	1975.1	COAL - 0.2 feet - bright, black, shiny-crushed
1975.1	1975.7	CARBONACEOUS MUDSTONE - black-thin coal streaks at top
1975.7	1977.7	SILTSTONE - medium gray, occasional thin mu&tone laminated bedding distorted
1977.7	1978.1	SILTY SANDSTONE - light medium gray, small scale crossbeds occasional mudstone laminated
1978.1	1981.35	INTERLAMINATED MUDSTONE-SILTSTONE - medium gray to dark gray predominantly mudstone - very fine scale load casts disturbed bedding, worm burrows towards the base
1981.35	1981.7	COAL - 0.35' - slickenside surfaces at 45° to core axis
1981.7	1982.2	COAL MUDSTONE - occasional coal streaks
1982.2	1982.5	MUDSTONE - dark gray
1982.5	1984.8	SILTSTONE - occasional mudstone laminated, medium dark gray minor coal debris
1984.8	1986.6	SANDSTONE - light medium gray, crossbedded, medium grained, coarser to base, occasional thin muddy siltston'e laminations
1986.6	1986.8	SILTY MUDSTONE - medium - dark gray
1986.8	1989.3	SANDSTONE - light gray, crossbedded at top, medium grained, coarser to base, bedding at

CORE DESCRIPTION

HOLE # B.C. 78-1 AREA DOWLING CK. - TRACK CK.

FROM 1989.3 TO 2015.0 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
1986.8	1989.3	cont'd - 84° to core axis
1989.3	1990.1	SILTY SANDSTONE - light medium gray, carbonaceous debris on bedded surfaces, crossbedded - ends on a slickenside, coal s m e a r e d fracture at 65° to core axis
1990.1	1990.9	SANDSTONE - medium grain, light gray, calcite on fracture sub to core axis, bedding at 78° core axis
1990.9	1993.5	SILTY SANDSTONE - medium gray, numerous thin mudstone interlaminated, crossbedded, bedding progressively disturbed to base, worm burrows at base
1993.5	1994.4	SANDSTONE - fine grain, light gray, disturbed bed and crossbedded
1994.4	1994.7	INTERLAMINATED SILTSTONE-MUDSTONE - predominantly siltstone, dark medium-gray, siltstone laminated show small scale crossbeds
1994.7	1995.0	MUDSTONE - dark gray to black - worm burrows (silt filled) at top
1995.0	1997.6	INTERLAMINATED MUDSTONE-SILTSTONE - dark gray - bioturbated, predominantly mudstone - coal streaks at base
1997.6	1997.7	SANDSTONE - light gray, coarse grained, full of coal clasts
1997.7	1997.9	COAL - 0.2' bright black shiny - base is a slip surface at 30° to core axis
1997.9	1999.1	CARBONACEOUS MUDSTONE - dark gray to black, thin coal streaks
1999.1	1999.9	MUDSTONE - dark gray - calcite streaks on bedding and rimming coal streaks
1999.9	2003.9	SANDSTONE SILTSTONE - medium gray, coal debris throughout bedding at 80° to core axis - thin pyrite lens at 2003.8'
2003.9	2004.8	INTERLAMINATED MUDSTONE SANDY SILTSTONE - medium gray to dark gray, siltstone crossbedded - mudstone laminated bioturbated
2004.8	2011.0	MUDSTONE - dark gray - minor thin siltstone laminated at 2009.3' siderite lens -> 2009.6' - center is pyritized shell layer at 2009.45' 2009.5'
2011.0	2011.4	INTERLAMINATED MUDSTONE-SANDSTONE - predominantly mudstone
2011.4	2014.1	MUDSTONE
2014.1	2014.3	MUDSTONE WITH SANDSTONE LOADCASTS
2014.3	2014.5	MUDSTONE - dark gray
2014.5	2015.0	SIDERITE MUDSTONE - shell fragments

CORE DESCRIPTION

HOLE # B.C. 78-l AREA DOWLING CK. - TRACK CK.

FROM 2015.0 TO 2044.1 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
2015.0	2018.5	MUDSTONE - carbonaceous - dark gray to black occasional thin sandstone clasts and thin sandstone interlaminated - fractured and shows slip at 45° to core axis
2018.5	2019.4	INTERLAMINATED MUDSTONE-SILTSTONE - light medium gray to black bedding at 80° to core axis, silt interlaminated are crossbedded
2019.4	2019.6	SIDERITE SILTSTONE - medium brownish gray
2019.6	2022.2	SANDSTONE - medium grain - medium light gray - small scale crossbeds
2022.2	12023.3	MUDSTONE - dark gray, minor silt interlaminated, occasional worm burrows near silt laminae
2023.3	2023.8	SIDERITE SILTSTONE - medium brownish gray, calcite filled tension fractured near to core axis
		- less sideritic to base
2023.8	2026.3	MUDSTONE - dark.gray
2026.3	2027.0	COALY MUDSTONE - dark gray to black - occasional thin coal streaks
2027.0	2027.65	COAL - 0.65 feet - bright, black, cleated
2027.65	2028.4	MUDSTONE - dark gray to black
2028.4	2028.5	SILTY SANDSTONE - fine grain, micaceous, ton
2028.5	2029.2	SILTY MUDSTONE - dark gray
2029.2	2033.7	SILTSTONE - medium gray, sandy at 2031.4 to 2031.5, 2031.8 to 2032.2; calcite rimmed coal streaks from 2032.5 to 2032.6
2033.7	2034.9	SANDSTONE - medium gray - medium grained - calcite rimmed coal streaks at base
2034.9	12035.0	MUDSTONE - dark gray
2035.0	2037.0	SILTY SANDSTONE - medium gray, carbonaceous debris on bedding occasional thin mudstone interlaminated
		- coal streak at 2036.7
2037.0	2037.2	SILTY MUDSTONE - dark gray, thin coal streaks
2037.2	2039.3	SANDY SILTSTONE - dark gray, numerous thin mudstone laminated and clasts
2039.3	2040.3	SILTY MUDSTONE - dark gray
2040.3	2041.4	CARBONACEOUS MUDSTONE - dark gray to black thin coal streaks
2041.4	2042.5	SILTY SANDSTONE - light medium gray, occasional thin mudstone interlaminated, crossbedded
2042.5	2043.2	CARBONACEOUS MUDSTONE - dark gray to black - numerous coal streaks
2043.2	2043.5	SILTY SANDSTONE - light medium gray, small scale crossbeds
2043.5	2043.7	SILTY MUDSTONE - medium dark gray
2043.7	2044.1	SANDY SILTSTONE

CORE DESCRIPTION

HOLE # B.C. 78-1 AREA DOWLING CK. - TRACK CK.

FROM 2044.4 TO 2077.1 BY R.B. ANDERSON - A.T. ARMSTRONG

FROM	TO	DESCRIPTION
2044.4	2044.5	CARBONACEOUS MUDSTONE - dark gray thin coal streaks
2044.5	2048.6	INTERLAMINATED MUDSTONE & SANDY SILTSTONE - predominantly sandy siltstone light gray to dark gray, load casting & occasional worm burrows
2048.6	2049.2	SILTY MUDSTONE - medium dark gray
2049.2	2049.4	SANDSTONE - medium grain, light gray, disturbed bedding
2049.4	2049.6	CARBONACEOUS MUDSTONE - dark gray to black, thin coal streaks
2049.6	2050.0	SANDSTONE - fine to medium grained, light medium gray highly distorted bedding - grading through silt to mud at base
2050.0	2050.5	SILTY MUDSTONE - coal streaks at base
2050.5	2051.3	SILTY SANDSTONE - light medium gray - small scale crossbeds very small coal chips
2051.3	2052.4	INTERLAMINATED-SILTSTONE-SANDSTONE-MUDSTONE - light medium gray to dark gray finely laminated, predominantly silt
2052.4	2052.9	SILTY MUDSTONE - medium dark gray - progressively silty to base - bioturbated at base
2052.9	2056.4	MUDDY SILTSTONE - minor siltstone laminated medium dark gray worm burrows and flute clasts throughout, distorted bedding, silt laminated cross-bedded, carbonaceous debris in muddy sections
2056.4	2064.2	SILTY MUDSTONE - dark gray, occasional thin silt interlaminated, carbonaceous debris throughout 2059.7' thin coal rimmed by calcite- on a slip at 65° to core axis - progressively silt downward
2064.2	2066.4	MUDDY SILTSTONE - dark medium gray - minor calcite rimmed coal streaks 2066.1 - coal streak 2066.4 - ¼" coal seamlet
2066.4	2067.4	MUDSTONE - dark gray - thin coal streaks
2067.4	2067.8	SILTY SANDSTONE - medium dark gray - mudstone clasts - disturbed bedding
2067.8	2068.6	SANDY SILTSTONE - carbonaceous debris on bedding - medium dark gray
2068.6	2069.4	SILTSTONE - light medium gray - small scale crossbeds - minor carbonaceous debris on bedding surfaces
2069.4	2076.8	SANDSTONE - medium grain - light medium gray - crossbedded - minor mud clasts carbonaceous debris on bedding surfaces
2076.8	2077.0	MUDSTONE - dark gray
2077.0	2077.1	SANDSTONE - light gray - coarse grain - quartz and mica rich

CORE DESCRIPTION

HOLE # 3.C. 78-1 **AREA** BRI -DOWLING CK

FROM 2077.1 TO 2117 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
2077.1	2081.6	MU TONE - dark gray - occasional thin silt interlaminae coaly towards base
2081.6	2082.3	SILTY MUDSTONE - dark medium gray
2082.3	2085.8	SANDY **SILTSTONE** - light medium grav - numerous mudstone laminae sandy at 2084.3
2085.8	2088.0	SILTY MUDSTONE **TO COALY** MUDSTONE
2088.0	2089.7	COAL - 1.7' - bone coal principally
2089.7	2089.9	SANDSTONE - light gray micaceous split
2089.9	2090.8	COAL 0.9' - -bri -cleated. -→20%
2090.8	2091.2	CARBONACEOUS MUDSTONE - dark gray
2091.2	2093.0	INTERLAMINATED MUDSTONE AND SILTSTONE - dark medium gray - predominant mudstone - tstone crossbedded
2093.0	2098.1	SANDY SILTSTONE - carbonaceous - medium dark gray - numerous mudstone streaks and small coal clasts - carbonaceous debris throughout
2098.1	2102.7	INTERLAMINATED MUDSTONE-SILTSTONE - mudstone predominant-dark medium gray-carbonaceous debris throughout-bioturbated from 2199 to 2100 mudstone dominant at base
2102.7	7105.6	CARBONACEOUS MUDSTONE - dark gray -→ black bedding Q core axis
2105.6	2107.2	COAL 1.6' bone to 2106 - clean and bright cleated
2107.7	2108.5	CARBONACEOUS SILTSTONE - m grav - calcite in tension to core axis - slickensides at various angles to core
2108.5	2108.8	CARBONACEOUS MUDSTONE - dark gray
2108.8	2111.1	COAL - 2.3'-good clean bright coal - cleated
2111.1	2112.7	CARBONACEOUS SILTY MUDSTONE - dark gray - minor coal streaks
2112.7	2115.3	INTERLAMINATED MUDSTONE - siltstone - medium dark gray - worm burrows
2115.3	711fi.7	MUDSTONE-R - dark gray - silty
2116.3	2116.45	SANDSTONE - ligh gray, fine-medium grain. highly distorted laminations, very thin irre- dark brownish gray mudstone, very small calcite rimmed coal fragments
2116.45	2116.5	COAL - black and bright - slickensided - some calcite on upper contact
2116.5	2116.55	CALCITE VEIN - thin-slivers of coal suspended in calcite
2116.55	2116.95	COALY MUDSTONE - black, coal streaks and very fine calcite streaks
2116.95	2117	COAL - bright and black, cleated and sheared (sli- ckensides) very fine calcite Veining top and bottom - seam at 60° to core axis

CORE DESCRIPTION

HOLE # B.C. 78-1 AREA BRI - DOWLING CK.

FROM 2117 TO 2135.1 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
2117	2121.41	INTERBEDDED SILTSTONE, MUDSTONE, SANDSTONE - very irregular contacts, disturbed bedding throughout, bioturbated, flute costs and load casts, medium gray to dark gray - 2118.15' to 2118.3' light medium gray, fine grained, sandstone bedding, very distorted laminations - 2118.5, very fine calcite streaks (possible shell layer) - 2120.2 - 2120.3 injected fine clastic dyke - 2120.3 - 2120.4 poorly developed crossbedding - 2121 - 2121.2 mudstone - dark gray - 2121.2 - 2122.4 silty mudstone - fine calcite streaks near top (shell fragments?) turbated mudstone - muddy siltstone downward - medium light gray siltstone lens at 2121.9 to 2122.1, irregular contacts
2122.4	2125.2	SANDSTONE AND SILTSTONE, MINOR MUDSTONE - light medium gray to medium dark gray - irregular and distorted laminations load casting throughout to 2124.3' - mudstone clasts 2122.8 - 2122.9 - bioturbated at 2123.9 - 2124.3 - 2125.2 very thinnly laminated generally fine grained sandstone, well defined small scale crossbedding shell layers at 2124.4, 2124.7, bedding at 85° to core axis
2124.2	2127.1	MUDSTONE - dark gray to black, minor carbonaceous debris throughout
2127.1	2127.4	CARBONACEOUS MUDSTONE
2127.4	2130.35	COAL - 2.95' - good clean and bright
2130.35	2130.75	CARBONACEOUS MUDSTONE
2130.75	2135.1	MUDSTONE - dark gray to black minor carbonaceous debris throughout - 2132 - 2132.05 thin coal seam (bright and black cleated) shearing evident rimmed on bottom surface with very fine calcite vein - coal streaks, some with calcite rims down to 2132.45' - very fine coal seam at 2132.7' - calcite rimmed top and bottom - followed by sub-parallel very fine calcite veins in mudstone for 0.5" - all oriented at

CORE DESCRIPTION

HOLE # B.C. 78-1 AREA BRI - DOWLING CK.

FROM 2132.7 TO 2148.2 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
cont'd		about 60° to core axis
		- 2133.15' vuggy calcite vein oriented at 60° to core axis fragments of mudstone suspended in vein and vugs lined with microcrystals of quartz
		- sheared and slickensided fracture at 50° to core axis at 2133.5'
		- irregular pyrite lens at 2133.9'
		- coal streak with calcite rims at 2134'
2135.1	2137.1	SILTSTONE, MUDSTONE, SANDSTONE - light gray to medium gray, disturbed bedding, load casting
		- 2136.1 shell bed
2137.1	2138.2	MUDSTONE, SILTSTONE - dark medium gray
2138.2	2138.4	SANDSTONE - fine grain, light medium gray, minor small scale crossbedding at base
2138.4	2138.7	SILTSTONE - medium gray, fine shell fragments at 2138.6'
		- thin layer of fine shell fragments on bottom surface at 83° to core axis
2138.7	2139.2	SILTSTONE, SANDSTONE, MUDSTONE - light medium gray to dark medium gray, irregular bedding, bioturbated at 2139.1 to 2139.2'
2139.2	2140.4	MUDSTONE, SILTSTONE - predominant mudstone, medium dark gray
		- minor shell fragments at 2139.7' and 2139.9'
2140.4	2140.9	SANDSTONE - fine grain, light medium gray, carbonaceous film on laminated irregular and distorted crossbedding
2140.9	2141.5	SILTSTONE, MUDSTONE - medium gray to medium dark gray irregularly laminated, disseminated fine shell fragments
2141.5	2143.9	SILTY MUDSTONE - grading downward to mudstone medium dark gray to dark gray
		- thin siltstone laminated at 2141.8' and 2142.2' 2143.8' - 2143.85' calcite filled tension fracture with suspended mudstone fragments
2143.9	2144.4	MUDSTONE - carbonaceous
2144.4	2146.0	COAL - 1.6' - dull bone coal overlying good clean bright black coal 0.1' split at 2145.5'
2146.0	2146.6	MUDSTONE - carbonaceous dark gray to black
2146.6	2146.8	INTERLAMINATED MUDSTONE, SILTSTONE - medium gray to dark gray finely laminated, load casting
2146.8	2148.2	SANDSTONE - fine grain, light medium gray, few darker siltstone laminations at 2147.4' minor

CORE DESCRIPTION

HOLE # B.C. 78-1 AREA BRI - DOWLING CK.

FROM 2148.2 TO 2164.5 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
cont'd	2148.2	bioturbated at 2147.3 to 2147.4' and at 2148.2'
2148.2	2150.2	SILTY MUDSTONE - dark medium gray, silty laminations at 2149.4
2150.2	2150.9	SILTSTONE TO SILTY MUDSTONE - light medium gray to dark gray, thin laminations generally at 80° to core axis - bioturbated at top and bottom with muddy clasts at bottom
2150.9	2156.6	MUDSTONE - silty at top becoming more muddy at bottom - 2154± fracture sub-parallel to core axis - calcite filled fractures at 2156.25', 2156.4' and 2156.45' oriented at 065° to core axis
2156.6	2160.4	SILTSTONE - light medium gray - distorted bedding 2156.6' to 2157.6' - generally massive 2157.6' to 2159.2' with fine lacey calcite veining at 2157.8', oriented about 80° to core axis - coal streak with calcite rims at 2158.1' - 2159.7' to 2160.4' - disturbed interlaminations silty mudstone and siltstone, some bioturbation and silty mud clasts present
2160.4	2161.7	SANDSTONE, SILTSTONE - light medium gray fine grain to dark medium gray generally very finely laminated with some very small scale cross-bedding, load casting and minor laminated displacements on preconsolidation fractures
2161.7	2161.85	SANDSTONE - fine grain, medium gray, upper and lower surfaces at 85° to core axis
2161.85	2162.1	SILTY MUDSTONE - dark medium gray, finer grained downward
2162.1	2162.2	SANDSTONE - medium grained carbonaceous debris on bedding planes, medium gray
2162.2	2162.3	MUDSTONE - silty, dark gray
2162.3	2163.0	SANDSTONE - fine grain medium gray, carbonaceous debris and coal clasts throughout, worm burrows and disturbed bedding at base
2163.0	2164.4	SANDSTONE AND SILTY MUDSTONE - interbedded, light medium-dark gray, worm burrows in silty units crossbedded, disturbed bedding, base is load casted
2164.4	2164.5	COAL - broken, apparently bright black and shiny, some grinding

CORE DESCRIPTION

HOLE # B.C. 78-l AREA BRI - DOWLING CK.

FROM 2164.5 TO 2195.7 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
2164.5	2164.7	COALY MUDSTONE - black, coal streaks, calcite filled fracture
2164.7	2165.2	MUDSTONE AND SILTY SANDSTONE - interlaminated, medium gray-dark gray
2165.2	2166.2	SILTY SANDSTONE - light-medium gray, small scale cross-beds, calcite rimmed coal clasts
2166.2	2167.4	MUDSTONE + SANDY SILTSTONE - interlaminated, predominantly dark gray mudstone, flute clasts load clasts and carbonaceous debris throughout
2167.4	2169.0	MUDSTONE - dark gray, becomes siltier at base
2169.0	2170.2	SILTSTONE - muddy, medium gray, distorted bedding, occasional calcite rimmed coal clasts, minor worm burrows
2170.2	2170.9	MUDSTONE - silty, dark gray
2170.9	2171.4	SILTSTONE - muddy dark - medium gray, distorted bedding, load casts
2171.4	2173.6	MUDSTONE - dark gray, occasional coal streaks
2173.6	2174.2	MUDSTONE - coaly, black, numerous coal streaks
2174.2	2174.5	MUDSTONE - silty, medium, dark gray. Thin calcite filled fracture at 50° to core axis
2174.5	2175.1	SILTSTONE - muddy, medium-dark gray
2175.1	2176.6	MUDSTONE - silty, dark gray
2176.6	2180.0	MUDSTONE - carbonaceous black, coal streaks throughout, pyrite nodules at 2178.5 core loss 0.5'
2180.0	2181.3	MUDSTONE - silty, medium-dark gray
2181.3	2181.8	SANDSTONE - silty, light-medium gray, distorted bedding, silty at base
2181.8	2184.5	MUDSTONE - silty, dark-medium gray, carbonaceous debris + coal clasts throughout. Base shows load casting and distorted bedding
2184.5	2189.5	SANDSTONE - medium-light gray; crossbeds, occasional thin coal streak, fine-medium grained, coarsens at base. Last 0.1' has numerous small mud clasts
2189.5	2191.2	SILTSTONE - light-medium gray, small scale crossbeds, carbonaceous debris on bedding surfaces - bedding 80° to core axis. Gets finer grained at base. Occasional mud interlaminae at base
2191.2	2192.1	MUDSTONE - silty dark-medium gray, with numerous silty load clasts
2192.1	2193.2	SILTSTONE/MUDSTONE - interlaminated, predominantly silt, carbonaceous debris on bedding surfaces, convolute bedding
2193.2	2194.1	MUDSTONE - dark gray, carbonaceous debris
2194.1	2195.7	COAL - 1.6', bright, black

CORE DESCRIPTION

HOLE # B.C. 78-1 AREA DDWLING CK. - TRACK CK.

FROM 2195.7 TO 2206.0 BY R.B. Anderson - A.T. Armstrong

FROM	TO	DESCRIPTION
2195.7	2196.1	MUDSTONE - carbonaceous dark gray, calcite filled fracture. at 70° to core axis
2196.1	2206.0	MUDSTONE/SILTY SANDSTONE - interlaminated, dominantly mudstone. Medium-dark gray, silt is crossbedded, load casting, calcite on bedding at 75° to core axis. Minor worm burrows at 2202.5. Sideritic'from 2204 - 2204.5. Numerous intersecting shear directions and calcite filled fractures at 45° to core axis. Slip on bedding at 73° to core axis, calcite filled fractures.
		T.D. = 2206'

PR BRI DOWLING CR.-78(3)A

467

NELL COMPLETION REPORT

BRI-DOWLING CREEK Prospect

Hole No. B.C. 78-2

Location:: Road parallel to, and south of Gething Creek 6,203,426 mN 544,580 mE

Gr. Elev.: 758 m. 758m(2486.0')

Province British Columbia

Surface Owner Crown Coal Lic. ~~Option-No.~~ 3646

Spudded Julv 21/78 Completed July 29/78

Depth: 1126.0' Air to _____ Water (Mud) to 1126.01.

Hole Size: 3.782 Bits: *Surface* 4.75' (tri-cone)

Main Hole 3.782 (diamond)

Cored: (Yes) (No); intervals 333.0' to 1126.0' (wireline, convention)

Core Head: ( ), I.D. 2.5", O.D. 3.782", Mfgr. Longyear

Logs Run: E-Log), Gamma Ray (X), Other Density

Mfgr. Gearhart Owens

Logging Co. Utah Mines Ltd.

Chemicalsf _____

Lost Circulation at depth(s) _____; Regained (Yes)(No)

Noticeable Water Invasion (No) (Yes); Intervals _____

Noticeable Gas Invasion: (No) (Yes); Intervals _____

Casing: Depth 98.0'; Diameter Hw 4.5" Recovered- (Yes) (No) -- Partially

Plugged: (Yes) (No); if no, explain _____

If hole plugged by other than contractor, give name and address

Invoice Number for above' _____

Contractor: Name & kddress Canadian Longyear Ltd. - New Westminster

Samples and Core Description by: R. B. Anderson

Report Prepared by: R.B. Anderson Date July 30, 1978

Comments: Casing - the bottom 20 feet and the casing shoe twist off when the casing was beinq pulled and was subsequently lost down the hole.

CORE DESCRIPTION

HOLE # B.C. 78-2 AREA BRI - DOWLING CK.

FROM T 0 O 935.1 BY R.B. Anderson

FROM	TO	DESCRIPTION
0	25	Overburden
25.0	333.0	Moosebar-TRI-CONED - Moosebar shale - dark gray
333.0	899	Moosebar Shale - cored - dark gray to black, massive, non-bedded pyrite nodules common throughout, occasional siderite nodule layers up to 0.5' thick, glauconitic towards the base, pyrite nodules up to ½" in diameter common near the base.
		Contact aradational over basal 0.5'.
		Gething Fm
899.0	902.6	SANDSTONE - coarse grained - medium gray, salt & pepper texture, occasional small sub-rounded pebbles.
902.6	903.3	CONGLOMERATE SANDSTONE - same as above except with a high pebble fraction.
903.3	904.8	COAL - 1.5' upper .05' pyritic, remainder - bright cleated hard black
904.8	907.3	CARBONACEOUS SILTSTONE - muddy dark gray-black plant debris, thin coal streaks, pyrite nodules running coal streaks.
907.3	908.0	COAL - dirty, pyritic bottom is ground.
908.0	908.8	SILTSTONE - carbonaceous dark gray
908.8	910.5	SILTSTONE - sandy, medium gray carbonaceous debris on bedding surfaces small scale crossbeds.
910.5	920.1	SANDSTONE - fine grained light-medium gray carbonaceous debris on bedding surfaces small scale crossbeds.
920.1	921.0	INTERLAMINATED MUDSTONE/SILTY SANDSTONE - light medium gray-dark gray disturbed bedding mainly sandstone
921.0	921.8	SANDSTONE - medium grain light-medium gray carbonaceous debris and coal streaks on bedding surfaces.
921.8	924.8	INTERLAMINATED MUDSTONE (CARBONACEOUS)/SANDSTONE - light-gray, dark gray, disturbed bedding. Mainly sandstone to-923.5. Mainly mudstone to 924.8.
924.8	928.5	MUDSTONE - coaly dark gray-black some coal streaks and pyrite nodules. Fine silt interlaminated from 927.5 to 928.5
928.5	929.7	INTERLAMINATED MUDSTONE/SILTY SANDSTONE - light-medium-dark gray, mainly mudstone.
929.7	932.9	SANDSTONE - medium gray fine grained, crossbeds, carbonaceous debris on bedding planes.
932.9	935.0	SILTSTONE - carbonaceous, dark gray with thin silty sandstone laminae, few coal streaks at base.
935.0	935.1	MUDSTONE - carbonaceous - dark gray.

CORE DESCRIPTION

HOLE # B.C. 78-2 AREA BRI - Dowling Ck.

FROM 935.1 TO 984.1 BY R.B. Anderson

FROM	TO	DESCRIPTION
935.1	935.5	COAL - 0.4' ground 0.1' recovered.
935.5	936.0	SANDSTONE - carbonaceous - fine grained dark-medium gray
936.0	940.6	SILTSTONE - sandy medium gray carbonaceous debris on bedding planes - bedding 80° to core axis muddy towards, base.
940.6	942.3	INTERLAMINATED MUDSTONE/SILTSTONE - mainly mudstone, dark-medium gray, occasional worm burrows.
- - - -		
942.3	943.2	MUDSTONE/SILTY - dark gray
943.2	943.3	MUDSTONE - coaly pyritic dark gray.
943.3	943.5	COAL - (0.2) dirty, occasional bright band.
943.5	945.2	MUDSTONE - coaly dark gray occasional coal streak.
945.2	945.7	SILTSTONE - muddy, medium gray.
945.7	950.0	SANDSTONE - medium gray, medium grained massive.
950.0	950.2	MUDSTONE - dark gray, worm burrows clastic dyke - to core axis
950.2	955.7	SANDSTONE - medium-coarse grain crossbeds, carbonaceous debris on bedding planes
955.7	959.6	INTERLAMINATED MUDSTONE/SILTSTONE - medium-dark gray siltstone crossbedded, few worm burrows.
959.6	961.2	MUDSTONE - silty dark gray, fine siltstone interlaminae bedding 80° to core axis. At base, sand lens.
961.2	961.7	COAL - 0.5 - broken, dirty base is ground.
961.7	962.0	MUDSTONE - dark gray, few thin pyrite streaks rimmed with calcite.
962.0	962.5	SILTSTONE - muddy, dark gray, carbonaceous debris throughout
962.5	967.4	SANDSTONE - silty fine grained medium gray thin shell bands at 963.1 and 966.8, mudstone clasts at base.
967.4	967.6	MUDSTONE - dark gray
967.6	967.9	INTERLAMINATED MUDSTONE/SILTY SANDSTONE - fine-dark gray.
967.9	968.2	SILTSTONE - medium-dark gray.
968.2	968.4	SANDSTONE - coarse grained base has many large sub-rounded mud clasts, base has channel gouging.
968.4	968.8	SANDSTONE - silty dark-medium gray. Sideritic at base.
968.8	969.1	SANDSTONE - light-medium gray, fine grained crossbeds.
969.1	970.0	INTERLAMINATED MUDSTONE/SILTY SANDSTONE - sandstone dominates medium-dark gray. worm burrows and load casting.
970.0	979.8	MUDSTONE - silty, medium-dark gray, fine silty laminae bedding 75° to core axis. More silty at base.
979.8	980.3	SILTSTONE - sideritic - brownish/gray with numerous thin shell bands (pyritized)
980.3	984.1	MUDSTONE - silty dark gray small pyrite nodules,

CORE DESCRIPTION

HOLE # B.C. 78-2 AREA BRI - Dowling Ck.

FROM 984.1 TO 1026.8 BY R.B. Anderspn

FROM	TO	DESCRIPTION
980.3	984.1	cont'd - numerous thin silt lenses from 981.5 - 982.0, - fault gouge from 982.8 - 983.5.
984.1	984.9	INTERLAMINATED MUDSTONE/SILTSTONE - medium-dark gray, load casted.
984.9	985.2	SANDSTONE - medium-coarse grained, medium gray, disturbed bedding at base.
985.2	985.6	SILTSTONE - sandy, medium gray, numerous coal streaks, calcite rimmed.
985.6	985.9	SILTSTONE - siderite, medium-dark brownish gray.
985.9	986.5	SILTSTONE - (sideritic) medium gray, thin sandstone lenses, distorted bedding especially at base.
986.5	987.3	SANDSTONE - fine grained, medium gray, bedding 60° to core axis carbonaceous debris on bedding surface.
987.3	987.7	SILTSTONE - dark-medium gray few thin sandy laminae, base is sideritic.
987.7	990.7	MUDSTONE - dark gray, few coal streaks, pyritized shell fragments. Siltstone interlaminae 988.0 - 989.0 more silt at base.
990.7	990.8	COAL - bright, cleated banded.
990.8	991.0	SANDSTONE - quartz rich, light gray.
991.0	993.6	COAL - 2.6' dirty to 991.8, bright from 991.8 - 993.6, pulverized rock band (0.1') in lower 0.5 feet.
993.6	997.3	MUDDY SILTSTONE - carbonaceous, dark medium gray, few thin coal streaks sand lens 994.5 - 994.7 bedding - 70° to core axis.
997.3	1001.6	MUDSTONE - coaly, dark gray-black, few siderite nodules.
1001.6	1002.8	MUDSTONE - silty, dark-medium gray.
1002.8	1006.1	SILTSTONE - sandy&dark-medium gray, occasional thin coal streak.
1006.1	1006.8	SANDSTONE - dark-medium gray, medium grained mud clasts at base.
1006.8	1007.0	MUDSTONE - base is ground.
1007.0	1013.7	SILTSTONE - sandy, medium gray slickensided fault surface at 1008. 45° to core axis bed at 70° to core axis. Fine sandstone laminated 1111.0' - 1112.5' becoming sandier at base. Sandy siltstone clasts at base.
1013.7	1026.8	SANDSTONE - light gray, fine grained-medium grained, crossbeds bedding 70° to core axis. Carbonaceous debris on bedding surfaces. Coarse grained at 1016.5, many mud clasts at 1019.5 to 1019.8 and 1025.3 to 1025.5. Thin distorted coal streaks 1026.2 - 1026.8.

CORE DESCRIPTION

no E # B C. 78-2 AREA BRI - Dowling Ck.

FROM 102.8 TO 1102.3 BY R.B. Anderson

FROM	TO	DESCRIPTION
1026.8	1037.7	MUDSTONE/SILTY - dark gray, occasional coal streaks.
1037.7	1039.6	MUD&TONE - dark grav-black many thin coal streaks.
1039.6	1040.8	MUDSTONE - coalv, black, highly broken thin talc band within unit.
1040.8	1051.1	MUDSTONE - silty medium-dark gray, numerous thin siltstone laminae with crossbeds.
1051.1	1052.6	COAL - 1.5' upper bench cannel coal lower bench-bright, blocky, highly fractured throughout.
1052.6	1052.8	MUDSTONE - coalv dark gray, coal streaks.
1052.8	1056.4	SILTSTONE - dark-medium gray, distorted bedding.
1056.a	In58.n	COAL - 1.6' blocky, bright, black thin micaceous split at 1056.8 at 70° to core axis.
1058.0	1058.5	SILTY SEED EARTH (SEAT-EARTH)
1058.5	1058.7	COAL - 0.2' broken, bright, black, blocky.
in58.7	1059.4	SILTY SEED EARTH - many thin coal streaks.
1059.4	1060.0	MUDSTONE - coaly black.
1060.0	1060.7	COAL - ' briuht black blocky broken.
In6n.7	1061.7	MUDSTONE - dark grav few thin coal streaks bedding to core axis.
1061.7	1062.9	SILTSTONE - muddy, medium-dark gray, worm burrows throughout.
1062.9	1065.7	MUDSTONE - silty, dark gray, occasional thin siltstone interlaminae.
1065.7	1066.8	SANDSTONE - medium grav. medium grained many thin mudstone interbeds.
1066.8	1068.5	MUDSTONE - dark grav.
1068.5	1068.8	COAL - 0.3' bright black broken.
1068.8	1074.8	SILTSTONE - sandv, medium gray, abundant fine grained carbonaceous debris bedding at 75° to core axis.
In7a.x	In87.8	SANDSTONE - fine to medium grain, light-medium gray. mudstone clasts from 1077.5 - 1075.8. Bedding 80° to core axis thin coal streaks from 1082.0 - 1083.8.
1083.8	1085.2	MUDSTONE carbonaceous, dark gray-black numerous thin coal streaks, fractured, slickensided at 80° to core axis (bedding plane slips)
1085.2	1085.5	SILTSTONE - sandy, medium gray.
1085.5	1094.7	MUDSTONE - dark gray, occasional thin coal streak many slickensided surfaces at various angles.
1094.7	1098.3	MUDSTONE - silty dark-medium gray.
1098.3	1098.8	MUDSTONE - dark grav.
1098.8	1100.0	COAL - 1.21 - compact, duram coal, metallic lustre.
1100.0	1102.3	MUDSTONE - silty-medium-dark gray.

CORE DESCRIPTION

HOLE # B.C. 78-2 **AREA** BRI COAL - Dowling Ck.

FROM 1102.3 **TO** 1126.0 **BY** R.B. Anderson

FROM	TO	DESCRIPTION
1102.3	1104.9	MUDSTONE - dark gray.
1104.9	1105.0	COAL - 0.1 broken
1105.0	1105.4	MUDSTONE - coaly, black.
1105.4	1108.8	MUDSTONE - silty, dark gray.
1108.8	1109.5	SILTSTONE/MUDSTONE - interlaminated - medium-dark gray, distorted bedding, calcite rimmed coal clasts.
1109.5	1110.7	MUDSTONE - silty, medium-dark gray.
1110.7	1113.2	MUDSTONE - dark gray.
1113.2	1113.9	SILTSTONE - sandy, medium gray.
1113.9	1115.3	MUDSTONE - silty, medium-dark gray.
1115.3	1115.5	SANDSTONE - light-medium gray.
1115.5	1116.5	MUDSTONE - silty medium-dark gray.
1116.5	1120.3	SILTSTONE - medium gray, occasional mudstone and sandstone interbeds, sandier at base. Small scale crossbeds and worm burrows.
1120.3	1122.9	MUDSTONE - silty, medium-dark gray.
1122.9	1124.0	MUDSTONE - dark gray.
1124.0	1124.9	SILTSTONE - medium gray small scale crossbeds, thin mudstone interlaminae with occasional worm burrows.
1124.9	1126.0	MUDSTONE - silty, medium-dark gray,worm burrows throughout, siltstone interlaminae
		END OF HOLE 1126.0'

PR - BRI. - DOWLING CR. 78(3)A.

467

NELL COMPLETION REPORT

Bri-Dowling Creek Prospect

Hole No. BC-78-3

Location: Mile 27.5 Johnson Creek-Track Creek Road 6,205,570 mN 543,060 mE

Gr. Elev.: 818 m

Province British Columbia

Surface Owner Crown Coal Licence ~~Option~~ NO.

Spudded July 30, 1978 Completed Ausust 3. 1978

Depth: 776' Air to - Water (Mud) to 776'

Hole Size: HQ, 3.782" Bits: Surface tricone (4.75"~)

Main Hole diamond inserts (3.782")

Cored: (Yes) (No); intervals 145' to 776' (wireline, convention)

Core Head: ( ), I.D. 2.5", O.D. 3.782", Mfgr. Canadian Lonavear Ltd.

Logs Run: E-Log ( ), Gamma Ray (x), Other Densitv

Mfgr. Gearhart - Owens

Logging Co. Utah Mines Ltd.

Chemicals:

Lost Circulation at depth(s) ; Regained (Yes) (No)

Noticeable Water Invasion: (No) (Yes); Intervals bottom of hole

Noticeable Gas Invasion: (No) (Yes); Intervals

Casing: Depth 141'; Diameter HW 4.5" Recovered (Yes) (No)

Plugged: (Yes) (No); if no, explain as of Aug. 7, 1978; awaitinq statement from B.C. Dept. of Mines Reclamation Officer.

If hole plugged by other than contractor, give name and address

Invoice Number for above

Contractor: Name & Address Canadian Longyear Ltd.

-Samples and Core Description by: A. T. Armstrong

Report Prepared by: A. T. Armstrong Date August 7, 1978

Comments: Core recovered is entirely from the Gething Formation and is thought to be from near the top of the formation.

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 0 TO 178.4 BY A. T. Armstrong

FROM	TO	DESCRIPTION
0	145	OVERBURDEN
		GETHING FORMATION
145	147.4	SANDSTONE - medium gray, quartz sandstone, 10-20% mafics, few scattered mud pellets at 145.5 - 146.5 coal streaks (irregular) also at 147.1 - carb. slip at 147.4 (base)
147.4	147.8	SILTSTONE/MUDSTONE - interlain dark-medium gray, irregular siltstone laminae
147.8	150.8	SILTSTONE - medium gray, fine irregular laminae
150.8	155.7	SILTSTONE - fine grained, light medium gray, bedding irregular bd. 70° to C.A.
155.7	156.0	MUDSTONE - black, carbonaceous
156.0	156.6	COAL - 0.6' black, bright, cleated
156.6	156.8	SANDSTONE/SILTSTONE - interlain, light-medium gray, sandstone - fine grained, fine small x-beds at base
156.8	160.3	SILTSTONE/MUDSTONE - interlain, smaller grain size towards base, medium dark gray. At 157.7 - sandstone band 0.05' thick, sandstone band at 158.2. Carbonaceous at base, pyrite on bedding planes at base.
160.3	161.8	COAL - 0.5' 10%-15% recovered, mixed bright and dull
161.8	162.1	MUDSTONE - dark gray, fine carbonaceous bands decreasing in no. downward, very fine disseminated pyrite.
162.1	164.5	SILTSTONE - dark medium gray, few coal streaks disseminated fine grained pyrite, fine x-beds and laminations 163.7-164.5
163.7	164.5	
164.5	167.1	SANDSTONE - fine grained light - medium gray, indistinct irregular bedding
167.1	169.5	SILTSTONE/MUDSTONE - interlain mudstone content increases downward bd. 75° to C.A. Worm burrows at top
169.5	172.1	MUDSTONE - dark gray, fine grained pyrite replacement and disseminated pyrite at base
172.1	172.9	MUDSTONE - coal bands and disseminated pyrite 25% recovery.
172.9	173.4	MUDSTONE - dark gray
173.4	178.0	MUDSTONE/SILTSTONE - interlain mainly siltstone at top, grades to more mudstone at base. Siltstone - light - medium gray. Mudstone - light brown(tar
178.0	178.4	MUDSTONE - black, coal streaks

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 178.4 TO 211.0 BY A. T. Armstrong

FROM	TO	DESCRIPTION
178.4	178.8	MUDSTONE/SILTSTONE - interlain, irregularly mixed
178.8	179.8	SILTSTONE/SANDSTONE - grades from siltstone → sandstone at base medium gray
179.8	183.9	SILTSTONE/MUDSTONE - grades from siltstone top to mudstone bottom , medium - dark gray
183.9	184.8±	MUDSTONE - black coal streaks, fine disseminated pyrite
184.8±	185.2±	MUDSTONE - carbonaceous and coal interbeds, fine disseminated pyrite
185.2±	185.5±	MUDSTONE - carbonaceous with pyritic leaf replacement and disseminated pyrite.
185.5±	186.7	COAL - 1.2' bright, black, cleated 25% recovery.
186.7	187.0	MUDSTONE - fine carbonate veining, dark gray, small pyrite replacement modules and disseminated pyrite.
187.0	188.5	MUDSTONE - silty carbonaceous debris, disseminated fine grained pyrite throughout.
188.5	189.6	SILTSTONE - fine grained, medium gray, x-bedded few fine silty bands
189.6	190.5	MUDSTONE - silty, thinly bedded, worm burrows
190.5	192.7	SILTSTONE - silty, minor x-beds, band 75° to C.A. cyclic dep'n of silt to sand repeated throughout
192.7	196.1	SILTY MUDSTONE/MUDSTONE - interlain, medium gray, dark gray, disturbed bedding at top, muddier downward, fine x-beds, extremely fine load casts at base.
196.1	202.3	SILTY MUDSTONE - MUDSTONE - grades to mudstone towards base, mdedium dark gray, Ironstone bands at 197.8 - 197.9, 200.3-200.4, brownish gray
202.3	202.35	MUDSTONE - carbonaceous, black, strongly pyritic
202.35	203.4	COAL - 1.05' bright, black, blocky
203.4	204.1	MUDSTONE - dark gray, carbonaceous, coal streaks. Grades into next unit below.
204.1	204.8	MUDSTONE - silty, medium gray
204.8	205.8	SILTSTONE/SILTY MUDSTONE - interlain - irregular, medium gray
205.8	208.4	SANDSTONE/SILTSTONE/MUDSTONE - interlain - irregular bedding, light gray-black, few very fine x-beds in sandstone.
208.4	210.3	MUDSTONE - dark gray - black, pyritic at base, Ironstone band at 209.3
210.3	210.6	COAL - 0.3' dull and bright mixed, black
210.6	211.0	MUDSTONE - silty, with few fine carbonate veins.

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 211.0 TO 262.0 BY A. T. Armstrong

FROM	TO	DESCRIPTION
211.0	213.4	SILTSTONE/MUDSTONE - irregular bedding interlain, medium gray, dominantly siltstone.
213.4	219.1	SANDSTONE - finely laminated, fine grained light-medium gray, x-beds, finer grained at base. Band 76° to C.A. bioturbated at 218.0'.
219.1	221.5	SILTSTONE/SILTY MUDSTONE/MUDSTONE - grades from siltstone at top to mudstone at base. Bioturbated from 219.1 - 219.4.
221.5	230.7	SILTY MUDSTONE/MUDSTONE - gray to black carbonaceous material throughout
230.7	231.0	MUDSTONE - carbonaceous, black, coal streaks, slickensided shears
231.0	231.65	COAL - 0.65' 40% recovered dull and bright mixed.
231.65	232.0	MUDSTONE - carbonaceous with coal streaks.
232.0	235.6	SILTSTONE/MUDSTONE - irregular laminations light-medium to dark medium gray, carbonaceous from 232.0-232.8.
235.6	238.8	SANDSTONE - silty - light gray, massive, sandier as you move to base, fine grained.
238.8	245.2	SANDSTONE/SILTSTONE - interbedded, fine laminae fine x-beds, light-medium gray, fine-grained.
245.2	245.5	MUDSTONE - dark gray.
245.5	246.9	SANDSTONE - medium grain light-medium gray, x-beds
246.9	247.15	MUDSTONE - sideritic, gray-tan
247.15	247.25	SANDSTONE - carbonaceous debris, irregular channel or lens.
247.25	247.95	MUDSTONE - coaly, black, coal streaks throughout, slickensides.
247.95	249.0	MUDSTONE - coal streaks, dark gray.
249.0	251.7	MUDDY SILTSTONE - medium gray, mudstone clasts 250.6 to 251.7.
251.7	257.8	SANDSTONE - fine grained , light to medium gray, mottled to irregularly banded. - imperfect x-bedding 254.7-254.9, 256.3-256.5.
257.8	259.2	SILTY MUDSTONE - medium gray to dark gray - increasing mud content downward 258.6-258.8 carbonaceous fragments
259.2	260.1	MUDSTONE - dark gray to black 259.5 carbonaceous plant debris
260.1	261.0	COAL - 0.9'± - bright, black, blocky
261.0	261.4	MUDSTONE - dark brownish gray, coal streaks to 261.2, fine grained pyrite spheroids and irregular masses 261.2 to 261.4 comprising 25% of rock.
261.4	262.0	COAL - 0.6'± - bright, black, blocky duller with bright streaks near bottom.

Note: Underlined footages are approximate - core is badly broken with variable loss.

CORE DESCRIPTION

HOLE # BC 78-3 AREA

FROM 262.0 TO 306.7 BY A. T. Armstrong

FROM	TO	DESCRIPTION
262.0	263.0	MUDSTONE - dark brownish grey to black - carbonaceous debris
263.0	263.2	COALY MUDSTONE - black
263.2	264.0	MUDSTONE - dark gray to black mottled
264.0	265.7	COALY MUDSTONE - dark brownish grey mudstone with strong coal streaks.
265.7	266.65	COAL 0.95'± - bright, black, blocky
266.65	267.6	MUDSTONE - dark gray - coal streaks to 267.3'
267.6	269.7	INTERLAMINATE SILTSTONE - MUDSTONE - light medium gray to dark gray - generally finely laminate with bedding disturbed throughout. - minor fine grained sandstone content near base.
269.7	271.0	SANDSTONE - light gray, fine grained, minor x-bedding 270.5 to 271.0'
271.0	276.7	SILTY SANDSTONE TO MUDDY SILTSTONE - light grey to black, regular to moderately disturbed fine laminations (apparently cyclic) fine black carbonaceous bands. - bedding @ 75° to C/A.
276.7	278.4	MUDDY SILTSTONE - medium gray, occasional fine siltstone bands.
278.4	280.3	SANDSTONE - fine to medium grained, medium grey x-bedded Ironstone clasts @278.7, 279.5'-279.6' and 279.7'
280.3	292.25	INTERLAMINATED SILTSTONE, SILTY MUDSTONE - light gray to dark gray often with a brownish tinge, fine channel scouring, very fine x-bedding, load casting common throughout - worm burrow @ 281.0' - very fine coal streaks @ 282.35' - siltstone clasts with mudstone matrix @ 290.8' to 291.0'
292.25	292.35	CARBONACEOUS MUDSTONE - black - slickensided surfaces
292.35	293.2	COAL - 0.85'± - bright, black with extremely bright vitrain streaks
293.2'	293.4'	COALY MUDSTONE - black with coal streaks
293.4'	298.6'	MUDSTONE - dark gray to black - fine coal streaks and carbonaceous debris throughout.
298.6	300.65	COAL - 2.05'± - bright and black to dull and black with some very thin brownish mudstone laminae.
300.65'	300.9'	MUDSTONE - dark brownish gray - carbonaceous
300.9	306.7'	SILTSTONE - generally light medium gray, some dark gray muddy bands near the top with minor carbonaceous debris - very finely laminate and often disturbed.
Note:	Underlined footages are approximate - core is badly broken with variable loss.	

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 306.7 TO 351.8 BY A. T. Armstrong

FROM	TO	DESCRIPTION
306.7'	308.5'	MUDSTONE - dark gray to black at bottom
308.5'	308.75	COAL SEAM - 0.25' - bright and black with brilliant vitrain streaks
		- irregular contacts (lower surface @ approximately 70° to C/A)
308.75	308.8'	MUDSTONE - black, carbonaceous, irregular
308.8'	312.5'	SILTSTONE - medium gray, highly disturbed down to 311.7' with numerous irregular fine calcite veins and gash fillings 309' to 311.2' - thin shell band? @ 311.4'
312.6'	314.5	SILTY MUDSTONE dark medium gray - carbonaceous debris throughout
314.6'	315.7	INTERLAMINATE SILTSTONE - SILTY MUDSTONE - light to medium gray - mud clasts near top
		- very fine slump folding in fine laminations.
315.7	320.9	SILTY MUDSTONE - Medium gray, with light gray silt beds throughout.
320.9	321.0	MUDSTONE - black, pyritic, coal streaks
321.0	322.35	COAL - 1.35' few, silty bands at top, bright, black
322.35	322.4	MUDSTONE - black, coal streaks
322.4	339.2	SILTSTONE/SANDSTONE/MUDSTONE - interlain dominantly fine grained, light gray sandstone and siltstone. Mudstone content diminishes from 322.4' - 325.0' few fine coaly streaks near top, well developed fine x-beds throughout occasional worm burrows. Mudstone content increases from 337.3'-339.2' band 77° to C.A.
339.2	345.7	MUDSTONE/SILTSTONE - interlain - irregular thin laminations, fine grained pyrite at 343.3' band 77° to C.A. at base. Light - medium gray to dark gray.
345.7	346.6	MUDSTONE - coaly, slickensided coal streaks
346.6	347.3	SILTSTONE - muddy, medium gray
347.3	348.25	MUDSTONE - coaly, black coal streaks, slickensided surfaces
348.25	348.5	SILTSTONE - medium gray - brown to light gray, many fine coal streaks, down to 348.6, small filled channel at base.
348.5	349.9	SILTSTONE - muddy - medium gray
349.9	350.5	SANDSTONE - silty, fine grained, very fine laminae, graded bedding
350.5	351.8	MUDSTONE - dark gray - black, Ironstone bands from top to 351.0.
Note:	Underlined footages are approximate - core is badly broken with variable loss.	

CORE DESCRIPTION

HOLE # BC 78-3 AREA

FROM 351.8 TO 411.7 BY A. T. Armstrong

FROM	TO	DESCRIPTION
351.8	352.0	SANDSTONE - silty, medium brown-grey, coal streaks, possible channel sill.
352.0	352.4	COAL - 0.4 bright, black, irregular contacts.
352.4	352.7	MUDSTONE - black, fine coal streaks
352.7	368.3	SILTSTONE - interlain with mudstone and fine grained sandstone, fine x-beds and laminations light grey - medium grey, occasional load marks and carbonaceous bands becomes muddier downward carbonaceous debris near base minor disseminated pyrite
368.3	370.10	COAL - 1.8' moderately bright with bright steaks.
370.10	370.15	MUDSTONE - carbonaceous
370.15	370.70	MUDSTONE - silty, fine coal streaks
370.70	371.7	MUDSTONE/SILTSTONE - interlain, medium-dark grey
371.7	378.7	SILTSTONE/SANDSTONE/MUDSTONE (silty) - interlain, finely laminated, fine x-beds, fine carbonaceous veins at 375.25 + 375.4
378.7	386.9	MUDSTONE/SILTSTONE - interlain, medium-dark grey silty clasts in mudstone matrix at 380.7 to 380.9 band 76° to C.A.
386.9	392.7	MUDSTONE/MUDDY SILTSTONE - interlain dark grey-black carbonaceous material throughout, pelecypod shells at 391.4.
392.7	392.9	SANDSTONE - fine grained light-medium gray
392.9	397.2	SILTSTONE/SILTY MUDSTONE - light grey-dark grey finely laminated fine x-beds 394.5-394.8
397.2	398.8	MUDSTONE - dark grey-black, few silty clasts
398.8	399.0	SANDSTONE - light grey, fine-grained
399.0	399.25	MUDSTONE - coaly, bright coal streaks throughout
399.25	399.8	SILTSTONE - medium grey
399.8	399.85	COAL - 0.05' black, bright
399.85	402.1	MUDSTONE - light grey brown to black, fine shell debris at 400.6, coal streaks from 401.0-401.1 grades to lower unit
402.1	402.95	SANDSTONE - silty - fine grained, load casts at 402.5 band 75° to C.A.
402.95	403.4	MUDSTONE - grades into fine grained sandstone light brown to medium grey, carbonaceous debris throughout
403.4	404.5	MUDSTONE - silty grades to mudstone, light brownish grey - dark grey, 404-404.5 carbonate veining
404.5	410.6	SANDSTONE - fine grained, light grey, fine laminae x-beds
410.6	411.7	MUDSTONE (silty) SILTSTONE - interbedded light-medium grey

Note: Underlined footages are approximate - core is badly broken with variable loss.

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 411.7 TO 461.2 BY A. T. Armstrong

FROM	TO	DESCRIPTION
411.7	414.0	SANDSTONE - fine grained light grey, carbonate vein at 10° to C.A. at 411.9'
414.0	418.2	MUDSTONE - medium to dark grey, Ironstone band at 416.3, silty bands at base
418.2	422.8	SANDSTONE/SILTSTONE - interlain - fine-grained sandstone light grey - dark grey, fine laminations and x-beds.
422.8	423.4	MUDSTONE - silty - fine laminations, medium grey
423.4	424.0	SILTSTONE - medium grey, fine laminations
424	426.4	INTERLAMINATE MUDSTONE & MUDDY SILTSTONE - dark grey to black, finely laminate with irregular bedding surfaces - 424.9 - 425.3 fine worm burrows.
426.4	427.6	SILTY MUDSTONE - dark grey, coal streaks
427.6	428.4	MUDSTONE - black coal streaks
428.4	431.0	COAL - 2.6' shiny, with bright streaks dirty at top
431.0	431.6	MUDSTONE - silty - fine coal streaks
431.6	434.5	SANDSTONE - silty, light-medium grey, fine-grained,
434.5	440.3	SANDSTONE - fine grained to medium grained, silty laminae at base, band 80° to C.A. scour marks on basal contact.
440.3	444.5	MUDSTONE - dark grey to black, Ironstone bands at 442.2 and 442.65, few coal streaks at base.
444.5	444.7	COAL - 0.2' bright, black
444.7	444.9	MUDSTONE - coaly, black
444.9	445.1	MUDSTONE - black, few coal streaks
445.1	446.0	SILTSTONE/MUDSTONE - interlain - dark grey-black
446.0	448.7	SANDSTONE - silty carbonaceous, debris at 447.2-447.5, thin black mudstone laminae throughout
448.7	450.3	SILTSTONE/MUDSTONE - interlaminated, medium grey-black, muddier at base, worm burrows at 449.5-449.7
450.3	450.4	MUDSTONE - black, carbonaceous
450.4	451.0	COAL - 0.6' dull, black
451.0	451.3	MUDSTONE - dark grey
451.3	454.4	SANDSTONE - silty, light medium grey carbonaceous debris, fine disseminated pyrite throughout
454.4	456.6	SILTY MUDSTONE/MUDSTONE - interlain, dark grey - black
456.6	458.5	SILTSTONE/FILTY MUDSTONE - interlain - fine laminae medium to dark grey distorted beds, clastic dike at 457.9
458.5	461.2	MUDSTONE/SILTSTONE - silty clasts in a muddy matrix, fine laminations at base, medium grey to black
Note:	Underlined footages are approximate - core is badly broken with variable loss.	

CORE DESCRIPTION

HOLE # B. C. 78-3 AREA

FROM 461.2 TO 516.3 BY A. T. Armstrong

FROM	TO	DESCRIPTION
461.2	465.2	SANDSTONE - fine grained light grey, few thin carbonaceous laminae throughout
465.2	466.4	MUDSTONE/SANDSTONE - interlain, mudstone increases towards base, carbonaceous at base
466.4	466.45	MUDSTONE - carbonaceous, black, few coal streaks
466.45	466.6	COAL - 0.15 dull, black, few bright streaks
466.6	466.8	SILTSTONE/MUDSTONE (carb) - interlaminated band 82° to C.A.
466.8	472.6	SANDSTONE - fine grained, light grey, few carbonaceous mudstone bands throughout
		- core loss
472.6	474.2	COAL 1.6' (50% recovery) black, dull-bright
474.2	474.6	MUDSTONE - black
474.6	480.8	SILTSTONE/MUDSTONE (silty) - interlain, minor sand laminae throughout, disturbed bedding medium grey-dark grey
480.8	487.2	MUDSTONE/SANDSTONE - interlain, light grey-black, at 484.2 - worm burrows, highly disturbed bedding
487.2	492.3	SILTSTONE/MUDSTONE - interlain, well developed bedding and x-beds, worm burrows at 488.8-489.1 light medium grey to black.
492.3	496.8	SILTSTONE - light-medium grey, carbonate vein at 492.8, well developed x-beds, muddy at base
496.8	502.6	MUDSTONE/SILTSTONE - mixed - increasing mudstone at base, light medium grey-black highly disturbed bedding sandy band at 502.3
502.6	502.7	CONGLOMERATE - sandy medium grey pebbles up to 4 mm. in diameter
502.7	504.2	MUDSTONE - black, carbonaceous at base
504.2	505.25	COAL 1.05' bright black blocky 40% recovery
505.25	506.0	MUDSTONE - black, coal streak at top
506.0	514.3	SILTSTONE/SANDSTONE - interlain fine grained sandstone well developed bedding and x-beds
		- siltstone is muddy in places light grey-dark grey
		- worm burrows at 509.7 and 511.1-511.3 scour/filled at 513.8, coal streak at base
514.3	515.8	MUDSTONE - coaly, black bright coal streaks carbonaceous debris on bedding surfaces
515.8	516.3	MUDSTONE/SILTSTONE - dark grey, carbonaceous debris, highly disturbed

Note: Underlined footages are approximate - core is badly broken with variable loss.

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 516.3 TO 573.6 BY A. T. Armstrong

FROM	TO	DESCRIPTION
516.3	518.4	SANDSTONE/SILTSTONE (muddy) - interlain band 80° to C.A. regular bedding, highly disturbed at base.
518.4	519.3	SILTSTONE - muddy, dark grey
519.3	520.8	SILTSTONE/MUDSTONE - interlain, light grey-black fine laminae.
520.8	521.9	MUDSTONE - black
521.9	523.4	MUDSTONE/SILTSTONE - interlain silty at top, muddy at base disturbed - worm burrows throughout.
523.4	531.0	MUDSTONE - black, carbonaceous, toward base silty streaks throughout
531.0	531.3	COAL - 0.3 cannel coal - dull
531.3	532.8	MUDSTONE - black
532.8	534.0	MUDSTONE - silty, dark grey
534.0	539.5	SANDSTONE - fine grained light grey, x-beds, worm burrows at 534.4, 537.8, 538.5 becomes siltier at base
539.5	540.6	SILTSTONE/MUDSTONE - light medium to dark grey distinct and highly disturbed bedding
540.6	542.2	MUDSTONE/SILTSTONE - interlain medium grey - dark grey muddy with silty clasts at top distinctly interlaminated at base
542.2	543.3	MUDSTONE - carbonaceous, black
543.3	543.8	MUDSTONE - coaly
543.8	544.05	COAL - 0.25' bright black
544.05	544.35	SILTSTONE - coal and carbonaceous material throughout fine carbonate streaks throughout
544.35	545.9	COAL - 1.55' - bright black blocky
545.9	546.0	MUDSTONE - coal streaks, black
546.0	546.8	COAL - 0.8' bright, black
546.8	547.7	MUDSTONE - black, carbonaceous
547.7	550.2	MUDSTONE/SILTSTONE - interlain light grey-black finely laminae, graded beds worm burrows from 549.7-550.2
550.2	571.6	SILTSTONE - muddy - disturbed to well mixed light grey-dark grey - sandy from 544.6-544.8, 555.5-555.6, 556.-556.7, 557.4-557.9 carbonate rimmed coal streaks at 558.0 muddy bands at 567.3-567.5, 567.9-568.4, 569.1-569.3
571.6	571.9	SANDSTONE - light grey, stripped, fine grained
571.9	572.6	COAL - 0.7' cannel - some bright bands (some core loss)
572.6	573.6	SILTSTONE (muddy)/SILTSTONE - mixed, irregular calcite veins throughout, shell fragments and carbonaceous debris, siltstone clasts in muddy siltstone at base. Light grey and medium grey-brown.

NOTE: Underlined footages are approx.-core is badly broken with variable loss.

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 573.6 TO 643.0 BY A. T. Armstrong

FROM	TO	DESCRIPTION
573.6	576.2	COAL - 2.6' - dull, bright, black
576.2	576.7	MUDSTONE - black, coal streaks near top.
576.7	581.3	SILTSTONE/MUDSTONE - interlain very fine laminae at top, becoming siltier and larger at bottom
581.3	582.1	MUDSTONE - black, thin coal streaks
582.1	584.3	MUDSTONE - silty, dark grey
584.3	585.5	SILTSTONES - medium to dark grey
585.5	593.6	SILTSTONE/SANDSTONE - interlain light to medium grey coal streak at 586.5. X-beds from 588.1-589.0. Lithic fragments in sand from 590.5-590.8. Muddy from 590.9 to 591.4 disturbed beds from 591.4 to base, small clasts at base.
593.6	599.2	SILTSTONE/MUDSTONE - mixed and interlaminated medium grey-black, more muddy increases downward.
599.2	599.25	MUDSTONE - coaly
599.25	600.2	COAL - 0.95' - bright, black and hard
600.2	600.45	MUDSTONE - coaly, black, many coal streaks
600.45	601.4	MUDSTONE - coal streaks, black
601.4	609.8	SILTSTONE/MUDSTONE - interlain, finely bedded and x-bedded, light medium grey to black, mainly siltstone worm burrows from 602.6 to 603.2 and at 605.6 - carbonaceous surfaces common - fine calcite on lower bedding surfaces
609.8	612.4	MUDSTONE/SILTSTONE - interlain, mainly mudstone, medium grey to black.
612.4	619.5	MUDSTONE - black, at 613.7, small coal seam (less than 0.4') not recovered. Coal streaks 615.9-616.4, some slickensides. At 619.2-619.5, carbonaceous debris.
619.5	621.7	SILTSTONE/SILTY MUDSTONE - mixed and interlaminated - light grey-medium grey
621.7	632.7	SANDSTONE - light-medium grey, fine-medium grained, coarser downward, x-beds. At 623.6-624.3, silty, with disturbed bedding, some carbonaceous surfaces from 625.5 to 628.1. - Mud clasts at 628.5 and 630.7.
632.7	637.6	MUDSTONE/SILTSTONE - interlain, increasing mud content downward, light medium grey to back, silt beds at base broken to form aligned clasts.
637.6	639.5	MUDSTONE - black, carbonaceous debris throughout, fine coal streaks.
639.5	640.0	SILTSTONE - light medium grey
640.0	643.0	MUDSTONE - black, carbonaceous, coal streaks from 640.3 to 640.6.

NOTE: Underlined footages are approx. - core is badly broken with variable loss.

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 643.0 TO 693.6 BY A. T. Armstrong

FROM	TO	DESCRIPTION
643.0	666.5	MUDSTONE/SILTSTONE/SILTY MUDSTONE - interlain light grey to black, mainly mudstone, rhythmic succession of silts and muds, finely bedded, up to beds approaching 0.5', some disturbed bedding, graded fine sandstone unit 665.6-665.7. Sandy at base.
666.6	667.3	MUDSTONE - sandy streaks at 666.85 and 667.15.
667.3	668.5	MUDSTONE/MUDDY SANDSTONE - interlain speckled light grey and black. Carbonaceous debris and coal streaks in sandstone and mudstone at: 667.6 - 668.15
668.5	670.7	SANDSTONE - fine grained, light grey, coal streaks at 668.9, fine mudstone clasts from 669.8 to 670.5. Mudstone band 670.5 - 670.55.
670.7	671.2'	MUDSTONE - black, with numerous coal streaks
671.2	672.6	SANDSTONE - light to medium grey, silty at top, with fine sand content towards the bottom. Worm burrows at 672.1
672.6	674.0	SANDSTONE - light grey to light medium grey, fine to medium grained - in part, finely laminate and finely cross-bedded. Some grade bedding.
674.0	674.5	SILTSTONE, MUDSTONE, SANDSTONE (Interlaminate) - finely banded, light medium grey to black - predominantly siltstone - bedding irregular worm burrows at 673.4'
674.5	674.9	SANDSTONE - light grey, fine grained finely bedded and x-bedded.
674.9	676.8	MUDDY SILTSTONE - medium grey to dark grey, mottled, increasing mud content downward.
676.8	680.5	MUDSTONE - black coal streaks 678.6 to 679.5 - silty with mottled appearance near base
680.5	681.3	MUDDY SILTSTONE - dark medium grey, strongly disturbed bedding
681.3	686.2	INTERLAMINATED SILTSTONE-MUDSTONE- light medium grey to black - well bedded and finely x-bedded to strongly disturbed bedding - increasing mud content toward base.
686.2	689.3	SILTY MUDSTONE - medium grey to black - silt as fine discontinuous lenses giving a mottled appearance.
689.3	693.6	MUDSTONE - black, become carbonaceous near the base, coal streak from 693 to 693.6
NOTE:	Underlined footages are approximate - core is badly broken with variable loss.	

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 693.6 TO 731.0 BY A. T. Armstrong

FROM	TO	DESCRIPTION
693.6	695.5	COAL - 1.9'± - black, moderately bright with bright streaks - ash present and conspicuous from 695.3' to 695.5'.
695.5'	696.0'	MUDSTONE - dark brownish grey
696.0	696.35'	SILTY MUDSTONE - dark brownish grey, irregularly banded - Coal streak at top, carbonaceous down to 696.1'
696.35'	696.45'	COAL - 0.1'± - bright, black, cleated
696.45'	697.3'	MUDSTONE - black, carbonaceous and coal streaked
697.3'	705.9'	SILTY MUDSTONE, MUDSTONE, SILTSTONE - Interlaminate and mixed, light medium grey to dark grey - predominantly silty mudstone, - bedding generally disturb to highly mixed - well developed worm burrows 704.3 to 704.7
705.9'	710.3'	SANDSTONE - fine grained, light to medium grey - well defined fine bedding and x-bedding - bedding variable 77° to 82° to C/A
710.3'	711.9'	COAL - 1.6'? - moderately bright with bright streaks, black
711.9'	712.2'	MUDSTONE - brownish black, carbonaceous and with coal streaks
712.2'	713.2'	SILTSTONE - light medium grey, coarsely speckled with carbonaceous debris
713.2'	716.0'	SILTSTONE-SANDSTONE - light to medium grey fine sandstone, well bedded to weakly disturbed, good graded bedding at the base - mudstone lamination at 714.3' to 714.35'
716.0'	719.4'	INTERLAMINATED MUDDY SILTSTONE, MUDSTONE & SILTSTONE - light medium grey to dark grey - well bedded to x-bedded to lensy - mudstone becomse predominent towards base
719.4'	720.1'	INTERLAMINATE MUDSTONE-SILTSTONE - medium grey to black - predominantly mudstone with thin siltstone laminae and lenses.
720.1'	720.8'	COAL - 0.7'? - black - moderately bright with bright streaks
720.8'	721.4'	MUDSTONE - black - carbonaceous and coal streaked
721.4'	733.1'	SILTY MUDSTONE - mixed - dark grey mottle appearance
722.1'	737.6'	INTERLAMINATED SILTSTONE - SANDSTONE - light grey to medium grey, fine grained sandstone - well defined x-bedding, few muddy lenses
727.6'	731.0'	INTERLAMINATED MUDSTONE-SILTSTONE - medium grey to black - predominantly mudstone with increasing mud-stone content downward. Siltstone diminishes to small lenses downward - worm burrows @ 731'

NOTE: Underlined footages are approximate - core is badly broken with variable loss.

loss.

CORE DESCRIPTION

HOLE # B.C. 78-3 AREA

FROM 731.0 TO BY A. T. Armstrong

FROM	TO	DESCRIPTION
731.0'	736.25'	MUDSTONE - dark grey to black - few fine silty lenses near top - coal streaks and carbonaceous 434.7' to 36.25'
736.25	736.65	COAL - 0.4' mixed dull to bright, black
736.65	736.8	CARBONACEOUS MUDSTONE - dark brownish grey to black
736.8	738.3	COAL - 1.5' - (core recovery approximately 10%) dull to bright, black
738.3	739.3	MUDSTONE - black, coal streaked
739.3	740.6	SILTY MUDSTONE - medium to dark grey - silt content increasing downwards - highly mixed with mottle appearance.
740.6	748.5'	SILTSTONE - SANDSTONE - light medium grey - fine grained sand - disturbed to well bedded - locally x-bedded - worm burrows 742.9, 743.8', 744.7' - fine dar grey muddy laminae - carbonaceous debris 744.7 to 748.5'
748.5	750.6	INTERLAMINATE SILTSTONE-MUDSTONE - light medium grey and black - mudstone increasing downward, siltstone often as fine discontinuous lenses towards bottom
750.6	752.2	MUDSTONE - black, coal streaked near the top - strongly disturbed with minor silt content at base.
752.2	752.4	SANDSTONE - light medium grey - fine grained
752.4	752.6	MUDDY SILTSTONE - dark grey
752.6	752.7	SANDSTONE - medium grained, medium grey speckled
752.7	753.0	MUDSTONE-SILTSTONE - medium grey to black mixed
753.0	753.7	SANDSTONE - light medium grey, medium grained x-bedded - with some graded bedding
753.7	754.	INTERLAIN SILTSTONE-MUDSTONE - medium grey to black finely laminate
754	756.8	SANDSTONE - light to light medium grey - generally fine grained with some medium grain sand near base - finely bedded with local x-bedding.
756.8	758.2'	SILTSTONE - light medium grey, finely laminate
758.2'	764.6'	INTERLAMINATE MUDSTONE & SILTSTONE - light medium grey and black - thinnly bedded to lensy downward with increasing mud content downward.
764.6	767.5	MUDSTONE - black - few silty lenses near top - carbonaceous near bottom with coal streaks at base.
767.5	767.7	MUDDY COAL - black
767.7	768.0	COAL - 0.3' - bright, black, cleated
768.0	776.0	INTERLAMINATE & MIXED MUDDY SILTSTONE, SILSTONE & MUDSTONE- medium to dark grey carbonaceous and coal streaked at top carbonaceous debris to 771.8' - generally disturbed bedding throughout with wel developed bedding (fine) 774.7 to 776.

END OF HOLE @ 776'

PR-BRI-DOWLING CR. 78(3)A.

467

WELL COMPLETION REPORT

BRI-DOWLING CREEK Prospect

Hole No. BC-78-4

Location: Approximately one mile upstream from the confluence of Gething and Dowling Creek on Dowling Creek.

Gr. Elev.: I 752m

Province British Columbia

Surface Owner Crown Coal Licence ~~Option~~ No. 3647

Spudded August 9, 1978 Completed August 16, 1978

Depth: 987.0' Air to - Water (Mud) to 987.0'

Hole Size: HQ Bits: Surface HW Casing (4.5")

Main Hole HQ (3.782")

Cored: (Yes) (No); intervals 157.0' - 987.0' (wireline, convention)

Core Head: ( ), I.D. 2 25/32, O.D. 3.782, Mfgr. Longyear

Logs Run: E-Log ( ), Gamma Ray (X), Other Density

Mfgr. Bearhart - Owens

Logging Co. Utah Mines Ltd.

Chemicals:

Lost Circulation at depth(s) - ; Regained (Yes) (No)

Noticeable Water Invasion: (No) (Yes); Intervals 595.0' to 601.0'

Noticeable Gas Invasion: (No) (Yes); Intervals

Casing: Depth 157.0'; Diameter HW Recovered (Yes) (No)

Plugged: (Yes) (No); if no, explain Casing left in hole - capped to stem flow.

If hole plugged by other than contractor, give name and address

Invoice Number for above

Contractor: Name & Address Canadian Longyear Ltd.

Samples and Core Description by: R.B. Anderson and A.T. Armstrong

Report Prepared by: R.B. Anderson Date August 17, 1978

Comments:

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA BRI-DOWLING CREEK

FROM 0 TO 580.7' BY R.B. Anderson & A. T. Armstrong

FROM	TO	DESCRIPTION
0	157'	OVERBURDEN
157'	552.9	MOOSEBAR SHALE - dark grey to black silty Ms - sub-coidal fracturing
		- polished slip surfaces at 60° to C.A.
		glauconitic - 541 to 542
		pyrite filled worm burrows common towards base
		551 to 552.9 - silty grades into rounded pebble rich sandy Ms - erosional safe at base
		GETHING FORMATION
552.9	554.2'	CARBONACEOUS Ms - dark grey to black - pyrite nodules to ½" (worm burrows on roots?)
554.2	554.7	COAL - 0.5' - base is calcite coated slip surface at 10° to C/A - some the pyrite streaks
554.7'	555.3'	SILTSTONE - bioturbated - medium grey - numerous thin calcite veinlets
555.3'	561.4'	SANDSTONE - fine to medium grained, light to medium grey x-bedded - grading to cse grained 559.8'- cse to 561.4' - erosional contact
561.4'	567.1'	MUDSTONE - dark grey - occasional pyrite nodules - silty between 562.2 and 562.8, 564.2 and 564.8 - irregular basal contact.
567.1'	568.1	SANDSTONE - fine to medium grained, wavey bedding bedding at 65° to C/A (probably x-bedding surface) carbonaceous debris on bedding surfaces.
568.1'	570.0'	SILTY MUDSTONE - medium grey - occasional fine silt laminae.
570.0'	572.3	MUDSTONE - dark grey, coal streaks near to base, silty toward base
572.3'	573.8'	SANDSTONE - light medium grey, interbedded fine, medium and coarse grained; occasional worm burrows in fine grains and beds, calcite coat slips at 45°/C.A.
573.8'	576.4'	SANDY SILTSTONE - medium grey, distorted bedding, occasional vent. worm burrow, bedding at 68° to C/A.
576.4'	577.4'	SILTY MUDSTONE - dark medium grey
577.4'	578.1'	SANDSTONE - light medium grey, fine grained, carbonaceous debris on bedding surfaces at 70° to C/A.
578.1'	578.8'	SILTY MUDSTONE - small sandstone clasts - dark medium grey.
578.8'	580.7'	INTERLAIN - SILTY MUDSTONE & SANDSTONE - light grey to medium grey - worm burrows throughout, carbonaceous debris on bedding surfaces at 70° to C/A

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA

FROM 580.7' TO 621.1' BY R. B. Anderson & A. T. Armstrong

FROM	TO	DESCRIPTION
580.7'	582.0	SILTY MUDSTONE - dark medium grey - ocassional thin silt laminations - grain size increasing downward.
582.0	583.7	SANDSTONE - fine - medium grained, medium light grey carbonaceous debris on bedding surfaces at 70° to C/A - calcite filled frature at 582.9' at 70° to C/A - silty toward base
583.7'	585.8'	SILTY MUDSTONE - dark medium grey - ocassional thin silt laminae.
585.8'	589.0'	INTERLAIN SANDSTONE - SILTY MUDSTONE - sandstone medium grained - disturbed bedding, vertical and horizontal worm burrows.
589.0'	591.1'	SANDSTONE - light grey medium to coarse grained, carbonaceous streaks
591.1'	591.2'	MUDSTONE - coaly - dark grey
591.2'	591.8'	SANDSTONE - fine grained at top coarser downward - light medium grey
591.8'	592.9'	SILTY MUDSTONE - dark medium grey - worm burrows throughout
592.9'	595.0'	MUDSTONE - dark grey
595.0'	601.1'	COAL - 6.1' - mostly durain with little vitrain
601.1'	602.1'	COALY MUDSTONE - dark grey - ocassional coal streaks
602.1'	604.8'	INTERLAIN SANDY SILTSTONE & MUDSTONE - silts are x-bedded - worm burrows throughout light medium grey to dark medium grey
604.8'	606.9'	SILTY MUDSTONE - dark grey, ocassional thin siltstone laminae - bedding at 75° to C/A
606.9'	608.7'	COALY MUDSTONE - dark grey to black - numerous ¼" coal streaks - increasing silt fraction toward base
608.7'	612.4'	SANDSTONE - fine grained, light medium grey distorted bedding worm burrows occasional silty mudstone interlain.
612.4	614.6'	INTERLAIN SANDSTONE & SILTY MUDSTONE - light grey to medium grey - worm burrows-distorted bedding
614.6'	616.7'	SANDY SILTSTONE - light medium grey - ocassional slump features
616.7'	617.3'	SILTSTONE - dark medium grey
617.3'	619.8'	INTERLAIN SILTY SANDSTONE & SILTY MUDSTONE - light medium grey to dark medium grey - calcite vein at 618.5' with brecciated wall rock. - horizontal and vertical worm burrows throughout erosional basal contact.
619.8'	620.1'	COALY MUDSTONE - dark grey to black
620.1'	621.1'	COAL - 1.0' - badly crushed

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA BRI-DOWLING CREEK

FROM 621.1' TO 685.8' BY R. B. Anderson & A. T. Armstrong

FROM	TO	DESCRIPTION
621.1'	621.6'	CARBONACEOUS MUDSTONE - dark grey
621.6'	622.9'	MUDSTONE - dark grey with numerous very thin siltstone interlaminae
622.9'	630.8'	INTERBEDDED SANDSTONE - SILTY MUDSTONE - medium light grey to medium dark grey - bedding @ 75° to C/A numerous worm burrows
630.8'	635.5'	SILTY MUDSTONE - dark grey - ocassional thin siltstone interlaminae
635.5'	643.9'	MUDSTONE - dark grey, some thin silstone interlain between 639 and 640.5
643.9'	645.2'	INTERLAMINAE SANDSTONE & MUDSTONE - light grey to dark grey bioturbated with worm burrows - x-bedded sands
645.2'	647.0'	SANDSTONE - medium grained massive ocassional thin coal streak - light grey - erosional surface at base.
647.0'	647.4'	COAL - 0.4' - dominantly durain
647.4'	648.0	COAL MUDSTONE - dark grey
648.0	651.7	SILTY MUDSTONE - dark grey - numerous coal streak towards base
651.7'	651.9'	SANDSTONE - very carbonaceous - very dark grey
651.9'	652.1'	COAL - 0.2'
652.1	652.2	SANDSTONE - coaly - split } 2.0 net/2.1 gross
652.2'	654.0'	COAL - 1.8'
654.0'	655.1'	CARBONACEOUS MUDSTONE - dark grey - numerous thin coal streaks - rather gradational at base into next unit
655.1'	656.6'	INTERMIXED MUDSTONE - SILTSTONE - blatchy dark grey and dark medium grey - minor sand content toward the base.
656.6'	657.2'	SANDSTONE - light to light medium grey - vine grained thinnly laminate and finely x-bedded
657.2'	672.6'	SILTY MUDSTONE- dark medium grey to dark grey more muddy and carbonaceous at the top with increasing silt content downward. - at 666.5', 666.9', 668.0' and 671.3' very fine irregular carbonate veins - at 667.5 several thin carbonate veins at 10° to C/A
672.6'	681.0'	INTERBEDDED SILTY MUDSTONE & SANDSTONE - predominantly ilty mudstone with few fine grained light medium to medium grey
681.0'	685.8'	MUDDY SANDSTONE TO SANDSTONE - gradational medium grey to dark grey - decreasing mud downward, generally disturbed to highly mixed with bedding and x-bedding in bottom 2 feet.

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA BRI-DOWLING CREEK

FROM 685.8' TO _____ BY R. B. Anderson & A. T. Armstrong

FROM	TO	DESCRIPTION
685.8'	691.8'	MUDDY SANDSTONE TO SANDSTONE - decreasing mud content downward - disturbed to highly mixed in top 2 feet with bedding development improving downward to well developed in bottom 2 feet - bedding at 75° to C/A strongly define by carbonaceous debris on bedding surfaces.
691.8'	692.5'	INTERBEDDED CLAYSTONE & MUDDY SANDSTONE - very pale greyish tone claystone and dark grey muddy sandstone with carbonaceous debris - 692.3' 692.5' - coal streaks
692.5'	694.2	COAL - 1.7' - very highly crushed (core necessary approximately 40%) generally bright and black with very thin dull dark brown streaks
	694.2'	
694.2'	694.4'	SANDSTONE - fine grained, pale tone coloured - with fine clasts and streaks of mudstone near upper and lower surfaces.
694.4'	695.55'	COAL - 1.15' - generally bright and black cleated to concoidally fractured.
695.55'	695.7'	CARBONACEOUS MUDSTONE - dark grey, very fine coal streaks
695.7'	701.2'	INTERLAMINATED SILTSTONE & MUDSTONE - light medium to dark grey - thin laminae at 75° to C/A - increasing mudstone content downward with siltstone becoming lensy toward base - worm burrows throughout.
701.2'	701.3'	MUDSTONE - black
701.3'	703.7'	COAL - 2.4' - (core strongly crushed 702.5 - 703.7 recovery about 15%) generally bright black coal.
703.7'	704.3'	MUDSTONE - dark grey - silty near bottom
704.3'	704.8'	SILTSTONE - medium grey, disturbed bedding
704.8'	705.4'	MUDSTONE-SILTSTONE - strongly mixed - medium grey to dark grey
705.4'	708'	SANDSTONE - light medium to dark medium grey - fine grained - thinnly laminate with some fine x-bedding - worm burrows throughout.
708'	709.6'	MUDDY SILTSTONE - dark medium grey to dark grey decreasing mud content downward - massive with some fine x-bedding. Secured basal contact.
712.1'	713.5'	SILTY MUDSTONE - dark grey massive
713.5'	717.6'	SANSATONE - fine grained, generally thinnly laminate - some fine x bedding - light medium to medium grey - few silty bands - bedding highly disturbed near base
717.6'	722.8'	INTERMIXED MUDDY SILTSTONE & SANDSTONE - light medium to dark gray, irregularly banded to blotchy -

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA BRI-DOWLING CK.

FROM 717.6' TO 776.9' BY R.B. Anderson & A.T. Armstrong

FROM	TO	DESCRIPTION
	cont'd	worm burrows common
722.8	724.8	INTERLAMINATED MUDDY SILTSTONE AND SANDSTONE - light gray to dark gray - well developed fine laminations with some fine crossbedding - bedding at 75° to core axis - few worm burrows
724.8	730.1	SANDSTONE - light medium to medium gray - fine grained - massive at top becoming finely laminated at 727.3' few worm burrows - fine crossbedding near base
730.1	731.2	INTERLAMINATE SILTSTONE AND MUDSTONE - light medium gray to dark gray - thinnly laminate
731.2'	733.0	MUDSTONE - dark grey to black - 0.2' of pale brownish grey iron rich claystone at top - coal streaks near base.
733.0'	734.5'	COAL - 1.5' - (very strongly crushed with about 10% recovery) 0.1' mudstone split
734.5'	745.4'	MUDSTONE - dark grey - minor fine sand content to 735.6' - fine carbonate veining 735.7' to 736', 736.2 - 736.3, 736.7, 737 to 738.7, 740.7-740.8, pyrite and coal streaks at 740.9' - coal streaks 743' to base
745.4'	753.85'	MIXED TO INTERLAMINATED MUDSTONE, SILTSTONE, SANDSTONE - light medium grey to dark grey - minor sandstone content, fine grained - strongly disturbed bedding 745.4' - 747.6' 748.2' - 748.8' bedding at 80° to C/A - worm burrows common throughout - increasing mudstone content downward with siltstone becoming lensy at 752'
753.85'	761.5'	COAL - 7.65' - dull to bright, black 755.8' - 756.5' - muddy coal with bright streaks (possibly a split)
761.5	764.8'	MUDSTONE - dark grey - silty band at 762.1 to 762.3' - becoming moderately silty toward the base.
764.8'	773.0'	INTERLAMINATED & INTERMIXED MUDSTONE, MUDDY SILTSTONE & SILSTONE - predominantly mudstone - finely laminate to strongly mixed banded to blotchy in appearance light medium to dark grey - mudstone content increasing toward the base - some worm burrowing.
773.0'	774.7'	MUDSTONE - dark grey to black
774.7'	776.9'	COAL - 2.2' - (strongly crushed with about 50% recovery) - generally bright black with a 0.05' sandstone split - not sampled - insufficient.

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA BRI-DOWLING CREEK

FROM 776.9' TO 826.0' BY R. B. Anderson & A. T. Armstrong

FROM	TO	DESCRIPTION
776.9'	777.2'	MUDSTONE - black
777.2'	784.0'	INTERLAMINATED & INTERMIXED MUDSTONE & SILSTONE - predominently mudstone - medium grey to dark grey - irregularly bedded to mixed - scoured bedding surfaces common and worm burrows common.
784.0'	789.0'	MUDSTONE - dark grey to black - coal streaks near the base.
789.0'	789.8'	COAL - 0.8' - good bright banded, black
789.8'	792.4'	MUDSTONE - black, occasional thin silt lamination.
792.4'	794.35'	COAL - 1.95' - black, bright, banded - thin split at 792.8 - 798.3 mudstone split
794.35'	794.6'	MUDSTONE - dark grey to black
794.6'	795.5'	SANDSTONE - light medium grey, fine grained, thinnly laminate - carbonaceous debris on bedding surfaces
795.5'	795.9'	SILTY MUDSTONE - dark grey to black
795.9'	796.8'	CARBONACEOUS MUDSTONE - black, numerous thin coal streaks
796.8'	797.9'	SILTY SANDSTONE - medium grey, bedding distorted, fine grained
797.9'	799.0'	SILTY MUDSTONE - medium dark grey, bedding at 75° to C/A - minor plant debris
799.0'	799.1'	COAL - 0.1 feet
799.1'	799.3'	SILTY MUDSTONE - dark medium grey, thin coal streaks
799.3'	802.2'	CARBONACEOUS SILTY SANDSTONE - medium grey, coarse grained and more interlaminated with silty mudstone towards base
802.2'	804.5'	SILTY MUDSTONE - carbonaceous - dark medium grey occasional siltstone laminae - grading into muddy siltstone at 804.5'
804.5	811.4	MUDDY SILSTONE - dark grey, very thin pure silt laminae, worm burrows - bedding at 75° to C/A
811.4	820.0	INTERLAMINATE MUDDY SILTSTONE & CARBONACEOUS MUDSTONE - light medium grey to dark medium grey occasional worm burrow zones - silt as x beds - erosional contact at base.
820.0	820.9	SILTY MUDSTONE - dark medium grey - occasional thin silt interlaminae.
820.9	821.45	SANDSTONE - fine grained - bedding at 75° to C/A light medium grey - carbonaceous debris on bedding surface - erosional contact with coal
821.45'	826.0	COAL - 4.55' - split 824.6 - 824.8 bentonite - bright, banded, cleated & black

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA BRI-DOWLING CREEK

FROM 826.0 TO 869.0 BY R. B. Anderson & A. T. Armstrong

FROM	TO	DESCRIPTION
826.0	827.1	COALY MUDSTONE - black with numerous coal clasts
828.0	828.5	WOLDED BRECCIA ZONE - calcite wolding
		- open vugs with pyrite crystals on calcite
		- wall rock calcite cemented
827.1	829.1	CARBONACEOUS SILTSTONE - dark medium grey, occasional thin coal clasts
829.1	830.0	CARBONACEOUS MUDSTONE - with coal clasts block
830.0	830.2	COAL - 0.2' - bright, black, banded
830.2	830.6	SILTY SANDSTONE (carbonaceous) - medium grey
830.6	832.6	CARBONACEOUS SANDSTONE - light medium grey, carbonaceous debris - thin coal streaks on bedding surfaces - fine to medium grained, medium to coarseat base
832.6	834.5	INTERLAIN SILTSTONE-MUDSTONE - light medium - medium grey
		- predominately silstone - distorted bedding
		- occasional worm burrows.
834.5	847.6	INTERLAIN MUDSTONE-SILTSTONE - light medium to dark grey - predominantly mudstone - generally disturbed bedding - some areas worm burrowed - very thin coal band at 847.2 - ocassional contact at base
847.6	850.5	INTERBEDDED SANDSTONE - SILTSTONE - fine grained sandstone-increasing siltstone downwards - massive at top and with thin distorted laminae at bottom
		- worm burrows in finer silty bands
850.5	853.5	INTERLAMINATE SILTSTONE-MUDSTONE - silty at top with increasing mud content downwards - bedding at 75° to C/A - numerous bands with worm burrows - light medium grey to dark grey
853.5	861.0	MUDSTONE - very dark grey - minor silt content near the top
861.0	865.4	INTERMIXED MUDSTONE, SILTY MUDSTONE & SILTSTONE - dark medium grey to dark grey blotchy appearance
		- bedding disturbed where present - worm burrows in silty bands - predominantly mud-stone
		- fine white carbonate bands at 862.3', 862.5 to 863'; 863.6' (possibly some organic re-mains
		- carbonaceous debris common in bottom 2 feet
865.4	865.5	COAL - 0.1' - bright, black, cleated
865.5	869.0	COALY MUDSTONE - black with numerous bright black thin coal seams and coal streaks - shearing with slickensides in thin coals - fine irregular calcite veining at 865.9', 866.3', 867.1' - some silty clasts enclosed in mud throughout.

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA BRI-DOWLING CREEK

FROM 869.0 TO 924.4 BY R. B. Anderson & A. T. Armstrong

FROM	TO	DESCRIPTION
869.0	870.0	COAL - 1.0' - bright and black
870.0	870.5	MUDSTONE - black with fine coal streaks
870.5	870.65	COAL - 0.15' - bright, black, cleated
870.65	870.9	MUDSTONE - black, few very fine coal streaks
870.9	881.5	SANDSTONE - fine grained, light grey to light medium grey - minor carbonaceous debris and mud content 870.9' to 872.0' - muddy bands at 876.0' and 876.2' - thinnly bedded and finely x bedded throughout - few infilled scour marks - few worm burrows - some normal graded bedding present - vuggy calcite veins at 780.4' and 780.8' at approximately 109 to C/A.
881.5	894.7	INTERLAMINATED MUDSTONE & SILTSTONE - light medium grey to dark grey - predominently mudstone with increasing mud content downwards - silt seduced to a few bands and lenses near base. - laminae at 75° to C/A - few worm burrows near top. - thin irregular coal seams at 886.1' and 894.2 - 894.5' - irregular calcite veining enclosing fine rock shards at 884.2'
894.7	898.3	SILTSTONE-MUDSTONE - light medium to dark medium grey - distorted bedding to strongly mixed - worm burrows common.
898.3	904.7	MUDSTONE - dark grey to black - extremely fine bright streaks of coal common
904.7	913.0	INTERBEDDED MUDSTONE - grading to medium grained sandstone in 0.4' thick repetative beds - sandstone to mudstone contact sharp, mudstone to sandstone gradational - dark grey to medium grey - sandstone usually contains mudstone clasts.
913.0	914.7	COAL - (1.7') 0.4 core available - the rest loss - that remaining is bright, black, thinnly banded - not sampled
914.7	917.8	MUDSTONE - dark grey - ocassional thin silt laminae - ocassional vertical burrows
919.6	919.8	SILTY MUDSTONE - dark grey - 75° C/A
919.8	920.2	COALY MUDSTONE - black - massive
920.2	923.7	COAL (3.5') - bright, black, shiny, cleated - 40% vitrain bands
923.7	924.4	COALY MUDSTONE - dark grey - black, numerous thin coal streaks

CORE DESCRIPTION

HOLE # B.C. 78-4 AREA BRI-DOWLING CREEK

FROM 924.4 TO 987.0 BY R. B. Anderson & A. T. Armstrong

FROM	TO	DESCRIPTION
924.4	947.5	LAMINATED MUDSTONE-SILTSTONE - dark medium grey to black predominates - laminations only up to .03' thick, silt and some thin sands dominate above 933.0
947.5	957.2	SILTY MUDSTONE - dark grey
957.2	962.2	FINELY LAMINATED SILTSTONE IN A MUDSTONE BASE - dark medium grey
962.2	964.0	COAL - (1.8') with a thin shale split at approximately 963.0 - usually bright - predominantly durain.
964.0	965.7	CARBONACEOUS SANDSTONE - dark medium grey - medium grained- full of small coal clasts and carbonaceous depris. - extensive calcite filled fractures at various to the C.A.
965.7	966.0	COAL - (0.3') - black - broken
966.0	967.0	COALY MUDSTONE- black
967.0	970.6	COAL (3.6') - dull metallic shine - Bone Coal? ashy 969.3 to 970.0 - bright cleated bench - 969.1 to 969.3
970.6	973.1	MUDSTONE - dark grey with numerous thin silty stone laminae
973.1	974.3	INTERLAMINATED SILTSTONE - MUDSTONE - medium grained - planar laminations - siderite cement in siltstone
974.3	975.5	MUDSTONE - dark grey - black
975.5	977.5	COAL - 2.0' bright - black- shiny - thinly banded
977.5	978.0	COALY MUDSTONE - dark grey - black - appears boney.
978.0	987.0	INTERLAMINATED SILTSTONE - MUDSTONE - dark grey to medium grey - silt is x-bedded - mudstone is usually vertically worm burrowed - silt appears to have scoured the mudstone.
		987.0' - E.O.H.

PR-BRI-DOWLING CR-78(3)A

467

WELL COMPLETION REPORT

BRI-DOWLING CREEK Prospect

Hole No. B.C. - 78-5

Location: On Dowling Creek at 6,197,065 m N x 539,200 m E

Gr. Elev.: 828 m

Province British Columbia

Surface Owner Crown Option No. Coal Licence 3654

Spudded August 23, 1978 Completed August 29, 1978

Depth: 276.15 m(906') Air to _____ Water (Mud) to 276.15 m (906')

Hole Size: 3.782 in. Bits: Surface Tricone (4.75 in.)

Main Hole Diamond inserts (3.782 in).

Cored: (Yes) (No); intervals 22.56m(74') to 276.15m (906') (wireline, convention)

Core Head: ( ), I.D. 2.5 in., O.D. 3.782 in. Mfgr. Canadian Longyear Ltd.

Logs Run: E-Log ( ), Gamma Ray ( ), Other Density

Mfgr. Gearhart-Owens

Logging Co. Utah Mines Ltd.

Chemicals: _____

Lost Circulation at depth(s) - ; Regained (Yes) (No)

Noticeable Water Invasion: (No) (Yes); Intervals 39.62m(130') to 276.15 m (906')

Noticeable Gas Invasion: (No) (Yes); Intervals _____

Casing: Depth 22.56 m(74'); Diameter HW 4.5 in. Recovered (Yes) (No)

Plugged: (Yes) (No); if no, explain _____

If hole plugged by other than contractor, give name and address

Invoice Number for above _____

Contractor: Name & Address Canadian Longyear Ltd.

Samples and Core Description by: A. T. Armstrong

Report Prepared by: _____ Date _____

Comments: Aluminum and rubber plugs were placed in the borehole at 25 m (82') and 45.7 m (150') to stop the large volume of water coming from the hole. A valve equipped cap will be fixed to the casing when one is available.

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 0 TO 121.5 BY A. T. Armstrong

FROM	TO	DESCRIPTION
0	74'	OVERBURDEN
74'	83'	MIXED SILTY MUDSTONE & SANDSTONE - Mottled dark grey with few irregular laminations and swirls of fine grained medium grey sandstone
83'	85.7'	MIXED TO INTERLAMINATE SANDSTONE & MUDSTONE - light medium grey to dark grey - strongly disturbed and mixed to 84' - fine grained sandstone - finely interlaminate and finely x bedded 84'-85.7' worm burrows common.
85.7'	90.3'	MUDSTONE - dark grey - few fine grained, very small, medium grey, sand lenses throughout - 87.8-88.2' fine coal streaks - some carbonaceous debris throughout.
90.3'	93.7'	MIXED TO INTERLAMINATE SILTY MUDSTONE & SANDSTONE - dark grey mudstone and light medium grey, fine grained, sandstone - mixed to disturbed bedding worm burrows common.
93.7'	101.1	MUDSTONE - dark grey - few very small, fine grained sandy light medium grey lenses 100.8' to 101.1' coal streaks
101.1'	104.6'	MIXED TO MODERATELY DISTURBED SILTY MUDSTONE & SANDSTONE- fine grained, light medium grey sandstone laminae and dark grey silty mudstone. 101.1' to 101.6' sandy bed with coal streaks and carbonaceous debris.
104.6'	109.4'	SANDSTONE - fine to coarse grained, light medium grey to medium grey - grain size increasing downward, finely laminate and x-bedded. Few worm burrows - graded bedding in coarser laminae - carbonaceous debris on bedding surfaces 108.4' - 108.6' - bedding at 65° to core axis
109.4'	118'	INTERLAMINATE SILTSTONE, SANDSTONE, MUDSTONE - predominantly siltstone and fine grained sandstone with thin laminae of mudstone - mudstone content increase downward - silty beds are very finely laminate often with fine well defined x-bedding light medium grey to dark grey - horizontal and vertical worm burrows generally in the mud laminae - bedding becomes disturbed and lensy near the base.
118'	121.5'	INTERLAMINATE MUDSTONE-SILTSTONE - medium grey to dark grey disturbed bedding at the top - increasing mudstone content downward with siltstone becoming lensy toward base and grading into mudstone. Base of unit is defined by a thin sandy lamination.

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 121.5' TO 149.7 BY A. T. Armstrong

FROM	TO	DESCRIPTION
121.5	126.2	MUDSTONE - dark grey to black - coal streaks 123' to 124.5' - badly broken with some core loss 121.8' to 123.8' - becoming silty toward the base
126.2	129.5	SANDSTONE - light grey to light medium grey - fine to medium grained - carbonaceous debris on some bedding surfaces - generally well developed bedding and x-bedding.
129.5	133.7	INTERLAMINATE SANDY SILTSTONE & MUDSTONE - colour banded light medium to dark grey - increasing mudstone towards the base and siltstone becomes lensy - bedding at 60^{o} to core axis
133.7	138.8	MUDSTONE - dark grey to black - carbonaceous and with coal streaks 134' to 137' with some core loss in the same area.
138.8	141.6	SANDSTONE/SILTSTONE - cyclic sequence of fine grained light to light medium grey sandstone overlain by medium grey to dark medium grey siltstone - Cycles from 0.4' to 0.8' scouring on top of some silty units very fine laminations and fine x bedding in sandstones - few worm burrows in silty laminae.
141.6	142.2	MUDDY SILTSTONE - dark medium grey mottled
142.2	143.7	INTERLAMINATED MUDSTONE & SILTSTONE - light medium grey thin laminae and lenses of siltstone in a predominantly mudstone units. - increasing mudstone downward bedding at 63^{o} to core axis
143.7	144.75	MUDSTONE - dark grey, few fine light medium grey, silty streaks
144.75	145.6	COAL - 0.85' - very badly broken although recovery appears to be reasonably good, durain with vitrain streaks.
145.6	147.1	MUDDY SILTSTONE - dark brownish grey - strongly contorted bedding in the middle laced with fine irregular calcite veins - top and bottom appear to be irregular muddy clasts surrounded by black coal streaked mudstone - less intense calcite veining toward the top and bottom.
147.1	149.7	COAL - 2.6' (Note: lower footage and coal thickness are questionable) - badly broken, bright, black, and cleated.

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 149.7' TO 189.8 BY A. T. Armstrong

FROM	TO	DESCRIPTION
149.7	153.2	INTERLAMINATE MUDSTONE & SILTSTONE - predominantly mudstone, dark grey to black with thin light grey laminae and lenses of siltstone near the top and dying out toward the base. Bedding $\measuredangle$ 60° to core axis
153.2	155.1	MUDDY SILTSTONE - dark medium to dark grey blotchy - massive unit
155.1	157	SANDSTONE - light medium grey - fine to medium grained - scattered carbonaceous debris and carbonaceous debris on bedding surfaces 155.1' to 156.1' - uniformly thin bedded 156.1' to 157.0', bedding $\measuredangle$ 60° to core axis
157	157.3	MUDSTONE - dark grey with a light medium grey sandstone clast? cutting through mudstone. (Note: may be sand filling a drying crack in mud).
157.3	160.3	COAL - 3.0' - badly broken with recovery of approximately 30%. - bright, black and cleated top and bottom with a fine grained bright black pyritic band of about 0.2' thickness included.
160.3	161.2	MUDSTONE - dark grey - few coal streaks - silty band at 160.4' - 160.5'
161.2	161.8	INTERLAMINATE SILTSTONE-MUDSTONE - blotchy to banded medium grey and dark grey.
161.8	167.0	SANDSTONE - fine grained, light to light medium grey - generally moderately disturbed finely laminate- few muddy siltstone laminae toward the base. - small impact or loading structure at 167.6' to 163.0' (photograph taken).
167.0	176.5	SANDSTONE-SILTSTONE-MUDSTONE - Cyclic sequence - each cycle with a basal sand and grading upwards into mudstone. - 0.2' to 2' thick - light grey to dark grey - worm burrows in muddy beds.
176.5	180.2	INTERLAMINATE MUDSTONE AND SILTY SANDSTONE - dark grey mudstone with light medium to medium grey laminae and lenses of silty sandstone - increasing mudstone downward with silty sandstone becoming lensy.
180.2	186.5	MUDSTONE - dark grey - minor silt content as small irregular lenses at the base.
186.5	189.8	MIXED SILTY MUDSTONE - sandstone - light medium grey to dark grey - fine grained sandstone - strongly disturbed bedding

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 189.8 TO 241.5 BY A. T. Armstrong

FROM	TO	DESCRIPTION
189.8	197.1	SANDY SILTSTONE - light medium - medium grey finely laminate to lensy - minor mud content in some bands.
		- disturbed bedding - more mudstone downward.
#36 197.1	199.1	COAL - 2.0' - very badly broken, footages may be incorrect
		- bright black
199.1	201.7	SILTY MUDSTONE - dark grey - increasing silt content downward
201.7	203.3	INTERLAMINATE SANDSTONE/MUDSTONE - light medium grey to dark grey - finely laminate - weakly disturbed, few worm burrows - increasing sandstone toward the base
203.3	212.3	SANDSTONE - fine to coarse grained generally very uniform, moderately finely bedded - light medium to medium grey
		- bedding ∠ at 55° to core axis
		- carbonaceous debris on some bedding surfaces
212.3	214.3	SILTSTONE/SANDSTONE - predominantly thin laminated light medium-medium grey siltstone with contorted sandstone beds - fine grain light medium grey sandstone with graded bedding
214.3	220.3	MUDSTONE - dark grey to black - few small medium grey siltstone lenses
		- sandy lenses 220.1 - 220.2
220.3	220.6	COAL - 0.3' - bright, black, cleated
220.6	226.5	MUDSTONE - dark grey to black siltstone lenses and fine laminae 222 - 224 (Note: significant core loss 224.5 - 226' - some fragments have coal streaks)
226.5	241.5	SILTY MUDSTONE - dark medium grey to dark grey with varying silt content
		- 226.5 to 227.5'- brownish grey vuggy mudstone (may be calcareous) with white calcite in vugs
		- 227.5' - 229' - carbonaceous and coal streaked
		- 233' to 234' - distorted bedding and silty clasts
		- 237' to 238' - distinct siltstone bands (note: significant core loss 238.1' to 240')
		- 240' to 240.2' - part of large silt lens
		- 240' to 240.8' - fine irregular calcite veining
		- 241' to 241.5' siltstone and fine grained
		- sandstone with mudstone laminae and small clasts

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 241.5 TO 299.8 BY A.T. Armstrong

FROM	TO	DESCRIPTION
241.5	247.0	SANDSTONE - fine grained, light grey to light medium grey, minor carbonaceous debris on disturbed bedding surfaces - irregular coal streak at 246.7' - lower surface is a sheared coal streak
247.0	248.7	SILTY MUDSTONE - dark brownish grey - numerous irregular coal streaks, very fine upper and lower contacts are sheared coaly bands - laced throughout with very fine calcite vein and calcite filled tension gashes
248.7	277.3	SANDSTONE - fine to coarse grained - becoming generally coarser downward - from massive to very thinnly laminate - carbonaceous bedding surfaces are common - occasional coal streaks throughout - some bedding is weakly disturbed - few crossbedded areas 253.6 to 254.4' strongly carbonaceous and sheared silty mudstone band with very fine calcite veining - bedding ∢ 62° to core axis
277.3	278.1	MUDSTONE - dark grey - coal streaks near upper contact - silty lenses 277.7 to 277.9'
278.1	284.1	INTERLAMINATE SILTSTONE AND MUDSTONE - light medium to dark grey - thin laminate, regular to contorted down to 279.3' - strongly disturbed to mixed and predominantly siltstone to the base - coal streaks 282.5 to 283.2 in more muddy unit - bedding ∢ 62° to core axis
284.1	289.5	SANDSTONE/MUDDY SILTSTONE - light medium to dark grey - generally finely laminate with some cross-bedding - graded bedding common - 286.3' to 286.5', 286.7' to 287' and 287.9' to 288.3' sandstone clasts in a muddy matrix, scouring exident
289.5	291.8	MUDSTONE - dark grey with fine light medium grey lenses of siltstone throughout and few siltstone laminae near the base - 291.6' - 291.8' carbonaceous
291.8	292.8	COAL - 1.0' - bright black, finely cleated
292.8	299.8	INTERLAMINATE MUDSTONE/SILTSTONE - light medium grey to dark grey - finely laminate uniform to moderately disturbed, lensy in part - worm burrows common throughout

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 299.8 TO 347 BY A.T. Armstrong

FROM	TO	DESCRIPTION
299.8	300.4 ±	CARBONACEOUS MUDSTONE - dark grey few silty fine laminae and lenses - fine grained pyrite blebs near upper contact and some fine disseminated pyrite in carbonaceous base
300.4 ±	301.3 ±	COAL - 0.9' ± - badly broken dull black with few bright streaks
301.3 ±	302.2	COALY MUDSTONE - black with coal streaks
302.2	304.3	MUDDY SILTSTONE - medium grey to dark grey strongly mixed siltstone and mudstone at top to massive muddy siltstone near base
304.3	308.5	SANDY SILTSTONE - medium grey - very inhomogeneous unit, generally strongly disturbed bedding, often lenses of silt in sand or sand in silt, some darker grey muddy bands - minor carbonaceous debris - lensy and grading into silty mudstone of the base
308.5	313.5	SILTY MUDSTONE - medium brownish-grey to dark grey often mottled - carbonaceous debris common
313.5	325.8	SANDSTONE SILTSTONE MUDSTONE - light grey to dark grey finely laminate and colour banded cyclic sequence - cycles of sandstone grading upward into siltstone and mudstone from 0.4' to 3.0' - graded bedding, some crossbedding, worm burrows in the muddy bands - bedding ⊀ at 65° to core axis
325.8	331.8	MIXED TO INTERLAMINATE MUDSTONE AND SILTSTONE - dark grey with light medium grey lenses and thin laminae of siltstone - prominent worm burrows - well developed bedding 330.7' to 330.6' at 50° to core axis
331.8	334.3	MUDSTONE - dark grey to black carbonaceous and coal streaked towards base (Note: 332.8' to 334.3' - badly broken with significant core loss)
334.3	335.0	SILTY MUDSTONE - dark medium bluish grey - homogeneous
335.0	347	MIXED SILTSTONE & MUDDY SILTSTONE - light grey to dark medium grey - laminate 335.4 - 335.8 at 60° to core axis - 336.2 to 336.6 muddy with fine coal streaks irregularly sheared also 340.8' to 341.1' ~~341.3 to 341.7' irregular~~ rounded pale

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 347 TO 413.2 BY A.T. Armstrong

FROM	TO	DESCRIPTION
		cont'd greyish-brown claystone in mudstone
		- 341.7 to 342.5 - mudstone with shears and carbonaceous debris
347.0	349.8	SILTSTONE - light grey massive homogeneous with mud veins at 10° to core axis
		- few irregular fine white calcite veins and gashes
349.8	356.0	MUDSTONE/SILTSTONE - dark medium grey to dark grey mottle appearance, compact, massive
356.0	365.0	SANDSTONE - fine grained light grey to medium grey - generally finely laminate often with fine cross-bedding - some narrow bands of silty mudstone
		(Note: footages not exact as core is badly broken and grinding is evident)
		- occasional worm burrows - mud clasts present in sand at 361±
365	373.5	MUDSTONE - dark grey massive
373.5	389	MUDSTONE/SILTSTONE - predominant dark grey mudstone with thin laminae and lenses of light-medium grey siltstone - inhomogeneous mixtures of silt and mud with a mottled appearance
		- at 374' prominent worm burrows
		- 385' to 386.5' strongly coal streaked
389	393.8	INTERLAMINATE MUDSTONE, SILTSTONE, SANDSTONE - generally muddy at the top and sandy at the base - banded dark grey to light medium grey - finely laminate, regular to strongly disturbed
393.8	396.2	MUDSTONE - dark grey to black - coal streaks to 395.2', strongly carbonaceous and with fine grained pyrite disseminations and inbands 393.8' to 394.1'
		- moderate silty toward the base
396.2	396.5	SILTSTONE - light medium to medium grey irregularly banded, with worm burrows
396.5	397.6	SILTY MUDSTONE - dark grey massive, sandy at the base
397.6	398	SANDSTONE - fine grained, light medium grey indistinct bedding - silty mud clasts at the base
398	401.1	MUDSTONE/SILTY MUDSTONE - dark medium to dark grey mottled
		- thin coal seams at 398.8', 398.9' and 399' to 400.5'
401.1	413.2	INTERLAMINATE SANDSTONE, MUDSTONE, SILTSTONE - light grey to dark grey, thin generally regular laminations
		- fine grained finely laminated sandstone commonly with crossbedding (medium grained

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 413.2 TO 475.6 BY A.T. Armstrong

FROM	TO	DESCRIPTION
		cont'd massive sandstone 409.8' - 410.2')
		- some carbonaceous debris on occasional bedding surfaces
413.2	416.8	SANDSTONE - light to light medium grey - fine grained
		- even fine laminations at 63° to core axis
		- mudstone band at 414' - crossbedded 415' to 415.5'
416.8	423.5	INTERLAMINATED MUDSTONE/SILTSTONE - predominate dark grey mudstone with fine laminae and lenses of light medium grey siltstone
		- some light grained sand laminae 421.4' to 421.8'
		- pale brownish-grey claystone bands at 421.1' to 421.3' and 422.0' to 422.3'
423.5	433.3	SANDSTONE - light grey-laminate and crossbedded
		- medium grained - carbonaceous debris 432.5'
433.3	433.7	COAL - 0.4' - badly broken - poor recovery bright black cleated
433.7	443.3	MUDSTONE - dark grey, lighter grey with minor silt content towards the base
		- massive - coal streak at 434.7'
443.3	445.5	INTERLAMINATED MUDSTONE/SANDSTONE - banded light medium grey and dark grey - fine grained sandstone
		- moderate disturbed to contorted laminations
445.5	446.9	SANDSTONE - light medium grey, fine to medium grained
		- few small mud clasts enclosed in sand
		- indistinct bedding and crossbedding
446.9	449.4	INTERLAMINATE SANDSTONE AND SILTY MUDSTONE - light medium to dark medium grey bedded
449.4	451.1	SANDSTONE - light medium grey - bedded and crossbedded occasional carbonaceous bedding surfaces
451.1	467.4	INTERLAMINATED MUDSTONE, SILTSTONE, SANDSTONE - predominantly mudstone and silty mudstone with lenses, laminations and beds of siltstone and fine grained sandstone - colour banded light grey to dark grey - sandy bands are cross-bedded, bedding is regular to moderately disturbed - worm burrows common in mudstone
		- 462.5' - 463' coal streaks
467.4	469.7	MUDSTONE - dark grey to black, coal streaked and coal banded 467.8 to 469.0
469.7	475.6	SILTSTONE - light medium to light medium grey
		- muddy at the top - massive to 471'
		- moderately disturbed finely laminate with numerous worm burrows 471' to 475.6'

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 475.6 TO 538.2 BY A.T. Armstrong

FROM	TO	DESCRIPTION
475.6	485.3	SILTY MUDSTONE - dark medium grey to dark grey
		- commonly mottled massive with areas of more silty indistinct laminations
		- coal streaks 480.6' to 480.7'
485.3	487.8	SILTSTONE - medium grey to dark medium grey
		- massive with occasional highly disturbed laminations
487.8	505	SANDSTONE - fine to medium grained light medium grey
		- thinnly laminate to massive over 2' - very fine mudstone laminae closely spaced to up to 2' spacing
		- calcite veining at 5° to core axis 494' to 499' and vein with suspended breccia fragments at 508'
505	513	INTERLAMINATE SANDSTONE, SILTSTONE, MUDSTONE - light medium grey to dark grey - sandstone is very fine grained - predominantly sandstone at top of sequence to predominantly mudstone at the base
		- thinnly laminate, regular to moderate disturbed bedding - worm burrows common throughout
513	515.2	MUDSTONE - dark grey to black - few lighter silty lenses
515.2	516.7	SANDSTONE - light medium grey - strongly disturbed bedding - few very fine coal streaks
516.7	519.4	SILTY MUDSTONE - dark grey - more muddy in the centre
		- coal streaks and 2 fine coal seams 517.8' to 518.0'
519.4	521.3	INTERLAMINATE - (fine grained) sandstone and siltstone
		- light medium to medium grey disturbed bedding
521.3	525.7	MUDSTONE, CLAYSTONE & SILTY MUDSTONE - 521.3 to 523.6' pale brownish-grey massive claystone with silty mudstone
		- 523.6' - 525.1' dark grey mudstone
		- 525.1' - 525.7' mixed mudstone and silty mudstone with mottled appearance
525.7	535.4	SANDSTONE - generally light grey, fine grained - finely laminate, distinct to disturbed - some cross-bedding - silty and muddy laminations near the top and bottom with a few throughout
535.4	537.8	INTERLAMINATE MUDSTONE/SILTSTONE - medium grey and dark grey - becoming more muddy and grading to mudstone at the base - silty material often as lenses in mudstone
537.8	538.2	MUDSTONE - dark grey to black

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 538.2 TO 561.0 BY A.T. Armstrong

FROM	TO	DESCRIPTION
538.2	539.2	COAL - 1.0' - 20% recovery bright, black, cleated
539.2	539.5	MUDSTONE - dark grey
539.5	540.4	SILTSTONE TO SANDSTONE - medium grey - some carbonaceous debris - fine to medium grained
540.4	542.0	INTERLAMINATED SANDSTONE/SILTSTONE - finely laminate and colour banded light medium to dark medium grey - crossbedded and moderately disturbed 541 - 541.6' with a few worm burrows
542.0	545.2	SILTY MUDSTONE AND MUDDY SILTSTONE - dark medium to dark grey - concretionary bodies at 544.3' and 544.6' light greyish-brown amorphous appearance. Base in predominant silt grading into fine sand.
545.2	548.0	SANDSTONE - light grey to light medium grey fine to medium grained, finely bedded and cross-bedded - prominent worm burrows 545.2' to 545.8' - thin muddy bands 545.8' and 546.5' and 547'
548.0	548.7	INTERLAMINATE SILTSTONE/MUDSTONE - medium grey to dark grey - thinnly laminate to lensy siltstone - unit becomes increasingly muddy downward and grades to mudstone at the base
548.7	550.9	COAL - 2.2' - (only a few fragments recovered) bright block cleated
550.9	551.6	MUDSTONE GRADING DOWNWARD INTO SILTSTONE - medium to dark grey, coal streaks at the top - sheared carbonaceous surfaces at 551.3 and 551.41
551.6	556.4	INTERLAMINATED AND MIXED SILTSTONE AND MUDSTONE - light medium to dark grey banded to mottled - generally moderately disturbed laminations - worm burrows evident in banded areas
556.4	557.5	SANDSTONE - light medium grey, finely laminate and crossbedded
557.5	558.05	MUDSTONE - dark grey to black - silty at the top - coal streaks near the base
558.05	559.0	COAL - 0.95' - bright, black, cleated (Note: 30% recovery)
559.0	560.2	MUDDY SILTSTONE - medium greyish brown - laced with a network of fine irregular calcite veins - some carbonaceous debris
560.2	560.4	MUDSTONE - black with small coal streaks
560.4	561.0	COAL - 0.6 - (very finely broken with 30% recovery) bright, black

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 561.0 TO 604.5 BY A.T. Armstrong

FROM	TO	DESCRIPTION
561.0	562.8	SILTY MUDSTONE - dark medium grey to dark grey - carbonaceous debris throughout and a few fine coal streaks - more muddy at the top and the bottom
562.8	563.0	COAL - 0.2' - (broken core, 50% recovery) bright and black
563.0	576.2	MUDSTONE/SILTSTONE - variable between siltstone and mudstone - bedding where present is generally disturbed - light medium to dark grey
576.2	580.3	INTERLAMINATE SILTSTONE/SILTY MUDSTONE/SANDSTONE - very finely laminate to lensy - light medium to dark grey - some fine crossbedding - few very small worm burrows - sandstone is fine grained
580.3	585.8	SANDSTONE - light medium to medium grey - fine to medium grained - very distinct fine bedding and well developed crossbedding - carbonaceous debris on bedding planes common throughout
585.8	589.1	SILTSTONE/SILTY MUDSTONE - dark medium to dark grey - disturbed to lensy bedding - some worm burrows evident
589.1	589.9	CARBONACEOUS SILTY SANDSTONE - a rather heterogeneous mixture - light medium to dark medium grey - numerous irregular coal streaks near the base, sandy channel fillings on lower contact
589.9	596.3	INTERBEDDED MUDSTONE/SILTY MUDSTONE/SILTSTONE - light medium grey to dark grey - disturbed to lensy bedding - coal streak 594.5 to 595.3' - thin coal bands at 594.9', 595.0', 595.1' - few worm burrows
596.3	598.7	INTERLAMINATE SANDSTONE/SILTSTONE - light grey to medium grey - fine grained sandstone very finely bedded and crossbedded - few scoured sand to silt contacts - worm burrows present in silty bands
598.7	600.0	INTERLAMINATE SILTSTONE/MUDSTONE - thinnly laminate to lensy - medium to dark grey - worm burrows throughout - becoming more muddy toward the base
600.0	604.5	MUDSTONE - dark grey to black - coal streaks at 600.1 - 600.6', 603.5' to 604'

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 604.5 TO 674.9 BY A.T. Armstrong

	FROM	TO	DESCRIPTION
	604.5	607.8	SILTY MUDSTONE/SILTSTONE - muddy top of unit grades into cleaner siltstone toward the base - moderate to strongly disturbed bedding - light medium to dark medium grey - worm burrows throughout
	607.8	617.0	MUDSTONE/SILTY MUDSTONE - predominantly mudstone - dark medium to dark grey lighter coloured silty areas - numerous silty clasts or lenses - grading downward to more silty rock with silt bands at the base
	617.0	631.0	SANDSTONE - light grey to light medium grey fine grained at the top to medium and coarse grained at the base - fine grained sands are very thinnly bedded and finely crossbedded - very wavy bedding 519 to 520.1' with carbonaceous debris on surfaces - few dark grey, thin silty laminations - soft mud clast at 627.7'
#37	631.0	633.2	COAL 2.2' - (1.4' recovered with a 0.3' mudstone split) generally bright black and cleated
	633.2	633.5	MUDSTONE - dark grey to black coal streaked
	633.5	642.0	INTERBEDDED AND INTERLAMINATE MUDSTONE/SILTSTONE - minor fine grained sandstone. Appears to be an alternating sequence - irregular to disturbed bedding - lenses common - worm burrows common
	642.0	650.0	INTERLAMINATED SANDSTONE/SILTSTONE - light grey to light medium grey - fine wavy to planner bedding - well formed very fine crossbedding - carbonaceous debris on bedding surfaces
oal ost	650.0	657.6	MUDSTONE - dark grey to black - coal streaks 650.1 - 653.6 (core loss 650.2 to 652.7' - approximately 20% recovery) irregular silty areas 653.6' to 654.7'
	657.6	661.0	INTERLAMINATED MUDSTONE & SILTSTONE - minor sandstone - thinnly laminate, planner to weakly disturbed - few carbonaceous wavy bands
oal ost	661.0	665.7	MUDSTONE - dark grey - few silty lenses throughout, becoming silty toward the base - small coal band at 661.4' to ? (core missing to 662.6)
	665.7	666.9	INTERLAMINATED SILTSTONE/MUDSTONE - very finely laminate medium grey
	666.9	670.2	COALY MUDSTONE - black thin coal seams and coal streaks throughout - strongly sheared with slickensided shear surfaces from 668.5' to 670.0'
	670.2	674.9	SANDSTONE - light medium grey, fine to medium grained - silty near the top - an abrupt irregular

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 674.9 TO 743.8 BY

FROM	TO	DESCRIPTION
		cont'd basal contact with coal
		- finely bedded and crossbedded
674.9	675.4	COAL 0.5' - bright and black
675.4	678.0	MUDSTONE/SILTSTONE - medium grey to dark grey coal streaks 675.4' to 676' - silty 676.2' to 676.6' - dark greyish brown claystone 677' to 677.7' - coaly mudstone base
678.0	680.1	SANDSTONE - fine grained, light medium grey
		- very fine regular to strongly disturbed laminations
680.1	680.3	COALY MUDSTONE - black
680.3	680.5	COAL - 0.2'-broken - bright, black
680.5	681.3	MUDSTONE - dark brownish grey
681.3	683.3	SILTSTONE - very strongly disturbed to mixed silty top of a major sandstone unit - medium grey
		- grading into fine grained sandstone
683.3	731.0	SANDSTONE - light grey to light medium grey - fine grained to coarse grained with pebble bands
		- appears to be several cycles of sand deposition under varying conditions - bedding in coarse sands is often much steeper than normal bedding - graded bedding is common and is evident through several of the major cycles and in smaller units
		- silty laminae at 690.2', 690.5', 691.5'
		- pebble bands at 696.1', 699.2', 700.4' to 700.5', 702.2' to 702.4', 705.2', 705.4', 713.4' to 713.5', 713.8' to 713.9', 718.5', 727.9'
		- soft ton coloured mud clasts at 713.2', 716.9', 717.4'
		- carbonaceous debris on bedding surfaces is common throughout with very prominent carbonaceous and coaly areas at 696.3', 705.3 to 705.4', 706.2' to 706.7', 707.4' to 707.9', 713.1' to 713.4', 715.4' to 715.6' 717.9', 722.3' to 722.6', 729.3', 730.1' to 730.2'
#38 731.0	733.6	COAL 2.6' - generally bright and black with good recovery
733.6	743.8	INTERLAMINATED AND MIXED SILTSTONE/MUDSTONE - predominantly siltstone with muddy areas and few mudstone beds - light medium to dark grey
		- generally highly disturbed to mixed with areas of well defined fine laminae and crossbedding in clean siltstone

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 743.8 TO 846.1 BY A.T. Armstrong

FROM	TO	DESCRIPTION
743.8	771.9	SANDSTONE - fine to coarse grained with pebble bands
		- bedding angles are highly variable with coarse crossbedding common - graded bedding is common within individual beds and larger sequences
		- pebble bands and pebbly areas at 748.6' to 748.8', 757.2' to 757.4', 760.2' to 760.9', 763.2'. 769.5' to 769.5'
		- soft light brown mud clasts at 756.6' to 756.7', 761'
		- carbonaceous debris on bedding at 650.6' to 651.0', 651.4', 652.3' to 652.9', 670.8'
771.9	774.1	COAL 2.2 - (only a few fragments recovered - possibly 2%) - apparently good clean bright black coal
774.1	791.9	MUDSTONE - dark grey to black - generally homogeneous with a few silty areas near the top
791.9	804.2	INTERBEDDED AND INTERLAMINATED MUDSTONE/SILTSTONE
		- predominantly mudstone with distinct siltstone laminations and narrow beds - some strongly disturbed to mixed areas with a mottled appearance - medium grey to dark grey
804.2	808.5	MUDSTONE - dark grey to black - coal streaked at the base
808.5	809.0	COAL 0.4' - bright black
809.0	809.3	MUDSTONE - black
809.3	809.6	COAL 0.3' - bright and black
809.6	810.3	MUDSTONE - dark grey to black - strongly coal streaked
		- silty toward the base
810.3	819.0	INTERLAMINATED TO MIXED SILTSTONE/MUDSTONE - light medium grey to dark grey - disturbed to strongly disturbed bedding - worm burrows common throughout
819.0	820.8	MUDSTONE - dark grey
820.8	822.2	SANDSTONE - light grey, fine grained, abundant carbonaceous debris
822.2	823.6	COAL 1.4' - black, bright, banded (Note: about 15% recovery)
823.6	823.8	MUDSTONE - black
823.8	846.1	INTERLAMINATED AND INTERBEDDED - SILTSTONE/MUDSTONE/ SANDSTONE - light medium to dark grey
		- well bedded to strongly disturbed
		- worm burrows common in muddy laminae
		- mud clasts common in sandy laminae
		- carbonaceous debris on some bedding surfaces
		- predominantly siltstone

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 846.1 TO 896.1 BY A.T. Armstrong

	FROM	TO	DESCRIPTION
	846.1	846.4	MUDSTONE - black, coal streaked
	846.4	847.7	COAL 1.3' - banded, black, dull with bright streaks
	847.7	848.1	MUDSTONE - black, coal streaks, carbonaceous debris
	848.1	850.3	SILTSTONE - medium grey, regularly laminate to weakly disturbed, carbonaceous debris present
	850.3	851.3	MUDSTONE - dark grey, carbonaceous debris throughout
	851.3	851.9	SANDSTONE - fine grained, medium grey - carbonaceous debris throughout
	851.9	853.6	MUDSTONE - dark grey to black, coal streaks down to 852.7'
	853.6	857.7	INTERLAMINATED AND INTERBEDDED SILTSTONE/MUDSTONE - light medium to dark grey - predominantly siltstone at the top and mudstone at the bottom, finely laminate to lensy gradation between - basal contact is mudstone with silt clasts from underlying beds
	857.5	869.5	INTERLAMINATED SANDSTONE/SILTSTONE/MUDSTONE - predominantly sandstone, fine grained light to light medium grey - bedding is generally distinct although moderately irregular - occasionally contorted - sandy laminae often have scoured bases and display graded bedding - worm burrows common in finer laminae - some carbonaceous debris throughout
	869.5	872.4	MUDSTONE - dark grey, light medium grey fine silty lenses common down to the base
#39	872.4	873.5	COAL 1.1' - cannel coal to 873.1' - 873.1' - 873.5' bright, black, cleated
	873.5	874.0	MUDSTONE - dark brownish grey, mudstone clasts in mudstone matrix
#40	874.0	874.9	COAL 0.9' - bright and black (Note: badly broken - recovery about 30%)
	874.9	875.1	MUDSTONE - black
	875.1	879.3	MUDDY SILTSTONE - dark medium to dark grey banded to mottled appearance
	879.3	884.7	SILTY MUDSTONE - dark grey massive - coal streaks
	884.7	889.1	MUDDY SILTSTONE - medium to dark grey, laminate to massive - coal streaks throughout
	889.1	889.4	COALY MUDSTONE - black with numerous coal streaks
	889.4	894.5	INTERLAMINATED & INTERBEDDED MUDSTONE/SILTSTONE - light medium to dark grey, banded laminate to mottled mixed
#41	894.5	896.1	COAL 1.6' - 894.5' - 895.5' bright black and banded - 895.5' - 896.1' dull black and granular textured with bright streaks

CORE DESCRIPTION

HOLE # B.C. 78-5 AREA

FROM 896.1 TO 906.0 BY A.T. Armstrong

FROM	TO	DESCRIPTION
896.1	897.5	CARBONACEOUS SANDSTONE - light medium grey to black - medium grained sandstone with up to 50% carbonaceous and coaly material
897.5	898.6	MUDDY SANDSTONE - dark grey - mixed mud and sand (medium grained) - fine calcite veining at the base and parallel to the base
898.6	902.6	SANDSTONE - light grey - fine to medium grained - carbonaceous material on bedding surfaces and occasional carbonaceous clasts, well developed laminations
902.6	902.7	COAL 0.2' - few fine fragments recovered
902.7	903.0	MUDSTONE - black - coal streaked
903.0	906.0	SILTY MUDSTONE/MUDDY SILTSTONE - dark medium to dark grey - mixed with mottled appearance

CONFIDENTIAL

BRI COAL - DOWLING CREEK

Hole BC-78-1

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #1 3/8" x 0												
1.400 F	51.79	9	3.23	0.79	28.19	68.58	15007	5.34	63.91	68.29	75.10	74.84
1.400 S	48.21	1	61.51	0.48	14.06	24.43	5421	94.66	36.09	31.71	24.90	25.16
Total	100.00		31.33	0.64	21.38	47.29	10385	100.00	100.00	100.00	100.00	100.00
Sample #2 3/8" x 0												
1.400 F	17.95	3	7.21	0.72	21.99	70.80	14376	2.80	29.25	21.94	35.44	34.04
1.400 S	82.05	1	54.66	0.38	17.12	28.22	6094	97.20	70.75	78.06	64.56	65.96
Total	100.00		46.14	0.44	17.99	35.87	7580	100.00	100.00	100.00	100.00	100.00
Sample #3 & #4 3/8" x 0												
1.400 F	81.45	9	5.42	0.66	26.02	68.56	14744	39.76	88.49	81.35	88.86	88.10
1.400 S	18.55	2 1/2	36.06	0.38	26.20	37.74	8742	60.24	11.51	18.65	11.14	11.90
Total	100.00		11.11	0.61	26.05	62.84	13631	100.00	100.00	100.00	100.00	100.00
Sample #5 3/8" x 0												
1.400 F	91.61	8	2.74	0.86	22.82	74.44	15153	42.64	95.40	91.00	95.86	95.54
1.400 S	8.39	1	40.24	0.45	24.64	35.12	7729	57.36	4.60	9.00	4.14	4.46
Total	100.00		5.89	0.83	22.97	71.14	14530	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-1

Sample #1

Washability Test

Minus 3/8" x 28m fraction

Moisture Free Basis

Specific Gravity	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	48.20	9	2.05	0.86	30.10	67.85	15195	48.20	2.05	0.86	30.10	67.85	1519
1.350 F	4.28	8 1/2	8.41	0.87	26.50	65.09	14217	52.48	2.57	0.86	29.81	67.62	1511
1.400 F	2.45	8	16.07	0.79	24.98	58.95	12798	54.93	3.17	0.86	29.59	67.24	1501
1.450 F	2.06	5 1/2	20.28	0.72	23.45	56.27	12174	56.99	3.79	0.85	29.37	66.84	1491
1.500 F	0.92	5 1/2	26.37	0.71	23.26	50.37	11101	57.91	4.15	0.85	29.27	66.58	1484
1.550 F	0.79	5 1/2	29.98	0.89	22.32	47.70	10544	58.70	4.50	0.85	29.18	66.32	1479
1.600 F	1.17	2 1/2	35.18	0.84	20.72	44.10	9674	59.87	5.10	0.85	29.01	65.89	1469
1.600 S	40.13	1/2	67.85	0.42	12.65	19.50	4283	100.00	30.28	0.68	22.45	47.27	1051
Total	100.00		30.28	0.68	22.45	47.27	10514						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	79.66	8 1/2	10.58	0.87	27.43	61.99	13833	38.13	87.17	88.93	92.60	92.49
Conc. II	10.22	1	56.44	0.56	15.87	27.69	6149	26.10	7.17	6.60	5.31	5.27
Refuse	10.12	0	78.13	0.44	10.84	11.03	2637	35.77	5.66	4.47	2.09	2.24
Total	100.00		22.10	0.80	24.57	53.33	11914	100.00	100.00	100.00	100.00	100.00

BRJ COAL - DOWLING CREEK

Hole BC-78-1
Samples 3 & 4
Trojan Seam
Washability Test

Minus 3/8" x 28m Fraction

Moisture Free Basis

Specific Gravity	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	57.49	9	3.36	0.68	27.75	68.89	15134	57.49	3.36	0.68	27.75	68.89	1513
1.350 F	14.04	9	9.37	0.65	26.81	63.82	13935	71.53	4.54	0.67	27.56	67.90	1489
1.400 F	9.04	9	13.65	0.61	26.72	59.63	13106	80.57	5.56	0.67	27.47	66.97	1469
1.450 F	4.46	7 1/2	18.62	0.57	25.30	56.08	12202	85.03	6.25	0.66	27.36	66.39	1456
1.500 F	2.62	7 1/2	24.06	0.56	25.95	49.99	11257	87.65	6.78	0.66	27.31	65.91	1446
1.550 F	2.15	4	28.34	0.50	23.58	48.08	10523	89.80	7.30	0.65	27.22	65.48	1437
1.600 F	1.64	1	32.32	0.43	21.85	45.83	9876	91.44	7.74	0.65	27.13	65.13	1429
1.600 S	8.56	1/2	51.87	0.22	28.27	19.86	5325	100.00	11.52	0.61	27.23	61.25	1352
Total	100.00		11.52	0.61	27.23	61.25	13525						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	85.78	9	6.94	0.63	26.07	66.99	14443	57.83	86.54	86.75	89.89	89.57
Conc. II	12.23	5	30.53	0.69	24.03	45.44	10141	42.17	13.46	13.25	10.11	10.43
Refuse	1.99											
Total	100.00		10.29	0.62	25.78	63.93	13831	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-1

Sample #5

Washability Test

Minus 3/8" x 28m Fraction

Moisture Free Basis

Specific Gravity	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	80.28	8	2.36	0.85	23.62	74.02	15199	80.28	2.36	0.85	23.62	74.02	151
1.350 F	10.60	1	6.34	0.77	21.31	72.35	14517	90.88	2.82	0.84	23.35	73.83	151
1.400 F	1.28	4 1/2	13.00	0.73	23.30	63.70	13239	92.16	2.97	0.84	23.35	73.68	150
1.450 F	0.82	4	19.37	0.73	22.06	58.57	12250	92.98	3.11	0.84	23.34	73.55	150
1.500 F	0.30												
1.550 F	0.36												
1.600 F	0.35	1 1/2	27.79	0.64	21.91	50.30	10594	93.99	3.38	0.84	23.32	73.30	150
1.600 S	6.01	0	51.03	0.30	28.28	20.69	4859	100.00	6.24	0.80	23.62	70.14	144
Total	100.00		6.24	0.80	23.62	70.14	14409						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	86.99	8	2.91	0.90	23.07	74.02	14962	44.99	88.57	87.79	90.04	89.97
Conc. II	10.76	1	23.79	0.78	21.46	54.75	11155	55.01	11.43	12.21	9.96	10.03
Refuse	2.25											
Total	100.00		5.63	0.88	22.86	71.51	14466	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-1

Structures

	Sample #1		Sample 3 & 4		Sample #5	
Mesh Size	% Weight	Cum. % Wt.	% Weight	Cum. % Wt.	% Weight	Cum. % Wt.
-3/8" +1/4"	32.45	32.45	26.71	26.71	25.15	25.15
-1/4" +6m	31.56	64.01	28.89	55.60	31.40	56.55
-6m +10m	16.34	80.35	19.72	75.32	18.89	75.44
-10m +28m	12.48	92.83	14.54	89.86	14.43	89.87
-28m	7.17	100.00	10.14	100.00	10.13	100.00
Total	100.00		100.00		100.00	

BRI COAL - DOWLING CREEK

Hole BC-78-2

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #8	3/8" x 0											
1.400 F	78.83	9	5.04	3.24	31.07	63.89	14730	30.58	56.05	84.77	86.66	86.94
1.400 S	21.17	6	42.61	9.46	20.78	36.61	8245	69.42	43.95	15.23	13.34	13.06
Total	100.00		12.99	4.56	28.89	58.12	13357	100.00	100.00	100.00	100.00	100.00
Sample #9	3/8" x 0											
1.400 F	55.80	9	6.16	0.83	23.93	69.91	14504	13.59	74.92	67.28	71.11	72.78
1.400 S	44.20	1	49.46	0.35	14.69	35.85	6849	86.41	25.08	32.72	28.89	27.22
Total	100.00		25.30	0.62	19.85	54.85	11120	100.00	100.00	100.00	100.00	100.00
Sample #10	3/8" x 0											
1.400 F	50.92	8	7.34	0.74	23.76	68.90	14275	16.55	63.04	51.45	65.10	63.93
1.400 S	49.08	1	38.41	0.45	23.26	38.33	8357	83.45	36.96	48.55	34.90	36.07
Total	100.00		22.59	0.60	23.51	53.90	11371	100.00	100.00	100.00	100.00	100.00
Sample #11	3/8" x 0											
1.400 F	85.01	9	3.79	0.76	28.44	67.77	14961	25.39	94.58	90.08	95.27	95.15
1.400 S	14.99	1	63.17	0.25	17.76	19.07	4322	74.61	5.42	9.92	4.73	4.85
Total	100.00		12.69	0.69	26.84	60.47	13366	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-3

Single Gravity Tests

Product and Sp. Gr.	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #12 3/8" x 0												
1.400 F	62.41	8	4.83	1.05	25.89	69.28	14648	11.86	71.90	74.39	81.78	80.71
1.400 S	37.59	1	59.57	0.68	14.80	25.63	5812	88.14	28.10	25.61	18.22	19.29
Total	100.00		25.41	0.91	21.72	52.87	11327	100.00	100.00	100.00	100.00	100.00
Sample #13 3/8" x 0												
1.400 F	87.71	1 1/2	2.24	0.85	21.16	76.60	15041	27.97	93.25	91.30	92.48	92.34
1.400 S	12.29	1/2	41.18	0.44	14.39	44.43	8912	72.03	6.75	8.70	7.52	7.66
Total	100.00		7.03	0.80	20.33	72.64	14287	100.00	100.00	100.00	100.00	100.00
Sample #14 3/8" x 0												
1.400 F	91.16	1 1/2	4.22	0.82	21.31	74.47	14710	51.80	94.44	92.37	94.89	94.86
1.400 S	8.84	0	40.49	0.50	18.16	41.35	8219	48.20	5.56	7.63	5.11	5.14
Total	100.00		7.43	0.79	21.03	71.54	14137	100.00	100.00	100.00	100.00	100.00
Sample #15 3/8" x 0												
1.400 F	92.38	1	1.50	0.92	20.21	78.29	15078	29.63	95.18	94.49	95.71	95.66
1.400 S	7.62	0	43.19	0.56	14.28	42.53	8295	70.37	4.82	5.51	4.29	4.34
Total	100.00		4.68	0.89	19.76	75.56	14561	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-3

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #16 3/8" x 0												
1.400 F	92.88	1	2.86	1.19	20.25	76.89	14889	70.64	88.05	93.25	93.88	93.88
1.400 S	7.12	1	15.51	2.10	19.12	65.37	12665	29.36	11.95	6.75	6.12	6.12
Total	100.00		3.76	1.26	20.17	76.07	14731	100.00	100.00	100.00	100.00	100.00
Sample #17 3/8" x 0												
1.400 F	69.77	1 1/2	3.66	0.82	21.79	74.55	14740	17.09	74.77	59.76	87.26	83.47
1.400 S	30.23	0	41.00	0.64	33.87	25.13	6734	82.91	25.23	40.24	12.74	16.53
Total	100.00		14.95	0.77	25.44	59.61	I2320	100.00	100.00	100.00	100.00	100.00
Sample #18 3/8" x 0												
1.400 F	74.97	1/2	3.13	0.73	19.55	77.32	14675	23.09	80.80	74.63	82.58	83.29
1.400 S	25.03	0	31.23	0.52	19.91	48.86	8817	76.91	19.20	25.37	17.42	16.71
Total	100.00		10.16	0.68	19.64	70.20	13209	100.00	100.00	100.00	100.00	100.00
Sample #19 3/8" x 0												
1.400 F	85.42	1	3.36	0.73	20.43	76.21	14789	30.88	92.44	80.21	94.41	93.20
1.400 S	14.58	0	44.06	0.35	29.53	26.41	6320	69.12	7.56	19.79	5.59	6.80
Total	100.00		9.29	0.68	21.76	68.95	13554	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-3

Single Gravity Tests

Product and Sp. Gr.	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #20	3/8" x 0											
1.400 F	96.65	4 1/2	1.83	0.77	19.48	78.69	15141	59.62	97.38	96.84	98.02	97.89
1.400 S	3.35	1	35.75	0.61	18.32	45.93	9391	40.38	2.61	3.16	1.98	2.11
Total	100.00		2.97	0.76	19.44	77.59	14949	100.00	100.00	100.00	100.00	100.00
Sample #21	3/8" x 0											
1.400 F	60.90	1	2.73	1.08	20.11	77.16	14904	8.50	70.30	46.12	87.22	81.60
1.400 S	39.10	0	45.80	0.71	36.59	17.61	5235	91.50	29.70	53.88	12.78	18.40
Total	100.00		19.57	0.94	26.55	53.88	11124	100.00	100.00	100.00	100.00	100.00
Sample #22	3/8" x 0											
1.400 F	54.88	6	3.32	0.90	25.37	71.31	14866	7.09	16.88	43.70	92.21	80.57
1.400 S	45.12	0	52.91	5.39	39.76	7.33	4359	92.91	83.12	56.30	7.79	19.43
Total	100.00		25.70	2.93	31.86	42.44	10125	100.00	100.00	100.00	100.00	100.00
Sample #23	3/8" x 0											
1.400 F	40.35	4 1/2	6.88	1.12	25.37	67.75	14205	13.82	50.96	32.88	56.04	51.16
1.400 S	59.65	1	29.02	0.73	35.03	35.95	9175	86.18	49.04	67.12	43.96	48.84
Total	100.00		20.09	0.89	31.13	48.78	11205	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-3

Sample #17

Washability Test

Minus 3/8" x 28m Fraction

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Moisture Free Basis: Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	44.17	1	2.74	0.82	22.56	74.70	14917	44.17	2.74	0.82	22.56	74.70	1491
1.350 F	19.73	1/2	4.94	0.78	20.57	74.49	14472	63.90	3.42	0.81	21.95	74.63	1477
1.400 F	5.02	1/2	9.65	0.83	22.43	67.92	13634	68.92	3.87	0.81	21.98	74.15	1469
1.450 F	2.40	1/2	16.83	0.87	22.80	60.37	12438	71.32	4.31	0.81	22.01	73.68	1462
1.500 F	1.48	1/2	21.53	0.84	23.82	54.65	11397	72.80	4.66	0.81	22.04	73.30	1455
1.550 F	1.38	1/2	26.27	0.80	21.93	51.80	10655	74.18	5.06	0.81	22.04	72.90	1448
1.600 F	1.93	1/2	32.17	0.70	18.61	49.22	9948	76.11	5.75	0.81	21.95	72.30	1436
1.600 S	23.89	0	45.68	0.64	36.83	17.49	5342	100.00	15.29	0.77	25.51	59.20	1221
Total	100.00		15.29	0.77	25.51	59.20	12211						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	84.33	1	8.05	0.84	23.57	68.38	13806	56.18	85.61	81.38	90.83	89.67
Conc. II	13.49	0	33.80	0.76	29.03	37.17	8559	43.82	14.39	18.62	9.17	10.33
Refuse	2.18											
Total	100.00		12.08	0.83	24.43	63.49	12984	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-3

Sample #18

Washability Test

Minus 3/8" x 28m Fraction

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Moisture Free Basis: Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	35.14	1/2	1.31	0.78	19.25	79.44	15097	35.14	1.31	0.78	19.25	79.44	1509
1.350 F	28.35	0	2.76	0.74	18.70	78.54	14787	63.49	1.96	0.76	19.00	79.04	1495
1.400 F	10.41	0	9.53	0.77	22.15	68.32	13583	73.90	3.02	0.76	19.45	77.53	1476
1.450 F	7.06	0	14.02	0.73	24.21	61.77	12663	80.96	3.98	0.76	19.86	76.16	1458
1.500 F	3.12	0	18.58	0.70	26.05	55.37	11590	84.08	4.53	0.76	20.09	75.38	1447
1.550 F	2.23	0	24.57	0.63	20.52	54.91	11081	86.31	5.04	0.76	20.10	74.86	1438
1.600 F	1.51	0	27.74	0.60	22.36	49.90	10322	87.82	5.43	0.75	20.14	74.43	1431
1.600 S	12.18	0	45.07	0.40	37.72	17.21	5325	100.00	10.26	0.71	22.28	67.46	1321
Total	100.00		10.26	0.71	22.28	67.46	13219						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	84.69	1/2	6.83	0.72	20.68	72.49	14035	59.94	87.64	82.73	88.74	88.23
Conc. II	13.57	0	25.25	0.56	23.88	50.87	10359	40.06	12.36	17.27	11.26	11.77
Refuse	1.74											
Total	100.00		9.65	0.70	21.17	69.18	13472	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-3

Structures

	Sample #17		Sample #18	
Size	% Weight	Cum. % Wt.	% Weight	Cum. % Wt.
-3/8" +1/4"	33.18	33.18	30.45	30.45
-1/4" +6m	27.48	60.66	29.59	60.04
-6m +10m	16.41	77.07	16.36	76.40
-10m +28m	13.05	90.12	13.63	90.03
-28m	9.88	100.00	9.97	100.00
Total	100.00		100.00	

BRI COAL - DOWLING CREEK

Hole BC-78-4

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #28 3/8" x 0												
1.400 F	63.49	2	3.30	0.70	23.25	73.45	14891	8.68	77.62	72.79	83.89	82.92
1.400 S	36.51	0	60.36	0.35	15.11	24.53	5334	91.32	22.38	27.21	16.11	17.08
Total	100.00		24.13	0.57	20.28	55.59	11401	100.00	100.00	100.00	100.00	100.00
Sample #29 3/8" x 0												
1.400 F	74.48	7	3.10	0.87	25.08	71.82	14851	13.76	86.40	82.74	88.20	88.30
1.400 S	25.52	1	56.69	0.40	15.27	28.04	5740	86.24	13.60	17.26	11.80	11.70
Total	100.00		16.77	0.75	22.58	60.65	12526	100.00	100.00	100.00	100.00	100.00
Sample #30 3/8" x 0												
1.400 F	77.50	9	2.93	0.92	28.78	68.29	14977	18.51	87.06	79.03	88.93	87.93
1.400 S	22.50	1	44.42	0.47	26.31	29.27	7083	81.49	12.94	20.97	11.07	12.07
Total	100.00		12.27	0.82	28.22	59.51	13201	100.00	100.00	100.00	100.00	100.00
Sample #31 3/8" x 0												
1.400 F	90.97	7 1/2	3.06	0.98	26.51	70.43	14981	51.05	93.80	93.84	93.06	93.41
1.400 S	9.03	1	29.57	0.65	17.54	52.89	10653	48.95	6.20	6.16	6.94	6.59
Total	100.00		5.45	0.95	25.70	68.85	14590	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Single Gravity Tests

Product and Sp. Gr.	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #32 3/8" x 0												
1.400 F	29.79	3	3.55	0.82	22.96	73.49	14877	2.13	53.63	50.24	59.80	59.68
1.400 S	70.21	0	69.39	0.30	9.65	20.96	4264	97.87	46.37	49.76	40.20	40.32
Total	100.00		49.78	0.46	13.61	36.61	7426	100.00	100.00	100.00	100.00	100.00
Sample #33 3/8" x 0												
1.400 F	49.69	4	4.10	0.90	23.09	72.81	14782	12.49	61.32	59.77	56.09	57.31
1.400 S	50.31	1/2	28.36	0.56	15.35	56.29	10874	87.51	38.68	40.23	43.91	42.69
Total	100.00		16.30	0.73	19.20	64.50	12816	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Sample #24 Superior Seam

Washability Test

Minus 3/8" x 28m Fraction

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Moisture Free Basis: Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	91.92	7 1/2	1.38	0.72	27.68	70.94	15208	91.92	1.38	0.72	27.68	70.94	15208
1.350 F	5.48	1 1/2	3.19	0.90	22.45	74.36	14827	97.40	1.48	0.73	27.39	71.13	15187
1.400 F	0.92	1	7.08	0.63	21.14	71.78	14119	98.32	1.53	0.73	27.33	71.14	15177
1.400 S	1.68	1	41.98	0.48	23.60	34.42	7781	100.00	2.22	0.73	27.26	70.52	15053
Total	100.00		2.22	0.73	27.26	70.52	15053						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc, I	89.75	7	1.48	0.74	26.34	72.18	15133	48.72	90.59	90.52	91.04	91.11
Conc, II	9.10	1	13.64	0.67	24.15	62.21	12931	51.28	9.41	9.48	8.96	8.89
Refuse	1.15											
Total	100.00		2.73	0.73	26.11	71.16	14907	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Sample #26 Trojan Seam

Washability Test

Minus 3/8" x 28m Fraction

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	37.98	9	3.37	1.05	32.45	64.18	15076	37.98	3.37	1.05	32.45	64.18	15076
1.350 F	8.59	8	8.78	0.95	26.88	64.34	14104	46.57	4.37	1.03	31.42	64.21	14898
1.400 F	6.56	5 1/2	13.79	0.92	23.84	62.37	13183	53.13	5.53	1.02	30.49	63.98	14687
1.450 F	3.61	8	21.74	0.99	24.55	53.71	11932	56.74	6.56	1.02	30.11	63.33	14512
1.500 F	2.31	7 1/2	27.45	0.90	24.35	48.20	10919	59.05	7.38	1.01	29.88	62.74	14371
1.550 F	2.40	5 1/2	33.01	0.89	22.97	44.02	10023	61.45	8.38	1.01	29.61	62.01	14202
1.600 F	2.31	3	36.68	0.75	21.18	42.14	9333	63.76	9.41	1.00	29.31	61.28	14026
1.600 S	36.24	1	64.23	0.44	16.24	19.53	4190	100.00	29.28	0.80	24.57	46.15	10461
Total	100.00		29.28	0.80	24.57	46.15	10461						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	84.89	9	11.58	0.99	28.39	60.03	13570	48.64	94.28	90.99	95.60	95.43
Conc. II	6.67	2	53.55	0.49	18.16	28.29	6400	17.67	3.70	4.57	3.54	3.54
Refuse	8.44	0	80.68	0.21	13.92	5.40	1484	33.69	2.02	4.44	0.86	1.03
Total	100.00		20.21	0.89	26.49	53.30	11822	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Sample #27 Trojan Seam

Washability Test

Minus 3/8" x 28m Fraction

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	57.86	9	2.93	0.97	30.26	66.81	14980	57.86	2.93	0.97	30.26	66.81	14980
1.350 F	35.16	2 1/2	6.63	0.78	23.67	69.70	14335	93.02	4.33	0.90	27.77	67.90	14736
1.400 F	5.84	1	10.76	0.75	21.90	67.34	13656	98.86	4.71	0.89	27.42	67.87	14672
1.400 S	1.14	1/2	32.91	0.52	19.11	47.98	9652	100.00	5.03	0.89	27.33	67.64	14615
Total	100.00		5.03	0.89	27.33	67.64	14615						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis: % Ash	% S	% VM	% FC	Btu	% Distribution: Ash	S	VM	FC	Btu
Conc. I	87.32	8 1/2	4.19	0.91	27.08	68.73	14757	61.40	88.73	89.03	88.94	89.22
Conc. II	11.01	4	18.14	0.80	22.99	58.87	12277	38.60	11.27	10.97	11.06	10.78
Refuse	1.67											
Total	100.00		5.96	0.90	26.56	67.48	14443	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Sample #28 Titan Seam

Washability Test

Minus 3/8" x 28m Fraction

Specific Gravity	% Weight	FSI	Moisture Free Basis — Elementary Data % Ash	% S	% VM	% FC	Btu	Moisture Free Basis — Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	22.83	7 1/2	2.10	0.81	26.52	71.38	15136	22.83	2.10	0.81	26.52	17.38	15136
1.350 F	38.96	1	3.12	0.68	22.10	74.78	14928	61.79	2.74	0.73	23.73	73.53	15006
1.400 F	2.64	1	9.52	0.68	22.52	67.96	13742	64.43	3.02	0.73	23.68	73.30	14954
1.450 F	1.12	2 1/2	17.01	0.69	24.68	58.31	12385	65.55	3.26	0.73	23.70	73.04	14911
1.500 F	0.98	1	22.44	0.62	22.88	54.68	11569	66.53	3.54	0.72	23.69	72.77	14861
1.550 F	3.22	1/2	28.49	0.49	18.24	53.27	10703	69.75	4.69	0.71	23.44	71.87	14670
1.600 F	5.46	1/2	32.24	0.45	17.02	50.74	10008	75.21	6.69	0.70	22.97	70.34	14331
1.600 S	24.79	0	74.16	0.26	13.70	12.14	2921	100.00	23.42	0.59	20.67	55.91	11502
Total	100.00		23.42	0.59	20.67	55.91	11502						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	87.54	2 1/2	8.77	0.71	23.59	67.64	13933	44.77	96.28	93.04	97.62	97.86
Conc. II	3.36	1/2	49.95	0.41	16.97	33.08	6930	9.79	2.17	2.57	1.83	1.87
Refuse	9.10	0	85.63	0.11	10.73	3.64	374	45.44	1.55	4.39	0.55	0.27
Total	100.00		17.15	0.65	22.20	60.65	12464	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Sample #29 Gething Seam

Washability Test

Minus 3/8" x 28m Fraction

Moisture Free Basis

Specific Gravity	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	22.39	9	1.97	0.97	28.61	69.42	15116	22.39	1.97	0.97	28.61	69.42	15116
1.350 F	46.19	2	2.85	0.86	23.57	73.58	14880	68.58	2.56	0.90	25.22	72.22	14956
1.400 F	4.50	4 1/2	9.93	0.80	23.67	66.40	13722	73.08	3.02	0.89	25.12	71.86	14880
1.450 F	2.77	1 1/2	16.00	0.67	22.01	61.99	12645	75.85	3.49	0.88	25.01	71.50	14798
1.500 F	2.24	1	20.43	0.58	21.14	58.43	11806	78.09	3.97	0.87	24.90	71.13	14711
1.550 F	1.56	1	25.00	0.55	19.93	55.07	10957	79.65	4.39	0.87	24.80	70.81	14638
1.600 F	1.04	1	30.84	0.52	19.22	49.94	9991	80.69	4.73	0.86	24.73	70.54	14578
1.600 S	19.31	0	75.64	0.33	13.06	11.30	2392	100.00	18.42	0.76	22.48	59.10	12225
Total	100.00		18.42	0.76	22.48	59.10	12225						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	89.76	7	6.98	0.86	24.77	68.25	14177	47.23	97.47	93.91	97.14	96.93
Conc. II	3.70	1	41.34	0.30	17.27	41.39	8415	11.54	1.39	2.70	2.43	2.37
Refuse	6.54	0	83.63	0.14	12.26	4.11	1414	41.23	1.14	3.39	0.43	0.70
Total	100.00		13.26	0.79	23.68	63.06	13128	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Sample #30 Moqul Seam

Washability Test

Minus 3/8" x 28m Fraction

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Moisture Free Basis: Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	47.48	9	1.70	0.96	29.83	68.47	15219	47.48	1.70	0.96	29.83	68.47	15219
1.350 F	28.41	8 1/2	3.93	0.88	26.90	69.17	14828	75.89	2.54	0.93	28.73	68.73	15073
1.400 F	2.54	8	12.32	0.92	25.76	61.92	13298	78.43	2.85	0.93	28.64	68.51	15016
1.450 F	1.33	7	17.34	0.88	24.56	58.10	12479	79.76	3.09	0.93	28.57	68.34	14974
1.500 F	1.25	4	22.11	0.76	23.07	54.82	11659	81.01	3.39	0.93	28.48	68.13	14923
1.550 F	1.60	1	25.91	0.61	21.19	52.90	10892	82.61	3.82	0.92	28.34	67.84	14844
1.600 F	1.29	1	29.53	0.66	22.76	47.71	10129	83.90	4.22	0.92	28.26	67.52	14772
1.600 S	16.10	1	52.35	0.35	27.35	20.30	5244	100.00	11.97	0.83	28.11	59.92	13238
Total	100.00		11.97	0.83	28.11	59.92	13238						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	92.78	9	5.53	0.93	28.73	65.74	13050	54.02	97.51	93.93	98.18	98.11
Conc. II	2.60	3	36.37	0.58	27.25	36.38	8459	9.96	1.70	2.50	1.52	1.66
Refuse	4.62	0	74.08	0.15	21.95	3.97	675	36.02	0.79	3.57	0.30	0.23
Total	100.00		9.50	0.89	28.38	62.12	13301	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Sample #32

Washability Test

Minus 3/8" x 28m Fraction

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Moisture Free Basis: Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.300 F	10.72	6	1.92	0.93	26.04	72.04	15116	10.72	1.92	0.93	26.04	72.04	15116
1.350 F	15.48	1	2.59	0.75	21.78	75.63	15015	26.20	2.32	0.82	23.52	74.16	15053
1.400 F	2.48	1	10.92	0.73	19.26	69.82	13689	28.68	3.06	0.82	23.15	73.79	14934
1.450 F	1.64	1	15.61	0.67	17.96	66.43	12917	30.32	3.74	0.81	22.87	73.39	14825
1.500 F	2.21	1	22.01	0.60	17.08	60.91	11907	32.53	4.98	0.79	22.48	72.54	14626
1.550 F	1.11	1	28.26	0.62	16.77	54.97	10869	33.64	5.75	0.79	22.29	71.96	14504
1.600 F	1.00	1/2	32.80	0.56	16.73	50.47	10059	34.64	6.53	0.78	22.13	71.34	14376
1.600 S	65.36	0	76.13	0.27	8.19	15.68	3076	100.00	52.02	0.45	13.02	34.96	6990
Total	100.00		52.02	0.45	13.02	34.96	6990						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis: % Ash	% S	% VM	% FC	Btu	% Distribution: Ash	S	VM	FC	Btu
Conc. I	53.50	3 1/2	10.29	0.86	22.46	67.25	13744	14.80	76.67	71.61	78.16	82.95
Conc. II	14.18	1	43.40	0.44	14.74	41.86	8402	16.55	10.33	12.46	12.89	13.44
Refuse	32.32	0	78.98	0.24	8.27	12.75	991	68.65	13.00	15.93	8.95	3.61
	100.00		37.18	0.60	16.78	46.04	8864	100.00	100.00	100.00	100.00	100.00

BRI COAL - DOWLING CREEK

Hole BC-78-4

Structures

	Sample #24		Sample #26		Sample #27		Sample #28		Sample #29		Sample #30		Sample #32	
Size	% Wt.	Cum. % Wt.	% Wt.	Cum. % Wt.	% Wt.	Cum. % Wt.	% Wt.	Cum. % Wt.	% Wt.	Cum. % Wt.	% Wt.	Cum. % Wt.	% Wt.	Cum. % Wt.
-3/8"+ ¼"	24.73	24.73	25.78	25.78	24.71	24.71	25.38	25.38	24.56	24.56	21.88	21.88	30.23	30.23
-¼" +6m	27.37	52.10	28.04	53.82	31.41	56.12	29.43	54.81	28.12	52.68	26.59	48.47	29.56	59.79
-6m +10m	18.10	70.20	17.84	71.66	18.43	74.55	17.70	72.51	17.46	70.14	18.69	67.16	16.41	76.20
-10m +28m	16.72	86.92	15.82	87.48	15.07	89.62	15.22	87.73	17.14	87.28	18.41	85.57	13.46	89.66
-28m	13.08	100.00	12.52	100.00	10.38	100.00	12.27	100.00	12.72	100.00	14.43	100.00	10.34	100.00
Total	100.00		100.00		100.00		100.00		100.00		100.00		100.00	

BRI COAL - DOWLING CREEK

Hole BC-78-5

Single Gravity Tests

Product and Sp. Gr.	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution: Ash	S	VM	FC	Btu
Sample #34 3/8" x 0												
1.400 F	94.32	2	3.12	0.75	21.32	75.56	14952	66.36	94.39	92.75	96.46	95.99
1.400 S	5.68	1	26.27	0.74	27.66	46.07	10365	33.64	5.61	7.25	3.54	4.01
Total	100.00		4.44	0.75	21.68	73.88	14692	100.00	100.00	100.00	100.00	100.00
Sample #35 3/8" x 0												
1.400 F	57.12	1	3.19	0.86	20.57	76.24	14871	9.10	69.65	41.83	83.91	76.36
1.400 S	42.88	1/2	42.43	0.50	38.10	19.47	6132	90.90	30.35	58.17	16.09	23.64
Total	100.00		20.02	0.71	28.09	51.89	11123	100.00	100.00	100.00	100.00	100.00
Sample #36 3/8" x 0												
1.400 F	75.97	1	2.32	1.03	21.84	75.84	14795	12.40	86.22	73.84	91.00	89.00
1.400 S	24.03	0	51.84	0.52	24.46	23.70	5782	87.60	13.78	26.16	9.00	11.00
Total	100.00		14.22	0.91	22.47	63.31	12629	100.00	100.00	100.00	100.00	100.00
Sample #37 3/8" x 0												
1.400 F	31.34	2	5.89	0.95	19.79	74.32	14562	4.31	46.49	45.50	53.47	53.32
1.400 S	68.66	1/2	59.66	0.50	10.82	29.52	5819	95.69	53.51	54.50	46.53	46.68
Total	100.00		42.81	0.64	13.63	43.56	8559	100.00	100.00	100.00	100.00	100.00

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #38 3/8" x 0												
1.400 F	95.12	1	3.42	0.66	17.65	78.93	14863	75.77	96.76	95.27	96.15	96.01
1.400 S	4.88	1	21.31	0.43	17.08	61.61	12024	24.23	3.24	4.73	3.85	3.99
Total	100.00		4.29	0.65	17.62	78.09	14725	100.00	100.00	100.00	100.00	100.00
Sample #39 3/8" x 0												
1.400 F	16.57	7	2.51	0.85	20.59	76.90	15155	0.92	30.79	29.07	29.60	30.19
1.400 S	83.43	1/2	53.69	0.38	9.98	36.33	6958	99.08	69.21	70.93	70.40	69.81
Total	100.00		45.21	0.46	11.74	43.05	8316	100.00	100.00	100.00	100.00	100.00
Sample #40 3/8" x 0												
1.400 F	87.66	5	1.79	0.86	20.22	77.99	15312	20.67	95.93	81.57	96.73	95.71
1.400 S	12.34	0	48.80	0.26	32.46	18.74	4876	79.33	4.07	18.43	3.27	4.29
Total	100.00		7.59	0.79	21.73	70.68	14024	100.00	100.00	100.00	100.00	100.00
Sample #41 3/8" x 0												
1.400 F	29.82	9	6.96	0.89	22.78	70.26	14549	4.24	52:58	51.32	55.51	55.75
1.400 S	70.18	1	66.89	0.34	9.18	23.93	4908	95.76	47.42	48.68	44.49	44.25
Total	100.00		49.02	0.50	13.24	37.74	7783	100.00	100.00	100.00	100.00	100.00