

PR - SOUTH MOUNT
GETHING 81 (1)A

1981 REPORT OF EXPLORATION ACTIVITIES
ON THE SOUTH MOUNT GETHING PROPERTY
Coal Licence Numbers 4129 to 4142 inclusive
and 4145, 4146, 4150 and 4152
Peace River Land Dist. & Liard Mining Divis.
N.T.S. Designation 93 0-16W. & 94 B-1W.
LAT. 55°58'N; LONG. 122°25'W
Owned and Operated by Utah Mines Ltd.
Report by: P.S. Cowley of Utah Mines Ltd.
Field Work Performed Between
May 28, 1981 and September 11, 1981.

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Located In

Peace River Land District and Liard Mining Division

National Topographic System Designation
93-O-16 West and 94-B-1 West
Centred on Lat. 55°58'N; Long. 122°25'W

Owned and Operated by Utah Mines Ltd.

Report By: P.S. Cowley
of
Utah Mines Ltd.
1600 - 1050 West Pender Street
Vancouver, B.C.
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Field Work Performed Between
May 28, 1981 and September 11, 1981

Report Submitted April 16, 1982

hole
#4152 - SMG - 81 - 28

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ABSTRACT

The 18 contiguous coal licences, numbering 4129 to 4142 inclusive, 4145, 4146, 4150 and 4152, which comprises the South Mount Gething Property, were issued to Utah Mines Ltd. on August 15, 1978. The property is located in the Liard Mining District and the Peace River Land District.

The 1981 exploration program was formulated to determine further information of the extent, metallurgical quality and continuity of the two thick coal seams intersected in D.D.H. SMG-80-11. Two rotary drill holes, located 4 kilometres northwest of DDH SMG 80-11, totalling 160 metres on C.L. 4152, was unsuccessful in locating the two thick seams. Seven test pits, located 0.5 kilometres south of DDH SMG 78-1 on C.L. 4139, also were unsuccessful in uncovering the thick seams.

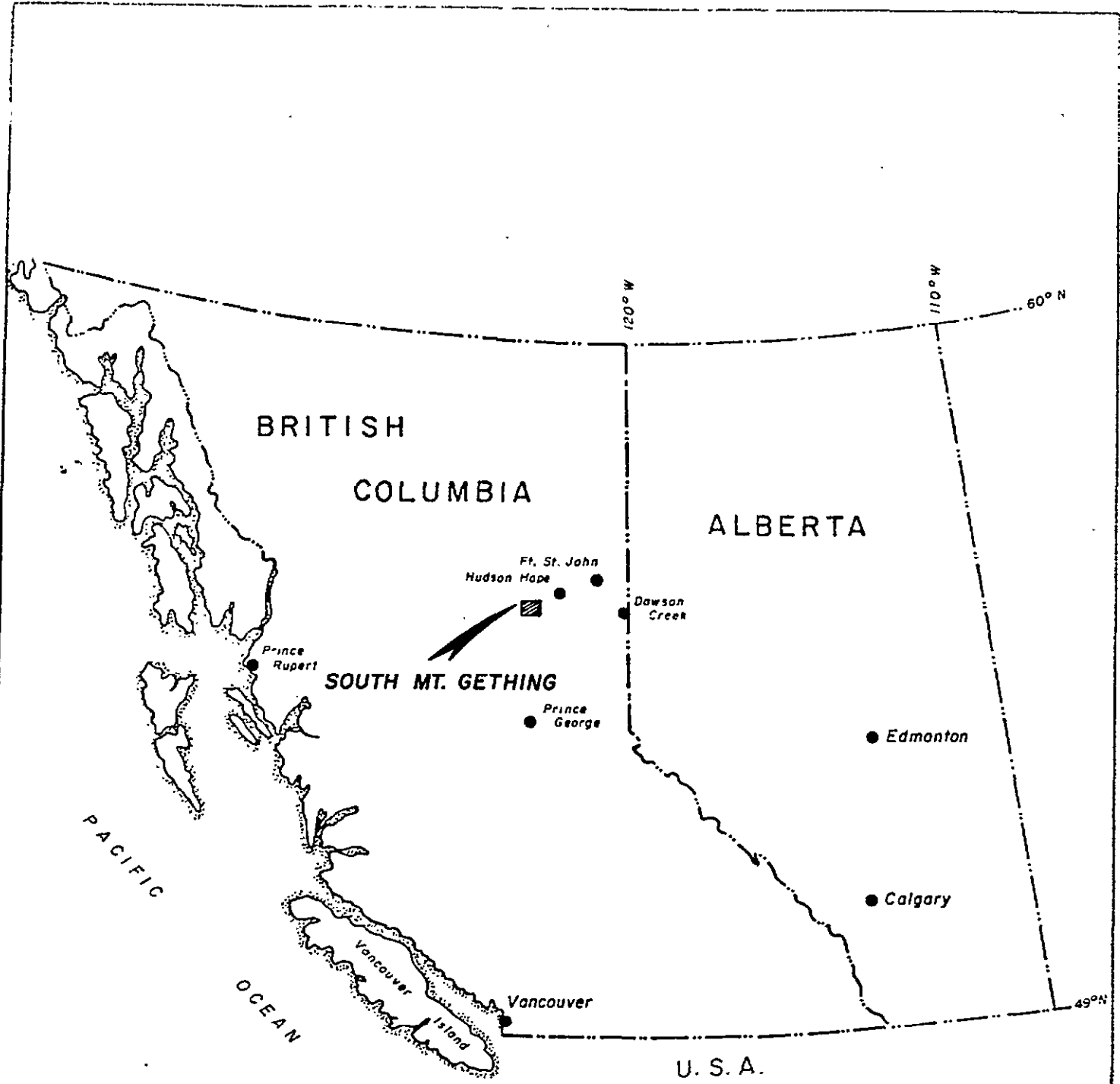
LOCATION AND ACCESS

South Mount Gething Property is located in the designated "Northeast Coal Block", lying within the Liard Mining Division and the Peace River Land District. Geographical co-ordinates of the centre of the property are 55°58'N; 122°25'W. The coal licences are within the area covered by the National Topographic System designation 93-O-16 and 94-B-1W. The property, which is roughly v-shaped, is largely confined between Dowling Creek on the east and Gaylard Creek on the north, with one licence lying within and north of the Gaylard Creek Valley.

The central part of the property lies approximately 15 kilometres west-southwest from the W.A.C. Bennett Dam, 36 kilometres west-southwest of the town of Hudson's Hope and 60 kilometres northwest of the town of Chetwynd. Vancouver is approximately 770 kilometres south of the property. (See Figure 1, page 3, figure 2, page 4).

Highway 29, joining Chetwynd, Hudson's Hope and Fort St. John, passes approximately 31 kilometres to the east of the property. Canfor Limited's (a major forest products company) Johnson Creek-Track Creek Road, which joins Highway 29, 19 kilometres south of Hudson's Hope, and several secondary logging roads provide direct road access to various parts of the property. (See map 1 in pocket).

Alternate access to the Johnson Creek - Track Creek Road is possible by travelling over the 13.7 kilometres of Utah Mines Ltd. road from the west end of the W.A.C. Bennett Dam. Drill access roads to diamond drill hole sites SMG-78-2, SMG-79-4, SMG-79-5 and SMG-79-6 provide road access to the northeastern portion of the property. Away from these roads, access to much of the property is possible only by helicopter or on foot. The diamond drill holes in the western and southern portions of the property have helicopter landing pads which provide easier access to this portion of the property. (See map 1 in pocket).



UTAH MINES LTD.
SOUTH MT. GETHING

LOCATION MAP

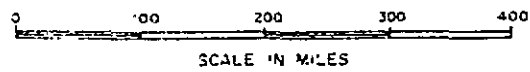
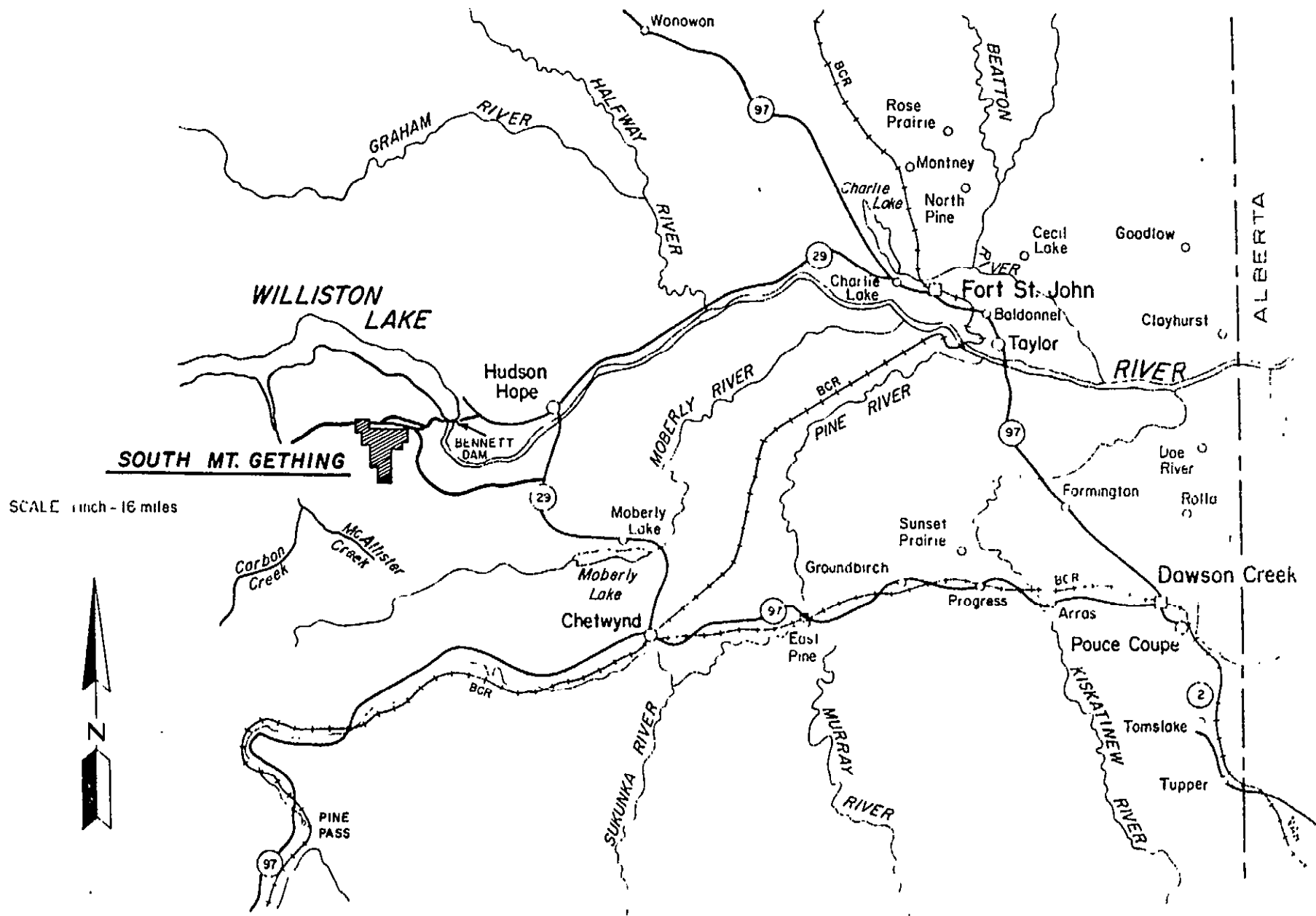


FIGURE — 1

FIGURE - 2
REGIONAL MAP
SOUTH MT. GETHING



PROPERTY AND TITLE

The South Mount Gething Property comprises 18 contiguous coal licences number 4129 to 4142 inclusive, and 4145, 4146, 4150, and 4152. These licences encompass 5152 hectares (See Figure 3, page 6).

Application for title to these coal licences was made in the prescribed manner by Utah Mines Ltd. in the spring of 1978. The licences were issued on August 15, 1978 and, subsequently, signed by the Minister of Energy, Mines and Petroleum Resources. This property forms a natural westward extension of the Bri Coal property, held by Utah Mines Ltd. under an agreement formed with Bri Coal Mining Ltd., Suneva Resources Ltd. and Rainier Energy Resources Ltd.

With the exception of part of the northern boundary, the property is surrounded by other adjoining coal properties. Crowsnest Resources Limited holds adjacent coal licences to the northwest, west, south and southeast. The East Mount Gething Property, also owned by Utah Mines Ltd., adjoins the South Mount Gething Property on the northeast. (See Figure 3, page 6).



56°00'

4152

4150

4146 4145

4142 4141 4140

4139 4138 4137

4136 4135

4130 4129

EAST MT. GETHING
Gaylord Creek

4134 4133
4132 4131

BRI COAL
PROPERTY
Dowling Creek

SHELL CANADA

SHELL CANADA

122° 25'

FIGURE — 3

SOUTH MT. GETHING
COAL LICENCES



Scale — 1:100,000

PHYSIOGRAPHY

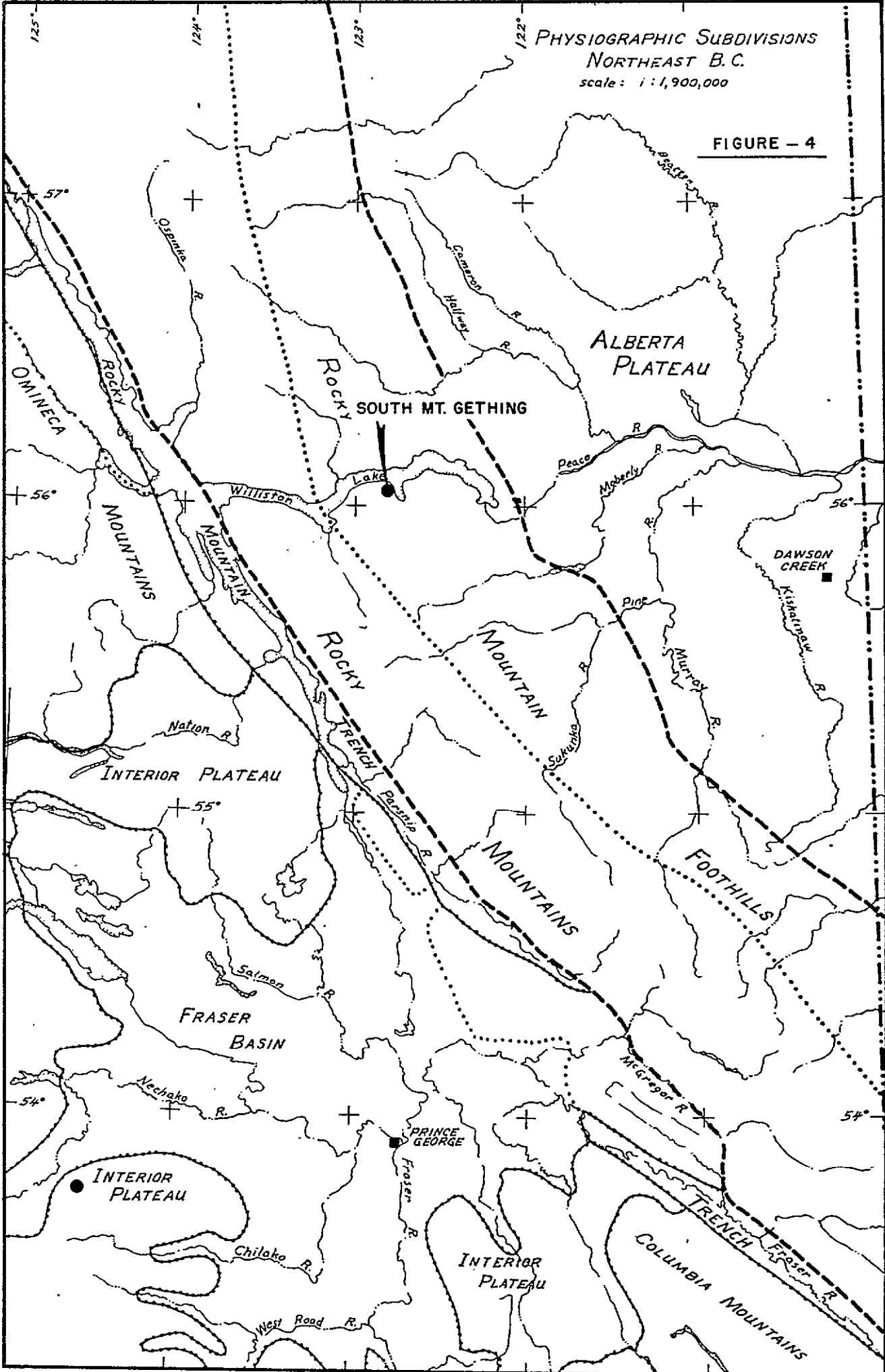
The South Mount Gething Property is situated in the eastern belt of the Rocky Mountain Foothills. (See Figure 4, page 8). To the west, the margin of the Foothills belt is considered to be the easternmost major fault which thrusts Paleozoic strata over Mesozoic strata. The eastern margin is a series of en-echelon thrust faults and folds, which separate the flat lying to gently dipping strata of the Alberta Plateau (Holland, 1976). Within the Foothills belt, major fold axes and thrust faults trend in a northerly to northeasterly direction with the thrusts dipping to the southwest. Structural deformation is considerable near the western margin of the Foothills and diminishes in extent and complexity toward the eastern margin.

The Property is underlain by a broad, south plunging anticline. This prominent structural feature is reflected in the topography of the property. South Mount Gething itself approximates the form of a slice from a cone, with the apex to the south. This conic form is contained to the west, south and east by numerous hills and ridges occurring in a roughly parabolic pattern. Segments of many streams follow and accentuate this pattern.

Topographic relief in the immediate area of the property is moderate. Elevations range from approximately 770 metres in Gething Creek Valley at the eastern property boundary, to 1535 metres at the summit of South Mount Gething. Surface slopes are generally shallow to moderate. A few areas of steep slopes and vertical cliffs occur on South Mount Gething to the north and northwest. Stream valleys are commonly broad and V-shaped with moderate to shallow gradients. Gaylard Creek Valley and the lower part of Gething Creek Valley are alluvium filled and relatively broad and flat bottomed in form.

PHYSIOGRAPHIC SUBDIVISIONS
NORTHEAST B.C.
scale: 1 : 1,900,000

FIGURE - 4



EXPLORATION OF THE SOUTH MOUNT GETHING PROPERTY

Previous Exploration

Coal has been known to exist in the Peace River area since 1792, when Sir Alexander MacKenzie noted the existence of a "bituminous substance which resembles coal" in Peace River Canyon. Exploration, specifically designed to test the coal potential of the area covered by the South Mount Gething Property, had not been undertaken prior to the acquisition of the property by Utah Mines Ltd. in 1978.

General reference to the area is made in various Geological Survey of Canada and British Columbia Ministry of Energy, Mines and Petroleum Resources publications (eg. McLearn and Kindle, 1950; Hughes, 1964; Stott, 1963). Geological Survey of Canada Map 11 - 1961 provides a useful basic interpretation of the geology of the property. There are several reports which deal with specific adjacent map areas and contain information which is useful in the interpretation of the geology of this property (eg. Stott, 1969; LeNobel, 1975, 1977; Anderson and Armstrong, 1978; Duncan, 1979; Cowley, 1980).

The 1978 exploration program for the South Mount Gething Property provided a preliminary appraisal of the coal potential of the property. A program of geological mapping and limited diamond drilling was undertaken which resulted in coverage of the property area at 1:10,000 scale and the drilling of three widely spaced diamond drill holes. In total, 606.86 metres of diamond drilling were completed in the three holes. Thirty-seven samples were taken from the core recovered from the drill holes and four samples were taken from trenches.

The 1979 exploration program for the South Mount Gething Property was designed to provide further information on the extent, metallurgical quality and continuity of coal seams on the property, pursuant to the 1978 program. The determination of the extent of the thick coal seam intersected in D.D.H. SMG-78-1, which was drilled during the 1978 program, was considered a priority. It was also particularly important to determine the continuity of coal seams from the Bri Coal Property to the South Mount Gething Property. A program of seven (7) diamond drill holes and limited geological mapping was undertaken to provide the information required to fulfill the objectives of the program.

Forty-six (46) coal samples from the total 1493 metres of diamond drilling were taken. All data and logs derived from the 1979 exploration program may be referred to in the 1979 Report of Exploration Activities on the South Mount Gething Property by D.N. Duncan of Utah Mines Ltd.

The 1980 exploration program was designed to provide further information on the extent, metallurgical quality and continuity of coal seams of the South Mount Gething Property. Specifically, the program had three objectives; to conduct an extensive mapping program, determine an adit entry for the Superior and Trojan seams by a rotary program near the property's northeastern boundary with Bri-Dowling Creek Property, and to determine the extent of the thick coal seam intersected in SMG-78-1.

The extensive mapping program was conducted on 1:10,000 scale maps augmented with 1:30,000 scale air photographs. The mapping carried out enhanced the understanding of the stratigraphy and structural complexity on the property which previously was poorly understood.

Diamond drilling was limited to two (2) helicopter assisted drill holes near the western boundary of the property. A total of 354.48 metres were drilled in the two holes. Seven (7) coal samples were taken from the core. All data and logs derived from the 1980 exploration program may be referred to in the 1980 Report of Exploration Activities on the South Mount Gething Property by P.S. Cowley of Utah Mines Ltd.

A total of twenty-seven (27) rotary drill holes were completed on the northeast portion of the property to determine an adit entry location for the Superior and Trojan Seams. A total of 1151.56 metres were drilled. Although overburden proved excessive, the rotary program accurately located a fault not previously detected and simplified coal seam correlation in the area.

1981 EXPLORATION PROGRAM

The 1981 exploration program was very limited. The primary interest was to intersect or uncover the two thick seams intersected in DDH-SMG 80-11 (see Fig. 5, page 13) and the Moosebar-Gething contact elsewhere on the property, to determine coal seam extent and quality and stratigraphic position across the property.

The field work began May 28 and finished September 11, 1981. A minor amount of mapping was conducted including a near complete 307 metre section of Gething strata on a newly built logging road. Seven test pits in one locality were trenched in search of the thick coal seams mentioned above (see Fig. 5, page 13). The depth of the pits were limited to approximately 10 feet with the John Deere C-450 tractor-backhoe owned by P. Demeulemeester. Six of the seven test pits were abandoned in fill. The seventh test pit uncovered 10 metres of Gething section where one 0.60m coal seam was sampled. The sample was submitted for analysis to Utah International Inc. Minerals Laboratory at 1190 Bordeaux Drive, Sunnyvale, California, 94086. Analyses were conducted following the procedures outlined on the laboratory flow chart on the following page (Table 1). The 400m trail built to the test pit location was slashed by Dave Gayse and Danny McAvary. The trail was made to minimize surface disturbance and tree falling. All felled trees were bucked to four feet or smaller. Seeding was not necessary.

Two rotary drill holes were performed in the northwest corner of the property. Green Acres Water Well Drilling provided a Failing CF-15 rotary rig with air hammer and a tandem water truck. The drilling crew consisted of Glen Maurer and Curtis Roberts. A 100m trail was pushed by a Skidder owned by P. Demulemeester to minimize surface disturbance and tree falling. No seeding was necessary. The first hole was abandoned in 20 metres of overburden. The second hole was artesian. Attempts were made to plug the hole but failed. By the advise of T. Hall, Regional Reclamation Inspector, it was left and will be plugged in 1982, if necessary. The second hole penetrated 135.33 metres of Gething section. Eight coal samples were taken and sent for analysis as above.

FLOW CHART FOR ANALYSIS OF DIAMOND DRILL HOLE SAMPLES

INCOMING SAMPLE

AIR DRIED

- 1) CRUSH 3/4"
- 2) CRUSH 3/8"
- 3) WEIGH TOTAL INCOMING SAMPLE

SPLIT ~ 1000 GRAMS

SPLIT SMALL AMOUNT FOR RUN
OF MINE (R.O.M.) SAMPLE

EXCESS SAMPLE
FOR STORAGE

- HEAD (R.O.M.)
~ 1000 GRAMS
- 1) PULVERIZE 60 MESH
 - 2) MAKE SAMPLE & DUPLICATE
 - 3) RUN ASSAYS
 - a) FSI
 - b) %MOISTURE
 - c) %ASH
 - d) %SULPHUR
 - e) %VOLATILE MATTER

WASH (1.4 SPECIFIC GRAVITY)

1.4 FLOAT

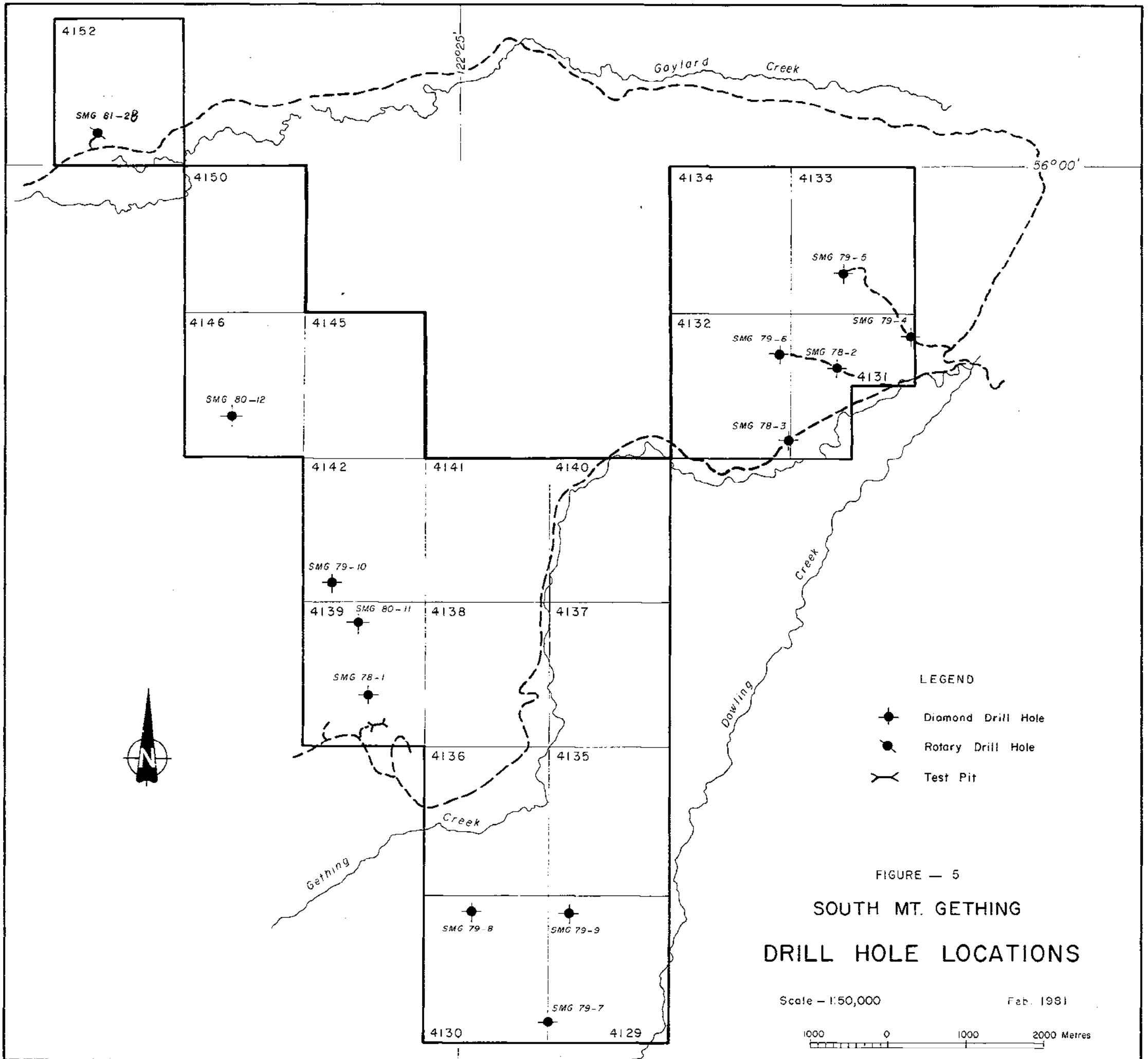
- 1) AIR DRY
- 2) WEIGH SAMPLE*
- 3) PULVERIZE (60 MESH)

1.4 SINK

- 1) AIR DRY
- 2) WEIGH SAMPLE*
- 3) PULVERIZE (60 MESH)

- 4) MAKE SAMPLE & DUPLICATE SAMPLE
- 5) RUN ASSAYS
 - a) FSI
 - b) %MOISTURE
 - c) %ASH
 - d) %SULPHUR
 - e) %VOLATILE MATTER

*WEIGHT RECOVERY OF COAL INSIDE SAMPLE



GEOLOGY -- GENERAL AND LOCAL

The South Mount Gething Property is underlain by folded and faulted sediments of Upper Jurassic to Lower Cretaceous age. The oldest, the Upper Jurassic to Lower Cretaceous Minnes Group consists of Monteith, Beattie Peaks, Monach and Bickford Formations. Unconformably overlying these rocks are sediments of the Lower Cretaceous Bullhead Group which comprises Cadomin and Gething Formations. The Bullhead Group is, in turn, disconformably overlain by the Fort St. John Group. The Moosebar Formation and Gates Formation are the only units of the Fort St. John Group exposed on the property (see Table 2, page 15).


Type sections of Formations within the Minnes Group can be found in the Carbon Creek basin. Each formation varies in thickness away from this location. The Monteith Formation thins from 564 metres in the Carbon Creek basin to 287 metres in the eastern part of the Foothills (Hughes, 1964). Beach and Spivak (1944) measured 447 metres of Monteith Formation on the Mount Gething, 3 kilometres north of the South Mount Gething Peak. The Beattie Peaks and Monach Formations thin from 373 metres and 131 metres at Beattie Peaks in the Carbon Creek basin to 21 metres and 40 metres respectively in drill core near Butler Ridge, 20 kilometres northeast of South Mount Gething. The Monach is completely absent in areas on Butler Ridge and Grant's Knob 17 kilometres east of South Mount Gething (Hughes, 1964). The Bickford Formation is 750 metres beneath the Carbon Creek Coal Licences and is absent in the Peace River Canyon (Stott, 1966).

The marine Monteith Formation may be divided into two lithofacies on South Mount Gething as in the Carbon Creek basin; an upper unit of clean quartzitic sandstones and conglomerates, dirty sandstones and minor siltstone; and a lower unit of dirty sandstones. The upper Monteith unit contains approximately 300 metres of an almost continuous sequence of fine-grained orthoquartzites to quartzite granular conglomerate with minor interbeds of fine-grained dirty sandstones and siltstones. The orthoquartzites may be white to light grey on a fresh surface and weather light grey. The clean quartzitic sandstones are massive with occasional cross-bedding but rarely may be thick to thin bedded. Beds range from 0.01 metre to 20 metres thick. Interbedded with the orthoquartzites are fine-grained, medium brown, thin to thick bedded sandstones and medium brown siltstones. The upper lithofacies of the Monteith Formation is easily recognized on the landscape by the light grey prominent orthoquartzites.

NOMENCLATURE OF THE LOWER CRETACEOUS BULLHEAD

AND FORT ST. JOHN GROUP

TABLE - II

		Muller 1961	Stott 1968 Pine River Foothills	(used in this report) Stott 1968 Upper Peace River	Flynn 1976	
Upper Cretaceous		Dunvegan Fm.	Dunvegan Fm.	Dunvegan Fm.		
			Cruiser Fm.	Cruiser Fm.		
Lower Cretaceous	Fort St. John Group	Cruiser Fm.	Goodrich Fm.	Goodrich Fm.	Hasler Fm. & Younger	
		Goodrich Fm.	Hasler Fm.			
		Hasler Fm.	Commotion Fm. Boulder Creek Member Hulcross Member	Hasler Fm.		
		Commotion Fm.				Gates Fm.
		Moosebar Fm.				
	Bullhead Group	Gething Fm.	Gething Fm.	Gething Fm.	Gething Fm.	
		 Monach Fm.	Cadomin Fm.	Cadomin Fm.	Cadomin Fm.	
		Beattie Peaks Fm.				
		Montieth Fm.				
Lower Cretaceous & Jurassic	Fernie Group	Minnes Group	Minnes Group	Minnes Group		
Jurassic		Fernie Group	Fernie Group			

The lower lithofacies of the Monteith Formation conformably overlies the Jurassic Fernie shales and is overlain conformably by the Lower Cretaceous Beattie Peaks Formation. The Monteith-Beattie Peaks contact is assumed to be the contact between massive quartzose sandstones and the recessive Beattie Peaks Formation.

The recessive nature of the Beattie Peaks Formation restricts its exposure to two isolated outcrops on the South Mount Gething Property. Therefore, because of recessive characteristics, also exhibited in the Carbon Creek basin, the description given for this formation will be that from Carbon Creek basin. The only marked difference between the two localities is thickness. The Beattie Peaks Formation is estimated to be 40 metres thick on the South Mount Gething Property.

The Beattie Peaks Formation is distinguished from overlying and underlying strata by its recessive, thinly interbedded siltstone, fine-grained sandstone, mudstone and rare coals. Casts and worm tracks and burrows are common. The sandstone may contain abundant pelecypods in medium beds.

The Monach Formation, conformably overlying the Beattie Peaks Formation, varies considerably away from Carbon Creek basin. Stott (1967) states: "As Muller (1961) was unable to distinguish typical Monach sediments throughout parts of the Pine Pass map-area, the Monach sandstones may be prominent only as a local facies in the Carbon Creek basin." Sediments that may be correlated to the Monach Formation are exposed on the property. The sediments consist of fine to medium-grained sandstones interbedded with siltstone and mudstone. The sandstones have a high quartz content displaying a salt and pepper appearance. Frequently these cross-bedded sandstones are massive, forming 20 metre cliffs on the property. Despite an erosional unconformity between the Monach and Cadomin Formations, the prominent sandstones of both formations appear so similar as to be transitional. The separation is then made at the first conglomeratic band of the Cadomin Formation.

The uppermost unit in the Minnes Group is the non-marine Bickford Formation. The unit consists of strata similar to the Gething Formation, including coals. However, the pre-Cadomin regional erosional unconformity bevelled this unit in the vicinity of the South Mt. Gething Property. "In the vicinity of Peace River canyon, the Cadomin is in contact with strata low in the Beattie Peaks Formation" (Stott, 1966). The total amount of sediments removed by the erosional event is not known and may vary from area to area in the region.

Stott considers the Lower Cretaceous Bullhead and Fort St. John Groups to form a non-marine to marine sequence:

"The basal succession of Lower Cretaceous coalbearing sediments and massive conglomerates is included in the Bullhead Group. The overlying Lower Cretaceous marine sediments with tongues of carbonaceous, sandy sediments are included in the Fort St. John Group. The lower part of the sequence records widespread fluvial conditions that developed after initial deposition of conglomeratic sediments. The upper part records the complex intertonguing of marine transitional and flood plain environments along the coast line of the Early Cretaceous epicontinental sea"

In the property area, the Cadomin Formation is most commonly a sequence of interbedded sandstones and conglomerates. The sandstone beds are typically medium to coarse-grained, massive to coarsely cross-bedded and weather light red-brown in colour. The sandstones contain abundant quartz, chert and volcanic rock fragments, which gives them a salt and pepper appearance on fresh surfaces. The sandstone beds range from less than one metre to over seven metres in thickness. The conglomerate units contain well rounded pebbles and cobbles of chert, quartz and volcanic fragments. These conglomerates range in thickness from pebble bands to massive units over two metres thick.

The contact between the Cadomin and Gething Formations is not clearly defined in the property area. McLearn and Kindle (1950, page 65) noted that the contact may occur at the same stratigraphic horizon from area to area. Irish (1970, page 68) noted that, to the northeast of the Bri-Dowling Creek Property:

"In Peace River Canyon, coarse sandstones of the Cadomin Formation grade laterally into interbedded coal, sandstones and shale of the Gething Formation, and therefore the formations are in part lateral equivalents.

This indicates that the contact between the two formations is transitional, not abrupt. Stott (1963, page 3) noted that the Cadomin and Gething Formations are actually "facies of a vertical transition from the Cadomin Formation to the Gething Formation. The contact between the two formations is placed at the top of the uppermost thick, coarse grained sandstone bed of the Cadomin Formation.

The character of the Gething Formation sediments underlying the property is typical; as described by Irish (1979, page 69), 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 levee deposits and others may represent flood plain splay deposits (Stott, 1968, page 111). Sedimentary features attributable to these types of deposits are present in drill core and in outcrop on the Bri-Dowling Creek Property.

Stott (1968, page 111) lists some of the features found in sandstones in the Gething Formation; well sorted nature but often containing considerable matrix, festoon cross-beds, 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, page 112). These silts and clays 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, page 112) suggests that some may have originated in abandoned river channels, some paralleling major river channels and some on deltas.

Work by Stott (1969, page 4) indicated a minimum thickness of 1,600 feet (490 metres) for the Gething formation in the area. The total thickness approaches 1,800 feet (550 metres) if a postulated fault is absent. This formation contains the coal seams of interest on the South Mount Gething Property.

The Bullhead Group is overlain by marine sediments of the Fort St. John Group, which comprises, from oldest to youngest, the Moosebar Formation, the Gates Formation, the Hasler Formation, the Goodrich Formation and the Cruiser Formation (see Table 2). Of these formations, only the Moosebar Formation and the Gates Formation have been observed on the property in outcrop or in drill core.

The Moosebar Formation of the Fort St. John Group disconformably overlies the Gething Formation. It consists of dark grey to black, rubbly to blocky mudstones throughout most of the section. The lower part of the Moosebar Formation is typically strongly glauconitic with abundant pyrite nodules and thin volcanic ash (bentonite) bands. The Moosebar-Gething contact has not been observed in drill core or outcrop on the South Mount Gething Property. However, on the

Bri-Dowling Creek Property adjacent to South Mount Gething, the contact is observed as a thin pebbly basal sandstone to conglomerate lying abruptly on carbonaceous Gething Formation sediments. This basal unit is very poorly sorted with a mud matrix and often contains abundant glauconite and pyrite. McKechnie (1955) noted that the basal conglomerate of the Moosebar Formation:

"...is a typical mud-flats conglomerate ranging from a few inches to about 4 feet thick, and is composed of well rounded grey and black chert pebbles about one quarter inch in diameter in a mudstone matrix."

Ironstone concretions occur in bands at various levels throughout the section. Toward the top of the formation, the mudstones become gritty and thin beds of fine-grained sandstone and siltstone are present. Stott (1968, page 51) considers that the upper boundary with the overlying Gates Formation should be "drawn at the base of the first thick succession of sandstone."

The Gates Formation, as observed from drill core and field mapping, consists of interbedded, grey to brownish-grey, often green weathering, fine to medium grained sandstone, dark grey shales and grey to brownish-grey siltstone. The sandstone units often resemble Gething Formation sandstones, with very minor coaly streaks observed in rare cases. Ironstone concretions were observed in the Gates Formation in siltstone beds in outcrop on the property. Formations overlying the Gates Formation were not observed.

STRUCTURE

The South Mount Gething Property is located within the Rocky Mountain Foothills structural belt, which is underlain by folded and thrust faulted Mesozoic Strata (Irish, 1968). The general trend of the structures is northwesterly, with most of the thrust faults dipping in a southwesterly direction.

The property is underlain by Minnes, Bullhead and Fort St. John Group sediments which have been folded into a broad, south plunging anticline and thrust faulted at its base. The displacement of the thrust fault is suggested by mapping and air photo interpretation. Irish, (1968), on his structural map of northeastern British Columbia, shows the South Mount Gething anticline into two thrust faults to the north of the property. Generally, the intensity of structures increase to the north of the property.

Strata on the over thrust side exhibit several northwest trending flexures along the northwest face of South Mount Gething. The structures throw strata steeper in the same dip direction. Only a major flexure can be seen in cross-section (see Fig. 6, page 21). This particular flexure extends the full length of the property's western boundary, losing its intensity to the south. A discontinuous thrust fault to the west of South Mount Gething summit postulated in the 1979 report has been discarded. This flexure appears to be a thrust of Cadomin strata onto older strata, but the flexure continues into the older strata. In addition, the thickness of strata between the Cadomin and Monteith Formations at this locality seems to be consistent across the property.

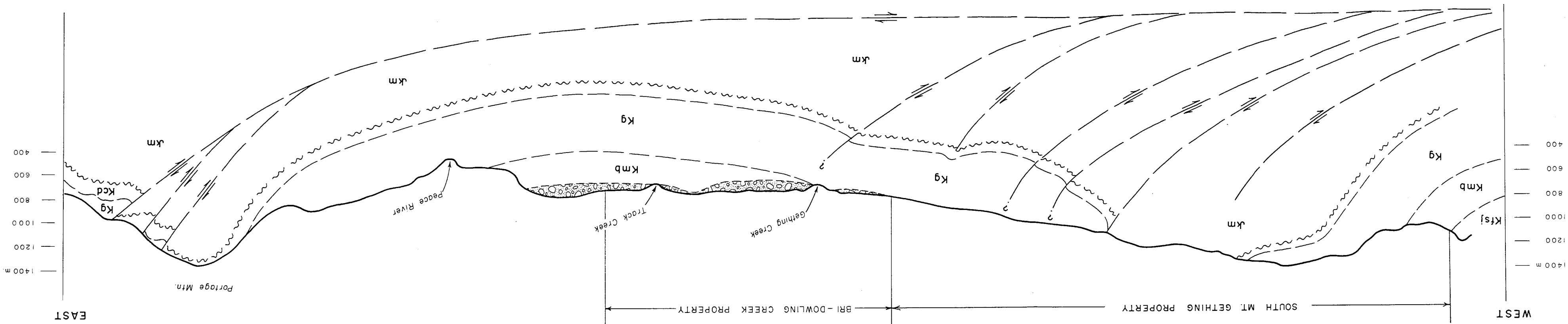
The eastern part of the property consists of strata on the under thrust side of the major thrust fault. Minor faulting is evident in drill core and outcrop. Some of the faulting noted in drill core closely approximated bedding dip angles and are probably the result of slight movement, in response to folding, along bedding surfaces. Fractures have been produced as an accommodation to stress associated with folding and thrust faulting. Bedding dips in the upper part of D.D.H. SMG 78-3 and the lower part of D.D.H. SMG 79-5 each show a minor scale tight fold which may be faulted. The faulted lobe of Moosebar strata in the lower east corner of the property was delineated by the 1980 rotary drill program. Minor folding and faulting have been noted in several road cuts along Gething Creek Road. In several localized areas, widely variable bedding attitudes suggest small scale folding.

Date - Dec. 1980
NTS - 93 0/16
Horizontal Scale - 1:50,000
Vertical Scale - 1:25,000

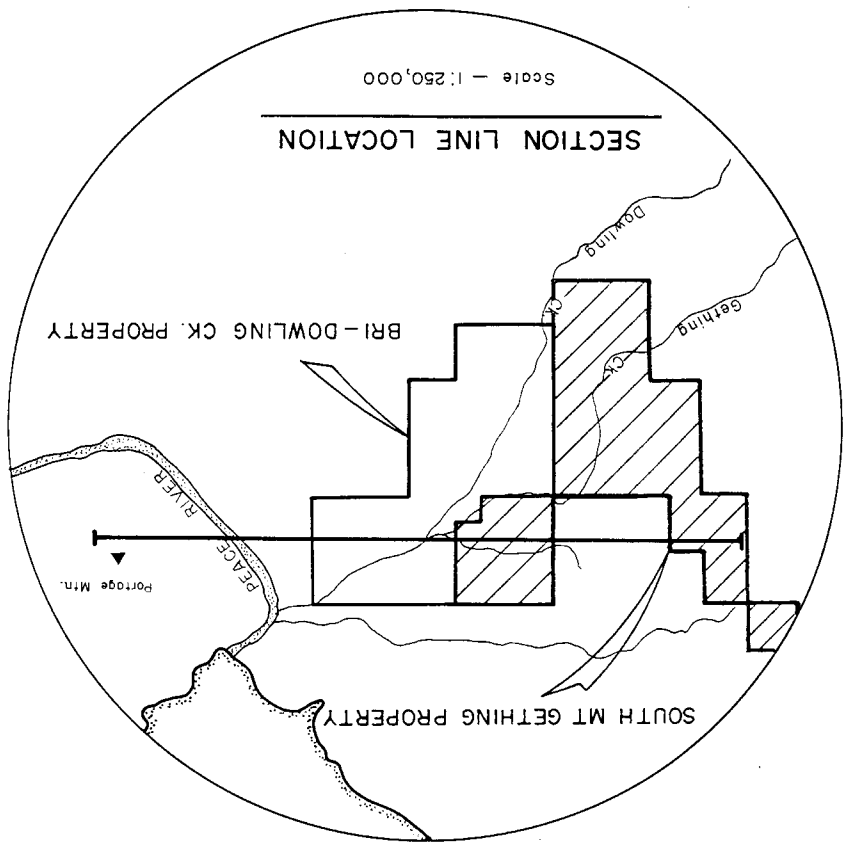
EAST - WEST SECTION
ALONG 6,204,000 N
LOOKING NORTH

SOUTH MT. GETHING

FIGURE - 6



- LEGEND
- Quaternary Alluvium
 - Fort St. John Group (undifferentiated)
 - Moosebar Formation
 - Gething Formation
 - Cadomin Formation
 - Minnes Group
 - Unconformity
 - Thrust Fault



(2 X VERTICAL EXAGGERATION)

DRILL HOLE DATA
R.D.H. SMG 80-28

A. WELL COMPLETION REPORT:

Location: In the southwest corner of C.L. 4152
U.T.M. Coordinates 6,206,369N x 531,601E ok

Elevation: 818.9 metres

Orientation: Vertical

Date Collared: 10 September 1981

Date Completed: 11 September 1981 Plugged: no, next season

Overburden Depth: 1.98 metres

Casing Depth: 1.98 metres Casing Size: 7 3/8"

Final Depth: 135.33 metres

Formations Encountered: 0 to 1.98 metres - Overburden
1.98 to 135.33 metres - Gething Fm.

Logged by: P. Cowley

Coal Seams Sampled:

<u>Sample No.</u>	<u>Interval</u>	<u>Chips</u>	<u>Thickness</u>	
			<u>Density Log</u>	<u>True</u>
1	8.84m to 9.14m	0.30m	0.45m	0.40m
2	14.02m to 14.48m	0.46m	0.70m	0.63m
3	29.26m to 29.87m	0.61m	0.70m	0.63m
4	32.00m to 33.07m	1.07m	0.70m(sp)	0.60m(sp)
5	34.14m to 35.20m	1.06m	1.20m(sp)	1.08m(sp)
6	55.32m to 55.93m	0.61m	1.10m	0.99m
7	62.94m to 63.70m	0.76m	1.20m	1.08m
8	78.03m to 78.64m	0.61m	1.00m	0.90m

Logs Run: Gamma Ray, Density, Caliper - by Utah Mines Ltd.

CORRELATION OF COAL SEAMS

In the Peace River area, the coal seams of the Gething Formation show significant variability in thickness and lateral extent. While coal seams are correlatable over one or two kilometre distances, correlations are at best tentative when drill holes are more widely separated.

In the South Mount Gething Property area, the most precisely correlatable horizon is the Moosebar-Gething contact. Failing intersection of this contact correlation of coal seams between drill holes becomes complex, involving physical, chemical and geophysical drill derived data.

In the northeast corner of the property, none of the diamond drill holes intersected the contact. However, with the aid of the South Mount Gething 1980 rotary drill program and data from nearby 1980 Bri-Dowling Creek Property drill holes, the coal seams in the northeast of the property may be correlated with respect to the Moosebar-Gething contact. The coal seams in the diamond drill holes in the southwest part of the property are correlated with an assumed relationship with the Moosebar-Gething contact which from mapping suggests a close proximity to certain holes.

Diamond drill holes SMG-78-2, SMG-78-3, SMG-79-4, SMG-79-5 and SMG-79-6 and pertinent rotary drill holes 80-3 and 80-4 located in the northeast corner of the property were correlated together (see Fig 8, map pocket). This grouping is close to the Bri-Dowling Creek Property and information from Bri drill holes were utilized in the correlation. The Superior seam was intersected in seven (7) 1980 rotary drill holes. The seam averaged 2.06m but ranged from 1.65m to 2.59m thick. The R.D.H. SMG-80-3, used as a representative case, intersected the Superior seam 1.5m below the Moosebar-Gething contact. In R.D.H. SMG 3, 4 and 7 two, closely spaced seams 42m below the Moosebar-Gething contact were correlated to the Trojan seam. The Trojan seam, if the correlation is correct, thins and splits from the Bri-Dowling Creek Property to South Mount Gething Property. The Titan seam normally approximately 65m below the Moosebar-Gething contact appears to be channelled in D.D.H. SMG-78-2. In D.D.H. SMG 78-3 the upper 1/3 of the hole has been faulted, losing the upper seams, but below the fault the coal seams are correlatable. The Falls seam, typically 90m below the Moosebar-Gething contact was intersected in D.D.H.'s SMG 78-2, 78-3 and 79-6. The Falls seam is thickest (1.40m) in SMG 78-3, gradually thins to 1.25m in SMG 78-2, and finally splits into two 0.60m seams in SMG 79-6. The seams below the Falls seam were not named. In

D.D.H. SMG 78-3 and SMG 79-6 a thick split seam was cored approximately 145m below the Moosebar-Gething contact. This seam thins to the northeast in D.D.H. SMG 78-2.

Diamond drill holes SMG 78-1, 79-7, 79-8, 79-9, 79-10 and 80-11, located in the southwest part of the property were correlated together (see Fig. 9, map pocket).

A 3.21 metre thick coal seam was penetrated only in SMG 80-11. Its lateral extent is unknown. A 4.56 metre average seam, 32 metres below the 3.21 metre seam was penetrated in SMG 78-1 and SMG 80-11. The attempts to uncover these seams during the limited 1981 Exploration program were inconclusive. On C.L. 4139 seven test pits terminated in overburden. On C.L. 4152, RDH 81-28 spudded in Gething strata making stratigraphic position unreliable. Along the newly built logging road to Wright Lake, a nearly complete section 307 metres thick of Gething strata is exposed.

CONCLUSIONS AND RECOMMENDATIONS

Coal licences in the northeastern, southern and western areas of the South Mount Gething Property have potential for discovery of economically mineable coal seams. Exploration work to date has primarily involved 2454 metres of diamond drilling 12 widely spaced holes, 1286 metres of rotary drilling in 28 shallow, closely spaced holes, seven test pits and extensive geological mapping.

The three diamond drill holes cored during the 1978 exploration program provided an initial examination of the coal seams underlying the property. The results of this program provided areas of interest for further exploration in 1979.

In 1979, seven diamond drill holes, in 2 groups, were drilled on the property. Diamond drill holes SMG 79-4, 79-5 and 79-6 further examined the northeastern portion of the property. Three coal seams in these holes were of significant (0.90m) thickness but were of limited areal extent.

Diamond drill holes SMG 79-7, 79-8, 79-9 and 79-10 in the southern portion of the property, did not intersect the 4.62 metre thick coal seam in D.D.H. SMG 78-1, having each been spotted east of what is now thought to be its subcrop. The four holes did not intersect any coal seams thicker than 1.37 metres and correlations, though tentative, do not suggest reliable seam continuity.

In 1980, D.D.H. SMG 80-11 penetrated a seam with a true thickness of 4.50 metres correlated to the 4.62 metre thick seam in SMG 78-1. D.D.H. SMG 80-11 also penetrated a seam with a true thickness of 3.09 metres which overlies the afore mentioned seam. These two significant seams dip up to 45°. Diamond drill hole SMG 80-12, located to penetrate these thick western seams was unsuccessful, having been located east of what is now thought to be their subcrop.

The 1980 rotary drill program in the north^{est} on C.L.'s 4131 and 4132 was not successful in locating adit entries for the Superior and Trojan seams. These seams subcrop below excessive overburden thickness. However, the program did more completely define the structural complexity of the area by delineating a fault previously undetected and by assisting in seam correlation.

Extensive geological mapping in 1980 added greatly to the structural and stratigraphic interpretation of the property. Coal licences (C.L.'s 4143, 4144, 4147 to 4149 and 4151) centrally located

over the top of South Mount Gething are underlain by Minnes Group, Cadomin and lowermost Gething Formations. Thus, these licences were abandoned in May 1981.

The 1981 Exploration program was designed to uncover or intersect the two thick coal seams intersected in D.D.H. SMG 80-11. Attempts to locate the seams were unsuccessful. On C.L. 4139, seven test pits terminated in overburden. On C.L. 4152, R.D.H. SMG 81-28 spudded Gething strata making stratigraphic position uncertain.

An extensive rotary drill program is recommended for the 1982 field season to intersect the two thick coal seams of D.D.H. SMG 80-11. The program should test the full length of the property to determine the seams' lateral extent.

SELECTED BIBLIOGRAPHY

- Anderson, R.B., and Armstrong, A.T.,
1979: 1978 Report of Exploration Activities on the Bri-Dowling
Creek Property (unpublished report)
- Armstrong, A.T., and Anderson, R.B.,
1979: 1979 Report of Exploration Activities on the Bri-Dowling
Creek Property (unpublished report)
- Armstrong, A.T.,
1979: 1978 Report of Exploration Activities on the South Mount
Gething Property (unpublished report)
- Armstrong, A.T.,
1979: 1979 Report of Exploration Activities on the West Carbon
Creek Property (unpublished report)
- Cowley, P.S.,
1980: 1980 Report of Exploration Activities on the South Mount
Gething Property (unpublished report)
- Duncan, D.N.,
1980: 1979 Report of Exploration Activities on the South Mount
Gething Property (unpublished report)
- Duncan, D.N.,
1981: 1980 Report of Exploration Activities on the Bri-Dowling
Creek 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.
(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

1967: Geology of the Pine Valley Mount Wabi to Solitude Mountain Northeastern British Columbia; British Columbia Department of Mines and Petroleum Resources, Bulletin 52

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

LeNobel, 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)

Mathews, W.H.,

1947: Geology and Coal Resources of the Carbon Creek - Mount Bickford Map - Area; British Columbia Department of Mines, Bulletin 24

McKechnie, N.D.,

1955: Coal Reserves of the Hasler Creek-Pine River Areas; British Columbia Department of Mines, Bulletin 36

McLearn, F.H., and Kindle, E.D.,

1950: Geology of Northeastern British Columbia; Geological Survey of Canada, Memoir 259

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.,

- 1960: Cretaceous Rocks between Smoky and Pine Rivers, Rocky Mountain Foothills, Alberta and British Columbia; Geological Survey of Canada, Paper 60-16
- 1961: Dawson Creek Map - Area, British Columbia; Geological Survey of Canada, Paper 61-10
- 1961: Type sections of some formations of the Lower Cretaceous Fort St. John Group near Pine River, British Columbia; Geological Survey of Canada, Paper 61-11
- 1963: Stratigraphy of the Lower Cretaceous Fort St. John Group and Gething and Cadomin Formations, Foothills of Northern Alberta and British Columbia; Geological Survey of Canada, Paper 62-39
- 1967: Fernie and Minnes Strata North of Peace River, Foothills of Northeastern British Columbia; Geological Survey of Canada, Paper 67-19 (Part A)
- 1968: Lower Cretaceous Bullhead and Fort St. John Groups, between Smoky and Peace Rivers, Rocky Mountain Foothills, Alberta and British Columbia; Geological Survey of Canada, Bulletin 152
- 1969: Fernie and Minnes Strata North of Peace River, Foothills of Northeastern British Columbia; Geological Survey of Canada, Paper 67-19 (Part B)
- 1969: The Gething Formation at Peace River Canyon, British Columbia; Geological Survey of Canada, Paper 68-28

APPENDIX I
DESCRIPTIVE LITHOLOGIC LOGS
R.D.H. SMG 81-28
WRIGHT LAKE ROAD SECTION

HOLE#

SMG RDH 81-28

From Om

To 39.62

FROM	TO	DESCRIPTION
0	1.98	OVERBURDEN
1.98	3.05	Sandstone - fine grained, medium to light grey
3.05	3.66	Mudstone/Siltstone - dark grey
3.66	5.49	Sandstone - fine grained, light grey
6.10	7.62	Sandstone and Siltstone - interbedded, - sandstone fine grained to light grey brown, - siltstone medium grey
7.62	8.84	Siltstone - medium grey
8.84	9.14	COAL - 0.30m, Sample #1,
9.14	9.75	Siltstone - and minor mudstone
9.75	10.67	Sandstone - medium to fine grained, light grey to salt and pepper, carbonaceous debris
10.67	12.19	Sandstone - medium to fine grained, salt and pepper carbonaceous debris
12.19	12.80	Siltstone - medium grey
12.80	14.02	Mudstone - dark grey
14.02	14.48	COAL - 0.46m SAMPLE #2
14.48	15.70	Siltstone - dark grey, carbonaceous
15.70	16.76	Sandstone - fine grained medium to light grey, carbonaceous, silty at base
16.76	17.07	Sandstone - very fine grained, medium grey
17.07	17.68	Siltstone - medium grey
17.68	19.81	Mudstone - medium grey
19.81	21.34	Mudstone and Minor Siltstone - dark grey
21.34	27.43	Mudstone - dark grey, silty in places
27.43	28.04	Siltstone - dark grey, carbonaceous
28.04	29.26	Mudstone - dark grey
29.06	29.87	COAL - 0.61m SAMPLE #3
29.87	30.48	Mudstone - dark grey, carbonaceous
30.48	31.24	Siltstone - medium grey
31.24	32.00	Mudstone - dark grey
32.00	33.07	COAL - 1.07m, SAMPLE #4
33.07	34.14	Siltstone - dark grey
34.14	35.20	COAL - 1.06m, SAMPLE #5
35.20	38.10	Siltstone - medium grey, coaly from 37.49m to 38.10m
38.10	39.62	Siltstone - medium grey, sandy in places

HOLE# SMG RDH 81-28From 39.62 To 74.37

FROM	TO	DESCRIPTION
39.62	41.15	Siltstone/Mudstone - interbedded dark grey
41.15	42.67	Siltstone - dark grey
42.67	44.20	Sandstone - very fine grained medium grey
44.20	45.11	Sandstone - fine grained light grey
45.11	46.02	Siltstone - medium grey and minor mudstone dark grey
46.02	47.24	Sandstone - fine grained, carbonaceous, light grey
47.24	47.85	Siltstone - and minor mudstone
47.85	48.77	Mudstone - dark grey, coaly at approx. 48.16m
48.77	50.29	Sandstone, Siltstone, Mudstone interbedded, - sandstone fine grained, medium light grey
50.29	53.34	Mudstone - dark grey, carbonaceous, coaly from 51.82m to 52.42m
52.88	53.34	Siltstone - medium grey, carbonaceous
53.34	55.32	Mudstone - dark grey
55.32	55.93	COAL - 0.61m SAMPLE #6
55.93	57.00	Mudstone - dark grey
57.00	57.61	Sandstone - fine grained, medium grey, carbonaceous
57.61	57.91	Siltstone - medium brown
57.91	60.81	Sandstone - fine grained, medium grey, carbonaceous
60.81	61.42	Mudstone - dark grey
61.42	61.57	Sandstone - fine grained, medium grey, carbonaceous
61.57	62.94	Mudstone and Coal
62.94	63.70	COAL - 0.76m SAMPLE #7
63.70	64.01	Mudstone - dark grey
64.01	66.45	Siltstone - dark grey, carbonaceous, sandy
66.45	66.90	COAL - 0.45m
66.90	67.06	Siltstone - dark grey, sandy at base
67.06	68.58	Sandstone - fine grained, light grey brown, silty at base
68.58	69.49	Siltstone - dark grey, carbonaceous
69.49	70.10	Mudstone - medium brown
70.10	70.41	COAL - 0.31m
70.41	72.85	Siltstone - dark grey carbonaceous and mudstone dark grey
72.85	74.37	Sandstone - fine to medium grained, salt and pepper

FROM	TO	DESCRIPTION
74.37	74.68	Mudstone - dark grey
74.68	74.98	COAL and MUDSTONE
74.98	75.44	COAL - 0.45m
75.44	76.20	Mudstone - dark grey
76.20	77.42	Siltstone - medium grey, carbonaceous
77.42	78.03	Mudstone - dark grey
78.03	78.64	COAL - 0.61m SAMPLE #8
78.64	80.47	Sandstone - very fine grained, medium grey, carbonaceous
80.47	82.90	Siltstone - medium grey
82.90	83.21	Mudstone - dark grey
83.21	83.82	Siltstone dark grey, carbonaceous
82.83	83.97	Mudstone - dark grey, very carbonaceous
83.97	88.39	Siltstone - dark grey, sandy in places
88.39	89.11	Sandstone - fine grained, medium to light grey
89.11	89.31	Mudstone - dark grey
89.31	89.76	COAL - 0.45m
89.76	91.44	Sandstone - fine to very fine grained, medium grey
91.44	92.05	Mudstone and Siltstone - medium and dark grey
92.05	92.51	COAL - 0.46m
92.51	96.32	Mudstone - dark grey
96.32	96.93	Siltstone - dark grey
96.43	99.06	Sandstone - fine grained, medium grey, carbonaceous
99.06	100.28	Sandstone - fine to medium grained, salt and pepper
100.28	101.35	Siltstone - dark grey, mudstone dark grey
101.35	102.35	Mudstone - dark grey
102.11	103.63	Siltstone - dark grey
103.17	105.16	Mudstone - dark grey
105.16	106.68	Siltstone - dark grey and sandstone fine grained, light grey, interbeds
106.68	108.20	Mudstone - and minor siltstone, dark grey
108.20	109.73	Mudstone and Siltstone - interbedded, dark grey
109.73	112.17	Mudstone - dark grey
112.17	113.84	Siltstone - medium grey
113.84	114.91	Mudstone - dark grey
114.91	115.06	COAL - 0.15m

HOLE# Wright Lake Road Traverse From Om To 43.35m

FROM	TO	DESCRIPTION
0	1.00	Siltstone - medium grey
1.00	2.50	<u>Coal</u> - 1.50m
2.50	2.60	Mudstone - dark grey
2.60	3.50	Sandstone - fine grained, light grey
3.50	4.00	Mudstone - dark grey
4.00	4.40	Siltstone - medium grey
4.40	4.60	Mudstone - dark grey
4.60	6.10	Siltstone - medium grey
6.10	7.10	Mudstone - dark grey
7.10	9.10	Siltstone - medium grey
9.10	10.60	Sandstone - fine grained, light grey
10.60	11.60	Cover
11.60	12.65	Mudstone - dark grey
12.65	14.15	Silty Mudstone - dark grey
14.15	17.10	Cover
17.10	25.20	Interbedded Sandstone and minor Siltstone
25.20	25.65	Mudstone - dark grey
25.65	26.55	<u>Coal</u> - 0.90m
26.55	27.10	Mudstone - dark grey
27.10	29.10	Cover
29.10	32.00	Sandstone - fine grained, light grey
32.00	33.10	Sandstone, medium grained, light grey
33.10	34.00	Siltstone - medium grey
34.00	34.40	<u>Coal</u> 0.40m
34.40	36.70	Mudstone and Siltstone - mudstone dark grey at top grades to medium grey siltstone at bottom
36.70	38.15	Sandstone - fine grained, light grey
38.15	39.60	Cover
39.60	39.85	Sandstone- fine grained, light grey
39.85	40.35	Mudstone - dark grey
40.35	41.00	Mudstone - dark grey, carbonaceous
41.00	42.00	<u>Coal</u> 1.00m
42.00	42.20	Mudstone - dark grey
42.20	42.40	<u>Coal</u> - 0.20m
42.40	42.75	Siltstone - medium grey
42.75	43.35	Mudstone - dark grey

HOLE* Wright Lake Road Traverse From 43.35m To 94.40m

FROM	TO	DESCRIPTION
43.35	43.45	Coal - 0.10m
43.45	43.80	Mudstone - dark grey
43.80	44.70	Sandstone - fine grained, light grey
44.70	46.30	Siltstone - medium grey
46.30	47.20	Mudstone - dark grey, very carbonaceous
47.20	48.20	Coal - 1.00m
48.20	49.30	Mudstone - dark grey
49.30	50.54	Sandstone - fine grained, light grey
50.45	50.60	Mudstone, dark grey
50.60	50.70	Coal 0.10m
50.70	52.80	Mudstone - dark grey
52.80	52.90	Coal - 0.10m
52.90	53.10	Mudstone - dark grey
53.10	53.50	Sandstone - fine grained, light grey
53.50	54.05	Mudstone - dark grey
54.05	54.45	Sandstone- fine grained, light grey
54.45	57.70	Sandstone, fine grained, light grey, carbonaceous
57.70	58.10	Siltstone - medium grey
58.10	58.15	Mudstone - very carbonaceous, dark grey
58.15	58.90	Coal - 0.75m
58.90	59.00	Mudstone - dark grey
59.00	59.55	Coal 0.55m
59.55	59.65	Mudstone - dark grey
59.65	59.90	Coal 0.25m
59.90	61.25	Siltstone - medium grey
61.25	61.55	Coal 0.30m
61.55	61.80	Mudstone - dark grey
61.80	62.60	Siltstone - medium grey
62.60	66.00	Mudstone - very carbonaceous, dark grey
66.00	66.20	Coal 0.20m
66.20	66.65	Mudstone - dark grey
66.65	67.75	Coal - 1.10m
67.75	69.80	Sandstone miner Mudstone - fine grained light grey
69.80	71.60	Coal-1.80m, minor 0.10m mudstone split
71.60	76.20	Interbedded Siltstone and Mudstone
76.20	80.80	Mudstone - dark grey
80.80	93.00	Cover
93.00	94.40	Coal 1.40m

HOLE# Wright Lake Road Traverse From 94.40m To 145.90m

FROM	TO	DESCRIPTION
94.40	95.25	Mudstone - very carbonaceous, dark grey
95.25	100.60	Cover
100.60	102.80	Sandstone - fine grained, light grey
102.80	103.25	Mudstone - dark grey
103.25	105.25	<u>Coal</u> 2.0m
105.25	105.60	Siltstone - medium grey
105.60	105.90	Mudstone - dark grey
105.90	106.80	Siltstone - medium grey
106.80	107.90	Mudstone - dark grey
107.90	108.25	Siltstone - medium grey
108.25	108.60	Sandstone - fine grained, light grey
108.60	109.80	Mudstone - dark grey
109.80	118.70	Cover
118.70	119.00	Mudstone - dark grey
119.00	119.25	Sandstone - fine grained, light grey
119.25	121.80	Siltstone - medium grey
121.80	122.10	<u>Coal</u> 0.30m
122.10	122.50	Mudstone, very carbonaceous, dark grey
122.50	122.60	Siltstone, very carbonaceous, medium grey
122.60	122.90	Mudstone, very carbonaceous, dark grey
122.90	123.20	<u>Coal</u> 0.30m
123.20	123.50	Mudstone, very carbonaceous, dark grey
123.50	123.70	Siltstone - medium grey
123.70	124.85	Mudstone - dark grey
124.85	125.05	Sandstone - fine grained, light grey
125.05	136.45	Cover
136.45	139.40	Sandstone - fine grained, light grey
139.40	139.90	Siltstone - carbonaceous, medium grey
134.90	140.65	<u>Coal</u> 0.75m
140.65	140.85	Sandstone - fine grained, light grey
140.85	141.00	<u>Coal</u> - 0.15m
141.00	141.90	Mudstone - dark grey
141.90	143.40	Sandstone - light grey, fine grained
143.40	144.00	Siltstone - medium grey
144.00	144.40	Mudstone, very carbonaceous, dark grey
144.40	144.80	<u>Coal</u> - 0.40m
144.80	145.40	Mudstone - dark grey
145.40	145.90	Siltstone - medium grey

HOLE# Wright Lake Road Traverse From 145.90m To 203.90

FROM	TO	DESCRIPTION
145.90	146.10	Mudstone - dark grey
146.10	147.20	Sandstone - fine grained, light grey
147.20	148.60	Cover
148.60	148.90	Mudstone - dark grey
148.90	149.20	Sandstone, fine grained, light grey
149.20	149.50	Siltstone, medium grey
149.50	152.60	Cover
152.60	153.60	Siltstone - medium grey
153.60	156.15	Sandstone - worm burrows, light grey, fine grained
156.15	157.70	Mudstone - dark grey
157.70	158.20	Coal 0.50m
158.20	158.90	Mudstone - carbonaceous, dark grey
158.90	175.10	Cover
175.10	176.60	Sandstone - light grey, fine grained
176.60	178.60	Siltstone and minor sandstone
178.60	183.60	Sandstone - light grey, fine grained to medium grained
183.60	186.60	Sandstone - minor conglomerate, fine - coarse grain
186.60	187.70	Cover
187.70	189.20	Sandstone - light grey, fine grained
189.20	193.40	Siltstone - medium grey
193.40	193.70	Coal - 0.30m
193.70	195.60	Mudstone - dark grey, carbonaceous
195.60	196.00	Coal - 0.40m
196.00	196.20	Mudstone - dark grey
196.20	197.50	Sandstone - medium grey
197.50	198.00	Mudstone - dark grey
198.00	198.15	Coal 0.15m
198.15	198.50	Mudstone - dark grey
198.50	198.80	Siltstone - medium grey
198.80	199.20	Mudstone - dark grey
199.20	200.40	Sandstone - fine grained, light grey
200.40	201.60	Siltstone - medium grey
201.60	201.70	Sandstone - light grey, fine grained
201.70	202.10	Siltstone - medium grey
202.10	202.20	Mudstone - dark grey
202.20	203.90	Coal 1.70m - 0.10m mudstone split

HOLE# Wright Lake Road Traverse From 203.90 To 295.70

FROM	TO	DESCRIPTION
203.90	204.20	Mudstone - dark grey
204.20	205.20	Siltstone - medium grey
205.20	211.30	Sandstone and minor Siltstone - fine grained, light grey
211.30	212.00	Mudstone - dark grey
212.00	213.15	Coal - 1.15m
213.15	214.65	Sandstone - fine grained, light grey
214.65	217.60	Sandstone and Siltstone interbedded
217.60	220.10	Sandstone - light grey, fine grained
220.10	221.10	Siltstone - medium grey
221.10	221.50	Mudstone - dark grey
221.50	222.35	Coal - 0.85m
222.35	223.00	Sandstone - light grey, fine grained
223.00	225.10	Siltstone - medium grey
225.10	225.60	Mudstone - fine grained, light grey
225.60	226.00	Siltstone - medium grey
226.00	227.80	Mudstone - dark grey
227.80	228.35	Coal - 0.55m
228.35	228.65	Mudstone - dark grey
228.65	231.00	Sandstone - fine grained, light grey
231.00	231.20	Coal - 0.20m
231.20	231.70	Siltstone - medium grey
231.70	232.10	Coal - 0.40m
232.10	232.30	Mudstone - dark grey
232.30	233.00	Sandstone - fine grained, light grey
233.00	233.35	Mudstone - dark grey, carbonaceous
233.35	233.80	Siltstone - medium grey
233.80	234.20	Sandstone - fine grained, light grey
234.20	235.65	Siltstone - medium grey
235.65	237.15	Sandstone - fine grained, light grey
237.15	238.40	Cover
238.40	240.80	Sandstone - fine grained, light grey
240.80	281.10	Cover
281.10	283.40	Sandstone - fine grained, light grey, worm burrows
283.40	292.80	Cover
292.80	293.80	Sandstone - fine grained, light grey, worm burrows
293.80	295.70	Cover

APPENDIX II

ANALYTICAL DATA

R.D.H. SMG 81-28

TRENCH SMG 81-1

SUNNYVALE MINERALS LABORATORY

SOUTH MOUNT GETTING COAL

DRILL HOLE RDH-SMG-81-28

HEAD ANALYSIS

<u>PRODUCT</u>	<u>AIR DRY BASIS</u>							<u>MOISTURE FREE BASIS</u>				
	<u>% H2O</u>	<u>% ASH</u>	<u>% S</u>	<u>% VM</u>	<u>% FC</u>	<u>BTU</u>	<u>FSI</u>	<u>% ASH</u>	<u>% S</u>	<u>% VM</u>	<u>% FC</u>	<u>BTU</u>
SAMPLE #1	1.49	33.64	0.84	27.54	42.33	9782	6 1/2	34.15	0.85	22.88	42.97	9930
SAMPLE #2	1.28	26.59	2.61	25.81	46.32	11089	8	26.93	2.64	26.14	46.93	11233
SAMPLE #3	1.35	11.12	0.78	29.84	57.69	13523	7 1/2	11.27	0.79	30.25	58.48	13708
SAMPLE #4	1.23	35.75	0.48	27.73	35.29	8476	2	36.20	0.49	28.08	35.72	8582
SAMPLE #5	2.09	29.36	0.94	20.14	48.41	10237	7	29.99	0.96	20.57	49.44	10456
SAMPLE #6	1.56	44.15	0.68	17.51	36.78	8048	1 1/2	44.85	0.69	17.79	37.36	8176
SAMPLE #7	1.63	17.54	0.84	25.12	55.71	12196	8	17.83	0.85	25.54	56.63	12398
SAMPLE #8	1.01	49.51	0.45	20.19	29.29	6895	1	50.02	0.45	20.40	29.58	6965

SUNNYVALE MINERALS LABORATORY

SOUTH MOUNT GETTING COAL

SOLE RDH-SMG-81-28

SAMPLE #4

HEAD ANALYSIS

MINERAL ANALYSIS OF ASH PERCENT WEIGHT IGNITED BASIS

Silica, SiO ₂	42.80
Alumina, Al ₂ O ₃	17.40
Titania, TiO ₂	0.54
Ferric oxide, Fe ₂ O ₃	27.20
Lime, CaO	2.89
Magnesia, MgO	3.30
Potassium oxide, K ₂ O	0.55
Sodium oxide, Na ₂ O	0.13
Sulfur trioxide, SO ₃	3.18
Phos. pentoxide, P ₂ O ₅	1.64
Undetermined	0.37
Total	<u>100.00</u>

ALKALIES AS Na₂O, DRY COAL BASIS = 0.18

SILICA VALUE = 56.18

BASE: ACID RATIO = 0.56

FOULING INDEX = 0.07

SLAGGING INDEX = 0.27

SUNNYVALE MINERALS LABORATORY

SOUTH MOUNT GETTING COAL

HOLE RDH-SMG-81-28

SAMPLE #4

HEAD ANALYSIS

ULTIMATE ANALYSIS

	<u>AIR DRY BASIS</u>	<u>MOISTURE FREE BASIS</u>
% MOISTURE	1.23	--
% CARBON	51.24	51.88
% HYDROGEN	3.39	3.42
% NITROGEN	1.02	1.02
% CHLORINE	0.01	0.01
% SULFUR	0.48	0.49
% ASH	35.75	36.20
% OXYGEN (DIFF.)	6.88	6.96
TOTAL	100.00	100.00

FUSION TEMP. OF ASH

	<u>Oxidizing</u>	<u>Reducing</u>
Initial deformation	2290	2010
Softening (H=W)	2405	2095
Softening (H=1/2 W)	2447	2198
Fluid	2560	2340

SUNNYVALE MINERALS LABORATORY

SOUTH MOUNT GETTING COAL

HOLE PJH-SIG-81-28

SAMPLE #5

HEAD ANALYSIS

MINERAL ANALYSIS OF ASH PERCENT WEIGHT IGNITED BASIS

Silica, SiO ₂	75.20
Alumina, Al ₂ O ₃	16.30
Titania, TiO ₂	0.60
Ferric oxide, Fe ₂ O ₃	2.09
Lime, CaO	0.69
Magnesia, MgO	0.88
Potassium oxide, K ₂ O	3.20
Sodium oxide, Na ₂ O	0.39
Sulfur trioxide, SO ₃	0.38
Phos. pentoxide, P ₂ O ₅	0.19
Undetermined	0.08
Total	<u>100.00</u>

ALKALIES AS Na₂O, DRY COAL BASIS = 0.75

SILICA VALUE = 95.36

BASE: ACID RATIO = 0.08

FOULING INDEX = 0.03

SLAGGING INDEX = 0.08

SUNNYVALE MINERALS LABORATORY

SOUTH MOUNT GETTING COAL

HOLE RDH-SMG-81-28

SAMPLE #7

HEAD ANALYSIS

MINERAL ANALYSIS OF ASH PERCENT WEIGHT IGNITED BASIS

Silica, SiO ₂	61.00
Alumina, Al ₂ O ₃	16.90
Titania, TiO ₂	0.65
Ferric oxide, Fe ₂ O ₃	8.41
Lime, CaO	4.06
Magnesia, MgO	1.96
Potassium oxide, K ₂ O	2.39
Sodium oxide, Na ₂ O	0.60
Sulfur trioxide, SO ₃	3.08
Phos. pentoxide, P ₂ O ₅	0.68
Undetermined	0.27
Total	<u>100.00</u>

ALKALIES AS Na₂O, DRY COAL BASIS = 0.39

SILICA VALUE = 80.87

BASE: ACID RATIO = 0.22

FOULING INDEX = 0.13

SLAGGING INDEX = 0.19

SUNNYVALE MINERALS LABORATORY

SOUTH MOUNT GETTING COAL.

HOLE RDH-SMC-81-28

SAMPLE #7

HEAD ANALYSIS

ULTIMATE ANALYSIS

	<u>AIR DRY BASIS</u>	<u>MOISTURE FREE BASIS</u>
% MOISTURE	1.63	--
% CARBON	69.47	70.62
% HYDROGEN	4.49	4.56
% NITROGEN	1.34	1.36
% CHLORINE	0.03	0.03
% SULFUR	0.84	0.85
% ASH	17.54	17.83
% OXYGEN (DIFF.)	4.66	4.75
TOTAL	100.00	100.00

FUSION TEMP. OF ASH

	<u>Oxidizing</u>	<u>Reducing</u>
Initial deformation	2256	2150
Softening (H=W)	2423	2295
Softening (H=1/2 W)	2491	2347
Fluid	2740	2470

SUNNYSIDE MINERALS LABORATORY

SOUTH MOUNT GETTING COAL

HOLE RDH-SMG-81-28

SULFUR FORMS

AIR DRY BASIS

MOISTURE FREE BASIS

<u>PRODUCT</u>	<u>AIR DRY BASIS</u>				<u>MOISTURE FREE BASIS</u>			
	<u>SULFATE SULFUR AS % S</u>	<u>PYRITIC SULFUR</u>	<u>ORGANIC SULFUR</u>	<u>TOTAL</u>	<u>SULFATE SULFUR AS % S</u>	<u>PYRITIC SULFUR</u>	<u>ORGANIC SULFUR</u>	<u>TOTAL</u>
SAMPLE #4	<0.01	0.08	0.40	0.48	<0.01	0.08	0.41	0.49
SAMPLE #5	<0.01	0.19	0.75	0.94	<0.01	0.19	0.77	0.96
SAMPLE #7	<0.01	0.09	0.75	0.84	<0.01	0.09	0.76	0.85

TRENCH SAMPLE

SMC-TP-81-1

AIR DRY BASIS

MOISTURE FREE BASIS

<u>PRODUCT</u>	<u>% H2O</u>	<u>% ASH</u>	<u>% S</u>	<u>% VM</u>	<u>% FC</u>	<u>BTU</u>	<u>PSI</u>	<u>% ASH</u>	<u>% S</u>	<u>% VM</u>	<u>% FC</u>	<u>BTU</u>
SAMPLE #1	2.65	5.65	0.87	20.76	70.94	13671	1	5.80	0.90	21.33	72.87	14043

APPENDIX III

COST STATEMENT

Note: represents a consolidation of the costs included in the Application to Extend the Term of Licence for Coal Licence Numbers 4129 to 4142 inclusive, 4145, 4146, 4150 and 4152.

ON PROPERTY COSTS:

1.) Operators Fees, Salaries and Wages: Professional and Technical	\$ 1,400.00
2.) Contractors and Consultants: P. Demeulemeester (includes charges for slashing, clearing and construction of trails, drill sites and reclamation work)	\$ 3,736.00
Green Acres Water Well Drilling Ltd. (includes charges for direct rotary drilling costs)	\$ 5,553.99
Pacific Surveys Ltd.	\$12,465.68
3.) Equipment and Instruments Used: Comprobe logging unit (density-gamma @ 3.05/metre)	\$ 412.00
4.) Field Camp Costs: Food	\$ 3,032.21
Accommodation	\$ 417.94
Telephone	\$ 15.94
5.) Sampling, Analysis and Testing: (Laboratory analysis of coal samples performed by Utah International Inc. Minerals Laboratory, Sunnyvale, California)	\$ 270.00
6.) Supplies and Material Costs: Operating and maintenance supplies Office and technical supplies	\$ 1,625.28
7.) Transportation Costs: Fuel	\$ 7,700.72
Ford Van from Arena Motors, Kamloops	\$ 3,854.94
Repairs	\$ 1,193.99

8.) Reclamation Work	\$	0.00
(grass seed mixture and B.C. Forest Service stumping charges)		
Total On Property Costs:		\$41,678.69

OFF PROPERTY COSTS:

1.) Supplies and Services	\$	2,835.39
2.) Travelling Expenses	\$	2,347.32
Total Off Property Costs:		\$ 5,182.71
Total Project Costs:		\$46,861.40

APPENDIX IV
STATEMENT OF QUALIFICATIONS

APPENDIX IV

STATEMENT OF QUALIFICATIONS

I, PAUL STUART COWLEY, of 2603 MacKenzie 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, 1979.

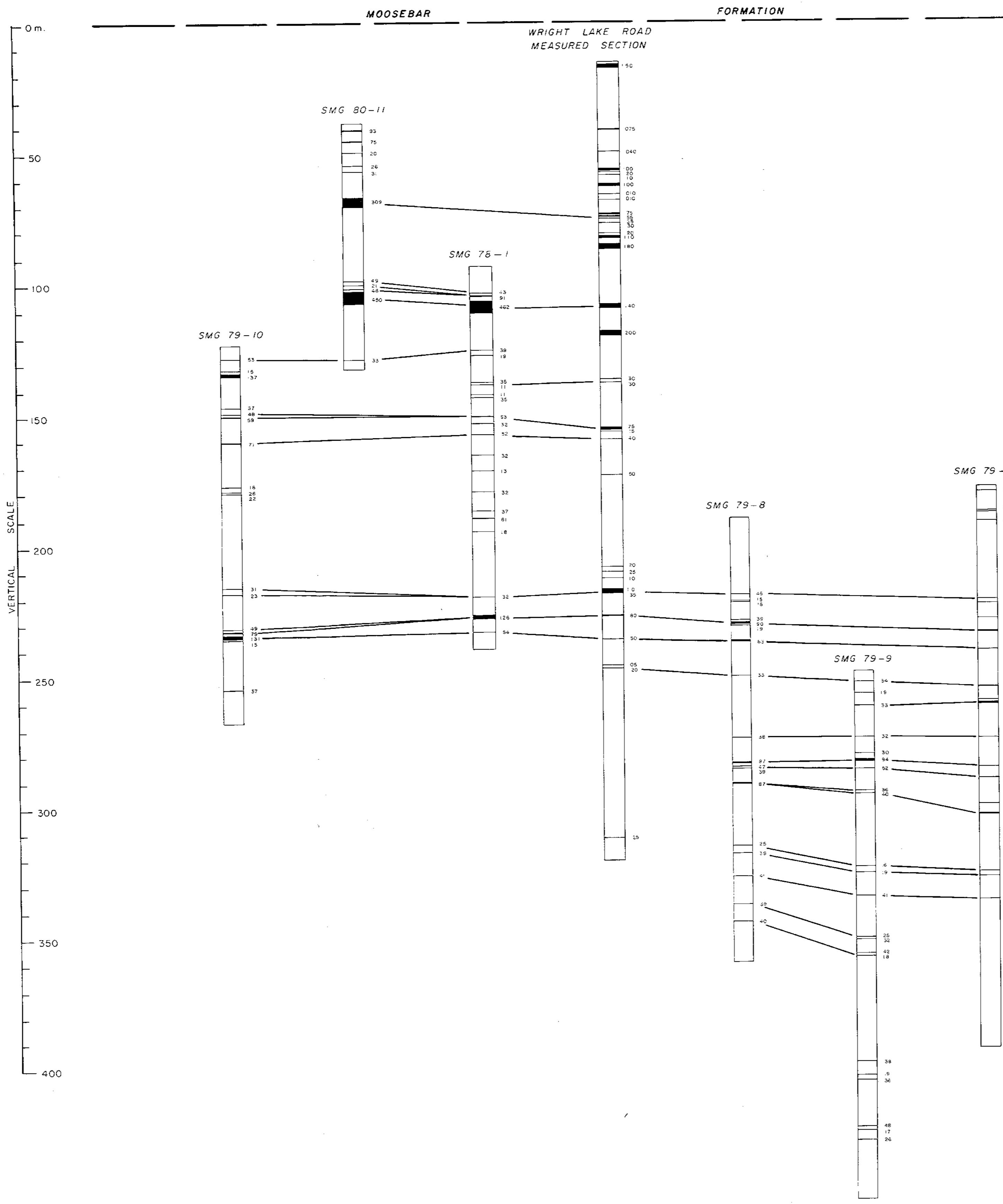
Since graduation I have been engaged in Coal Exploration in British Columbia for Utah Mines Ltd.



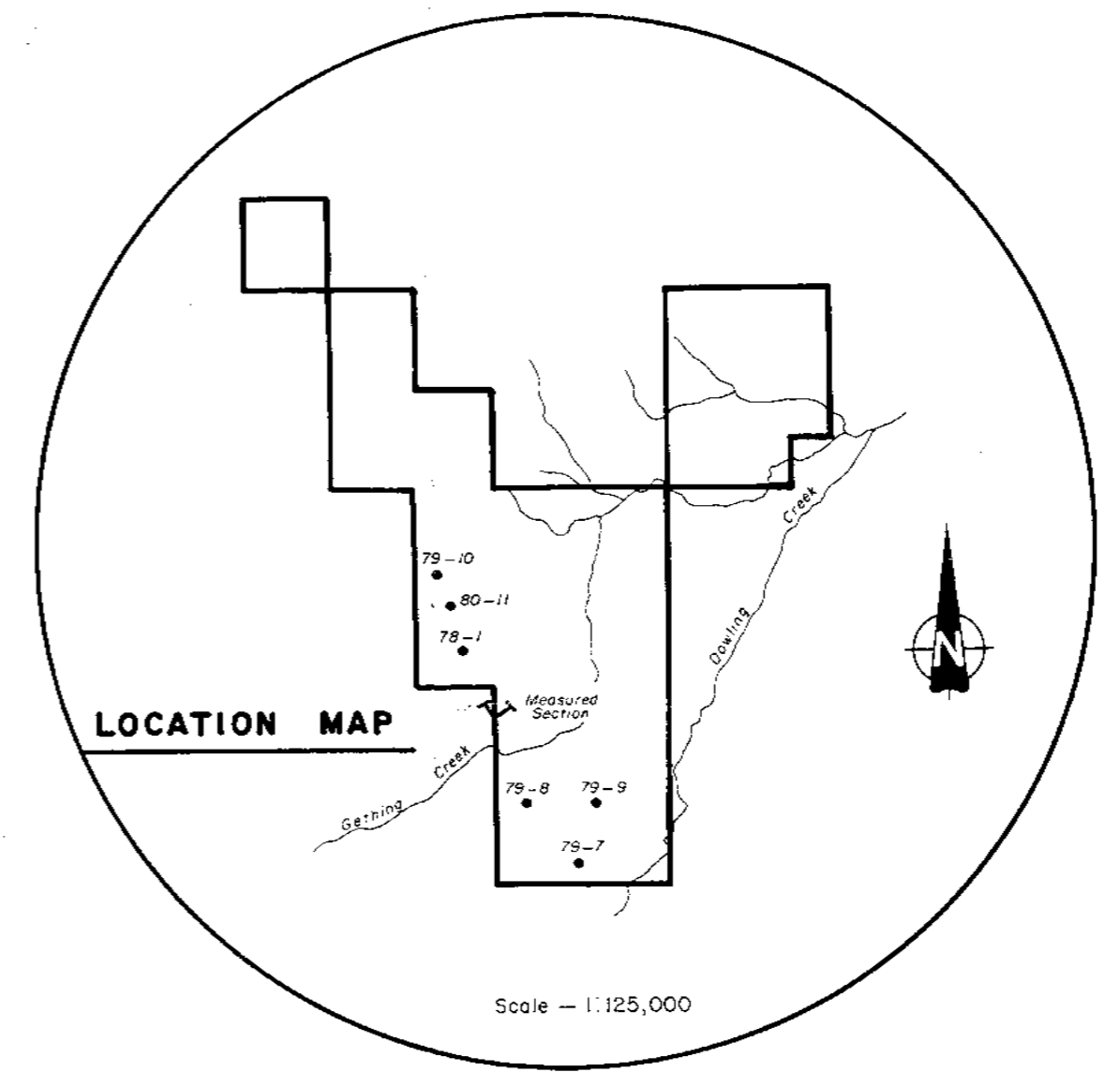
Paul S. Cowley

Vancouver, B.C.

Geologist



Note: Graphic Logs Have Been Corrected For Dip.
Coal Seam Thickness In Centimetres.



640

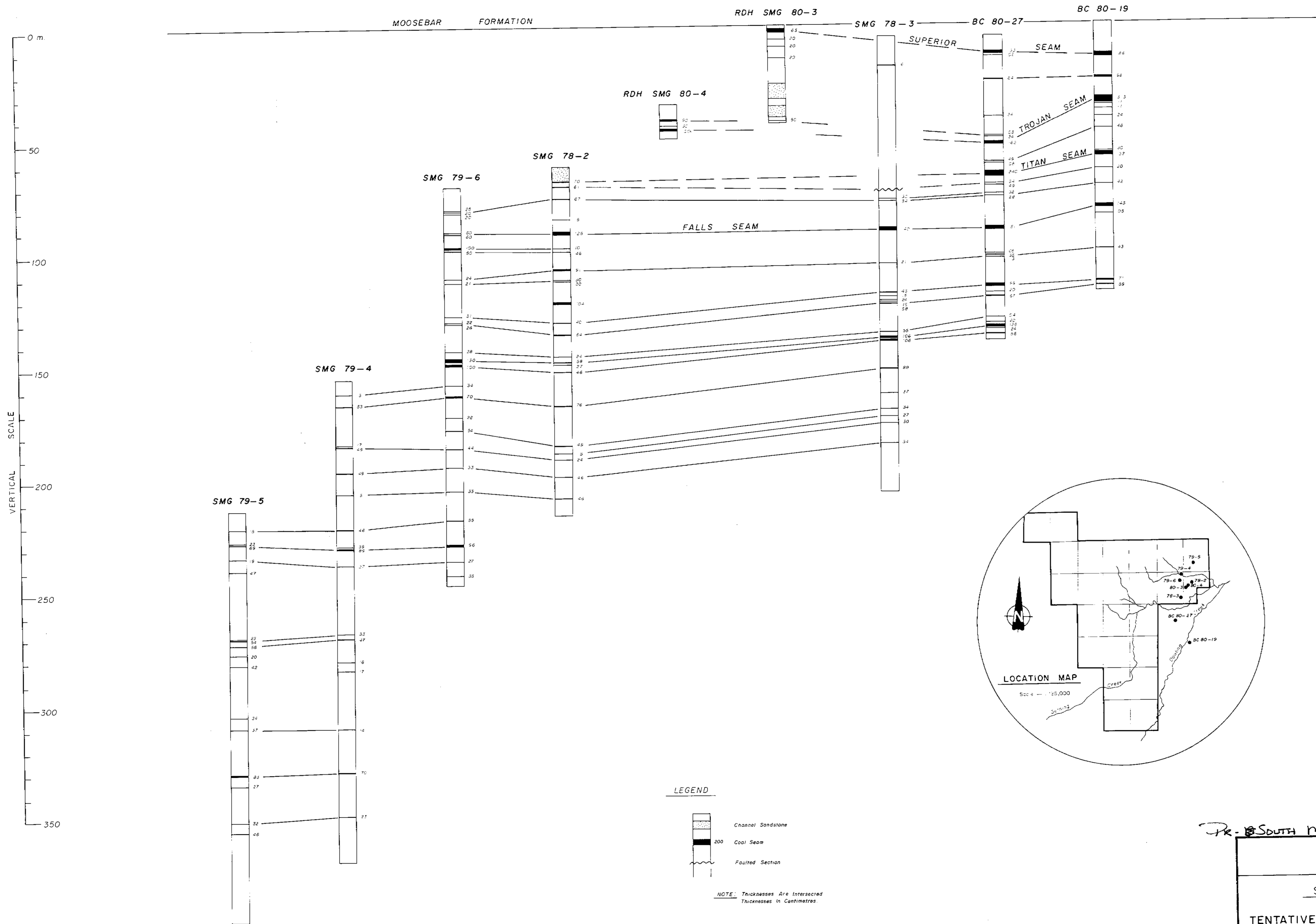
FIGURE - 8
PR. SOUTH MOUNT GETTING 8(2)A(1)

UTAH MINES LTD.
 EXPLORATION DEPARTMENT
 VANCOUVER BRITISH COLUMBIA

SOUTH MT. GETTING

TENTATIVE COAL SEAM CORRELATION
 OF WEST SIDE OF SOUTH MT. GETTING

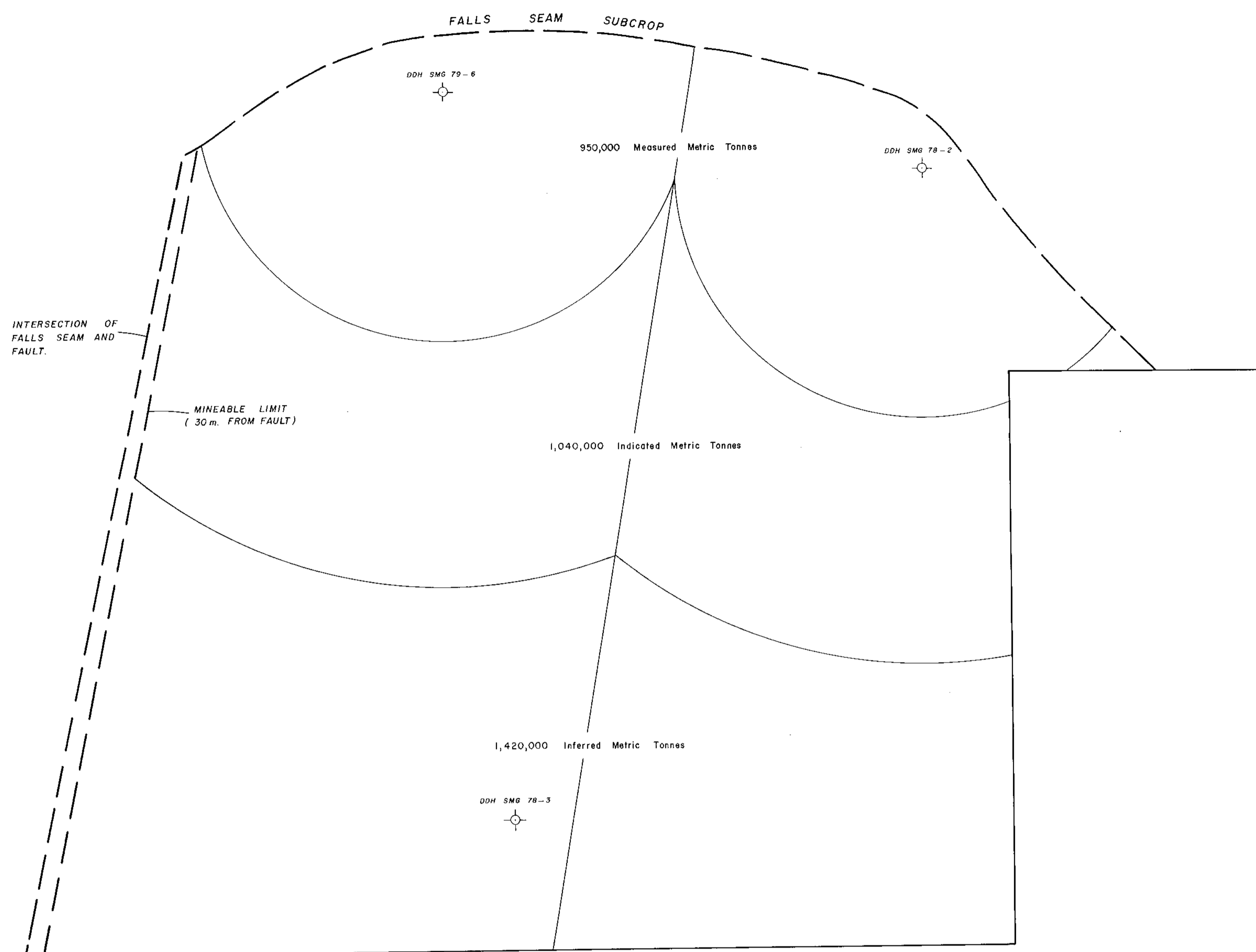
Work by: P. Cowley	Date: April 1982	NTS Ref. 93.0/16
Drawn by: T. Drews	Revised:	Vertical Scale - 1:1000



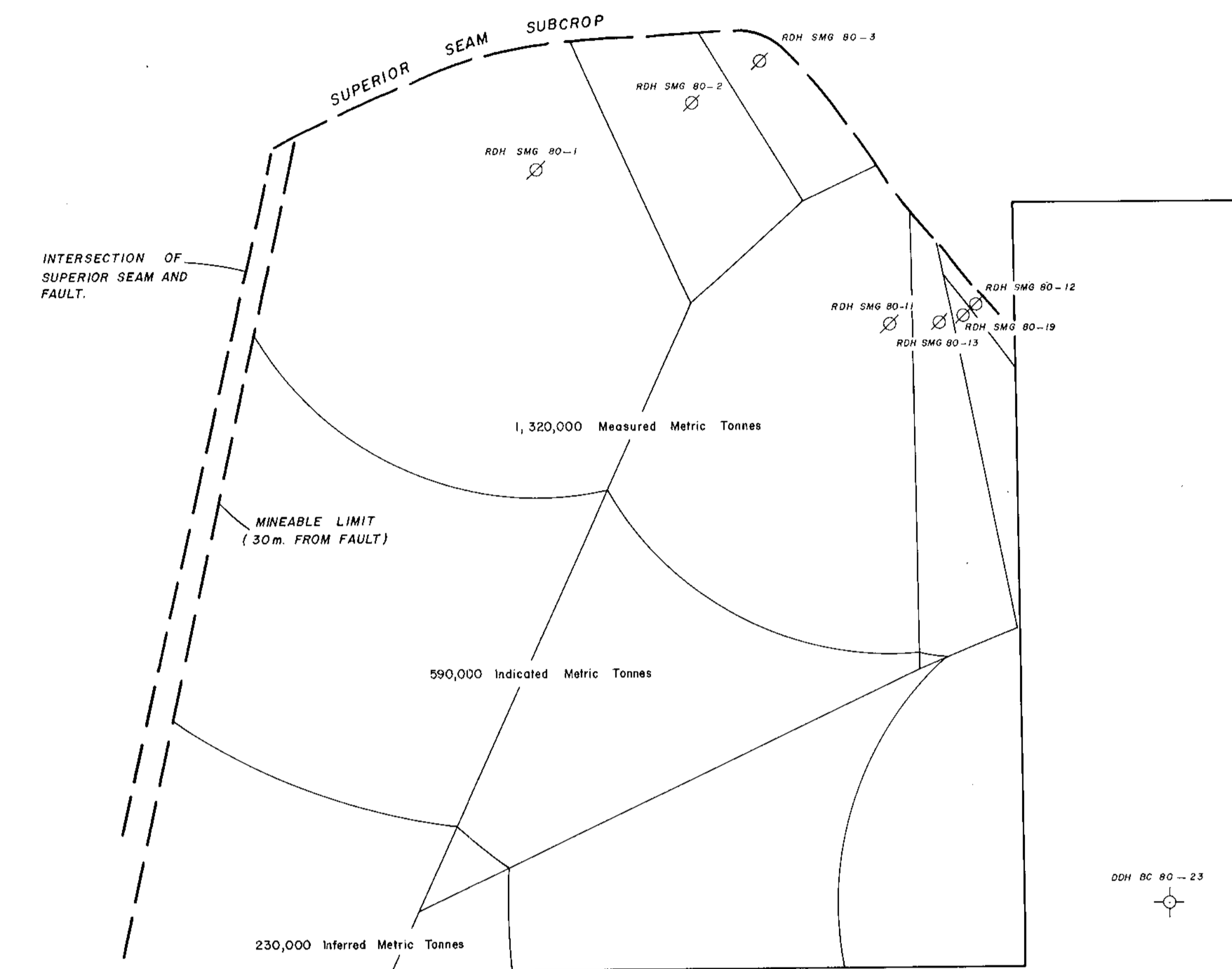
640

FIGURE - 7
 PR - SOUTH MOUNT GETHING 81(2)A(1)

UTAH MINES LTD. EXPLORATION DEPARTMENT VANCOUVER BRITISH COLUMBIA		
SOUTH MT. GETHING		
TENTATIVE COAL SEAM CORRELATION OF N.E. CORNER OF SOUTH MT. GETHING		
Work by: P. Cowley	Date: Feb 981	NTS Ref: 93 0/16
Drawn by: T. Drews	Revised:	Vertical Scale - 1:1000



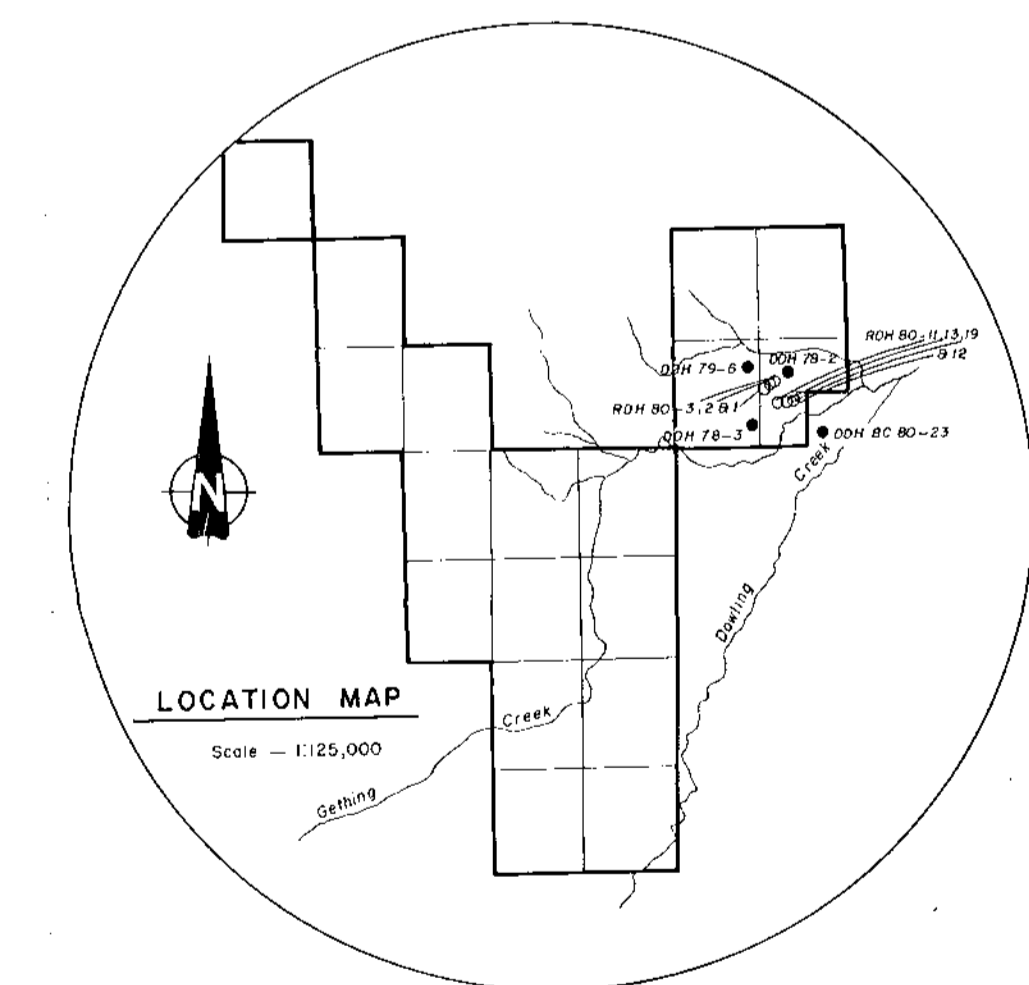
FALLS SEAM TONNAGE CALCULATIONS



SUPERIOR SEAM TONNAGE CALCULATIONS



SPLIT SEAM TONNAGE CALCULATIONS



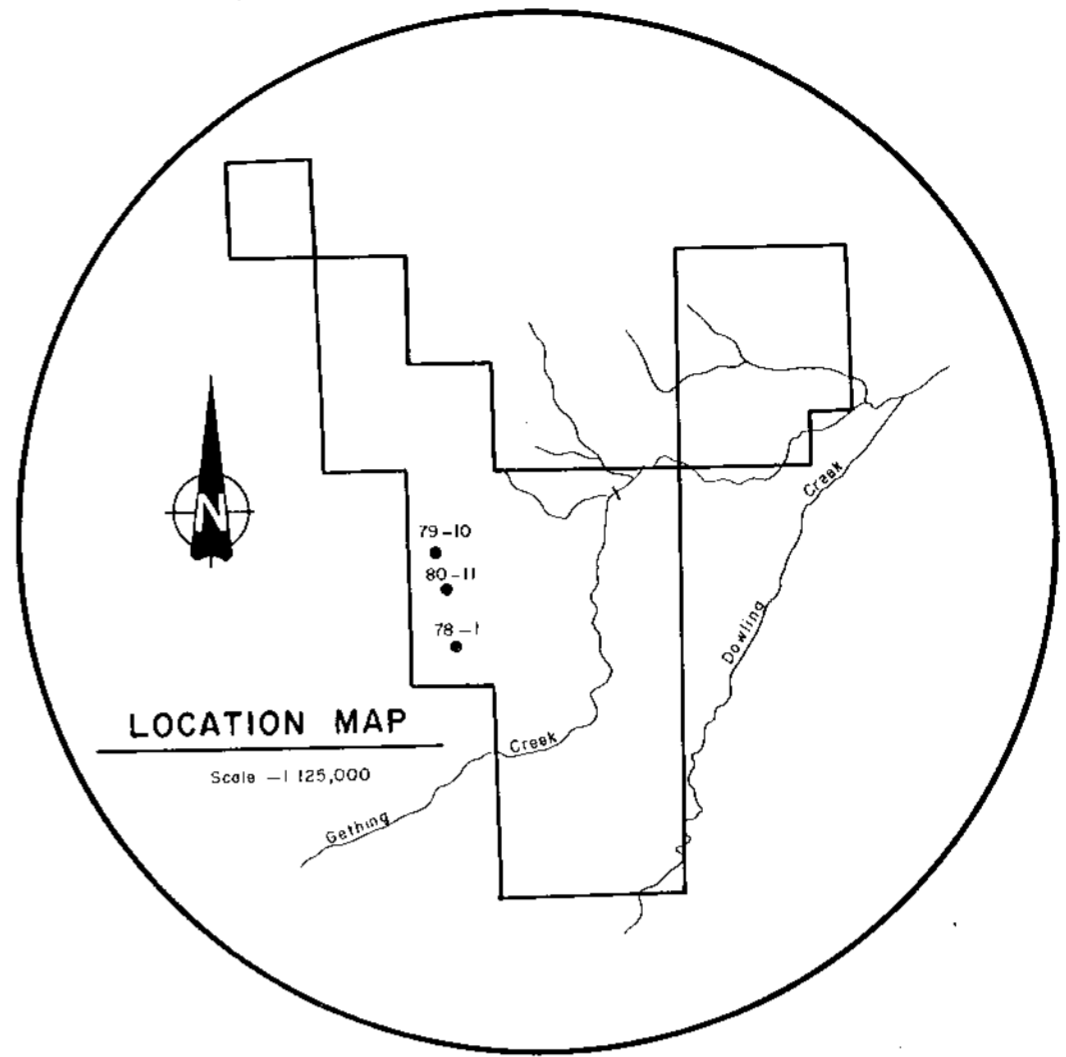
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FIGURE - 9
PR-SOUTH MOUNT GETHING 81(24)A(1)*

UTAH MINES LTD. EXPLORATION DEPARTMENT VANCOUVER BRITISH COLUMBIA		
SOUTH MT. GETHING		
COAL SEAM TONNAGE CALCULATIONS OF N.E. CORNER OF SOUTH MT. GETHING		
Work by: P. Cowley	Date: April 1982	NTS Ref: 93.0/16
Drawn by: T. Drews	Revised:	Scale: 1:5000

UPPER SEAM
2,210,000 Inferred Metric Tonnes

LOWER SEAM
3,210,000 Inferred Metric Tonnes



UPPER SEAM
3,390,000 Indicated Metric Tonnes

LOWER SEAM
4,930,000 Indicated Metric Tonnes

79-10

LOWER SEAM SUBDIP

80-II

UPPER SEAM
1,590,000 Measured Metric Tonnes

LOWER SEAM
2,310,000 Measured Metric Tonnes

610 m. Mining Limit

LOWER SEAM
2,200,000 Indicated Metric Tonnes

78-1

LOWER SEAM
1,850,000 Measured Metric Tonnes

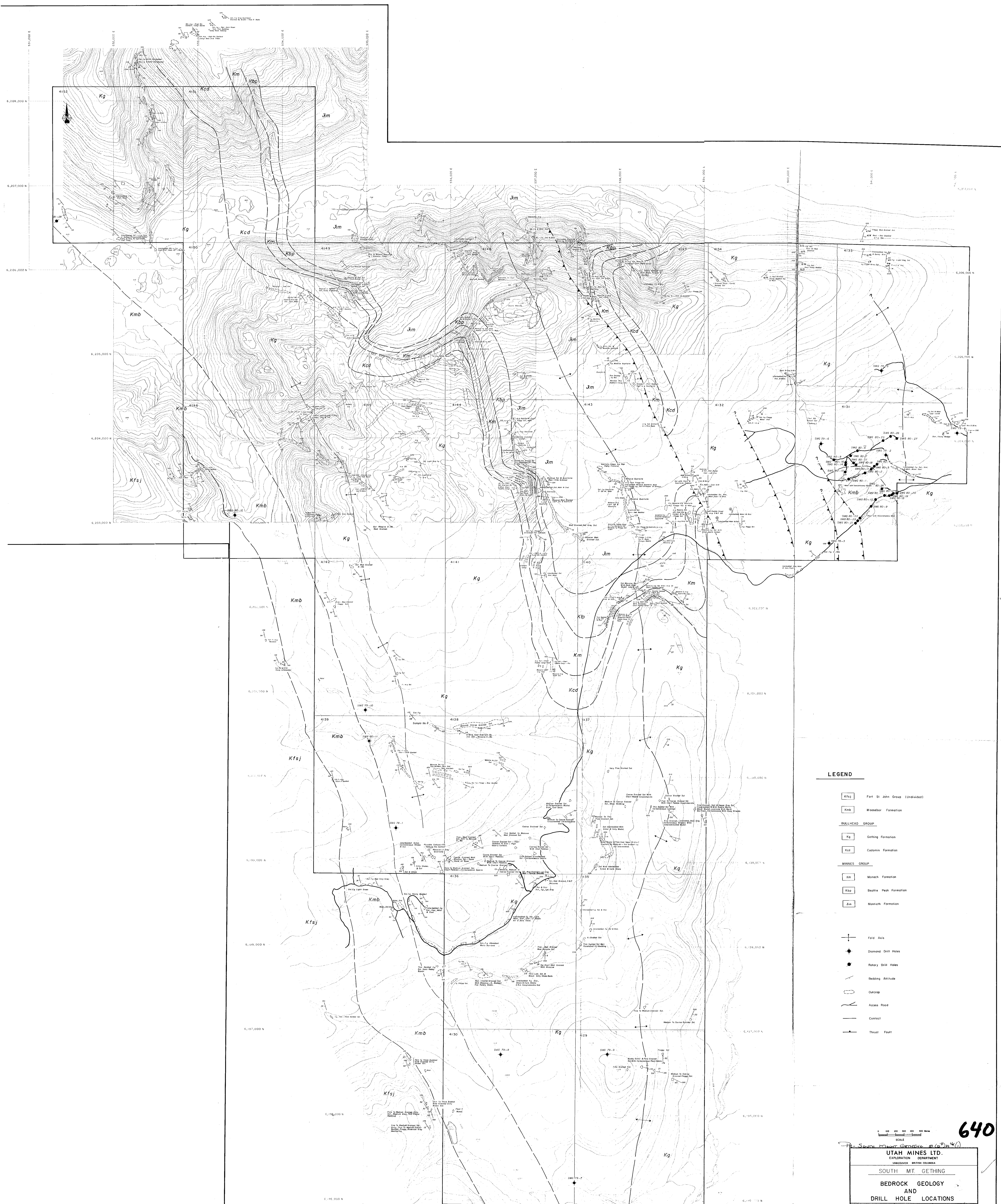
LOWER SEAM
151,000 Inferred Metric Tonnes

Note: Figure Shows Plan View Of Inclined Areas Of Influence
For Tonnage Calculations These Surfaces Were Rotated
Back To Horizontal.

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FIGURE - 10
PR-SOUTH MOUNT GETHING 81(2)*A*

UTAH MINES LTD.		
EXPLORATION DEPARTMENT		
VANCOUVER BRITISH COLUMBIA		
SOUTH MT. GETHING		
COAL SEAM TONNAGE CALCULATIONS		
OF WEST SIDE OF SOUTH MT. GETHING		
Work by: P. Cowley	Date: April 1982	NTS Ref. 93 0/16
Drawn by: T. Drews	Revised:	Scale - 1:5000



LEGEND

- Kfsj Fort St. John Group (Undivided)
- Kmb Moosebar Formation
- REILHEAD GROUP**
- Kg Getting Formation
- Kcd Cadomin Formation
- MINNES GROUP**
- Km Minnoch Formation
- Kbp Boutte Peak Formation
- Ksm Mastath Formation
- + Fold Axis
- ◆ Diamond Drill Holes
- Rotary Drill Holes
- / Bedding Altitude
- Outcrop
- Access Road
- Contact
- Thrust Fault

640

UTAH MINES LTD.
SOUTH MOUNTAIN DISTRICT
SOUTH MOUNTAIN GETHING

**BEDROCK GEOLOGY
AND
DRILL HOLE LOCATIONS**

Scale 1:50,000	Date February 1951	NTS Ref. 25 0/15
Drawn by J. Owen	Revised April 1950	Scale 1:50,000