

1981 REPORT OF EXPLORATION ACTIVITIES
ON THE EAST MOUNT GETHING PROPERTY

Coal Licence Nos. 3506 to 3529

Located in
Peace River Land District and Liard Mining Division

National Topographic System
Designation 94 B 1 West

Centred on Lat. $56^{\circ}02'N$; Long. $122^{\circ}20'W$

Owned and Operated by Utah Mines Ltd.

Report By D.N. Duncan of
Utah Mines Ltd.

Field Work Performed Between
May 16, 1981 and September 16, 1981

Report Submitted February, 1982

OPEN FILE
CONFIDENTIAL

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ABSTRACT

Utah Mines Ltd. became owner and operator of the East Mount Gething Property on April 23, 1971 under an agreement with Trend Exploration Ltd. The property has since undergone extensive exploration in the belief that it has the potential to become a metallurgical and/or thermal coal producer.

An exploration program for the 1981 field season was formulated for the East Mount Gething Property based on the results of previous exploration programs. This program was designed to examine the property in greater detail and to facilitate the selection of those areas and seams most amenable to mining. During the program 779.98 metres of diamond drilling was completed in three holes, 810.77 metres of rotary drilling was completed in six holes and extensive, detailed geological mapping was performed on the property. Three drill trails were constructed for access to the diamond drill holes. All rotary drilling was located on previously existing roads.

Exploration work completed during the 1981 field season greatly improved the understanding of the property geology. Two previously undetected anticlines were delineated, the stratigraphy of the property is better understood and coal seam correlations are considered representative of the actual conditions. The interpretations and conclusions in this report are considered to be the most accurate possible given available information.

<u>LICENCE NO.</u>	<u>BOREHOLE ID</u>
3518	81-13
3515	81-12
3509	81-6
3507	81-11
	81-4
3508	81-15
	81-3
	81-2
	81-1

LOCATION AND ACCESS

The East Mount Gething Property is located in the "Northeast Coal Block" of British Columbia, lying within the Liard Mining Division and the Peace River Land District. The property is centred on 56°02'N latitude; 122°20'W longitude and lies within the area covered by the National Topographic System designation 94-B-1 West. The property is largely confined by Williston Lake on the north and east, Mount Gething on the west and Gaylard Creek on the south. The southeast corner of the property lies approximately two kilometres west from the W.A.C. Bennett Dam. The town of Hudson's Hope is located approximately 24 kilometres northeast from the southeast corner of the property and a small part of the property lies within the Hudson's Hope District Municipality (see figure 2, page 4). The town of Chetwynd is located approximately 59 kilometres southeast from the property and the city of Vancouver lies approximately 775 kilometres south from the property (see figure 1, page 3 and figure 2, page 4).

Access to the property is gained via paved road from Hudson's Hope to the W.A.C. Bennett Dam and the Utah Mines Limited road from the dam. Alternate access to the property is provided by the Canfor Limited Johnston Creek-Track Creek Road which intersects Highway 29 nineteen kilometres south from Hudson's Hope. Canfor Limited logging roads and Utah Mines Limited drill roads constructed during the 1981 exploration program provide additional access to portions of the property (see figure 3, page 5). Away from these roads, access to the property is possible by helicopter, boat (along Williston Lake) or on foot.

PROPERTY AND TITLE

The East Mount Gething Property comprises 19 contiguous coal licences numbered 3506 to 3524 inclusive. These licences encompass 5,509 hectares. The property adjoins the South Mount Gething and Bri Properties on the southern boundary. The remainder of the property boundary adjoins land where the coal rights are held by the crown or have been assigned to B.C. Hydro (see figure 4, page 6).

Utah Mines Ltd. became the owner and operator of the East Mount Gething Coal Licences under an agreement with Trend Exploration Ltd. dated the 16th of April, 1971. Transfer of ownership was effected by Order in Council Number 1389 on April 23, 1971.

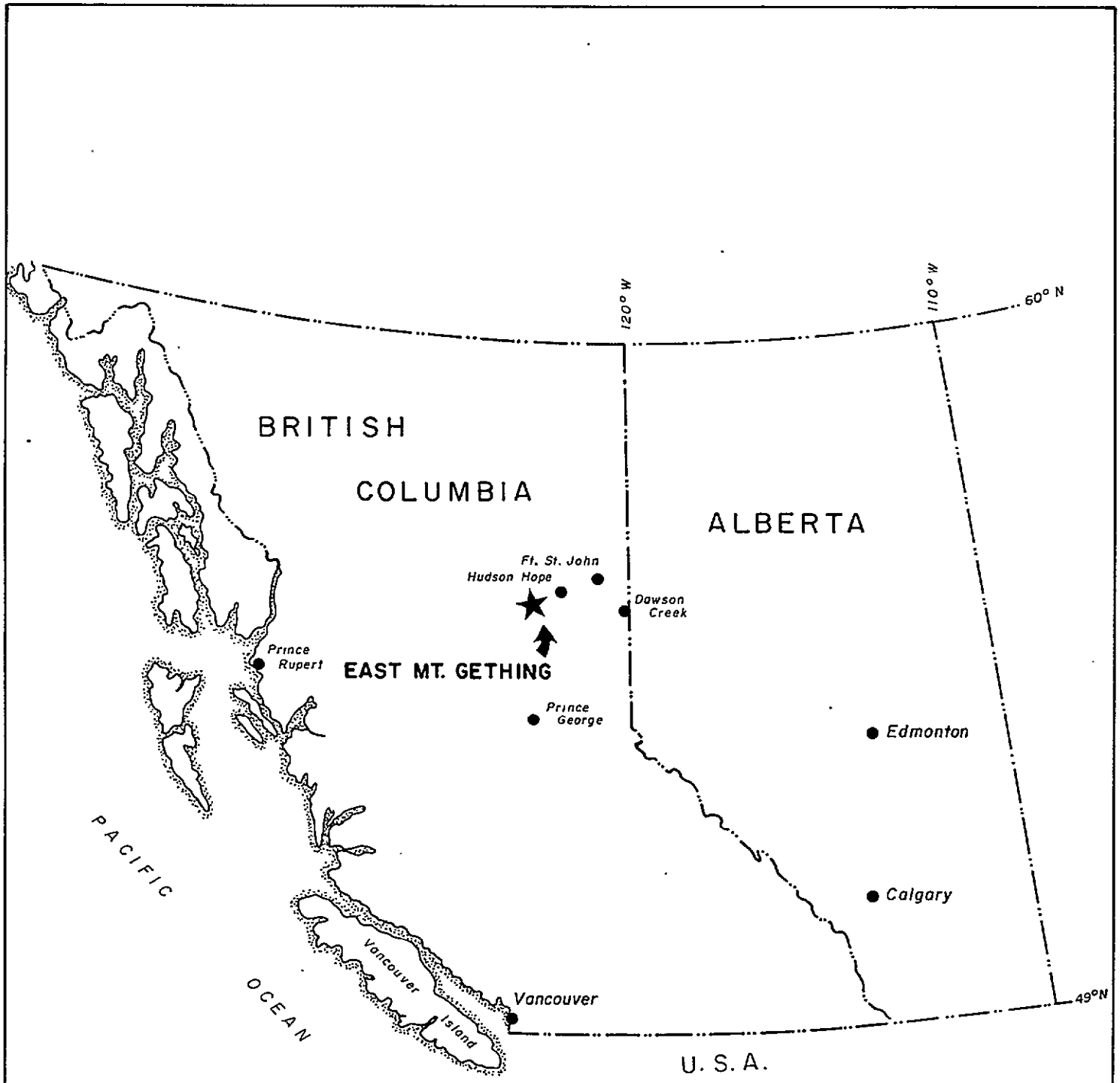
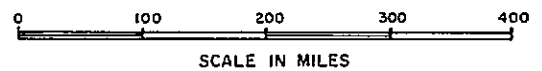


FIGURE - I
 UTAH MINES LTD.
 EAST MT. GETHING
 LOCATION MAP



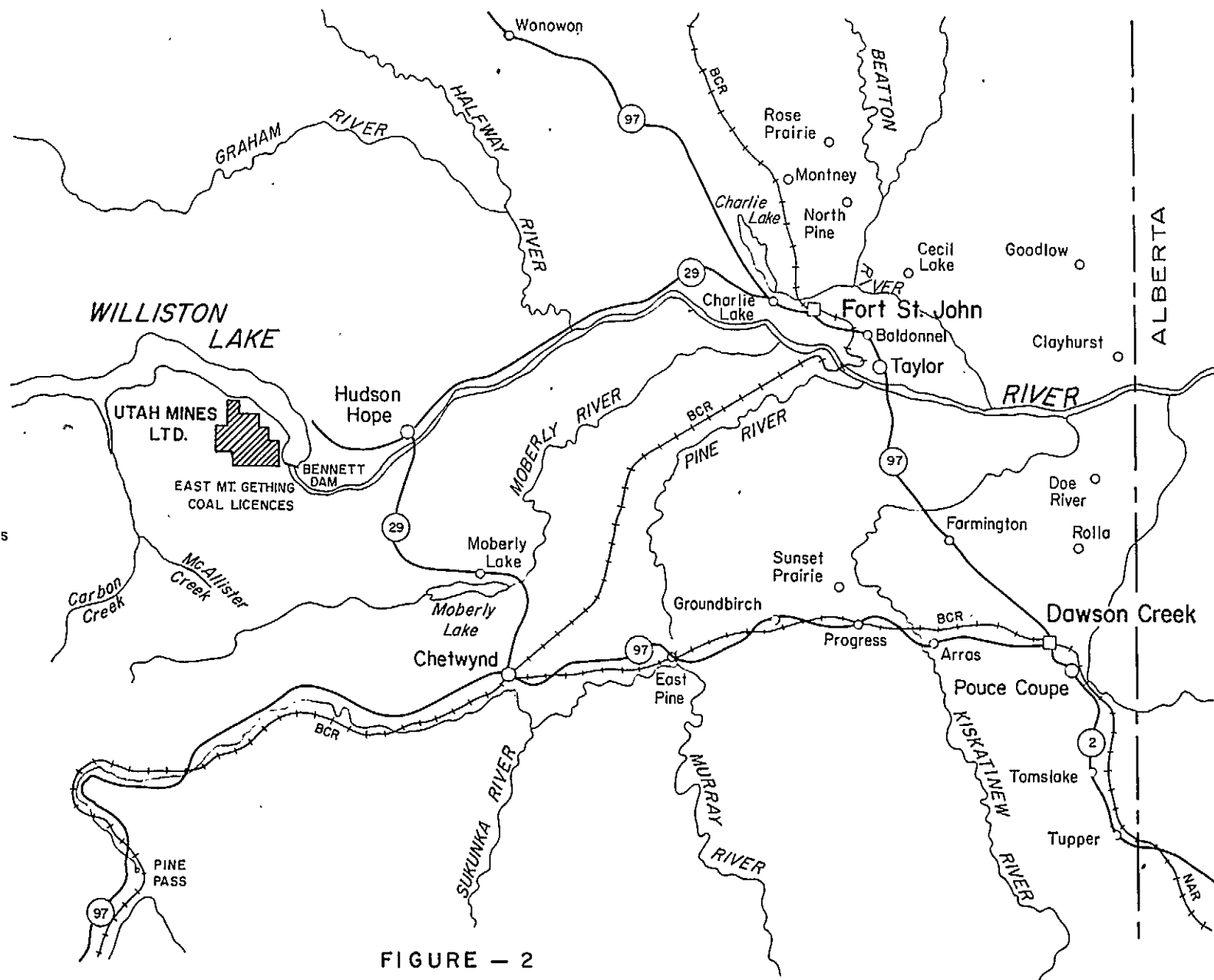





FIGURE - 2

REGIONAL MAP

EAST MT. GETHING COAL LICENCES

5

LEGEND

-  Diamond Drill Hole
-  Rotary Drill Hole
-  Access Road

Scale - 1:50,000

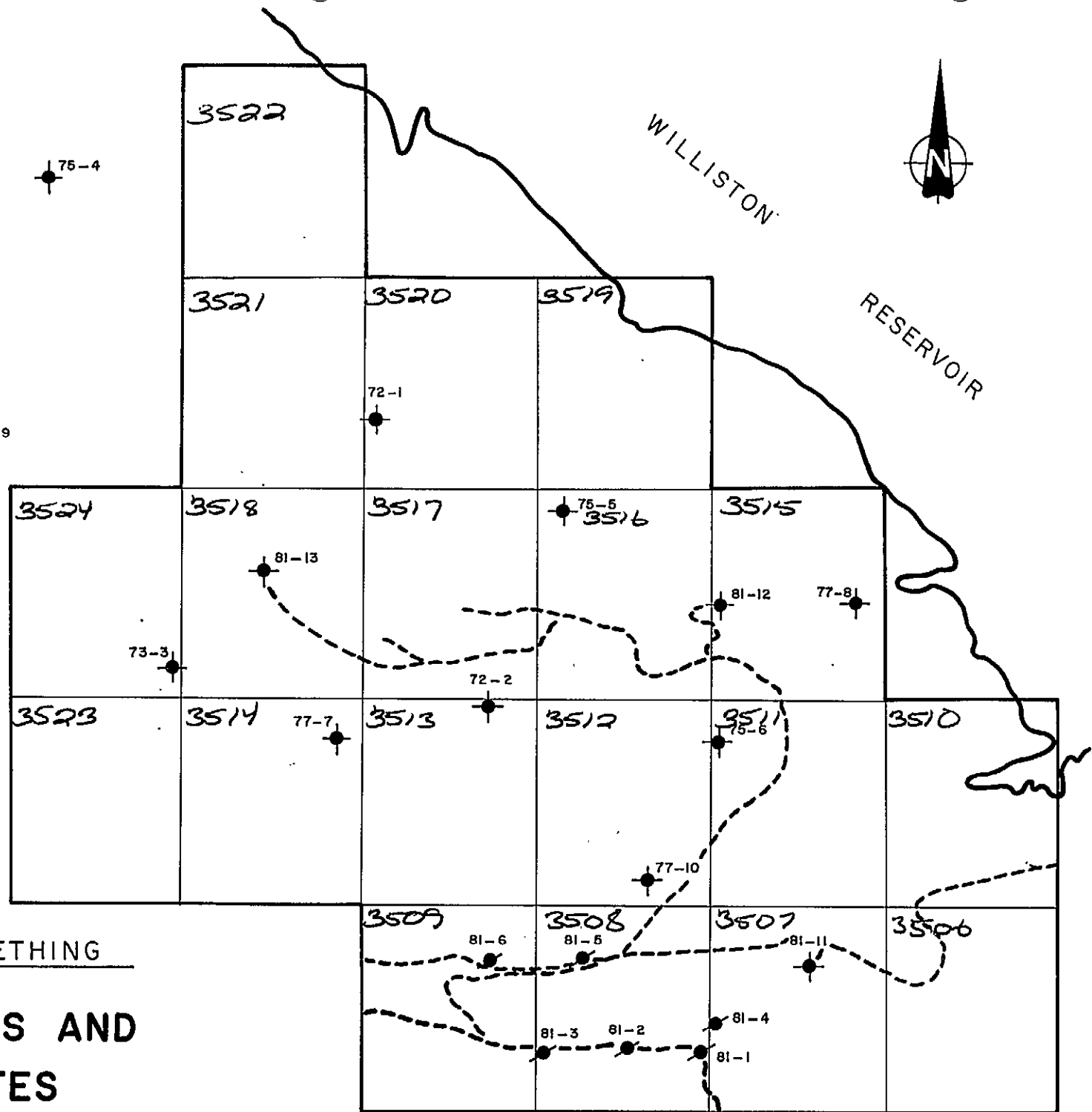


FIGURE -3

EAST MT. GETHING

ACCESS ROADS AND DRILL SITES

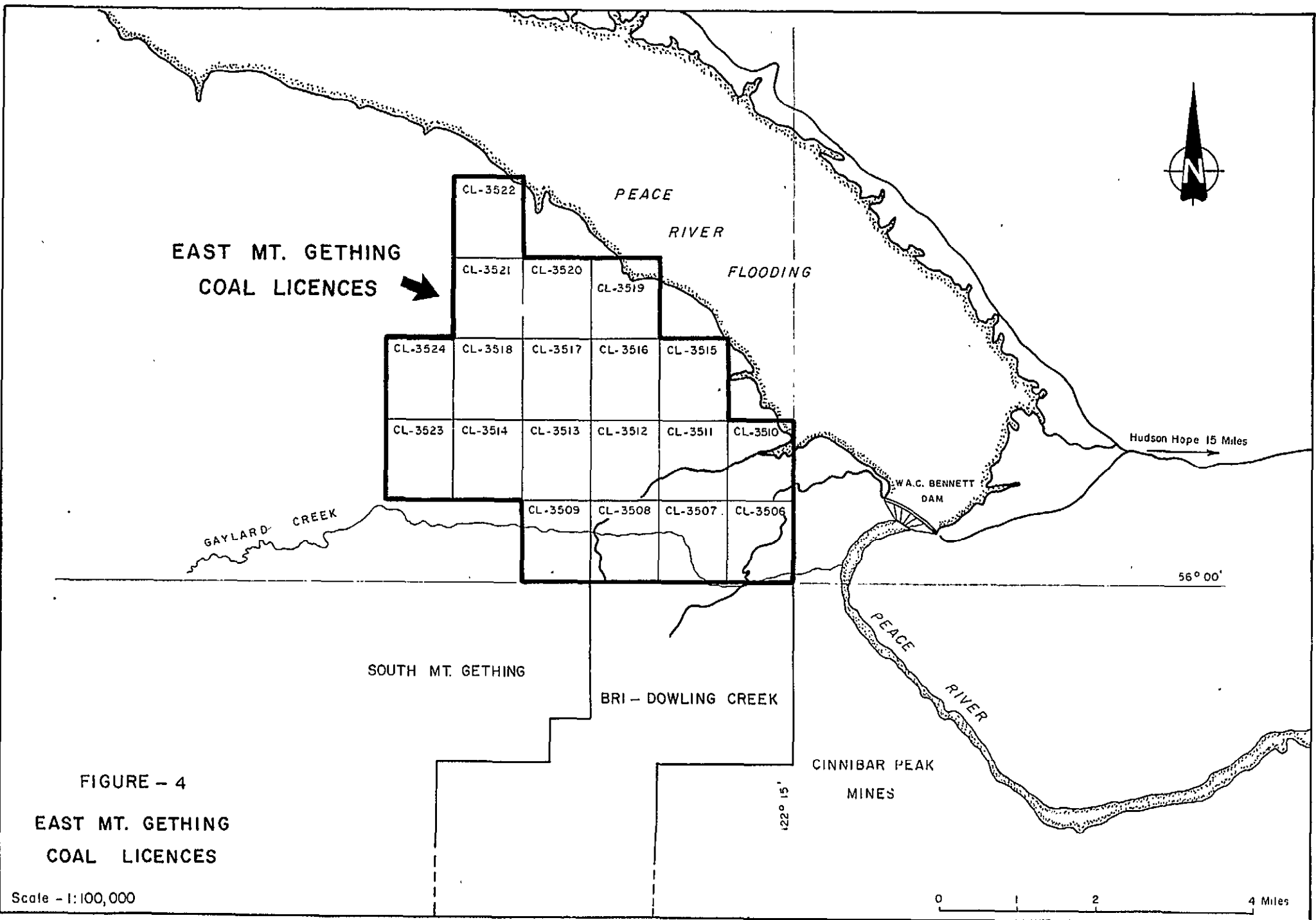
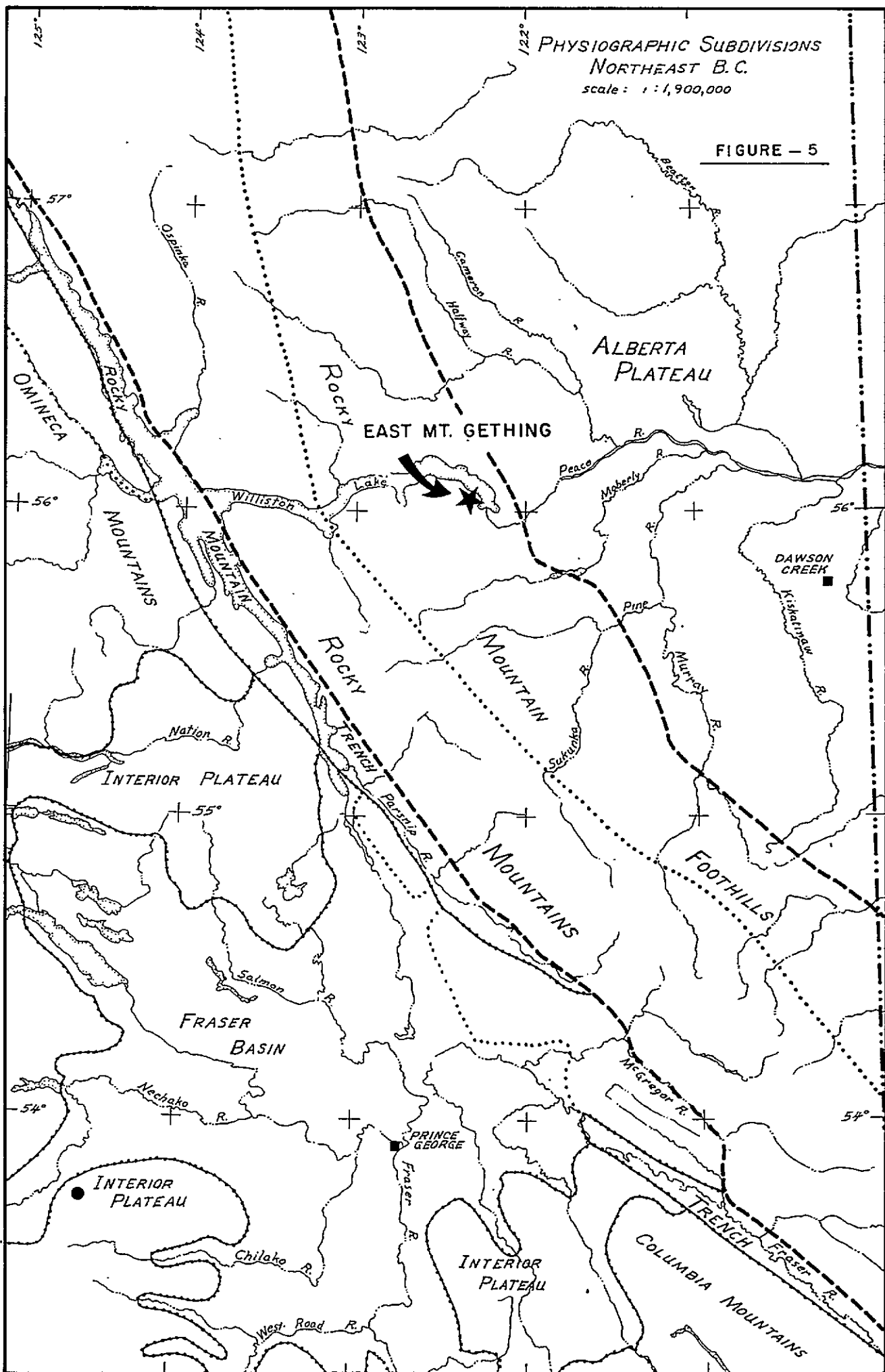


FIGURE - 4
EAST MT. GETHING
COAL LICENCES

PHYSIOGRAPHY

The East Mount Gething Property is situated in the outer (eastern) belt of the Rocky Mountain Foothills (see figure 5, page 8). The western 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 an echelon thrust faults which separate the folded and faulted strata of the Foothills from the gently dipping to flat lying strata of the Alberta Plateau (Holland, 1976). Within this belt, major fold axes and thrust faults trend in a northerly to northwesterly direction, with thrust faults dipping to the west or southwest. Structural deformation is considerable near the western margin of the Foothills and diminishes in extent and complexity toward the eastern margin. Bedrock structure and lithology are commonly reflected by the topography.

The property is underlain by a broad, south plunging syncline. This structural feature is reflected, to a certain extent, in the topography of the property. Topographic relief in the immediate vicinity of the property is moderate. The lowest elevations, found in creek valleys, are in the order of 600 metres above sea level, while Mount Gething - the highest mountain in the area - has an elevation of approximately 1,800 metres above sea level at its peak. The property itself is largely situated on the eastern flank of Mount Gething. Creek valleys range in form from the steep-sided, deeply incised canyon of Table Creek to the broader valley of Gaylard Creek. Hilltops and ridge crests are broad and generally rounded.



EXPLORATION OF THE
EAST MOUNT GETHING PROPERTY

PREVIOUS EXPLORATION

Coal has been known to exist in the Peace River area since 1792, when Sir Alexander MacKenzie reported a "bituminous substance which resembles coal" in the Peace River Canyon. Exploration programs designed to investigate the coal potential of the East Mount Gething Property area began in 1970 by Trend Exploration Limited.

During the summer of 1970, Trend Exploration Ltd. conducted a geological mapping program in the East Mount Gething area. This exploration led to the licencing of the 24 coal leases which presently constitute the East Mount Gething Property.

Since its acquisition of the property in 1971, Utah Mines Ltd. has conducted four separate programs on the East Mount Gething Property (not including the 1981 field season). These programs were conducted in the summers of 1972, 1973, 1975 and 1977. The purpose of the exploration was to provide geological and analytical data with which to advance the understanding and evaluation of the property. Limited geological mapping and diamond drilling were undertaken in order to fulfill those objectives. In total, 2,728 metres of diamond drilling were completed during the four programs.

All data and logs derived from previous exploration of the property are on file with the Ministry of Energy, Mines and Petroleum Resources and also in Utah Mines Ltd. company files.

1981 EXPLORATION PROGRAM

The 1981 exploration program for the East Mount Gething Property was designed to provide further information on the extent, quality and continuity of coal seams on the property. Exploration activities commenced on May 16, 1981 and were concluded on September 16, 1981. The program had several objectives: to examine the extent of the "Riverside", "Milligan" and "Louise" seams as defined by previous exploration; to more accurately correlate the cored section of the property with the Bri and South Mount Gething sections; and to conduct an extensive geological mapping program on and around the property.

The mapping program was conducted intermittently from May 16, 1981 to September 10, 1981. The mapping was done on 1:5,000 scale maps augmented with 1:30,000 scale air photographs. Field crews were led by D.N. Duncan, P. Cowley and R.B. Anderson, who were assisted by K. Foellmer, L. Louie, L. Kenkel and B. Thomae. After a short period of familiarization, K. Foellmer also led field crews. Logging and exploration roads provided some access to the property, but a Bell 206 helicopter was required to investigate the more inaccessible areas. The mapping enhanced the understanding of the stratigraphy and structure of the property. All information obtained in the mapping program is plotted on the geological property map in the map pocket of this report.

All slashing for road and drill site construction was done by Mr. K. Sheen and Mr. J. France who were hired as hourly employees. A Caterpillar D7G tractor and Caterpillar 518 Skidder were used in the construction of drill sites and roads. This equipment was supplied by Peace Dozing Ltd., the contractor for the job. In total, 2,525 metres of road approximately 10 metres in width was constructed for access to the diamond drill sites. Culverts were installed, where needed, to provide road drainage and free flow of small streams. Three road accessible diamond drill sites, each measuring approximately 20 metres by 30 metres, were slashed, cleared and leveled with a temporary waste mud sump excavated at each site. At one site (EMG-81-13) minor clearing was required to provide a location for the water supply pump. All rotary drilling was performed on preexisting roads with no extra clearing required. Road and drill site maintenance were carried out on an as needed basis.

A trailer camp was installed on the Carbon Creek Property to provide accommodations for up to 25 people. This camp was used as a base for the East Mount Gething exploration program.

Reclamation of disturbed ground was performed upon completion of the exploration program. Roads and diamond drill sites were cleaned up, recontoured and the mud sumps were refilled and levelled. All trees leaning over the roads were felled, bucked and buried. The diamond drill sites and access roads were sown with a grass seed mixture recommended by the Reclamation Branch of the British Columbia Ministry of Energy, Mines and Petroleum Resources for forested areas of the "Northeast Coal Block". All culverts were removed and water bars were constructed on all steep road grades. In some places special ditches and channels were excavated to provide adequate drainage and to minimize erosion.

Construction equipment, a Caterpillar D7G tractor and Caterpillar 518 skidder, required throughout the exploration program was provided by Peace Dozing Ltd. A John Deere 550 backhoe was used to install culverts and dig ditches. One or more 4-wheel drive pick-up trucks were used to transport personnel, fuel and supplies. A 1-ton, 4-wheel drive flat deck truck with a crane was used to haul heavier loads and to transport the downhole logging equipment.

The exploration program included the drilling of three diamond drill holes (see figure 3, page 5). Diamond drilling was contracted to Longyear Canada Ltd. who supplied a Longyear "38" diamond drilling rig. The drill was mobilized from Vancouver to the property and commenced work on June 2, 1981. Two 12 hour shifts were worked each day that the actual drilling was in progress. Drillers on the job were R. Marseille and R. Landry with drill helpers B. Oakford and C. McIvor. Removal of the drilling rig from its last site was completed on June 24, 1981.

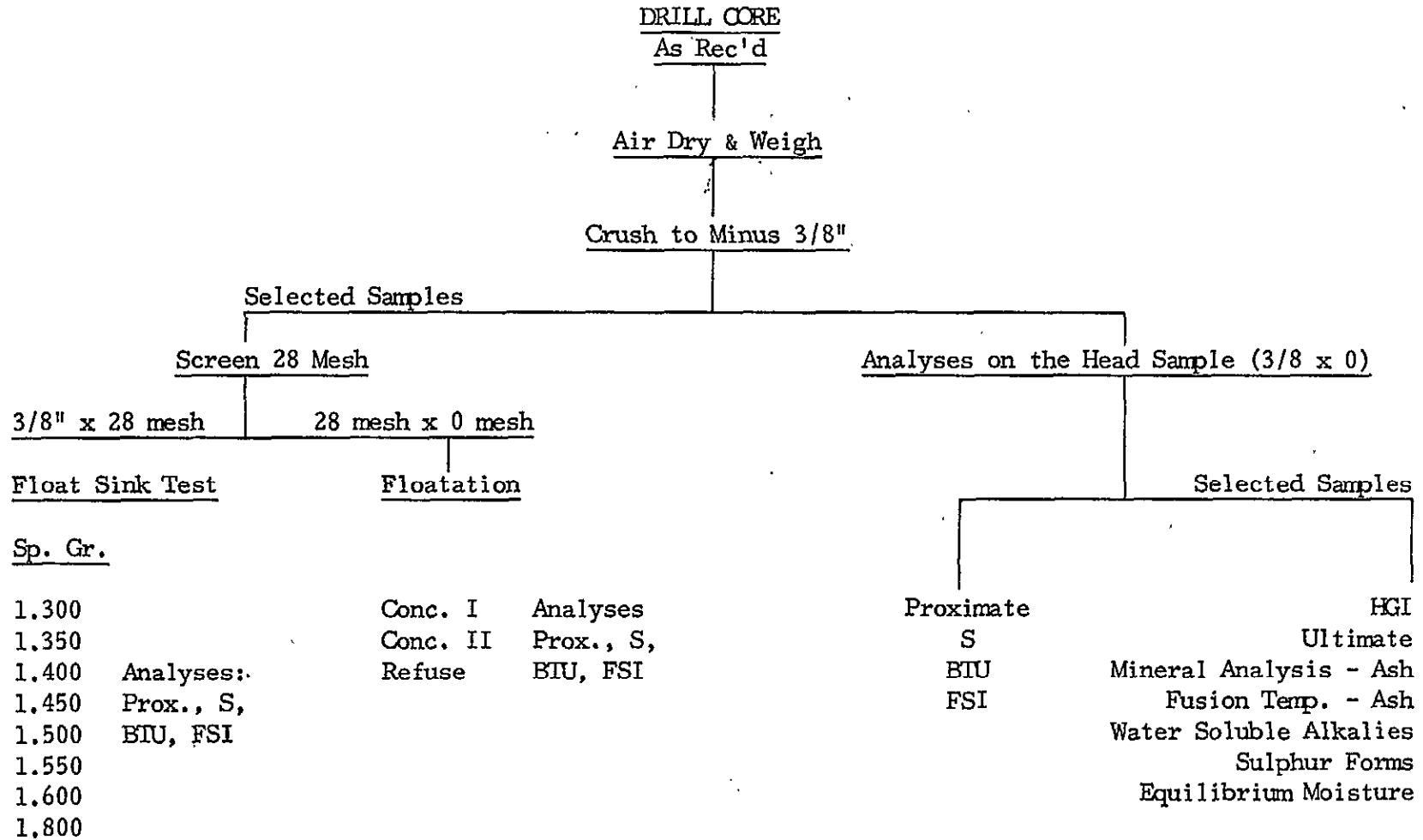
In total, 779.98 metres of diamond drilling were completed in the three holes. The core was logged by K. Foellmer and D.N. Duncan, assisted by L. Kenkel, L. Louie and B. Thomae. Descriptive lithologic logs are bound in this report in Appendix I, graphic lithologic logs are included in the map pocket. Mechanical logs consisting of combined gamma-ray and gamma-gamma density logs were run in all the holes (caliper run in two holes). All mechanical logging was done by Utah Mines Ltd. personnel using a portable Gearhart-Owen Model 06-3200 Widco Logger or a Comprobe Inc. digitized logger employing electric hoisting and a combination down hole tool (mechanical logs are included in the map pocket).

Forty-six coal samples were taken from core recovered from the three diamond drill holes. These samples were submitted for analysis to the Utah International Inc. Minerals Laboratory at 1190 Bordeaux Drive, Sunnyvale, California. Analyses were completed following the procedures outlined in the laboratory flow chart on the following page (Table I). The analytical results for the samples are bound in this report in Appendix II.

Drill holes, both diamond and rotary, were sealed with cement in accordance with the instructions of the Chief Inspector of Mines.

Rotary drilling was contracted to Green Acres Drilling Ltd. of Edmonton, Alberta. A Fahling Model CF-15 air hammer, truck mounted rotary drill was supplied by the contractor. An attendant water truck was also supplied with the drill. The rotary drill rig commenced

TABLE - I
CANADIAN COAL - FLOW SHEET



operations on the property on June 17, 1981 and finished on the 26th of that month. At that time it was moved to the Carbon Creek Property having completed four of the six rotary holes on East Mt. Gething Property. The rig was returned to the property and commenced drilling on September 3, 1981 and completed the last hole on September 6, 1981. A total of 810.77 metres of rotary drilling were completed in six drill holes (see figure 3, page 5). The rotary chips were logged by L. Kenkel, L. Louie and B. Thomae of Utah Mines Ltd. (descriptive lithologic logs are bound in this report in Appendix III). Mechanical logs consisting of combined gamma, gamma-gamma density and caliper were run in all six holes. All mechanical logging was done by Utah Mines Ltd. personnel using a Comprobe Inc. digitized logger employing electric hoisting and a combination down hole tool (mechanical logs are included in the map pocket).

Helicopter use during the 1981 exploration program was minimal, involving mapping crew support. Bell 206 Jet Rangers supplied by Rotortech Helicopters Ltd. and by Maple Leaf Helicopters Ltd., both out of Chetwynd, B.C., were utilized.

Numerous less significant materials and services were supplied by individuals and companies in Hudson's Hope, Chetwynd and Fort St. John.

The drill hole (both diamond and rotary) sites and access roads were surveyed by Mr. E. Thornton of Utah Mines Ltd.

GEOLOGY - GENERAL AND LOCAL

The East Mount Gething Property is underlain by folded and faulted sediments of the Upper Jurassic to Lower Cretaceous Minnes Group and the Lower Cretaceous Bullhead Group (see Table II, page 15). The Minnes Group consists of Monteith, Beattie Peaks, Monach and Bickford Formations. Unconformably overlying these rocks are sediments of the Cadomin and Gething Formations which comprise the Bullhead Group.

Of the four formations which comprise the Minnes Group, only the Beattie Peaks Formation is exposed on the property. This formation outcrops in the southwest corner of Coal Licence Number 3523 (see geology map in map pocket). The Beattie Peaks Formation consists of recessive, thinly interbedded siltstone, fine grained sandstone, mudstone and rare coals. Worm tracks and burrows are common.

The Monach and Bickford Formations which overlie the Beattie Peaks Formation are not present in the East Mount Gething Property area. These units were bevelled off by the pre-Cadomin regional erosional unconformity. Stott (1966) states that:

"In the vicinity of Peace River canyon, the Cadomin is in contact with strata low in the Beattie Peaks Fm".

The contact between the Upper Jurassic to Lower Cretaceous Minnes Group and the overlying conglomeratic sediments of the Cadomin Formation is an abrupt, regional erosional unconformity (Stott; 1968, page 14). This unconformity is present in the Peace River area, extending to the north, south and east along the Rocky Mountain Foothills and into the Alberta Plateau. The total amount of sediments removed and the exact time interval involved in this erosional event are not known and may vary from area to area in the region.


The Lower Cretaceous Bullhead Group which overlies the Minnes Group in described by Stott (1968, page 7):

"The basal succession of Lower Cretaceous coal-bearing sediments and massive conglomerates is included in the Bullhead Group....the sequence records widespread fluvial conditions that developed after initial deposition of conglomeratic sediments."

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.			
	Lower Cretaceous	Fort St. John Group	Cruiser Fm.	Cruiser Fm.	Cruiser Fm.	Hasler Fm. & Younger	
Goodrich Fm.			Goodrich Fm.	Goodrich Fm.			
Hasler Fm.			Hasler Fm.	Hasler Fm.			
Commotion Fm.			Commotion Fm.	Boulder Creek Member	Fort St. John Group		Hasler Fm.
				Hulcross Member			
				Gates Fm.			
Moosebar Fm.		Moosebar Fm.	Hulcross Member				
		Moosebar Fm.	Gates Member				
Bullhead Group		Bullhead Group	Gething Fm.	Gething Fm.	Gething Fm.	Gething Fm.	
			 Monach Fm.				
	Beattie Peaks Fm.		Cadomin Fm.	Cadomin Fm.	Cadomin Fm.		
Montieth Fm.							
Lower Cretaceous & Jurassic		Fernie Group	Minnes Group	Minnes Group	Minnes Group		
	Jurassic		Fernie Group	Fernie Group			

The oldest unit outcropping on the property is the Cadomin Formation. In the property area, the Cadomin Formation consists of a sequence of interbedded sandstones and conglomerates. The sandstone units are typically coarse grained, massive to coarsely cross-bedded, and weather light red-brown to grey in colour. The sandstones contain abundant quartz, chert, and volcanic rock fragments with minor feldspar grains, giving 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 with minor quartz and volcanic rock fragments. These conglomerates range from pebble bands to massive units greater than two metres in thickness. The Cadomin Formation was mapped in several areas, generally on the western side of the property (see the geology map in the map pocket).

The environment of deposition for the Cadomin Formation is considered to have been a piedmont alluvial plain (Stott; 1968, page 108). The presence of abundant conglomerate in the formation in the property area indicates that the area was relatively close to the source area of the formation.

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 not occur at the same stratigraphic horizon from area to area. Irish (1970, page 68) noted that, to the northeast of the East Mount Gething 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 one depositional sequence". Thus, there is a lateral and 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 East Mount Gething 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 total thickness of 550 metres for the Gething Formation in the area. Diamond drilling, rotary drilling and geological mapping on the East Mount Gething Property, however, indicate that approximately 610 metres of Gething Formation section is present in the property area. Since the top of the Gething Formation is not present on the property, the formation must be greater than 610 metres thick. Correlation with data from the Bri-Dowling Creek and South Mount Gething Properties to the south indicates an actual thickness of approximately 670 metres (2200 feet) for the Gething Formation.

STRUCTURE - GENERAL AND LOCAL

The East Mount Gething Property is located within the Foothills Structural Belt. This belt is underlain by folded and thrust faulted Mesozoic strata (Irish, 1968). The general trend of structures in the region is northwesterly, with most of the thrust faults dipping in a southwesterly direction. Where sediments are thick the dominant form of deformation is folding.

The property is underlain by Gething Formation and older sediments which have been folded into a broad, south-plunging syncline. This syncline has a generally north trending axis, which lies approximately along the eastern boundary of the property (see geology map in map pocket). The majority of the property lies on the generally east to southeast dipping, western limb of the syncline.

The central portion of the property is underlain by relatively flat lying Gething Formation sediments. There is little evidence of faulting in this area, with dips varying from 0° to 20° and strikes ranging from north to east (see geology map in map pocket). This central region is flanked by anticlines to the east and west (see figures 6, 7, and 8 in map pocket). These assymetric anticlines are probably the result of thrust faulting at depth. Irish (1968, page 24) states that, in the property area, most thrust faults:

"...have resulted from the breaking of tightly compressed anticlines and begin and/or terminate in compressed, assymetrical anticlines...."

The presence of these two anticlines is indicated by diamond drill hole information and geological mapping.

The stratum contour maps (in the map pocket) for the Riverside, Louise and Milligan seams show the effects of the folds on these seams. the seams are broken into mineable blocks by the folding, with wide areas of unmineable coal caused by the steepening of dips on the limbs of the folds.

Structural geology for the East Mount Gething property is shown on the 1:10,000 scale geological map and on the 1:10,000 scale cross sections (in the map pocket). The cross sections and geological map portray the present interpretation of the structural geology of the sediments underlying the property. The information to produce the map and cross sections was obtained from geological field mapping and diamond drill hole data.

A 1:50,000 scale cross section showing the structural form and stratigraphic relationships of the property and surrounding area is shown on the following page (figure 9). It is postulated that the thrust faults which underlie the anticlines on the property are splays from a major thrust fault which underlies the property at depth. This major thrust could be the thrust fault which comes to surface on Portage Mountain to the east, but there is too little data in the intervening area to be certain.

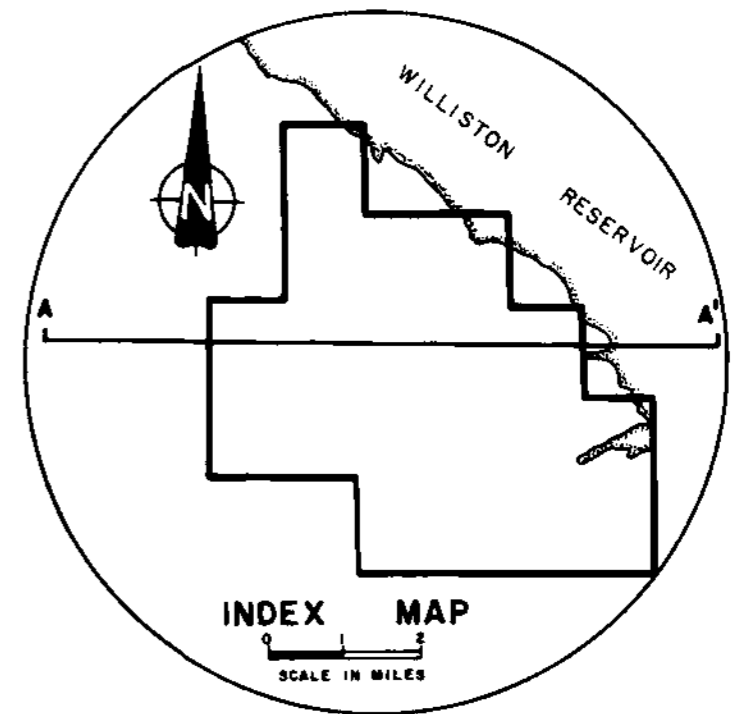
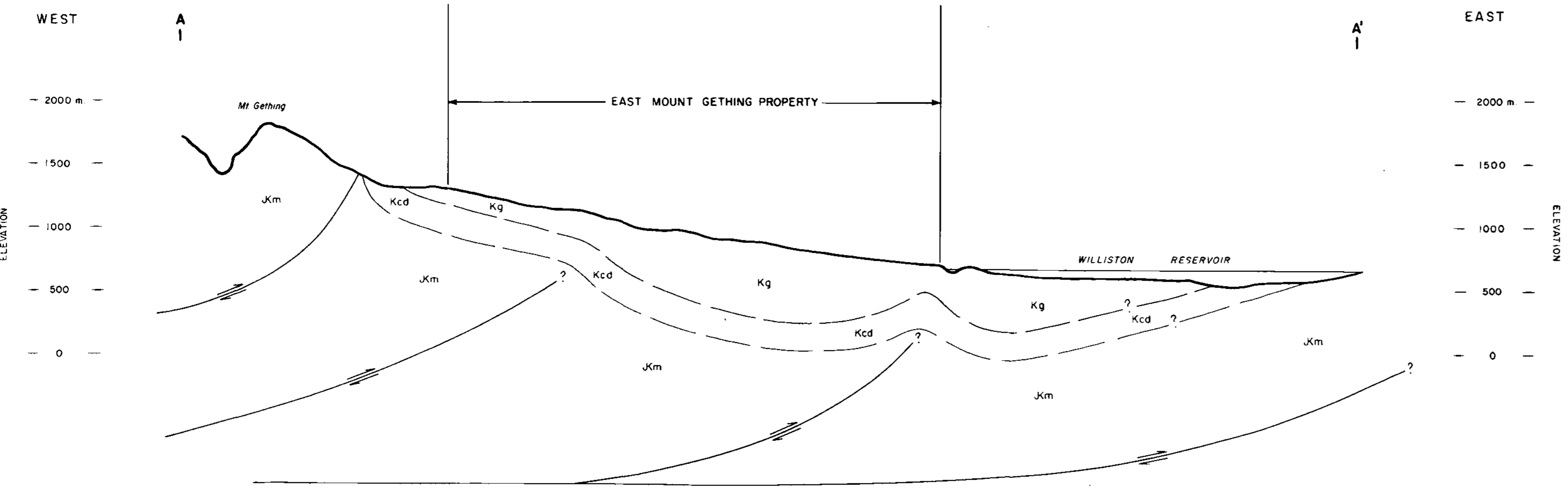


FIGURE - 9

LEGEND

- Kg Gething Formation
- Kcd Cadomin Formation
- Jm Minnes Group (Undifferentiated)

UTAH MINES LTD.		
EXPLORATION DEPARTMENT		
Vancouver		British Columbia
EAST MOUNT GETHING		
CROSS SECTION		
STRUCTURAL STYLE		
LOOKING NORTH		
Work by: N. Duncan	Date: Feb 1982	NTS Ref. 94 B/1
Drawn by: T. Drews	Revised:	Scale - 1:50,000
2 X Vertical Exaggeration		

COAL GEOLOGY

The Gething Formation section penetrated in diamond and rotary drill holes on the East Mount Gething Property contains over 80 coal seams. These seams vary from one centimetre to 3.80 metres (including splits) in thickness. Stott (1969, page 8) states that for coal seams of the Gething Formation in the Peace River area:

"Current work shows that considerable variation occurs within each individual seam, that thickness may change rapidly, and that both coal seams and sandstone units are lenticular and have limited extent."

This makes the correlation of coal seams a complex problem involving the evaluation of physical, chemical and geophysical data. The wide distribution of drill holes on the property makes correlation even more difficult. The Gething Formation-Cadomin Formation contact provides a datum for the correlation of the seams and seam nomenclature is based upon this datum (see Table III, page 22). This contact, however, varies in its exact location in the stratigraphic column (see Geology section of this report). Thus, care must be taken when using the contact as a datum as the interburden between a seam and the contact may vary across the property. The coal seam correlations shown in figure 22 (in map pocket) represent the most accurate description possible given the data available.

Only three of the seams penetrated in drilling on the property are of sufficient thickness and lateral continuity to be of economic interest. These seams are the Milligan seam, the Louise seam and the Riverside seam. Proximate analyses and dry mineral-matter free data for these seams are shown in Tables IV, V and VI on pages 24, 29 and 33. Analytical Data on all coal samples taken since 1972 are bound in Appendix III of this report.

The Milligan Seam

The Milligan seam is a medium volatile bituminous coal (Table IV, page 24). The seam ranges in thickness from 0.45 metres to 1.30 metres (net coal thickness) with an average thickness of 0.91 metres. Figure 13, page 25 shows the net seam thickness isopachs for the Milligan seam. The maximum seam development is in the zone bounded by drill holes 72-2, 75-6 and 77-10. There is a general decrease in thickness away from this

FORT ST. JOHN
GROUP

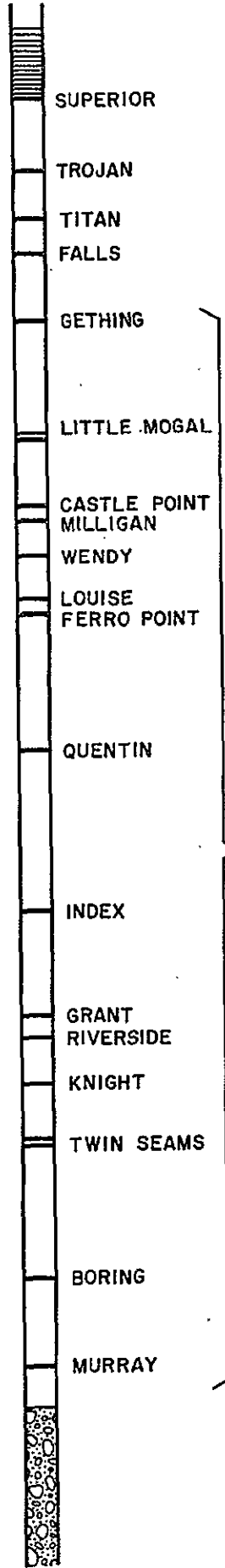
MOOSEBAR FORMATION
(SHALE)

BULLHEAD
GROUP

GETHING FORMATION
(Sandstone, Shales, Siltstones, Coals)

CADOMIN FORMATION
(Conglomerate)

↑
YOUNGER



COAL SEAMS WITHIN THE UTAH EAST MT. GETHING
LICENCE AREA

TABLE -- III

Approximate Location Of Coal Seams
Within The Lower Cretaceous Gething Fm.
Peace River Canyon, N.E. B.C.

Vertical Scale — 1" = 200'

zone. In drill hole 81-12 the seam is thin, only 0.45 metres thick, and the isopach map shows a relatively rapid decrease in seam thickness toward this hole.

The Free Swelling Indices (F.S.I.) for the Milligan seam (Table IV, *ibid.*) vary from 0 to 2 with an average value of $1\frac{1}{2}$. The seam is poorly agglomerating to non-agglomerating and has little or no potential as a metallurgical grade coal.

The calorific values for the seam (dry mineral-matter free) range from 13,125 B.T.U./lb. to 14,923 B.T.U./lb and average 14,337 B.T.U./lb (Table IV, *ibid.*) These values indicate that the seam has potential as a thermal grade coal. The sulphur content of the seam varies from 0.76% to 1.30% (Table IV, *ibid.*) with an average value of 0.94%. The sulphur content isopach map (figure 14, page 26) shows that the sulphur content is lowest in drill holes 72-2, 75-5 and 75-6. The sulphur content increases gradually toward drill holes 72-1 and 81-11 and increases rapidly toward drill hole 81-12. The high sulphur content of the seam in hole 81-12 (1.30%) indicates that the seam, in this area, was probably subjected to brackish or marine conditions at the time of deposition. The sulphur content isopach map shows a distinct bi-lobate form, trending away from drill hole 72-2. This form may be indicative of the coal swamp geometry at the time of deposition of the seam.

The ash content of the Milligan seam (Table IV, *ibid.*) ranges from 3.65% to 17.94% and averages 10.25%. The distribution of ash content for the seam is shown in the ash content isopach map (figure 15, page 27). The ash content of the seam is lowest in the vicinity of drill holes 75-5, 75-6 and 81-11. The seam has a high ash content in the vicinity of drill holes 72-1 and 81-12. The ash isopach map shows a bi-lobate trend very similar to the trend observed in sulphur values. This similarity reinforces the postulation that the swamp geometry is represented by the isopach maps.

An examination of the data for the Milligan seam indicates the following:

- 1.) The seam is of little potential as a metallurgical grade coal.
- 2.) The seam has potential as a thermal grade coal, but relatively high sulphur and ash values would necessitate the washing of the coal.
- 3.) Seam thickness and quality information indicate that the seam is of highest quality in the vicinity of drill holes 72-2, 75-6 and 77-10.

TABLE IV

MILLIGAN COAL SEAMAIR DRIED

D.D.H.	SAMPLE #	H ₂ O	Ash	S	V.M.	F.C.	B.T.U.	F.S.I.
72-1	1	1.60	16.79	0.99	22.12	59.49	12,167	1½
72-2	4	1.93	11.96	0.80	20.19	65.92	12,930	2
75-5	3	2.08	5.91	0.79	23.11	68.90	12,433	1½
75-6	5	1.89	5.27	0.76	20.54	72.30	14,021	1½
81-11	1	2.17	3.65	0.99	21.16	73.02	14,303	1½
81-12	13	6.19	17.94	1.30	25.38	50.49	10,553	0
Average		2.64	10.25	0.94	22.08	65.02	12,735	1½



DRY MINERAL - MATTER FREE

D.D.H.	SAMPLE #	V.M.	F.C.	B.T.U.
72-1	1	25.56	74.44	14,901
72-2	4	22.33	77.67	14,877
75-5	3	24.50	75.50	13,300
75-6	5	21.54	78.46	14,893
81-11	1	21.93	78.07	14,923
81-12	13	31.78	68.22	13,125
Average		24.61	75.39	14,337

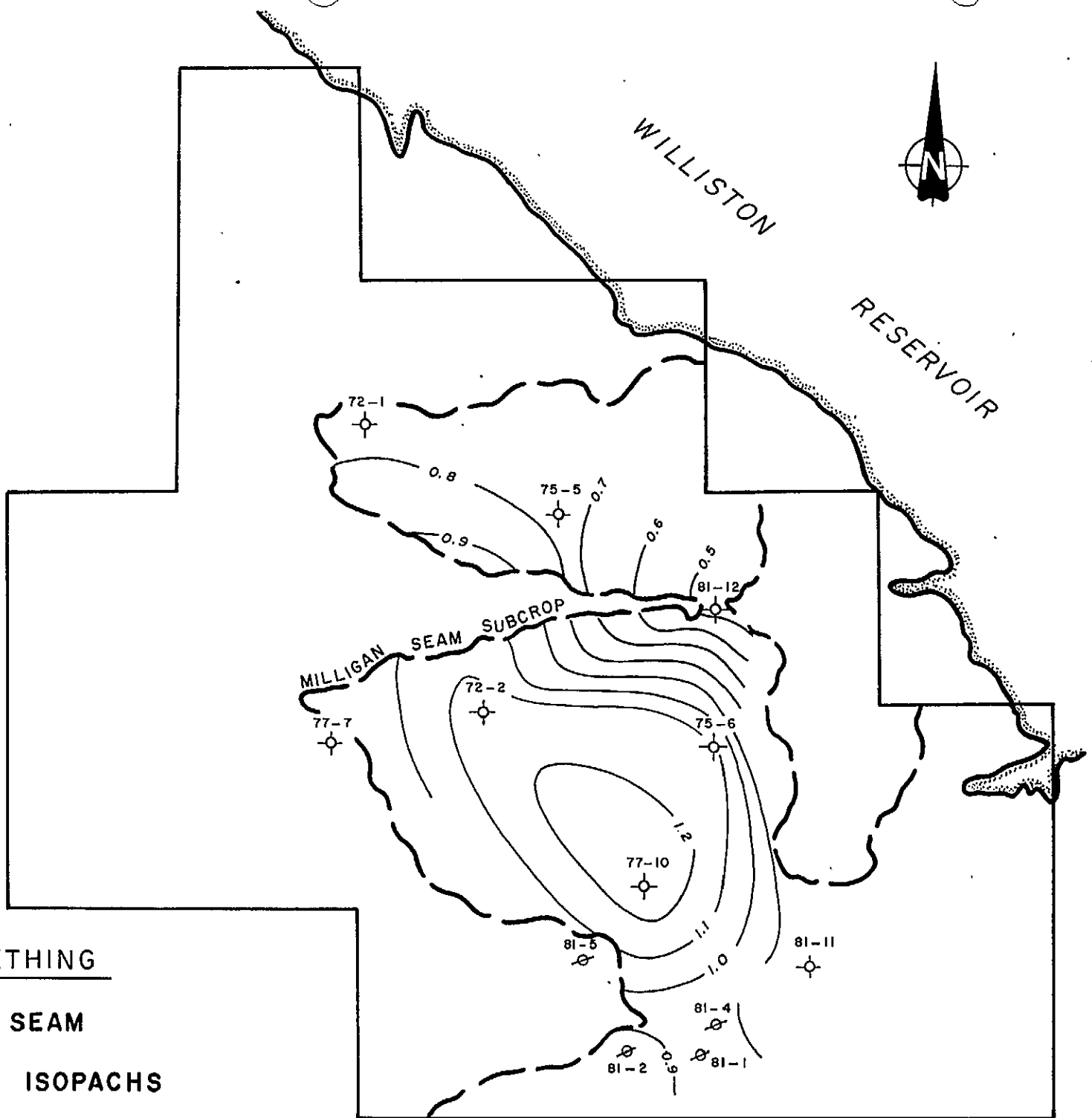


WILLISTON
RESERVOIR

LEGEND

-  Diamond Drill Hole
-  Rotary Drill Hole

Scale — 1:50,000



FIGURE—13

EAST MT. GETHING

MILLIGAN COAL SEAM

NET SEAM THICKNESS ISOPACHS

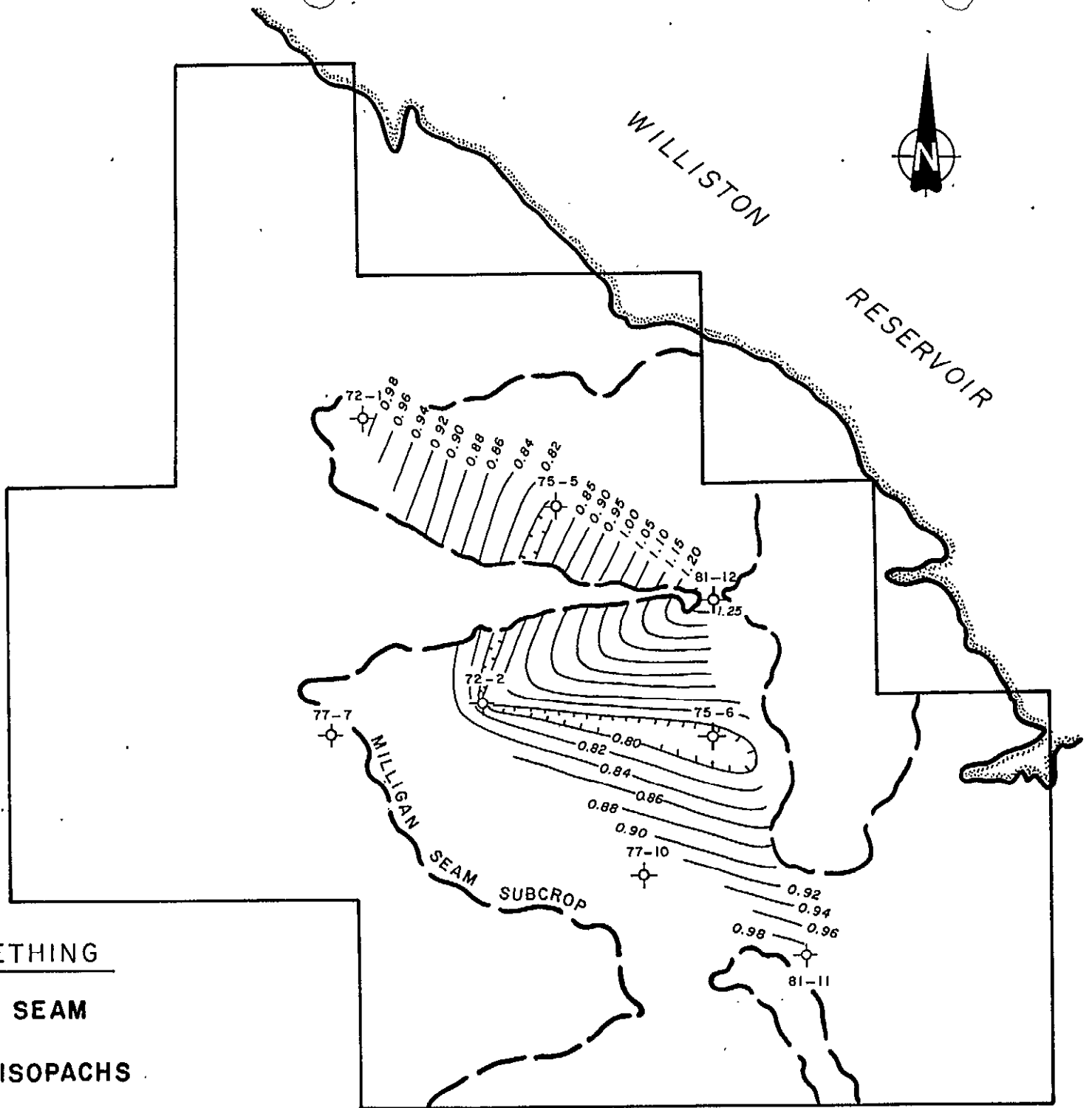
LEGEND

- ⊕ Diamond Drill Hole
- ⊗ Rotary Drill Hole

Scale - 1:50,000



FIGURE - 14

EAST MT. GETHING
MILLIGAN COAL SEAM
 SULPHUR CONTENT ISOPACHS



— 27 —

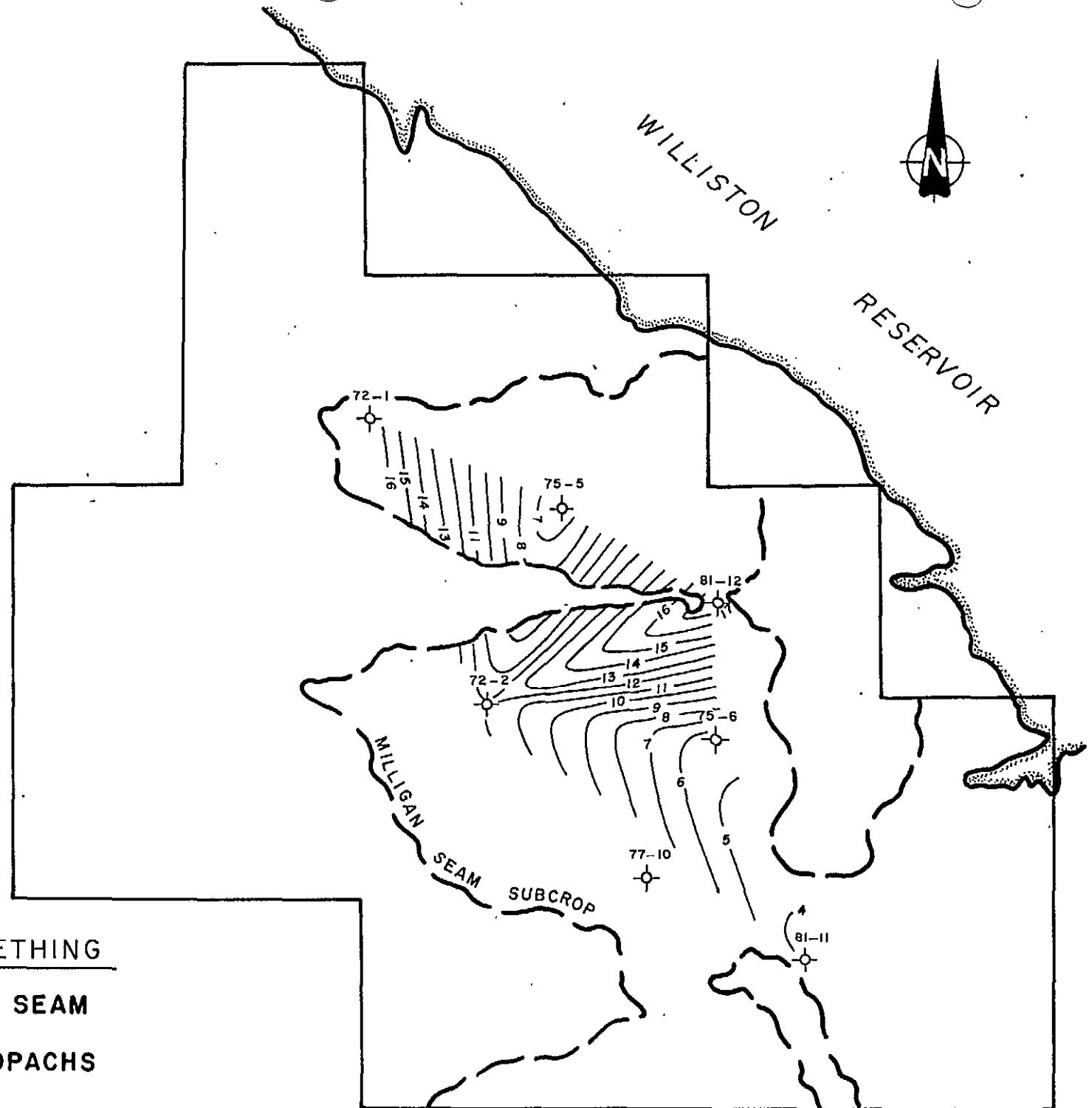
LEGEND

-  Diamond Drill Hole
-  Rotary Drill Hole

Scale — 1:50,000

FIGURE — 15

EAST MT. GETHING
MILLIGAN COAL SEAM
ASH CONTENT ISOPACHS



- 4.) Overburden thickness (both bedrock and glacial) make potentially strip mineable areas very limited in extent. Thus, underground mining techniques would have to be used in the extraction of this seam.
- 5.) Seam thickness, sulphur content and ash content isopach maps show the swamp geometry at the time of seam deposition and also relate to the depositional environment.

The Louise Seam

The Louise seam is a medium to high volatile bituminous coal (Table V, page 29). The seam ranges in thickness from 0.55 metres to 1.65 metres, with an average thickness of 1.08 metres (net coal thickness). The net seam thickness isopach map (figure 16, page 30) shows a thinning trend away from drill hole 72-1. The seam thins gradually toward the southeast, with a steepening of the isopach gradient in the vicinity of rotary drill hole 81-2.

The Free Swelling Indices for the Louise seam vary from $1\frac{1}{2}$ to 4, with an average value of $2\frac{1}{4}$ (Table V, *ibid.*). The seam is poorly agglomerating and is not suitable as a metallurgical coal except, possibly, in a blend with other metallurgical coals.

The calorific values for the Louise seam range from 13,835 B.T.U./lb to 15,026 B.T.U./lb (Dry Mineral-Matter Free) and average 14,660 B.T.U./lb (see Table V, *ibid.*). These high calorific values indicate that the seam has strong potential as a thermal grade coal. The sulphur content of the seam is low, ranging from 0.54% to 0.84% and averages 0.68% (see Table V, *ibid.*). These values have been used in the compilation of a sulphur content isopach map (figure 17, page 31). This map shows that the lowest sulphur concentrations are found in the areas around drill holes 72-2, 75-5 and 75-6 and that the general form of the distribution is bi-lobate. This form is postulated to represent roughly, the shape of the coal swamp at the time of deposition of the coal seam. Higher sulphur values are thought to represent a closer proximity to brackish or marine conditions.

The ash content of the Louise seam ranges from 5.31% to 29.43% with an average value of 18.46% (see Table V, *ibid.*). These values are high and indicate that relatively large amounts of non-organic material were introduced into the swamp at the time of deposition. The distribution of ash content shown in figure 18, page 32 shows that the lowest ash values are situated in the area of drill hole 77-10. High ash content values lie along a trend between drill holes 72-1, 72-2

TABLE V

LOUISE COAL SEAMAIR DRIED

D.D.H.	SAMPLE #	H ₂ O	Ash	S	V.M.	F.C.	B.T.U.	F.S.I.
72-1	4	1.69	25.74	0.75	22.81	49.76	10,634	2
72-2	5	1.67	29.43	0.54	21.36	47.54	9,997	2
75-5	4	1.75	13.65	0.62	23.60	61.00	12,683	1½
75-6	6	1.12	25.27	0.58	31.13	42.48	10,044	1½
77-10	3	1.19	5.31	0.73	26.59	66.91	14,140	4
81-11	3+4	1.57	15.31	0.84	26.72	56.40	12,130	3½
81-12	15+16	1.89	14.50	0.70	21.52	62.08	12,508	1½
Average		1.55	18.46	0.68	24.82	55.17	11,734	2½

DRY MINERAL - MATTER FREE

D.D.H.	SAMPLE #	V.M.	F.C.	B.T.U.
72-1	4	29.17	70.83	14,761
72-2	5	28.36	71.64	14,679
75-5	4	26.77	73.23	14,899
75-6	6	40.52	59.48	13,835
77-10	3	27.92	72.08	15,026
81-11	3+4	30.90	69.10	14,563
81-12	15+16	24.47	75.53	14,857
Average		29.73	70.27	14,660

LEGEND

- ⊕ Diamond Drill Hole
- ⊗ Rotary Drill Hole

Scale - 1:50,000

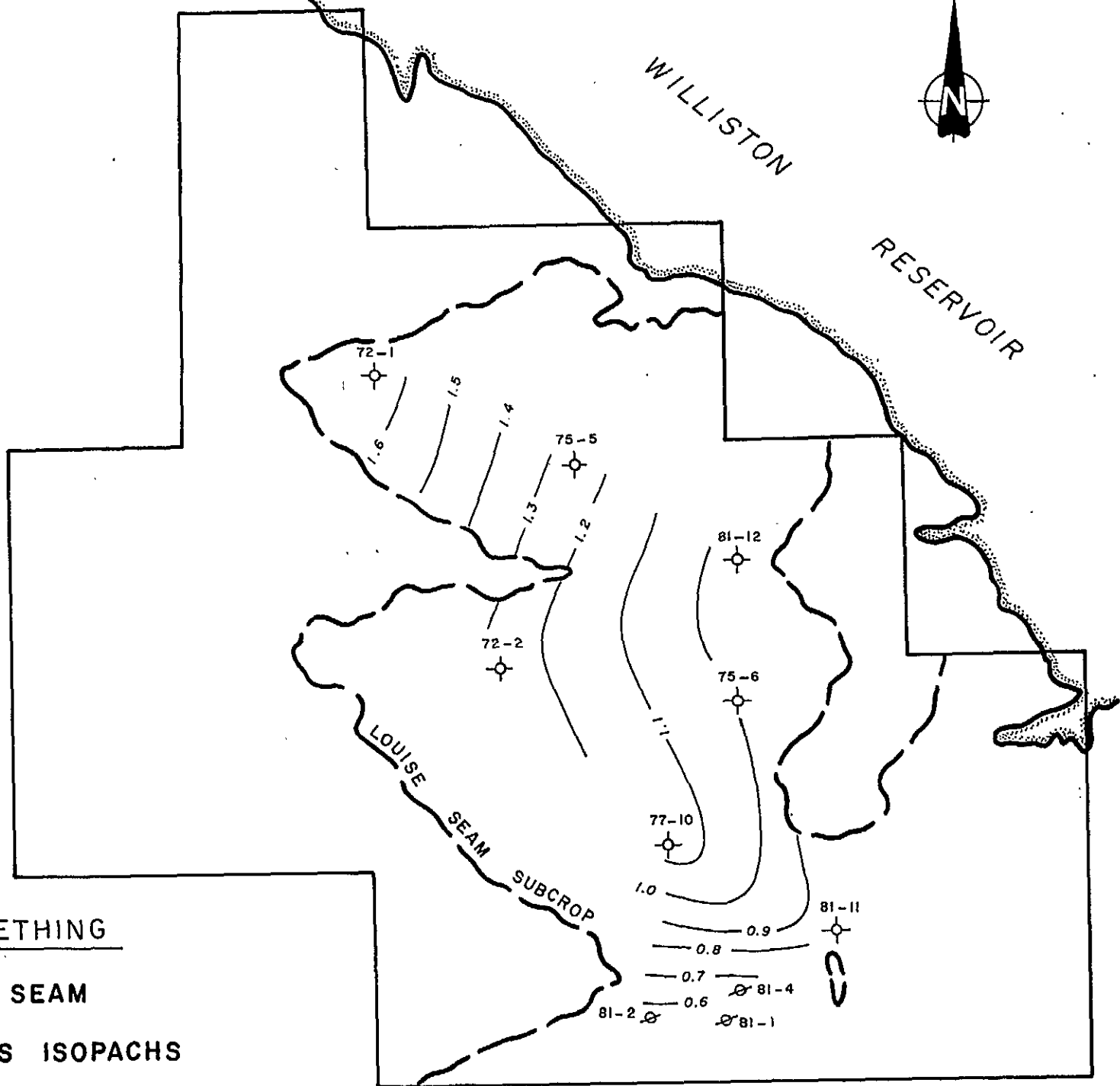


FIGURE-16



EAST MT. GETHING

LOUISE COAL SEAM

NET SEAM THICKNESS ISOPACHS

3

LEGEND

-  Diamond Drill Hole
-  Rotary Drill Hole

Scale - 1:50,000

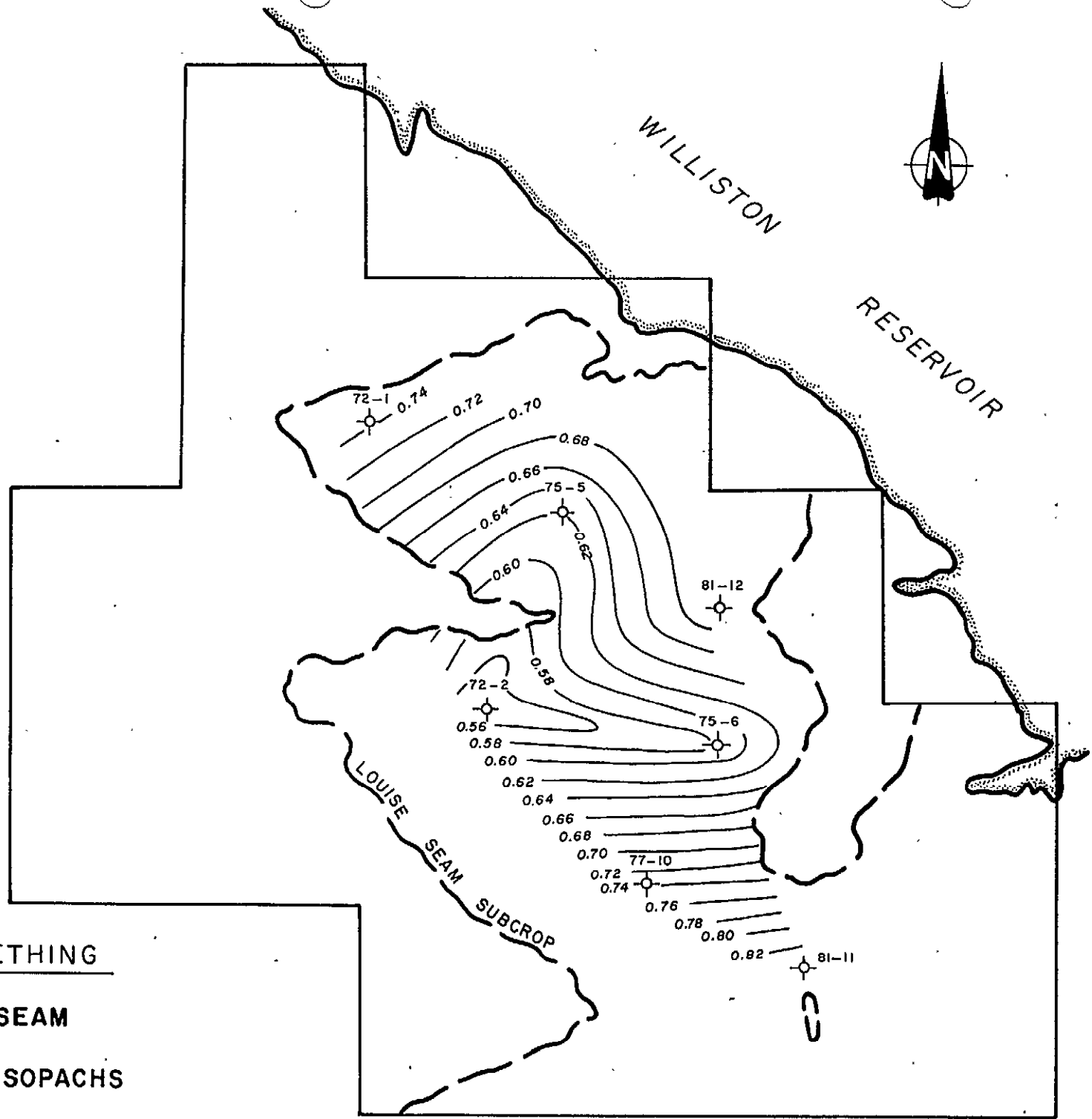


FIGURE-17



EAST MT. GETHING

LOUISE COAL SEAM

SULPHUR CONTENT ISOPACHS

13

LEGEND

-  Diamond Drill Hole
-  Rotary Drill Hole

Scale - 1:50,000

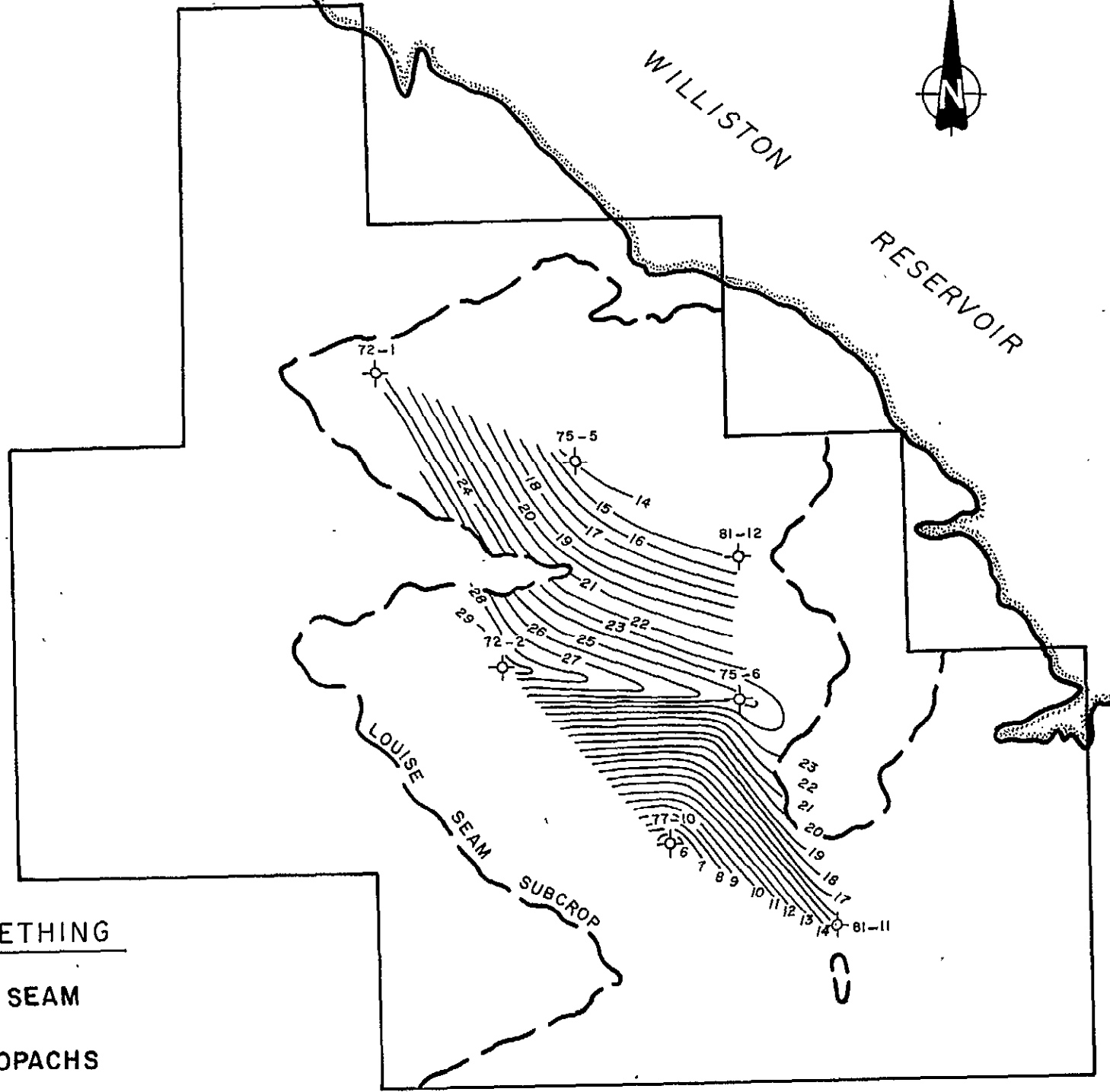


FIGURE--18

EAST MT. GETHING

LOUISE COAL SEAM

ASH CONTENT ISOPACHS

and 75-6. The generally high ash values would necessitate washing of the coal prior to shipment of a saleable product.

An examination of all the available data for the Louise coal seam indicates the following:

- 1.) The seam is not saleable as a metallurgical coal except in a blend with other, higher grade metallurgical coals.
- 2.) The seam has potential as a thermal grade coal with high calorific values and low sulphur content, but high ash values would necessitate the washing of the coal.
- 3.) Seam thickness and proximate analyses data indicate that the seam is of highest quality in the areas around drill holes 77-10 and 75-5.
- 4.) The thickness of rock and glacial deposits above the seam make underground mining the only feasible method for the extraction of the seam.

The Riverside Seam

The Riverside seam is a medium to low volatile bituminous coal (see Table VI, page 34). The seam ranges from 0.60 metres to 3.15 metres in thickness, with an average thickness of 1.78 metres (net coal thickness). Figure 19, page 35 shows the net seam thickness isopachs for the Riverside seam. This isopach map shows that the seam is best developed in the area of drill holes 72-2, 73-3 and 81-13. The seam thickness decreases rapidly toward drill holes 81-6 and 81-12. The seam thickness also decreases toward drill hole 77-10, but at a lower rate.

The Free Swelling Indices for the Riverside seam range from 1 to 5 with an average value of 2 (see Table VI, *ibid.*). This indicates that the seam has limited potential as a metallurgical grade coal, except in a blend with other metallurgical grade coals. The calorific values for the seam (Dry Mineral-Matter Free) range from 14,858 B.T.U./lb to 15,507 B.T.U./lb with an average value of 15,202 B.T.U./lb (see Table VI, *ibid.*). These high calorific values indicate that the seam has potential value as a thermal grade coal.

The sulphur content of the Riverside seam varies from 0.36% to 0.80% and averages 0.56% (see Table VI, *ibid.*). The sulphur content isopach map (figure 20, page 36) shows the trend in sulphur content for the seam. The isopach map shows that the lowest sulphur values are located in the area of drill hole 77-7 and that sulphur content increases generally to the northeast of this hole. Drill hole 81-12 has the highest sulphur content (0.80%) which is thought to indicate a closer proximity to

TABLE VI

RIVERSIDE COAL SEAMAIR DRIED



D.D.H.	SAMPLE #	H ₂ O	Ash	S	V.M.	F.C.	B.T.U.	F.S.I.
73-3	2+3	1.46	9.59	0.46	21.40	67.55	13,668	2
77-7	4,5,6+7	1.54	6.72	0.36	20.30	71.43	13,916	1
77-10	12	0.85	29.28	0.58	17.11	52.76	10,583	1
81-12	31+32	1.09	6.70	0.80	21.68	70.53	14,227	5
81-13	36	2.38	27.79	0.60	18.22	54.61	10,861	1½
Average		1.24	16.02	0.56	19.74	63.38	12,651	2

DRY MINERAL - MATTER FREE

D.D.H.	SAMPLE #	V.M.	F.C.	B.T.U.
73-3	2+3	23.26	76.74	15,265
77-7	4,5,6+7	21.56	78.44	15,018
77-10	12	21.63	78.37	15,507
81-12	31+32	22.82	77.18	15,363
81-13	36	22.69	77.31	14,858
Average		22.39	77.61	15,202

35

LEGEND

-  Diamond Drill Hole
-  Rotary Drill Hole

Scale - 1:50,000

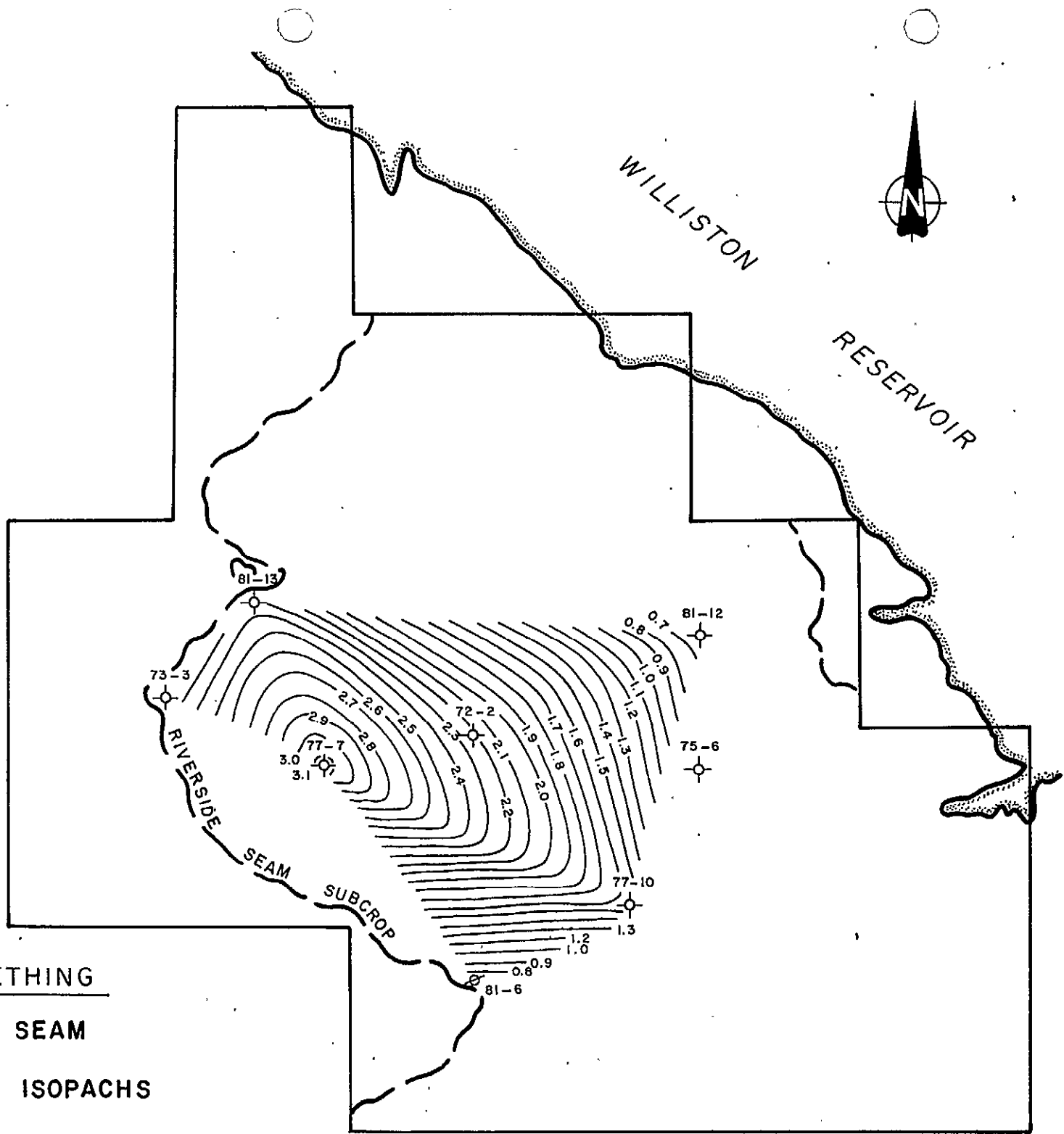




FIGURE-19

EAST MT. GETHING

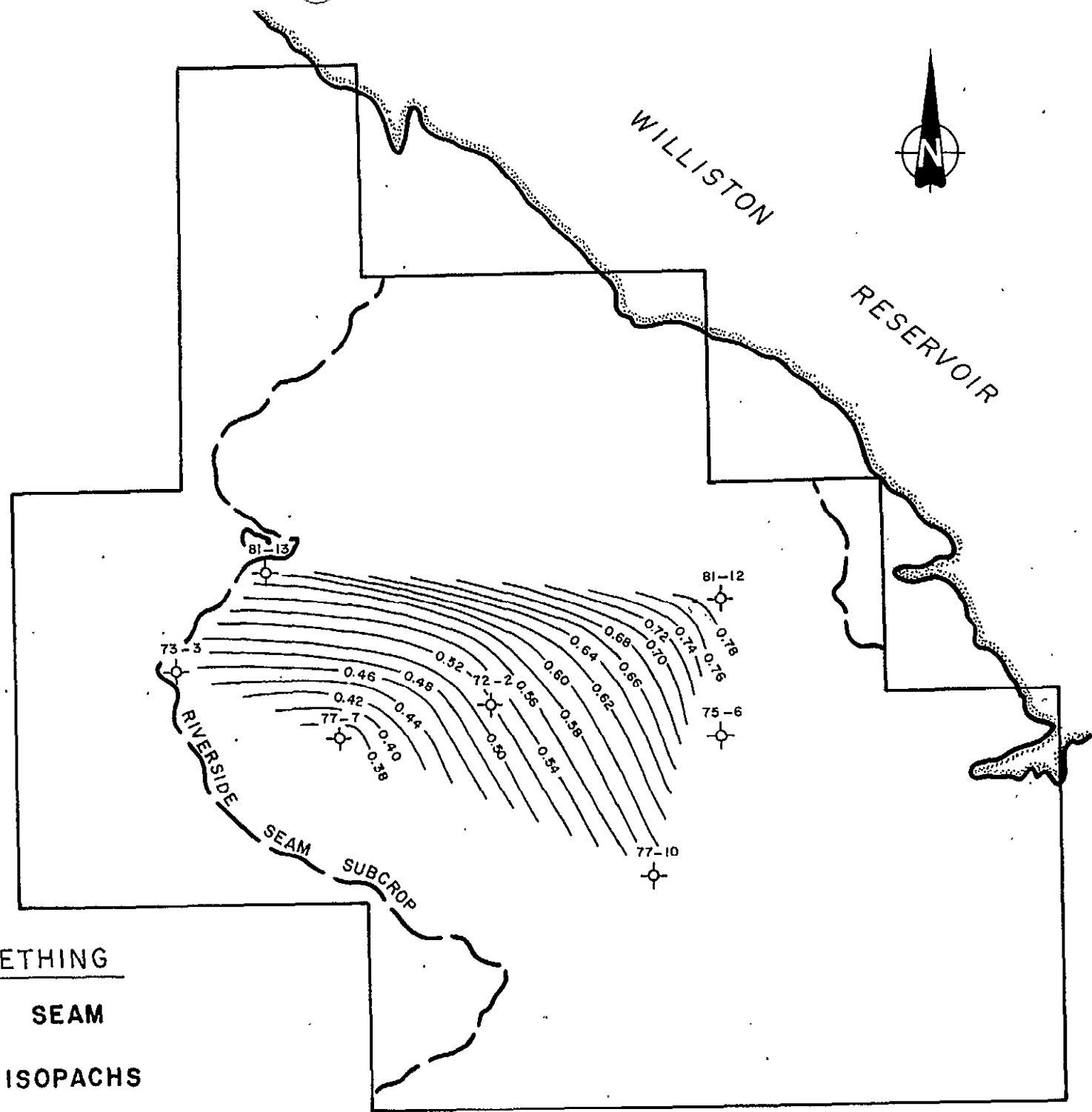
RIVERSIDE COAL SEAM

NET SEAM THICKNESS ISOPACHS

LEGEND

-  Diamond Drill Hole
-  Rotary Drill Hole

Scale—1:50,000



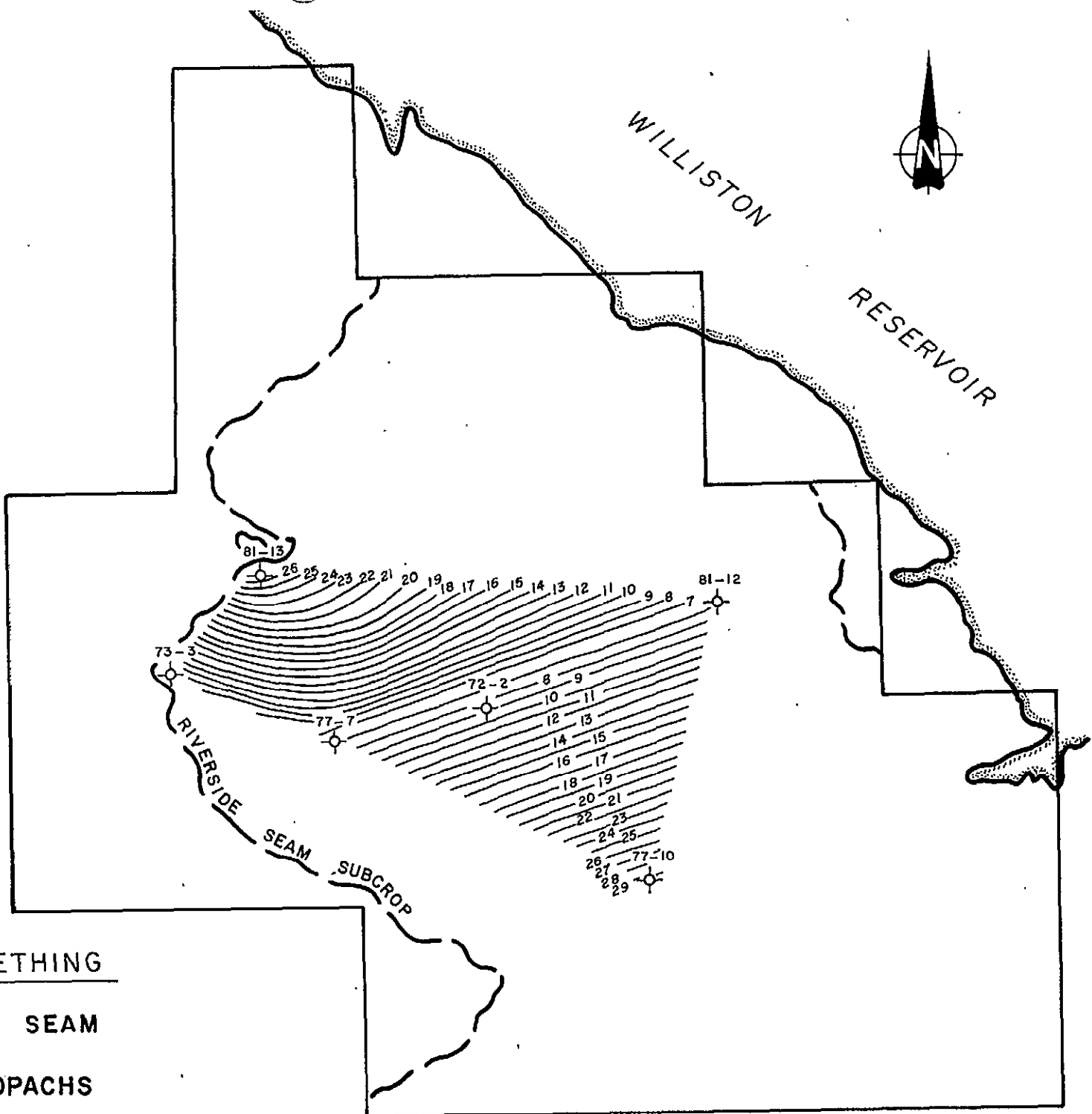
FIGURE—20

EAST MT. GETHING
RIVERSIDE COAL SEAM
SULPHUR CONTENT ISOPACHS





WILLISTON

RESERVOIR



LEGEND

-  Diamond Drill Hole
-  Rotary Drill Hole

Scale - 1:50,000

FIGURE - 21

EAST MT. GETTING

RIVERSIDE COAL SEAM

ASH CONTENT ISOPACHS

brackish or marine conditions. The evenness of the gradient is caused in part by the low number of sample points (five) and their wide spacing.

The ash content of the Riverside seam (see Table VI, *ibid.*) ranges from 6.70% to 29.28% with an average value of 16.02%. Figure 21, page 37 shows the ash content distribution for the Riverside seam in the property area. The ash content is lowest in the vicinity of drill holes 77-7 and 81-12 and increases away from the low ash axis between these two holes. The trends observed in ash content distribution are suggestive of a coal swamp with crevass splaying on the northwest and southeast boundaries. The ash contents of the seam indicate that washing would be needed for the seam. While ash content is low for the samples from drill holes 77-7, 73-3 and 81-12, there are a number of splits in the seam which were not included in the samples. These splits would be removed with the coal if it were mined and would greatly increase the ash content.

An examination of the data available for the Riverside seam indicates that:

- 1.) A mined product would not likely be saleable as a metallurgical coal except as a blend with other, higher grade metallurgical coals.
- 2.) The seam has potential as a thermal grade coal owing to its high calorific values and low sulphur content, but high ash contents and numerous splits would introduce a high dilution factor upon mining and would necessitate the washing of the coal.
- 3.) The seam is thickest and of highest quality in the vicinity of drill hole 73-3.
- 4.) The potentially strip mineable reserves are low for this seam due to deep overburden and thick rock strata above the seam, making underground mining the only feasible method for large scale extraction of the seam.

CONCLUSIONS AND RECOMMENDATIONS

Utah Mines Ltd. acquired the East Mount Gething Property on April 23, 1971. Since that time, the property has undergone a significant amount of exploration in the belief that it has the potential to become a metallurgical and/or thermal coal producer. Exploration work to date has primarily consisted of diamond drilling, geological mapping and limited rotary drilling.

Previous exploration programs, undertaken in the years 1972, 1973, 1975 and 1977, provided a good data base for the 1981 program. The 1981 exploration program was designed to examine the property in more detail and to refine the existing model of the property geology.

On the basis of geological mapping and previous diamond drill derived information five coal licences were dropped from the property. These licences, numbered 3525, 3526, 3527, 3528 and 3529, were surrendered to the Crown on December 9, 1981. The reasons for dropping the licences are:

- 1.) Mapping indicated that steeply dipping (approximately 45°) beds are present along the western margin of licences 3525, 3527 and 3529.
- 2.) The area dropped was underlain predominantly by Cadomin Formation and Minnes Group sediments which contain rare coal seams which are discontinuous and thin when present (see geology map, figure 23, in map pocket).
- 3.) The thin capping of Gething Formation sediments present in the area contained no coal seams of mineable thickness (greater than 0.92 metres) in diamond drill holes 75-4 and 77-9 (see correlation chart, figure 22, in map pocket).

On the basis of 1981 diamond drilling and rotary drilling two previously undefined anticlinal structures were delineated. These anticlines trend in a northerly direction and are thought to be underlain at depth by thrust faults. The western anticline (see geology map, figure 23, in map pocket) appears to be monoclinial, with a shallow western limb and steeper eastern limb (see cross sections, figures 6 through 8, in map pocket). The eastern anticline (see geology map, figure 23, in map pocket) is a more symmetrical anticline which brings the Cadomin Formation close to the surface in the area of diamond drill hole 81-12. These structures are not fully understood or delineated and require further investigation.

The central portion of the property is relatively undisturbed and is underlain by gently dipping sediments. This area has the most potential for the economic recovery of mineable seams. The three seams which are potentially mineable are the Milligan seam, the Louise seam and the Riverside seam (see correlation chart, figure 22, in map pocket). Deep overburden (glacial and bedrock) makes the strip mine potential of these seams limited, but underground operations are feasible. Potential entry points for the seams exist along the Gaylard Creek Valley which flows across the southern portion of the property. These seams have limited potential as metallurgical grade coal as they are poorly agglomerating. They do have potential as thermal grade coal, but would require washing, in most cases, to produce a saleable product (see Coal Geology section of this report).

It is recommended that no further diamond drilling be undertaken on the property in the 1982 field season. Rotary drilling will provide sufficient information on the seams at a considerable cost savings. Rotary drilling should be undertaken in the central portion of the property to provide more accurate information on the coal seams. The southeastern portion of the property requires drilling to determine the presence and extent of mineable seams. Drilling on both sides of the eastern anticline is recommended to more accurately determine the effects of this structure on the three coal seams of interest. All rotary drilling recommended can be done on existing roads or on short access trails constructed during the 1982 program. Further mapping can be done along the shore of Williston Lake. This mapping was not performed in 1981 due to unusually high water levels in the lake.

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APPENDIX I

DESCRIPTIVE LITHOLOGIC LOGS AND
WELL COMPLETION REPORTS FOR 1981

DIAMOND DRILL HOLES

D.D.H. EMG-81-11
WELL COMPLETION REPORT

Location: - On a newly constructed access road (by Utah Mines Ltd.) 200 metres from its junction with the Utah Mines Ltd. W.A.C. Bennett Dam access road.
- U.T.M. Coordinates: 6,207,458mN x 544,595mE
- Coal Licence No. 3507

Elevation: 739.5 metres

Orientation: Vertical

Date Collared: June 4, 1981

Date Completed: June 8, 1981

Plugged: Yes - cemented

Overburden Depth: 20.20 metres

Casing Depth: 25.9 metres

Casing Size: H.W. 11.4 cm
(recovered)

Final Depth: 218.54 metres

Formations Encountered: 0 to 20.20m Overburden
20.20m to 218.54m Gething Formation

Core Description By: K. Foellmer and D.N. Duncan

Coal Seams Sampled:

<u>Sample No.</u>	<u>Seam Name</u>	<u>Interval</u>	<u>Thickness</u>	
			<u>Core</u>	<u>Density Log</u>
1	Milligan	32.72m to 33.22m	0.50m	0.80m
2		51.70m to 52.31m	0.61m	0.60m
3	Louise	69.74m to 70.00m	0.26m	0.40m
4	Louise	70.20m to 71.05m	0.85m	0.45m
5		89.50m to 90.45m	0.95m	0.90m
6		96.07m to 96.62m	0.55m	0.50m
7		104.20m to 104.46m	0.26m	1.00m
8		104.63m to 105.16m	0.53m	
9		135.24m to 135.57m	0.33m	0.70m
10		151.73m to 152.97m	1.24m	1.40m
11		154.72m to 155.42m	0.70m	0.40m
12		160.45m to 161.16m	0.71m	0.75m

Logs Run: Gamma and Density - by Utah Mines Ltd.

Comments: - No resistivity log as probe run through drill rods.
- Logger drive gears for the chart recorder were set at 10" = 100' - log had to be reduced by 50% to get correct scale.
- Gas invasion at approximately 198 metres.

HOLE# EMG-81-11From On To 39.77m

FROM	TO	DESCRIPTION
0	25.90	OVERBURDEN
25.90	32.75	Sandstone, Medium Gray, Fine Grained, X-Laminated, Calcareous Cement, Dolomite Veinlets, Salt and Pepper Coarsens Downwards - at 30.19 to 30.61m Sandstone Contains Mudstone rip up Clasts - Minor Mud Clasts in Sandstone from 30.61m and Carbonaceous Plant Debris - Sharp Lower Contact
32.72	33.22	Coal - 0.5m, ~ 45% Vitrain, 55% Claro-Durain, Poorly Cleated, SAMPLE #1
33.22	34.39	Siltstone - Mudstone Interbedded, Dark Grey - Medium Grey, 75° Angle from C.A. X-Lamination, Convolute Bedding, Slickensides, ~ 70° from CA, Mudcrack Casts, Minor Worm Bore Holes, Load Casts, - Carbonaceous Plant Debris, Coaly Streaks Pyrite Veinlets, - Upper Contact Gradational from Coal to Mudstone, Lower Contact Gradational
34.39	38.06	Sandstone, Siltstone, Interbedded, Salt and Pepper, Fine Grained, Grades into a Muddy Siltstone Downward - Highly Calcareous, Minor Calcite Veinlets, Minor Pyrite Flakes, Micaceous, Carbonaceous Plant Debris - X-Lamination, Convolute Bedding, Slickensides at 60° to C.A. Load Casts, Worm Burrows.
38.06	38.78	Mudstone - Dark Grey - Planar Lamination, Load Casts - Carbonaceous Plant Debris, Coaly Streaks, Minor Pyrite Flakes
38.78	39.70	Coaly Mudstone - Dark Grey - Abundant Vitrain Near Upper Contact ~ 0.22m - Laminated Near Upper Contact, Grading to Massive W/Conchoidal Fracture Near Bottom Slickensides at 60° from C/A, Coaly Streaks - High Pyrite Content near Upper Contact Decreasing to Low
39.70	39.77	Mudstone, Siltstone, Interbedded - Medium Grey to Dark Grey - X-Laminated, Loadcasts, - Carbonaceous Plant Debris, Pyrite Flakes

HOLE# EMG-81-11 From 39.77 To 49.41

FROM	TO	DESCRIPTION
39.77	40.00	Mudstone, Dark Gray - Massive W/Coaly Streaks, Pyrite Flakes
40.00	40.68	Mudstone, Siltstone, Interlaminated, Coarsens Towards Bottom, Dark Gray to Medium Gray, Bedding has 75° Dip from C.A. - Laminated, Minor Convoluted Laminae, Load Casts - Slickensides ~ 80° From C.A. - Minor Coal Bands, May Show Movement, and Contains Abundant Pyrite - Carbonaceous Plant Debris, Pyrite Flakes Throughout
40.68	40.91	Sandstone, Siltstone - Interlaminated, Dark Gray and Salt and Pepper, - Convoluted Bedding, X-Lamination, Slickensides ~ 70° From C.A. - Carbonaceous Material
40.91	42.23	Mudstone, Dark Gray - Laminated, Contains Some Minor Interlaminations of Siltstone (Medium Gray) - Slickensides ~70° From C.A. - Minor Carbonaceous Plant Debris, Coaly Streaks Minor Pyrite Flakes
42.23	42.60	Mudstone, Siltstone, Interbedded, Medium Gray - Laminated, Slickensides Zone 42.47-42.55 @ 75° to C/ Carbonaceous Plant Debris, Coaly Streaks
42.60	44.95	Siltstone - Medium Gray - Laminated - Carbonaceous Plant Debris, Coaly Streaks, calcareous W/Minor Calcite Veinlets - Increasing to Muddy Siltstone Towards Bottom.
44.95	46.42	Siltstone - Medium Gray - Laminated, Minor X Laminations - Minor Carbonaceous Plant Debris, Calcareous cement
46.42	49.41	Siltstone With Sandstone and Mudstone Laminations and Beds, Medium Gray - Planar Laminated, Minor X Bedding, Convoluted Bedding in Sandstone/Siltstone, Increasing Mudstone near Bottom, Load Casts - Slickenside zone 46.42 - 46.54m ~ @ 75° to C/A, Abundant Coaly Streaks near Upper Contact, Pyrite Throughout, Calcite stringers, Minor Carbonaceous Plant Debris

HOLE# EMG-81-11From 49.41 To 56.00

FROM	TO	DESCRIPTION
		Slickensides at 49.32m @ 70° to C.A.
49.41	50.44	Sandstone, Salt and Pepper, Fine Grained, Increasing In Silt Content Downwards
		X-Bedding
		- Abundant Carbonaceous Plant Debris, Minor Coaly Streaks
		Minor Calcareous Cement, Minor Mica Flakes
50.44	51.39	Mudstone - Medium Grey to Dark Grey, Contains Minor Sandstone Laminae and Minor Siltstone Laminae and Beds
		- X-Laminations, Load Casts, Minor Flame Structures, Minor Small Rip-Up Clasts
		Minor Carbonaceous Plant Debris, Minor Dolomitic Stringers
51.39	51.70	Mudstone, Sandstone Interbedded to Interlaminated, Salt and Pepper to Dark Grey
		Sandstone, Fine Grained, Predominant Sandstone at Upper Contact, Predominant Mudstone at Lower Contact
		X-Bedded, Bedding angle 70° to C/A, Minor Worm Burrows Holes, Load Casts
		Slickensides at 51.63m angle 67° to C/A
		Minor Carbonaceous Plant Debris Found Near Lower Contact
51.70	52.31	Coal - 0.6m, Cleated, ~ 30% Vitrain ~ 60% Clarain ~ 10% Durain
		- Very Abundant Slickensides, Minor Pyrite
		Sample # 2
52.31	52.42	Mudstone, Dark Grey
		Minor Laminations, Coaly Streaks
		Carbonaceous Plant Debris
52.42	55.56	Sandstone, Salt and Pepper, Fine Grained, to Medium Grained, Minor Mudstone Laminations Near Upper Contact
		X-Laminated, Minor Fractures With Medium to Coarse Grained Quartz Crystals on Fracture Surfaces
		Carbonaceous Plant Debris, Pyrite on Slickensides Surface - Slickensides Zone 55.04 to 55.31 angle 60° to C/A
		Grades Into a Siltstone at Lower Contact
55.56	56.00	Silty Mudstone, Dark Grey, 2cm Bed of Fissile Mudstone at 55.72 - Bedding @ 60° to C/A, Minor Ripple Marks
		Minor Load Casts, Carbonaceous Plant Debris

HOLE# EMG-81-11From 56.00 To 61.84

FROM	TO	DESCRIPTION
56.00	56.10	Coal - 0.10m, Black, Cleated ~ 90% Vitrain ~ 10% Claro Durain Slickensides at Lower Contact Angle 70° to C/A
56.10	56.32	Mudstone, Dark Grey Abundant Carbonaceous, Plant Debris, Coaly Streaks, Slickensides at 56.20 Angle 60° to C/A
56.32	56.43	Coal - 0.11m, Black, Cleated Thin Laminations of Mudstone at Upper Contact ~ 50% Vitrain ~ 50% Claro-Durain Slickensides Throughout
56.43	57.00	Mudstone, Grades to Silty Mudstone Downward, Medium Dark Grey - Carbonaceous Plant Debris, Minor Pyrite
57.00	57.95	Sandstone, With Minor Mudstone and Siltstone Laminations, Salt and Pepper, Fine Grained Bedding Angle 55° to C/A, Minor Convoluted Bedding, Minor Worm Burrows, Load Casts, Minor Graded Bedding - Carbonaceous Plant Debris, Minor Calcite Stringers Near Basal Contact
57.95	59.49	Sandstone, Salt & Pepper Fine Grained to Medium Grained - Minor Siltstone Laminations - X Bedding, Minor Convoluted Bedding - Minor Carbonaceous Plant Debris, Calcite Stringers - Mudstone Laminations Near Basal Content - Slickensides Zone 59.19 to 59.49 Angle ~ 60° to C/A
59.49	60.39	Siltstone - Light Grey - Medium Grey, Minor Sandstone Lamination + Increasing Mudstone Laminations Downwards - Worm Burrows, Minor Convoluted Bedding Bedding Angle 55° to C/A Minor Carbonaceous Debris
60.39	61.53	Mudstone, Dark Grey with Minor Siltstone Laminations Minor Convoluted Bedding Very Minor Carbonaceous Debris Increasing Downwards
61.53	61.84	Mudstone, Dark Grey Brown, Coaly Near Upper Contact Slickensides Zone Coaly Streaks, Minor Coal Laminations Minor Pyrite, Carbonaceous Plant Debris

HOLE#

EMG-81-11

From

61.84

To

70.00

FROM	TO	DESCRIPTION
61.84	64.00	Sandstone With Laminae of Siltstone and Mudstone, Salt and Pepper, Fine Grained to Medium Grained - Minor Convolute Bedding, Worm Burrows, Minor Load Casts, Bedding Angle 50° to C/A Slickensides at 62.07, 62.41, 62.62, 62.71, 62.96, 63.32 Angle ~ 55° to C/A - Carbonaceous Plant Debris, Minor Coal Streaks, Calcite Stringers; Minor Calcite Veinlets <0.7cm
64.00	64.80	Muddy Siltstone, Medium Grey to Dark Grey Minor Convolute Laminae, Minor Worm Burrows Loadcasts, Bedding Angle 50° to C/A Carbonaceous Plant Debris, Coal Streaks, Minor Pyrite Flakes Near Lower Contact on Slickensides and in Core
64.80	66.98	Mudstone, Dark Grey to Black, Minor Siltstone Laminae Near Lower Contact Slickensides at 65.55m (no <) and 66.35 Angle 55° to C/A Minor Carbonaceous Plant Debris, Minor Calcite Stringers
66.98	69.56	Silty Mudstone, Medium Grey to Dark Grey, Minor Siltstone Laminations with Increasing Mud Content Downwards, Load Casts, Minor X-Laminations, Minor Flame Structures, Slickensides at 67.16, 67.80, 68.04, 69.20, 69.39 Angle ~ 55° to C/A Minor Carbonaceous Plant Debris
69.56	69.63	Coal 0.07m Black, Poorly Cleated, Minor Pyrite, ~ 60% Vitrain ~ 40% Claro Durain, Pyrite Probably Due to Slickensides Slickensides on Upper Contact and Perhaps in middle of Band
69.63	69.74	Mudstone, Dark Grey Carbonaceous Plant Debris, Pyrite Replaced Plant Debris, Coaly Streaks
69.74	70.00	Coal - 0.26m Black, Bright at top Becoming Duller Toward Base, Abundant Vitrain at Top to Good Cleat, Poorly Cleated Claro-Durain @ Base with Minor Vitrain Bands 60% Vitrain, 25% Claro-Durain 5% Fusain-Minor MS Splits less than 0.01m in Thickness From Middle to Base of Seam. SAMPLE #3

HOLE# EMG-81-11From 70.00m To 75.29m

FROM	TO	DESCRIPTION
70.00	70.20	Mudstone, Dark Grey, Abundant Plant Debris Much of Plant Debris is Pyritized - Disseminated Pyrite Throughout Section - Minor Light Grey Siltstone Laminae - Bedding Angle 60° to C/A
70.20	71.05	COAL - 0.85m - 50% recovery - Black, Dull Banded, 90% Claro-Durain 10% Vitrain - Very Minor Fusain (< 1%), Minor Siltstone Splits <0.01m Thick - Poorly Cleated, Minor Slickensides @ Base of seam SAMPLE # 4
71.05	71.27	Mudstone, Black, Highly Carbonaceous, Abundant Plant Debris, Minor Slickensides with Pyrite Along Surfaces, Some of The Plant Debris is Pyritized.
71.27	71.30	COAL - 0.03m - Black, Bright, 90% Vitrain 10% Claro-Durain Well Cleated
71.30	72.38	Mudstone and Siltstone, Interlaminated, Approximately Evenly Distributed, Mudstone is Dark Grey, Siltstone is Medium to Light Grey - Minor Very Fine Grained, Light Grey, Sandstone Lenses and Laminae, Abundant Plant Debris Which is Pyritized in Places, Minor Slickensides @ 50% to C/A Throughout Section Bedding Angle 55° to C/A
72.38	73.04	Siltstone, Muddy, Dark Medium Grey, Minor Very Fine Grained, Sandstone Laminae, l, Bedding Sandstone, Fine Grained and Mudstone @ 72.88m to 72.91m - Minor Plant Debris Toward Base
73.04	74.04	Siltstone and Sandstone, Interbedded, Siltstone is Medium Grey and Predominant Sandstone is Fine Grained with Convolute Bedding and is Finely Laminae, Minor Mudstone Laminae from 73.20m to 73.25m with Minor Plant Debris, Calcite Veinlet @ 73.34m - Minor Plant Debris Throughout Section, Slickensides @ 50% to C/A Throughout Section - Bedding Angle 55° to C/A
74.04	75.29	Mudstone, Dark Grey, Slightly Silty, Minor Plant Debris

HOLE# EMG-81-11From 79.46m To 86.65m

FROM	TO	DESCRIPTION
79.46	79.73	Sandstone, Fine Grained, Salt and Pepper to Light Grey, Finely Laminated X Bedding, Minor Dark Grey Mudstone Laminae, Convoluted Bedding, Minor Worm Burrows in Muddy Sections, @ 79.62m Calcite Veinlet, Vuggy, Coarsely Crystalline Minor Calcite Stringers Throughout Section
79.73	80.88	Sandstone and Silty Mudstone - Interlaminae, Sandstone is Salt and Pepper to Light Grey, Fine Grained, with Minor X Bedding, Mudstone is medium Grey to Dark Medium Grey, Abundant Slickensides Along Bedding Planes @ 30° to C/A, Abundant Worm Burrows, Convoluted Bedding, Minor Calcite Stringers Throughout, Abundant Pyrite on Slip Surfaces
80.88	81.38	Fault Gouge, Highly Ground Mudstone and Siltstone, No Orientations Possible.
81.38	81.85	Siltstone and Sandstone, Interlaminae to Mixed, Siltstone Predominant and Slightly Muddy and Dark Medium Grey, Sandstone Fine Grained and Salt & Pepper Convoluted Bedding, Abundant Coal Streaks, Abundant Slickensides @ 35° to C/A
81.85	81.92	Muddy Coal - 0.07m, Black, Highly Sheared, Abundant Vitrain, Abundant Slickenside with Pyrite
81.92	82.41	Muddy Siltstone, Dark Medium Grey, Abundant Coal Streaks, Abundant Plant Debris, Abundant Slickensides @ 40° to C/A, Abundant Pyrite Along Slip Surfaces, Sandstone Becoming Abundant Toward Base as Mixture and Laminae Within Siltstones, Sandstones Fine Grained and Salt and Pepper
82.41	86.65	Sandstone, Fine Grained to Medium Grained, Salt and Pepper, Laminae, X Bedding, Minor Carbonaceous Mudstone Laminae, Coarsens Toward Middle of Section - Bedding Angle 35° to C/A at 82.69m, Abundant Calcite Veinlets and Stringers Throughout Section @ ~ 70° to C/A (Across Bedding), Abundant Slickensides with Pyrite Throughout Section 83.83 to 83.96m have Ground Sandstone with Abundant Calcite and Poor Recovery (fault zone?) Bedding Angle 30° to C/A @ 86.65m

HOLE*

EMG-81-11

From 86.65m To 90.85m

FROM	TO	DESCRIPTION
86.65	87.79	Sandstone and Muddy Siltstone, Interlaminae, Sandstone is Fine Grained, Salt and Pepper, X Bedding, Grade Bedding, and is predominant, Muddy Siltstone is Dark Medium Grey with Minor Plant Debris, Minor Coaly Streaks, Abundant Worm Burrows, Convoluted Bedding Toward Base, Abundant Calcite Veinlets and Stringers Throughout Section - Major Veinlets are Along Bedding, Bedding Angle 45° to C/A
87.79	88.70	Sandstone and Mudstone - Interlaminated to Mixed, Mudstone Dark Grey and Silty, Sandstone Fine Grained, Salt and Pepper to Light Medium Grey, Minor Plant Debris from 88.00m to 88.15m Highly Broken and Ground Rock Fault Zone ? Abundant Calcite Stringers from 88.15m to 88.21m - from 88.42m to 88.70m (?) Broken and Ground Rock Fault Zone ? - Minor Worm Burrows Toward Base of Section - Minor X Bedding
88.70	89.19	Silty Mudstone, Dark Medium Grey, Higher Silty Content @ Top of Section, Abundant Slickensides @ 30° to C/A (avg.) - Bedding Angle 40° to C/A
89.19	89.50	Sandstone and Mudstone, Interlaminated, Sandstone Salt and Pepper, Fine Grained and Predominant @ Top of Section, Mudstone is Dark Grey to Dark Medium Grey, Silty and Increasing Toward Base, Abundant Worm Burrows, Convoluted Bedding, Very Carbonaceous Toward Base, Coaly Streaks @ Base
89.50	90.45	COAL - 0.95m Black, Dull Banded, Abundant Claro-Durain, Highly Sheared so Very Difficult to See Internal Structures - Abundant Slickensides - Minor Vitrain, no Visible Fusain - 68% Recovery SAMPLE # 5 No Visible Cleat
90.45	90.69	Mudstone, Dark Grey, Highly Carbonaceous, Abundant Plant Debris, Minor Coal Streaks, Abundant Slickensides
90.69	90.85	Silty Mudstone, Dark Grey to Dark Medium Grey, Abundant Plant Debris - Minor Slickensides, Silt Content Highest at Top of Section.

HOLE# EMG-81-11From 90.85m To 99.78m

FROM	TO	DESCRIPTION
90.85	91.54	Sandstone and Siltstone, Interlaminated to Interbedded, Sandstone is Fine Grained, Salt and Pepper, Finely Laminated - Siltstone is Medium Grey, Minor Convoluted Bedding, Minor Plant Debris, Bedding Angle 40° to C/A, Minor Slickensides, Minor Calcite Stringers Throughout Section
91.54	94.95	Sandstone, Fine Grained, Salt and Pepper, Finely Laminated, X Bedding, Minor Convoluted Bedding, Minor Carbonaceous Mudstone Laminated, Abundant Calcite Stringers Throughout Section - Minor Plant Debris with i Mudstone Laminated, Calcite Veinlet with Breccia @ 94.00m Angle 40° to C/A, Bedding Angle 40° to C/A @ 93.50m contact with Underlying Unit Gradational - Unit Contains Minor Siltstone Laminated, Medium Grey, Toward Base
94.95	96.07	Siltstone, Mudstone and Sandstone - Interlaminated to Interbedded - Siltstone Medium Grey - Mudstone Dark Grey with Carbonaceous Plant Debris - Sandstone Fine Grained and Salt and Pepper - Minor X Bedding - @ 95.05m a Calcite Veinlet with Breccia Frags. ~ 0.01m Thick - Minor Slickensides Throughout, Mudstone Content Increasing Toward Base of Section Until Predominate @ Base.
96.07	96.62	COAL - 0.55m Black, Highly Broken and Sheared With Abundant Slickensides - 67% Recovery, Minor Mudstone Split (0.02m Thick) within Seam But Recovery Too Poor to Place it Exactly in the Seam - Abundant Vitrain SAMPLE #6
96.62	96.89	Siltstone - Medium Grey, Abundant Plant Debris
96.89	99.78	Sandstone, Fine Grained to Medium Grained, Salt and Pepper, Finely Laminated Medium Grained, Right @ Top of Section, Fine Grained for Majority, X Bedding, Minor Mudstone and Siltstone Laminated Toward Base of Section, These Laminated Contain Minor Worm Burrows and Minor Coaly Streaks, Calcite Stringers Throughout Section - Calcite Veinlet @ 97.90 with VUGs < 0.01m Thick @ ~ 80° to C/A - Abrupt contact with Underlying Unit

HOLE# EMG-81-11From 99.78m To 108.05m

FROM	TO	DESCRIPTION
99.78	103.19	Muddy Siltstone with Silty Sandstone, Interbedded and Interlaminated Muddy Siltstone - Dark grey, Silty Sandstone Salt and Pepper, Fine Grained, Convoluted Bedding, X Laminated, Minor Load Casts, Abundant Worm Burrows Calcite Stringers (More Abundant around Slip Faults). - Slickensides Throughout, Minor Faults Very Abundant 100.44 to Lower Contact, Displacement of 1.5cm at 101.0 Bedding Angle 43° to C/A
103.19	104.20	Mudstone, Dark Grey, Slightly Silty Minor Carbonaceous Plant Debris, Minor Coaly Streaks Minor Slickensides
104.20	104.46	Coal 0.26m Black, Poorly Cleated ~ 85% Recovery, Lower Portion is Sheared, ~ 70% Vitrain ~ 30% Claro-durain, Sharp Lower Contact SAMPLE #7
104.46	104.63	Siltstone, Medium Grey, with Minor Mudstone Laminations Convoluted Bedding, Minor Pyrite, Minor Coaly Streaks
104.63	105.16	COAL - 0.53m, Black-Brown Grades from a Muddy Coal to a Coal; the Top 28cm is Very Hard and Dense, Lower 25 cm Highly Broken ~ 59% Recovery in this Section - No Visible Cleat, Minor Pyrite, Slickensides ~ 20% Vitrain, ~ 75% Claro-durain ~ 5% Mudstone SAMPLE # 8
105.16	106.59	Siltstone, Mudstone, Interlaminated, Mudstone, Dark Grey Siltstone Medium Grey, also Contains Very Minor Sandstone Laminae, Dolomite Stringers - Convoluted Bedding, Minor Faulting, Slickensides Throughout and from 31° to 37° to C/A. Minor Calcite Crystals on Slickensides
106.59	107.05	Silty Mudstone and Gouge Fault Zone Recovery ~ 41%, Abundant Calcite Crystals Throughout Very Broken Up, Slickensides
107.05	108.05	Sandstone, Salt and Pepper, Grades from Silty Sandstone Downwards to Medium Grained, - Contains Minor Siltstone and Mudstone Laminations, - Convoluted Bedding, Minor X Bedding, Minor Slickensides Throughout and Angle 43° to C/A, Calcite Stringers, Vuggy Calcite Veinlet at 107.38m @ 47° to C/A

HOLE#

EMG-81-11

From 108.05m To 120.42

FROM	TO	DESCRIPTION
108.05	113.25	Sandstone, Salt and Pepper, Medium Grained to Coarse Grained, Clean, Muscovite on Bedding Surfaces, Calcite Stringers and Minor Vuggy Calcite Veinlets, Minor Carbonaceous Debris, Very Minor Coal Streaks, Minor Mud Clasts, X Bedding, Minor Faults and Slickensides incr. After 111.52m Downwards, Slickenside at 112.01m c 56° from C/A, angle at 112.81m of 37° from C/A Possible Fault Between 112.15m to 112.47m, Broken Rock and Recovery of 47%, Slickensides Zone, Sandstone is Siltier
113.25	115.03	Siltstone, Light Grey to Medium Grey, Sandy near Upper Contact Becoming Muddy Near Lower Contact. - Abundant Minor Faults from 113.25 to 113.85m - Calcite Stringers, Calcite Druse on Slickenside Surfaces, Worm Burrows, - Convoluted Laminations, Minor Loadcasts, Minor Flame Structures - Slickensides at 114.00m @ 55° to C/A, at 114.84m, angle 45° to C/A
115.03	116.76	Mudstone, Silty Near Upper Contact and Decreasing Siltiness Downwards, Medium Grey to Dark Grey, Minor Siltstone Laminations, Minor Convoluted Laminae, Bedding angle 42° to C/A - Minor Slickensides ie at 115.62m angle 29° to C/A at 115.83m angle 39° to C/A - 20cm, Core Loss at 116.48 to 116.68
116.76	116.82	Sandstone, Mudstone, Siltstone, Interlaminated, Mudstone, Dark Grey, Siltstone Medium Grey Sandstone, Salt and Pepper, Fine Grained Load Casts, Worm Bore Holes
116.82	116.97	COAL 0.15m, Black, Poorly Cleated ~ 90% Vitrain ~ 10% Clair-durain
116.97	118.96	Coal Mudstone, Dark Grey, Increasing Mud Content Downwards Recovery ~ 72%, Highly Broken, Slickensides Throughout, Coal Streaks,
118.96	120.42	Siltstone with Minor Mudstone and Sandstone Laminae, Salt and Pepper to Medium Grey, Sandstone, Fine Grained Salt and Pepper, Convoluted Bedding, Minor X Laminae,

HOLE# EMG-81-11From 120.42 To 129.48

FROM	TO	DESCRIPTION
118.96	Cont'd	Minor Faulting, Load Casts, Worm Burrows...
		Carbonaceous Plant Debris, Calcite Stringers,
		Slickensides at 119.05 angle 42° to C/A, 119.22m,
		119.54m, 119.59m, 119.65m, @ 10° to C/A, 119.81,
		119.91, 11 99, 120.16m
		Calcite on Slickenside Surfaces
120.42	125.12	Sandstone, Siltstone, Mudstone, Equal Proportions
		Grading from Sandstone to Mudstone Downwards
		Sandstone, Salt & pepper, Fine Grained, Laminated, Calcite
		Stringers, Carbonaceous Plant Debris, Minor X
		Laminations, Minor Slickensides
		Siltstone, Salt and Pepper to Medium Grey, Laminated,
		Minor X Laminated, Convoluted Bedding, Carbonaceous
		Plant Debris, Minor Faulting, Bedding angle 50° to C/A
		- Calcite Stringers, Slickensides at Average of 50° to
		C/A, Mudstone, Dark Grey, Abundant Slickensides
		Throughout and from 30° to 40° to C/A, Calcite
		Stringers in Upper Part of Mudstone Decreasing
		Downwards, Calcite Veinlet at 122.40m angle 30° to C/A
		on Slickenside Surface
125.12	125.25	Muddy Siltstone, Medium Grey to Dark Grey
		Minor Coaly Streaks
125.25	126.66	Sandstone, Salt and Pepper, Fine Grained to Medium
		Grained, Minor Siltstone and Mudstone Laminae,
		Convoluted Laminae, Worm Bore Holes, Planar Laminae,
		Minor Carbonaceous Debris, Minor Coaly Streaks, Minor
		Calcite Stringers, Slickensides Zone From 126.46 to
		126.66m
126.66	127.98	Silty Mudstone, Dark Grey, Contains Minor X Laminations
		of Siltstone Near Upper Contact, Minor Carbonaceous,
		Plant Debris, Slightly Siltier at Lower Contact,
		Sharp Lower Contact,
127.98	128.55	Mudstone, Dark Grey, Minor Small Pyrite Replaced Shells
128.55	128.72	COAL - 0.17m, Black, Poorly Cleated ~ 15% Claro-
		Durain ~ 85% vitrain
128.72	129.48	Sandstone, Siltstone, Muddy Siltstone

HOLE# EMG-81-11From 129.48To 138.50

FROM	TO	DESCRIPTION
128.72	Cont'd	Dark Grey, Closest to Upper Contact, Grading to Interlaminated, Siltstone, Sandstone, Abundant Carbonaceous Plant Debris, Coaly Streaks, Sandstone, Salt and Pepper, Fine Grained, Convoluted Bedding, Minor X Laminae, Minor Carbonaceous Plant Debris, Siltstone, Medium Grey, Interlaminated with Sandstone Increasing Downwards to Lower Contact
129.48	130.95	Mudstone, Medium Grey to Dark Grey, Minor Siltstone Increasing Downwards, Minor Carbonaceous Plant Debris, Very Minor Coaly Streaks, Slickensides 130.34m Angle 40° to C/A
130.95	133.53	Sandstone, Salt and Pepper, Medium Grained to Fine Grained, Minor Mudstone Laminations Increasing Downwards X-Bedding, Bedding on Mudstone ~ 50° to C/A Calcite Stringers, Very Minor Carbonaceous Plant Debris Slickensides Along Mudstone Laminations
133.53	135.21	Muddy Siltstone with Increasing mud content Downwards Light Grey to Medium Grey to Dark Grey, Minor Sandstone Minor X-Laminae, Load Casts, Planar Laminae, Laminae Minor Convoluted Bedding, Worm Burrows, Very Minor Carbonaceous Plant Debris, Slickensides at 134.32 and 134.43m Angle 55° to C/A
135.21	135.24	Mudstone, Dark Grey, Minor Plant Debris
135.24	135.57	COAL - 0.33m, Black, Very Poorly Cleated ~ 60% Vitrain, ~ 35% Claro-durain, ~ 5% Fusain Mud Chip at 135.36m, Minor Fusain Inclusions Throughout Slickensides. SAMPLE #9
135.57	135.59	Silty Mudstone, Dark Grey, Coaly Streaks
135.59	135.68	COAL - 0.09m, Black, Vitrain Laminae ~ 60% Vitrain, ~ 40% Clair-Durain, Sheared, Minor Cleating SAMPLE #9 - 135.24 to 135.68
135.68	138.50	Sandstone, Siltstone, Grades to Siltstone Downwards, Sandstone, Salt and Pepper, Medium Grained to Fine Grained, Medium grained in centre of section, X Bedding, Planar Laminae, Minor Carbonaceous Debris, Calcite on Fracture Surfaces

HOLE# EMG-81-11From 138.50 To 149.15

FROM	TO	DESCRIPTION
135.68	Cont'd	Coaly Streaks at Very Top of Section, Abundant Slickensides Angle 40° to C/A
		From 135.68 to 135.98m Decreasing Amount Downwards
		Siltstone, Light Grey to Medium Grey, With Minor Sandstone Laminae
		Convoluted Bedding, X-Laminae, Increasing in Fracture Occurrence, Calcite Stringers Along Fracture Surface, Slickensides Increase to base ~ Angle 55° to C/A
		Bedding at 138.03 - Angle 60° to C/A
138.50	139.32	Muddy Siltstone, Medium Grey, with Minor Mudstone Laminae, Minor Convoluted Bedding
		- Highly Fractured, Calcite in Fractures
		- Slickensides Throughout at 138.65 Slickenside Angle 52° to C/A
		- Quartz Crystals, Coarse Grained at 139.10m
		- Broken Rock in Lowest 21cm
		- Sharp Lower Contact
139.32	140.50	Sandstone, Salt and Pepper, Fine Grained, Minor X-Lamination, Minor Convoluted Bedding
		- Increasing Amount of Calcite Stringers Downward to 140.20m - Minor Calcite 140.20-140.50m
		- Calcite up to 0.4cm Along Fractures from 139.70 to 140.20m
		- Minor Carbonaceous Plant Debris, Probable Worm Borrow Near Lower Contact
		- Slickensides at 139.45m, 140.27, 140.37m angle at 60° to C/A
140.50	141.02	Mudstone, Dark Grey, Minor Silt Near Upper Contact
		- Slickenside Zone from 140.84 to 140.93m: angle at 140.84 ~ 55° to C/A, at 140.93m, Angle 25° to C/A
		- Minor Carbonaceous Plant Debris, Minor Coaly Streaks in Slickenside Zone
141.02	149.14	Siltstone, Sandstone, Mudstone, Gradational Throughout Section, Becoming Mudstone at Bottom of Section
		Siltstone, Light Grey to Medium Grey
		Sandstone, Salt and Pepper, Fine Grained, Near Upper Part of Section and in centre

HOLE# EMG-81-11 From 149.14 To 152.97

FROM	TO	DESCRIPTION
141.02	Cont'd	Mudstone, Dark Grey, Grades from Silty Mudstone to Mudstone Downwards - Convoluted Bedding and Laminae, Minor X-Lamination, Minor Loadcasts in Mudstone, Worm Burrows in Lower Section
		Minor Fracture Throughout Section, Minor Coal Streaks in Sandstone, Minor Carbonaceous Plant Debris, Coal Band ~ 0.5cm, Vitrain at 141.40m and 141.47m
		Calcite Stringers Throughout Section, Brecciated Rock Filled with Calcite at 142.66m
		- Calcite Veinlet at 142.38m ~ 0.9cm, Vuggy
		- Quartz Veinlet at 146.56 ~ 1.0cm Well-Formed Crystals ~ .5cm - Slickensides at 141.07, 141.20, 141.31
		Angle 26° to C/A, Zone From 141.58 to 141.73 cm, 141.86, 141.12, 144.17, 144.31 Angle 16° to C/A, 144.52, 144.93, 145.32, 145.55, 146.80, 146.94, 146.14, angle 22° to C/A, 146.32, 146.50, 147.18 angle 50° to C/A, 147.26, 147.37, 147.87, 148.13, 148.24m, 148.34m, 148.54, 148.84 angle 5 to C/A
149.14	149.19	COAL - 0.05m, Black, Poorly Cleated, Vitrain Bands ~ 50% Vitrain ~ 50% Claro-Durain
149.19	151.73	Mudstone, Siltstone, Interlaminated, Muddier at Upper and Lower Contact, Siltier in Centre, Minor Fine Grained Sandstone Laminae, Mudstone, Medium Grey to Dark Grey, Section Closest to Upper Contact has Abundant Coal Streaks, Carbonaceous Plant Debris
		Siltstone, Light Grey to Medium Grey, Minor Coal Streaks, Carbonaceous Plant Debris
		- Minor Convoluted Bedding, Minor Graded Bedding, Minor Coal Streaks, Minor X-Lamination, Slickensides Throughout ~ Angle 60° to C/A
		Bedding Angle at 150.55 is 55° to C/A, at 150.30 is 55°
		- Calcite Stringers Close to 150.55m to C/A
151.73	152.97	COAL - 1.24m - Black - Bright - Poorly Cleated ~ 35% Vitrain ~ 15% Clair-Durain
		Minor Slickensides Throughout SAMPLE #10
		Recovery ~ 53% 0.6m Core Loss

HOLE# EMG-81-11 From 152.97 To 160.63

FROM	TO	DESCRIPTION
152.97	154.72	Siltstone, Mudstone, Sandstone, Interlaminated with Minor Beds of Sandstone
		Siltstone, Light Grey to Medium Grey
		Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Mudstone, Medium Grey to Dark Grey
		- Minor X-Lamination, convoluted Bedding, Minor Load Cas
		- Carbonaceous Plant Debris, Calcite Stringers in Upper Part of Section, Coaly Streaks Throughout,
		- Minor Slickensides 153.78m @ 63° to C/A
		Bedding Angle at 153.75 is 67° to C/A, Bedding Angle at 70° to C/A 154.57 is
154.72	155.42	COAL - 0.7m - Black - Core Loss ~ 0.21m - 70% Recovery
		- Parts Highly Broken, All is Sheared and Shows Slickensides, Has Vitrain Bands
		- Contains a Minor Mudstone Splint ~ 0.02 m Thick But Recovery Too Poor to Place it Exactly in Seam
		- Minor Fusain ~ 50% Vitrain ~ < 50% Clair-Durain, Very Poor Cleating SAMPLE #11
155.42	156.82	Silty Mudstone, Medium Grained to Dark Grey, With Minor Sandstone Laminae, Sandstone, Salt and Pepper, Fine Grained, - Coaly Near Upper Contact, Coaly Streaks Throughout - Minor Convoluted Laminae in Sandstone
		- Minor Carbonaceous Debris, Minor Slickensides ie. ~ at 156.70 angle 55° to C/A, Core Loss 0.8m - 58% Recovery
156.82	160.45	Siltstone, Mudstone, Siltstone Grading Downwards to Mudstone, Sandstone Beds in Upper Section
		Siltstone, Light Grey to Medium Grey
		Mudstone, Medium Grey to Dark Grey
		Sandstone, Salt and Pepper, Fine Grained to Medium Grained
		- Convoluted Bedding, X-Lamination, Ripple Marks, Worm Burrows, Minor Flame Structure
		- Minor Slickensides ie angle at 158.38 is 57° to C/A
		- Carbonaceous Plant Debris, Minor Oxidized Pyrite?
160.45	160.63	COAL - 0.18m, Black, Bright, Highly Sheared Abundant Vitrain, Minor Fusain, Vitrain Laminae, SAMPLE # 12

FROM	TO	DESCRIPTION
160.63	160.66	Mudstone Splint, Medium Grev to Dark Grev, Abundant Pyrite Nodules
160.66	161.16	COAL - 0.53m Black, Bright Core Loss 0.15m ~ Recovery - 73% Highly Sheared and Very Broken - Difficult to See Internal Structure - Some Lamination of Fusain and Abundant Vitrain, SAMPLE #12, 160.45 to 161.16m Vitrain
161.16	161.90	Siltstone, Medium Grey to Dark Grey, Minor Fine Grained Sandstone Laminae - Convoluted Bedding, Coaly Streaks, Carbonaceous Plant Debris, Minor Worm Bore Holes Slickensides at 161.40m Angle 65° to C/A
161.90	163.60	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, with Minor Siltstone Laminae Increasing Siltstone Downwards X-Bedding, Minor Load Casts and Convoluted Bedding Near Upper Contact, Calcite Stringers, Minor Carbonaceous Debris, Slickensides Along Mudstone Siltstone Laminae ~ Angle 45° to C/A
163.60	164.84	Siltv Mudstone, Medium Grey to Dark Grey, with Siltstone Laminae, Minor X-Lamination, Bedding Angle at 163.64 i to C/A 42° Load casts, Carbonaceous Plant Debris - Slickensides Throughout ie 163.75 Angle 45° to C/A at 164.41 Angle 26° to C/A, 164.80 Angle 30° to C/A
164.84	166.08	Siltstone, Medium Grained, with Minor Fine Grained Sandstone Laminae, Convoluted Laminae, Minor Bed Displacement along Slickensides at 165.65 Angle 25° to C/A Calcite Stringers Throughout, Load Features, - Carbonaceous Plant Debris
166.08	168.96	Sandstone, Salt and Pepper, Fine Grained, Minor Siltstone Laminae - X-Bedding, Minor Load Casts and Plastic defin. - Calcite Stringers - Highly Fractured Zone at 166.67 to 166.73 - Minor Slickensides ie at 167.21 Angle 65° to C/A - Minor Worm Burrows

HOLE# FMG-81-11From 168.96 To 179.77

FROM	TO	DESCRIPTION
168.96	171.57	Siltstone, Sandstone, Interlaminated Sandstone, Salt and Pepper, Fine Grained Siltstone, Medium Grained - Small Scale Fractures and Slickensides Throughout ie Slickenside at 168.99 angle 45° to C/A, at 169.36m angle 32° to C/A, at 169.70m angle 20° to C/A at 170.33 angle 33° to C/A - Calcite Stringers in Fractures, Load Casts, Minor X Lamination, Minor Worm Bore Holes, Displacement Along Fractures
171.57	172.63	Silty Mudstone, Sandstone, Interlaminated Silty Mudstone, Medium Grey to Dark Grey Sandstone, Salt and Pepper, Very Fine Grained - Minor Ripple Marks, Load Casts, Minor X Lamination Bedding at 172.29m is 55° to C/A - Minor Carbonaceous Plant Debris, Worm Burrows - Slickensides Throughout ie at 171.73m angle 50° to C/ at 172.27m angle 40° to C/A
172.63	173.44	Mudstone, Dark Grey with Minor Siltstone Laminae - Minor X Laminae, Calcite on Slickenside Surface - Slickensides ie at 172.93 angle 55° to C/A at 173.38 angle 59° to C/A
173.44	173.94	Mudstone, Dark Grey with Minor Interbedded Sandstone Sandstone, Salt and Pepper, Medium Grained - Minor Load Structures, Minor Calcite Stringers in Sandstone, Mudstone, Friable in Places - Minor Slickensides with Calcite on Surface, Some Displacement
173.94	174.00	Mudstone, Dark Grey, Gouge, Abundant Slickensides
174.00	179.77	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Clean - X-Bedding, Minor Worm Burrows - Pressure Solution Along Bedding Planes and on Some Fracture Surfaces - Zeolites Along Fracture Surfaces - Minor Calcite Replacement Along Some Fractures

HOLE# EMG-81-11From 179.77 To 188.51

FROM	TO	DESCRIPTION
174.00	Cont'd	- Minor Slickensides, Minor Oxidized Pyrite, Minor Carbonaceous Debris, ~ 10cm Core Loss
179.77	179.92	Siltstone, Medium Grey with Minor Mudstone and Sandstone Lamination, Convoluted Bedding ? Highly Fractured, Abundant Slickensides ~ angle 10° to C/A - Minor Calcite Stringers
179.92	181.87	Silty Mudstone, Siltstone, Medium Dark Grey to Medium Grey, Gradational to Siltstone Downwards Calcite Stringers and Calcite along Slickensides Surfaces Sheared Zone from 180.35 to 180.75 Probable Core Loss of 25cm Here. - Slickensides Throughout, Minor Carbonaceous Plant Debris
181.87	185.22	Sandstone, Salt and Pepper, Fine Grained, Contains Minor Siltstone Laminae Near Bottom of Section - X-Bedding, Minor Convoluted Bedding, Minor Worm Burrows, Minor Carbonaceous Plant Debris - Slickensides Throughout - Very Minor Calcite Stringers, Calcite Veinlet at 184.68 ~ 0.3 cm Thick angle at < 60° to C/A ~ 10cm of Core Loss
185.22	187.16	Siltstone, Sandstone, Interlaminated Siltstone, Medium Grained Sandstone, Salt and Pepper to Light Grey X-Bedding, Minor Climbing Ripples, Minor Convoluted Bedding Minor Worm Burrows, Very Minor Carbonaceous Plant Debris - Load Casts, Slickensides Throughout Bedding at 186.46 angle 55° to C/A - Brecciated Rock with Calcite Cement at 186.56 - Calcite on Slickenside Surfaces
187.16	188.51	Mudstone, Siltstone, Sandstone Interlaminated with High Mud Content Increasing Downwards Mudstone, Dark Grey, Siltstone Light Grey to Medium Grey, Sandstone, Salt and Pepper, Fine Grained

HOLE#

EMG-81-11

From 188.51

To 193.77

FROM	TO	DESCRIPTION
187.16	Cont'd	- Abundant Worm Burrows, Minor Coaly Streaks Near Lower Contact Increasing Downwards
		- Carbonaceous Plant Debris, Slickensides Throughout
		- Planar Laminae with Minor Load Casts
		Bedding at 188.05 angle 55° to C/A
188.51	188.68	COAL - 0.17m, Black, Bright, Poorly Cleated
		- Minor Laminae of Fusain
		- Minor Laminae of Vitrain, Predominant ~ 90% Clair-Durain
		- Slickensides Throughout
188.68	188.80	Silty Mudstone, Dark Grey, Minor Siltstone Laminae
		- Carbonaceous Plant Debris
188.80	190.75	Siltstone, Mudstone, Sandstone, Interlaminated, Predominant Siltstone,
		Siltstone, Light Grey, Mudstone, Medium Grey to Dark Grey, Sandstone, Salt and Pepper, Fine Grained,
		- Load Structures, Minor X-Lamination, Worm Burrows, Bedding at 190.72 angle 65° to C/A
		Minor Convoluted Bedding, Minor Carbonaceous Plant Debris
190.75	191.84	Mudstone, Dark Grey, Increasing Siltiness Downwards
		- Carbonaceous Plant Debris
		191.06 to 191.21 - Highly Fractured Zone with Abundant Slickensides, Massive Pyrite Zone 0.02m Wide
		Core Loss 0.16m
191.84	192.75	Silty Sandstone, Light Grey to Medium Grey
		- Convoluted Bedding, Minor X-Lamination, Minor Load Casts
		- Worm Burrows, Carbonaceous Plant Debris
		- Fractured Zone with Calcite Cement and Medium Grained Crystals From 192.27 to 192.42m, Minor Slickensides
192.75	193.77	Siltstone, Medium Grey to Dark Medium Grey, Minor Sandstone Laminae, Slickensides Throughout, Worm Burrows, Load Casts, Minor Convoluted Laminae, Very Minor X-Lamination, Calcite Stringers, : 193.54
		Bedding angle 50° to C/A
		- Minor Carbonaceous Plant Debris

HOLE# EMG-81-11From 193.77 To 201.84

FROM	TO	DESCRIPTION
193.77	194.62	Sandstone, Salt and Pepper, Fine Grained, With Minor Siltstone Laminae
		Convolute Bedding, Minor X-Lamination, Worm Burrows, Carbonaceous Plant Debris, Slickensides Throughout, Calcite Stringers
		- Sheared Zone - at 194.04 to 194.16, Mudstone, Medium Grained, Slickensides
194.62	195.33	Siltstone, Medium Grey to Medium Dark Grey
		Convolute Bedding, Load Structures
		- Slickensides Throughout, Worm Burrows, Minor Carbonaceous Plant Debris, Calcite Stringers, Minor Oxidized Pyrite, at 194.77 Bedding Angle 50° to C/A
195.33	197.21	Sandstone, Salt and Pepper, Fine Grained
		- Minor Convolute Laminae, Slickensides, Minor Displacement, Calcite Stringers in Fractures and Along Slickensides
		- Carbonaceous Plant Debris, Minor Small Zeolites on Some Fracture Surfaces
197.21	197.76	Siltstone, Medium Grey to Dark Grey, with Minor Mudstone
		Convolute Bedding, Slickensides Throughout, Minor Load Structures, Calcite Veinlet at 197.62m
		Along Slickenside, Minor Carbonaceous Plant Debris
197.76	199.55	Sandstone, Salt and Pepper, Fine Grained to Medium Grained to Coarse Grained, Coarsening Downwards, X-Bedding, Slickensides Throughout, Calcite Stringers, Carbonaceous Plant Debris
199.55	201.18	Siltstone, Medium Dark Grey, Increasing Sandiness at Lower Contact, Highly Sheared at Upper Contact, Convolute Bedding Near Upper Contact, Minor Load Casts
		Calcite Stringers, Well Developed Quartz Crystals on some Slickenside Surfaces,
		- Slickensides Throughout, Gradational Lower Contact, Carbonaceous Plant Debris
		Core Loss of 0.25m, Probably at 199.64m
201.18	201.84	Silty Sandstone, Medium Grey, Increasing Sandiness Downwards, Minor X-Lamination, Minor Convolute Laminae
		Worm Burrows, Carbonaceous Plant Debris,

HOLE# EMG-81-11From 201.84 To 208.19

FROM	TO	DESCRIPTION
201.18	Cont'd	Slickensides Throughout ie 201.42m angle 70° to C/A Calcite on Slickenside Surfaces
201.84	204.40	Sandstone, Salt and Pepper, Fine Grained, Minor Siltstone Laminae Near Lower Contact Convoluted Bedding, Minor Load Structures Slickensides Throughout At 202.40m, Bedding @ 70° to C/A Carbonaceous Plant Debris Abundant Calcite Stringers Filling Fractures Increasing Downwards
204.40	205.55	Sandstone, Siltstone, Interlaminated, Sandstone, Salt and Pepper, Fine Grained, Siltstone, Medium Grey, Convoluted Bedding and Laminae, Load Structures, Minor Fractures with Some Laminae Displacement Minor Worm Burrows, Minor Carbonaceous Plant Debris Calcite Stringers Throughout
205.55	207.09	Sandstone, Salt and Pepper to Medium Grey, Fine Grained to Medium Grey, Increasing Grain Size Downwards, At 206.57, Coarse Grained Laminae Minor Load Structures, Minor Convoluted Laminae, Minor X-Lamination, Slickensides Throughout ie at 206.8: Slickensides @ 43° to C/A Minor Carbonaceous Plant Debris, Calcite and Minor Quartz Stringers Throughout
207.09	207.79	Sandstone, Siltstone, Interlaminated, Siltstone, Medium Grey, Slightly Muddy in Places, Sandstone, Salt and Pepper, Laminae are Fine Grained to Coarsly Grained, Sandstone Shows X-Lamination Minor Load Casts, Planar Laminae At 207.17m Bedding angle 38° to C/A Slickensides Throughout, Minor Calcite Found On Slickenside Surfaces
207.79	208.19	Sandstone, Salt and Pepper, Fine Grained to Coarsly Grained, Coarsening Downwards, Minor Mud Rip up Clasts near Lower Contact, X-Lamination, Slickensides Throughout, Minor Load Structures, Minor Calcite on

HOLE# EMG-81-11From 208.19 To 213.45

FROM	TO	DESCRIPTION
207.79	Cont'd	Slickenside Surfaces
208.19	209.43	Sandstone and Siltstone Interlaminated, Sandstone, Salt and Pepper, Fine Grained, Siltstone, Medium Dark Grey, Slightly Muddy in Places X-Laminated, Minor Load Casts, Minor Worm Burrows, at 208.76 Bedding angle 45° to C/A at 209.15m Bedding Angle 40° to C/A Slickensides Throughout, Calcite on Slickenside Surface Minor Calcite Stringers
209.43	209.57	Sandstone, Salt and Pepper, Coarsly Grained Slickensides Throughout at 209.54 Slickenside angle at to C/A, Fractured, Minor Calcite Stringers, Minor Zeolites on Fracture Surfaces
209.57	210.83	Sandstone, Muddy Siltstone, Interlaminated, Muddy Siltstone, Medium Grey to Dark Grey, Sandstone, Salt and Pepper, Fine Grained and Coarsly Grained, Coarse Grained Siltstone are Beds Load Structures, X-Laminated, Minor Convoluted Laminae, Slickensides Throughout, Minor Calcite Stringers, Minor Oxidized Pyrite From 210.12 to 210.83, Highly Fractured, Abundant Zeolites Along Fractures Rock Closest to Lower Contact Highly Broken, Fault Zone? At 209.89 Bedding angle 40° to C/A
210.83	211.48	Sandstone, Salt and Pepper to Medium Grey, Fine Grained with Minor Medium Grained Laminae Near Lower Contact X-Bedding, Climbing Ripples Slickensides Throughout, Minor Calcite Stringers Calcite along Slickenside Surfaces Minor Coaly Streaks Near Lower Contact Sharp Lower Contact
211.48	211.78	Muddy Siltstone, Medium to Dark Grey Minor Carbonaceous Plant Debris Slickenside at 211.70 Angle 35° to C/A
211.78	213.45	Sandstone, Muddy Siltstone, Interbedded and Inter-laminated

HOLE# EMG-81-11From 213.45 To 218.54

FROM	TO	DESCRIPTION
211.78	Cont'd	Sandstone, Salt and Pepper, Fine Grained to Coarsly Grained, X-Bedded
		Muddy Siltstone, Medium Grey to Dark Grey
		Convoluted Bedding, X-Laminae, Load Structures
		Worm Burrows, Carbonaceous Plant Debris, Minor Oxidized Pyrite
		Bedding at 212.95 angle 40° to C/A
213.45	214.05	COAL - 0.50m, Black, Core Loss 0.45m ~ 10% Recovery
		Highly Broken and Sheared
		Predominantly Clairo-durain
214.05	214.72	Siltstone, Medium Dark Grey with Minor Sandstone
		Carbonaceous Plant Debris, Minor Coaly Streaks Near Upper Contact
214.72	215.35	Silty Mudstone, Dark Grey
		Slickensides Throughout, Carbonaceous Plant Debris
		Minor Coaly Streaks, Core Loss ~ 5cm at Lower Contact
215.35	215.79	Siltstone, Medium to Dark Grey, Some Mud Content
		Carbonaceous Plant Debris, Coaly Streaks
215.79	217.22	Coaly Mudstone, Dark Grey to Black
		Broken, Slickensides Throughout
		- 65% Recovery, Core Loss 0.47cm
		Carbonaceous Plant Debris, Coaly Streaks
		Coal Bands < 0.01m
217.22	218.31	Sandstone, Siltstone, Interlaminae, Sandstone, Salt and Pepper, Fine Grained
		Siltstone, Medium Grey to Medium Dark Grey
		Convoluted Laminae, X-Laminated, minor load casts
		Worm Burrows, Carbonaceous Plant Debris, Minor Coaly Streaks, Minor Calcite Stringers
		Minor Slickensides
		At 218.18 Bedding, angle @ 65° to C/A
218.31	218.54	Muddy Siltstone to Silty Mudstone, Medium Grey to Dark Grey, Increasing Muddiness Downward, Minor X-Lamination, Worm Burrows, Carbonaceous Plant Debris, Minor Oxidized Pyrite
	T.D.	END OF HOLE
		218.54 Metres

D.D.H. EMG-81-12
WELL COMPLETION REPORT

Location: - On a newly constructed access road (by Utah Mines Ltd.) 1,025 metres from its junction with the Canfor Ltd. Elizabeth Creek Forest Haul Road.
- U.T.M. Coordinates: 6,210,643mN x 543,603mE
- Coal Licence No. 3515

Elevation: 769 metres

Orientation: Vertical

Date Collared: June 9, 1981

Date Completed: June 15, 1981 Plugged: Yes - Cemented

Overburden Depth: 37.40 metres

Casing Depth: 41.45 metres Casing Size: HW-11.4cm
(unrecovered)

Final Depth: 306.32 metres

Formations Encountered: 0 to 37.40m Overburden
37.40 to 306.32m Gething Formation

Core Description By: K. Foellmer

Coal Seams Sampled:

<u>Sample No.</u>	<u>Seam Name</u>	<u>Interval</u>	<u>Thickness</u>	
			<u>Core</u>	<u>Density Log</u>
13	Milligan	44.78m to 45.00m	0.22m	0.45m
14		57.00m to 57.25m	0.25m	0.40m
15	Louise	70.80m to 71.07m	0.27m	0.25m
16	Louise	71.45m to 71.85m	0.40m	0.70m
17		75.33m to 75.78m	0.45m	0.40m
18		82.59m to 82.89m	0.30m	0.40m
19		112.39m to 112.60m	0.22m	0.30m
20		124.47m to 127.70m	0.23m	0.40m
21		126.35m to 126.82m	0.47m	0.40m
22		131.65m to 132.20m	0.55m	0.60m
23		148.24m to 148.56m	0.32m	0.40m
24		204.22m to 204.68m	0.46m	0.50m
25		205.19m to 205.39m	0.20m	0.30m
26		211.36m to 211.57m	0.21m	0.30m
27		212.72m to 213.22m	0.50m	0.40m
28		221.45m to 221.80m	0.35m	0.40m
29		238.88m to 239.17m	0.29m	0.35m
30		252.41m to 252.66m	0.25m	0.65m
31	Riverside	266.86m to 267.15m	0.29m	0.70m
32	Riverside	267.20m to 267.58m	0.38m	
33		274.66m to 275.08m	0.41m	0.50m

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

- Comments:
- No resistivity log as resistivity module inoperative on probe.
 - Hole is flowing, water invasion at approximately 50.29 metres - stopped when hole cemented.
 - Unable to pull casing, so left in hole.

CORE DESCRIPTION

HOLE# E.M.G.-81-12 From 0.00m To 50.47m
 Area EAST MT. GETHING By K. Foellmer

FROM	TO	DESCRIPTION
0.00	41.45	OVERBURDEN
		<u>GETHING FORMATION</u>
41.45	44.46	SILTSTONE AND SANDSTONE INTERBEDDED SILTSTONE MEDIUM GREY, Most abundant top and bottom of unit, muddy towards base, minor plant debris. SANDSTONE is salt and pepper - fine to medium grained, cross bedded, load structures (minor), ripple marks, convoluted bedding - bedding angle to a 85° to C/A.
44.46	44.78	MUDSTONE AND SANDSTONE INTERLAMINATED Mudstone - minor plant debris, abundant worm burrows, dark medium grey. Sandstone - salt and pepper, very fine grained, occurs as laminae, minor convoluted bedding, sedimentary slump structures.
44.78	45.00	<u>COAL</u> - 0.22m Black Seam is oxidized, dull, banded, well cleated. 20% vitrain, 80% claro-durain, 100% recovery from 44.89m to 44.95m seam is muddy and highly oxidized to a reddish-orange colour. SAMPLE 13.
45.00	45.12	MUDSTONE - dark grey to black, abundant plant debris, minor coal bands.
45.12	50.17	SILTSTONE, MUDSTONE, SANDSTONE - interlaminated - more mudstone towards base, sandstone decreasing towards base. Siltstone medium to light grey, abundant plant debris, mudstone dark grey. Sandstone - fine grained, salt and pepper, minor convoluted bedding cross-bedded, minor plant rootlets minor worm burrows. Minor disseminated pyrite throughout section, abundant iron stain towards base bedding angle to at 87° to C/A.
50.17	50.47	<u>COAL</u> - 0.30m, ~ 20% recovery, 70% vitrain, 30% claro-durain, highly broken, minor fusain.

HOLE#

E.M.G. - 81-12

From 50.47m To 57.31m

FROM	TO	DESCRIPTION
50.47	51.60	SILTSTONE - siltstone muddy, medium grey, abundant plant debris. SANDSTONE in minor lenses, fine grained at top of unit; convoluted bedding (minor).
51.60	51.99	MUDSTONE, medium to dark grey, carbonaceous, abundant iron staining, coaly bands (minor).
51.99	52.86	SILTSTONE - muddy, medium grey, abundant plant debris, very minor calcite stringers, very minor worm burrows, minor coaly streaks.
52.86	53.64	SANDSTONE fine grained to medium grained salt and pepper graded bedding - coarsens towards base, well laminated top, poor lamination at base minor slickensides, minor carbonaceous mudstone laminae, minor coaly streaks.
53.64	54.89	MUDDY SILTSTONE, sandstone interlaminated, siltstone medium grey, sandstone very fine grained, occurs as lenses and thin laminates finely laminated, minor convoluted bedding, light grey - abundant plant debris, minor worm burrows calcite stringer at 54.26 \times 30° to C/A.
54.89	55.63	SANDSTONE - salt and pepper fine grained, abundant plant debris, minor coal streaks, minor siltstone laminae throughout.
55.63	57.00	SILTSTONE, SANDSTONE, MUDSTONE - interbedded, increasing mud at base, little at top of unit. SILTSTONE medium grey SANDSTONE - salt and pepper, fine grained MUDSTONE - dark grey Convoluted bedding, cross-bedding, numerous worm burrows minor plant debris, slumping (sedimentary), minor slickensides, bedding \times at 84° to C/A.
57.00	57.25	COAL - 0.25m black, dull banded, 90% claro-durain, 10% vitrain, moderately cleated, minor fusain. 1cm coaly mud at base SAMPLE 14.
57.25	57.31	MUDSTONE - dark grey, abundant plant debris, minor coal streaks.

HOLE* E.M.G.-81-12From 57.31m To 64.56m

FROM	TO	DESCRIPTION
57.31	58.67	SANDSTONE, SILTSTONE - interbedded
		SANDSTONE - salt and pepper fine grained to medium grained, cross-laminated, convoluted bedding, siltstone medium grey, abundant plant debris in top of section minor near base, minor worm burrows, cross-bedded minor dark grey mudstone laminae at base of section.
58.67	59.36	SANDSTONE medium grey, salt and pepper dark grey, muddy matrix minor plant debris, pyrite throughout section, calcareous cement, minor convoluted mud laminae at base.
59.36	60.61	SILTSTONE - MUDSTONE increasing mudstone content downward towards base
		SILTSTONE medium grey
		MUDSTONE medium-dark grey
		Minor cross-laminae, minor load casts, minor pyrite throughout, minor calcareous cement, minor carbonaceous plant debris decreasing downward coaly streaks near base.
60.61	60.84	SILTSTONE with SANDSTONE - medium with dark grey, convoluted bedding, minor load casts.
		Sandstone fine grained salt and pepper, abundant carbonaceous debris, coaly streaks.
60.84	62.91	SANDSTONE, salt and pepper, coarse grained to fine grained decreasing size size towards base, siltstone laminae near base, slickensides at 60.80 to 61.09, worm burrows near base, abundant carbonaceous mudstone. Minor pyrite, calcite on slickenside surfaces.
62.91	63.62	SILTSTONE, SANDSTONE interlaminated.
		SILTSTONE - medium to dark grey, slightly muddy, SANDSTONE - salt and pepper fine grained, cross-bedded, cross-laminated worm burrows, minor load structures, minor convoluted laminae, minor carbonaceous material.
63.62	64.39	SILTSTONE - muddy dark medium grey, minor load, minor cross-laminae at upper contact, minor carbonaceous plant debris, minor carbonaceous cement.
64.39	64.41	COALY MUDSTONE - sandy laminae, carbonaceous plant debris.
64.41	64.56	MUDSTONE, silty medium grey, carbonaceous plant material,

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E.M.G. - 81-12

From 64.41m

To 71.85m

FROM	TO	DESCRIPTION
64.41	64.56	coaly streaks, minor sandstone laminaes, minor worm burrows.
64.56	64.85	MUDSTONE - coaly dark grey to black, planar laminaes, slickensides at 64.65m, abundant carbonaceous plant debris, vitrain bands < 1/2 cm, broken - exact location of bands therefore unknown, core loss 10cm.
64.85	65.50	MUDSTONE, silty medium/dark grey, increasing silt downwards vitrain band at 64.93cm < 0.5cm, carbonaceous plant debris, pyrite, minor coaly streaks.
65.50	65.63	SANDSTONE - salt and pepper, fine grained to medium grained, increasing siltstone laminae downwards, cross-bedded, minor convoluted laminaes, worm burrows, minor load structures, carbonaceous plant debris.
66.63	67.36	SANDSTONE, SILTSTONE - interlaminated, increasing siltstone downwards, SANDSTONE - salt and pepper, fine grained. SILTSTONE - medium grey, slightly muddy at base, cross-laminae, minor convoluted bedding, load structures, worm burrows, carbonaceous plant debris.
67.36	69.20	MUDSTONE, dark grey, minor siltstone laminae near top at bottom, minor pyrite throughout, coaly streaks (minor carbonaceous debris).
69.20	70.80	MUDSTONE, SILTSTONE, SANDSTONE - increasing mudstone towards base, interlaminated, MUDSTONE - dark grey SILTSTONE - medium grey SANDSTONE - salt and pepper, fine grained, convoluted laminaes, minor cross-laminated, load structures, worm burrows, carbonaceous plant debris.
70.80	71.07	COAL - 0.27m black, poorly cleated, 5% vitrain, 5-7% fusain ~ 90% claro-durain SAMPLE 15.
71.07	71.45	MUDSTONE, minor siltstone laminations, mudstone dark grey, minor load casts, minor coaly streaks, carbonaceous plant debris.
71.45	71.85	COAL - 0.40m, cleated, black sandstone laminated at 71.60, 71.68, 71.70m, medium grained light salt and pepper, 5% fusain. Vitrain laminaes ~ 10%.

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E.M.G. - 81 - 12

From 71.45m To 75.78

FROM	TO	DESCRIPTION
71.45	71.85m	85% claro-durain, minor mudstone streaks near lower contact. SAMPLE 16.
71.85	71.95	MUDSTONE, coaly, laminated, medium grey to dark grey coaly streaks.
71.95	72.04	COAL - black, 0.09m predominately claro-durain, minor vitrain laminated at upper contact, minor fusain throughout, slightly cleated.
72.04	72.70	MUDSTONE, SILTSTONE, SANDSTONE - interlaminated, mudstone dark to medium grey, slightly silty; siltstone medium grey; sandstone salt and pepper, fine grained minor - convoluted bedding; minor load casts, worm burrows minor plant debris, minor coaly streaks.
72.70	73.17	SILTSTONE, SANDSTONE: siltstone light to medium grey; sandstone light grey fine grained; convoluted bedding, load casts, worm burrows, coaly streaks, carbonaceous plant material.
73.17	73.70	MUDSTONE with minor siltstone laminae, minor load casts, mudstone medium-dark grey; siltstone; light grey, minor cross-laminated, worm burrows, carbonaceous debris, increases towards base.
73.70	73.81	MUDSTONE with minor siltstone, dark grey, minor carbonaceous plant debris.
73.81	73.98	SILTSTONE medium grey, carbonaceous plant debris, calcareous cement.
73.98	74.95	SANDSTONE, SILTSTONE - interbedded SANDSTONE - salt and pepper fine grained; siltstone medium grey - minor load casts, calcareous cement, carbonaceous plant debris decreasing towards base,
74.95	75.28	SILTSTONE, muddy medium-dark grey increasing mudstone content towards base, minor siltstone laminae, calcareous cement, very minor carbonaceous plant debris.
75.28	75.33	MUDSTONE - dark grey, very minor carbonaceous debris and very minor siltstone clasts.
75.33	75.78	COAL - 0.45m black, 100% recovery cannel coal from

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E.M.G. - 81 - 12

From 75.33m To 82.89m

FROM	TO	DESCRIPTION
75.33	75.78	75.52 to 75.78m laminated, cleated, 20% vitrain, minor fusain, 80% claro-durain, minor oxidized pyrite. SAMPLE 17.
75.78	75.93	MUDSTONE - dark grey - increasing silt towards base coaly streaks near upper contact - carbonaceous near upper contact - coaly mudstone, carbonaceous plant material.
75.93	77.96	SANDSTONE, SILTSTONE - interbedded, Sandstone, salt and pepper to medium grey, fine grained; Sandstone, - medium dark grey cross-bedded, worm burrows, convoluted bedding, minor load structures, coaly streaks, calcareous cement, minor slickensides, minor slumping, calcite on slickenside surface. Bedding angle to at 85 - 90° to C/A
77.96	78.54	MUDSTONE with minor laminae of siltstone and sandstone mudstone dark grey, minor load structures.
78.54	78.71	MUDSTONE coaly; dark grey to black. COAL - question mark, core loss ~ 52% recovery, 0.08m highly broken, slickensides vitrinous coal bands of unknown thickness due to core loss.
78.71	78.84	MUDSTONE - silty dark grey, abundant coaly streaks, abundant plant debris.
78.84	79.39	SILTSTONE - light to medium grey with minor sandstone convoluted bedding, minor cross-laminae, worm burrows carbonaceous plant debris.
79.39	81.39	SANDSTONE, salt and pepper, fine grained to medium grained, cross-bedding, climbing ripples, minor plant debris.
81.39	82.59	SILTSTONE, SANDSTONE; increasing muddiness towards base, Siltstone light to medium dark grey, Sandstone salt and pepper fine grained; interlaminated, cross-laminated, load casts, minor convoluted laminae, worm burrows, carbonaceous plant debris, minor calcareous cement.
82.59	82.89	COAL - 0.30m Black, clearly (poorly) banded 20% vitrain, minor fusain, 80% claro-durain, SAMPLE 18.

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F.M.G. - 81 - 12

From 82.89m To 91.76m

FROM	TO	DESCRIPTION
82.89	82.94	COALY MUDSTONE - dark grey to black, vitrain bands
82.94	82.95	COAL - 0.01m Black vitrain band, cleated, minor claro-durain, bright
82.95	84.15	SILTSTONE - light to medium grey, muddy at top and base, minor convoluted bedding, abundant plant debris, minor load features, coaly streaks, minor cross-laminae calcareous cement.
84.15	85.96	SANDSTONE salt and pepper, fine grained - medium grained some minor siltstone laminated cross bedding, minor convoluted plant debris, minor calcareous cement, minor load structure bedding angle to at 80° to C/A.
85.96	86.68	SILTSTONE - with minor sandstone, siltstone light to medium grey, load structure, minor cross-laminated, minor convoluted bedding, worm burrows, minor carbonaceous debris.
86.68	87.06	SILTSTONE - muddy, medium to dark grey, load casts, minor cross-laminated, plant debris, worm burrows, minor calcareous cement.
87.06	87.68	MUDSTONE - silty (core loss 0.06m) dark grey, coaly chips, streaks, abundant plant debris.
87.68	88.09	SILTSTONE - medium grey with minor sandstone, minor load structures, minor convoluted bedding, carbonaceous plant debris, coaly streaks.
88.09	90.10	SANDSTONE, salt and pepper to light grey, fine grained to medium grained, coarser towards top. Cross-bedding minor load cast, minor worm burrows, minor fractures, carbonaceous plant debris hydrous ppt along fracture at 89.20m - minor mudstone laminae near lower contact contains abundant worm burrows.
90.10	91.76	SILTSTONE, SANDSTONE, MUDSTONE - interlaminated, increasing mudstone at base, Siltstone is medium - medium dark grey; Sandstone salt and pepper fine grained; mudstone is dark grey, cross-laminated, minor load casts, minor flame structure, abundant worm burrows - decreasing downwards, minor plant debris, minor convoluted laminae.

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E.M.G. - 81 - 12

From 91.76m To 95.61m

FROM	TO	DESCRIPTION
91.76	92.62	MUDSTONE - silty dark grey, carbonaceous plant debris, minor pyritized shell debris (?), minor coaly streaks at lower contact.
92.62	92.71	COAL - 0.09m - black - well cleated - bright ~80% vitrain, ~ 20% claro-durain, minor fusain.
92.71	93.04	MUDSTONE, silty - dark grey - coaly streaks, abundant carbonaceous plant debris.
93.04	93.72	SILTSTONE - SANDSTONE - interlaminated, siltstone light grey to medium grey, sandstone - light grey to salt and pepper; fine grained to very fine grained - decreasing grain size downwards - Slumping in sandstone near upper contact - Cross-laminated, load structures, worm burrows - Slickensides at 93.06 angle at 85° to C/A - Bedding angle at 83° to C/A - Minor pyrite near upper contact; minor carbonaceous plant debris.
93.72	94.82	SILTSTONE - MUDSTONE - interlaminated - siltstone light grey to medium grey Mudstone - medium dark grey to dark grey, increasing mud content towards base. - minor medium grained sandstone interlaminated at base - convoluted bedding; minor cross-laminae; worm burrows, load casts, carbonaceous plant debris
94.82	95.37	QUARTZITE - salt and pepper; medium grained to coarse grained - massive, carbonaceous plant debris - evidence of pressure solution at lower contact
95.37	95.43	CARBONACEOUS MUDSTONE - dark grey to black - minor mudstone laminae near upper contact - pyrite disseminated throughout
95.43	95.47	SANDSTONE - salt and pepper; medium grained - mudstone matrix
95.47	95.61	MUDSTONE - dark grey - minor pyrite disseminated throughout - minor carbonaceous plant debris

HOLE# E.M.G. - 81 - 12From 95.61m To 100.94m

FROM	TO	DESCRIPTION
95.61	96.15	SILTSTONE - medium grey to medium dark grey - minor sandstone rip up clasts - carbonaceous plant debris; minor coaly streaks
96.15	97.37	SANDSTONE - salt and pepper; medium grained to coarse grained - minor fine grained sandstone laminae throughout - silt rip-up clasts at 96.57m and near basal contact - cross-bedding; minor worm burrows in fine grained sandstone.
97.37	98.50	SANDSTONE - salt and pepper, fine grained to medium grained, with minor muddy siltstone beds which contain worm burrows - cross-bedding and laminae; minor worm burrows increasing towards base; minor carbonaceous plant debris increasing towards base. Bedding angle to at 85° to C/A.
98.50	99.52	SANDSTONE - salt and pepper to medium grey; fine grained minor siltstone laminae increasing towards base. - abundant worm burrows; convoluted laminae - abundant carbonaceous plant debris
99.52	100.49	SILTSTONE - mudstone, silty; gradational from siltstone to silty mudstone towards base. Siltstone - medium grey; silty mudstone - medium grey to medium dark grey - minor convoluted laminae near upper contact - minor load structures throughout; worm burrows; very minor carbonaceous plant debris.
100.49	100.71	SANDSTONE, SILTSTONE - interlaminated, sandstone is salt and pepper fine grained and medium grained; Siltstone medium grey; minor mudstone laminae near upper contact, convoluted laminated load structure, slumping worm burrows, carbonaceous plant debris.
100.71	100.92	SILTSTONE - dark to medium grey - muddy towards base carbonaceous plant debris, minor slump structure
100.92	100.94	MUDSTONE - coaly dark grey, coaly streaks, carbonaceous plant debris, minor vitrain laminae.

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E.M.G. - 81 - 12

From 100.94m To 107.92m

FROM	TO	DESCRIPTION
100.94	101.08	COAL - 0.14m Black, poorly cleated, banded, broken-up, ~60% vitrain ~40% claro-durain, core loss (probably) 10cm, therefore ~29% recovery.
101.08	101.72	MUDSTONE - dark grey, minor silt laminae near base coaly streaks near upper contact, decreasing downwards, plant debris.
101.72	102.52	MUDSTONE, SANDSTONE - interlaminated: mudstone medium dark grey to dark grey with minor siltiness; sandstone salt and pepper to light grey fine grained, cross-laminated, minor slump, load casts, worm burrows, carbonaceous plant debris.
102.52	103.02	MUDSTONE - dark grey; minor siltstone laminae near upper contact, coaly at 102.86 to 102.92m, minor coaly streaks throughout, possible minor zeolite on fracture surface, carbonaceous plant debris, abrupt lower contact
103.02	105.01	SANDSTONE - salt and pepper to medium grained, decreasing grain size towards base. Siltstone laminae near base, cross-bedding minor worm burrows in upper section - abundant in lower portion, carbonaceous plant debris increasing towards base.
105.01	106.32	SILTSTONE - medium grey, increasing mud content towards base, minor load casts and convoluted bedding in upper section, minor carbonaceous plant debris at upper contact, minor worm burrows near upper contact.
106.32	106.79	MUDSTONE - silty dark grey, minor mudstone and siltstone bands near base, minor small pyrite nodules? shells? Minor carbonaceous plant debris.
106.79	106.82	SANDSTONE - medium grained salt and pepper, contains minor coaly laminae, carbonaceous plant debris.
106.82	107.54	SILTSTONE - muddy, medium dark grey, minor pyrite shells? Nodules? carbonaceous plant debris.
107.54	107.67	SILTSTONE - medium grey, minor convoluted bedding, minor worm burrows, carbonaceous plant debris.
107.67	107.92	MUDSTONE, silty, medium/dark grey, minor carbonaceous plant debris, minor coaly streaks near lower contact.

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From 107.92m To 113.00m

FROM	TO	DESCRIPTION
107.92	107.97	COAL - 0.05m Black well cleated ~90% vitrain, bright, 10% claro-durain.
107.97	108.03	MUDSTONE - coaly, dark grey to black, carbonaceous plant debris, minor coal bands vitrain.
108.03	108.08	COAL - 0.05m Black, minor mudstone chips (clasts) banded ~70% vitrain ~30% claro-durain, core loss ~8cm.
108.08	108.36	MUDSTONE - silty, coaly dark grey to black, vitrain banded throughout decreasing towards base, carbonaceous plant debris.
108.36	110.87	SANDSTONE - salt and pepper to light grey, fine grained to coarse grained, minor mudstone laminae, cross-bedding, minor carbonaceous plant debris.
110.87	111.49	SANDSTONE, SILTSTONE - interlaminated, approximately 8cm core loss, Sandstone salt and pepper fine grained to medium grained; Siltstone medium grey, minor coal laminae, cross-bedding, minor load structure, minor slumping, minor worm burrows, carbonaceous plant debris, minor slickensides.
111.49	112.39	SILTSTONE, medium grey, minor sandstone laminae in upper portion - mud increasing near base, load casts, minor cross-laminae, worm burrows, carbonaceous plant debris, minor convoluted laminae.
112.39	112.60	COAL - BLACK 0.22m - cannel coal from 12.30 to 112.44m - dull, concoidal fracture hard. From 112.44 to 112.60m - bright coal ~ 75% vitrain, ~25% claro-durain, minor fusain, cleated. Splint, mudstone at 112.48m - 1cm wide SAMPLE #19 - Recovery ~ 100%
112.60	113.00	SILTSTONE - SANDSTONE - grades to sandstone at base. SILTSTONE - light grey to medium grey SANDSTONE - salt and pepper to light grey - coaly streaks near upper contact - cross-laminated, minor load structures, worm burrows near upper contact - carbonaceous plant debris.

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E.M.G. - 81-12

From 113.00m To 123.57m

FROM	TO	DESCRIPTION
113.00	115.00	SANDSTONE - salt and pepper, fine grained, cross-bedding angle at 78° to C/A, minor carbonaceous debris, planar laminae, minor worm burrows near lower contact.
115.00	116.16	SANDSTONE, SILTSTONE - interbedded sandstone salt and pepper fine grained, cross-bedding, slump structures, load casts, minor slickensides, gypsum on slickenside surface, worm burrows, minor carbonaceous plant debris.
116.16	116.59	SILTSTONE - muddy; medium to dark grey, minor siltstone laminae near upper contact, minor worm burrows near upper contact, carbonaceous plant debris, minor coal streak.
116.59	116.64	COAL - 0.05m black cannel, hard, dull, conchoidal fracture, minor banding.
116.64	116.73	MUDSTONE - coaly dark grey to black, minor sandstone laminae, minor carbonaceous plant debris, coaly streaks
116.73	116.76	COAL - 0.03m Black, cleated, laminated, ~60% claro-durain. ~ 40% vitrain
116.76	119.16	SILTSTONE - with minor sandstone throughout; medium grey minor convoluted bedding at upper and lower contact, minor pyrite, minor calcite along fracture surface at 117.76m worm burrows, carbonaceous plant material.
119.61	122.49	SANDSTONE, SILTSTONE - interbedded sandstone - salt and pepper to light grey, fine grained to medium grained Siltstone medium grey, slump structures cross-laminated, load casts, minor convoluted laminae, worm burrows, carbonaceous plant debris.
122.49	123.41	SILTSTONE - medium to medium/dark grey increased mud content toward base, minor carbonaceous debris.
123.41	123.44	COAL -with mud clasts, coal is black, well cleated ~90% vitrain, 10% claro-durain.
123.44	123.48	COAL - 0.04m, Black well cleated, 95% vitrain, 5% claro-durain, banded.
123.48	123.53	MUDSTONE - dark grey abundant pyrite, coaly streaks.
123.53	123.57	COAL - 0.04m black, cleated, banded ~50% vitrain, 50% claro-durain, minor oxidized pyrite.

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From 123.57m To 129.44m

FROM	TO	DESCRIPTION
123.57	124.11	MUDSTONE - medium-dark grey with abundant coaly streaks and minor coal bands <0.2cm carbonaceous plant debris.
124.11	124.47	SILTSTONE - muddy with minor cross-laminated sandstone near upper contact, medium - medium Dark Grey, carbonaceous plant debris,
124.47	124.70	COAL - 0.23m Black core loss 0.05 m 79% recovery, banded well cleated, minor pyrite, bright, minor fusain, 85% vitrain, 15% claro-durain, SAMPLE 20
124.70	125.39	MUDSTONE - Dark Grey, coaly bands < 0.2 cm decreasing towards base, coal bands predominant vitrain, carbonaceous plant debris
125.39	125.48	COAL 0.09m black, banded, cleated 40% vitrain, 60% claro-durain
125.48	126.23	Mudstone, Silty, coaly, dark grey to black, minor coal bands, abundant coaly streaks, minor slickensides, carbonaceous plant material, muddier toward base
126.23	126.24	COAL - 0.01m black, cleated, vitrain
126.24	126.35	Mudstone coaly dark grey - black, coaly bands < 0.3 cm, carbonaceous plant debris, coaly bands are vitrain
126.35	126.82	COAL - 0.47m black core loss 14 cm 73% recovery well cleated, highly broken, banded 85% vitrain, 15% claro-durain, very minor fusain SAMPLE 21
126.82	127.10	Siltstone, muddy, medium dark grey, abundant plant debris, minor coaly streaks
127.10	128.35	Siltstone, with minor sandstone laminaes, medium grey minor X-Laminae, minor load casts, carbonaceous plant debris
128.35	128.92	SANDSTONE - Salt and pepper to light grey fine grained coarsening towards base, convoluted bedding, carbonaceous plant debris
128.92	129.44	Siltstone, sandstone, interlaminated, siltstone medium grey, sandstone, salt and pepper, fine grained, X-Laminated, minor worm burrow, carbonaceous plant debris

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From 129.44m To 133.72m

FROM	TO	DESCRIPTION
129.44m	129.95m	Sandstone, fine grained - medium grained, salt and pepper, minor mudstone laminae, X-bedding, slickensides, carbonaceous plant debris
		slickensides @ 129.66 < at 78° to C/A, 129.73m, and at 129.90 < at 78° to C/A
129.95m	130.08	Siltstone Medium Grey, minor lams, minor X-laminae plant debris
130.08m	130.25m	Sandstone, salt and pepper, fine grained to medium grained, X-laminae, minor carbonaceous plant debris
130.25	130.39	Siltstone, medium grey with minor sandstone lams. carbonaceous plant debris, interlam. minor convoluted lam. load casts
130.39m	130.67	Sandstone, salt and pepper, fine grained to medium grained, x-laminae, carbonaceous plant debris, minor climbing ripples
130.67	131.06	Sandstone, siltstone (muddy) interlam, sandstone salt and pepper, fine grained, siltstone medium - dark medium grey, x-laminae, minor slump, load casts, slickensides @ 130.88m @ 80° to C/A, very minor plant debris
131.06m	131.43m	Sandstone, salt and pepper, medium grained, dolomite vein @ 131.31 and is 5cm thick, x-bedding, clean
131.43m	131.65	Siltstone, medium grey to light, minor load cast, planar laminated, worm burrows, coaly streaks, carbonaceous plant debris bedding < @ 80° to C/A
131.65m	132.20m	COAL - 0.55m black, 100% recovery cleated, banded bright, pyrite @ 132.00m, 30% vitrain, 70% claro-durain, minor fusain SAMPLE 22
132.20	133.25	Siltstone, medium grey with minor medium grained, Sandstone, salt and pepper, minor slump structures, load structures, carbonaceous plant debris, minor coaly streaks near upper contact Bedding @ 80° to C/A
133.25	133.72	Sandstone, salt and pepper, fine grained- medium grained minor siltstone near base in lams. carbonaceous plant debris, minor slickensides load casts, minor worm burrows

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From 133.72 m To 141.97 m

FROM	TO	DESCRIPTION
133.72	135.42	Siltstone, medium dark grey with minor sandstone (medium grained) lams near upper contact, increasing muddiness near lower contact, minor load casts, rip up mud clasts @ 133.87m
135.42	135.44	Mudstone, coaly dark grey to black, contains minor vitrinows coal bands <0.3cm, abundant carbonaceous material, coaly streaks
135.44	135.45	COAL - 0.01 m black, well cleated, laminated, contains pyrite, ~ 50% vitrain ~ 50% claro-durain
135.45	135.77	Siltstone medium grey, abundant coaly streaks, carbonaceous plant debris
135.77	136.81	Sandstone, medium grained, salt and pepper, convoluted bedding near upper contact, coaly streaks throughout (minor), X-bedding, carbonaceous plant debris, minor slump structure load casts
136.81	138.30	Sandstone, salt and pepper to light grey, fine grain very clean, minor convoluted bedding, X-bedding, minor load structures, minor slickensides, minor carbonaceous plant debris, minor siltstone lams. near lower contact containing abundant worm burrows. Plant debris increases with depth to abundant.
138.30	139.99	Siltstone, sandstone interlam; siltstone is medium to medium dark grey, sandstone is light grey, fine grained, siltstone increases in muddyness towards base, X-lam, minor load structures, slump structure, worm burrows, abundant carbonaceous debris
139.99	140.89	Siltstone, muddy, medium to medium dark grey, minor sandstone lams in centre of unit containing worm burrows, very minor plant debris
140.89	141.97	Siltstone, sandstone interlam, siltstone dark grey muddy content increases with depth, sandstone medium - coarse grained, increasing sandstone with depth, very minor plant debris in siltstone, load casts, minor convoluted bedding at base, with rip up mud clasts? minor worm burrows

HOLE# E.M.G. - 81 - 12From 141.97 m To 148.76 m

FROM	TO	DESCRIPTION
141.97	142.98	Sandstone, salt and pepper, medium grained to coarsly grained, quartzite with minor mud lams, x-bedded, carbonaceous plant debris
142.98	143.16	COAL - 0.18m black, well cleated, bright, slightly muddy towards base, minor fusain, increasing vitrain at lower contact ~ 40% vitrain ~ 60% claro-durain, banded
143.16	143.37	Siltstone, muddy, medium grey, increasing siltiness towards base, abundant carbonaceous plant debris, coaly streaks;
143.37	145.49	Sandstone, salt and pepper to light grey, fine grained of minor siltstone lams., convoluted bedding, abundant worm burrows, minor X-lam, X-bedding, decreasing bioturbation towards base, minor carbonaceous plant debris
145.49	146.23	Sandstone, siltstone interbedded, sandstone salt and pepper, fine grained - medium grained, increasing grain size towards base, siltstone medium dark grey X-bedding, load structures, worm burrows, carbonaceous plant debris, minor convoluted laminae
146.23	146.71	Sandstone, very fine grained to fine grained light salt and pepper to medium light grey; minor x-laminae, convoluted bedding, worm burrows, plant debris, minor slickensides
146.71	148.24	Sandstone, Siltstone, inter-lam. inter bed, sandstone salt and pepper, fine grained -very fine grained, siltstone medium grey - slightly sandy in places, X-laminae, minor load casts, worm burrows, carbonaceous plant debris, minor calcareous cement, minor coaly streaks near base
148.24	148.56	COAL - 0.32m black 0.06m core loss 81% recovery, minor fusain near upper contact, approximately 35% vitrain and 65% claro-durain, banded, poorly cleated SAMPLE 23
148.56	148.76	Silty mudstone, dark grey, minor siltstone lam. coaly streaks, carbonaceous plant debris

FROM	TO	DESCRIPTION
148.76	150.25	Sandstone, mudstone, siltstone interlam.
		Sandstone, salt and pepper, fine grained
		Mudstone, dark grey
		Siltstone, medium grey
		Cross-lam., convoluted lam. slump structure
		load casts, worm burrows, carbonaceous plant debris
		minor calcareous cement
150.25	150.95	Sandstone, salt and pepper, fine grained to medium
		grained, with minor siltstone laminae
		X-bedding, minor load casts, worm burrows,
		minor slump structures, minor slickensides, minor
		carbonate debris
150.95	151.00	Mudstone - dark grey
		Coaly streaks, minor carbonaceous plant debris
151.00	151.51	Siltstone, medium grey, increasing sand content
		towards base
		Carbonaceous plant debris
151.51	154.18	Sandstone, salt and pepper, light to medium grey,
		grain size?
		minor convoluted lam., X-lam, load casts, worm
		burrows, increasing bioturbation towards base,
		carbonaceous plant debris, increasing siltiness
		towards base
154.18	154.46	Silty mudstone, with coaly streaks, abundant
		carbonaceous material, coal band at upper contact
		0.5cm
154.46	157.13	Siltstone, medium grey to dark medium grey, with
		minor medium grained sandstone laminae
		Siltstone slightly muddy in places
		Load features, convoluted laminae, slump features,
		Worm Burrows, Carbonaceous Debris
157.13	157.62	Sandstone, Siltstone Interlaminated
		Sandstone, Salt and Pepper, Fine Grained - Medium
		Grained,
		Siltstone, Medium to Medium Dark Grey
		X-Laminae, slump structures, worm burrows,
		carbonaceous plant debris

HOLE# EMG-81-12From 157.62 m To 172.66 m

FROM	TO	DESCRIPTION
157.62	158.13	Sandstone, Salt & Pepper, light to medium grey increasing siltiness towards base, x-bedding, minor load casts, worm burrows, minor carbonaceous plant debris bedding < @ 83° to C/A
158.13	158.92	Sandstone, fine grained, salt and pepper to light medium grey Convolute bedding near base, X-laminae near centre 158.41 to 158.61 fine grained, sandstone bedding no structure, minor carbonaceous plant debris
158.92	158.98	Siltstone, medium grey Carbonaceous plant debris
158.98	160.94	Sandstone, Siltstone, interlaminae Sandstone, Salt & Pepper, fine grained to coarsely grained, laminae of varying grain size throughout, X-bedded, siltstone, medium grey to dark medium grey X-Laminae, load casts, worm burrows, carbonaceous plant debris, minor convolute bedding, increasing siltiness towards base, calcite vein at 160.77 of 0.2 cm Bedding < @ 83° to C/A
160.94	163.36	Mudstone, Sandstone interlaminated Mudstone, dark grey, slightly silty in places, Increasing mudstone towards base Sandstone, salt and pepper, fine grained to medium grained, load casts, minor convolute bedding in upper portion, worm burrows, carbonaceous plant debris, minor slickensides ie @ 162.00 slicken slide < @ 81° to C/A
163.36	167.81	Mudstone medium dark grey - dark grey with minor sandstone laminae which coarsen towards base, worm burrows, sandstone lams show load structures, minor coaly streak, carbonaceous debris decreasing towards base
167.81	172.66	Sandstone, salt and Pepper, coarsely grained, X-bedding, minor convolute bedding, coal lams < 0.4 cm @ 171.85, 172.52, 172.60 minor carbonaceous plant debris, clean.

HOLE#

EMG-81-12

From 172.66m To 179.28m

FROM	TO	DESCRIPTION
172.66	173.21	Siltstone medium grey with minor sandstone beds near upper contact, siltstone becomes muddier at lower contact, load clasts, carbonaceous debris, worm burrows, shiny structures (minor)
173.21	173.51	Mudstone dark grey, minor carbonaceous debris
173.51	173.55	COAL - 0.04m black, dull, minor vitrain lam, poorly cleated, duro-clarain
173.55	173.92	Mudstone, silty dark grey, becomes silty towards base coaly streaks, abundant carbonaceous plant debris,
173.92	174.41	Sandstone salt and pepper, fine grained - medium grained, with minor siltstone lam near base, X-bedding, minor climbing ripples, minor load casts, minor pyrite, carbonaceous plant debris, Minor worm bore hole.
174.41	175.21	Siltstone medium grey; with minor sandstone lams (fine grained), minor X-lam., minor load casts, worm burrows, with minor carbonaceous plant debris
175.21	175.39	Sandstone, salt & pepper, fine grained to medium grained, clean, minor mudstone lams, X-bedding, worm burrows, carbonaceous plant debris
175.39	176.35	Muddy Siltstone, medium grey to medium dark grey Mudstone bedding in center of section ~ 5 cm Minor sandstone laminae near top of contact Carbonaceous plant debris, coaly streaks increasing towards base
176.35	177.10	Sandy Siltstone medium to medium dark grey, Minor X-lam, minor load casts, minor slump structures Minor carbonaceous plant material, minor coaly streaks, slickenside.
177.10	177.65	Sandstone, salt & pepper, medium grained Siltstone lam., X-Lam. Minor load casts, minor load casts, minor convoluted Lam. minor pyrite, carbonaceous plant debris, minor coaly streaks, very minor worm burrows
177.65	179.28	Siltstone, dark grey, muddy at upper contact getting sandier in the middle and then muddy at lower contact,

HOLE# EMG-81-12

From 179.28 m To 182.85 m

FROM	TO	DESCRIPTION
177.65	179.28	Minor sandv lam, load casts, carbonaceous plant debris, coaly streaks, minor pyrite, minor worm burrows
CONT'D		
179.28	179.44	Mudstone, very dark grey, has abundant coaly streaks carbonaceous plant debris, vitrain coal band at 179.36m ~ 0.2cm
179.44	179.69	Silty Sandstone, salt and pepper, fine grained to medium grained, mudstone band, minor coaly streaks, minor pyrite, convoluted lam, X-Laminae, carbonaceous plant debris
179.69	180.61	Siltstone, medium grey to medium dark grey at lower contact, minor sandstone laminae, load casts, minor slump structures, minor X-laminae, coal streaks, muddier toward lower contact, carbonaceous plant debris, pyrite
180.61	180.85	Silty mudstone, dark grey, conchoidal fracture, very minor carbonaceous debris, minor pyrite, minor slickensides
180.88	181.33	Siltstone, dark grey, muddy at upper contact grading to fine grained, sandy at lower contact coaly hand at 18.26 ~ 0.3 Carbonaceous plant debris, pyrite, coaly streaks, planar lam.
181.33	181.90	Sandstone, salt and pepper, fine grained X-Worm, minor convoluted lam. load casts, pyrite, carbonaceous plant debris, minor calcite, minor coaly streaks
181.90	182.07	Mudstone, medium dark grey, abundant coaly streaks, pyrite carbonaceous plant debris
182.07	182.33	Sandstone, fine grained, salt & pepper X-lam, carbonaceous plant debris, pyrite coaly streaks
182.33	182.85	Siltstone, medium grey to medium dark grey Fine grained sandy siltstone at upper contact grading to muddy siltstone at lower contact, X-laminae, pyrite, abundant coal streaks, minor slickenside at 182.80

HOLE#

EMG-81-12

From 182.85m To 189.58m

FROM	TO	DESCRIPTION
182.85	183.43	Sandstone, Siltstone, fine grained, salt and pepper, Siltstone laminae & minor mudstone laminae convoluted laminae, carbonaceous plant debris, X-laminae, load casts, coaly streaks.
183.43	184.57	Siltstone; medium dark grey, muddy bands, carbonaceous plant debris, coaly streaks, conchoidal fracture, minor pyrite
184.57	185.19	Sandstone, fine grained - medium grained, salt & pepper, minor siltstone, X-lam. convoluted bedding, calcite stringers, coaly streaks, carbonaceous plant debris
185.19	186.12	Sandstone, fine grained - medium grained, salt & pepper, siltstone lam, muddy in places, calcareous cement, carbonaceous plant debris, minor coaly streaks, convoluted bedding, load casts
186.12	187.66	Siltstone, medium grey to medium dark grey, minor sandstone lam., becomes muddy at lower contact, planar lam., coaly streaks, carbonaceous plant debris fine calcite stringers, calcareous cement, convoluted lam.
187.66	187.76	COAL 0.10m, black, vitrain well cleated, bright, banded, 50% vitrain, 50% claro-durain.
187.76	188.60	Sandy siltstone, medium grey, planar lam. carbonaceous plant debris, calcareous cement, coaly streaks, convoluted bedding, load casts
188.60	189.07	Sandstone, Siltstone interlam. Sandstone, salt & pepper, medium grained at upper contact, grading to a sandy siltstone downwards, Siltstone, light grey, slightly muddy in parts, calcareous cement, carbonaceous plant debris, X-lam, load casts, minor worm burrows, coaly streaks.
189.07	189.52	Silty mudstone, dark grey, abundant coaly streaks, carbonaceous plant debris, calcareous cement; minor slickensides; oxidized pyrite,
189.52	189.58	COAL - 0.04m Black, vitrain shiny, cleated, banded, claro-durain, 40% vitrain, 60% claro-durain

HOLE# EMG-81-12From 189.58 m To 192.79 m

FROM	TO	DESCRIPTION
189.58	189.91	Silty Mudstone, Medium Grey - Dark Grey at 189.77-80 coal band, claro-durain with minor vitrain, coaly streaks in mudstone, carbonaceous plant debris esp. at upper contact, minor slickensides
189.91	190.98	Siltstone, medium grey - dark grey, sandy & silty in places, coaly streaks carbonaceous plant debris, oxidized iron (pyrite), minor calcite, minor slick- ensides, crossbedded near lower contact.
190.98	191.18	Interbedded Sandstone/Siltstone, Interbedded Sandstone, Salt & Pepper, medium grained, siltstone dark grey, cross lam., worm burrows
191.18	191.47	Sandstone, salt & pepper, medium grained - coarsly grained at lower contact, x-bedded, worm burrows, calcite cement, grades to sandy mudstone at lower contact, carbonaceous debris, minor load casts, slickensides
191.47	191.80	Muddy Siltstone, medium grey-dark grey, gets muddier toward lower contact, concoidal fracture
191.80	191.92	COAL - .12m Vitrain - banded, black shiny, cleated well claro durain - dull - medium shiny vitrain ~40%, claro durain ~ 60%
191.92	191.94	Mudstone, dark grey - coaly streaks Slickensides
191.94	192.32	Sandstone, fine grained, salt & pepper, X-lam. Abundant coaly streaks, carbonaceous plant materials 60° from core axis slickensides load casts, worm burrows, some convoluted lam.
192.32	192.44	Silty mudstone getting less silty near lower contact, calcite stringers, coaly streaks, carbonaceous plant debris
192.44	192.79	Sandstone, fine grained - medium grained, salt & pepper, at 192.63 - 192.65, muddy siltstone band, Slickenside at 192.65 with pyrite, carbonaceous debris with minor coaly streaks, convoluted lam.

HOLE# EMG-81-12From 192.79 m To 198.17 m

FROM	TO	DESCRIPTION
192.79	192.99	Muddy Siltstone, medium dark grey, Carbonaceous plant debris
192.99	193.92	Siltstone, light grey, concoidal fracture, carbonaceous plant debris, pyrite disseminated in siltstone, calcareous cement,
193.92	195.16	Siltstone (medium grey) with interbedded with sandstone (fine grained - medium grained) Convoluted bedding, muddy towards base. Calcareous cement, coaly streaks, carbonaceous plant debris (minor). load casts, concoidal fracture.
195.16	195.92	Sandstone, salt & pepper, medium grained - coarsly grained, siltstone bands present at 195.66 and 195.82 cross lam & convoluted bedding coaly streaks, carbonaceous plant material bad casts, calcite cement, worm burrows
195.92	196.96	Sandstone, Siltstone interbedded Siltstone, medium - medium dark grey Sandstone, fine grained, salt & pepper decreasing sandstone laminae towards base & increasing muddiness towards base X-laminae, convoluted lam. worm burrows, load casts, carbonaceous plant debris
196.96	197.27	Mudstone, medium dark grey, abundant coaly streaks, vitrain coal band at 197.10 m ~ 0.01 cm. slickensides, carbonaceous plant debris
197.27	197.72	Sandstone, salt & pepper, fine grained - medium grained, convoluted bedding, worm burrows, abundant carbonaceous plant debris, load casts, slickensides, calcareous cement
197.72	197.99	Siltstone - Sandstone interlam. Siltstone, light grey to medium grey, Sandstone, fine grained, salt & pepper slickensides with pyrite, abundant carbonaceous debris, coaly streaks, convoluted bedding
197.99	198.17	Sandstone, medium grained, salt & pepper, X-lam, convoluted bedding, slickensides, calcite cement minor carbonaceous debris, slickenside @ 50° to C/A

HOLE# EMG-81-12From 198.17 m To 204.68 m

FROM	TO	DESCRIPTION
198.17	198.33	Sandy siltstone, medium grey, calcite cement carbonaceous material
198.33	198.62	Silty Sandstone, salt & pepper, fine grained, convoluted bedding, carbonaceous plant debris, minor coaly streaks, calcite cement
198.62	199.02	Siltstone with sandstone lam. near upper contact grading to muddy lam. at lower contact Siltstone, medium dark grey, carbonaceous plant material, coaly streaks, calcite cement
199.02	201.10	Sandstone, salt & pepper, medium grained, with siltstone bands and one mudstone band X-lam, convoluted lam, worm burrows, carbonaceous material
201.10	201.21	Silty Mudstone, dark grey, coaly streaks, carbonaceous material
201.21	201.50	Silty Sandstone, fine grained, salt & papper Convoluted bedding, worm burrows, load casts, carbonaceous plant debris, minor coaly streaks, calcareous cement
201.50	202.18	Sandstone, medium grained to coarslev grained, salt & pepper, fairly clean X-lam, convoluted bedding, slickensides, well X-lam in center, minor worm burrows, calcareous cement
202.18	203.23	Sandstone, Siltstone Interbedded Sandstone, salt & pepper, fine grained Siltstone, light to medium grey convoluted bedding, X-lam, worm burrows, calcite laminae, carbonaceous plant material
203.23	203.74	Siltstone, light grey to dark grey Sandstone lam. near upper contact grading to muddy lam near lower contact
203.74	204.22	Silty mudstone, dark grey coaly streaks, carbonaceous material
204.22	204.68	COAL - 0.46m black, poorly cleated, broken, banded vitrain (miror) Vitrain - 25%, claro-durain - 75% SAMPLE # 24

HOLE#

EMG-81-12

From 209.64m To 211.34m

FROM	TO	DESCRIPTION
208.73	208.83	COAL 0.10m Vitrain, cleated shiny black 40% Claro-durain, dull 60%
208.83	208.95	Sandy Siltstone, Medium dark grey Carbonaceous plant debris and coal streaks muddy in places
208.95	209.64	Sandstone, salt & pepper, fine grained to medium grains with minor mudstone lam. increasing toward base, convoluted lam. load structures, X-lams. Minor slickensides, carbonaceous plant debris coaly streaks near upper contact
209.64	210.04	Mudstone, Sandstone interbedded Mudstone, dark grey to black, slightly carbonaceous increasing toward base Sandstone, salt & pepper medium grained, predominant near upper contact convoluted bedding/ minor X-lam. slump structures (minor) (minor) load structures, worm burrows in upper portion, coaly streaks near lower contact, carbonaceous plant debris (minor)
210.04	210.12	Carbonaceous mudstone - dark grey to black coal band at upper contact 0.05m coaly streaks throughout, carbonaceous plant debris
210.12	210.27	COAL - 0.15m black, dull, no cleating, very min slickenside, minor fusain, approximately 99% claro durain, minor sand lam near upper contact
210.27	210.67	Sandstone, salt & pepper, medium grained min. convoluted lam., load structures, includes some minor mudstone laminae increasing toward base, minor slickensides at 210.45m $\angle 77^{\circ}$ to C/A carbonaceous plant debris
210.67	210.69	COAL - 0.02m black 100% vitrain well cleated., bright
210.69	210.71	Coaly mudstone, dark grey to black, coal lam., minor carbonaceous plant debris
210.71	211.34	Siltstone, medium grey minor sandstone lam, in centre of section

HOLE#

FMG-81-12

From 211.34 m To 214.63 m

FROM	TO	DESCRIPTION
210.71	211.34	Bedding \angle at 80° to C/A Carbonaceous plant debris, minor coaly streaks near base
211.36	211.57	COAL - 0.21m Poorly cleated, vitrain lam. 5% vitrain 95% duro clarain minor fusain in form of plant debris SAMPLE #26
211.57	211.81	Mudstone, medium dark grey - dark grey Coaly streaks throughout (increasing) silt content near base, carbonaceous plant debris
211.81	212.72	Sandstone, salt & pepper, fine - medium grained, increasing grain size toward base; minor mudstone beds near upper & lower contacts X-bedding, convoluted bedding near lower contact, worm burrows, carbonaceous plant debris, slickensides at 212.35 m \angle 85° to C/A
212.72	213.22	COAL - 0.50m - CORE LOSS 0.16m RECOVERY 68% - black, banded, cleated \sim 25% vitrain \sim 75% Claro-durain SAMPLE #27
213.22	213.28	Mudstone, dark grey - coaly streaks, slickensides
213.28	213.45	COAL - 0.17m CORE LOSS 0.08m, RECOVERY 53% black, poorly cleated, broken \sim 10% vitrain, 90% claro-durain
213.45	214.35	Silty Sandstone, medium grained, very fine grained to fine grained, increasing silt content downwards, minor load casts, carbonaceous plant debris
214.35	214.53	COAL - 0.18m, black, banded, bright, - mudstone splint at 214.49m \sim 0.5cm - cleated near lower contact \sim 50% vitrain \sim 50% claro-durain
214.53	214.63	Sandstone, salt & pepper, fine grained X-bedding, minor coaly streaks, carbonaceous plant debris

HOLE# EMG-81-12From 214.63m To 219.24 m

FROM	TO	DESCRIPTION
214.63	215.03	Siltstone, medium grey to dark medium grey, gradational from muddy at upper contact to sandy at lower contact. Minor coaly streaks, carbonaceous plant debris
215.03	216.55	Sandstone, salt & pepper to medium grey, fine grained to medium grained, decreasing grain size towards base X-laminae, load structures, ripple marks, minor carbonaceous plant debris decreasing towards base, coaly streaks near upper contact. Lower contact is gradational
216.55	217.79	Siltstone, medium grey with minor fine grained sandstone laminae throughout Very minor X-lam. very minor carbonaceous plant debris, gradational lower contact
217.79	218.22	Mudstone, dark grey, slightly silty near upper contact Carbonaceous plant debris increasing towards base Coaly streak at upper contact
218.22	218.34	Coaly Mudstone, dark grey to black Vitrainous coal lam. throughout Carbonaceous plant debris, minor oxidized pyrite in centre of section?
218.34	218.82	Silty Mudstone, medium dark grey to dark grey, increasing silt content towards base Abundant vitrain coaly streaks throughout Coal band < 0.1 cm at 218.54 Abundant carbonaceous plant debris throughout Gradational lower contact
218.82	218.97	Siltstone, medium grey, increasing sand content towards base Carbonaceous plant debris, coaly streaks near upper contact, lower contact is gradational
218.97	219.24	Sandstone, salt & pepper, fine grained to medium grained - minor convoluted bedding near base - X-lam. throughout, carbonaceous plant debris

HOLE# EMG-81-12From 219.24 m To 224.12 m

FROM	TO	DESCRIPTION
219.24	219.33	Silty Mudstone, medium dark grey to dark grey - Coaly streaks throughout, carbonaceous plant debris throughout
219.33	219.35	Coaly Mudstone, dark grey to black Coal laminations throughout
219.35	219.45	COAL - 0.10m, black - banded, ~ 7% vitrain ~ 93% claro-durain
219.45	219.69	Mudstone dark grey slightly silty, abundant coaly streaks, carbonaceous plant debris, calcareous cement
219.69	221.45	Siltstone, muddy, medium dark grey, carbonaceous plant debris, slickensides @ 220.10m, coaly streaks (minor) throughout, muddy towards base
221.45	221.80	COAL - 0.35m black, broken, minor fusain, banded, poorly cleated ~ 20% vitrain, minor pyrite flakes, 75% recovery ~ 80% claro-durain SAMPLE 28
221.80	221.90	Siltstone, medium dark grey, coal ban @ 221.85m, approximately 0.05m thick, carbonaceous plant debris
221.90	222.10	Sandstone, salt & pepper, medium grained, minor slickensides, minor X-bedding, carbonaceous plant debris, slightly calcareous Rip-up silt clasts near base
220.10	222.54	Siltstone, medium grey, very minor siltstone lam. near centre of section, carbonaceous plant debris
222.54	223.77	Sandstone, salt & pepper, fine grained to coarsly grained, interlam + interbedding, quartz veinlet, X-bedding, load structures, minor worm burrows near centre of section, carbonaceous plant debris, minor calcareous stringers along bedding plane, bedding @ 83° to C/A
223.77	224.06m	Siltstone medium grey, minor sandstone lams. near upper contact, carbonaceous plant debris, X-lam (minor)
224.06	224.12	COAL - 0.06m, black, banded, ~ 10% vitrain, 90% claro-durain

HOLE#

EMG-81-12

From 224.12 m To 229.95 m

FROM	TO	DESCRIPTION
224.12	224.14	Mudstone coaly splint, dark grey to black, coaly streaks throughout
224.14	224.26	COAL - 0.12m black, poorly cleated, ~ 30 vitrain ~ 70% claro-durain
224.26	224.47	Mudstone, grey dark, abundant slickensides throughout coaly streaks, minor plant debris
224.47	224.64	Mudstone, silty medium dark grey, plant debris, minor coaly streaks
224.64	224.90	Siltstone, medium grey, increasing siltstone content towards base, carbonaceous plant debris
224.90	225.65	Sandstone, salt & pepper, fine grained to coarsly grained, coarsening towards base, X-bedding, load casts, possible plant rootlets, minor worm burrows, carbonaceous plant debris, ripple marks
225.65	225.77	Siltstone, medium grey, minor sand lenses, minor load casts, X-lam. minor plants debris
225.77	226.01	Mudstone, dark grey to black, coaly towards base, coal bands at base < 0.01m - carbonaceous plant debris
226.01	227.36	Sandstone, salt & pepper, fine grained to coarsly grained, inter lam., increasing amount of fine grained sandstone lam. toward base. X-lam. load casts, carbonaceous plant debris (minor), bedding $\frac{1}{2}$ @ 80° C/A
227.36	227.92	Siltstone, medium grey - fine grained sandstone beds at 227.44m and 224.58 ~ 0.01 m wide Load structures in sandstone, X-lam. Minor coaly streaks, carbonaceous plant debris Slickensides at 227.91m $\frac{1}{2}$ @ 77° to C/A Dolomite on slickenside surface
227.92	229.95	Sandstone, salt & pepper, fine grained to coarsly grained, coarsening towards base X-bedding, minor convoluted bedding near upper contact calcite veinlet (< 0.2cm) cut almost vertically from 229.27m to 229.73m coaly chips near base, minor carbonaceous plant debris, calcareous cement throughout

HOLE# EMG-81-12From 229.95 m To 233.19 m

FROM	TO	DESCRIPTION
229.95	230.02	Mudstone dark grey, coaly streaks, carbonaceous plant debris
230.02	230.05	COAL - 0.03m black, banded, 50% vitrain, 50% claro-durain, poorly cleated
230.05	230.19	Mudstone dark grey, slightly silty in places, friable, coaly streaks, carbonaceous plant material
230.19	230.29	COAL - 0.10m black, banded, 50% vitrain, 50% claro-durain
230.29m	230.45m	Mudstone dark grey to black (brown), coaly near upper contact, coaly streaks throughout, carbonaceous debris 0.9cm coal band @ upper contact
230.45	230.66	Siltstone, medium grey, coaly streaks near upper contact, carbonaceous plant debris, slightly muddy near upper contact
230.66	231.09	Siltstone, muddy, medium dark grey to dark grey, mudstone bed @ 230.93m ~ 1 cm thick, coaly streaks, carbonaceous plant debris
231.09	231.54	Sandstone, salt and pepper, fine grained to medium grained, interbedded, X-bedding, load structures, minor worm burrow (over), carbonaceous plant debris
231.54	231.72	Mudstone, medium dark grey to dark grey, silty near upper contact, abundant carbonaceous plant debris, coaly streaks
231.72m	231.92	Sandstone, salt & pepper, fine grained to medium grained, decreasing grain size toward lower contact, convoluted bedding, load structure, minor worm burrows throughout, carbonaceous plant debris (minor)
231.92	232.14	Siltstone, medium grey, minor load structures, coaly streaks throughout, carbonaceous plant debris
232.14	232.41	Mudstone, silty, dark grey, minor carbonaceous plant debris, minor coaly streaks near upper contact
232.41	233.19	Sandstone, salt & pepper, medium grained to coarsely grained, inter bedding, X-bedding, convoluted bedding towards lower contact, minor slickensides near lower contact, load structures, minor slump structures near lower contact, carbonaceous plant debris, bedding < @ 80° to C/A

HOLE#

E.M.G. 81-12

From 233.19m To 239.45 m

FROM	TO	DESCRIPTION
233.19m	234.06m	Siltstone, medium grey with minor sandstone laminae near centre of section, load structures, X lam. worm burrows near centre of section, minor coaly streaks, abundant carbonaceous plant debris
234.06	234.18m	Mudstone, dark grey, coaly band < 1cm @ 234.10cm carbonaceous plant debris
234.18m	234.37	Siltstone, medium grey, abundant carbonaceous plant debris, coaly streak gradational contact (lower)
234.37	235.74	Sandstone, fine grained to coarsely grained, salt & pepper, increasing grain size towards base, X-bedding, load casts, carbonaceous plant debris increasing coaly streak towards base, minor slickensides towards base
235.74	236.04	Sandstone, salt & pepper, coarsely grained, interlam with coaly bands < 0.3cm., slickensides
236.04	236.12m	Mudstone, dark grey, coaly streaks, carbonaceous
236.12	236.14m	COAL 0.02m black, laminated, 20% vitrain, 80% claro-durain
236.14	236.22	Mudstone dark grey to black, coaly streaks, abundant carbonaceous plant debris
236.22	236.74	Sandstone, salt & pepper, fine grained to medium grained, grain size decreasing to base, X-lam, load casts, slightly muddy in places, carbonaceous plant debris in muddy sections
236.74	238.65	Siltstone, muddy medium to medium dark grey, higher silt content near upper contact, minor slump near base, carbonaceous plant debris
238.65	238.88	Mudstone dark grey, gradational upper contact, slightly silty near upper contact, minor carbonaceous plant debris
238.88m	239.17	COAL - 0.29m black, banded, minor fusain, poorly cleated ~ 5% vitrain, 95% claro-durain SAMPLE 29
239.17	239.36	Mudstone dark grey coaly streaks, minor carbonaceous plant debris
239.36	239.45	COAL, 0.09m Black, poorly cleated ~ 3% fusain, 3% vitrain, 94% claro-durain, dull

HOLE#

EMG-81-12

From 239.45 m To 243.99 m

FROM	TO	DESCRIPTION
239.45	239.64	Mudstone, coaly dark grey to black, increasing silt contact towards base, minor sandstone lams. towards base, coaly streaks, carbonaceous plant debris
239.64	240.04	Sandstone, silty, medium grey, very fine grained, increasing silt content towards base, coaly streaks, plant rootlets, minor X-lam., coaly chip, carbonaceous plant debris
240.04	240.16	COAL 0.12m black, poorly cleated, banded ~ 3% fusain, 30% vitrain 67% claro-durain
240.16	240.26	Mudstone, dark grey to black, silty towards base, coaly streaks, carbonaceous plant debris
240.26	240.79	Sandstone, salt & pepper, fine grained to medium grained, increasing grain size towards the base X-bedding, minor convoluted lam., carbonaceous plant debris
240.79	241.22	Muddy Siltstone, medium grey to dark, medium grey, mud content varies throughout section - minor slickensides with calcite on surfaces, carbonaceous plant debris
241.22	242.02	Sandstone, salt & pepper, light medium grey, fine grained, planar lam. minor X-lam. - at 241.80 to 241.62 fractured zone with calcite filling fractures Calcareous cement throughout, minor carbonaceous plant debris
242.02	242.38	Siltstone, medium dark grey, slightly muddy in places, carbonaceous plant debris, calcareous cement
242.38	243.76	Sandstone, salt & pepper, fine grained to coarsly grained, increasing grain size towards center - medium grained from center to base, X-bedding, convoluted bedding, load casts near upper contact, slump structure near upper contact, minor slickensides, carbonaceous plant debris decreasing downwards, calcareous cement
243.76	243.99	Mudstone dark grey, carbonaceous plant debris, coaly streaks,

HOLE# EMG-81-12From 243.99m To 249.28 m

FROM	TO	DESCRIPTION
243.99	244.30	Sandstone, silty, medium grey, fine grain, convoluted bedding, carbonaceous plant debris, coaly streaks near upper contact
244.30	244.35	COAL - 0.05m black, banded, vitrain is cleated, 25% vitrain, 75% claro durain
244.35	244.49	Mudstone, carbonaceous dark grey to black, minor fine grained, sandstone lenses, coaly streaks throughout, carbonaceous plant debris
244.49	244.55	COAL, 0.06m black, hard, dull, 100% claro-durain, minor vitrain near upper contact
244.55	244.97	Sandstone, carbonaceous mudstone inter lam. Sandstone, salt & pepper, fine grained to medium grained, carbonaceous mudstone black, almost coal in places., minor slickensides, X-lam. load structures, carbonaceous plant debris, ripple marks
244.97	245.91	Sandstone, salt & pepper, medium grained, minor rip-up mud clast @ 245.80, calcareous cement and @ 245.18, X-bedding, minor carbonaceous plant debris, plant rootlet, increasing carbonaceous debris towards base
245.91	246.26	Siltstone medium grey, slickensides @ 246.01m @ 60° to C/A, plant rootlets, carbonaceous plant debris
246.26	247.83	Sandstone, fine grained - medium grained, salt and pepper interbedding, X-laminated, convoluted laminae, worm burrows, load structure, carbonaceous plant debris, calcareous cement
247.83	248.25	Sandstone, silty, medium grey, medium grained to sand lenses in upper contact, convoluted bedding, carbonaceous plant debris, calcareous cement
248.25	249.28	Sandstone, salt & pepper, fine grained to medium grained, X-bedding X-Laminae, slump structures, plant rootlets, minor carbonaceous plant debris, calcareous cement, ripple marks, bedding @ 80° to C/A, becomes silty towards base

HOLE#

EMG-81-12

From 249.28 m To 253.88 m

FROM	TO	DESCRIPTION
249.28	249.41	Mudstone dark grey - black, coaly streaks, slickensides, carbonaceous plant debris, coal loss 0.05m
249.41	249.63	Sandstone, medium grey, fine grained, Abundant coaly streaks from upper contact to centre of section, carbonaceous plant debris throughout
249.63	251.32	Siltstone, medium dark grey - slightly muddy in places, minor carbonaceous plant debris throughout, minor coaly streaks near base
251.32	252.29	Sandstone, Siltstone, interlam. increasing towards base, Sandstone, salt & pepper, fine grained to medium grained, Siltstone, medium grey X-Lam., convoluted lam., load structures, minor worm burrows throughout, abundant carbonaceous plant debris
252.29	252.41	Silty Mudstone, medium dark grey Carbonaceous plant debris
252.41	252.66	COAL - 0.25m black ~ 95% Recovery Bright, banded, vitrain is cleated ~ 20% vitrain, ~ 80% claro-durain SAMPLE #30
252.66	252.74	Carbonaceous Mudstone, black w/minor fine grained sandstone lam. - minor carbonaceous plant debris
252.74	252.99	COAL - 0.25m black ~ 60% recovery ~ 0.10m core loss ~ 2% fusain increasing toward base ~ 98% claro-durain, minor vitrain
252.99	253.74	Sandstone, Salt & Pepper, fine grained to medium grained, minor silt near upper contact - X-Lam. convoluted lam, load structures - minor slickensides, carbonaceous plant debris Bedding $\frac{1}{2}$ at 80° to C/A, calcareous cement
253.74	253.88	Muddy Siltstone, medium dark grey, higher mud content at upper contact

HOLE# EMG-81-12From 253.88 m To 259.84 m

FROM	TO	DESCRIPTION
253.74	253.88	Slickensides at 253.69 \perp a 90° to C/A
		Continued
		calcite on slickenside surface
		core loss \sim 5cm
253.88	254.68	Sandstone, salt & pepper, fine grained
		X-lam. convoluted bedding, minor load casts near
		upper contact, carbonaceous plant debris,
		calcareous cement
254.68	257.88	Sandy Siltstone, medium grey, minor lam. increasing
		near base, worm burrows, carbonaceous plant debris,
		minor convoluted lam.
257.88	257.91	Sandstone, salt & pepper, coarsly grained,
		carbonaceous plant debris, minor coaly streaks
257.91	258.15	Siltstone, medium grey, muddy towards base
		coaly streaks increasing towards base
		minor carbonaceous plant debris
258.15	258.30	COAL - 0.15m black
		core loss of \sim 5 cm 66% recovery
		no apparent cleat, broken, banded
		\sim 25% vitrain \sim 75% claro-durain
258.30	258.37	Silty mudstone, medium dark grey, abundant
		carbonaceous plant debris
258.37	258.88	Sandstone, salt & pepper to light grey, fine grained,
		minor convoluted bedding in upper portion
		planar lam. near lower contact
		minor coaly streaks, minor carbonaceous plant debris
258.88	259.12	Muddy siltstone, medium dark grey
		Minor carbonaceous plant debris
259.12	259.31	Silty sandstone, medium grey
		Calcite stringers, minor plant rootlets, carbonaceous
		plant debris
259.31	259.66	Sandstone, salt & pepper, fine grained - medium
		grained, decreasing grain size towards lower contact,
		X-bedding, convoluted bedding near lower contact,
		minor carbonaceous plant debris, minor calcareous
		cement
259.66	259.84	Siltstone, light medium grey, abundant
		carbonaceous plant debris

HOLE#

EMG-81-12

From 259.84m To 266.86 m

FROM	TO	DESCRIPTION
259.66	259.84	gradational upper and lower contact, calcareous cement
		continued
259.84	262.03	Silty Sandstone, light to medium grey, fine grained minor fine grained lam. throughout, increasing siltiness towards base slicken sides @ 260.70 m slicken sides } @ 30 to C/A calcite along slicken side surface minor carbonaceous plant debris calcite stringers
262.03	262.34	Siltstone, medium grey muddy towards lower contact, minor planar lam., carbonaceous plant debris, minor calcareous cement
262.34	262.47	Mudstone, dark grey, Minor silt, coaly streaks, carbonaceous plant debris
262.47	262.49	COAL - 0.02m black, highly broken, oxidized pyrite, banded, abundant vitrain, unable to tell %'s due to brokenness
262.49	262.62	Mudstone, dark grey, abundant coaly streaks, carbonaceous plant debris, coal band at upper contact less than 0.2 cm)
262.62	263.36	Siltstone, light to medium grey minor siltstone lam. increasing to base sandstone shows X-lam., coaly streaks, carbonaceous plant debris decreasing towards base
263.36	266.86	Sandstone, salt & pepper, fine grained to coarsly grained, coarsening towards base, grainsize grades proportionally from fine grained to coarsly grained X-bedding, minor convoluted bedding from upper contact to centre of section slickensides at 264.16, 264.32, 264.43, 264.59, 264.9 265.09, calcite on slicken side surfaces, bedding } @ 77° to C/A minor carbonaceous plant material throughout decreasing towards lower contact

HOLE#

EMG-81-12

From 266.86m To 270.59 m

FROM	TO	DESCRIPTION
266.86	267.15	COAL - 0.29m - black - poorly cleated banded, sharp upper contact minor fusain streaks, ~ 7% vitrain ~ 93% claro-durain SAMPLE #31
267.15	267.20	Mudstone, dark grey coaly streaks throughout carbonaceous plant debris
267.20	267.58	COAL - 0.38m black, core loss ~ .10m ~ 74% Recoverv banded, cleated, bright ~ 60% vitrain ~ 40% claro-durain SAMPLE #32
267.58	267.67	Mudstone, dark grey Coaly streaks, abundant carbonaceous plant debris
267.67	267.84	Sandstone, salt & pepper, medium grained X-lam. throughout, minor load structures, abundant carbonaceous plant debris, calcareous cement
267.84	267.97	Siltstone, medium grey, increasing mud content towards base minor load structures, abundant carbonaceous plant debris
267.97	268.30	Mudstone, dark grey, slightly silty in places fine grained, sandstone bedding from 268.16 to 268.20 abundant carbonaceous plant debris
268.30	269.95	Sandstone, salt & pepper, fine grained to coarsly grained, increasing grain size towards centre of section, decreasing grain size from centre to base - X-bedding and minor X-lam. in fine grained sandston load structures, minor carbonaceous plant debris throughout, worm burrows near lower contact, minor slickensides with calcite on surfaces in upper portio. Bedding @ 80° to C/A
269.95	270.59	Siltstone, medium grey, minor medium grained sand- stone convoluted lam. near upper contact carbonaceous plant debris throughout

HOLE# EMG-81-12From 270.59 m To 277.00m

FROM	TO	DESCRIPTION
270.59	272.24	Sandstone, salt & pepper, medium grained to coarsly grained, increasing grain size towards base, clean X-bedding throughout, minor carbonaceous plant debris At 271.75 pyrite crystals, calcite, quartz crystals Calcareous cement
272.24	272.95	Siltstone, sandstone interlam. siltstone medium to medium dark grey, sandstone, salt & pepper, fine grained, sandstone is X-lam. minor load structures, minor carbonaceous plant debris near upper contact
272.95	273.51	Siltstone medium to medium dark grey, minor fine grained sandstone lam (X-lam) throughout, increasing mudstone towards base, minor carbonaceous plant debris
273.51	274.01	Mudstone, dark grey, minor carbonaceous plant material
274.01	274.18	Siltstone, medium dark grey, slightly silty in places minor sandstone lenses near lower contact
274.18	274.21	Mudstone, carbonaceous, dark grey to black, minor sandstone lenses, coaly streak
274.21	274.24	COAL, 0.03m black, poorly cleated, lam. ~ 10% vitrain, ~ 90% claro-durain
274.24	274.66	Mudstone, carbonaceous dark grey to black, minor fine grained sandstone lam. near upper contact, dull, dense, minor carbonaceous plant debris
274.66	275.08	COAL, 0.42m, black, 0.11m core loss, 73% recovery, poorly cleated, broken ~ 20% vitrain ~ 80% claro-durain, minor fusain lenses (chips) SAMPLE 33
275.08	276.01	Siltstone, medium grey, coaly streaks, minor carbonaceous plant debris, minor replacement calcite
276.01	276.10	Mudstone, dark grey, carbonaceous plant debris, abundant
276.10	276.26	COAL - 0.16m black, banded, ~ 10% vitrain, 90% claro-durain (? slightly muddy?) core loss of 6cm, 63% recovery
276.26	277.00	Siltstone, light medium grey to medium grey, minor sandstone increases towards base, abundant carbonaceous plant debris, coaly streaks

HOLE# EMG-81-12From 277.00 m To 280.94 m

FROM	TO	DESCRIPTION
277.00	277.20	Mudstone, dark grey to black, carbonaceous towards base, coaly bands <0.01m near upper contact (vitrain) carbonaceous plant debris
277.20	277.86	Siltstone, sandstone interbedded, siltstone medium grey, sandstone, salt & pepper to light medium grey, fine grained, minor convoluted bedding, coaly streaks throughout, increasing towards lower contact, abundant carbonaceous plant debris, minor slickenside
277.86	278.61	Siltstone, medium grey to medium dark grey, minor X-lam., coaly streaks, abundant carbonaceous plant debris decreasing towards base; pyrite nodules @ 278.42m and pyrite flakes continuing to lower contact (abundant)
278.61	278.92	Mudstone, Silty; dark grey, coal band < 0.01m ^A 278.70m and 278.86m, calcareous deposit on either side of coal bands, coaly streaks, abundant carbonaceous plant debris, minor slickensides, minor pyrite flakes, calcite stringers near base
278.92	278.95	COAL - 0.03m black, cleated, banded, ~ 70% vitrain, ~ 30% claro-durain, calcareous cement throughout
278.95	279.27	Siltstone, muddy, medium dark grey, minor sandstone lams. near upper contact, minor load casts, coaly bands < 0.01m @ 279.02, 279.04, 279.10m, slickensides @ 279.08 @ 279.08, 279.31m & @ 60° to C/A, coaly streaks, carbonaceous plant debris
279.27	280.12m	Sandstone, salt & pepper to light grey, fine grained to medium grained, silty towards upper contact, increasing grain size to base, S-Lam., minor convoluted bedding near base, minor worm burrows throughout, minor slump structure near base, minor carbonaceous plant debris throughout
280.12	280.94	Siltstone, medium grey, slightly mudstone in places, calcareous cement, worm burrows (minor), carbonaceous plant debris increasing towards base, minor X-lam.

HOLE# EMG-81-12From 280.94 m To 285.83 m

FROM	TO	DESCRIPTION
280.94	281.55	Sandstone, fine grained to medium grained increasing towards base, salt & pepper, X-bedding, minor load structures near upper contact, worm burrows, plant rootlets, carbonaceous plant debris, decreasing towards base
281.55	282.00	Siltstone, medium grey - medium dark grey, minor sandstone lenses near upper contact, worm burrows, minor plant rootlet, carbonaceous plant debris
282.00m	283.55	Siltstone, sandstone interlam. siltstone medium grey increasing towards base, siltstone, salt & pepper, fine grained - medium grained, sandstone X-lam., minor convoluted bedding throughout, worm burrows, load casts, carbonaceous plant debris, calcareous cement bedding δ at 80° to C/A
283.55	283.99m	Mudstone, silty dark grey, minor fine grained sandstone lam. near upper contact, minor carbonaceous plant debris, calcareous cement;
283.99m	284.03	Mudstone, dark grey, minor medium grained sandstone lams. coaly streaks, minor carbonaceous plant debris
284.03	284.05	COAL - 0.02m black, cleated, \sim 100% vitrain, bright
284.05	284.20	Mudstone, dark grey, coaly streaks throughout, carbonaceous plant debris
284.20m	284.57	Mudstone, sandstone interlam. Mudstone, dark grey, sandstone, salt & pepper, fine grained - medium grained, convoluted bedding, load structures and slump structures, worm burrows, mudstone slightly carbonaceous, carbonaceous plant debris
284.57	284.60	Mudstone, dark grey to black, slightly carbonaceous, coaly streaks, carbonaceous plant debris throughout, 8cm core loss
284.60	285.60	Siltstone, sandstone interlam. siltstone medium grey, sandstone, salt and pepper, fine grained, sandstone shows minor X-lam., load structures, worm burrows, carbonaceous plant debris
285.60m	285.83	Sandstone, salt & pepper, medium grained, X-bedding, ripple marks, minor siltstone, Lam. near base, carbonaceous plant debris

HOLE#

EMG-81-12

From 285.83 m To 289.57 m

FROM	TO	DESCRIPTION
285.83	286.12	Siltstone, Sandstone inter bedding and lam., siltstone medium grey, sandstone, salt & pepper, fine grained, X-lam. minor load structures, minor carbonaceous plant debris, worm burrow near upper contact
286.12	286.30	Siltstone, muddy, medium grey to medium dark grey, grades to mudstone @ base, worm burrows (minor), minor carbonaceous plant debris, sharp contact at base
286.30	286.89	Sandstone, silty, medium grey, very fine grained to fine grained, increasing grain size towards base, minor X-lams near base, carbonaceous plant debris, minor worm burrows
286.89	287.94	Sandstone, salt & pepper, fine grained - coarsly grained, X-bedding, sandstone with minor mudstone lams from 286.89 to 287.02m, from 287.02m, sandstone is fine grained with increasing grain size towards base to coarsly grained, X-bedding, minor worm burrows, calcareous cement, carbonaceous plant debris, minor slickensides
287.94	287.95	Sandstone, Siltstone interlam, sandstone, salt & pepper, fine grained, siltstone medium grey, X-lam, minor carbonaceous plant debris, load casts, minor slump, minor worm burrows, bedding @ 80° to C/A
287.95	288.06	Sandstone, salt & pepper, medium grained, X-bedding, carbonaceous plant debris, sharp lower contact, calcareous cement
288.06	288.18	Sandstone, salt & pepper to medium grey, fine grained, X-lam., minor carbonaceous plant debris, calcareous cement
288.18	288.84	Siltstone, salt & peppr interlam., siltstone medium grey to medium dark grey, sandstone, salt & pepper, fine grained, x-lam., load structures, slump structure worm burrows, carbonaceous plant debris throughout
288.84	289.27	Siltstone, muddy, medium dark grey, abundant carbonaceous plant debris, coaly streaks,
289.27	289.57	Sandstone, muddy siltstone interbedded, sandstone, salt & pepper, medium grained, siltstone medium dry grey to dark grey, sandstone X-lam. plant debris

HOLE# EMG-81-12From 289.57 m To 297.50 m

FROM	TO	DESCRIPTION
289.27	289.57	convoluted bedding towards base, load structure and
		Continued minor slump structures near centre of section,
289.57	290.39	Mudstone, dark grey, slightly silty near upper contact
		sharp contact on base, minor carbonaceous plant debris
		pyrite @ 290.17 - 290.15m Core Loss 5 cm
290.39	291.22	Sandstone, fine grained - medium grained, salt and
		Pepper, medium grained sandstone is X-bedded, minor
		plant rootlets, carbonaceous plant debris decreasing
		towards base, minor worm burrows
291.22	291.69	Siltstone, medium grey to medium dark grey, slightly
		muddy in places, minor slickensides, abundant
		carbonaceous plant debris, calcite on slickensides,
		coaly streaks
291.69	295.34	Sandstone, Siltstone, Inter lam., sandstone, salt
		and pepper, fine grained, siltstone medium grey,
		siltstone increasing towards base, 44 cm core loss -
		core broken, X Lam., bedding $< @ 80^{\circ}$ to C/A
		load structure, plant debris, calcareous cement,
		minor worm burrows
295.34	295.94	Sandstone, fine grained-medium grained, salt and
		pepper to medium grey, ripple marks, worm burrow,
		minor carbonaceous plant debris, calcareous cement
295.94	296.26	Siltstone, medium grey to medium dark grey,
		carbonaceous plant debris, calcareous cement
296.26	296.88	Mudstone, silty, medium dark grey to dark grey in-
		creasing silt toward lower contact, minor
		slickensides, carbonaceous plant debris, calcite on
		slickenside surfaces, minor calcareous cement
296.88	297.13	Sandstone, salt & pepper, medium grained, X-lam.,
		minor mudstone lams throughout slickensides, minor
		carbonaceous plant debris, calcareous cement
297.13	297.50	Sandstone, Siltstone, (muddy) interbedded, sandstone
		salt and pepper, medium grained and siltstone medium
		dark grey, minor X-lam., minor load structure, worm
		burrows, abundant carbonaceous plant debris in muddy
		siltstone

HOLE# EMG 81-12 From 305.30m To 306.32

FROM	TO	DESCRIPTION
305.30	305.91	Sandstone, salt & pepper, fine grained - medium grained
		Mudstone band at 305.80 to 305.86
		Mudstone, medium dark grey with coaly streaks
		X-Lam, convoluted lam. worm burrows, load casts,
		abundant carbonaceous debris, coaly material
		minor calcareous cement
305.91	306.25	Muddy Siltstone, medium grey, minor carbonaceous debris, minor calcareous cement
306.25	306.32	Mudstone, medium dark grey, abundant coaly streaks, abundant carbonaceous plant material, calcite band
		END OF HOLE
		T.D. = 306.32m

D.D.H. EMG-81-13
WELL COMPLETION REPORT

Location: - On a newly constructed access roak (by Utah Mines Ltd.) 1,300 metres from its junction with a Canfor Ltd. log landing.
- U.T.M. Coordinates: 6,210,910mN x 539,768mE.
- Coal Licence No. 3518.

Elevation: 1088 metres

Orientation: Vertical

Date Collared: June 17, 1981

Date Completed: June 23, 1981

Plugged: Yes - cemented

Overburden Depth: 99.00 metres

Casing Depth: 102.72 metres

Casing Size: HW-11.4cm
(recovered)

Final Depth: 255.12 metres

Formations Encountered: 0 to 99.00m Overburden
99.00m to 255.12m Gething Formation

Core Description By: K. Foellmer

Coal Seams Sampled:

<u>Sample No.</u>	<u>Seam Name</u>	<u>Interval</u>	<u>Thickness</u>	
			<u>Core</u>	<u>Density Log</u>
34		126.99m to 127.62m	0.63m	1.35m
36	Riverside	136.09m to 138.93m	2.84m	3.80m
37	Riverside	136.26m to 139.71m	0.45m	
38		157.50m to 158.55m	1.05m	1.00m
39		163.39m to 163.65m	0.26m	0.40m
40		180.49m to 180.88m	0.39m	0.40m
41		189.86m to 190.07m	0.21m	0.30m
42		190.17m to 190.43m	0.26m	0.25m
43		196.08m to 196.28m	0.20m	0.20m
44		206.11m to 206.32m	0.21m	0.20m
45		206.60m to 207.00m	0.40m	0.40m
46		208.22m to 208.48m	0.26m	0.30m
47		226.18m to 226.95m	0.77m	0.75m
48		249.93m to 250.70m	0.77m	0.75m

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

Comments: No resistivity log run as resistivity module inoperative on probe.

HOLE# EMG-81-13From 0.0m To 104.97m

FROM	TO	DESCRIPTION
0.0	102.72	OVERBURDEN
102.72	103.12	Siltstone, Medium Grey with Rust Brown Streaks Broken
103.12	103.63	Sandstone, Siltstone Interlaminated Sandstone, Salt and Pepper, Fine Grained - Medium Grained Siltstone, Medium Dark Grey Convoluting Bedding, Slump Structure Minor Load Structures, Worm Burrows, Bedding @ 75° to Carbonaceous Plant Debris Near Lower Contact (Minor) C/A
103.63	103.98	Sandstone, Salt and Pepper, Medium Grey Minor Fine Grained Sandstone Laminae and Very Minor Mudstone Laminations X-Bedding, Minor Carbonaceous Plant Debris
103.98	104.22	Siltstone, Medium Grey, Slightly Muddy in Places Minor Calcite Streamers near Lower Contact Minor Worm Burrows, Carbonaceous Plant Debris Minor Coaly Streaks near Lower Contact
104.22	104.35	Sandstone, Salt and Pepper, Medium Grained Abundant Carbonaceous Plant Debris X-Bedded
104.35	104.52	Siltstone, Sandstone Interbedded Siltstone, Medium Grained, Sandstone, Salt & Pepper, Fine - Medium Grained Rusty Colour Throughout with Rusty Streaks Minor Convoluting Laminae Load Structures, Minor Worm Burrows Carbonaceous Plant Debris, Calcareous Cement
104.52	104.84	Siltstone, Medium Grey Minor Mudstone Laminae Minor Worm Burrows, Abundant Carbonaceous Plant Debris Bedding @ 73° to C/A Minor Pyrite Replacement of Plant Debris Minor Coaly Streaks in Middle of Section Calcareous Cement
104.84	104.87	COAL - .03m Black Mushy, Highly Weathered Unable to Determine Composition.

HOLE* EMG-81-13

From 104.97m To 107.19m

FROM	TO	DESCRIPTION
104.87	105.24	Siltstone, Medium Grey, Orange Brown Bands
		Minor Mudstone Laminae, Mudstone Content increases towards base
		Abundant Carbonaceous Debris, Coaly Streaks,
		Carbonaceous Cement
105.24	105.86	Mudstone, dark grey
		Abundant Carbonaceous Plant Debris
		Slickensides at 105.70 @ 65° to C/A
		Coal Band, Due to Weathered Condition, Unable to Place in Section
105.86	106.19	Siltstone, Mudstone Interlaminae
		Siltstone, Dark Grey, Yellow Brown in Places
		Mudstone- Light Grey - Light Yellow Brown
		Very Weathered, Carbonaceous Plant Debris
		Very Soft
		Possible Fault - @ 106.13m @ 27° to C/A
		Upper Contact @ 75° to C/A
		Iron Staining Throughout
		Rock contains Water
106.19	106.28	Mudstone Dark Grey, Abundant Carbonaceous Plant Debris
		Becomes Silty Toward Base
		Coaly Streaks Toward Base
106.28	106.36	Siltstone, Medium Dark Grey
		Carbonaceous Plant Debris with Minor Pyrite Replacement
		Minor Planar Laminae
106.36	106.82	Sandstone, Siltstone, Fine - Medium Grained,
		Medium Grained Near Lower Contact, X-Bedding, Minor
		Calcite Stringers Near Middle of Section, Minor Load
		Structures, Carbonaceous Plant Debris and Minor Pyrite
		Replacement, Calcareous Cement
106.82	107.19	Sandstone, Siltstone, Interlaminated
		Sandstone, Salt and Pepper, Fine Grained
		Siltstone, Medium Grey
		X-Laminae, Load Structures, Minor Calcite Stringers
		Carbonaceous Plant Debris, Minor Worm Burrows Near
		Lower Contact, Iron (rusty) Stains
107.19	108.36	sandstone, Salt and Pepper, Medium Grained
		Minor mudstone beds near upper contact

HOLE# EMG-81-13From 108.36 m To 112.24 m

FROM	TO	DESCRIPTION
107.19	Cont'd	X-Bedding, Very Minor Carbonaceous Plant Debris Minor Fe (Rust) Staining, Calcareous Cement
108.36	108.44	Siltstone, Medium Dark Grey Minor Carbonaceous Plant Debris, Rust Stain, Weathered
108.44	108.48	COAL 0.04m Black, Very Weathered, Minor Vitrain Difficult to Determine Composition
108.48	108.71	Silty Mudstone, Medium Dark Grey Abundant Carbonaceous Plant Debris, Minor Coaly Streaks
108.71	109.42	Sandstone, Siltstone, Interlaminated Sandstone, Salt and Pepper, Medium Grained Siltstone, Medium Grey to Medium Dark Grey X-Laminae, Load Structures, Minor Slump Structures, Minor Coaly Streaks, Carbonaceous Plant Debris (Abundan Worm Burrows, Plant Rootlets Minor Calcareous Cement on Bedding Planes Micaceous, Iron Stains (Yellowish)
109.42	109.52	Mudstone, Medium Dark Grey, Slightly Silty in Places Carbonaceous Plant Debris
109.52	110.51	Sandstone, Siltstone Interlaminatae and Interbedded Sandstone, Salt and Pepper, Medium Grained to Coarsly Grained, Increased Toward Base Siltstone, Medium Grey to Medium Dark Grey, Slightly Muddy in Places, X-Laminae, Load Structures Bedding @ 73° to C/A Abundant Carbonaceous Plant Debris, Calcareous Stringer Minor Worm Burrows
110.51	111.15	Sandstone, Salt and Pepper, Medium grained to Coarse Grained, Coarsening towards Lower Contact, X-Bedding, Carbonaceous Plant Debris increasing to Lower Contact, ^{Minor} Mud rip up clasts @ 111.09
111.15	112.24	Sandstone, Siltstone Interlaminated with Minor Mudstone ^{Lam.} Sandstone, Salt and Pepper, Fine Grained Siltstone, Medium Grey to Medium Dark Grey X-Laminae, Slump Structures Throughout, Minor Load Structures, Abundant Worm Burrows, Carbonaceous Plant Debris, Bedding @ 77° to C/A Minor Plant Rootlets Near Lower Contact

HOLE# EMG-81-13From 118.22 m To 123.77 m

FROM	TO	DESCRIPTION
114.68	Cont'd	Minor Calcareous Stringer, Brown Orange Oxidized Sandstone Band @ 116.71 - 116.75m
118.22	118.53	Siltstone, Sandstone Interlaminated Siltstone, Medium Grey to Medium Dark Grey increasing Sandstone, Salt and Pepper, Fine Grained towards base X-Laminated, Minor Load Structure Bedding @ 70° to C/A, Minor Oxidation to Orange Brown Throughout, Carbonaceous Plant Debris, Calcareous Cement on Bedding Planes
118.53	119.26	Siltstone (Muddy), Medium Dark Grey Fractured Throughout, Almost Vertical Fracture from 118.75 to 119.05m Calcite on Fracture Surface, Orange- Brown, Oxidation, Minor Carbonaceous Plant Debris
119.26	120.08	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, with Minor Siltstone Laminae which are medium Grey, Oxidized or orange Bands at 119.63m to 119.69m Possible Fracture Surface at 119.63 to 119.74m @ 9° to C/A. X-Bedding, Load Structures, X-Lam. Plant Rootlets, Worm Burrows, Minor Calcite
120.08	121.80	Siltstone, Medium Dark Grey, Sandy Near Upper and Lower Contact Decreasing Towards Centre of Section, Minor Mudstone Laminae, Carbonaceous Plant Debris, Shell Molds and Casts, Minor Pyrite Replacement of Plant Debris, Calcareous Cement
121.80	122.18	Sandstone, Salt and Pepper, Fine Grained, Medium Grained near Centre of Section, X-Lam., Carbonaceous Plant Debris Increasing Towards Base, Minor Coaly Streaks, Calcareous Cement
122.18	123.28	Sandstone, Siltstone, Interlam, Mudstone Laminae Near Lower Contact, Sandstone, Salt and Pepper, Fine Grained, Siltstone Medium Grey, X-Lam, Minor Worm Burrows, Calcite along Fracture Surfaces, Minor Fracture Surfaces, Carbonaceous Plant Debris, Calcareous Cement, Bedding @ 75° to C/A
123.28	123.77	Muddy Siltstone, Dark Grey, Minor Mudstone Beds (very soft), Minor Orange Brown Oxidation, Minor

HOLE# EMG-81-13From 123.77 m To 128.64 m

FROM	TO	DESCRIPTION
123.28	Cont'd	Carbonaceous Plant Debris, Calcareous Cement, Minor Pyrite Flakes, Shell Fragments, Minor Coaly Streaks
123.77	124.77	Sandstone, Siltstone, Interlaminated Increasing Silt Content Toward Base, Sandstone, Salt and Pepper, Fine Grained, Siltstone, Medium Grey, Planar Laminae, Load Structures, Minor Convoluted Bedding, Calcareous Cement, Minor Carbonaceous Plant Debris, Worm Burrows
124.77	126.05	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Coarsening Towards Lower Contact, Minor Siltstone Laminae Throughout, X-Bedding, X-Laminae, Minor Load Structures, Minor Coaly Streaks, Plant Rootlets, Minor Slickensides, Carbonaceous Plant Debris Bedding @ $\sim 78^{\circ}$ to C/A
126.05	126.23	Silty Mudstone, Medium Grey, Minor Sandstone X-Laminae Abundant Carbonaceous, Plant Debris, Calcareous Cement
126.23	126.46	Mudstone, Dark Grey to Black, Carbonaceous Towards Base
126.46	126.54	COAL - 0.08m, Black, Banded, Cleated $\sim 50\%$ Vitrain $\sim 50\%$ Claro-Durain - Broken
126.54	126.76	Coaly Mudstone, Dark Grey to Black Coaly Streaks Throughout, Minor Slickensides
126.76	126.95	COAL - 0.19m, Black, Poorly Cleated, Banded $\sim 60\%$ Claro-Durain $\sim 40\%$ Vitrain
126.95	126.99	Coaly Mudstone, Dark Grey to Black Coaly Streaks, Minor Pyrite Bands
126.99	127.62	COAL - 0.63m Black Cannel Coal, Dull Conchoidal Fracture, Banded, Minor Vitrain, Coal Streaks, Very Minor Pyrite, Hard SAMPLE # 34
127.62	127.77	Coaly Mudstone, Dark Grey to Black Coaly Streaks, Pyrite Disseminated Throughout
127.77	127.95	COAL - 0.18m, Black, Poorly Cleated, Banded $\sim 5\%$ Vitrain $\sim 92\%$ Claro-Durain, $\sim 3\%$ Fusain, Minor Pyrite Flakes Throughout
127.95	128.64	Muddy Siltstone, Medium Grey to Medium Dark Grey, Minor Mudstone Laminae, Coaly Streaks Near Upper Contact, Carbonaceous Plant Debris, Pyrite Disseminated Throughout

HOLE# EMG-81-13From 128.64m To 134.09 m

FROM	TO	DESCRIPTION
128.64	128.75	Silty Mudstone, Dark Grey, Coaly Streaks Throughout, Minor Calcite Stringers at Upper Contact, Pyrite Disseminated Throughout Section
128.75	129.01	Siltstone, Medium Grey, Minor Coaly Streaks Minor Carbonaceous Plant Debris, Slickensides at Basal Contact @ 73° to C/A, Calcite on Surface of Slickensides, Increasing Mud Content Towards Base
128.01	129.21	Mudstone, Dark Grey to Black Abundant Carbonaceous Plant Debris, Abundant Coaly Streaks, Minor Pyrite Replacing Plant Debris
129.21	129.23	COAL - 0.02m Black, Highly Broken, Weathered, laminated Unable to Determine Composition Because Too Broken, Abundant Claro-Durain
129.23	130.02	Silty Mudstone, Dark Grey, Minor Fine Grained Sandstone Lam. near Centre of Section Carbonaceous Plant Debris, Pyrite Disseminated Throughout Section, Pyrite Replacement of Plant Debris, Minor Coaly Streaks
130.02	130.82	Sandstone, Salt and Pepper, Fine Grained, Minor Siltstone Lam. - Medium Grey, X-Bedding, X-Laminated Minor Carbonaceous Plant Debris, Decreasing Towards Base Bedding @ 78° to C/A
130.82	131.49	Siltstone, Medium Grey, Minor Fine Grained, Sandstone Lam. Near Base, Minor Muddiness Near Centre of Section Minor Load Casts, Minor Carbonaceous Plant Debris
131.49	131.83	Muddy Siltstone - medium dark grey; pyrite replacement of plant debris, Carbonaceous Plant Debris,
131.83	132.84	Siltstone, Medium Grey to Medium Dark Grey, Increasing Mud Content Towards Base, Gradational Lower Contact - Minor Carbonaceous Plant Debris
132.84	133.47	Mudstone, Medium Grey to Dark Grey, Increasing Silt Content Towards Base, Slightly Carbonaceous Towards Base, Carbonaceous Plant Debris Increasing Towards Base, Pyrite Replacement of Plant Debris, Coaly Streaks
133.47	134.09	Siltstone, Sandstone, Interlam, Siltstone Medium Grey to Medium Dark Grey, Slightly Muddy in Places Sandstone, Salt and Pepper, Fine Grained, - 0.05m Loss

HOLE* EMG-81-13From 134.09 m To 137.53 m

FROM	TO	DESCRIPTION
133.47	Cont'd	X-Laminae, Load Structures, Abundant Carbonaceous Plant Debris, Pyrite Replacement of Plant Debris, Calcareous Cement
134.09	134.34	Siltstone, Medium Grey Fracture From 134.21 to 134.30 @ 27° to C/A Carbonaceous Plant Debris Throughout, Minor Pyrite Replacement of Plant Debris Calcareous Cement
134.34	134.98	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Coarsening Towards Base, X-Lam. Load Casts Abundant Carbonaceous Plant Debris, Calcareous Cement, Worm Tube filled with Pyrite and Quartz Crystals, Minor Slickensides
134.98	135.15	Siltstone, Medium Grey, Increasing Mud Content Towards Base, Carbonaceous Plant Debris, Minor Worm Burrows, Calcareous Cement
135.15	136.09	Silty Mudstone, Medium Dark Grey to Dark Grey -Core Loss ~ .10m, Coal Bands at 135.58m and 135.66m <0.01m Thick, Highly Broken, Maybe More Bands but Core too Broken to see, Slickensides at 135.58m @ 60° to C/A, Abundant Carbonaceous Plant Debris Increasing Towards Base, Minor Pyrite Replacement of Plant Debris, Calcareous Cement
136.09	136.31	COAL - 0.22m Black, Bright, Cleated Broken, Pyrite Disseminated Throughout, Minor Fusain, ~ 90% Claro-Durain, CORELOSS ~ 0.03m ~ 10% vitrain, Sample 36
136.31	136.47	Mudstone, Dark Grey, Slightly Carbonaceous, Slickensides Throughout, Coaly Streaks, Minor Pyrite Flakes Throughout
136.47	137.29	COAL - 0.82m Black, Poorly Cleated ~ 3% Fusain, ~ 20% Vitrain, ~ 77% Claro-Durain, Minor Pyrite Disseminated Throughout, Abundant Pyrite at Base, Sample 36
137.29	137.38	Coaly Mudstone, Dark Grey - Brown to Black - Highly Broken, Contains Abundant Water - Coaly Streaks
137.38	137.53	COAL - 0.15m, Black, Cleated, Broken ~ 5% Vitrain, ~ 95% Claro-Durain Sample #36

HOLE* EMG-81-13From 137.53m To 141.43 m

FROM	TO	DESCRIPTION
137.53	137.61	Mudstone, Dark Grey-Brown Very Soft, Minor Coalv Streaks, Minor Pyrite Throughout
137.61	137.65	COAL - 0.04m Black, Highly Broken, Pyrite Disseminated Throughout, ~ 90% Vitrain, ~ 10% Claro-Durain, Sample#3
137.65	137.91	Mudstone, Dark Grey Brown to Black, Coalv Towards Base, Pyrite Disseminated Throughout, Coalv Streaks, Carbonaceous Plant Debris Sample # 36
137.91	138.93	COAL - 1.02m Black, Poorly Cleated, Dull Minor Banding, Predominant Cannel Coal? ~ 5% Fusain, ~ 10% Vitrain, ~ 85% Claro-Durain, ~ 100% Recovery, Minor Pyrite Throughout Sample # 36
138.93	139.05	Mudstone, Dark Grey Brosn, Soft, Coalv Streaks, Minor Carbonaceous Plant Debris, Coal Band < 0.01 m Near Upper Contact-
139.05	139.26	Muddy Siltstone, Medium Dark Grey, Increasing Mud Content Towards Base, Abundant Carbonaceous Plant Debris, Minor Pyrite Replacement of Plant Debris
139.26	139.71	COAL - 0.45m Black, Banded, Cleated in Places, Slightly Muddy Near Upper Contact, Mudstone Split < 0.01cm at 139.50m, Broken from 139.47m to 139.71 with/ ~ 0.04m CoreLoss ~ 5% Fusain ~ 40% Vitrai ~ 55% Claro-Durain, SAMPLE # 37
139.71	139.83	Mudstone, Medium Dark Grey Brown Carbonaceous Plant Debris
139.83	140.03	Siltstone, Medium Grey, Slightly Muddy in Places, Abundant Carbonaceous Plant Debris, Minor Pyrite Replacement of Plant Debris, Gradational Lower Contact,
140.03	140.47	Sandstone, Salt and Pepper, Fine Grained, Coarsens Towards Base, X-Lam, Minor X-Bedding, Minor Load Structures, Carbonaceous Plant Debris, Minor Pyrite Replacement near Upper Contact
140.47	141.33	Siltstone, Sandstone, Interlaminated, Siltstone, Medium Dark Grey, Sandstone, Salt and Pepper, Fine Grained, X-Laminae, Minor Road Structures, Bedding @ 78° to C/A - Carbonaceous Plant Debris
141.33	141.43	Mudstone, Dark Grey Carbonaceous Plant Debris, Minor Pyrite Replacement

HOLE#

EMG-81-13

From 141.43 m To 149.59 m

FROM	TO	DESCRIPTION
141.33	Cont'd	of Plant Debris, Coal Bands < 0.01m Near Base
141.43	141.53	COAL - 0.10m Black, Cleated, Banded ~ 40% Vitrain ~ 60% Claro-Durain, Very Minor Pyrite Disseminated Throughout
141.53	142.01	Siltstone, Medium Grey, Carbonaceous Plant Debris Throughout, Minor Pyrite Replacement of Plant Debris, Coaly Streaks,
142.01	142.34	Mudstone, Dark Grey to Black - Minor Slickensides, Carbonaceous Plant Debris - Minor Pyrite Replacement of Plant Debris
142.34	143.51	Siltstone, Medium Grey Coaly Streaks, Minor Carbonaceous Plant Debris, Pyrite Replacement of Plant Debris
143.51	146.26	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Minor Siltstone Laminae Throughout, X-Bedding, Minor Load Casts, Mud Rip up Clasts at Lower Contact, Bedding Angle 75° to C/A - Minor Carbonaceous Plant Debris, Minor Pyrite Replacement of Plant Debris near Lower Contact
146.26	147.62	Siltstone, Sandstone, interbedded Siltstone, Medium Grey, Decreasing towards base Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Increasing Grain Size towards base. X-Laminae, Load Structures Carbonaceous Plant Debris, Minor Coaly Streaks near upper contact, Pyrite Replace of Plant Debris near Upper Contact, Fracture at 147.16m angle 45° to C/A, Mud along Fracture Surface, Sharp Lower Contact
147.62	149.15	Sandstone, Salt and Pepper, Very Coarse Grained, contains Pebble Bands throughout, Pebbles are up to ~ 1.0cm in diameter, predominantly Quartz and Chert Sub rounded to rounded - Minor X-Bedding, clean Possible fracture from 148.09m to 149.03m angle at 3° to C/A
149.15	149.59	Sandstone, Very Coarse Grained, Salt and Pepper, Yellow Brown, Minor Pebble Bands with Pebbles to 0.8cm, Yellow Brown Colour possible due to a Mudstone Matrix

HOLE#

EMG-81-13

From 149.50 m To 157.40 m

FROM	TO	DESCRIPTION
149.59	151.47	Sandstone-Quartz Very Coarse Grained, Salt and Pepper, Minor Pebble Bands up to 0.4cm Diametre, Pebble comp. Predominantly Quartz and Chert, Sub-Rounded to Rounded From 150.33 to 150.60m yellow-brown Mud Matrix Possible Fracture from 151.38m angle 7° to C/A
151.47	151.61	Conglomerate Salt and Pepper, Quartz Chert Pebble with Minor Mafics, Pebbles up to 1.0cm Diametre, Sub-angular to Sub-rounded, Coarse Grained Sandstone Matrix
151.61	151.83	Sandstone Quartz, Salt and Pepper, Coarse Grained to Very Coarse Grained, Clean, Minor Pebbles up to 0.5cm Throughout
151.83	152.10	Conglomerate - Quartz Chert Pebbles, Salt and Pepper, Pebbles up to 1.2cm in Diameter, Sub-angular to Sub-rounded, Coarse Grained, Sandstone Matrix, Coaly Chip - Decreasing in Grain size towards Base, Minor Calcareous Cement
152.10	154.56	Sandstone, Quartz, Salt and Pepper, Coarse Grained to Very Coarse Grained, Clean Increasing in Pebble Bands towards base, Pebbles Quartz Chert, up to 1.1cm in Diametre, Sub-Angular to Sub-Rounded, Minor Coaly Streaks, Minor Calcareous Cement
154.56	154.70	Conglomerate - Chert Quartz Pebble - Salt and Pepper, Pebbles up to 1.3cm diametre, Sub-angular to Subrounded, Coarse Grained, Sandstone (quartz) Matrix, Minor Calcareous Cement, Coaly Chips, Sharp Lower Contact
154.70	155.94	Muddy Siltstone, Medium Grey, Decreasing Mud Content towards Base, Minor Carbonaceous Plant Debris Throughout
155.94	156.71	Sandstone, Salt and Pepper, Fine Grained, Minor Siltstone Laminated near top and bottom of Section X-Laminated, Load Structures, Worm Burrows, Carbonaceous Plant Debris, Bedding Angle at 79° to C/A, Minor Calcareous Cement
156.71	157.40	Siltstone, Medium Dark Grey, Minor Fine Grained Sandstone Laminae, Minor Load Structures, Minor Slump Structures, Carbonaceous Plant Debris Decreasing towards base, Minor Calcareous Cement

HOLE# EMG-81-13From 157.40 m To 163.26 m

FROM	TO	DESCRIPTION
157.40	157.50	Mudstone, Dark Grey, Slightly Silty in Places - Carbonaceous Plant Debris, Abundant Pyrite on Bedding Surfaces
157.50	158.55	COAL - 1.05m Black - Banded, Minor Cleating in Vitrain - Possibly some Cannel Coal Near Upper Contact ~ 5% Fusain ~ 17% Vitrain ~ 78% Claro-Durain - Minor Pyrite Flakes Near Upper Contact SAMPLE #38
158.55	159.00	Silty Mudstone, Medium Dark Grey to Dark Grey, Minor Silt Content Towards Base Abundant Carbonaceous Plant Debris, Pyrite Replacement of Plant Debris, Coaly Streaks
159.00	160.20	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Increasing Grain Size Towards Base, X-Bedding, X-Laminated, Minor Carbonaceous Plant Debris Plant Rootlets
160.20	160.43	Siltstone, Sandstone, Interbedded, Siltstone, Medium Grey, Sandstone, Salt and Pepper, Medium Grained to Coarse Grained, X-Bedding, X-Laminated, Minor Carbonaceous Plant Debris
160.43	160.94	Siltstone, Medium Grey to Medium Dark Grey, Minor Fine Grained Sandstone with Increasing Mud Content Towards Base, Gradational Contact Bedding Angle at 77° to C/A, Very Minor Carbonaceous Plant Debris
160.94	161.63	Silty Mudstone, Dark Grey to Medium Dark Grey, Minor Carbonaceous Plant Debris, Minor Coaly Streaks, Worm Tubes, Plant Rootlet
161.63	162.49	Siltstone, Sandstone, Mudstone Interlaminated, Sandstone Laminae near Upper, Mudstone Near Lower, Siltstone Medium Grey, Sandstone, Salt and Pepper, Fine Grained, Mudstone Dark Grey, X-Laminated (Sandstone) Plant Rootlets, Minor Coaly Streaks, Carbonaceous Plant Debris, Minor Calcareous Cement
162.49	163.26	Sandstone, Siltstone Interbedded at Upper Contact to Interlam. at base, Sandstone, Salt and Pepper, fine Grained to Medium Grained, Siltstone Medium Grey

HOLE#

EMG-81-13

From 163.26 m To 167.24 m

FROM	TO	DESCRIPTION
		to Medium Dark Grey, X-Laminae in Sandstone, Minor Convoluted Bedding towards Base. Load Structures
		Worm Burrows, Carbonaceous Plant Debris, Minor Calcareous Cement.
163.26m	163.36	COAL - 0.10m, Black, Minor Fusain ~ 15% Vitrain, 85% Claro-Durain, Poorly Cleated, Laminated
163.36	163.39	Silty Mudstone, Dark Grey to Black, very Hard, Fracture
163.39	163.65	COAL 0.26m, Black, Cleated in Places, ~ 37% Vitrain 60% Claro-Durain, Core Loss - 77%, 3% Fusain (charcoal?) SAMPLE 39
163.65	163.85	Silty Mudstone, Dark Grey to Medium Dark Grey, Minor Slickensides near Upper Contact, Abundant Coaly Debris, Pyrite Replacement of Plant Debris, Coaly Streaks Throughout
163.85	164.40	Siltstone, Medium Grey, Increasing Sand Content towards Base, Carbonaceous Plant Debris, Minor Coaly Streaks, Calcareous Cement
164.40	164.83	Sandstone, Salt and Pepper, Fine Grained X-Bedding, Scouring, Minor Load Structures, Carbonaceous Plant Debris, Minor Pyrite Replacement of Plant Debris, Calcareous Cement
164.83	165.50	Siltstone, Sandstone, Interbedded, Siltstone, Medium Grey, Sandstone, Salt and Pepper, Medium Grey, Sandstone is X-Laminated, Load Structures, Minor Worm Burrows, Minor Carbonaceous Plant Debris Bedding Angle 75° to C/A
165.50	166.50	Muddy Siltstone, Medium Grey to Medium Dark Grey, Muddier near centre of Section Abundant Carbonaceous Plant Debris, Coaly Streaks near Upper Contact
166.50	166.80	Sandstone, Salt and Pepper, Fine Grained X-Laminated, Minor Convoluted Bedding, Minor Load Structures, Carbonaceous Plant Debris, Calcareous Cement
166.80	167.24	Siltstone, Medium Grey, Minor Fine Grained Sandstone Laminae, Abundant Carbonaceous Plant Debris, Calcareous Cement

FROM	TO	DESCRIPTION
167.24	167.40	Silty Mudstone, medium Dark Grey to Dark Grey, Carbonaceous Plant Debris, Minor Coaly Streaks, Slickensides 167.30m Angle 75° to C/A, Calcareous Cement
167.40	168.20	Sandstone, Salt and Pepper to Medium Grey, Medium Grained to Fine Grained, Grain Size Decreasing towards Base, Becomes a Siltstone at Base, X-Laminated, Minor Load Structures, Minor Carbonaceous Plant Debris
168.20	169.06	Siltstone, Sandstone, Interlaminated, Increasing Siltstone content towards Base, Siltstone, Medium Grey to Medium Dark Grey, Slightly Muddy Towards Base, Sandstone, Salt and Pepper, Fine Grained, Minor Medium Grained Sandstone Laminae near Upper Contact, - Minor X-Laminae Minor Load Structures, Carbonaceous Plant Debris Throughout, Calcareous Cement
169.06	170.98	Muddy Siltstone, Medium Dark Grey, Minor Fine Grained Sandstone Laminae. Sandstone is X-Laminated, Minor Load Structures, Minor Slickensides, Carbonaceous Plant Debris, Pyrite Replacement of Plant Debris near Sandstone Laminae
170.98	171.09	Mudstone, Dark Grey-Brown, Abundant Carbonaceous Plant Debris, Coaly Streaks, Minor Pyrite Replacement of Plant Debris
170.09	172.10	Sandstone, Siltstone, Interlaminae Sandstone, Salt and Pepper, Very Fine Grained, Siltstone, medium Grey - X-Lam, minor Convolutd Laminae Ripple Marks, Load Structures, Worm Burrows, Minor Pyrite near Lower Content, Carbonaceous Plant Debris, Minor Rip Up Clasts Bedding Angle at 70° to C/A
172.10	172.12	Mudstone, Dark Grey Brown, Carbonaceous Plant Debris, Pyrite Replacement of Plant Debris, Coaly Streaks, Slickensides at Lower Contact, Slickensides Angle at 70° to C/A
172.12	172.30	COAL - 0.18m, Black, Banded, Poorly Cleated ~ 85% Claro-Durain ~ 15% vitrain

HOLE# EMG-81-13From 172.30 m To 177.90 m

FROM	TO	DESCRIPTION
172.30	172.42	Silty Mudstone, Dark Grey - Abundant Carbonaceous Plant Debris, Coaly Streaks
172.42	172.92	Sandstone, Siltstone, Interlam. Siltstone, Medium Grey Sandstone, Salt and Pepper, Fine Grained, X-Laminae, Load Casts, Worm Burrows, Minor Carbonaceous Plant Debris, Bedding Angle 77° to C/A
172.92	173.07	Mudstone, Dark Grey Brown -Carbonaceous Plant Debris, Coaly Streaks, Minor Slickensides, Calcite on Slickensides Surface
173.07	174.00	Sandstone, Salt and Pepper, Fine Grained to Coarse Grained, Coarsening Towards the Base X-Bedding, Load Structures, Slump Structures, Worm Burrows, Tree Rootlets, Minor Coaly Streaks, Carbonaceous Plant Debris, Calcareous Cement
174.00	174.42	Siltstone, Medium Grey - Minor Carbonaceous Plant Debris, Calcite Stringers, Minor Worm Burrows, Mud Rip-up Clasts at Lower Contact
174.42	174.46	Mudstone, Dark Grey Minor Carbonaceous Plant Debris, Minor Slickensides
174.46	175.09	Siltstone, Sandstone, Interlam. Siltstone, Medium Grey, Sandstone, Salt and Pepper, Fine Grained, Convolute Lam. Rip-up Clasts, Load Structures - Minor Carbonaceous Plant Debris Increasing Towards Lower Contact - Pyrite Replacement of Plant Debris near Lower Contact
175.09	175.35	COAL - 0.26m Black, Core Loss ~ 0.08cm ~ 69% Recovery, Banded, Poorly Cleated ~ 3 % Vitrain ~ 97% Claro-Durain
175.35	175.87	Muddy Siltstone, Medium Dark Grey, CORE LOSS ~ 0.07m - Coaly Streaks, Abundant Carbonaceous Plant Debris, Pyrite Replacement of Plant Debris
175.87	177.90	Sandstone, Salt and Pepper, Fine Grained to Coarse Grained, Minor Siltstone Lam, Interlaminated by Grain Size - X-Lam, Load Structures, Scouring, Worm Burrows, Calcite along Bedding Planes in Lower Section of Core, Abundant Carbonaceous Plant Debris - Gradational Lower Contact

HOLE# EMG-81-13From 177.90m To 187.07m

FROM	TO	DESCRIPTION
177.90	178.70	Siltstone, Medium Grey, Slightly Muddy in Places Coaly Streaks near Centre of Section, Carbonaceous Plant Debris, Minor Calcareous Cement
178.70	180.49	Sandstone, Salt and Pepper, Fine Grained to Coarse Grained, Coarse Grained near Lower Contact, - convoluted Bedding, Load Structures, Minor Slump Structures, Minor Worm Burrows, Coal Band ~ 0.5cm at 179.24m, Carbonaceous Plant Debris, Minor Pyrite Replacement Near upper Contact
180.49	180.88	COAL - 0.39m Black CORE LOSS 0.06m recovery ~ 85% Lower Section Highly Broken, Cleated, Banded Mud Splint from 180.62 to 180.64m ~ 30% Vitrain ~ 70% Claro-Durain SAMPLE #40
180.88	181.77	Siltstone, Medium Grained, Muddy near Upper Contact Abundant Carbonaceous Plant Debris, Coaly Streaks Throughout, Minor Worm Burrows, Minor Pyrite Replacement, Minor Slickensides
181.77	181.83	Mudstone, Dark Grey - Brown Coaly Streaks, Coal Band < 0.01m at 181.78m Carbonaceous Plant Debris
181.83	183.25	Sandstone, Siltstone, Interlam. near Upper Contact, Interbedded Near Lower Contact, Sandstone, Salt and Pepper, Fine Grained, Siltstone, Medium Grained, Slightly Muddy in Places X-Lam. Load Structures, Worm Burrows - Abundant Carbonaceous Plant Debris, Minor Pyrite Flakes near Lower Contact
183.25	183.28	Coaly Mudstone, Dark Grey to Black, Coaly Streaks Throughout, Minor Slickensides
183.28	187.07	Siltstone, Medium Grey to Medium Dark Grey, Slightly Muddy in Places, Minor Fine Grained Sandstone Lam. Throughout, Coaly Streaks, Carbonaceous Plant Debris Decreasing towards Base, Minor Pyrite Replacement of Plant Debris Near Base, Minor Worm Burrows near Base, Bedding Angle 80° to C/A

HOLE# EMG-81-13From 187.07 m To 190.63 m

FROM	TO	DESCRIPTION
187.07	187.67	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, X-Lam. X-Bedding near Base, Minor Load Casts, Worm Burrows, Very Minor Carbonaceous Plant Debris
187.67	188.26	Siltstone Medium Grey, Carbonaceous Plant Debris Base Minor Sandstone Lam. near Upper Contact. Bedding Angle of 78° to C/A Minor Coaly Streaks near Upper Contact
188.26	188.55	Sandstone, Salt and Pepper, Fine Grained High Energy Environment ? Minor Convoluted Bedding Carbonaceous Plant Debris and Minor Coaly Streaks
188.55	188.76	Muddy Siltstone Abundant Carbonaceous Material and Coaly Streaks, Minor Oxidized Pyrite ?
188.76	189.86	Sandstone, Siltstone Interbedded Siltstone Base Slightly Muddy at Base Sandstone, Salt and Pepper, Fine Grained - Medium Grained, X-Bedded Siltstone - Medium Grey - Medium Dark Grey, Worm Burrows, X-Lam, Load Structures, Minor Convoluted Bedding, Carbonaceous Plant Debris, Minor Slickensides, Minor Slump Structures
189.86	190.07	COAL - 0.21m, Black, Poorly Cleated, Minor Banding, Minor Oxidized Pyrite (?), Broken ~ 10% Vitrain, ~ 90% Claro-durain, SAMPLE 41
190.07	190.17	Coaly Mudstone, Dark Grey to Black Abundant Coaly Streaks, Carbonaceous Plant Debris, Pyrite Flakes Throughout
190.17	190.43	COAL - 0.26m, Black, Banded, Poorly Cleated Mudstone Splits from 190.20 to 190.23m and from 190.35m to 190.38m, ~ 80% Claro-durain, ~ 20% vitrain SAMPLE #42
190.43	190.63	Silty Mudstone, Medium Dark Grey Carbonaceous Plant Debris, Coaly Streaks Throughout, Minor Pyrite Replacement of Plant Debris

HOLE#

EMG-81-13

From 190.63 m To 195.97 m

FROM	TO	DESCRIPTION
190.63	191.30	Muddy Siltstone, Medium Grey, Minor Fine Grained Sandstone Laminae near base, Carbonaceous Plant Debris, Minor Coaly Streaks
191.30	191.96	Sandstone, Muddy Siltstone, Interbedded, Sandstone, Salt and Pepper, Fine Grained, X-Laminate Siltstone, Medium Grey to Dark Grey Minor Load Structures, Worm Burrows, Slump Structure Carbonaceous Plant Debris
191.96	192.64	Muddy Siltstone, Medium Dark Grey, Increasing Siltstone Towards Base - Abundant Carbonaceous Plant Debris Decreasing towards Base
192.64	193.45	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Minor Siltstone Laminae near Upper Contact, X-Bedding, X-Laminated, Ripple Marks near Lower Contact, Load Structures, Slump Structures near Upper Contact, Abundant Worm Burrows near Upper Contact, Carbonaceous Plant Debris Increasing towards Base
193.45	193.87	Silty Mudstone, Dark Grey, Minor Fine Grained Sandstone Lamination Increasing towards Base, Minor Carbonaceous Plant Debris
193.87	195.78	Sandstone, Salt and Pepper, Fine Grained to Coarse Grained, Minor Siltstone Laminae near Upper Contact, Grain Size Coarsens towards Base X-Bedding, X-Laminae, Minor Load Structures, Minor Slump Structures - Possible Pressure Solution Surface at 194.23, Small Mud Rip-Up Clasts Throughout Section from 194.80 to 194.96; Carbonaceous Plant Debris Decreasing Towards Base Bedding Angle 75° to C/A
195.78	195.97	Coaly Mudstone, Dark Grey to Black Coaly Laminations, Carbonaceous Plant Debris Minor Slickensides, Possible Minor Pyrite Disseminated Throughout

HOLE# EMG-81-13From 195.97 m To 199.52 m

FROM	TO	DESCRIPTION
195.97	196.00	COAL - 0.03m Black, CORE LOSS ~ 0.015cm, Highly Broken, Banded, Poorly Cleated, ~ 35% Vitrain ~ 65% Claro-durain
196.00	196.08	Silty Mudstone, Medium Dark Grey Abundant Carbonaceous Plant Debris, Coaly Streaks Throughout
196.08	196.28	COAL - 0.20m Black, Banded, Poorly Cleated ~ 45% Vitrain ~ 55% Claro-durain SAMPLE 43
196.28	196.52	Mudstone, Dark Grey Brown, Slightly Silty in Places - Abundant Carbonaceous Plant Debris, Coaly Streaks
196.52	198.22	Siltstone, Sandstone, Interlaminated and Interbedded Siltstone, Medium Grey to Medium Dark Grey Siltier towards Upper Contact Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Increasing Grain Size towards Base X-Laminated, Convoluted Laminae, Load Structures, Minor Slump Structures near Base Coal Band < 0.01m at 197.36m Minor Slickensides, Minor Pyrite Replacement near Base of Plant Debris, Carbonaceous Plant Debris Throughout, Minor Worm Burrows, Bedding Angle 78° to C/A
198.22	198.52	Sandstone, Salt and Pepper, Medium Grained, Minor Siltstone Laminae near Base, X-Bedding, Ripple Marks, Minor Worm Burrows, Minor Load Structures near Base
198.52	198.62	Muddy Siltstone, Medium Dark Grey Carbonaceous Plant Debris, Slickensides at Lower Contact, Angle at 71° to C/A
198.62	199.15	Sandstone, Salt and Pepper, Medium Grained to Coarse Grained, Interlaminated by Grain Size, X-Bedding, Convoluted Bedding near Upper Contact
199.15	199.52	Sandy Mudstone, Medium Dark Grey-Brown to Dark Grey, Decreasing Amount of Sand towards Base, Convoluted Laminae, Minor Worm Burrows, Carbonaceous Plant Debris, Rip up Sand Clasts at Base

HOLE# EMG-81-13From 199.52m To 203.94m

FROM	TO	DESCRIPTION
199.52	201.15	Sandstone, Salt and Pepper, Medium Grained to Coarse Grained, Coarse near Lower Contact
		- Minor Silty Mudstone Beds
		X-Bedding, X-Laminated, Minor Convoluted Bedding
		Near Upper Contact and near Lower Contact, Load Structures and Slump Structures near Mudstone Beds, Rip up Mud Clasts near up Contact, Slickensides
		Along Mudstone, Sandstone Bedding Contacts, Carbonaceous Plant Debris, Coaly Streaks near Lower Contact
		Bedding Angle at 83° to C/A
201.15	201.55	Silty Mudstone, Dark Grey, Minor Sandstone Laminae near Upper Contact - Abundant Carbonaceous Plant Debris, Coaly Streaks, Minor Slickensides
201.55	201.61	COAL 0.06m - Black - Cleated, Banded ~ 45% Claro-Durain, ~ 55% vitrain
201.61	202.46	Siltstone, Medium Dark Grey, Muddy Near Upper Contact Minor Fine Grained Sandstone Laminae Throughout
		- Calcite Stringers near Lower Contact
		- Coaly Streaks Throughout, Pyrite Replacement of Plant Debris
		- Carbonaceous Plant Debris Throughout
202.46	203.07	Sandstone, Salt and Pepper, Medium Grained Mud Rip Up Clasts at Lower Contact
		- Calcite Vein ~ 0.01m at 202.94 to 202.95
		- Convoluted Laminae near Upper Contact
		- Load Casts, Slump Structures near Upper Contact
		- Calcareous Cement, Minor Carbonaceous Plant Debris
203.07	203.30	Siltstone, Sandstone, Interlaminated
		Siltstone, Medium Grey
		Sandstone, Salt and Pepper, Fine Grained
		Convoluted Bedding, Slump Structures, Minor Worm Burrows (clam burrows?)
		Minor Calcite Stringers near Upper Contact
		Carbonaceous Plant Debris
203.30	203.94	Muddy Siltstone with Sandstone Beds
		Medium Dark Grey (Muddy Siltstone)

HOLE# EMG-81-13From 203.94m To 205.55 m

FROM	TO	DESCRIPTION
203.30	Cont'd	Sandstone, Salt and Pepper, Fine Grained, X-Laminated
		Load Structures, Calcite Stringers near Upper Contact
		Clam Burrows in Mudstone
		Carbonaceous Plant Debris, Minor Coaly Streaks
		Near Lower Contact, Minor Slickensides
		Pyrite Replacement of Plant Debris (minor)
		Minor Worm Burrows
203.94	204.31	Siltstone, Medium Dark Grey
		Minor Sandstone Laminaes near Upper Contact
		Carbonaceous Plant Debris
		Coaly Streaks, Calcareous Cement
		Pyrite Replacement of Plant Debris (Minor)
		Worm Burrow (Minor)
204.31	204.50	Sandstone, Salt and Pepper, Fine Grained
		Minor Mudstone Bed in Centre of Section overlain
		at 204.39m by < 1 cm Coal Band
		X-Laminaes, Slump Structure, Load Structure
		Worm Burrows, Carbonaceous Plant Debris, Calcareous
		Cement, Coaly ~ streaks
204.50	205.08	Silty Mudstone, Dark Medium Grey, increasing
		Siltiness towards the base
		Carbonaceous Plant Debris, Calcareous Cement
		Coaly Streaks Near Upper Contact
		Calcite Stringers
205.08	205.31	Siltstone/Sandstone Interlaminated
		Siltstone Medium Grey to Medium Dark Grey Slightly
		Muddy - near the base
		Sandstone, Salt and Pepper, Fine Grained, Minor
		X-Laminated
		Load Structure and Minor Slump Structure
		Minor Worm Burrows
		Carbonaceous Plant Debris
205.31	205.55	Silty Mudstone
		Minor Carbonaceous Plant Debris
		Worm Burrows
		Minor Coaly Streaks

HOLE#

EMG-81-13

From 205.55 m To 208.48 m

FROM	TO	DESCRIPTION
205.55	205.76	COAL - 0.21cm Black, 0.03m CORE LOSS Slightly Cleated, Barded ~ 25% Vitrain 75% Claro Durain
205.76	206.11	Muddy Siltstone, Dark Grey, increasing Mud Content Towards Base Carbonaceous Plant Debris, Coaly Streaks Increasing Near Base Calcareous Cement
206.11	206.32	COAL - 0.21m, Black, Banded 0.01 m Core Loss Mud Splint < 0.01m at 206.21m ~ 30% Vitrain ~ 70% Claro-Durain Minor Fusain SAMPLE #44
206.32	206.60	Silty Mudstone, Medium Dark Grey Carbonaceous Plant Debris, Slickensides Throughout Minor Coaly Streaks
206.60	207.00	COAL - 0.40m Black Cleated, Banded, Bright ~ 35% Vitrain ~ 65% Claro-Durain Minor Fusain SAMPLE #45
207.00	207.82	Coaly Mudstone, Dark Grey to Black Coaly Streaks, Abundant Pyrite Disseminated Throughout Lower 0.07m
207.82	207.42	Muddy Siltstone, Medium Dark Grey Abundant Plant Debris, Coaly Streaks Minor Pyrite Replacement of Plant Debris
207.42	208.12	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Minor Siltstone Laminae near Base X-Laminae, Load Casts, Worm Burrows Minor Convoluted Laminae, Minor Calcite Stringers
208.12	208.22	Carbonaceous Mudstone, Dark Grey, Black Coaly Streaks Throughout, Carbonaceous Plant Debris
208.22	208.48	COAL - 0.26m - Black - Banded ~ 5% Fusain ~ 5% Vitrain ~ 90% Claro-Durain Poorly Cleated SAMPLE #46

HOLE#

EMG-81-13

From 208.48 m To 213.19 m

FROM	TO	DESCRIPTION
208.48	208.68	Muddy Siltstone, Medium Dark Grey, Muddy at Upper Contact, Carbonaceous Plant Debris, Coaly Streaks
208.68	208.72	COAL - 0.04m - Black - Banded, Cleating not Apparent ~ 30% Vitrain ~ 70% Claro-Durain
208.72	209.86	Siltstone, Medium Grey, Minor Sandstone Laminae Throughout, Carbonaceous Plant Debris, Very Minor Pyrite Replacement of Plant Debris, Coaly Streaks near Base and Upper Contact, Calcareous Cement, Minor X-Laminae
209.86	211.00	Sandstone, Salt and Pepper, Fine Grained to Medium Grained Minor Siltstone Laminae towards base (Siltstone - increasing to Base) Convoluted Bedding, X-Laminae, Load Structures Minor Slickensides, Worm Burrows, Carbonaceous Plant Debris, Minor Coaly Streaks, Calcareous Cement
211.00	211.45	Sandstone, Medium Grained to Coarse Grained, Salt and Pepper, <u>Clear</u> X-Bedded Minor Worm Burrows near Upper Contact
211.45	212.12	Siltstone, Medium Grey - Minor Fine Grained Sandstone Laminae near Upper Contact - Minor Load Structures Bedding Angle @ 75° to C/A Carbonaceous Plant Debris
212.12	212.32	Sandstone, Salt and Pepper, Fine Grained to Medium Grained Silty near Upper Contact, Grain Size increases to base X-Bedded, Ripple Marks, Worm Burrows, (clam burrows ?), Load Structures near Upper Contact Minor Carbonaceous Plant Debris
212.32	212.87	Siltstone, Sandstone Interlaminae X-Laminae, Load Casts, Worm Burrows Very Minor Carbonaceous Plant Debris
212.87	213.19	Sandstone, Salt and Pepper, Medium Grained Scouring, X-Bedded, Ripple Marks, Worm Burrow,

HOLE# EMG-81-13From 213.19 m To 216.09 m

FROM	TO	DESCRIPTION
212.87	Cont'd	Calcareous Cement, Very Minor Carbonaceous Plant Debris
213.19	213.57	Siltstone, Sandstone Interlaminated Siltstone, Medium Dark Grey, Slightly Muddy in Places Sandstone, Salt and Pepper, Medium Grained to Coarse Grained, Load Structures, Slump Structures, Carbonaceous Plant Debris, Worm Burrows
213.57	213.69	Mudstone (carbonaceous), Very Dark Grey-Black Very Minor Sandstone Laminae near Upper Contact Worm Burrows, Carbonaceous Plant Debris
213.69	213.95	COAL - 0.26m (15cm core loss) Black Banded, Slightly Cleated, ~ 5% Fusain, 15% Vitrain, 80% Claro Durain
213.95	214.41	Sandstone, Muddy Siltstone Interlaminated Sandstone, Salt and Pepper, Medium Grained, Bedding Angle @ 78° to C/A Muddy Siltstone, Medium Grey to Dark Grey X-Laminated, Coaly Streaks, Worm Burrows, Load Structures, Slump Structures, Plant Rootlets, Carbonaceous Plant Debris, Pyrite Replacement of Plant Debris near upper Contact
214.41	215.10	Muddy Siltstone, Medium Dark Grey - Carbonaceous Plant Debris, Coaly Streaks Coaly at 214.85 to 214.87m
215.10	215.58	Siltstone, Medium Grey to Medium Dark Grey, Minor Sandstone Laminae near Upper Contact, Increasing Mud Content Towards Base, Gradational Lower Contact, Minor X-Laminae Near Upper Contact, Worm Burrows Carbonaceous Plant Debris
215.58	215.89	Silty Mudstone, Dark Grey Abundant Carbonaceous Plant Debris, Coaly Streaks
215.89	216.09	COAL - 0.20m, CORE LOSS, 0.10m ~ 50% Recovery Black, Banded, Cleated, ~ 40% Vitrain ~ 60% Claro- Durain

HOLE#

EMG-81-13

From 216.09 m To 220.26 m

FROM	TO	DESCRIPTION
216.09	216.92	Muddy Siltstone, Medium Dark Grey
		Increasing silt content towards the base
		Minor Sandstone Laminaes at Base
		Minor Load Structure Near Base
		Coaly Streaks, Abundant Carbonaceous Plant Debris
		Possible Worm Burrows
216.92	218.12	Sandstone, Medium Grained, Salt and Pepper
		Minor Mudstone Laminae in Centre of Section
		@ 217.86m Mud Rip Up Clasts
		X-Bedding, Minor Load Structures, Worm Burrows in
		Upper Part of Section, Minor Carbonaceous Plant
		Debris Near Upper Contact
218.12	218.46	Muddy Silt - Medium Dark Grey, Muddier near Upper
		Contact, Minor Slickensides at Upper Contact
		Angle @ 69° to C/A
		Possible Clam Burrows, Pyrite on Slickenside Surface
		Abundant Carbonaceous Plant Debris Decreasing
		Towards Base
218.46	218.64	Sandstone, Muddy Siltstone Interlaminated
		Sandstone, Salt and Pepper, Fine Grained to Medium
		Grained
		Medium Siltstone, Medium Dark Grey
		Load Structures, Minor Slump Structures
		Minor Worm Burrow
		Minor Carbonaceous Plant Debris
218.64	219.07	Siltstone, Medium Grey to Medium Dark Grey
		Muddy in Centre of Section
		Abundant Clam Burrows at Upper Contact
		Minor Carbonaceous Plant Debris
		Minor Coaly Streaks
219.07	220.21	Siltstone, Sandstone Interlaminated, Interbedded
		at Base, Convoluted Bedding, Slump Structures,
		Load Structures
		Siltstone, Medium Grey, Sandstone, Salt and Pepper,
		Fine Grained to Medium Grained, Calcite Stringer
		Carbonaceous Plant Debris, Minor Worm Burrows

HOLE#

EMG-81-13

From 220.26m To 225.57 m

FROM	TO	DESCRIPTION
220.21	221.55	Sandstone, Salt and Pepper, Fine Grained to Medium Grained, Minor Muddy Siltstone Laminae Throughout X-Bedding, Load Structures, Convoluted Laminae Mud Rip Up Clasts at 220.48m, Worm Burrows Slickensides along Mudstone Laminae Bedding Angle @ 73° to C/A
221.55	221.95	Siltstone, Medium Grey Minor Carbonaceous Plant Debris Slickensides at Lower Contact Angle @ 75° to C/A
221.95	222.97	Silty Mudstone, Dark Grey Brown Coaly Streaks, Carbonaceous Plant Debris
222.97	223.18	Coaly Mudstone, Dark Grey Brown, Coaly Streaks, Carbonaceous Plant Debris, Possible Minor Oxidized Pyrite, Minor Coal Bands Throughout
223.18	223.29	COAL 0.11m Thick, Black, Highly Broken Banded, Approximately 30% Vitrain, 70% Claro-Durain, Bright
223.29	223.47	Silty Mudstone, Dark Grey, Carbonaceous Plant Debris Minor Slickenside, Minor Coaly Streaks, Possible Coal Band at 223.44m (less than 0.01m)
223.47	223.51	COAL - 0.04m Highly Broken, Black, Difficult to Determine Composition - but Predominantly Vitrain
223.51	223.56	Coaly Mudstone, Dark Grey Brown to Black, Minor Slickensides, Coaly Streaks Throughout, Carbonaceous Plant Debris
223.56	224.39	Siltstone, Medium Grey, Minor Sandstone Laminae, Minor Load Casts, Worm Burrows, Carbonaceous Plant Debris, Coaly Streaks
224.39	225.57	Sandstone, Siltstone Interlaminated Sandstone, Salt and Pepper, Fine Grained -Medium Grained, Increases towards Base Siltstone, Medium Dark Grey X-Lamination, Minor Convoluted Bedding towards Base, Load Structures, Slump Structures, Plant Rootlets, Minor Worm Burrows, Abundant Carbonaceous Plant Debris, Very Minor Coaly Streaks

HOLE#

EMG-81-13

From 225.57 m To 228.56 m

FROM	TO	DESCRIPTION
225.57	226.04	Silty Mudstone, Dark Grey, Abundant Coaly Streaks near Upper Contact decreasing Towards Base, Coaly Band < 1cm @ 225.57m Abundant Carbonaceous Plant Debris, Minor Slickenside Near Base
226.04	226.12	Coaly Mudstone, Dark Grey Brown to Black Coal Bands < 1cm Throughout, Carbonaceous Plant Debris
226.12	226.13	COAL 0.01m Black, 100% Vitrain, Cleated
226.13	226.18	Coaly Mudstone, Black Slickensides Throughout Coaly Streaks Throughout Some Carbonaceous Plant Debris
226.18	226.95	COAL - 0.77m Black, Dull With Bright Bands, Poorly Cleated, Broken at Upper Contact, ~ 30% Vitrain ~ 70% Claro-Durain, Minor Fusain SAMPLE # 47
226.95	227.76	Siltstone, Medium Grey to Medium Dark Grey, Muddy toward Base, Minor Carbonaceous Plant Debris, Possible Shell Fragments Slickensides at 227.69m Angle @ 50° to C/A
227.76	227.92	Coaly Mudstone, Dark Grey to Black Abundant Coaly Laminae, Oxidized Pyrite Flakes Throughout, Abundant Carbonaceous Plant Debris, Cleated near Upper Contact
227.92	228.21	Muddy Siltstone, Medium Dark Grey to Black Coaly near Base, Abundant Coaly Streaks, Carbonaceous Plant Debris, Slickensides near Upper Contact
228.21	228.56	Sandstone, Fine Grained - Medium Grained, Salt and Pepper to Medium Grey, Minor Siltstone Laminae Throughout, Convolute Bedding, Load Structures, Worm Burrows, Possible Clam Burrows near Lower Contact, Slickensides @ 228.36 Angle @ 55° to C/A Pyrite on Slickenside Surfaces, Coaly Streaks, Carbonaceous Plant Debris

HOLE#

EMG-81-13

From 228.56 m To 231.93m

FROM	TO	DESCRIPTION
228.56	229.79	Siltstone, Medium Dark Grey, Muddy in Places
		Carbonaceous Plant Debris Throughout
		Coaly Streaks Throughout
		Minor Slickensides
		Slickensides @ 228.83 Angle @ 62° to C/A
		and @ 229.29 Angle @ 70° to C/A
229.79	230.07	Siltstone with Minor Interbed Sandstone
		Siltstone medium Dark Grey, Sandstone, Salt and Pepper
		Medium Grained
		Load Structures, Worm Burrows, Coal Streaks
		Throughout, Carbonaceous Plant Debris
230.07	231.03	Sandstone, Siltstone Interbedded
		Siltstone, Medium Dark Grey, Slightly Muddy in Places
		Sandstone, Salt and Pepper, Medium Grained - Coarse
		Grained, X-Bedded
		Slump Structures, Load Structures, Minor Worm
		Burrows, Coaly Streaks, Carbonaceous Plant Debris,
		Minor Slickensides Along Bedding Surfaces, Bedding
		Angle @ 70° to C/A
231.03	231.38	Silty Mudstone, Dark Brown Grey
		- Increasing Mud Content Towards Base
		Minor Carbonaceous Plant Debris
		Minor Load Structures
231.38	231.47	COAL - 0.09m, No Cleating Apparent, Black, Banded,
		Approximately 5% Fusain, 25% Vitrain, 70% Claro-Durain
231.47	231.55	Coaly Mudstone, Dark Grey Brown to Black
		Oxidized Pyrite, Abundant Carbonaceous Plant Debris
		Coaly Streaks Throughout
231.55	231.71	COAL - 0.16m Black
		Banded, Poorly Cleated, Dull with Bright Bands,
		25% Vitrain, 75% Claro-Durain
231.71	231.93	Silty Mudstone, Dark Grey Brown
		Abundant Slickensides Throughout
		Abundant Carbonaceous Plant Debris, Coaly Streaks
		Throughout

HOLE#

EMG-81-13

From 231.93m To 236.83m

FROM	TO	DESCRIPTION
231.93	232.92	Siltstone, Medium Dark Grey, Slightly Muddy in Places, Minor Coaly Streaks, Carbonaceous Plant Debris
232.92	233.00	Mudstone, Dark Grey Brown Carbonaceous Plant Debris, Coaly Streaks Near Base
233.00	233.12	COAL - 0.12m, Black, Banded, Cleated, Broken, Minor Oxidized Pyrite, 35% Vitrain, 65% Claro-Durain
233.12	233.58	Muddy Siltstone, Medium Dark Grey to Dark Grey Minor Sandstone Laminae, Load Casts, Abundant Carbonaceous Plant Debris, Worm Burrows Near Center of Section, Minor Coaly Streaks
233.58	233.81	Sandstone, Salt and Pepper, Medium Grained, Minor Mudstone Laminae, Load Structures, Plant Rootlets, Worm Burrows, Slump Structures, Minor Pyrite Throughout, Dolomitic Cement
233.81	234.40	Muddy Siltstone, Medium Dark Grey, Minor Medium Grained, Sandstone Laminae near Upper Contact, Increasing Siltiness Towards Base Slickenside at 234.22m Angle @ 80° to C/A Carbonaceous Plant Debris, Minor Coaly Sandstone
234.40	234.87	Siltstone, Medium Grey, Very Hard Calcareous Stringers Carbonaceous Plant Debris
234.87	235.23	Muddy Siltstone, Medium Dark Grey, Dark Grey, Carbonaceous Plant Debris
235.23	235.32	COAL - 0.09m, Black, Banded, 3% Vitrain, 97% Claro- Durain
235.32	235.40	Carbonaceous Mudstone, Dark Grey, Black Coal Laminae Throughout, Carbonaceous Plant Debris
235.40	235.89	Siltstone, Medium Dark Grey, Minor Sandstone Laminae Near Lower Contact, Carbonaceous Plant Debris Throughout, Minor Coal Streaks
235.89	236.83	Sandstone, Salt and Pepper, Fine Grained, Medium Grained, Very Minor Carbonaceous Plant Debris, Minor Coaly Streaks, X-Laminae

HOLE#

EMG-81-13

From 236.83m To 243.02 m

FROM	TO	DESCRIPTION
236.83	237.17	Siltstone, Sandstone Interlaminated
		Siltstone, Medium Grey
		Sandstone, Salt and Pepper, Fine Grained
		Carbonaceous Plant Debris
237.17	238.03	Sandstone, Salt and Pepper, Fine Grained - Coarsly
		Grained, Coarsening Towards Base, X-Bedded
		Throughout, Minor Siltstone Laminae in Centre
		Section, Minor Slickensides, Coaly Streaks Near
		Base, Minor Carbonaceous Plant Debris
238.03	238.32	Siltstone, Sandstone Interlaminated
		Siltstone, Medium Grey
		Sandstone, Salt and Pepper, Fine Grained
		Coaly Streaks, X-Laminated, Carbonaceous Plant Debris,
		Minor Slickensides, Minor Load Structures, Possible
		Worm Burrows
238.32	238.47	Mudstone, Dark Grey, Brown
		Slickensides Throughout
		Coaly Streaks Throughout
		Abundant Carbonaceous Plant Debris
238.47	239.09	Muddy Siltstone, Medium Dark Grey
		Muddier Near Upper Contact
		Slickensides Near Upper Contact
		Coal Band @ 238.87 < 1cm
		Carbonaceous Plant Debris Throughout
239.09	240.09	Sandstone, Siltstone Interlaminated
		Sandstone, Salt and Pepper, Fine Grained, Siltstone.
		Medium Grey, X-Laminated, Load Structures, ripple
		Marks, Slump Structures, Worm Burrows, Minor
		Carbonaceous Plant Debris, Bedding Angle @ 73° to C/A
240.09	241.35	Siltstone, Medium Dark Grey, Minor Sandstone
		Laminae @ Upper Contact, Muddy @ Lower Contact
		Worm Burrows, Minor Load Structures, Coaly Streaks,
		Increasing Plant Debris Towards Base
241.35	243.02	Sandstone, Salt and Pepper, Fine Grained to Coarsly
		Grained, Increasing Grain Size Towards Base,
		Minor Mudstone Laminae Towards Base, X-Bedding,
		Minor Carbonaceous Plant Debris, Minor Calcareous
		Cement

HOLE#

EMG-81-13

From 248.64 m To 252.28 m

FROM	TO	DESCRIPTION
248.64	249.07	Siltstone, Sandstone, Interbedded
		Siltstone, medium Grey to Medium Dark Grey
		Sandstone, Salt and Pepper, Fine Grained to Medium Grained
		X-Laminae, Load Structures, Convoluted Bedding
		Near Lower Contact, Worm Burrows, Carbonaceous
		Plant Debris Throughout Decreasing Near Base
249.07	249.93	Sandstone, Siltstone, Interlaminated
		Sandstone, Salt and Pepper, Fine Grained to Medium Grained
		Siltstone, Medium Grey
		Convoluted Bedding, Load Structures, Worm Burrows
		Minor X-Laminae, Minor Carbonaceous Plant Debris
		Increasing Towards Base
249.93	250.70	COAL - 0.77m - CORE LOSS ~ 0.06m
		Black, Banded, Minor Oxidized Pyrite Near Base, Increasing Towards Base, Poorly Cleated, ~ 15% Vitrain
		~ 85% Claro-Durain, Minor Fusain, SAMPLE #48
250.70	250.93	Silty Mudstone, Dark Grey Brown, Increasing Mud Content Towards Upper Contact
		Coaly Streaks, Carbonaceous Plant Debris
250.93	250.99	COAL - 0.06m - Black - Banded - Cleated
		~ 30% Vitrain ~ 70% Claro-Durain
250.99	251.37	Siltstone, Medium Dark Grey to Medium Grey, Muddy at Upper Contact, Sandy at Lower Contact, Abundant Carbonaceous Plant Debris, Minor Worm Burrows, Minor Dolomite on Plant Debris
251.37	251.44	Coaly Mudstone, Dark Grey Brown to Black
		Coal Laminations throughout, Abundant Carbonaceous Plant Debris, Coaly Streaks
251.44	251.65	Muddy Siltstone, Medium Dark Grey, Muddier Near Upper and Lower Contacts
		Carbonaceous Plant Debris, Coaly Streaks
251.65	252.28	Sandstone, Siltstone Interlam. Interbedded near Lower Contact, Sandstone, Salt and Pepper, Fine Grained to Medium Grained

HOLE# EMG-81-13From 252.28m To 255.12m

FROM	TO	DESCRIPTION
251.65	Cont'd	Siltstone, Medium Grey
		X-Bedding, Load Structures, Minor Worm Burrows
		Throughout, Carbonaceous Plant Debris, Minor Pyrite
		Flakes on Plant Debris near Upper Contact, Non-
		Calcareous White ppt on Bedding Planes
		Bedding Angle @ 78° to C/A
252.28	253.77	Sandstone, Salt and Pepper, Fine Grained, Medium
		Grained
		X-Bedding, Rip-Up Mud Clasts Near Lower Contact
		@ 253.35
		@ 253.44 to 253.59 Muddy Sandstone
		-Decreasing Mud Content Upwards
		-Minor Coaly Streaks, Minor Carbonaceous Plant Debris
		Throughout, Minor Convolute Bedding, Minor Load
		Structures near Muddy Sandstone, Minor Worm Burrows,
		Calcareous Cement
253.77	254.05	Muddy Siltstone, Medium Dark Grey to Medium Grey
		Increasing Siltiness towards Base
		Carbonaceous Plant Debris
254.05	255.46	Sandstone, Siltstone Interlaminated
		Sandstone, Salt and Pepper, Fine Grained Siltstone,
		Muddy Grey to Medium Dark Grey
		X-Bedding, Ripple Marks, Minor Load
		Structures, Worm Burrows Near Upper Contact, Minor
		Carbonaceous Plant Debris
254.46	255.12	Silty Mudstone, Dark Grey Brown
		Muddier near Upper Contact
		Coaly Streaks Throughout
		Carbonaceous Plant Debris, Minor Worm Burrows
		Near Upper Contact
		END OF HOLE 255.12 Metres

APPENDIX II

DESCRIPTIVE LITHOLOGIC LOGS AND
WELL COMPLETION REPORTS FOR 1981
ROTARY DRILL HOLES

R.D.H. EMG-81-1
WELL COMPLETION REPORT

Location: - In a small opening on the north side of the Canfor
Ltd. Johnston Creek Forest Haul Road.
- U.T.M. Coordinates: 6,206,712mN x 543,303mE.
- Coal Licence No. 3508.

Elevation: 812 metres

Orientation: Vertical

Date Collared: June 17, 1981

Date Completed: June 20, 1981

Plugged: Yes - cemented

Overburden Depth: 1.22 metres

Final Depth: 185.93 metres

Formations Encountered: 0 to 1.22m Overburden
1.22m to 185.93m Gething Formation

Rock Chip Description By: D.N. Duncan, L. Louie and B. Thome

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

Comments: No resistivity log run as resistivity module
on probe inoperable.

CORE DESCRIPTION

HOLE # RDH-EMG-81-1 From 0 m To 18.29 m
 Area East Mt. Gethin By _____

FROM	TO	DESCRIPTION
0	1.22	OVERBURDEN
1.22	1.83	COAL BLACK
1.83	3.35	Mudstone - dark grey, interbedded with fine grain sandstone, siltstone medium grey
3.35	4.88	Sandstone, salt and pepper, fine grained) inter- (minor) silty mudstone) bedded very fine grained sandstone at base
4.88	6.10	very fine sandstone and medium grained sandstone sandstone and siltstone, dark grey interbedded (minor coal) (?) fine grained sandstone with more siltstone medium grained sandstone with no siltstone
6.10	7.62	SILTSTONE and sandstone (fine grained) salt and pepper - medium grained with very minor coal and minor mudstone. Siltstone 100%
7.62	9.14	FINE GRAINED SANDSTONE (salt & pepper) minor coal coal - sandstone plus carbonaceous debris coaly streaks in sandstone medium grained - coarse grained sandstone, salt and pepper, light coloured sandstone
9.14	10.67	MEDIUM GRAINED SANDSTONE (salt and pepper) darker colour, some carbonaceous debris, minor coaly streak siltstone and mudstone
10.67	12.19	MUDDY SILTSTONE - silty mudstone 11.58 m to 12.19 m coal, black vitrain
12.19	13.72	12.34 m. end of coal mudstone dark grey, siltstone, very fine grained (salt and pepper) dark grey
13.72	15.24	SANDSTONE very fine grained, salt and pepper, dark grey, minor mud interbedded
15.24	16.76	COAL (minor band) at 15.24 0.10 m. thick very fine grained sandstone mudstone interbedded
16.76	18.29	VERY FINE GRAINED SANDSTONE, salt and pepper, dark grey, fine grained - medium grey sandstone interbedded with siltstone carbonaceous plant debris, coal at end of run 18.29 :

HOLE* RDH-EMG-81-1From 18.29 To 35.05

FROM	TO	DESCRIPTION
18.29	19.81	SANDSTONE, fine grained, salt and pepper, medium grey medium grained sandstone - lighter grey
19.81	21.34	FINE GRAINED SANDSTONE - SILTSTONE getting muddy COAL 20.12 m 0.15 m. SILTSTONE AND SANDSTONE SANDSTONE - medium to coarse grained fine grained sandstone, salt and pepper
21.34	22.86	CARBONACEOUS MUDSTONE, dark grey fine grained sandstone, salt and pepper, light to medium grey, some minor siltstone fine grained sandstone
22.86	24.38	SILTSTONE interbedded with mudstone dark grey siltstone, sandstone light grey, salt and pepp medium grey
24.38	25.91	SANDSTONE, fine grained, medium grey
25.91	27.43	SANDSTONE, salt and pepper, fine grained carbonaceous debris, sandstone getting darker siltstone dark grey, interbedded with sandstone siltstone dark grey, silty mudstone, dark grey.
27.43	28.04	SILTY MUDSTONE, dark grey, getting less silty
28.04	28.35	COAL black, vitrain, shiny 0.30 m.
28.35	28.96	MUDSTONE, dark grey with minor coal
28.96	30.48	CARBONACEOUS MUDSTONE, dark grey with siltstone very fine grained sandstone, salt and pepper
30.48	32.00	SANDSTONE, very fine grained, carbonaceous debris, medium dark grey, getting siltier, muddy siltstone, dark grey, mudstone, dark grey, carbonaceous mudstone dark grey
32.00	33.53	CARBONACEOUS MUDSTONE, dark grey, minor coal coal 32.31 m.; siltstone, dark grey, muddy siltstone medium dark grey, carbonaceous debris, getting darker and more muddy
33.53	35.05	SILTSTONE - muddy, dark grey, siltstone, getting sandy sandy siltstone, medium grey very fine grained sandstone, light grey, carbonaceous debris, silstone-sandstone interbedded; siltstone, light grey; sandstone, salt and pepper, fine grained

HOLE# RDH-EMG-81-1

From 35.05 To 48.77

FROM	TO	DESCRIPTION
35.05	36.58	SANDSTONE, very fine grained, medium grey, sandstone getting darker; sandstone getting coarser grained and darker; siltstone, dark grey
36.58	38.10	SILTSTONE, medium to dark grey sandy siltstone, dark grey; sandstone, very fine grained, medium grey, siltstone, dark grey
38.10	39.62	MUDDY SILTSTONE, dark grey silty mudstone, dark grey, siltstone, dark grey
39.62	41.15	SANDSTONE, medium grained to coarse grained, salt and pepper, very fine grained sandstone, medium grey, siltstone, dark grey, silty mudstone, dark grey, carbonaceous debris, sandstone, fine grained, medium grey
41.15	42.67	SILTY SANDSTONE, medium grey coal @ 41.45 m. black 0.20 m thick coaly mudstone, dark grey, mudstone, dark grey sandstone, fine grained, medium grey, carbonaceous material, sandstone, medium grey, medium grey sandstone, fine grained, medium grey
42.67	44.20	SANDSTONE, fine grained, medium grey silty sandstone, medium grey; siltstone with carbonaceous debris, SANDSTONE, fine grained, medium grey
44.20	45.72	SILTY SANDSTONE, very fine grained siltstone, medium grey siltstone, dark grey to black sandstone, medium grained, medium grey sandstone getting finer
45.72	47.24	SILTY SANDSTONE, medium grey minor carbonaceous debris sandstone, medium grained to coarse grained, salt and pepper, with carbonaceous debris
47.24	48.77	SILTSTONE with carbonaceous debris, blackish coaly mudstone, blackish silty mudstone, medium dark grey sandstone, very fine grained, medium dark grey siltstone, medium grey

HOLE#

RDH-EMG-81-1

From 48.77

To 67.06

FROM	TO	DESCRIPTION
48.77	50.29	* Making water 2 or 3 gals/min.* carbonaceous siltstone, dark grey to black, getting muddy, silty mudstone, dark grey
50.29	51.82	SANDSTONE, fine grained, salt and pepper sandy siltstone, dark grey, sandstone, fine grained salt and pepper, carbonaceous material sandstone getting darker
51.82	53.34	SANDSTONE, fine grained, salt and pepper to medium grey, silty sandstone, dark grey, minor carbonaceous debris, siltstone, dark grey siltstone getting muddy
53.34	54.86	COALY MUDSTONE, dark grey to black COAL 53.49 m to 54.17 m. black, 0.61 m carbonaceous mudstone, dark grey, carbonaceous siltstone dark grey,
54.86	56.39	SANDSTONE, fine grained, salt & pepper to medium grey, carbonaceous debris SANDSTONE, getting coarser grained silty sandstone, dark grey
56.39	57.91	SILTY SANDSTONE, medium dark grey sandstone, very fine grained, medium grey, carbonaceous debris, sandy siltstone, medium grey
57.91	59.44	SILTSTONE, dark grey, carbonaceous debris mudstone, dark grey coaly COAL 59.44 m. small band
59.44	60.96	MUDDY SILTSTONE, dark grey getting very dark eq. black
60.96	62.48	SANDSTONE, fine grained, medium grey, getting silty SILTSTONE, medium grey, muddy siltstone, medium grey, carbonaceous debris
62.48	64.00	SANDSTONE, medium grained to coarse grained, salt and pepper, carbonaceous debris (minor), laminated sandstone getting finer
64.00	65.53	SANDSTONE getting darker sandstone getting finer grained almost silty siltstone, dark grey
65.53	67.06	SILTSTONE and MUDSTONE interbedded. Both dark grey siltstone, dark grey muddy siltstone, dark grey, carbonaceous silty mudstone

HOLE* RDH-EMG-81-1

From 67.06 To 92.96

FROM	TO	DESCRIPTION
67.06	cont'd.	black to dark grey
67.06	68.58	MUDSTONE, black (worm burrows)
		muddy siltstone, dark grey
		siltstone, dark grey
		carbonaceous silty mudstone, black
68.58	70.10	CARBONACEOUS SILTY MUDSTONE, black
		siltstone, dark grey
		sandstone, very fine grained, medium grey, laminated
		carbonaceous material
70.10	71.63	SILTY MUDSTONE, medium grey, carbonaceous material
		siltstone, medium grey
		siltstone getting slightly muddy
		sandstone, very fine grained, medium grey
71.63	73.15	SANDSTONE, fine grained to medium grained, salt and pepper, laminae, silty sandstone, dark grey, fine grained
		sandstone, fine grained, salt and pepper
73.15	74.68	SANDSTONE, getting darker
74.68	76.20	SANDSTONE, fine grained, salt and pepper
76.20	77.72	SANDSTONE, fine grained, salt and pepper
		carbonaceous debris
77.72	79.25	SANDSTONE, fine grained, dark grey
		carbonaceous material
79.25	80.77	SANDSTONE, very fine grained, dark grey
80.77	82.30	SANDSTONE, very fine grained, dark grey, carbonaceous debris
82.30	83.82	SILTY SANDSTONE, dark grey
83.82	85.34	SILTSTONE, dark grey
85.34	86.87	SILTY SANDSTONE, dark grey, fine grained
86.87	88.39	SILTSTONE, dark grey
88.39	89.92	SANDSTONE, very fine grained, dark grey
		carbonaceous debris, siltstone, dark grey - getting sand
89.92	91.44	SANDSTONE, fine grained to medium grained, salt and pepper to medium dark, siltstone, dark grey about
		90.83 m. possible a fault because no chips also making
		H ₂ O a bit
91.44	92.96	SILTSTONE, dark grey
		fine grained, sandstone, dark grey, salt and pepper
		medium grey, carbonaceous debris

HOLE#

RDH-EMG-81-1

From 92.96

To 114.3

FROM	TO	DESCRIPTION
92.96	94.49	COAL → black 0.76 m. from 92.96 m to 93.73 m (some vitrain)
		sandy siltstone, dark grey
94.49	96.01	SANDY SILTSTONE, dark grey to black - carbonaceous fine grained, sandstone, medium grey, salt and pepper, very carbonaceous, fine grained to medium grained, sandstone, salt and pepper; very fine grained sandstone salt and pepper carbonaceous debris.
96.01	97.54	SILTSTONE
		COAL BAND 96.77 m.
		SILTSTONE DARK BLACK; Coaly siltstone; silty sandstone
		COAL BANDS THROUGHOUT THIS INTERVAL
97.54	99.06	VERY FINE GRAINED SANDSTONE, carbonaceous debris, salt and pepper dark grey, silty sandstone; siltstone
		mudstone, dark grey to black
99.06	100.58	SILTSTONE, dark grey, slightly muddy, coaly mudstone
100.58	102.11	COAL BANDS
		sandstone and coal interbedded
		100.58 m. to 101.19 m. carbonaceous sandstone ~ 0.30 m of coal black; sandstone, medium grey, salt and pepper
102.11	103.63	VERY FINE GRAINED SANDSTONE, salt and pepper (lighter) sandstone, very fine grained, salt and pepper
103.63	105.16	VERY FINE GRAINED SANDSTONE, salt and pepper making water at beginning of run
105.16	106.68	≈ 104.09 m.
		very fine grained sandstone, dark grey
106.68	108.20	SILTY SANDSTONE, dark grey to black
108.20	109.73	SILTSTONE, very carbonaceous, black
		silty mudstone, dark grey to black
109.73	111.25	COALY MUDSTONE, mudstone black
		coal black; very fine grained sandstone, carbonaceous salt and pepper
111.25	112.78	CARBONACEOUS SILTY SANDSTONE, very fine grained, salt and pepper
112.78	114.3	VERY FINE GRAINED SANDSTONE, salt and pepper, dark grey minor coal (vitrain); silty sandstone, dark grey - black, carbonaceous debris

HOLE#

RDH-EMG-81-1

From 114.3m

To 129.54m

FROM	TO	DESCRIPTION
114.3	115.82	SILTSTONE, dark grey coal at 114.60 m. interbedded with siltstone and mudstone to 115.21m. not pure coal. sandstone, fine grained, salt and pepper, laminated, making H ₂ O
115.82	117.35	SILTY SANDSTONE, dark grey to black, very fine grained to fine grained; carbonaceous debris, light grey to medium grey; sandstone, fine grained, light grey, siltstone, dark grey
117.35	118.87	SILTSTONE, dark grey muddy siltstone, dark grey, silty mudstone, dark grey
118.87	120.40	SILTY MUDSTONE, dark grey, getting siltier, siltstone, dark grey to medium grey, carbonaceous silty mudstone, dark grey to black, minor silty mudstone light brown
120.40	121.92	SILTY MUDSTONE, dark grey to black, carbonaceous, minor light brown, silty mudstone chips, mudstone, dark grey to black, carbonaceous material present fine grained sandstone interbedded with siltstone sandstone medium grey siltstone dark grey at end of run mostly fine grained sandstone medium grey to dark grey
121.92	123.44	SILTSTONE, medium dark grey to dark grey, carbonaceous
123.44	124.97	SANDSTONE, fine grained, dark grey, siltstone, dark grey to black sandstone, fine grained, dark grey siltstone, dark grey sandstone, fine grained, medium grey
124.97	126.50	SANDSTONE, fine grained, medium grey, minor mudstone dark grey, siltstone, dark grey; carbonaceous mudstone, black, sandstone, fine grained, salt and pepper, x-laminated
126.50	128.02	SANDSTONE, very fine grained, medium grey to dark grey, very carbonaceous, some coal silty sandstone, medium dark grey; siltstone, medium grey
128.02	129.54	FINE GRAINED SANDSTONE, salt and pepper, dark grey mudstone carbonaceous COAL 0.08m;

HOLE# RDH-EMG-81-1

From 129.54 To 147.83

FROM	TO	DESCRIPTION
129.54	cont'd.	carbonaceous siltstone
		fine grained sandstone, light grey to medium grey
129.54	131.06	SILTSTONE - SANDSTONE interbedded
		siltstone - dark grey
131.06	132.59	MUDSTONE - dark black, very soft
132.59	134.11	CARBONACEOUS - with coaly streaks
		minor coaly band
		carbonaceous mudstone
		COAL at 133.20 m. to end of run approx. 0.91 m.
		may be a coaly mudstone mixed with coal.
134.11	135.64	SANDSTONE, fine grained, medium grey - carbonaceous
135.64	137.16	SANDSTONE, fine grained, salt and pepper
		silty sandstone, medium grey to salt and pepper
		siltstone, dark grey
137.16	138.68	SANDSTONE, very fine grained, medium grey to salt & pepper, siltstone, sandstone interbedded
		sandstone - medium grey; siltstone - black.
		minor coal present
138.68	140.21	CARBONACEOUS MUDSTONE, dark grey to black
		coal material present with mudstone
		silty mudstone, medium dark grey,
		sandstone, medium grey, abundant carbonaceous material.
		COAL band approx. 0.03m. thick @ 139.29 m.
		sandstone, very fine grained, dark grey
		silty sandstone, medium grey, fine grained
140.21	141.73	SANDSTONE-SILTSTONE interbedded
		Sandstone - salt and papper siltstone - dark grey
		sandstone, very fine grained, dark grey.
141.73	143.26	SANDSTONE, very fine grained, medium grey to dark grey.
		sandstone getting slightly coarser
143.26	144.78	SANDSTONE, fine grained, medium to dark grey
		carbonaceous
144.78	146.30	SANDSTONE, fine grained, medium grey
		siltstone, dark grey
		sandstone, fine grained, medium grey to medium dark grey
146.30	147.83	SILTSTONE, dark grey
		CARBONACEOUS SILTSTONE, BLACK

HOLE#

RDH-EMG-81-1

From 147.83 To 164.59

FROM	TO	DESCRIPTION
147.83	149.35	SILTY MUDSTONE, dark grey
149.35	150.88	MISSING CORE
150.88	152.40	SILTSTONE, dark grey, silty sandstone, fine grained
152.40	153.92	SANDSTONE; silty sandstone interbedded, sandstone, salt and pepper, medium grained, dark medium grey, fine grained, decreases downward - coarsens downward near end of run - gets finer grained and darker - minor carbonaceous plant debris and lots of worm burrows.
153.92	155.45	SILTSTONE, medium grey - slightly sandy minor fine grained sandstone, salt and pepper laminated
155.45	156.97	SANDY SILTSTONE - medium grey - increasing sand content to sandstone - light grey to medium grey - siltstone - medium grey - sandstone - medium grey to brown, fine grained with minor coal
156.97	158.50	MUDSTONE - medium dark grey; slightly silty increasing siltiness downwards contains minor sandstone, fine grained, brown laminations, carbonaceous plant debris
158.50	160.02	SANDSTONE, fine grained, medium grey, slightly silty in places, mudstone - dark grey near end of run - slightly carbonaceous - with minor siltstone laminae, medium grey
160.02	161.54	SILTSTONE, SANDSTONE, interbedded siltstone - medium grey sandstone, fine grained, medium brown sandstone, salt & pepper to medium grey - medium grained
161.54	163.07	MUDDY SILTSTONE, medium dark grey - increasing grain size downwards - siltstone, salt and pepper, fine grained, minor grained sandstone and minor siltstone
163.07	164.59	MUDDY SILTSTONE, medium grey, decreasing mud content downwards, carbonaceous debris siltstone, medium dark grey, slightly muddy in places

HOLE# RDH-EMG-81-1From 164.59 To 178.31

FROM	TO	DESCRIPTION
164.59	166.12	MUDDY SILTSTONE, medium grey to medium dark grey; carbonaceous debris, silty mudstone, dark grey increasing siltiness downwards, siltstone, medium dark grey slightly muddy in places
166.12	167.64	MUDDY SILTSTONE - medium grey to medium dark grey carbonaceous plant debris sandstone, fine grained, salt & pepper to light grey carbonaceous plant debris becoming medium grey coaly streaks slightly laminated
167.64	169.16	SANDSTONE, fine grained, salt and pepper to light grey siltstone, medium grey - carbonaceous debris - getting more coarse - getting silty - siltstone, medium dark grey, carbonaceous debris
169.16	170.69	SILTSTONE, medium dark grey, carbonaceous debris sandy siltstone, medium dark grey sandstone, medium grey, fine grained getting silty and very fine grained
170.69	172.21	SILTY SANDSTONE, medium grey, fine grained becoming less silty coarse grained in places, highly broken; sandstone, medium grey, fine grained to coarse grained, carbonaceous plant debris, slightly silty. Sandstone, dark grey, fine grained
172.21	173.74	SANDSTONE, silty dark grey, very fine grained to medium grained, occasional calcite; grades downward to siltstone carbonaceous plant debris, slightly mudstone
173.74	175.26	SILTSTONE, dark grey carbonaceous plant debris
175.26	176.18	SILTSTONE, muddy, dark grey carbonaceous plant debris
176.78	178.31	SILTSTONE, slightly muddy, dark medium grey grading to mudstone, silty dark grey

R.D.H. EMG-81-2
WELL COMPLETION REPORT

Location: - On a log landing on the north side of the Canfor
Ltd. Johnston Creek Forest Haul Road.
- U.T.M. Coordinates: 6,206,760mN x 542,774mE.
- Coal Licence No. 3508.

Elevation: 789 metres

Orientation: Vertical

Date Collared: June 20, 1981

Date Completed: June 22, 1981

Plugged: Yes - cemented

Overburden Depth: 3.66 metres

Final Depth: 121.92 metres

Formations Encountered: 0 to 3.66m Overburden
3.66m to 121.92m Gething Formation

Rock Chip Description By: B. Thomae, L. Louie and L. Kenkel

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

Comments:

HOLE# RDH-EMG-81-2From 0m To 15.24 m

FROM	TO	DESCRIPTION
0	3.66	Overburden
3.66	4.57	Muddy Siltstone, Medium Grey
		Silty Mudstone, Dark Grey
4.57	6.10	Siltstone, Dark Grey
		- getting Sandy
		Silty Siltstone, Very Fine Grained, Medium Dark Grey
6.10	7.62	Sandy Siltstone, Fine Grained, Dark Grey
		Siltstone, Dark Grey
		getting Muddy
7.62	9.14	Siltstone, Dark Grey
		Coal - 8.22m Black 0.15m thick
		Carbonaceous Mudstone, Black Sandstone, Fine Grained, Medium Grey, Minor Pyrite
		Coarsening and getting Lighter
9.14	10.67	Sandstone, Fine Grained - Medium Grained, Medium Grey to Light Grey,
		- Minor Oxidation
		- Carbonaceous Material
		- Minor Laminae
		Sandy Siltstone, Medium Dark Grey
		Silty Sandstone, Very Fine Grained, Dark Grey to Medium Dark Grey
		- Minor Carbonaceous Material
10.67	12.19	Sandstone, Fine Grained, Medium Grey to Light Grey
		- Minor Carbonaceous Material
		- Minor Laminae
		Silty Sandstone, Medium Dark Grey, Minor Carbonaceous Material, Very Fine Grained
12.19	13.72	Sandy Siltstone, Medium Dark Grey
		Coal 13.41m 0.13m Thick, Black
		Silty Mudstone, Medium Dark Grey
13.72	15.24	Siltstone, Medium Dark Grey, Slightly Muddy
		Carbonaceous Debris
		- Getting Siltier
		Sandy Siltstone, Medium Dark Grey
		Sandstone, Very Fine Grained, Medium Grey to Light Grey, Minor Carbonaceous Debris, Minor Laminae. Coarsening

HOLE# RDH-EMG-81-2

From 15.24 To 27.43

FROM	TO	DESCRIPTION
15.24	16.76	Sandstone-Siltstone Interbedded, Sandstone Fine Grained, Light Grey
		Siltstone, Dark Grey
		- Carbonaceous Material
		Laminae, Minor X-Laminae
		Sandy Siltstone, Muddy Dark Grey
16.76	18.29	Sandy Siltstone, Medium Dark Grey, Laminae Minor Carbonaceous Debris
		Silty Mudstone, Medium Dark Grey, Minor Laminae
18.29	19.81	Muddy Siltstone, Medium Dark Grey
		Minor Laminae
		Getting Less Muddy
19.81	21.34	Silty Mudstone, Medium Dark Grey .
		- getting Less Silty, Possible Minor Pyrite
		Silty Sandstone Fine Grained, Medium Grey, Minor Pyrite
		- Minor Carbonaceous Debris
21.34	22.86	Silty Sandstone, Very Fine Grained, Minor Laminae
		Mudstone, Dark Grey
		Silty Sandstone, Very Fine Grained, Medium Dark Grey
		- Replacement Calcite
		- Carbonaceous Plant Debris
22.86	24.38	Sandstone, Salt & Pepper to Light Grey, Fine Grained- Medium Grained
		- Calcite Vein at 22.86m
		Carbonaceous Plant Debris
		Silty Mudstone, Medium Grey, Minor Coaly Streaks
		- Carbonaceous Plant Debris with Calcite Cement
24.38	25.91	Silty Sandstone, Fine Grained, Dark Grey, Minor Coaly Streaks
		- Carbonaceous Debris
		Sandstone, Siltstone interbedded
		Sandstone, Fine Grained - Medium Grained, Salt & Pepper
		Siltstone, Medium Grey
25.91	27.43	Sandstone, Salt & Pepper, Medium Grained - Coarse Grained - Minor Carbonaceous Debris
		- Minor Calcite Stringers and Laminae
		- Getting Finer

HOLE#

RDH-EMG-81-2

From 27.43

To 42.67

FROM	TO	DESCRIPTION
27.43	28.96	Siltstone - Mudstone Interbedded, Both Dark Grey Mudstone Dark Grey Coaly Mudstone, Black Sandstone, Salt & Pepper to Medium Grey, Fine Grained Medium Grained - becoming Silty and Finer Grained
28.96	30.48	Silty Sandstone, Medium Grey, Minor Laminae - carbonaceous Plant Debris - Abundant Pwrite Sandy Siltstone, Dark Grey Siltstone, Medium Dark Grey - Getting Muddy
30.48	32.00	Muddy Siltstone, Medium Dark Grey Silty Mudstone, Medium Dark Grey
32.00	33.53	- Carbonaceous Moist, Black - COAL 32.3m, ~ 0.6m Black Siltstone, Medium Grey, Slightly Muddy Sandstone, Fine Grained, Medium Grey, Carbonaceous Plant Debris Sandstone, Medium Grained, Salt & Pepper to Light Grey - Minor Laminae - Carbonaceous Material
33.53	35.05	Sandstone, Fine Grained - Medium Grained - Minor Laminae Siltstone, Medium Grey to Brown
35.05	36.58	Siltstone, Dark Grey, Carbonaceous Debris - Becoming Muddy Sandy Siltstone, Medium Grey to Brown
36.58	38.10	Sandstone, Fine Grained, Light Grey to Medium Grey - Minor Carbonaceous Debris Siltstone, Dark Grey Sandstone, Light Grey, Fine Grained - Medium Grained
38.10	39.62	Sandstone, Fine Grained - Medium Grained Minor Carbonaceous Debris
39.62	41.15	Sandstone, Fine Grained - Medium Grained, Light Grey to Medium Grey Coarsening
41.15	42.67	Sandstone, Fine Grained, Medium Dark Grey to Dark Grey. Coaly Debris near end of run ~ 0.13m

HOLE#

RDH-EMG-81-2

From 42.67

To 57.91

FROM	TO	DESCRIPTION
42.67	44.20	Sandstone, Fine Grained, Light Grey to Medium Grey - Carbonaceous Debris
		Sandstone, Very Fine Grained, Dark Grey
44.20	45.72	Sandstone, Fine Grained, Medium Grey, Minor Laminae COAL and Carbonaceous Mudstone 44.81 ~ 0.30
		Black
		Mudstone, Black, Carbonaceous
		Sandstone, Medium Grey, Fine Grained
45.72	47.24	Sandy Siltstone, Dark Grey Silty Sandstone, Medium Grey
47.24	48.77	Sandstone, Fine Grained, Medium Grey Sandstone, Salt and Pepper, Fine Grained - Medium Grained
48.77	50.29	Sandstone, Sandstone and Mudstone, Fine Grained - Medium Grained - getting finer - Minor Carbonaceous Debris
50.29	51.82	Sandstone, Very Fine Grained, Medium Dark Grey Muddy Siltstone, Medium Dark Grey Sandstone, Mudstone Interbedded Sandstone, Salt and Pepper, Fine Grained - Medium Grained, Silty Mudstone, Medium Dark Grey Siltstone, Slightly Muddy, Carbonaceous Plant Debris Sandy Siltstone, Medium Grey to Brown
51.82	53.34	Sandstone, Very Fine Grained, Medium Dark Grey Muddy Siltstone, Medium Dark Grey - Getting Muddier, Carbonaceous, Plant Debris
53.34	54.86	Mudstone, Dark Grey, Slightly Silty Making Water 54.86m.
54.86	56.39	Sandstone, Silty Medium Grey, Very Fine Grained Sandstone, Fine Grained Medium Grey Siltstone, Sandy, Medium Dark Grey Sandstone, Fine Grained, Salt and Pepper to Medium Grey Sandstone, Very Fine Grained Medium Grey, Carbonaceous Plant Debris
56.39	57.91	Sandstone, Fine Grained, Medium Grey, Carbonaceous Plant Debris Mudstone, Silty Dark Grey, Carbonaceous Plant Debris Siltstone, Slightly Muddy

HOLE#

RDH-EMG 81-2

From 57.91

To 71.63

FROM	TO	DESCRIPTION
57.91	59.44	Siltstone, Medium Dark Grey
		Sandstone, Fine Grained, Medium Grey
		Sandstone, Fine Grained and Medium Grained, Medium Grey
		Silty Mudstone, Medium Dark Green
59.44	60.96	Silty Mudstone, Medium Dark Grey
		Mudstone, Slightly Silty - Carbonaceous Plant Debris, Dark Grey
60.96	62.48	Silty Mudstone, Dark Grey
		Mudstone, Slightly Silty, Carbonaceous Debris, Minor Pyrite
		Sandstone, Salt & Pepper, Fine Grained to Medium Grained with Siltstone, Carbonaceous Plant Debris
		Sandstone, Fine grained, Medium Grey, Slightly Silty
		Sandstone, Salt & Pepper, Carbonaceous Plant Debris
62.48	64.00	Sandstone, Fine Grained, Salt & Pepper
		Sandstone, Very Fine Grained, Salt & Pepper, Minor Laminae, Carbonaceous Plant Debris
64.00	65.53	Muddy Siltstone, Medium Dark Grey
		Sandstone, Salt & Pepper, Fine Grained
		Sandstone, Very Fine Grained, Dark Grey
65.53	67.06	Sandstone, Very Fine Grained, Dark, Medium Grey
		Sandstone, Very Fine Grained, Medium Grey, Carbonaceous Plant Debris
		Silty Sandstone, Medium Grey, Very Fine Grained
67.06	68.58	Silty Sandstone, Dark Grey, Very Fine Grained, Carbonaceous Plant Debris
		Siltstone, Medium Dark, Grey
		Siltstone, Sandstone Interlaminae, Siltstone Dark Grey, Sandstone Medium Grey, Very Fine Grained, Sandstone, Very Fine Grained, Medium Grey, Carbonaceous Debris
		Sandy Siltstone, Medium Grey, Carbonaceous Debris
		Sandstone, Medium Grey, Very Fine Grained
68.58	70.60	Silty Sandstone, Medium Grey, Very Fine Grained
		Sandstone, Fine Grained, Medium Grey to Dark Grey
		Sandstone, Salt & Pepper, Fine Grained to Medium Grained
70.10	71.63	Sandstone, Medium Grey, Fine Grained, Slightly Silty in Places, Sandstone, Salt & Pepper to Dark Grey, Fine grained, carbonaceous Debris, Siltstone - Sandv.

HOLE# RDH-EMG 81-2

From 71.63 To 86.87

FROM	TO	DESCRIPTION
71.63	73.15	Medium Dark Grey Siltstone, - Sandy Medium Dark Grey
		Mudstone, Grey Black, Possible Coal Seam (Small)
		Mudstone, Slightly Carbonaceous
73.15	74.68	Muddy Siltstone, Dark Grey with Minor Coaly Streaks
		Sandstone, Salt and Pepper, Fine Grained, Minor Carbonaceous Debris
74.68	76.20	Sandstone, Salt and Pepper to Light Grey with Minor Carbonaceous Debris
		Minor Amounts of Silty Sandstone
		Sandstone, Salt and Pepper, Fine Grained to Medium Grading to Sandstone, Fine Grained, with Carbonaceous Debris
		Grading to Medium Sandstone, Salt and Pepper
76.20	77.72	Sandstone, Medium Grained, Salt and Pepper, Minor Carbonaceous Debris
		Sandstone, Fine Grained, Minor Laminaes, Minor Silt Silty Sandstone with Calcite Stringers
		Silty Sandstone with Pyrite
77.72	79.25	Coal - 77.72m to 78.94m Black Slightly Muddy in Places ~ 1.22m
		Siltstone, Dark Grey
		Sandy Siltstone, Medium Grey
79.25	80.77	Sandy Siltstone, Medium Grey
		Siltstone, Medium Grey
		Sandy Siltstone, Medium Grey with Replacement Calcite
		Siltstone, slightly Muddy, Dark Grey
		Sandstone, Salt & Pepper, Fine Grained
		Minor Carbonaceous Debris
80.77	82.30	Sandstone, Salt & Pepper, Fine Grained, Minor Carbonaceous, Debris
		Sandy Siltstone, Medium Grey
82.30	83.82	Siltstone, Medium Grey
		Siltstone, Muddy, Medium Dark Grey
		Mudstone, Dark Grey, Carbonaceous Debris
83.52	85.34	Sandstone, Fine Grained, Salt & Pepper
85.34	86.87	Sandstone, Fine Grained, Medium Grey
		Sandy Siltstone, with Carbonaceous Debris, dark grey

HOLE#

RDH-EMG 81-2

From 86.87

To 102.11

FROM	TO	DESCRIPTION
86.87	88.39	Sandy Siltstone, Dark Grey, Abundant Pyrite Silty Mudstone, Dark Grey,
88.39	89.92	Silty Mudstone, Slightly Carbonaceous, Dark Grey Sandy Siltstone, Medium Grey Muddy Siltstone, Dark Grey Sandstone, Fine Grained, Medium Grey, with Minor Carbonaceous
89.92	91.44	Sandstone, Fine Grained, Medium Grey, with Minor Carbonaceous Debris Siltstone, Dark Grey
91.44	92.96	Sandstone, Salt and Pepper, Fine Grained Sandstone, Medium Grey, Fine Grained, Carbonaceous Debris Silty Sandstone, Fine Grained, Medium Grey
92.96	94.49	Siltstone, Slightly Muddy, Dark Grey Mudstone, with Minor Coal - Carbonaceous Debris Silty Sandstone, Dark Medium Grey Sandstone, Fine Grained, Medium Grey to Salt and Pepper
94.49	96.01	Sandstone, Fine Grained to Medium Grained, Medium Dark Grey to Salt and Pepper Minor Plant Debris Becoming Very Fine Grained with Carbonaceous Debris
96.01	97.54	Very Fine Grained, Sandstone, Medium Grey Siltstone, Muddy, Slightly Dark Medium Grey Mudstone, Silty, Dark Grey, Carbonaceous Plant Matter Sandstone, Salt and Pepper to Medium Grey, Fine Grained, with Carbonaceous Debris
97.54	99.06	Sandstone, Fine Grained, with Minor Carbonaceous Debris Minor Laminae Fine Grained, Sandstone, Very Consolidated, Dark Green - Dark Grey Laminated
99.06	100.58	Siltstone, Dark Grey-Black, Carbonaceous Silty Sandstone, Dark grey-Black, very carbonaceous, Very Fine Grained, Sandstone
100.58	102.11	Fine Grained, Sandstone, with Siltstone Laminae Dark Black - Dark Green

HOLE#

RDH-EMG 81-2

From 102.11

To 114.30

FROM	TO	DESCRIPTION
		Carbonaceous Material
		Siltstone,
102.11	103.63	Siltstone, Dark Grey to Black
		Very Fine Grained, Sandstone
103.63	105.16	Very Fine Grained, Sandstone, Dark Grey to Black
		Laminated
		Silty Sandstone
		Very Fine Grained, Sandstone, Salt & Pepper
		Minor and Cannel Coal Vein
105.16	106.68	Sandy Siltstone, Dark Grey to Black
		Sandstone, Medium Grained, Salt and Pepper
106.68	108.20	Fine Grained, to Medium Grained, Sandstone,
		Medium Grey
		Slightly Salt and Pepper
		Minor Siltstone, Laminae
		Sandstone, Medium Grained, Salt and Pepper
		Carbonaceous Debris
108.20	109.73	Medium Grained to Coarse Grained, Sandstone,
		Salt and Pepper
		Fine Grained Sandstone Laminae.
		Minor Siltstone, laminae
		Carbonaceous Debris
		Sandstone, Siltstone, Interbedded, Siltstone,
		Dark Grey to Black
109.73	111.25	Sandstone, Siltstone, Interbedded, Siltstone, Dark
		Grey to Black
		Siltstone, Medium Grained to Coarse Grained
		Minor Fine Grained, Sandstone
111.25	112.78	Sandstone, Siltstone, Interbedded
		Sandstone, Salt and Pepper, Medium Grained to
		Coarse Grained
		Siltstone, Dark Grey to Black
		Slightly Muddy Siltstone Laminae (Minor)
		Light Brown
		Minor Iron Staining in Sandstone rusty brown
112.78	114.30	Sandstone, Medium Grained to Coarse Grained,
		Salt and Pepper

HOLE# RDH-EMG 81-2From 114.30 To 121.92

FROM	TO	DESCRIPTION
		Very Minor, Siltstone Laminaes
		Mudstone, Laminaes (Light Brown) (Minor)
114.30	115.82	Sandstone, Salt and Pepper, Medium Grained to Coarse Grained, (More on Coarse Grained Side)
		Slightly Carbonaceous
		Coal @ 114.60m to 115.06m 0.46m (Not Pure Coal)
		Black-Grey Mudstone Laminaes, Predominant
		Calcite Stringers Abundant - Coal, Siltstone
		Interbedded
		Siltstone, Dark Grey to Black
		A Slightly Muddy Siltstone (Black)
115.82	117.35	Silty Mudstone, Dark Grey to Black
		Muddy Siltstone, Dark Grey
		Mudstone, Slightly Silty Dark, Grey to Black
		Siltstone, Slightly Muddy, Dark Grey with Carbonaceous Debris
		Siltstone, Sandy in Places; Medium Grey
		Siltstone, Sandstone with Minor Mudstone
		Light Grey to Dark Grey
117.35	118.87	Coal - 117.35m to 118.57m 1.22m mixed with Siltstone Throughout
		Siltstone, Medium Grey, Laminations
		Sandstone, Very Fine Grained, Salt and Pepper, Minor Carbonaceous Debris, Minor Coal
118.87	120.40	Sandstone, Very Fine Grained, Salt and Pepper, with Minor Carbonaceous Debris, Minor Coaly Streaks
		Sandstone, Fine Grained, Salt and Pepper to Medium Grey, with Carbonaceous Plant Debris
120.40	121.92	Sandstone, Fine Grained to Medium Grained, Salt and Pepper to Medium Grey, Minor Plant Debris
		Sandstone, Siltstone, Interbedded, Sandstone, Fine Grained to Medium Grained, Salt and Pepper with Laminaes, Siltstone, Dark Grey
		Muddy Siltstone, Dark Brown, Minor Laminaes
		Mudstone Bed

R.D.H. EMG-81-3
WELL COMPLETION REPORT

Location: - On a log landing on the north side of the Canfor
Ltd. Johnston Creek Forest Haul Road.
- U.T.M. Coordinates: 6,206,753mN x 542,231mE.
- Coal Licence No. 3508.

Elevation: 766 metres

Orientation: Vertical

Date Collared: June 22, 1981

Date Completed: June 24, 1981

Plugged: Yes - cemented

Overburden Depth: 6.09 metres

Final Depth: 91.74 metres

Formations Encountered: 0 to 6.09m Overburden
6.09m to 91.74m Gething Formation

Rock Chip Description By: B. Thomae, L. Louie and L. Kenkel

Logs Run: Gamma and Density - by Utah Mines Ltd.

Comments: Caliper and resistivity modules on probe
inoperable.

HOLE# EMG-RDH-81-3From 0mTo 15.54

FROM	TO	DESCRIPTION
0	6.09	Overburden
6.09	7.62	Mainly sandstone, much variety, salt and Pepper, fine grained - medium grained Sandstone, iron staining, coarse grained, brownv- orange, Sandstone, medium dark grey, very fine grained, minor siltstone dark grey and mudstone dark grey to quartz, white
7.62	9.14	Mainly sandstone, much variety, salt & pepper, fine grained - medium grained brownv orange, coarse grained, iron-staining medium dark grey, very fine grained minor siltstone, dark grey and mudstone dark grey silty mudstone, dark grey, COAL - 8.23m to almost 9.14m (~ 3 ft) black sandstone, fine grained, salt & pepper to light grey abundant carbonaceous plant debris minor lamination
9.14	10.66	Sandstone, very fine grained, medium dark grey abundant carbonaceous debris minor lam.
10.66	12.49	Sandstone, fine grained, medium dark grey, abundant carbonaceous debris, sandy siltstone, medium dark grey COAL - 11.28m to 11.58m ~ 0.30m black, muddy siltston medium dark grey sandstone, salt & pepper to light grey, fine grained - medium grained
12.49	14.02	Sandstone, salt & pepper, medium grained - coarse grained, minor carbonaceous debris abundant carbonaceous debris sandstone, coarse grained, iron staining, salt and pepper * possible fracture in this interval
14.02	15.54	Sandstone, siltstone interbedded sandstone, salt & pepper, iron-staining, coarse grained, siltstone, dark grey muddy siltstone, medium dark grey Siltstone, medium dark grey minor carbonaceous debris getting sandy

HOLE# RDH-EMG-81-3

From 15.54 To 26.21

FROM	TO	DESCRIPTION
15.54	17.06	Mudstone, medium grey silty mudstone, medium grey
17.06	18.59	Silty mudstone, medium dark grey COAL - @ 17.34m black ~ 0.13m thick muddy siltstone, dark grey, carbonaceous siltstone, medium dark grey, carbonaceous - getting slightly sandy sandy siltstone, medium dark grey minor carbonaceous debris
18.59	20.11	Siltstone, dark grey, slightly sandy, carbonaceous material, silty sandstone, fine grained, medium grey siltstone, dark grey sandstone, fine grained - medium grained, salt & pepper to light grey abundant carbonaceous plant debris
20.11	21.64	Siltstone, dark grey, minor carbonaceous debris sandstone, very fine grained, medium dark grey, carbonaceous debris sandstone getting coarser, some salt & pepper sandstone, salt & pepper, medium grained - coarse grained, carbonaceous material some iron staining
21.64	23.16	Sandstone, salt & pepper, medium grained - coarse grained, carbonaceous material some iron staining
23.16	24.68	Sandstone, salt & pepper, medium grained - coarse grained, minor carbonaceous material making H ₂ O 81'
24.68	26.21	Sandstone, salt & pepper, medium grained - coarse grained some iron staining minor carbonaceous material, minor lam. mudstone, siltstone interbedded
26.21	27.72	mudstone, medium grey, siltstone, medium dark grey sandy siltstone, medium grey, muddy siltstone, medium dark grey mudstone dark grey, Coal @ 27.43m approx. 0.08m Carbonaceous mudstone with minor coal

HOLE# RDH-EMG-81-3

From 26.21 To 36.88

FROM	TO	DESCRIPTION
27.73	29.26	Muddy siltstone, dark grey
		sandy siltstone, dark grey, minor carbonaceous debris
		sandstone, fine grained - medium grained, salt & pepper, carbonaceous material
29.26	30.78	Sandstone, fine grained - medium grained, salt & pepper, carbonaceous material,
		- getting finer, sandy siltstone, medium dark grey
		muddy siltstone, medium grey
		siltstone dark grey
30.78	32.30	Carbonaceous mudstone, black
		- getting siltier and less carbonaceous
32.30	33.83	Silty mudstone, medium grey
		siltstone, medium grey
		Carbonaceous mudstone, black
		COAL - 32.6lm ~ 0.08m thick black
		Siltstone, mudstone interbedded
		Siltstone - dark grey, minor pvrte
		Mudstone medium grey
		Sandstone, fine grained, medium grained, carbonaceous plant debris
33.83	35.35	Sandstone, fine grained, medium grey to salt & pepper
		carbonaceous plant debris, minor pvrte
		Sandstone, siltstone interbedded
		Sandstone, fine grained, salt & pepper
		Siltstone, dark grey
		Sandstone, fine grained, medium grained, carbonaceous material
		Sandstone, salt & pepper, minor carbonaceous material
		fine grained - medium grained
		- increasing to carbonaceous debris
35.35	36.88	Sandstone, fine grained - medium grained, salt & pepper, abundant carbonaceous material
		- decreasing carbonaceous debris to a clean salt and pepper sandstone
		getting abundant carbonaceous material again
		getting coarser grained

HOLE#

RDH-EMG-81-3

From 36.88

To 50.59

FROM	TO	DESCRIPTION
36.88	38.40	Sandstone, fine grained, salt & pepper, abundant carbonaceous debris minor iron showing in some carbonaceous lam.
38.40	39.92	Sandstone, fine grained, salt & pepper, abundant carbonaceous plant debris Silty sandstone, very fine grained, carbonaceous mudstone Siltstone, dark grey, carbonaceous mat. COAL - 39.01 black ~ 0.20m thick carbonaceous siltstone, black
39.92	41.45	Sandstone, fine grained, salt & pepper, abundant carbonaceous material Minor carbonaceous lam.
41.45	42.97	Sandstone, fine grained, carbonaceous material Siltstone, medium dark grey
42.97	44.19	Silty mudstone, dark grey Mudstone, medium grey silty mudstone, medium dark grey, carbonaceous material
44.19	46.02	Muddy Siltstone, medium dark grey, carbonaceous material silty sandstone, medium grey - fine grained carbonaceous debris Sandstone, salt & pepper, fine grained, carbonaceous material
46.02	47.54	Sandstone, fine grained, salt & pepper to light grey, carbonaceous material
47.54	49.07	Sandstone, fine grained, medium grey, slightly silty minor carbonaceous debris Sandy Siltstone, medium brownish grey carbonaceous debris Siltstone, medium dark grey, carbonaceous material
49.07	50.59	Silty Mudstone, dark grey to black increasing siltstone content Sandstone, fine grained, salt & pepper to dark grey minor siltstone

HOLE# RDH-EMG-81-3

From 50.59 To 61.26

FROM	TO	DESCRIPTION
49.07	50.59	Muddy siltstone, dark grey, carbonaceous plant debris
	Cont'd.	Sandstone, fine grained, medium grey, abundant pyrite
50.59	52.12	Sandstone, fine grained, medium grey, slightly silty pyrite, Siltstone, medium dark grey, slightly muddy, Sandstone, fine grained, medium grey
52.12	53.64	Muddy Siltstone, medium dark grey Silty Mudstone, dark grey with very minor pyrite Muddy Siltstone, dark grey
53.64	55.16	Muddy Siltstone dark grey carbonaceous mudstone with minor coal at ~ 54.25m ~ 0.15m, abundant plant debris making water
55.16	56.69	COAL - 55.17m - 55.47m cannel muddy muddy siltstone, medium grey, plant debris, Sandstone, fine grained, medium grey - salt and pepper, minor siltstone
56.69	58.21	Sandstone, fine grained, medium grey, plant debris, Sandstone, medium grey, salt & pepper, with fine grained lenses @ 57.00m plant debris & coal streaks @ 57.45m, silty mudstone, dark grey, plant debris, interbedded siltstone, sandstone, sandstone dark grey sandstone, salt & pepper, fine grained
58.21	59.74	Siltstone, sandstone interbedded, siltstone medium dark grey, sandstone, salt & pepper, fine grained - medium grained Sandstone, salt & pepper, fine grained - coarsly grained Sandstone, siltstone interbedded sandstone, medium grained, salt & pepper Siltstone, dark grey Sandstone, medium grained, salt & pepper
59.74	61.26	Sandstone, fine grained - medium grained, salt & pepper, fine grained and medium grained occasionally interbedded

HOLE#

RDH-EMG-81-3

From 61.26

To 76.50

FROM	TO	DESCRIPTION
61.26	62.78	Sandstone, fine grained, salt & pepper to medium grey
		Sandstone, very fine grained, dark medium grey, minor pyrite
		COAL - @ 62.48m to 63.09m ~ 0.61m
62.78	64.31	COAL - @ 62.48m to 63.09m ~ 0.61m
		Silty sandstone, very fine grained, dark grey pyrite
		Sandstone, salt & pepper, fine grained - medium grained, minor coarse grained lams
		Sandstone - Siltstone interbedded, sandstone, medium grained, salt & pepper, siltstone, dark grey
64.31	65.83	Sandy Siltstone, dark grey
		Sandstone, salt & pepper, fine grained
		Sandstone, very fine grained, dark medium grey
		Sandy siltstone, medium grey, iron staining
		Sandstone, medium grey, fine grained pyrite
		Sandy Siltstone, medium dark grey
65.83	67.36	Sandstone, fine grained - medium grained, salt and pepper to medium grey, abundant iron stains, carbonaceous plant debris in fine grained calcite stringers @ 67.05m, minor siltstone lams. @ 67.36m
67.36	68.88	Sandstone, salt & pepper, fine grained - medium grained, finely laminated plant debris
68.88	70.40	Sandstone, fine grained - medium grained, salt & pepper laminated
		Silty Mudstone, medium brown
		Sandy Siltstone, medium dark grey to muddy siltstone medium brown
70.40	71.93	Silty Mudstone, medium grey to brown, iron staining, medium grained - coarsly grained, sandstone, salt & pepper
71.93	73.45	Sandstone, medium grained - coarsly grained, salt & pepper
73.45	74.98	Sandstone, medium grained - coarsly grained, salt & pepper
74.98	76.50	Siltstone, sandstone, siltstone dark grey, sandstone, salt & pepper, medium grained, minor coal band, sandstone, fine grained, light grey, minor coal band

R.D.H. EMG-81-4
WELL COMPLETION REPORT

Location: - On a log landing at the end of a logging road built
by Canfor Ltd.
- U.T.M. Coordinates: 6,206,978mN x 543,766mE.
- Coal Licence No. 3507.

Elevation: 759 metres

Orientation: Vertical

Date Collared: June 25, 1981

Date Completed: June 27, 1981

Plugged: Yes - cemented

Overburden Depth: 0 metres

Final Depth: 170.69 metres

Formations Encountered: 0 to 170.69m Gething Formation

Rock Chip Description By: L. Louie and B. Thomae

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

Comments: No resistivity log run as resistivity module
on probe inoperable.

CORE DESCRIPTION

HOLE# RDH-81-04 From 0 m To 10.67 m
 Area East Mt. Gethinc By _____

FROM	TO	DESCRIPTION
0	0.31	Yellow till (Oxidized) sandy OVERBURDEN
0.31	0.76	Grey till (unoxidised) OVERBURDEN
0.76	1.37	Grey SANDSTONE fine grained
1.37	1.83	OXIDIZED SHALE (orange grey) 2'
1.83	1.98	GREY SANDSTONE medium grained
1.98	3.96	SHALE (mudstone) very fine grained (silty mudstone) *making water
3.96	4.57	MUDDY SILTSTONE with oxidized parts dark grey
4.57	6.10	SILTSTONE dark grey - black SILTSTONE/MUDSTONE interlaminated coaly streaks - sandiness SANDSTONE, salt and pepper, medium grained MUDSTONE, light brown/dark grey interlaminated very carbonaceous; sandy siltstone dark grey some oxidized mudstone very fine grained sandstone, salt and pepper
6.10	7.62	SILTSTONE, dark grey - black coaly mudstone (silty) at 6.71m. laminated 6.85m coal black (o.10) siltstone dark grey to black with oxidized parts fine grained sandstone, salt and pepper with carbonaceous plant debris
7.62	9.14	FINE GRAINED SANDSTONE, salt and pepper with carbonaceous plant debris, fine grained to medium grained sandstone, salt and pepper. sandstone/siltstone laminaes; siltstone (minor) dark grey; carbonaceous material (minor) sandstone becoming darker medium grained sandstone, salt and pepper minor calcite veins minor oxidation, very minor coaly streaks
9.14	10.67	VERY FINE GRAINED SANDSTONE, salt and pepper minor siltstone laminated dark grey to black well laminated, sandy siltstone, siltstone medium grey, laminated dark grey and light brown mudstone (silty SILTY MUDSTONE, light brown/dark grey-black *carbonaceous

HOLE#

RDH-81-04

From 10.67

To 24.38

FROM	TO	DESCRIPTION
10.67	12.19	SILTY MUDSTONE, dark grey/light brown, minor coal black mudstone -> very carbonaceous
12.19	13.72	MUDSTONE black, slightly silty in places, carbonaceous siltstone silvery grey, slightly sandy
13.72	15.24	MUDSTONE/SILTSTONE/SANDSTONE interlaminated mudstone, dark grey - black also minor light brown siltstone, medium grey sandstone, fine grained, salt and pepper fine grained sandstone, salt and pepper, abundant carbonaceous material, siltstone/mudstone interlaminated siltstone, dark grey-black some light brown
15.24	16.76	MUDSTONE, black mudstone, dark grey to black/brown interlaminated siltstone, dark grey to black/brown interlaminated
16.76	18.29	SILTSTONE, medium grey minor brown interlaminated pyrite replacement of plant debris siltstone/mudstone interlaminated, light grey to medium grey minor light brown
18.29	19.81	SILTSTONE, medium grey and minor light brown fine grained to medium grained sandstone, salt & pepper minor siltstone laminae, dark grey, iron oxide staining siltiness
19.81	21.33	FINE GRAINED SANDSTONE, salt and pepper, with siltstone laminae (dark grey); siltstone to pure siltstone,
21.33	22.86	dark grey to black; siltstone with minor sandstone (fine grained to medium grained) laminated, salt and pepper; siltstone, dark grey to black sandstone, fine grained to medium grained, salt & pepper minor iron oxide staining; sandstone, medium grained to coarse grained, salt and pepper abundant carbonaceous debris coaly sandstone, medium grained to coarse grained, salt and pepper.
22.86	24.38	COARSE GRAINED SANDSTONE, salt and pepper, very carbonaceous, minor iron oxide staining, siltstone (sandstone interlaminated) siltstone - black sandstone - coarse grained, salt and pepper

HOLE# RDH-81-04

From 24.38 To 36.58

FROM	TO	DESCRIPTION
24.38	cont'd.	coarse grained sandstone brownish red, salt and pepper carbonaceous debris minor toward end of run
24.38	25.91	SANDSTONE, salt and pepper, medium grained, brownish sandstone, salt and pepper, medium grained, greyish abundant silvery specks within getting darker abundant carbonaceous debris minor mudstone laminaes, dark black sandstone turning brownish, salt and pepper, coarse grained very abundant silvery specks
25.91	27.43	SANDSTONE, medium grained to coarse grained, salt & pepper minor carbonaceous material with silvery specks mudstone laminaes minor (black), iron oxide staining in places, carbonaceous debris.
27.43	28.96	FINE GRAINED TO MEDIUM GRAINED SANDSTONE, salt & pepper carbonaceous debris abundant; silvery specks, mudstone laminaes black; sandstone turning brownish, salt & pepper.
28.96	30.48	MEDIUM GRAINED TO COARSE GRAINED SANDSTONE, salt and pepper, minor mudstone laminaes, carbonaceous debris silvery specks,
30.48	32.00	SANDSTONE, medium grained, salt and pepper abundant carbonaceous debris, iron oxide staining in in some places
32.00	33.52	SANDSTONE, medium grained, salt & pepper abundant carbonaceous debris minor iron oxide stains ↑ toward end of 1.52m interval carbonaceous plant debris becomes more abundant minor slickensides? silvery specks throughout
33.53	35.05	SANDSTONE, fine grained to medium grained interlaminated with iron stained mudstone, very abundant carbonaceous plant debris, calcite stringers abundant VERY COARSE GRAINED SANDSTONE with rusty mudstone laminaes; siltstone, dark grey/interlaminated with brownish siltstone
35.05	36.58	FINE GRAINED - MEDIUM GRAINED SANDSTONE, salt & pepper dark grey, minor siltstone laminaes, siltstone dark brown - black; siltstone, dark grey - black abundant carbonaceous material

HOLE# RDH-81-04

From 36.58 To 51.82

FROM	TO	DESCRIPTION
36.58	38.10	SILTSTONE, dark grey to black abundant carbonaceous material minor sandstone laminaes (coarse grained) possible fracture at 37.80 m. COAL black 0.10m siltstone - black
38.10	39.62	MUDDY SILTSTONE, dark grey - black, minor light brown laminaes; COAL @ 38.71m for about 0.15m; some cannal coal; silty mudstone (coaly)
39.62	41.15	SANDSTONE, very fine grained, salt and pepper abundant carbonaceous plant debris; well laminated with coaly streaks siltstone dark brown - dark grey
41.15	42.67	SILTSTONE, dark grey to dark brown abundant carbonaceous debris; COAL @ 41.61m about 0.46m black 50% cannal 50% vitrain; mudstone - very coaly; siltstone - dark grey - cannal coal; fine grained sandstone, salt and pepper, very carbonaceous; siltstone interlaminated with very coarse grained sandstone; minor mudstone
42.67	44.20	MUDSTONE, dark grey to black slightly silty; silty mudstone
44.20	45.72	COAL @ 44.50m. to 44.96m. 0.76m. cannal coal and clarodurain with some vitrain, very black; siltstone dark grey, carbonaceous.
45.72	47.24	VERY FINE GRAINED SANDSTONE, salt & pepper minor carbonaceous material.
47.24	48.77	SANDSTONE, very fine grained, salt & pepper, very light grey overall with minor carbonaceous debris, siltstone laminaes, dark grey to black
48.77	50.29	SANDSTONE, medium grained, salt & pepper, carbonaceous debris; siltstone, dark grey - black; sandstone, medium grained to coarse grained, salt & pepper; siltstone, black
50.29	51.82	SILTSTONE, medium dark grey silty sandstone, very fine grained, medium dark grey siltstone, medium dark grey; silty mudstone, medium grey; coal mixed with silty mudstone @ 51.51m.

HOLE# RDH-81-04

From 51.82 To 59.44

FROM	TO	DESCRIPTION
51.82	53.34	SILTY MUDSTONE, medium grey silty sandstone, very fine grained, dark grey; sandstone, very fine grained, medium grey - minor carbonaceous plant debris
53.34	54.86	SANDSTONE, fine grained, medium grey - minor carbonaceous plant debris; silty sandstone fine grained, medium grey to light grey sandstone, fine grained to medium grained, medium grey - getting slightly silty; sandy siltstone, medium grey brown; - minor carbonaceous plant debris
54.86	56.39	SANDY SILTSTONE, medium grey brown siltstone, medium grey brown - slightly muddy - minor carbonaceous plant debris siltstone, medium grey, slightly sandy - minor carbonaceous plant debris sandy siltstone, medium grey - carbonaceous material
56.39	57.91	SILTY MUDSTONE, medium grey brown COAL @ 56.69m only a few inches only a few inches approx. 1.52m thick; silty mudstone present with coal; sandstone, fine grained, medium grey brown - carbonaceous plant debris silty sandstone, very fine grained, medium grey brown - minor carbonaceous plant debris siltstone, medium grey, carbonaceous plant debris - slightly muddy; - getting less muddy and slightly sandy.
57.91	59.44	SILTSTONE, medium grey - sandy in some places silty sandstone, medium grey, fine grained - carbonaceous plant debris sandstone, medium grey brown, fine grained - minor carbonaceous material - getting slightly silty

HOLE#

RDH-81-04

From 59.44

To 71.63

FROM	TO	DESCRIPTION
59.44	60.96	SANDY SILTSTONE, medium dark grey, carbonaceous plant debris; silty sandstone, medium grey to light grey; siltstone, medium grey, sandy in some places - getting slightly muddy and less sandy; muddy siltstone medium grey brown; siltstone, medium grey; muddy siltstone, medium grey brown
60.96	62.48	MUDDY SILTSTONE, medium grey silty mudstone, medium dark grey siltstone, dark grey, - getting slightly sandy
62.48	64.01	MUDDY SILTSTONE, dark grey mudstone, medium dark grey; silty mudstone, medium dark grey; - getting less silty and - getting carbonaceous
64.01	65.53	SILTSTONE, medium dark grey silty sandstone, medium grey, fine grained - minor carbonaceous debris sandy siltstone, medium dark grey
65.53	67.06	SANDY SILTSTONE, medium dark grey muddy siltstone, medium grey brown sandy siltstone, medium dark grey sandstone, very fine grained, medium grey, silty in places - getting siltier sandy siltstone, medium grey, fine grained - calcite present
67.06	68.58	SANDY SILTSTONE, medium grey siltstone, dark grey, slightly muddy sandstone, salt and pepper, fine grained to medium grained - calcite present, white - coarsening - minor carbonaceous plant debris
68.58	70.10	SANDSTONE, salt and pepper, medium grained - coarse grained - minor calcite present *possibly making H ₂ O @ 69.19m - carbonaceous plant debris - carbonaceous debris increasing
70.10	71.63	MUDDY SILTSTONE - sandstone interbedded siltstone, dark grey brown sandstone, medium grey, salt and pepper sandstone, salt & pepper, fine grained to medium grained

HOLE#

RDH-81-04

From 71.63

To 82.30

FROM	TO	DESCRIPTION
71.63	cont'd.	- minor carbonaceous plant debris
		- getting more carbonaceous debris
71.63	73.15	SANDSTONE, salt and pepper, fine grained to medium grained; - minor carbonaceous cement
		- carbonaceous plant debris
		- getting silty
		silty sandstone, very fine grained, medium dark grey
		siltstone, dark grey, slightly muddy
		muddy siltstone, medium grey brown
		mudstone, black, slightly silty; - carbonaceous
		sandstone, salt and pepper, fine grained-coarse grained
		- abundant carbonaceous material.
73.15	74.68	SANDSTONE, salt and pepper, fine grained
		- carbonaceous plant debris
		- becoming silty
74.68	76.20	SILTY SANDSTONE, very fine grained, medium grey brown
		sandstone, fine grained, salt and pepper to light grey
		- getting silty; silty sandstone, medium grey brown
		- getting less muddy
76.20	77.72	MUDSTONE, dark grey,
		COAL - present with mudstone @ 77.11m for approx. 0.30m.
		MUDSTONE carbonaceous; sandstone, salt and pepper to
		light grey, fine grained to medium grained
77.72	79.25	SILTY SANDSTONE, very fine grained, medium dark grey
		muddy siltstone, medium grey brown to dark grey,
		sandy siltstone, medium dark grey
		silty sandstone, very fine grained, medium grey;
		sandstone, salt and pepper, medium grained
79.25	80.77	SANDSTONE, salt and pepper to light grey, medium grained
		to coarse grained; - carbonaceous plant debris
		- minor pyrite; sandy siltstone, dark grey
80.77	82.30	SANDY SILTSTONE, dark grey
		muddy siltstone, dark grey
		sandy siltstone, dark grey
		siltstone-sandstone interbedded
		siltstone: dark grey; sandstone: fine grained, salt &
		pepper; siltstone: dark grey; silty mudstone, medium
		dark grey

HOLE#

RDH-81-04

From 82.30

To 94.49

FROM	TO	DESCRIPTION
82.30	83.82	CARBONACEOUS MUDSTONE, black
		COAL @ 82.30 black for approx. 0.13 (also present with coal mudstone, dark grey, sandstone, salt & pepper, fine grained); sandstone, salt and pepper, fine grained
		- carbonaceous plant debris
		- minor pyrite present
		silty sandstone, medium dark grey, fine grained
		- carbonaceous plant debris
83.82	85.34	SANDY SILTSTONE, medium dark grey
		sandstone, light grey to medium grey, fine grained
		- carbonaceous material present
		- getting darker and very fine grained
		- minor iron staining
85.34	86.87	SANDY SILTSTONE, medium dark grey
		sandstone, medium dark grey, very fine grained
		- getting silty; carbonaceous sandy siltstone, black
86.87	88.39	SANDY SILTSTONE, medium dark grey
		silty sandstone, very fine grained, medium dark grey
88.39	89.92	SILTSTONE, medium grey brown, slightly sandy
		sandy siltstone, medium grey brown
		sandstone, very fine grained, medium dark grey,
		carbonaceous plant debris; COAL @ 89.61m. black approx. 5" thick; sandy siltstone, medium dark grey; silty sandstone, very fine grained, medium brown grey, minor carbonaceous debris
89.92	91.44	SILTY SANDSTONE, very fine grained, medium brown grey
		- carbonaceous plant debris; muddy siltstone, medium grey brown
91.44	92.96	*SANDSTONE, salt and pepper, fine grained to medium grained, minor carbonaceous plant material, making H ₂ O in this interval somewhere;
		SANDSTONE, salt and pepper, fine grained, abundant carbonaceous plant debris; - becoming finer grained and darker
92.96	94.49	SILTY SANDSTONE, medium dark grey, very fine grained
		- minor carbonaceous debris; siltstone, dark grey
		silty sandstone, medium dark grey, very fine grained
		sandstone, fine grained, medium brown to grey

HOLE#

RDH-81-04

From 94.49

To 109.73

FROM	TO	DESCRIPTION
94.49	Cont'd,	calcite vein, present, carbonaceous plant debris; - getting silty; siltstone, medium grey brown; silty sandstone, medium grey, very fine grained, minor carbonaceous cement
94.49	97.54	SILTY SANDSTONE, medium grey, very fine grained muddy siltstone, medium dark grey; siltstone, -mudstone interbedded, siltstone and mudstone, dark grey; siltstone, medium dark grey, slightly muddy
97.54	99.06	SANDSTONE, medium grained, salt & pepper to medium grey - carbonaceous plant debris - getting finer grained
99.06	100.58	SANDSTONE, very fine grained, black to medium dark grey, carbonaceous; abundant carbonaceous plant debris
100.58	102.11	SILTY SANDSTONE, very fine grained, dark grey. siltstone, dark grey sandstone, very fine grained, medium grey to dark grey siltstone laminated; - carbonaceous; SILTY SANDSTONE, dark grey, minor laminae
102.11	103.63	SANDSTONE, very fine grained, brown - grey to dark grey carbonaceous; sandy siltstone, dark grey with sandstone laminae, salt and pepper, fine grained; - pyrite silty sandstone, dark grey, very fine grained, minor carbonaceous debris, carbonaceous siltstone, dark grey to black; sandy siltstone, dark grey
103.63	105.16	SANDY SILTSTONE, dark grey
105.16	106.68	SILTSTONE-SANDSTONE interbedded siltstone, dark grey, sandstone: fine grained, salt & pepper. Siltstone, dark grey, muddy in places - getting less muddy.
106.68	108.20	MUDDY SILTSTONE, medium grey brown. Siltstone, dark grey. Sandstone, fine grained, salt & pepper to medium grey, carbonaceous plant debris. - Carbonaceous plant debris increasing
108.20	109.73	SANDSTONE, fine grained, medium grey, abundant carbonaceous debris - minor laminae Siltstone, medium grey brown, sandy in places - getting more sandy

HOLE#

RDH-81-04

From 109.73 To 120.34

FROM	TO	DESCRIPTION
09.73	Cont'd.	Sandstone, medium grey brown, fine grained, some in places
109.73	111.25	SANDSTONE, very fine grained, medium grey, carbonaceous plant debris. Sandstone, salt and pepper, medium graine to coarse grained. - minor carbonaceous plant material - minor laminae
111.25	112.78	SANDSTONE, medium grey to salt and pepper, fine grained - carbonaceous plant debris - minor carbonaceous laminae - minor calcareous cement
112.78	114.30	SANDSTONE, fine grained, salt and pepper to medium grey - minor carbonaceous plant debris - minor iron stained, coarse grained sandstone, orangy-
114.30	115.82	SANDSTONE, fine grained, salt & pepper to medium grey - minor carbonaceous plant debris *MAKING H ₂ O 114.60m. near end of run <u>COAL</u> and sandstone interbedded Sandstone, salt and pepper, medium grained * making H ₂ O @ 115.82 m. 0.31 ft.thick, black <u>COAL</u>
115.82	117.35	MUDSTONE, dark grey and minor coal (black). Silty mudstone, dark grey and minor coal black. Sandy siltstone, medium dark grey - carbonaceous
117.35	118.87	SANDSTONE - SILTY MUDSTONE interbedded Sandstone, slight grey, very fine grained. Silty Mudstone, dark grey. Sandstone-Siltstone interbedded. Sandstone, salt and pepper, fine grained to medium graine Siltstone, dark grey. Sandstone, salt and pepper, fine grained to medium grained. - getting darker and minor carbonaceous plant debris - abundant carbonate plant debris.
118.87	120.34	SANDSTONE, fine grained - medium grained, salt & pepper to medium grey. - carbonaceous plant debris and minor calcareous cement minor silt.

HOLE*

RDH-81-04

From 120.34

To 131.06

FROM	TO	DESCRIPTION
120.34	Cont'd.	Muddy siltstone, medium dark brown, carbonaceous plant debris. Sandy siltstone, dark grey. Sandstone fine grained, medium dark grey to light grey, minor carbonaceous material.
120.40	121.92	SILTY SANDSTONE, medium dark grey, very fine grained sandy siltstone, medium dark grey. Sandstone, very fine grained, medium grey. - carbonaceous material - coarsening - minor carbonaceous laminae
121.92	123.44	SANDSTONE, salt and pepper, medium grained - fine grained carbonaceous plant debris. Sandstone, salt and pepper fine grained - medium grained, carbonaceous plant debris.
123.44	124.97	Sandy siltstone, dark grey with minor sandstone laminae COAL 123.75 1.22m. black - minor siltstone throughout coal seam
124.97	126.49	SILTSTONE, dark grey with minor coal. Sandy Siltstone dark grey, carbonaceous muddy siltstone, black. Siltstone, fine grained-medium grained, salt and pepper to light grey, abundant carbonaceous plant debris.
126.49	128.02	SANDSTONE, fine grained-medium grained, salt & pepper to medium grey, carbonaceous plant debris. Siltstone medium dark grey - carbonaceous plant debris - getting sandy Sandstone, medium grey to salt and pepper, fine grained to medium grained - minor calcareous cement - minor carbonaceous material
128.02	129.54	SANDSTONE - fine grained, salt and pepper; carbonaceous calcite stringers (minor), quartz crystals transparent glassy, minor mudstone laminations
129.54	131.06	SILTSTONE with minor sandstone laminations siltstone - dark green to dark grey sandstone - medium grey, salt & pepper with iron oxide staining, minor carbonaceous material; very minor calcite stringers forwards and of intervals, carbonaceous debris ↑ too.

HOLE#

RDH-81-04

From 131.06 To 146.30

FROM	TO	DESCRIPTION
131.06	132.59	SILTSTONE, dark brown to dark grey with minor salt and pepper. Sandstone laminaes, medium grey; minor carbonaceous plant debris; ^{fl} sandstone laminaes; very carbonaceous mudstone black → COAL @ 132.44 0.46m. coal interlam with mudstone
132.59	134.11	VERY COALY MUDSTONE, very black very minor siltstone laminaes. Coal ground up therefor unable to determine type.
134.11	135.64	MUDSTONE, black very carbonaceous
135.64	137.16	minor sandstone laminaes. Sandstone, salt and pepper medium grained. Siltstone, dark brown black; muddiness, very carbonaceous; Siltstone/Sandstone interlaminated. Siltstone - black. Sandstone, fine grained, salt & pepper
137.16	138.68	SANDSTONE, very fine grained, salt and pepper; carbonaceous material; Fine grained Sandstone, salt and pepper. Silty Sandstone dark grey; Sandstone/Siltstone interlaminated, Sandstone, medium grey salt and pepper.
138.68	140.21	SILTSTONE - dark grey to black; carbonaceous material coaly streaks throughout; calcite stringers
140.21	141.73	SILTSTONE, dark grey to black; silty mudstone, dark grey to black, carbonaceous debris; laminated; Siltstone medium grey.
141.73	143.26	COALY SILTSTONE; dark grey-black, coaly mudstone very abundant coal @ 142.04m-142.34m, coaly siltstone @ 142.34m-142.95m. Sandstone, salt & pepper, fine grained to medium grained, very carbonaceous
143.26	144.78	SILTY SANDSTONE with minor mud, medium-dark grey. Siltstone, dark grey to black, fine grained to medium grained. Siltstone very carbonaceous, salt & pepper very fine grained sandstone, salt & pepper. Siltstone - black, very carbonaceous
144.78	146.30	SILTSTONE - salt & pepper, medium grained with coaly streaks very abundant sandy siltstone, dark grey to black. Very carbonaceous sandstone, medium grained, salt & pepper. Very fine grained sandstone, salt & pepper. Siltstone/Sandstone/Mudstone interlaminated

FROM	TO	DESCRIPTION
146.30	cont'd.	Siltstone - dark brown to black; sandstone, medium grey; salt & pepper; Mudstone-brown. Siltstone - medium grey to dark grey; ↑ darkness; ↑ coaliness.
		Sandstone - salt and pepper, fine grained to medium grained, very carbonaceous. Sandstone, very fine grained, salt & pepper.
		Siltstone - dark grey - black interlaminated
146.30	147.83	Sandstone, salt & pepper, fine grained, slightly carbonaceous. Sandstone, salt & pepper, very fine grained, very carbonaceous; Sandstone, salt & pepper, medium grained, very carbonaceous. Siltstone - medium dark grey to dark grey.
147.83	149.35	Siltstone/Sandstone - interlaminated. Siltstone - dark grey. Sandstone - medium grey, salt & pepper, somewhat carbonaceous. Siltstone - black abundant carbonaceous material. Silty Mudstone - black, minor coaly streaks, minor calcite stringers
149.35	150.88	Siltstone, somewhat coaly dark grey to black. Fine grained sandstone, salt and pepper with carbonaceous mudstone laminaes.
150.88	152.40	Siltstone - dark grey - black becoming muddier, very carbonaceous, somewhat coaly very black
152.40	153.92	Silty Mudstone - black
153.92	155.45	Silty Mudstone - black
155.45	156.97	COAL @ 0.61m - 155.75m - 156.36 vitrain*60%*claw durain 40%, minor siltstone laminaes, dark grey to black some cannel coal? Silty mudstone black
156.97	158.50	Silty Mudstone - dark grey - black abundant carbonaceous debris, minor very fine grained sandstone, laminaes salt and pepper; siltstone, medium dark grey - black Sandstone, fine grained, salt & pepper; abundant carbonaceous debris with minor mudstone laminaes.
158.50	160.02	Mudstone; dark shiny black, carbonaceous
160.02	161.54	COAL - @ 160.02m. to 160.32 Black 0.3lm * making water very fine grained Sandstone with coaly streaks towards end of interval, minor calcite stringers in sandstone fine grained sandstone with abundant carbonaceous debris

R.D.H. EMG- 81-5
WELL COMPLETION REPORT

Location: - On the Utah Mines Ltd. W.A.C. Bennett Dam access road.
- U.T.M. Coordinates: 6,207,512mN x 542,101mE.
- Coal Licence No. 3508.

Elevation: 806.7 metres

Orientation: Vertical

Date Collared: September 4, 1981

Date Completed: September 5, 1981

Plugged: Yes - cemented

Overburden Depth: 2.44 metres

Final Depth: 121.92 metres

Formations Encountered: 0 to 2.44m Overburden
2.44m to 121.92m Gething Formation

Rock Chip Description By: K. Foellmer and P. Cowley

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

Comments: No resistivity log run as resistivity module on probe inoperable.

HOLE# FM6 RDH 81-5

From 0m To 12.19m

FROM	TO	DESCRIPTION
0	2.44	OVERBURDEN TRICONED
2.44	3.05	SANDSTONE - salt and pepper fine grained iron stain - COAL approx. 0.15m at 2.59m to 2.74m sandstone - salt and pepper fine grained - iron stain, carbonaceous debris
3.05	4.57	SANDSTONE - salt and pepper fine grained, minor medium grained chips, very minor medium grey silt- stone - iron stain, minor carbonaceous debris sandstone laminated
4.57	6.10	SANDSTONE - salt and pepper fine grained to medium grained, iron stain, minor carbonaceous mudstone on sandstone, laminated, carbon- aceous debris, decreasing iron stain - sandstone fine grained salt and pepper minor iron stain, minor carbonaceous debris - siltstone / sandstone mixed, siltstone medium grey, carbonaceous debris, sandstone salt and pepper, fine grained, iron stain, laminated 5.79m
6.10	7.62	SILTSTONE - medium grey, iron stained laminated, carbonaceous debris - slightly sandy decreasing near downward - siltstone- mudsto
7.62	9.14	MUDSTONE - dark grey, carbonaceous, minor siltstone medium grey, carbonaceous debris at 8.23m COAL less than 0.10m at 8.38m mudstone dark grey
9.14	10.67	MUDDY SILTSTONE - medium grey, minor iron stained siltstone, laminated carbonaceous debris - sandy siltstone, medium grey minor carbonaceous debris
10.67	12.19	SANDSTONE - fine grained salt and pepper to medium grey, carbonaceous debris - sandstone/silt- stone mixed, sandstone salt and pepper, fine grained to medium grained iron stain, - siltstone medium grey, carbonaceous debris to 11.28m, - sandstone/mudstone mixed, sand- stone salt and pepper, medium grained

cont'd

HOLE# RDH 81-5From 10.67m To 18.29m

FROM	TO	DESCRIPTION
10.67	12.19	cont'd - mudstone dark grey carbonaceous debris 11.89m - sandstone salt and pepper medium grained, minor dark grey mudstone with carbonaceous debris
12.19	13.72	SANDSTONE/MUDSTONE - mixed, sandstone salt and pepper medium grained predominately - mudstone dark grey, very minor iron stain - sandstone salt and pepper, medium grained has minor carbonaceous laminated 12.50m - iron stained at 13.11m
13.72	15.24	SANDSTONE - salt and pepper medium grained to coarse grained- iron stain, minor carbonaceous debris, iron stain at 15.54m - sandstone fine grained salt and pepper, minor iron stain at 16.15m - sandstone, carbonaceous mudstone mixed, laminated, sandstone salt and pepper fine grained to medium grained minor iron stain, carbonaceous mudstone less than 0.2cm thick, black
15.24	16.76	SILTSTONE/SANDSTONE - mixed, laminated, siltstone medium grey slightly muddy, sandstone salt and pepper to medium grained, fine grained laminated sandstone - salt and pepper to medium grey-brown, fine grained to medium grained 12.90m - sandstone medium grey brown fine grained laminated, carbonaceous debris, slightly silty 13.11m - increasing silt content downwards
16.76	18.29	SILTSTONE - medium grey, carbonaceous debris, - <u>COAL</u> , 17.37m to 17.68m, black, minor dark grey-brown mudstone - mudstone/coal mixed, black with minor iron stain, slickensides, carbonaceous debris - siltstone, medium grey, minor carbonaceous debris 18.13m

HOLE # RDH 81-5

From 18.29m To 27.43m

FROM	TO	DESCRIPTION
18.29	19.81	SANDSTONE - carbonaceous mudstone interlaminated - sandstone, salt and pepper, fine grained to medium grained carbonaceous mudstone black, minor iron stain, coaly - sandstone salt and pepper medium grained at 12.65m - decreasing grain size downward, very minor carbonaceous debris- sandstone, salt and pepper, fine grained to medium grained minor dark grained mudstone , minor iron stain, minor carbonaceous debris 13.41m
19.81	21.33	SILTY SANDSTONE - medium grey, fine grained, minor carbonaceous debris, sandy siltstone - medium grey, minor orange brown iron stain 20.42m - siltstone - medium grey at 20.73m minor pyrite
21.33	22.86	MUDSTONE - dark grey - calcite, slightly silty in places, minor coal - siltstone medium grey - minor calcite 22.25m
22.86	24.38	COAL - mudstone and siltstone mixed, coal black mudstone dark grey siltstone medium grey with iron stain slickensides - coaly mud- stone, dark grey brown to black, carbon- aceous debris , coaly streaks, calcite, laminated, minor pyrite, minor medium grain siltstone near 24.38m
24.38	25.91	SANDSTONE - salt and pepper, medium grained, minor sandy siltstone 25.15m - sandstone sandy siltstone mixed siltstone salt and pepper, medium grained sandy siltstone - medium grained - sandstone salt and peppe fine grained to medium grained, abundant calcite, slickensides
25.91	27.43	SANDSTONE - salt and pepper, fine grained with high carbonaceous mudstone content, minor sand- stone salt and pepper medium grained, minor carbonaceous debris, - sandstone salt and pepper to medium grained brown, fine graine minor carbonaceous mudstone laminated 26.82

HOLE# RDH 81-5

From 27.43m To 38.10m

FROM	TO	DESCRIPTION
27.43	28.96	SANDSTONE - salt and pepper fine grained, carbonaceous debris, minor silt content increasing downward, - siltstone medium grey 28.35m - COAL approx. 0.15m - 28.80m to 28.96m
28.96	30.48	MUDSTONE /SILTSTONE - mixed, minor coal, - mudstone dark grey, siltstone medium grey minor iron stain, - sandstone/siltstone mixed, sandstone salt and pepper to medium brown, fine grained to medium grained, - siltstone medium grey, iron stain - sandstone salt and pepper fine grained, laminated, half of chips are iron stained, - sandstone/mudstone mixed, sandstone salt and pepper, fine grained, mudstone dark grey
30.48	32.00	SANDSTONE - salt and pepper, fine grained, sandstone salt and pepper fine grained, iron stained, at 30.78m to 31.24m - sandstone salt and pepper fine grained, very minor dark grey mudstone - sandstone salt and pepper, fine grained, minor carbonaceous debris
32.00	33.53	SANDSTONE - salt and pepper to medium grey, fine grained - siltstone medium grey brown 32.30m, mudstone COAL mixed, mudstone dark grey-brown, coal, black, carbonaceous debris, minor iron stain, slickensides 32.92
33.53	35.05	SANDSTONE - salt and pepper, fine grained, minor coal streaks, minor carbonaceous debris, very minor iron stain at 31.09m - sandstone salt and pepper, fine grained, laminated, minor coal streaks at 31.39m
35.05	36.58	SANDSTONE - salt and pepper, fine grained, carbonaceous debris, - sandstone salt and pepper to medium grey, fine grained, minor carbonaceous debris
36.58	38.10	SILTY SANDSTONE - medium grey, fine grained siltstone medium grey-brown, - siltstone medium grey slightly sandy in places, pyrite

HOLE#

RDH 81-5

From 38.10m To 53.34m

FROM	TO	DESCRIPTION
38.10	39.62	SANDY SILTSTONE - medium grey, silty sandstone medium grey - siltstone medium grey, minor carbonaceous debris
39.62	41.15	SILTY SANDSTONE - medium grey, fine grained, siltstone medium grey, very minor coal, minor carbonaceous debris, slightly sandy in places
41.15	42.67	SANDY SILTSTONE - medium grey, minor carbonaceous debris, - siltstone medium grey carbonaceous debris 42.21m
42.67	44.20	MUDSTONE - dark grey to black, slightly carbonaceous - minor medium grained, salt and pepper sandstone, - siltstone, medium grey, muddy in places, carbonaceous debris 43.28m mudstone, medium grey-brown - mudstone/coal mixed, mudstone dark grey-brown, COAL black at 43.74m
44.20	45.72	SANDSTONE - salt and pepper, fine grained, minor COAL siltstone medium grey-brown with minor COAL pyrite, minor carbonaceous debris
45.72	47.24	SANDSTONE - fine grained, salt and pepper to medium grained, very minor carbonaceous debris, very minor COAL
47.24	48.77	SILTY SANDSTONE - medium grey-brown, very fine grained - minor carbonaceous debris increasing to base, silt content increasing downward
48.77	50.29	SANDY SILTSTONE - medium grey-brown, carbonaceous debris, - muddy sandstone - dark grey, fine grained, carbonaceous debris
50.29	51.82	SANDY SILTSTONE - medium grey, carbonaceous debris, coaly streaks, - sandstone, salt and pepper, fine grained, minor COAL, pyrite, - siltstone /COAL mixed at 51.51m siltstone medium grey-brown, pyrite
51.82	53.34	COAL - 51.81m to 52.42m (0.61m), black SAMPLE #1 - siltstone - medium grey-brown, carbonaceous debris - silty sandstone, medium grey to salt and pepper, fine grained, carbonaceous debris

HOLE#

RDH 81-5

From 53.34m To 64.01m

FROM	TO	DESCRIPTION
53.34	54.86	SANDSTONE - fine grained, salt and pepper, very minor carbonaceous debris, silty sandstone salt and pepper to medium grey, fine grained carbonaceous debris, silty in places 54.25m - sandstone/siltstone mixed, sandstone salt and pepper, fine grained, siltstone medium grey, slightly sandy
54.86	56.39	MUDSTONE /SANDSTONE/COAL - mixed, mudstone, medium grey, carbonaceous debris, sandstone salt and pepper, fine grained, COAL minor (black) - sandstone salt and pepper, fine grained, minor carbonaceous debris
56.39	57.91	SANDSTONE - salt and pepper, fine grained to medium grained, laminated, minor iron stain, minor medium grey siltstone - sandstone fine grained, salt and pepper to medium grey, carbonaceous debris
57.91	59.44	SANDSTONE - very fine grained, salt and pepper, abundant carbonaceous debris, silty in place - sandy siltstone, medium grey-brown, minor carbonaceous debris, very minor coal 59.13m
59.44	60.96	SANDSTONE/SILTSTONE - mixed, sandstone salt to medium grey, fine grained, slightly silty - siltstone buff, hard, - muddy siltstone medium grey 60.35m carbonaceous debris
60.96	62.48	SILTY MUDSTONE - medium grained, sandstone salt and pepper, medium grained, minor dark grey mudstone 58.52m - siltstone/sandstone mixed, siltstone medium grey, carbonaceous debris, sandstone, salt and pepper, fine grained minor iron stain, - sandstone salt and pepper, medium grained, minor iron stain,
62.48	64.01	SANDSTONE - salt and pepper to yellow-brown, medium grained, completely iron stained, minor dark grey silty mudstone - sandstone salt and pepper, fine grained to medium grained 63.40m very minor iron stain

HOLE#

RDH 81-5

From 64.01m To 73.15m

FROM	TO	DESCRIPTION
64.01	65.53	SANDSTONE - salt and pepper medium grained, minor iron stain - siltstone/coal/sandstone mixed, 64.01m to 64.62m - siltstone medium grey coal black, approx. 0.15m, sandstone salt and pepper, medium grained, minor iron stain, minor carbonaceous debris- sandstone salt and pepper fine grained very minor carbonaceous debris
65.53	67.06	SANDSTONE - sandy siltstone mixed - sandstone salt and pepper, medium grained, sandy silt, medium grey - sandstone, salt and pepper, medium grained, grain size decreasing downward - sandstone, salt and pepper fine grained 66.75m
67.06	68.58	SANDSTONE - salt and pepper, fine grained, very minor carbonaceous mudstone laminated less than 0.2cm thick at 67.97m contains minor carbonaceous debris, - sandstone salt and pepper fine grained, carbonaceous debris, minor coaly streaks
68.58	70.10	SANDSTONE - salt and pepper to medium grained, fine grained, laminated, minor carbonaceous debris, increasing grain size downward, - sandstone salt and pepper, fine grained to medium grained, carbonaceous plant debris
70.10	71.63	SANDSTONE/SILTSTONE - mixed, sandstone salt and pepper, fine grained, siltstone, medium grey - coaly streaks, carbonaceous debris - sandstone salt and pepper, fine grained to medium grained, minor iron stain - sandstone - coal/siltstone mixed at 71.17m to 71.47m (0.30m) - sandstone salt and pepper medium grained, minor iron stain, siltstone medium grey, COAL, black
71.63	73.15	SANDY SILTSTONE - medium grey, carbonaceous debris siltstone medium grey, with minor medium grained, salt and pepper sandstone, carbonaceous debris

HOLE# RDH 81-5 From 73.15m To 83.82m

FROM	TO	DESCRIPTION
73.15	74.68	MUDDY SILTSTONE - medium grey, carbonaceous debris - mudstone dark grey to black, minor COAL slickensides, pyrite carbonaceous debris, - sandy siltstone, medium grey-brown 73.91m, - sandstone/siltstone mixed, sandstone salt and pepper fine grained, siltstone medium grey, - sandstone salt and pepper, fine grained - sandstone/siltstone/mudstone mixed - sandstone salt and pepper fine grained siltstone medium grey-brown mudstone dark grey, pyrite, minor carbonaceous debris
74.68	76.20	SANDSTONE - salt and pepper to light grey, fine grain sandstone, salt and pepper to medium grey fine grained, increasing silt content downward - sandstone/siltstone mixed at 60.04m, sandstone - salt and pepper fine grained to medium grained, siltstone medium grey, minor sandy siltstone, medium grey, carbonaceous debris
76.20	77.72	SILTY SANDSTONE - medium brown, fine grained, minor carbonaceous debris, - sandy siltstone medium grey
77.72	79.25	SANDSTONE - fine grained salt and pepper to medium gr slightly silty - sandstone/siltstone mixed - sandstone salt and pepper, fine grained to medium grained, - siltstone medium grey laminated - silty sand, medium grey
79.25	80.77	SANDY SILTSTONE - medium grey, minor carbonaceous debris, sandstone salt and pepper fine grained to medium grained, very minor siltstone, - sandstone dark grey to black, coal pyrite
80.77	82.30	SILTSTONE - medium grey, minor carbonaceous debris - sandstone salt and pepper, fine grained
82.30	83.82	SANDSTONE - salt and pepper fine grained minor iron stain - sandstone salt and pepper, fine grained to medium grained - sandstone salt and pepper

cont'd

HOLE#

RDH 81-5

From 83.82m To 92.96m

FROM	TO	DESCRIPTION
82.30	83.82	cont'd - fine grained, minor medium grey siltstone minor carbonaceous debris at 83.36m
83.82	85.34	SANDSTONE - sandy siltstone mixed, - sandstone salt and pepper, fine grained, sandy siltstone medium grey, carbonaceous debris - sandstone salt and pepper to medium grey, fine grained - grain size increasing downward - sandstone salt and pepper to medium grey, - fine grained at 85.04m
85.34	86.87	SANDSTONE - medium grey, fine grained slightly silty - sandstone, salt and pepper, fine grained at 85.80m, minor carbonaceous debris - sandstone, salt and pepper, medium grained minor carbonaceous debris, 86.56m
86.87	88.39	SILTY SANDSTONE - medium grey, fine grained, laminated minor carbonaceous debris, sandstone salt and pepper to medium grained, fine grained 87.32m - sandstone/siltstone mixed, - sandstone salt and pepper, fine grained - siltstone medium grained carbonaceous debris - siltstone medium grey, carbonaceous debris
88.39	89.92	SANDY SILTSTONE - medium grey carbonaceous debris, laminated - siltstone medium grey, sandy in places, carbonaceous debris
89.92	91.44	SILTY SANDSTONE - medium grey, fine grained - siltstone medium grey, minor COAL, carbonaceous debris, mudstone/COAL mixed at 90.22m - mudstone dark grey-brown, carbon- aceous debris, pyrite, COAL black - muddy siltstone medium grey, carbonaceous debris 90.52m - mudstone/COAL mixed at 90.68 - mudstone dark grey-brown, COAL black, carbonaceous debris, COAL at 91.13m black approx. 0.15m
91.44	92.96	SILTY MUDSTONE - dark grey, carbonaceous debris, siltstone, medium grey, carbonaceous debris minor dark grey mudstone

HOLE# RDH 81-5From 92.96m To 114.30m

FROM	TO	DESCRIPTION
92.96	94.49	MUDSTONE AND SILTSTONE - interbedded
94.49	96.01	SILTSTONE AND MINOR MUDSTONE
96.01	97.54	SANDSTONE, MUDSTONE, SILTSTONE - sandstone fine grained medium grey to 96.62m then mudstone to 96.93m then siltstone to 97.54m
97.54	99.06	SILTSTONE, SANDSTONE - interbedded, - sandstone fine grained medium grey
99.06	100.58	SANDSTONE AND MINOR SILTSTONE - sandstone fine grain medium grey to 99.97m then siltstone and sandstone interbedded
100.58	102.11	SANDSTONE AND MINOR SILTSTONE - sandstone fine grained light grey, minor interbeds of siltstone medium grey
102.11	103.63	SANDSTONE - fine to medium grained, salt and pepper to light grey
103.63	105.16	SANDSTONE AND MINOR MUDSTONE, SILTSTONE AND COAL - sand- stone medium to fine grained, light grey to 104.55m then mudstone siltstone and coal to 104.85m then sandstone fine grained light grey
105.16	106.68	SANDSTONE, SILTSTONE, COAL - minor coal near start approx. 10cm, then sandstone medium to fine grained, light grey to 106.07m then siltstone to 106.37m then sandstone fine grained light grey
106.68	108.20	SANDSTONE - fine to medium grained, light grey
108.20	109.73	SANDSTONE AND MINOR SILTSTONE - sandstone fine grained light grey to 109.12m then siltstone/mudstone and sandstone interbedded
109.73	111.25	SILTSTONE AND MUDSTONE, RARE SANDSTONE - siltstone medium grey interbedded with dark grey mud- stone, rare sandstone interbed
111.25	112.78	SILTSTONE AND SANDSTONE - siltstone, medium grey to 112.17m then sandstone, fine grained light grey
112.78	114.30	SANDSTONE AND SILTSTONE AND MUDSTONE - sandstone fine grained, salt and pepper to 113.84m then siltstone to 114.15m then mudstone

R.D.H. EMG-81-6
WELL COMPLETION REPORT

Location: - On the Utah Mines Ltd. W.A.C. Bennett Dam access road.
- U.T.M. Coordinates: 6,207,521mN x 541,627mE.
- Coal Licence No. 3509.

Elevation: 819.3 metres

Orientation: Vertical

Date Collared: September 6, 1981

Date Completed: September 6, 1981

Plugged: Yes - cemented

Overburden Depth: 0 metres

Final Depth: 118.57 metres

Formations Encountered: 0 to 118.57m Gething Formation

Rock Chip Description By: D.N. Duncan

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

Comments: No resistivity log run as resistivity module on probe inoperable.

CORE DESCRIPTION

HOLE# EMG RDH 81-6 From 0m To 18.29m
 Area _____ By _____

FROM	TO	DESCRIPTION
		GETHING FORMATION
0	1.52	SANDSTONE - fine grained, salt and pepper minor siltstone interbeds, dark to medium grey - abundant carbonaceous plant debris
1.52	3.05	MUDSTONE - dark grey, siltstone, medium grey, minor fine grained salt and pepper sandstone
3.05	4.57	MUDSTONE - dark grey and siltstone medium grey, interbedded
4.57	6.10	MUDSTONE - dark grey, abundant plant debris and coaly streaks
6.10	7.62	SANDSTONE - medium grained, salt and pepper coal bands sandstone becoming finer grained toward end of interval, siltstone medium grained at base
7.62	9.14	SANDSTONE - fine grained - medium grey and minor medium grey siltstone laminations, minor carbonaceous plant debris - sandstone medium grained, minor carbonaceous bands - silty mudstone, dark grey at end of interval
9.14	10.67	MUDSTONE - dark grey, carbonaceous, abundant coal bands and streaks, sandstone fine grained salt and pepper at 10.06m to end of run
10.67	12.19	MUDSTONE - carbonaceous dark grey, coaly streaks and plant debris, minor pyrite
12.19	13.71	SANDSTONE - salt and pepper, fine grained, then siltstone medium grey at 13.11m back to fine grained sandstone at end of run
13.71	15.24	SANDSTONE - fine grained salt and pepper becoming silty at end of run with minor coaly streaks
15.24	16.76	SANDSTONE - salt and pepper, fine grained, minor medium grey siltstone, becoming siltier at 16.15m then sandstone fine grained, salt and pepper at 16.46m
16.76	18.29	SANDSTONE - fine grained salt and pepper minor pyrite, becoming silty at end of run

CORE DESCRIPTION

HOLE# EMG RDH 81-6 From 18.29m To 38.10m
 Area _____ By _____

FROM	TO	DESCRIPTION
18.29	19.81	SANDSTONE - fine grained salt and pepper, minor carbonaceous siltstone, medium dark grey, coaly streaks
19.81	21.34	SANDSTONE - fine grained, salt and pepper, minor silty mudstone at top of run, minor medium grey siltstone throughout
21.34	22.86	SANDSTONE- fine grained, salt and pepper. silty mudstone dark grey at 22.25m - interbedded dark grey carbonaceous mudstone and coal at end of run
22.86	24.38	SANDSTONE - fine grained, minor iron stain along fractures, minor pyrite
24.38	25.91	MUDSTONE - dark grey slightly silty - coal bands, very coaly at 25.60 then fine grained salt and pepper sandstone at end of run
25.91	27.43	SANDSTONE - fine grained, salt and pepper, minor dark grey silty mudstone
27.43	28.96	SANDSTONE - fine grained, salt and pepper, minor medium grey siltstone, very coaly mudstone at 28.6 dark grey to black at end of run
28.96	30.48	SANDSTONE - fine grained salt and pepper, minor siltstone laminated
30.48	32.00	SANDSTONE - fine grained, salt and pepper and mudstone dark grey carbonaceous
32.00	33.53	MUDSTONE - dark grey, fine grained salt and pepper sandstone at 32.61m minor siltstone, medium grey
33.53	35.05	SANDSTONE - medium grained to fine grained, salt and pepper, mudstone dark grey at 34.44m, siltstone medium grey at 34.75m
35.05	36.58	SILTSTONE - medium grey and sandstone, fine grained salt and pepper interbedded to fine grained, sandstone at 35.66m, mudstone dark grey at 36.27m
36.58	38.10	MUDSTONE AND COAL - mudstone, dark grey to black to 37.18m poor chip recovery, - sandstone fine grained to medium grained salt and pepper at 37.18m, mudstone dark grey at 65.23m

CORE DESCRIPTION

HOLE # EMG RDH 81-6 From 38.10m To 59.44m
 Area _____ By _____

FROM	TO	DESCRIPTION
38.10	39.62	MUDSTONE - to 38.40m then fine grained salt and pepper sandstone - medium grained sandstone minor coaly streaks
39.62	41.15	SANDSTONE - fine grained to medium grained, salt and pepper, minor carbonaceous mudstone laminated with minor pyrite, mudstone dark grey at 40.84m
41.15	42.67	MUDSTONE - dark grey, carbonaceous coal 41.45m to 41.76m (?) muddy, poor chip recovery, no sample then mudstone to end of run
42.67	44.20	SANDSTONE- fine grained, salt and pepper with carbonaceous mudstone, laminated, medium grey siltstone at 44.04m
44.20	45.72	MUDSTONE - dark grey, slightly silty
45.72	47.24	MUDSTONE - dark grey, slightly silty becoming siltstone at 46.94m
47.24	48.77	SILTSTONE - to 47.40m then coal (?) to 47.70m (?) poor chip recovery - then mudstone dark grey, silty at 48.16m sandstone, fine grained, salt and pepper
48.77	50.29	SILTSTONE - medium grey to silty mudstone at 49.68m - sandstone, fine grained, salt and pepper at 49.99m
50.29	51.82	SANDSTONE - fine grained, salt and pepper, with minor medium grey siltstone beds, calcite in fractures at 51.51m
51.82	53.34	SANDSTONE - fine grained, salt and pepper, minor coaly streaks, minor dark medium grey siltstone laminated at 53.03m
53.34	54.86	MUDSTONE - coaly dark grey to 53.95 then sandstone fine grained salt and pepper
54.86	56.39	SANDSTONE - fine grained, salt and pepper
56.39	57.91	SANDSTONE - fine grained, salt and pepper to medium grey siltstone imbeds, mudstone dark grey silty at 57.30m
57.91	59.44	SANDSTONE - salt and pepper, fine grained, mudstone and coal at 58.52m to 59.13m sandstone, fine grained, salt and pepper to 59.43m with abundant carbonaceous plant debris.

CORE DESCRIPTION

HOLE# EMG RDH 81-6 From 59.44m To 77.72m
 Area _____ By _____

FROM	TO	DESCRIPTION
59.44	60.96	SANDSTONE - fine grained, salt and pepper, abundant plant debris, coaly mudstone at 60.35m to 60.90m then sandstone, salt and pepper, fine grained
60.96	62.48	SANDSTONE - salt and pepper fine grained, minor coaly streaks, minor medium grey siltstone imbeds
62.48	64.01	SANDSTONE - salt and pepper, medium grained, minor siltstone
64.01	65.53	SANDSTONE - fine grained, salt and pepper to medium grained, minor carbonaceous mudstone laminated
65.53	67.05	MUDSTONE - dark grey to 65.84m then fine grained salt and pepper sandstone with minor medium grey siltstone imbeds
67.05	68.58	MUDSTONE AND COAL - interbedded to 67.36 to fine grain salt and pepper, mudstone coaly at 67.97m to 68.27m pyrite sandstone salt and pepper fine grained
68.58	70.1	MUDSTONE - very coaly, pyrite to 69.49m then sandstone fine grained salt and pepper with carbonaceous plant debris
70.10	71.63	SANDSTONE - fine grained, salt and pepper, minor calcite along fractures, minor carbonaceous plant debris, minor coaly streaks
71.63	73.15	SANDSTONE - salt and pepper, fine grained with interbedded medium grey siltstone, siltstone at 72.24m, medium grey mudstone, dark grey at 72.85m
73.15	74.67	MUDSTONE - dark grey at 73.46m siltstone medium grey at 74.07m mudstone dark grey
74.67	76.20	SANDSTONE - fine grained salt and pepper minor coal streaks, abundant carbonaceous plant debris, muddy siltstone from 75.28m to 75.8m then fine grained salt and pepper sandstone
76.20	77.72	SANDSTONE - salt and pepper, fine grained, minor calcite filled fractures at 77.11 siltstone medium grey at 77.42m sandstone fine grained and salt and pepper with carbonaceous plant debris.

HOLE#

EMG RDH 81-6

From 77.72m To 99.06m

FROM	TO	DESCRIPTION
77.72	79.25	SANDSTONE - salt and pepper, fine grained minor carbonaceous plant debris with minor interbedded siltstone medium grey
79.25	80.77	SANDSTONE - salt and pepper, fine grained; minor plant debris, interbedded with medium grey siltstone
80.77	82.30	SILTSTONE - medium grey at 83.51m to 84.73m, sandstone fine grained to medium grained then mudstone coaly
82.30	83.82	MUDSTONE - dark grey to 82.90m then COAL & MUDSTONE to 83.82m
83.82	85.34	MUDSTONE - dark grey carbonaceous, abundant coal bands (?) - sandstone fine grained, salt and pepper at 84.73m
85.34	86.87	MUDSTONE - dark grey to 85.95m then sandstone, salt and pepper, fine grained then at 86.26m, silty mudstone - dark grey to end of run
86.87	88.39	SANDSTONE - salt and pepper, fine grained, minor carbonaceous mudstone laminations, minor medium grey siltstone interbedded
88.39	88.92	SANDSTONE - salt and pepper, fine grained, minor carbonaceous mudstone laminations
88.92	91.44	SANDSTONE - salt and pepper, fine grained - 90.22m to 91.44m mudstone and coal interbedded
91.44	92.96	MUDSTONE - dark grey at 91.74m sandstone, fine grained, salt and pepper
92.96	94.49	SANDSTONE - salt and pepper, fine grained
94.49	96.01	COAL - - 94.49m to 95.10m minor dark grey mudstone then sandstone, salt and pepper, fine grained
96.01	97.53	SANDSTONE - fine grained to very fine grained, salt and pepper, minor medium grained siltstone interbedded at 96.62m siltstone, medium grey at 96.93m - sandstone, salt and pepper, fine grained
97.53	99.06	SANDSTONE - fine grained to medium grained, salt and pepper, siltstone interbedded

APPENDIX III

ANALYTICAL DATA FOR 1972, 1973, 1975,

1977 AND 1981 DIAMOND DRILL HOLES

P/c

CARBON CREEK - EAST MT. GETTING

HEAD ANALYSES

Hole: EMC 72-1
 Location: 3450 Ft. WL x 850 NL of Section
 Elevation: 3450 Ft. (est.)
 Licence No. CL 1665

Sample No.	Footage	No. Of Feet	Lab. Assay FSI	Natural Basis						Dry Basis				
				Navajo Mine Assay						Navajo Mine Assay				
				% H2O	% Ash	% S	% VM	% FC	Btu	% Ash	% S	% VM	% FC	Btu
1	49.2-51.1 * G.M.	1.9	1 1/2	1.60	16.79	.99	22.12	59.49	12167	17.08	1.01	22.50	60.52	12377
2	124.1-126.1 ?	2.0	2 1/2	1.88	14.47	.98	23.00	60.65	12656	14.75	1.00	23.44	61.81	12898
3	168.6-170.3 ?	1.7	2 1/2	1.78	12.71	1.03	26.12	58.39	12522	13.96	1.05	26.59	59.45	12740
4	175.3-181.0 L.	5.7	2	1.69	25.74	.75	22.81	49.76	10634	26.18	.76	23.20	50.62	10187
5	191.4-192.4 ?	1.0	2	1.21	26.27	.75	22.98	49.54	10935	26.59	.76	23.26	50.15	11069
6	203.8-204.8 F.P.	1.0	2	2.12	1.57	.80	21.81	74.50	14570	1.60	.82	22.23	76.11	14886
7	285.3-286.6 ?	1.3	2	1.66	7.36	1.03	25.54	65.44	13799	7.48	1.05	25.97	66.54	14032
8	303.0-304.0 ?	1.0	8 1/2	1.55	13.54	1.14	27.02	57.89	12667	13.75	1.16	27.45	58.80	12866

CARBON CREEK - EAST MT. GETTING

HEAD ANALYSES

Hole: EMF 72-2
 Location: 1250 Ft. ELX 1200 Ft. SL of Section
 Elevation: 3450 Ft.
 Licence No. CL 1671

Sample No.	Footage	*	No. Of Feet	Lab. Assay FSI	Natural Basis						Dry Basis				
					Navajo Mine Assay						Navajo Mine Assay				
					% H ₂ O	% Ash	% S	% VM	% FC	Btu	% Ash	% S	% VM	% FC	Btu
1	97.7- 99.0	?	1.3	6 1/2	1.81	11.67	2.89	25.63	60.89	13036	11.89	2.94	26.10	62.01	13270
2	122.5-123.5	?	1.0	4 1/2	1.85	10.77	.91	25.41	61.97	13217	10.97	.93	25.89	63.14	13460
3	227.4-229.8	L.M.	2.4	2	2.15	13.37	1.12	26.40	58.08	12328	13.66	1.14	26.98	59.36	12590
4	378.4-382.2	G.M.	3.8	2	1.93	11.96	.80	20.19	65.92	12930	12.20	.82	20.59	67.22	13180
5	503.3-508.5	L.	5.2	2	1.67	29.43	.54	21.36	47.54	9997	29.93	.55	21.72	48.35	10167
6	513.5-514.5	?	1.0	3	1.38	15.98	1.22	31.52	51.12	11458	16.20	1.24	31.96	51.84	11618
7	537.0-538.0	F.P.	1.0	2	1.93	5.40	.94	22.05	70.62	14083	5.51	.96	22.48	72.01	14360
8	632.4-633.5	?	1.1	4	1.48	17.62	1.02	23.21	57.69	12142	17.88	1.04	23.56	58.56	12324
9	676.1-677.9	?	1.8	9	1.21	11.56	2.37	26.33	60.90	13297	11.70	2.40	26.65	61.65	13460

EAST MOUNT GETHING

HEAD ANALYSIS

HOLE: EMG 73-3
LOCATION: 300 FWL X 2,650 FSL of C.L. 1670
ELEVATION: 4,040 feet
LICENCE NO.: C.L. 1670

sample No.	Footage	No. of Feet	Lab. Assay FSI	Natural Basis						Dry Basis				
				Navajo Mine Assay						Navajo Mine Assay				
				%H2O	% Ash	%S	%VM	%FC	Btu	% Ash	%S	%VM	%FC	Btu
1	65.6-66.8	? 1.2	2	1.68	5.38	0.79	22.26	70.68	14035	5.47	0.80	22.64	71.89	14275
2	119.9-121.5	? 1.6	2	1.48	9.42	0.48	20.80	68.30	13504	9.56	0.49	21.11	69.33	13707
3	122.6-129.0*	G 6.4	2	1.46	9.63	0.46	21.55	67.36	13710	9.77	0.47	21.87	68.36	13913
4	195.6-198.1	R 2.5	2	1.31	9.05	0.65	22.59	67.35	13608	9.17	0.66	22.89	67.49 ⁹⁴	13789
5	288.0-290.0	? 2.0	2	1.25	16.23	0.66	19.36	63.16	12541	16.44	0.67	19.61	63.95	12700
6	438.7-440.1	? 1.4	3	1.25	5.24	0.70	22.21	71.30	14278	5.31	0.71	22.49	72.20	14459
7	500.9-503.2	? 2.3	4	1.24	10.18	0.68	21.04	67.54	13415	10.31	0.69	21.30	68.39	13583
8	515.5-517.6	? 2.1	2½	1.42	4.38	0.67	21.43	72.77	14473	4.44	0.68	21.74	73.82	14681
9	609.5-612.0	? 2.5	2	1.37	14.23	0.66	18.87	65.53	13046	14.43	0.67	19.13	66.44	13227
10	617.9-619.9	? 2.0	2½	1.38	6.48	0.71	20.36	71.78	14116	6.57	0.72	20.64	72.79	14314
11	664.4-666.0	? 1.6	3	1.31	7.16	0.69	18.76	72.77	13968	7.26	0.70	19.01	73.73	14153
12	703.1-706.0	M 2.9	2	1.41	17.79	0.63	18.07	62.73	12280	18.04	0.64	18.33	63.63	12456

EAST MOUNT GETTING COAL

Head Analysis

Hole 75-4

Sample No.	Depth	No. Of Feet	Grams Received	Air Dry Basis							Moisture Free Basis				
				% H ₂ O	% Ash	% S	% VM	% FC	Btu	FSI	% Ash	% S	% VM	% FC	Btu
1	164.1'-166.0'	1.9	1278	0.96	21.87	0.63	20.56	56.61	11777	4 1/2	22.08	0.64	20.76	57.16	11897
2	214.0'-216.7'	2.7	388	0.92	8.50	0.77	27.02	63.56	13893	8 1/2	8.58	0.78	27.27	64.15	14021
3	231.5'-232.7'	1.2	1165	1.26	6.99	0.81	23.66	68.09	14019	5 1/2	7.08	0.82	23.96	68.96	14198

Hole 75-6

1	55.8'-60.9'	5.1	3779	1.85	5.77	0.76	25.06	67.32	13902	1 1/2	5.88	0.77	25.53	68.59	14164
2	101.2'-103.3'	2.1	737	1.70	4.07	0.83	24.70	69.53	14442	1 1/2	4.14	0.84	25.13	70.73	14692
3	222.6'-224.8'	2.2	1972	1.83	11.81	0.98	27.39	58.97	13024	1	12.03	1.00	27.90	60.07	13267
4	268.7'-271.0'	2.3	957	1.07	6.65	1.05	29.17	63.11	13944	1	6.72	1.06	29.49	63.79	14095
5	365.5'-368.6'	3.1	2376	1.89	5.27	0.76	20.54	72.30	14021	1 1/2	5.37	0.77	20.94	73.69	14291
6	473.9'-477.0'	3.1	2731	1.12	25.27	0.58	31.13	42.48	10044	1 1/2	25.56	0.59	31.48	42.96	10158
7	488.0'-489.3'	1.3	1035	1.51	3.90	0.81	20.28	74.31	14404	1	3.96	0.82	20.59	75.45	14625
8	510.8'-512.1'	1.3	860	1.34	1.85	0.86	20.67	76.14	14650	1	1.88	0.87	20.95	77.17	14845

Hole 75-5

1	189.5'-192.6'	3.1	2031	2.15	3.69	0.91	24.23	69.93	14093	1	3.77	0.93	24.76	71.47	14403
2	308.0'-310.6'	2.6	2645	1.59	13.82	0.91	22.93	61.66	12630	1 1/2	14.04	0.92	23.30	62.66	12834
3	336.6'-338.6'	2.0	2297	2.08	5.91	0.79	23.11	68.90	12433	1 1/2	6.04	0.81	23.60	70.36	12697
4	461.9'-466.6'	4.7	4545	1.75	13.65	0.62	23.60	61.00	12683	1 1/2	13.89	0.63	24.02	62.09	12909
5	902.7'-905.0'	2.3	2019	1.21	7.37	0.85	26.76	64.66	13996	3	7.46	0.86	27.09	65.45	14167

COAL - EAST MT. GETHING

Hole 77-7

Head Analysis

Sample No.	Depth	No. Of Feet	Air Dry Basis							Moisture Free Basis				
			% H ₂ O	% Ash	% S	% VM	% FC	Btu	FSI	% Ash	% S	% VM	% FC	Btu
1	226.0-228.5	2.5	1.47	9.73	0.93	20.81	67.99	13350	1	9.88	0.94	21.12	69.00	13549
2	544.6-546.4	1.8	1.07	8.53	0.72	20.63	69.77	13672	1	8.62	0.73	20.85	70.53	13820
3	636.8-640.5	3.7	1.27	16.27	0.53	19.33	63.13	12457	1 1/2	16.48	0.54	19.58	63.94	12617
4	682.1-685.5	3.4	1.49	5.75	0.38	21.32	71.44	14112	1 1/2	5.84	0.39	21.64	72.52	14325
5	689.0-690.2	1.2	1.52	8.49	0.41	20.53	69.46	13625	1	8.62	0.42	20.85	70.53	13835
6	690.2-692.0	1.8	1.50	9.43	0.29	18.27	70.80	13446	1/2	9.57	0.29	18.55	71.88	13651
7	692.0-693.7	1.7	1.72	4.54	0.38	20.26	73.48	14227	1/2	4.62	0.39	20.61	74.77	14476
8	941.1-942.0	0.9	1.16	9.64	0.50	18.31	70.89	13570	1	9.75	0.51	18.53	71.72	13729
9	973.2-974.6	1.4	1.29	7.26	0.96	21.93	69.52	13960	7	7.35	0.97	22.22	70.43	14142

COAL - EAST MT. GETHING

Hole 77-8

Head Analysis

Sample No.	Depth	No. Of Feet	Air Dry Basis							Moisture Free Basis				
			% H ₂ O	% Ash	% S	% VM	% FC	Btu	FSI	% Ash	% S	% VM	% FC	Btu
1	174.1-176.1	2.0	1.66	14.77	0.50	17.36	66.21	12546	0	15.02	0.51	17.65	67.33	12758
2	248.4-250.4	2.0	1.15	9.29	0.56	22.25	67.31	13498	3	9.40	0.57	22.51	68.09	13655
3	254.0-256.0	2.0	1.23	7.58	0.47	19.51	71.68	13869	1	7.68	0.48	19.75	72.57	14042
4	335.9-337.4	1.5	1.28	13.00	0.57	19.84	65.88	12985	1	13.17	0.58	20.10	66.73	13153
4A	491.0-493.0	2.0	1.08	10.26	0.54	20.25	68.41	13648	6	10.37	0.55	20.47	69.16	13797
5	506.8-507.9	1.1	1.23	1.40	0.62	19.98	77.39	14863	1	1.42	0.63	20.23	78.35	15048
6	510.1-512.0	1.9	1.18	5.96	0.54	19.48	73.38	14127	1	6.03	0.55	19.71	74.26	14296
7	518.6-520.8	2.2	1.06	9.80	0.53	19.34	69.80	13548	1	9.90	0.54	19.55	70.55	13693
8	581.9-583.9	2.0	1.05	4.41	0.55	19.28	75.26	14418	1	4.46	0.56	19.48	76.06	14571
9	748.4-749.4	1.0	0.84	9.15	0.56	18.49	71.52	13765	1	9.23	0.56	18.65	72.12	13882
10	766.0-768.0	2.0	0.94	14.15	0.51	17.37	67.54	12893	1	14.28	0.51	17.54	68.18	13015
11	842.4-843.4	1.0	0.90	2.75	0.52	19.28	77.07	14809	1	2.77	0.52	19.46	77.77	14943

COAL - EAST MT. GETTING

Hole 77-9

Head Analysis

<u>Sample No.</u>	<u>Depth</u>	<u>No. Of Feet</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>
1	266.3-267.1	1.0	1.25	10.13	0.99	20.55	68.07	13372	1	10.26	1.00	20.81	68.93	13541
2	320.1-321.9	1.8	0.96	44.00	0.52	15.43	39.61	8244	1	44.43	0.53	15.58	39.99	8324
3	463.3-465.4	2.1	1.22	12.49	0.62	18.20	68.09	13011	1	12.64	0.63	18.43	68.93	13172

COAL - EAST MT. GETHING

Hole 77-10

Head Analysis

Sample No.	Depth	No. Of Feet	Air Dry Basis							Moisture Free Basis				
			% H ₂ O	% Ash	% S	% VM	% FC	Btu	FSI	% Ash	% S	% VM	% FC	Btu
1	387.2-388.7	1.5	1.49	1.57	0.99	22.53	74.41	14701	1	1.59	1.00	22.87	75.54	14923
2	436.0-	2.5	1.60	2.45	0.68	21.76	74.19	14510	1	2.49	0.69	22.11	75.40	14746
3	437.9-	2.9	1.19	5.31	0.73	26.59	66.91	14140	4	5.37	0.74	26.91	67.72	14310
4	450.5-452.0	1.5	1.24	9.79	0.67	23.35	65.62	13186	1	9.91	0.68	23.64	66.45	13352
5	475.8-477.0	1.2	1.27	4.29	1.08	21.01	73.43	14316	1	4.35	1.09	21.28	74.37	14500
6	573.8-575.2	1.4	0.98	6.53	1.03	23.90	68.59	13984	4 1/2	6.59	1.04	24.14	69.27	14122
7	619.3-	2.8	1.00	29.84	3.19	20.64	48.52	10163	5	30.14	3.22	20.85	49.01	10266
8	621.9-	3.2	1.11	28.04	2.19	21.26	49.59	10536	7 1/2	28.35	2.21	21.50	50.15	10654
9	643.6-645.6	2.0	1.12	4.44	1.18	23.84	70.60	14201	4	4.49	1.19	24.11	71.40	14362
10	937.5-	3.6	1.12	5.74	0.64	18.26	74.88	14231	1	5.81	0.65	18.46	75.73	14392
11	938.9-	3.8	1.01	12.55	0.62	19.51	66.93	13182	1 1/2	12.68	0.63	19.71	67.61	13316
12	1108.3-1110.3	2.0	0.85	29.28	0.58	17.11	52.76	10583	1	29.53	0.58	17.26	53.21	10674
13	1179.9-1182.1	2.2	0.97	6.82	0.64	19.67	72.54	14116	1	6.89	0.65	19.86	73.25	14254
14	1312.9-1315.9	3.0	0.89	5.78	0.67	19.53	73.80	14329	1	5.83	0.68	19.71	74.46	14458

EAST MOUNT GEIHING COAL
DRILL HOLE 81-11
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	2.17	3.65	0.99	21.16	73.02	14303	1½	3.73	1.01	21.63	74.64	14620
SAMPLE #2	1.79	29.50	1.09	22.66	46.05	10174	6½	30.04	1.11	23.07	46.89	10359
SAMPLE #3	1.39	13.17	0.91	25.73	59.71	12801	6½	13.36	0.92	26.09	60.55	12981
SAMPLE #4	1.62	15.97	0.82	27.02	55.39	11925	2½	16.23	0.83	27.46	56.31	12121
SAMPLE #5	1.70	7.86	0.90	19.08	71.36	13747	1½	8.00	0.92	19.41	72.59	13985
SAMPLE #6	1.13	28.75	1.04	23.10	47.02	10543	7	29.08	1.05	23.36	47.56	10663
SAMPLE #7	0.87	22.09	1.12	24.27	52.77	11742	7½	22.28	1.13	24.48	53.24	11845
SAMPLE #8	0.78	62.51	1.02	13.58	23.13	5323	1	63.00	1.03	13.69	23.31	5365
SAMPLE #9	1.14	21.41	0.79	22.98	54.47	11426	5	21.66	0.80	23.24	55.10	11558
SAMPLE #10	0.90	10.39	1.83	27.97	60.74	13663	8	10.48	1.85	28.22	61.30	13787
SAMPLE #11	1.07	57.23	1.28	15.16	26.54	5761	3	57.85	1.29	15.32	26.83	5823
SAMPLE #12	0.94	21.60	3.60	24.67	52.79	11392	4½	21.80	3.63	24.90	53.30	11500

EAST MOUNT GETHING COAL
DRILL HOLE 81-12
HEAD ANALYSIS

PRODUCT	AIR DRY BASIS							MOISTURE FREE BASIS				
	% H2O	% ASH	% S	% VM	% FC	BTU	FSI	% ASH	% S	% VM	% FC	BTU
SAMPLE #13	6.19	17.94	1.30	25.38	50.49	10553	0	19.12	1.39	27.05	53.83	11249
SAMPLE #14	2.51	6.56	0.84	21.04	69.89	13738	1½	6.73	0.86	21.58	71.69	14092
SAMPLE #15	2.03	11.52	0.75	24.91	61.54	12762	1½	11.76	0.77	25.43	62.81	13026
SAMPLE #16	1.80	16.51	0.67	19.24	62.45	12337	1½	16.81	0.68	19.59	63.60	12563
SAMPLE #17	1.88	10.17	0.79	22.13	65.82	13236	2	10.36	0.81	22.55	67.09	13490
SAMPLE #18	1.95	5.77	0.90	18.79	73.49	14068	2	5.88	0.92	19.16	74.96	14348
SAMPLE #19	1.20	20.22	0.76	23.62	54.96	11579	2½	20.47	0.77	23.91	55.62	11720
SAMPLE #20	1.28	15.31	2.46	23.26	60.15	12658	7	15.51	2.49	23.56	60.93	12822
SAMPLE #21	1.57	15.67	1.53	24.04	58.72	12679	8	15.92	1.55	24.42	59.66	12881
SAMPLE #22	1.50	7.87	1.52	23.14	67.49	13851	6½	7.99	1.54	23.49	68.52	14062
SAMPLE #23	1.28	11.51	0.92	24.91	62.30	12802	3½	11.66	0.93	25.23	63.11	12968
SAMPLE #24	1.23	6.67	0.83	19.88	72.22	14139	2½	6.75	0.84	20.13	73.12	14315

EAST MOUNT GETHING COAL
DRILL HOLE 81-12
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 #25	1.20	12.06	1.03	25.39	61.35	13394	8	12.21	1.04	25.70	62.09	13557
SAMPLE #26	1.09	7.79	0.71	18.62	72.50	14076	1½	7.88	0.72	18.83	73.29	14231
SAMPLE #27	1.06	12.87	0.76	19.82	66.25	13150	3½	13.01	0.77	20.03	66.96	13291
SAMPLE #28	1.00	23.41	1.49	19.47	56.12	9986	3½	23.65	1.51	19.67	56.68	10087
SAMPLE #29	1.12	5.59	0.75	20.32	72.97	14329	1½	5.65	0.76	20.55	73.80	14491
SAMPLE #30	1.07	11.50	0.80	20.12	67.31	13436	3½	11.62	0.81	20.34	68.04	13581
SAMPLE #31	1.14	4.17	0.69	18.95	75.74	14553	1½	4.22	0.70	19.17	76.61	14721
SAMPLE #32	1.05	8.63	0.88	23.76	66.56	13973	8	8.72	0.89	24.01	67.27	14121
SAMPLE #33	1.00	6.64	0.72	20.22	72.14	14249	1	6.71	0.73	20.42	72.87	14393

EAST MOUNT GETHING COAL
DRILL HOLE 81-13
HEAD ANALYSIS

PRODUCT	AIR DRY BASIS							MOISTURE FREE BASIS				
	% H ₂ O	% ASH	% S	% VM	% FC	BTU	FSI	% ASH	% S	% VM	% FC	BTU
SAMPLE #34	1.70	17.88	0.54	17.66	62.76	12041	1	18.19	0.55	17.97	63.84	12249
SAMPLE #36	2.38	24.79	0.60	18.22	54.61	10861	1½	25.39	0.61	18.66	55.95	11126
SAMPLE #37	1.73	9.36	0.60	21.92	66.99	13603	4	9.52	0.61	22.31	68.17	13842
SAMPLE #38	1.37	10.35	0.73	20.86	67.42	13341	2	10.49	0.74	21.15	68.36	13526
SAMPLE #39	1.67	6.24	0.90	21.55	70.54	14168	2½	6.35	0.92	21.92	71.73	14409
SAMPLE #40	1.19	21.44	0.78	22.14	55.23	11384	6½	21.70	0.79	22.41	55.89	11521
SAMPLE #41	1.55	4.73	0.78	20.15	73.57	14355	2½	4.80	0.79	20.47	74.73	14581
SAMPLE #42	1.33	29.18	0.54	15.02	54.47	10480	0	29.57	0.55	15.22	55.21	10621
SAMPLE #44	1.07	13.12	0.67	19.64	66.17	13063	2½	13.26	0.68	19.85	66.89	13204
SAMPLE #45	1.26	13.11	0.94	21.98	63.65	13044	6½	13.28	0.95	22.26	64.46	13210
SAMPLE #46	1.00	20.30	0.60	16.72	61.98	11997	1	20.51	0.61	16.89	62.60	12118
SAMPLE #47	1.94	7.47	0.83	21.52	69.07	13916	5	7.62	0.85	21.95	70.43	14191
SAMPLE #48	1.45	6.44	0.79	21.05	71.06	14063	4	6.53	0.80	21.36	72.11	14270

SUNNYVALE MINERALS LABORATORY

EAST MOUNT GETTING COAL

HEAD ANALYSIS

HOLE EMG-CC-81-11

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 #10	<0.01	1.58	0.25	1.83	<0.01	1.59	0.26	1.85

HOLE EMG-CC-81-13

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 #34	<0.01	0.03	0.51	0.54	<0.01	0.03	0.52	0.55
SAMPLE #36	0.02	0.15	0.43	0.60	0.02	0.15	0.44	0.61
SAMPLE #38	<0.01	0.01	0.72	0.73	<0.01	0.01	0.73	0.74

SUNNYVALE MINERALS LABORATORY

EAST MOUNT GETTING COAL

HOLE FMG-CC-11

SAMPLE-#10

HEAD ANALYSIS

MINERAL ANALYSIS OF ASF PERCENT WEIGHT IGNITED BASTS

Silica, SiO ₂	43.40
Alumina, Al ₂ O ₃	26.20
Titania, TiO ₂	0.89
Ferric oxide, Fe ₂ O ₃	7.68
Lime, CaO	2.31
Magnesia, MgO	0.83
Potassium oxide, K ₂ O	1.49
Sodium oxide, Na ₂ O	1.89
Sulfur trioxide, SO ₃	2.74
Phos. pentoxide, P ₂ O ₅	7.09
Undetermined	5.48
Total	<u>100.00</u>

ALKALIES AS Na₂O, DRY COAL BASIS = 0.30

SILICA VALUE = 80.04

BASE: ACID RATIO = 0.20

FOULING INDEX = 0.38

SLAGGING INDEX = 0.37

SUNNYVALE MINERALS LABORATORY

EAST MOUNT GETTING COAL

SOLE EMG-CC-81-11

SAMPLE-#10

HEAD ANALYSIS

ULTIMATE ANALYSIS

	<u>AIR DRY BASIS</u>	<u>MOISTURE FREE BASIS</u>
% MOISTURE	0.90	--
% CARBON	75.12	75.80
% HYDROGEN	4.78	4.82
% NITROGEN	1.35	1.36
% CHLORINE	0.13	0.13
% SULFUR	1.83	1.85
% ASH	10.39	10.48
% OXYGEN (DIFF.)	5.50	5.56
TOTAL	100.00	100.00

FUSION TEMP. OF ASH

	<u>Oxidizing</u>	<u>Reducing</u>
Initial deformation	2175	2130
Softening (H=W)	2650	2380
Softening (H=1/2 W)	2665	2460
Fluid	>2770	2705

* EQUILIBRIUM MOISTURE = 1.14

HARDGROVE GRINDABILITY INDEX = 74

SUNNYVALE MINERALS LABORATORY

EAST MOUNT GETTING COAL

HOLE EMC-CC-13

SAMPLE-# 34

HEAD ANALYSIS

MINERAL ANALYSIS OF ASH PERCENT WEIGHT IGNITED PASTS

Silica, SiO ₂	68.30
Alumina, Al ₂ O ₃	23.70
Titania, TiO ₂	1.09
Ferric oxide, Fe ₂ O ₃	0.67
Lime, CaO	0.49
Magnesia, MgO	0.39
Potassium oxide, K ₂ O	1.72
Sodium oxide, Na ₂ O	0.48
Sulfur trioxide, SO ₃	0.30
Phos. pentoxide, P ₂ O ₅	1.77
Undetermined	1.09
Total	<u>100.00</u>

ALKALIES AS Na ₂ O, DRY COAL BASIS	= 0.29
SILICA VALUE	= 97.78
RASF: ACID RATIO	= 0.04
FOULING INDEX	= 0.07
SLAGGING INDEX	= 0.02

SUNNYSIDE MINERALS LABORATORY

EAST MOUNT GETTING COAL

SOLE ENG-CC-81-13

SAMPLE-#34

HEAD ANALYSIS

ULTIMATE ANALYSIS

	<u>AIR DRY BASIS</u>	<u>MOISTURE FREE BASIS</u>
% MOISTURE	1.70	--
% CARBON	70.86	72.09
% HYDROGEN	3.77	3.84
% NITROGEN	0.96	0.98
% CHLORINE	0.04	0.04
% SULFUR	0.54	0.55
% ASH	17.88	18.19
% OXYGEN (DIFF.)	<u>4.25</u>	<u>4.31</u>
TOTAL	100.00	100.00

FUSION TEMP. OF ASH

	<u>Oxidizing</u>	<u>Reducing</u>
Initial deformation	2710	2690
Softening (H=W)	>2770	>2770
Softening (H=1/2 W)	>2770	>2770
Fluid	>2770	>2770

% EQUILIBRIUM MOISTURE = 2.12

HARDGROVE GRINDABILITY INDEX = 61

SUNNYVALE MINERALS LABORATORY

EAST MOUNT GETHING COAL

HOLE EMG-CC-13

SAMPLE-#36

HEAD ANALYSIS

MINERAL ANALYSIS OF ASH PERCENT WEIGHT IGNITED BASIS

Silica, SiO ₂	64.20
Alumina, Al ₂ O ₃	21.00
Titania, TiO ₂	0.82
Ferric oxide, Fe ₂ O ₃	5.07
Lime, CaO	0.93
Magnesia, MgO	1.23
Potassium oxide, K ₂ O	2.90
Sodium oxide, Na ₂ O	0.44
Sulfur trioxide, SO ₃	0.97
Phos. pentoxide, P ₂ O ₅	1.65
Undetermined	0.79
Total	<u>100.00</u>

ALKALIES AS Na ₂ O, DRY COAL BASIS	= 0.60
SILICA VALUE	= 89.88
BASE: ACID RATIO	= 0.12
FOULING INDEX	= 0.05
SLAGGING INDEX	= 0.07

SUNNYVALE MINERALS LABORATORY

EAST MOUNT GETHING COAL

HOLE FMG-CC-13

SAMPLE-#36

HEAD ANALYSIS

ULTIMATE ANALYSIS

	<u>AIR DRY BASIS</u>	<u>MOISTURE FREE BASIS</u>
% MOISTURE	2.38	—
% CARBON	63.65	65.20
% HYDROGEN	3.67	3.76
% NITROGEN	0.87	0.89
% CHLORINE	0.07	0.07
% SULFUR	0.60	0.61
% ASH	24.79	25.39
% OXYGEN (DIFF.)	3.97	4.08
TOTAL	100.00	100.00

FUSION TEMP. OF ASH

	<u>Oxidizing</u>	<u>Reducing</u>
Initial deformation	2550	2530
Softening (H=W)	>2770	>2770
Softening (H=1/2 W)	>2770	>2770
Fluid	>2770	>2770

% EQUILIBRIUM MOISTURE = 2.72

HARDGROVE GRINDABILITY INDEX = 66

SUNNYVALE MINERALS LABORATORY

EAST MOUNT GETTING COAL

HOLE EMG-CC-13

SAMPLE-#38

HEAD ANALYSIS

MINERAL ANALYSIS OF ASH PERCENT WEIGHT IGNITED BASIS

Silica, SiO ₂	63.70
Alumina, Al ₂ O ₃	29.40
Titania, TiO ₂	1.30
Ferric oxide, Fe ₂ O ₃	0.60
Lime, CaO	0.58
Magnesia, MgO	0.14
Potassium oxide, K ₂ O	0.59
Sodium oxide, Na ₂ O	0.29
Sulfur trioxide, SO ₃	0.53
Phos. pentoxide, P ₂ O ₅	2.54
Undetermined	0.33
Total	<u>100.00</u>

ALKALIES AS Na₂O, DRY COAL BASIS = 0.07

SILICA VALUE = 97.97

BASE: ACID RATIO = 0.02

FOULING INDEX = 0.01

SLAGGING INDEX = 0.02

SUNNYVALE MINERALS LABORATORY

EAST MOUNT GETTING COAL

HOLE EMG-CC-13

SAMPLE-#38

HEAD ANALYSIS

ULTIMATE ANALYSIS

	<u>AIR DRY BASIS</u>	<u>MOISTURE FREE BASIS</u>
% MOISTURE	1.37	—
% CARBON	77.86	78.94
% HYDROGEN	4.46	4.52
% NITROGEN	0.99	1.00
% CHLORINE	0.10	0.10
% SULFUR	0.73	0.74
% ASH	10.35	10.49
% OXYGEN (DIFF.)	4.14	4.21
TOTAL	100.00	100.00

FUSION TEMP. OF ASH

	<u>Oxidizing</u>	<u>Reducing</u>
Initial deformation	> 2770	> 2770
Softening (H=W)	> 2700	> 2770
Softening (H=1/2 W)	> 2770	> 2770
Fluid	> 2770	> 2770

% EQUILIBRIUM MOISTURE = 1.98

HARDGROVE GRINDABILITY INDEX = 54

APPENDIX IV
COST STATEMENT

Note: Represents a consolidation of the costs included in the Applications to Extend the Term of Licence for coal Licence Numbers 3506 to 3524 inclusive.

ON PROPERTY COSTS

1.) Operators Fees, Salaries and Wages: (Professional and Technical)	\$ 29,800.00
2.) Contractors and Consultants:	
Longyear Canada Ltd. (Diamond drilling)	\$109,850.00
Peace Dozing Ltd. (Road Construction)	\$ 75,200.00
Green Acres Drilling Ltd. (Rotary drilling)	\$ 21,550.00
3.) Equipment Used Comprobe Inc. Digitized Logging Unit	\$ 1,000.00
4.) Field Camp Costs (Food, Accomodation, Installation, etc.)	\$ 19,800.00
5.) Sampling, Analysis and Testing (Laboratory analysis of coal samples performed by Utah International Inc. Minerals Laboratory, Sunnyvale, California)	\$ 657.00
6.) Supplies and Materials Costs	\$ 2,000.00
7.) Transportation Costs:	
Bell 206B Jet Ranger from Rotortech Helicopters Ltd.	\$ 30,500.00

one 4-wheel drive Ford Pick-up truck from Arena Motors, Kelowna	\$ 3,970.00
8.) Reclamation Work	\$ 610.00
Total On Property Costs	\$294,937.00
<u>OFF PROPERTY COSTS</u>	
1.) Technical and Feasibility Studies	\$ 2,500.00
2.) Supplies and Services	\$ 700.00
Total Off Property Costs	\$ 3,200.00
Total Project Costs	\$298,137.00

APPENDIX V
STATEMENT OF QUALIFICATIONS


I, Donald Norman Duncan, of 107 Sapper Street, New Westminster, British Columbia, do hereby certify that:

I am a graduate of the University of British Columbia, with a Bachelor of Science Degree in Geology, 1977.

Since graduation I have been engaged in Mineral and Coal exploration in Alaska, Alberta, British Columbia and the Yukon Territory for Utah Mines Ltd.

I am a member of the Canadian Institute of Mining and Metallurgy.

Vancouver, B.C.


D. N. Duncan
Geologist

UTAH MINES LTD.

PR-East Mt. Gething 81(3)A*

GRAPHIC CORE LOG

HOLE NO. DDH-EMG-81-11

HOLE NO. DDH-EMG-81-11

LOG BY: K. Foellmer

ELEV: 739.5m

MOLE SIZE: HQ

PROJECT: East Mt. Gething

DATE: Feb. 8, 1982

M: 6,207,458m

AIR WATER

LEASE: 3507

E: 544.595m

T.D. 218.54 p.p.

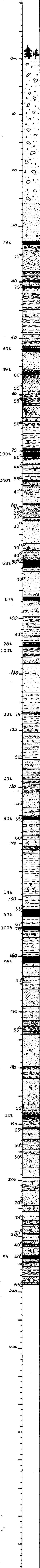
SEC: T. R.

% REC DEPTH STRIP LOG FWCKR SAMPLE NO. GRN.

LITHOLOGY

ANALYSIS

520



Coal - poorly cleated, ~ 45% vitrain, ~ 55% claro-durain

Coal - cleated, minor pyrite, ~ 60% clarain ~ 10% durain ~ 30% vitrain

Coal - cleated, ~ 90% vitrain ~ 10% claro-durain
Coal - cleated, slickensides, ~ 50% vitrain, ~ 50% claro-durain

Coal - poorly cleated, minor pyrite ~ 60% vitrain, ~ 40% claro-durain
Coal - 60% vitrain, 25% claro-durain, 5% fusain, vitrain content decreasing towards the base
Coal - dull, banded, poorly cleated, 90% claro-durain, 10% vitrain, minor fusain
Coal - bright, 90% vitrain, 10% claro-durain

Coal - dull banded, 85% duro-clarain, 15% vitrain, poorly cleated, minor pyrite

Muddy Coal

Coal - dull, highly sheared, minor vitrain, predominantly claro-durain

Coal - highly broken and sheared, abundant vitrain, 0.02m mudstone split

Coal - poorly cleated - ~ 70% vitrain, 30% claro-durain
Coal - no cleat, minor pyrite, lower half highly broken, ~ 20% vitrain, ~ 75% claro-durain, ~ 5% mudstone

Coal - poorly cleated ~ 90% vitrain, 10% claro-durain

Coal - poorly cleated ~ 15% claro-durain ~ 35% vitrain

Coal - poorly cleated ~ 60% vitrain ~ 35% claro-durain ~ 5% fusain
0.02m silty mudstone split @ 135.57m to 135.59m

Coal - poorly cleated ~ 50% vitrain ~ 50% claro durain
Coal - bright, poorly cleated, ~ 85% vitrain ~ 15% claro-durain

Coal - highly sheared, 0.02m mudstone split, ~ 50% vitrain ~ 50% claro-durain, minor fusain
- true thickness 0.53m from probe log

Coal - bright, sheared, abundant vitrain, minor fusain
0.02m mudstone split from 160.63 to 160.66m which contains pyrite nodules

Coal - bright, poorly cleated ~ 90% claro-durain, minor fusain, minor vitrain

Coal - highly broken and sheared, predominantly claro-durain

UTAH MINES LTD.

GRAPHIC CORE LOG

HOLE NO. DDH-EMG-81-12

HOLE NO. DDP-EMG-81-12

LOG BY: K. Foellmer

ELEV: 769

MOLE SIZE: H0

PROJECT: East Mt. Cething

DATE: Feb. 8, 1982

N. 6,210,643

AIR WATER

LEASE: 3515

E. 543,603m

T.D. 306.32m P.D.

SEC. T. R.

DEPTH	THICK	GRAV.	LITHOLOGY	ANALYSIS
0m				
10m				
20m				
30m				
40m				
50m	0.22	#13	Coal - well cleated, oxidized ~ 20% vitrain ~ 80% claro-durain	
60m	0.30		Coal - highly broken, ~ 70% vitrain ~ 30% claro-durain, minor fusain	
68m	0.25	#14	Coal - dull banded, cleated ~ 90% claro-durain ~ 10% vitrain, minor fusain	
70m	0.27	#15	Coal - poorly cleated ~ 5% vitrain ~ 5-7% fusain ~ 90% claro-durain	
72m	0.47	#16	Coal - cleated, contains sandstone laminations, ~ 10% vitrain ~ 5% fusain	
74m	0.09		Coal - predominantly claro-durain, minor fusain, minor vitrain	
76m	0.45	#17	Coal - cannel coal from 75.52m to 75.79m ~ 20% vitrain ~ 80% claro-durain, minor fusain	
78m	0.30	#18	Coal - cleated, ~ 20% vitrain ~ 80% claro-durain, minor fusain	
80m	0.01		Coal - cleated, bright, vitrain	
85m	0.09		Coal - well cleated, bright ~ 80% vitrain ~ 20% claro-durain, minor fusain	
90m				
95m	0.14		Coal - poorly cleated, banded, broken ~ 60% vitrain ~ 40% claro-durain	
100m	0.05		Coal - cleated, bright ~ 90% vitrain ~ 10% claro-durain	
102m	0.05		Coal - Minor mudstone clasts, ~ 70% vitrain ~ 30% claro-durain	
108m	0.22	#19	Coal - cannel coal from 112.39 to 112.44m; bright coal from 112.44 to 112.60m ~ 25% claro-durain, minor fusain	
110m	0.03		Coal - cannel, dull	
112m	0.03		Coal - cleated, ~ 60% claro-durain ~ 40% vitrain	
118m	0.04		Coal - well cleated, 95% vitrain, 5% claro-durain	
120m	0.04		Coal - cleated, banded ~ 50% vitrain ~ claro-durain, minor oxidized pyrite	
122m	0.23	#20	Coal - well cleated, minor pyrite, bright, minor fusain, 85% vitrain	
124m	0.01		Coal - banded, cleated ~ 40% vitrain ~ 60% claro-durain, 1% claro-durain	
126m	0.47	#21	Coal - vitrain	
128m	0.47		Coal - well cleated, broken, 85% vitrain, 15% claro-durain, minor fusain	
130m				
132m	0.55	#22	Coal - bright, pyrite, cleated, ~ 30% vitrain ~ 70% claro-durain, minor fusain	
134m	0.01m		Coal - well cleated, laminated, pyrite, ~ 50% vitrain, ~ 50% claro-durain	
140m				
142m	0.18		Coal - well cleated, bright, slightly muddy toward base, ~ 40% vitrain, ~ 60% claro-durain, banded, increasing vitrain toward base	
148m	0.32	#23	Coal - poorly cleated, banded, 35% vitrain, 65% claro-durain, minor fusain near upper contact	
150m				
152m				
154m				
156m				
158m				
160m				
162m				
164m				
166m				
168m				
170m				
172m	0.08		Coal - dull, poorly cleated, minor vitrain, predominantly claro-durain	
174m				
176m				
178m				
180m				
182m	0.10		Coal - bright, banded, well cleated, 50% vitrain, 50% claro-durain	
184m	0.04		Coal - cleated, bright, banded, 40% vitrain, 60% claro-durain	
186m	0.12		Coal - well cleated, banded, 40% vitrain, 60% claro-durain	
188m				
190m				
192m				
194m	0.46	#24	Coal - poorly cleated, broken, banded, 25% vitrain, 75% claro-durain	
196m	0.20	#25	Coal - cleated, bright, 35% vitrain, 65% claro-durain	
198m				
200m				
202m	0.10		Coal - 40% vitrain, 60% claro-durain	
204m	0.15		Coal - uncleated, dull, 99% claro-durain, minor fusain, minor sand lamina- tion @ top of seam	
206m	0.02		Coal - well cleated, bright, 100% vitrain	
208m	0.20	#26	Coal - poorly cleated, 5% vitrain, 95% claro-durain	
210m	0.50	#27	Coal - cleated, banded, 25% vitrain, 75% claro-durain	
212m	0.17		Coal - poorly cleated, broken, 10% vitrain, 90% claro-durain	
214m	0.18		Coal - cleated @ lower contact, bright, banded, 50% vitrain, 50% claro-durain, mudstone split from 214.49m to 214.54m	
216m				
218m	0.10		Coal - banded, 7% vitrain, 93% claro-durain	
220m	0.35	#28	Coal - poorly cleated, band, broken, minor pyrite flakes, 20% vitrain, 80% claro-durain	
222m				
224m	0.06		Coal - banded, 10% vitrain, 90% claro-durain	
226m	0.12		Coal - poorly cleated, 30% vitrain, 70% claro-durain	
228m				
230m	0.08		Coal - poorly cleated, banded, 50% vitrain, 50% claro-durain	
232m	0.10		Coal - banded, 50% vitrain, 50% claro-durain	
234m				
236m	0.02		Coal - laminated, 20% vitrain, 80% claro-durain	
238m	0.29	#29	Coal - poorly cleated, banded, 5% vitrain, 95% claro-durain	
240m	0.09		Coal - poorly cleated, 3% fusain, 3% vitrain, 94% claro-durain	
242m	0.12		Coal - poorly cleated, banded, 3% fusain, 30% vitrain, 67% claro-durain	
244m				
246m	0.05		Coal - cleated, banded, 25% vitrain, 75% claro-durain	
248m	0.06		Coal - hard, dull, ~ 100% claro-durain, minor vitrain @ top of seam	
250m				
252m				
254m	0.25	#30	Coal - cleated, bright, banded, 20% vitrain, 80% claro-durain	
256m	0.25		Coal - 2% fusain, 98% claro-durain, minor vitrain	
258m				
260m	0.15		Coal - uncleated, broken, banded, 25% vitrain, 75% claro-durain	
262m				
264m	0.02		Coal - highly broken, oxidized pyrite, banded, abundant vitrain	
266m				
268m	0.29	#31	Coal - poorly cleated, banded, 7% vitrain, 93% claro-durain	
270m	0.38	#32	Coal - cleated, banded, 60% vitrain, 40% claro-durain	
272m				
274m	0.09	#33	Coal - poorly cleated, 10% vitrain, 90% claro-durain	
276m	0.41		Coal - poorly cleated, broken, 20% vitrain, 80% claro-durain	
278m	0.16		Coal - banded, 10% vitrain, 90% claro-durain	
280m				
282m	0.03		Coal - cleated, banded, 70% vitrain, 30% claro-durain, abundant calcite throughout	
284m				
286m	0.02		Coal - cleated, bright, 100% vitrain	
288m				
290m				
292m				
294m	0.04		Coal - banded, 3% vitrain, 97% claro-durain	
296m				
298m				
300m				
302m				
304m				
306m				
308m				
310m				

520

GRAPHIC CORE LOG

HOLE NO. DDH-EMG-81-13

HOLE NO. DDH-EMG-81-13

LOG BY: K. Foellmer
 DATE: Feb. 8, 1982.

ELEV: 1088m
 NI: 6,210,910m
 E: 539,768m

MOLE SIZE: HQ
 AIR WATER
 TO: 255.12m D.

PROJECT: East Mt. Gething
 LEASE: 3518
 SEC. T. R.

% REC	DEPTH	STRIP LOG	THICK	SAMPLE NO.	GRAN.	LITHOLOGY	ANALYSIS
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520

% REC	DEPTH	STRIP LOG	THICK	SAMPLE NO.	GRAN.	LITHOLOGY	ANALYSIS
	0m						
	73°		0.03m			COAL - highly weathered	
	110m		0.04m			Coal - very weathered, minor vitrain	
	73°						
	77°						
	70°						
	120m						
	75°						
27%	78°		0.08m			COAL - banded, cleated, broken, ~ 50% vitrain ~ 50% claro-durain	
100%			0.19m			COAL - poorly cleated, ~ 60% claro-durain, ~ 40% vitrain	
			0.63m #34			COAL - Cannel coal, minor pyrite, conchoidal fracture	
			0.18m			COAL - poorly cleated, minor pyrite, ~ 5% vitrain ~ 92% claro-durain, ~ 3% fusain	
	130m		0.02m			COAL - highly broken, abundant claro-durain	
	78°						
			0.22m			COAL - disseminated pyrite, broken, vitrain is cleated ~ 70% claro-durain	
100%			0.82m			- mudstone splits from 136.31m ~ 30% vitrain, fusain near base to 136.47m, from 137.29 to 137.38m, from 137.53 to 137.61, from 137.65 to 137.91m	
			0.13m				
			0.04m #36				
100%			1.02m			COAL - banded, cleated in places, ~ 5% fusain ~ 40% vitrain ~ 55% claro-durain	
	140m		0.45m #37			mudstone split @ 139.50m	
40%	78°		0.10m			COAL - cleated, minor disseminated pyrite ~ 40% vitrain, ~ 60% claro-durain	
	150m						
	79°						
100%			1.05m #38			COAL - banded, minor cleat in vitrain, ~ 5% fusain ~ 17% vitrain ~ 78% claro-durain	
	160m						
	77°						
70%			0.10m			COAL - poorly cleated, laminated, minor fusain ~ 15% vitrain, ~ 85% claro-durain	
	75°		0.26m #39			COAL - cleated in places, ~ 37% vitrain ~ 60% claro-durain ~ 3% fusain	
	170m						
100%	70°		0.18m			COAL - banded, poorly cleated ~ 85% claro-durain ~ 15% vitrain	
	77°						
75%			0.26m			COAL - banded, poorly cleated ~ 3% vitrain, ~ 97% claro-durain	
85%	180m		0.39m #40			COAL - cleated, lower part highly broken, ~ 30% vitrain ~ 70% claro-durain - mud split from 180.62 to 180.64m.	
	80°						
	78°						
71%	190m		0.21m #41			COAL - poorly cleated, minor banding, broken ~ 10% vitrain ~ 90% claro-durain	
			0.26m #42			COAL - banded, poorly cleated ~ 80% claro-durain ~ 20% vitrain - mud split @ 190.20 to 190.23m; @ 190.35m to 190.38m	
	75°		0.03			Coal - highly broken, ~ 35% vitrain ~ 65% claro-durain	
89%			0.20 #43			Coal - poorly cleated, banded ~ 45% vitrain, ~ 55% claro-durain	
	78°						
	200m						
100%			0.06m			Coal - cleated, banded ~ 45% claro-durain ~ 55% vitrain	
	78°		0.21m			Coal - slightly cleated, banded ~ 25% vitrain ~ 75% claro-durain	
95%			0.21m #44			Coal - banded, ~ 30% vitrain ~ 70% claro-durain, minor fusain	
100%			0.40m #45			Coal - bright, cleated ~ 35% vitrain ~ 65% claro-durain, minor fusain	
84%			0.26m #46			Coal - banded, poorly cleated ~ 5% fusain ~ 5% vitrain ~ 90% claro-durain	
	210m		0.04m			Coal - banded, ~ 30% vitrain ~ 70% claro-durain	
	75°						
41%	76°		0.26m			Coal - banded, slightly cleated, ~ 5% fusain ~ 15% vitrain, ~ 80% claro-durain	
20%			0.26m			Coal - cleated ~ 40% vitrain ~ 60% claro-durain	
	220m						
	73°						
			0.11m			Coal - bright, highly broken, ~ 30% vitrain ~ 70% claro-durain	
			0.04m			Coal - highly broken, predominantly vitrain	
100%			0.01m			Coal - bright, 100% vitrain	
			0.77m #47			Coal - dull with bright bands, poorly cleated ~ 30% vitrain, ~ 70% claro-durain, minor fusain	
	230m						
40%	70°		0.09m			Coal - banded, ~ 5% fusain, ~ 25% vitrain ~ 70% claro-durain	
			0.16m			Coal - banded, ~ 25% vitrain, ~ 75% claro-durain	
41%			0.12m			Coal - banded, cleated, broken, minor oxidized pyrite ~ 35% vitrain ~ 65% claro-durain	
100%			0.09m			Coal - banded ~ 3% vitrain ~ 97% claro-durain	
	240m						
	78°						
	78°						
250m			0.77 #48			Coal - banded, minor oxidized pyrite ~ 15% vitrain ~ 85% claro-durain, minor fusain	
100%	78°		0.06m			Coal - cleated, ~ 30% vitrain ~ 70% claro-durain	

Widco WELL LOG

COMPANY Utah Mines Ltd.
 WELL R.D.H. - E.M.G. - 81-1
 LOCATION 543,303 m E
 6,206,712 m N

COMPANY Utah Mines Ltd.
 AREA East Mount Gething
 WELL R.D.H. - E.M.G. - 81-1
 COUNTY SEAVE B.C.

COORDINATES 543,303 m E
 6,206,712 m N
 ELEVATION 812 m
 D.F.
 K.B.
 G.I.

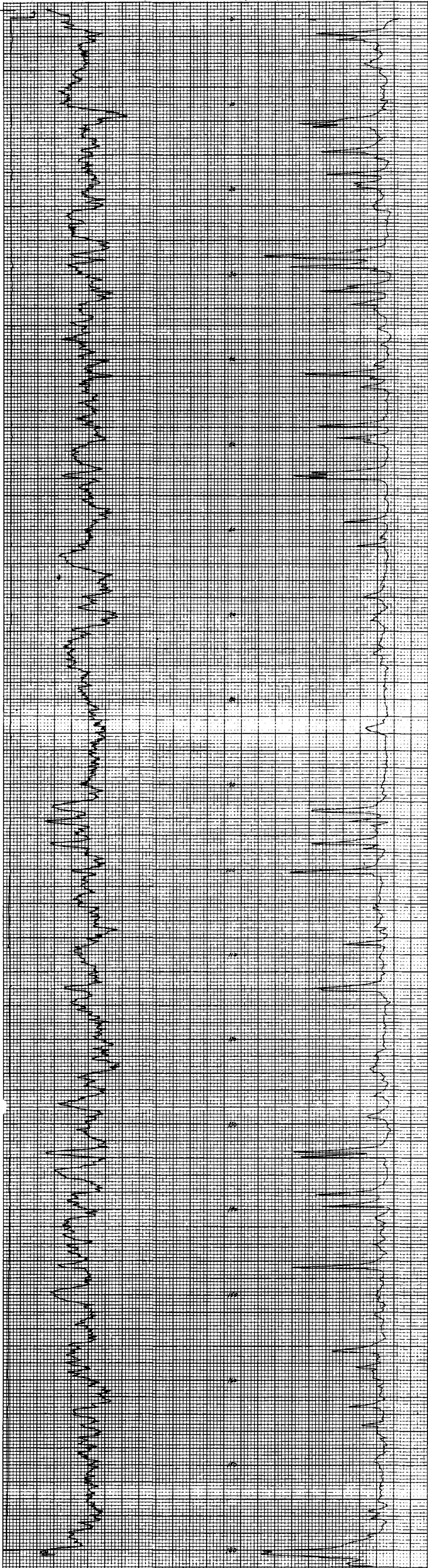
520

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	June 21, 1981		Nature		
First Reading	182 m		Density		
Last Reading	0 M		Viscosity	@ of	@ of
Footage Logged	182 m		Resistivity	@ of	@ of
Bottom (Driller)	185.93		Res. @ BHT	@ of	@ of
Casing (From Log)			pH		
Casing (Driller)			Circ. Temp.		
Casing Size			B.H. Temp.		
Bit Size	11.4 cm				
Bit Size					
			Logged by	D.N. Duncan	
			Witnessed by	D. Samchuk	

REMARKS

Reg. U.S. Pat. Off.

CALIPER GAMMA DENSITY
 100 cps 2.5 T.C. 1000 cps
 2.5 T.C. 2.2 T.C.



FO-139

PR-East Mt. Gething 81(3)A * 1

Widco

WELL LOG

COMPANY Utah Mines Ltd.
WELL R.D.H.-EMG-81-2
LOCATION 542,774 m E
6,206,760 m N

COMPANY Utah Mines Ltd.
AREA East Mount Gething
WELL R.D.H.-E.M.G.-81-2
COUNTY ~~STATE~~ B.C.

COORDINATES 542,774 m E
6,206,760 m N
ELEVATION 789 m
D.F.
K.A.
G.I.

520

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	June 22, 1981		Nature		
First Reading	121 m		Density		
Last Reading	0 m		Viscosity	@ of	@ of
Footage Logged	121 m		Resistivity	@ of	@ of
Bottom (Driller)	121.92 m		Res. @ BMT	@ of	@ of
Casing (From Log)			pH		
Casing (Driller)			Circ. Temp.		
Casing Size			S.H. Temp.		
Bit Size:	11.4 cm				
Bit Size:					
			Logged by	D. N. Duncan	
			Witnessed by	G. Samchuk	

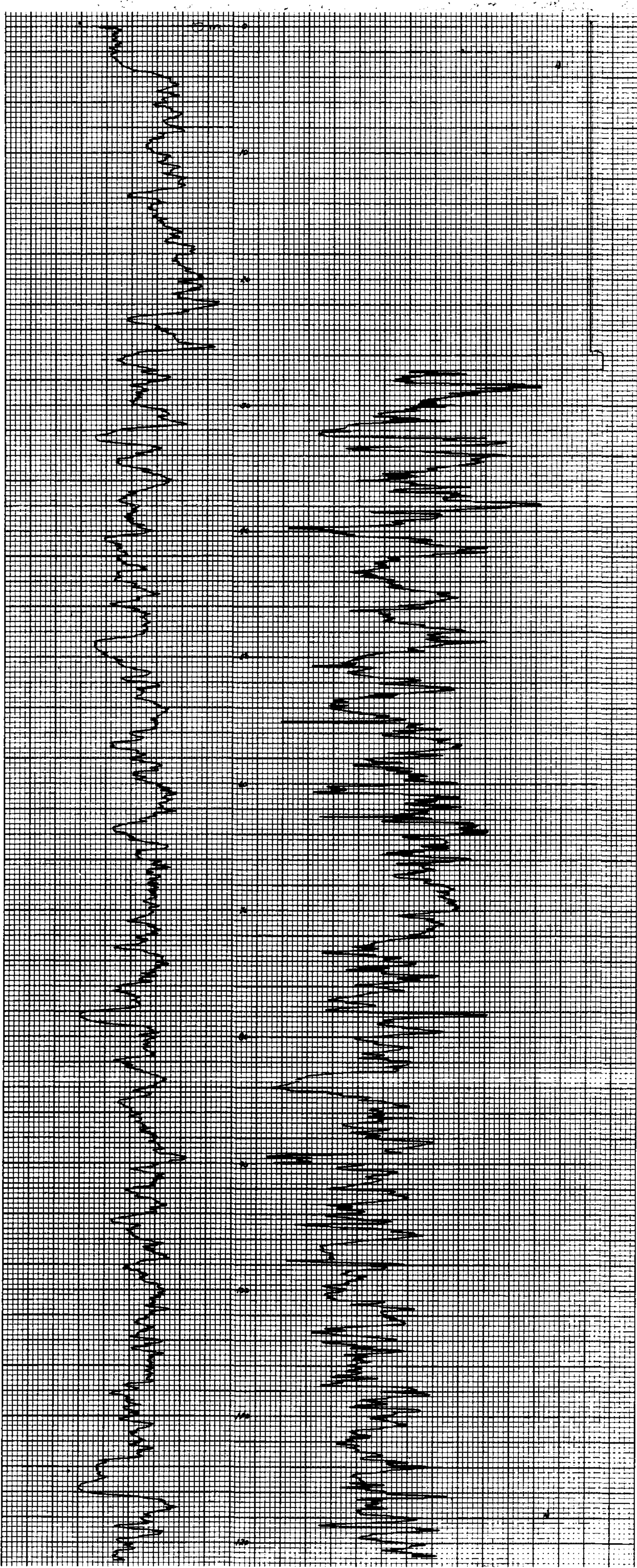
REMARKS

* Reg. U.S. Pat. Off.

GAMMA

RESISTIVITY

100 cps
2.5 T.C.



FO-128

122 East Mt Gething S113) 1

Widco

WELL LOG

COMPANY Utah Mines Ltd.
 WELL R.D.H.-E.M.G.-81-2
 LOCATION 542,774, m E
 6,206,760 m N

COMPANY Utah Mines Ltd.
 AREA East Mount Gething
 WELL R.D.H.-E.M.G.-81-2
 COUNTY BRITISH COLUMBIA

520

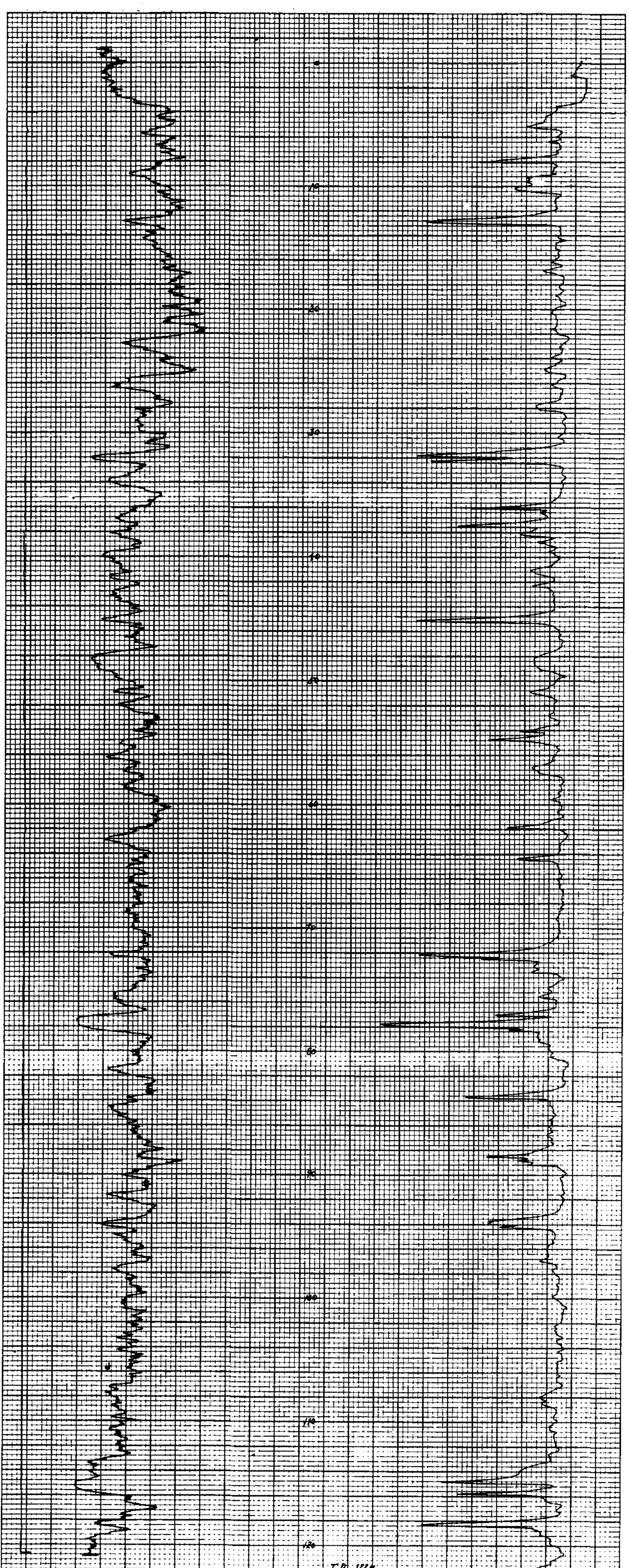
COORDINATES: 542,774 m E
 N 6,206,760 m
 S
 ELEVATION: 789 m
 D.F.
 K.B.
 G.I.

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	June 22, 1981		Nature		
First Reading	122 m		Density		
Last Reading	0		Viscosity	@ °F	@ °F
Footage Logged	122 m		Resistivity	@ °F	@ °F
Bottom (Driller)	121.92 m		Res. @ BHT	@ °F	@ °F
Casing (From Log)			pH		
Casing (Driller)			Circ. Temp.		
Casing Size			B.H. Temp.		
Bit Size:	11.4 cm				
Bit Size:					
			Logged by	D.N. Duncan	
			Witnessed by	G. Samchuk	

REMARKS

Reg. U.S. Pat. Off.

CALIPER GAMMA DENSITY
 100 cps 2.5 T.C. 1000 cps
 2.5 T.C. 2.2 T.C.



FO-139

PR East Mt Gething 81(3) *1

Widco

WELL LOG

COMPANY Utah Mines Ltd.
WELL R.D.H.-E.M.G.-81-3
LOCATION 542,231 m E
6,206,753 m N

COMPANY Utah Mines Ltd.
AREA East Mount Gething
WELL R.D.H.-E.M.G.-81-3
COUNTY SWYB B.C.

520

COORDINATE 542,231mE
6,206,753 m
ELEVATION 766 m
D.F.
K.B.
G.L.

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	June 24, 1981		Nature		
First Reading	91.7 m		Density		
Last Reading	0		Viscosity	@ of	@ of
Footage Logged	91.7 m		Resistivity	@ of	@ of
Bottom (Driller)	91.74 m		Res. @ BHT	@ of	@ of
Casing (From Log)			pH		
Casing (Driller)			Circ. Temp.		
Casing Size			B.H. Temp.		
Bit Size:	11.4 cm				
Bit Size:					
			Logged by	D.N. Duncan	
			Witnessed by	L. Kenkel	

REMARKS

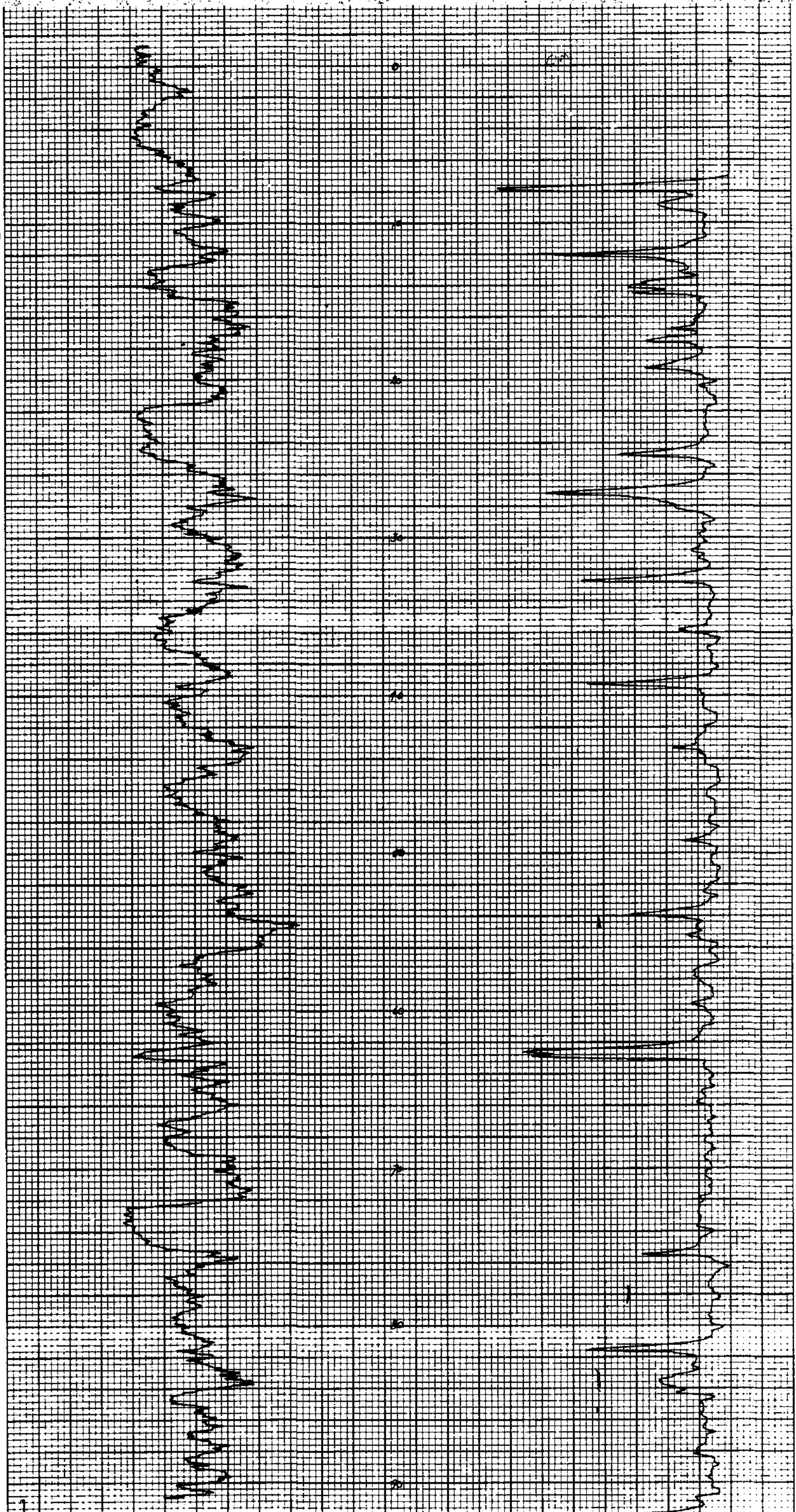
* Reg. U.S. Pat. Off.

GAMMA

100 cps
2.5 T.C.

DENSITY

1000 cps
2.2 T.C.



FO-139

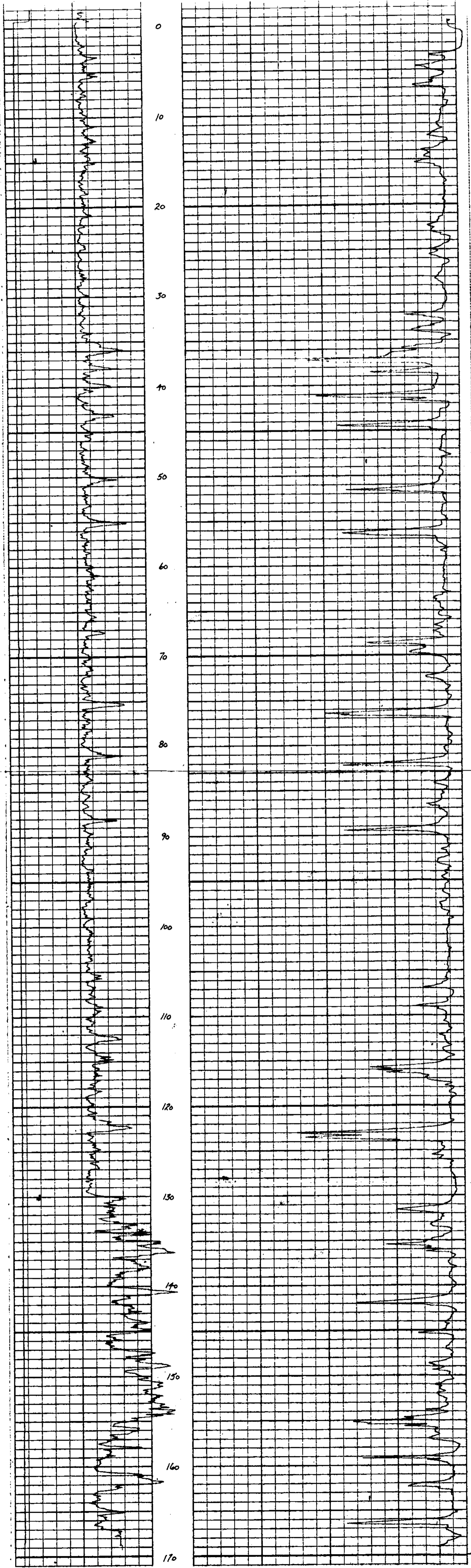
Midco

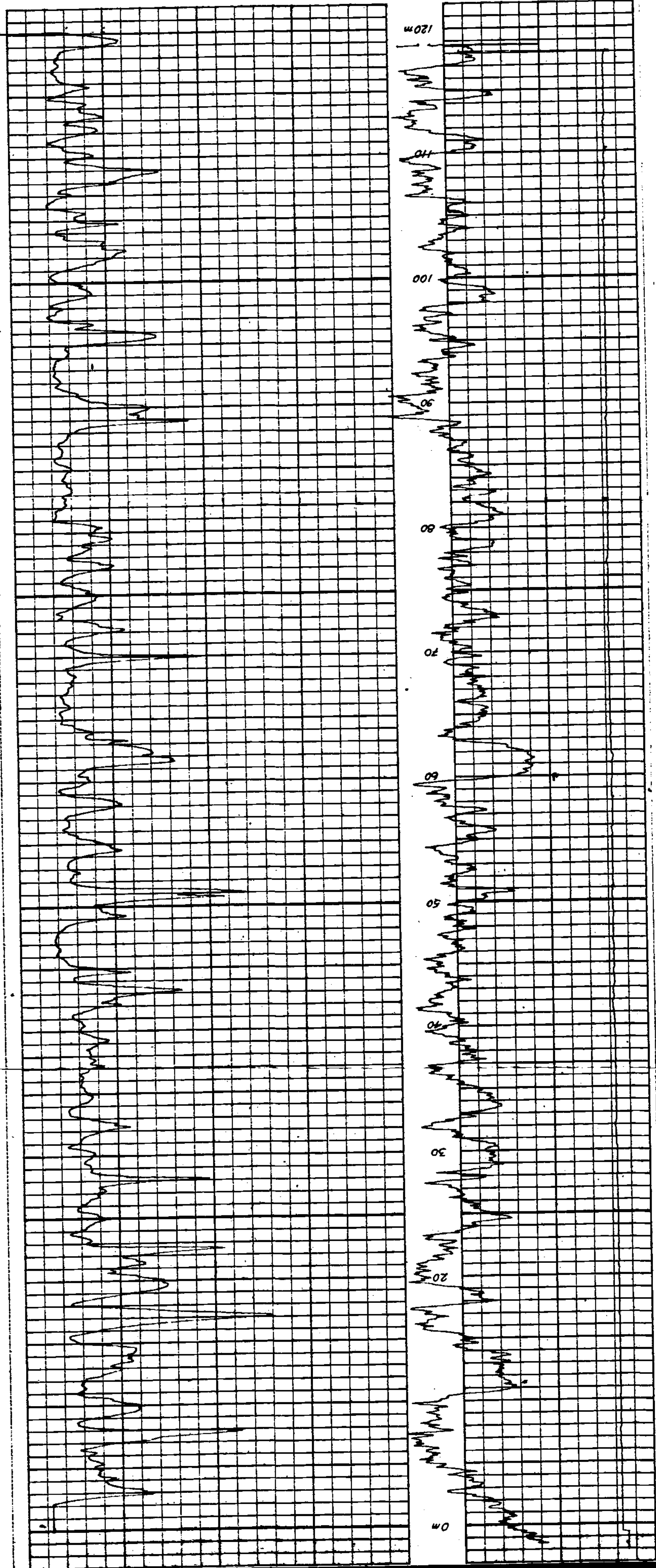
COMPANY: Utah Mines Ltd.
 WELL: R.D.H. - E.M.G. - 81-4
 LOCATION: 543.766 m E, 778 m N
 AREA: East Mount Gething
 ELEVATION: 759 m
 COUNTY: SHERK Co., B.C.
 DATE: June 27, 1981

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	June 27, 1981		Nature		
First Reading	170 m		Density		
Last Reading	0 m		Viscosity	@	@
Footage Logged	170 m		Resistivity	@	@
Bottom (Driller)	170.69 m		Res. @ BHT	@	@
Casing (From Log)			pH		
Casing (Driller)			Circ. Temp.		
Casing Size			B.H. Temp.		
Bit Size	11.4 cm		Logged by	R.B. Anderson	
Bit Size			Witnessed by	L. Louie	

REMARKS:

CALIPER	GAMMA	DENSITY
	100 cps	1000 cps
	2.5 T.C.	2.2 T.C.





COMPANY Utah Mines Ltd.
 WELL R.D.H. 596 - 81-3
 LOCATION 542.101 N.E.
 6,207,512 M.N.

REGISTRATION: 542.101 N.E.
 M.S. 207,512 M.N.
 REVISION: 886.2 M.N.
 D1 _____
 D2 _____
 D3 _____

DATE: Sept. 5, 1981
 TIME: 120.2 m
 FIRST READING: 120.2 m
 LAST READING: 0 m
 FOOTAGE LOGGED: 120.2 m
 BOTTOM (DIPPER): 121.92 m
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):
 CASING (FROM LOG):

LOGGED BY: D.H. Duncan
 CHECKED BY: R. Fogarty

DATE: _____
 TIME: _____

DEPTH: _____

REMARKS: _____

COMPANY: Utah Mines Ltd.
 WELL: R.D.H.-R.M.G.-81-5
 LOCATION: 542.101 N.E.
 6,207,512 M.N.

REGISTRATION: 542.101 N.E.
 M.S. 207,512 M.N.
 REVISION: 886.2 M.N.

DATE: _____
 TIME: _____

DEPTH: _____

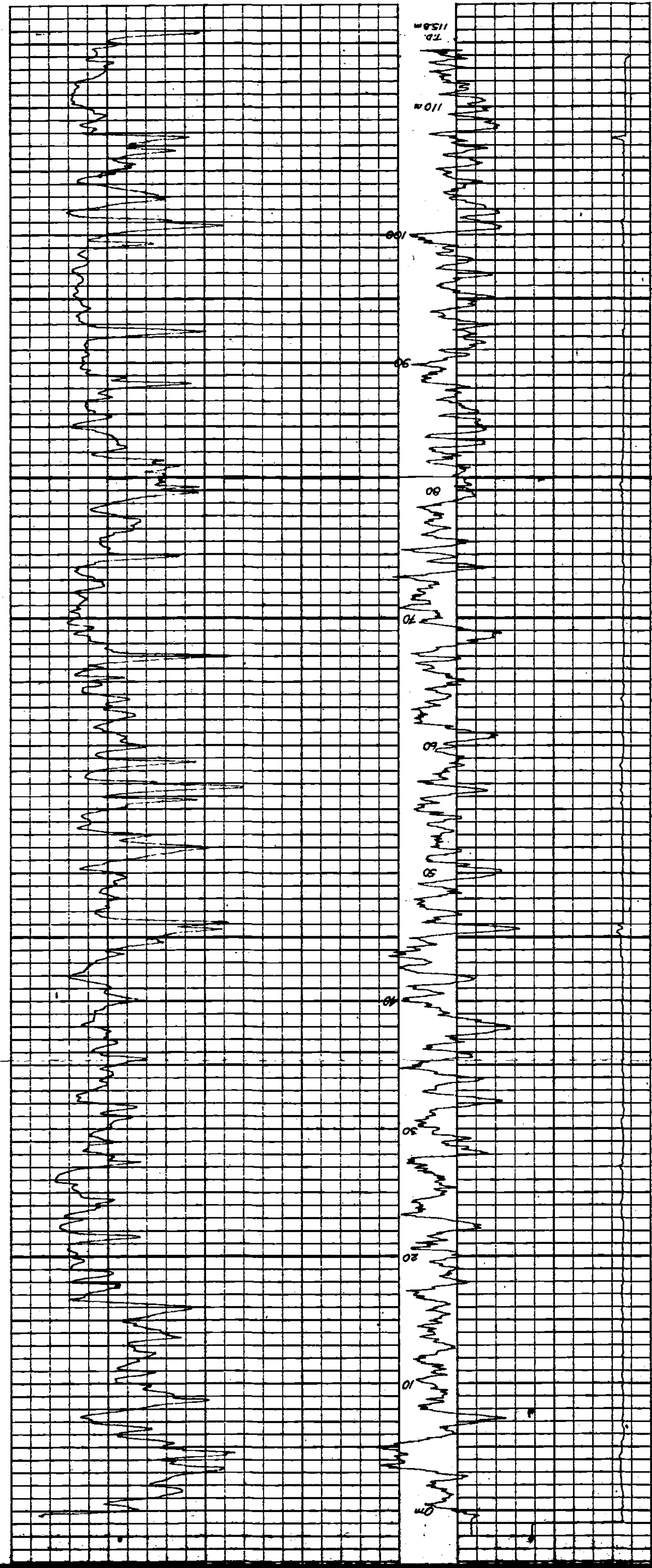
REMARKS: _____

520

WEZ. 100

WEZ. 100

1 x U



COMPANY Utah Mines Ltd. UNIT R.D.H. ENG-81-6 LOCATION 541.527 ME. 6,207,521 m. N.		520 COORDINATES 541.527 ME. N. 6,207,521 m. N. DIVISION 819.3 M.	AREA East Mount Gehring UNIT R.D.H. - E.M.G.-81-6 COMPANY B.C.
DATE	115.8 m	115.8 m	115.8 m
FIRST READING	0 m	0 m	0 m
FOOTING LOGGED	115.8 m	115.8 m	115.8 m
BOTTOM (DRIVE)	115.8 m	115.8 m	115.8 m
CORRECTION (DRIVE)	115.8 m	115.8 m	115.8 m
CORRECTION (FROM LOG)	0 m	0 m	0 m
CR. TEMP.			
CR. TEMP.			
MOISTURE			
LOGGED BY	P. CONLEY	P. CONLEY	P. CONLEY
WORKED BY	K. FOLLMOE	K. FOLLMOE	K. FOLLMOE
DEPARTMENT			
SCALE	100 cps	100 cps	100 cps
DENSITY	2.5 g/cm³	2.5 g/cm³	2.27 g/cm³

WEL 100

Widco

WELL LOG

COMPANY Utah Mines Ltd.
 WELL D.D.H. - EMG-81-11
 LOCATION 544.595 m E
 6,207.458 m N.

COMPANY Utah Mines Ltd

AREA East Mount Gething

WELL D.D.H. - E.M.G. - 81 -11

COUNTY ~~XXX~~ B.C.

COORDINATES 544-595m E

N 6,207,458 m

ELEVATION: 739.5 m

D.F.

K.B.

G.L.

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	June 8, 1981		Nature		
First Reading	216.1 m		Density		
Last Reading	0.00 m		Viscosity	@ of	@ of
Footage Logged	216.1 m		Resistivity	@ of	@ of
Bottom (Driller)	218.54 m		Res. @ BHT	@ of	@ of
Casing (From Log)			pH		
Casing (Driller)	25.9 m		Circ. Temp.		
Casing Size	HW		B.H. Temp.		
Bit Size	HQ				
Bit Size					
			Logged by	R.B. Anderson	
			Witnessed by	L. Louie-T. Jones	

REMARKS

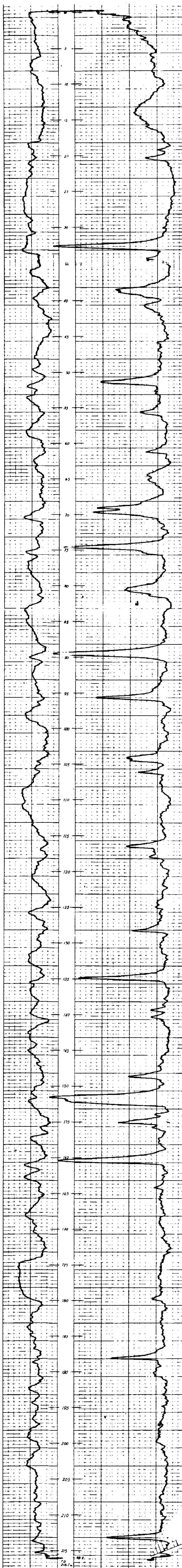
* Reg. U.S. Pat. Off.

GAMMA

100 cps
3 T.C.

DENSITY

500 cps
3 T.C.



40138

Widco WELL LOG

COMPANY Utah Mines Ltd.
 WELL D.D.H.-E.M.G.-81-12
 LOCATION 543,603 ME
 6,210,643 m N

COMPANY Utah Mines Ltd.
 AREA East Mount Gething
 WELL D.D.H.-E.M.G.-81-12
 COUNTY d B.M.W.C. B.C.

COORDINATES 543,603m E
 N 6,210,643 m
 \$
 ELEVATION: 769 m
 D.F.
 K.B.
 G.I.

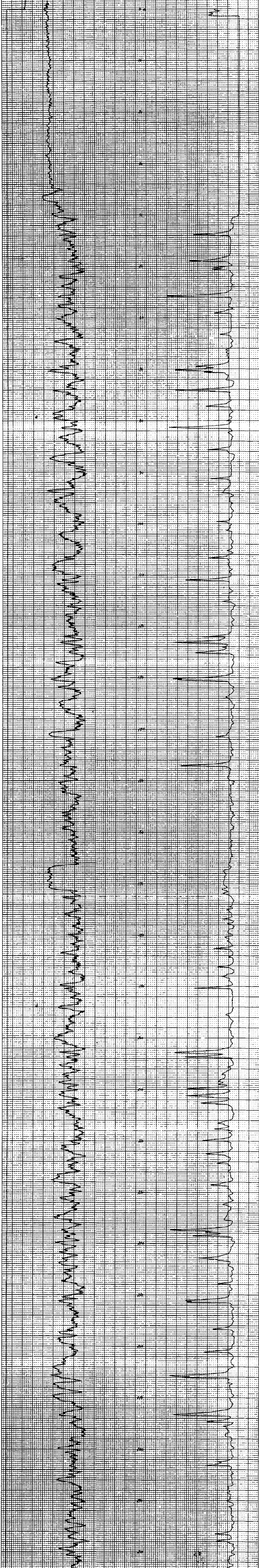
520

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	June 22, 1981		Nature		
First Reading	305 m		Density		
Last Reading	0 m		Viscosity	@	@
Footage Logged	305		Resistivity	@	@
Bathos (Driller)	306.32 m		Res. @ BMT	@	@
Casing (From Log)	41.45 m		pH		
Casing (Driller)	HW		Circ. Temp.		
Casing Size	HQ		B.H. Temp.		
Bit Size:					
Bit Size:					
			Logged by	D.N. Duncan	
			Witnessed by	B. Thomae	

REMARKS

Reg. U.S. Pat. Off.

CALIPER GAMMA DENSITY
 100 cps 1000 cps
 2.5 T.C. 2.2 T.C.



PR-East Mt Gething 81(3)7 #1

Widco

WELL LOG

COMPANY Utah Mines Ltd.
WELL D.D.H.-E.M.G.-81-13
LOCATION 6,210,910 m N
539,768 m E

COMPANY Utah Mines Ltd.
AREA East Mount Gething
WELL D.D.H. - E.M.G. - 81 - 13
COUNTY STARK B.C.

COORDINATES 539,768 m E
N 6,210,910 m N
ELEVATION 1088 m
D.F.
K.B.
G.I.

520

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	June 23, 1981		Nature		
First Reading	253 m		Density		
Last Reading	OM		Viscosity	@	@
Footage Logged	253 m		Resistivity	@	@
Bottom (Driller)	255.12 m		Res. @ BHT	@	@
Casing (From Log)			pH		
Casing (Driller)	102.72 m		Circ. Temp		
Casing Size	HW		B.H. Temp		
BT Size	HQ				
BT Size			Logged by	D.N. Duncan	
			Witnessed by	L. Kenkel	

REMARKS

* Reg. U.S. Pat. Off.

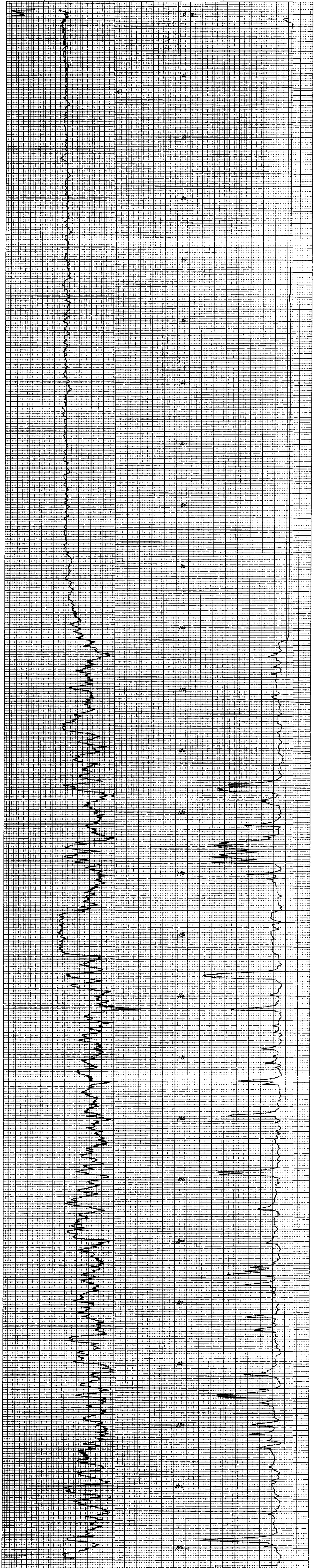
CALIPER

GAMMA

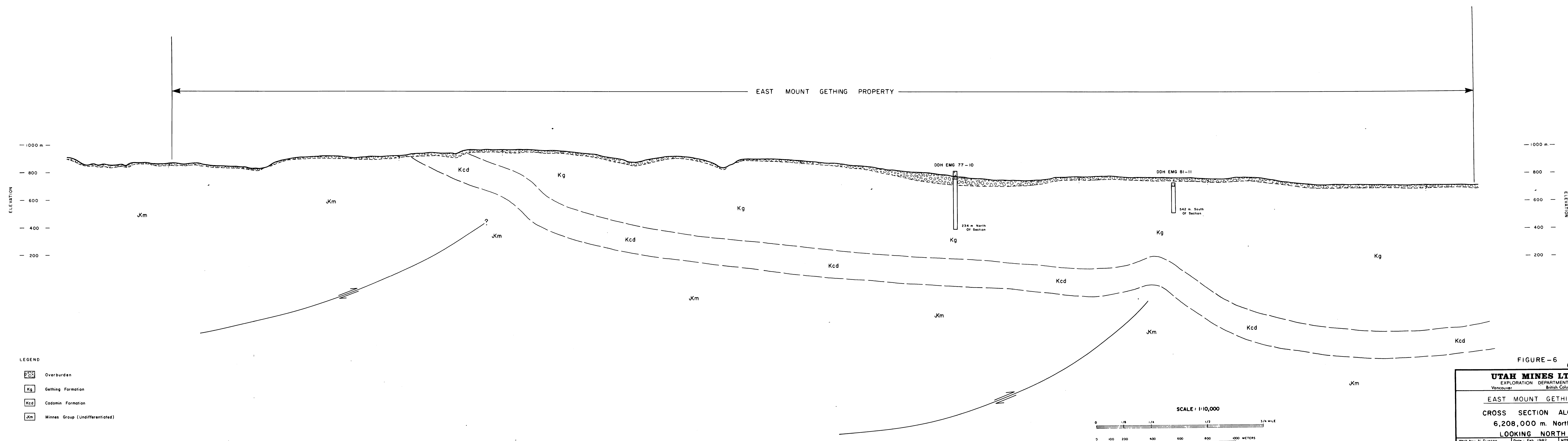
DENSITY

100 cps
2.5 T.C.

1000 cps
2.2 T.C.



10128



- LEGEND
- Overburden
 - Gething Formation
 - Cadinin Formation
 - Minnes Group (Undifferentiated)

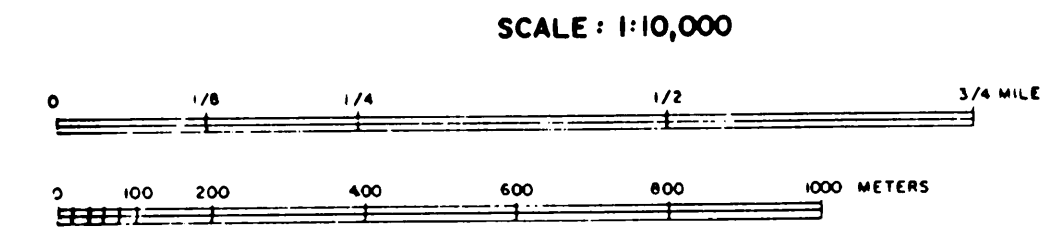


FIGURE-6 520

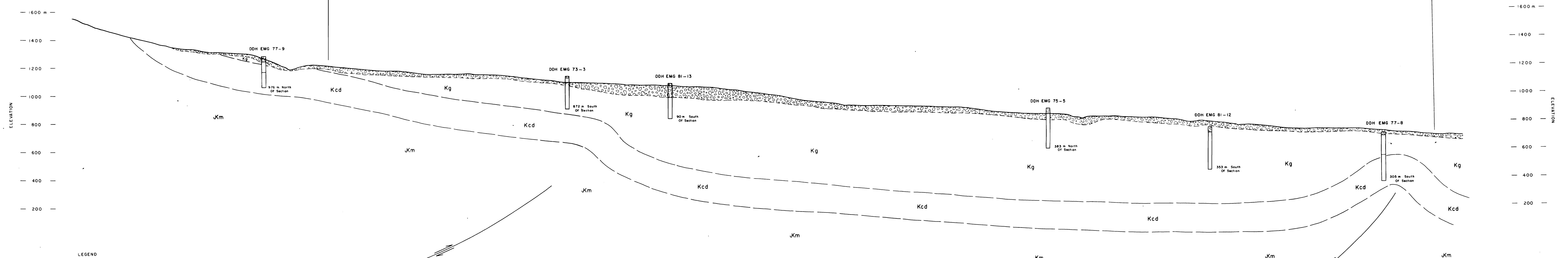
UTAH MINES LTD.		
EXPLORATION DEPARTMENT Vancouver British Columbia		
EAST MOUNT GETHING		
CROSS SECTION ALONG		
6,208,000 m. North		
LOOKING NORTH		
Work by: N. Duncan	Date: Feb. 1982	NTS Ref. 94 B/1
Drawn by: T. Drews	Revised:	Scale - 1:10,000
No Vertical Exaggeration		

PR-EAST MT. GETHING 81(2)A

WEST

EAST

EAST MOUNT GETHING PROPERTY



- LEGEND
- Overburden
 - Gething Formation
 - Cadomin Formation
 - Minnes Group (Undifferentiated)

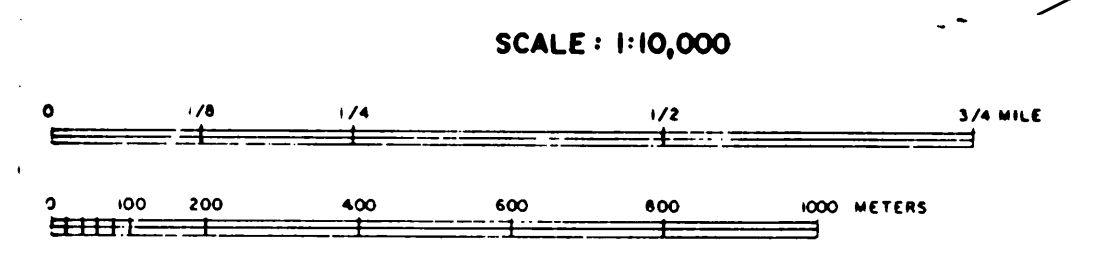
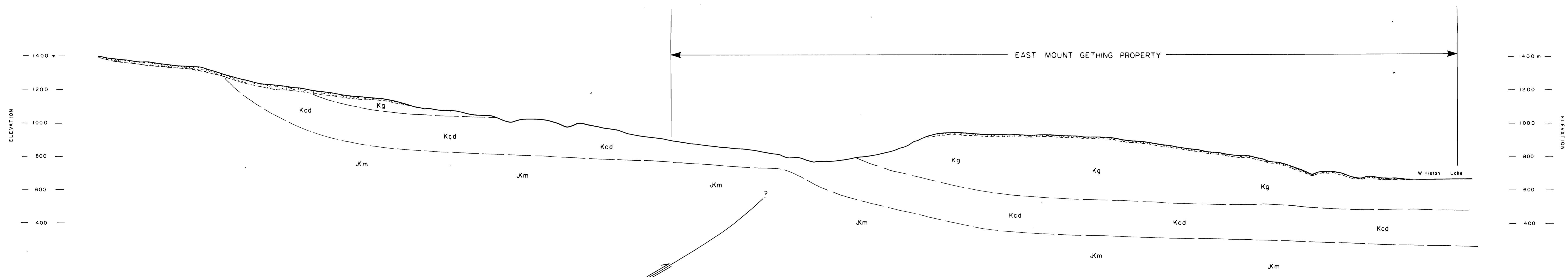


FIGURE-7 **520**

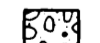
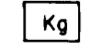
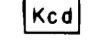
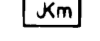
UTAH MINES LTD.		
EXPLORATION DEPARTMENT		
Vancouver British Columbia		
EAST MOUNT GETHING		
CROSS SECTION ALONG		
6,211,000 m. North		
LOOKING NORTH		
Work by: N Duncan	Date: Feb. 1982	NTS Ref. 94 B/1
Drawn by: T. Drews	Revised:	Scale - 1:10,000
No Vertical Exaggeration		
SCALE IN		
PR-East Mt. Gething 8(2)A		

WEST

EAST



LEGEND

-  Overburden
-  Gething Formation
-  Cadomin Formation
-  Minnes Group (Undifferentiated)

SCALE: 1:10,000

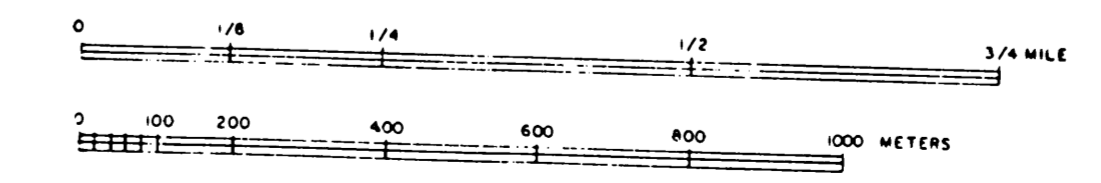


FIGURE - 8

520

UTAH MINES LTD. EXPLORATION DEPARTMENT Vancouver British Columbia		
EAST MOUNT GETHING		
CROSS SECTION ALONG 6,213,000 m. North LOOKING NORTH		
Work by: N. Duncan	Date: Feb. 1982	NTS Ref. 94 B/1
Drawn by: T. Drews	Revised:	Scale - 1:10,000
No Vertical Exaggeration		

PR-East Mt. Gething 8/67A

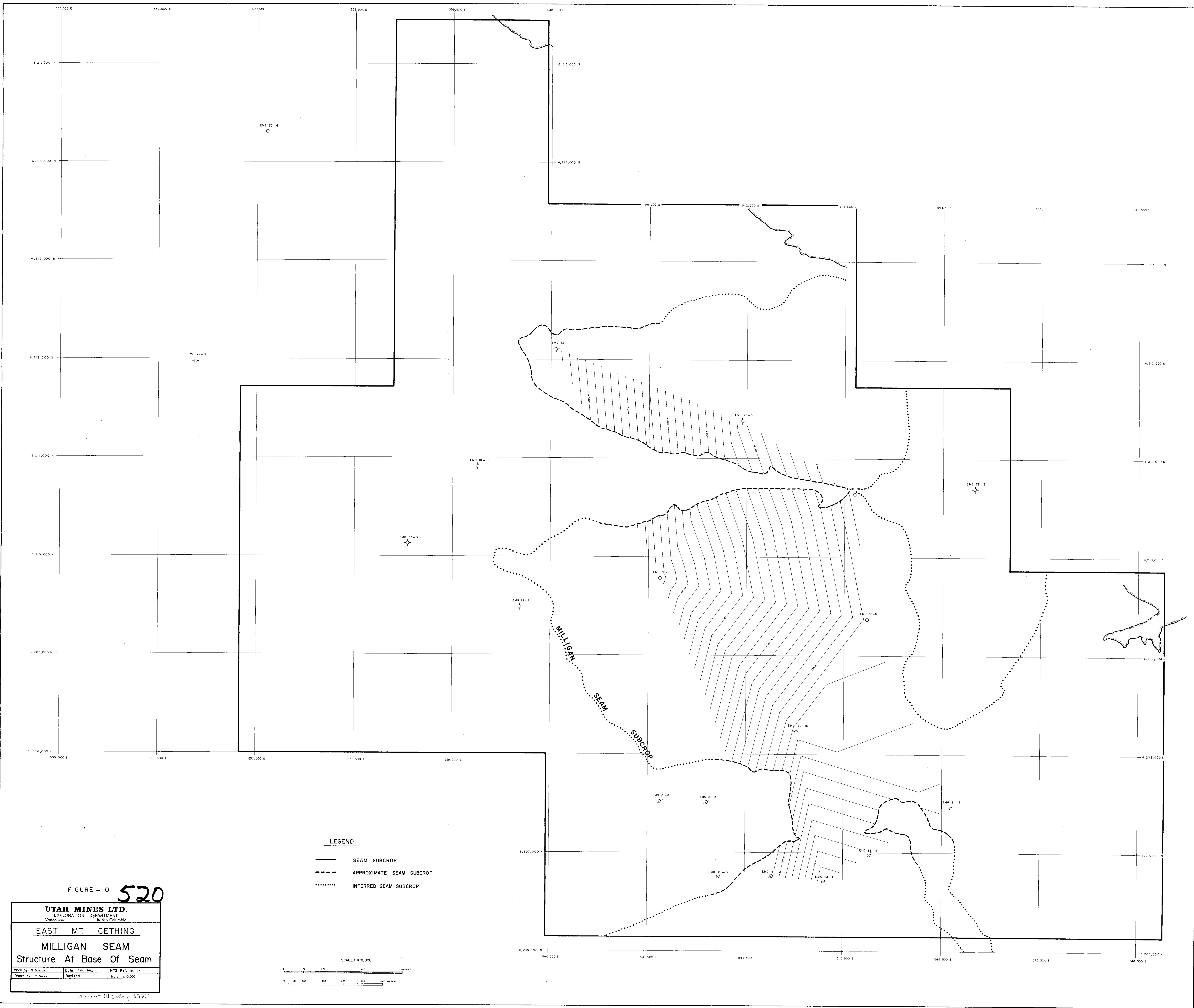


FIGURE - 10 **520**

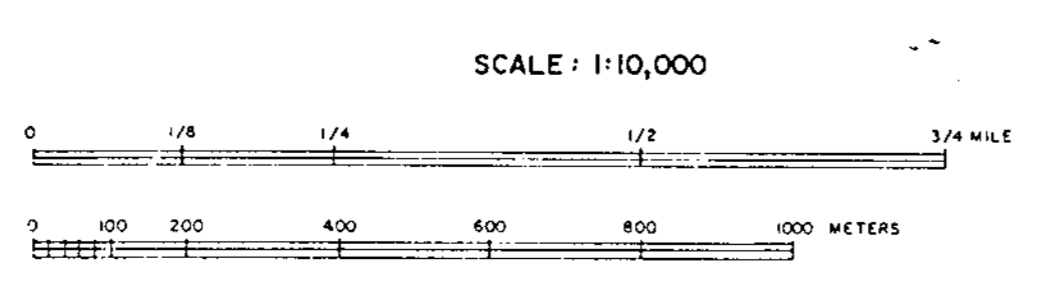
UTAH MINES LTD.
 EXPLORATION DEPARTMENT
 Vancouver British Columbia

EAST MT. GETTING

MILLIGAN SEAM
 Structure At Base Of Seam

Work by: N. Dunbar	Date: Feb. 1982	NTS Ref: 92 B/1
Drawn by: I. Orzes	Revised:	Scale: 1:110,000

PR - East Mt. Getting 81(2)A



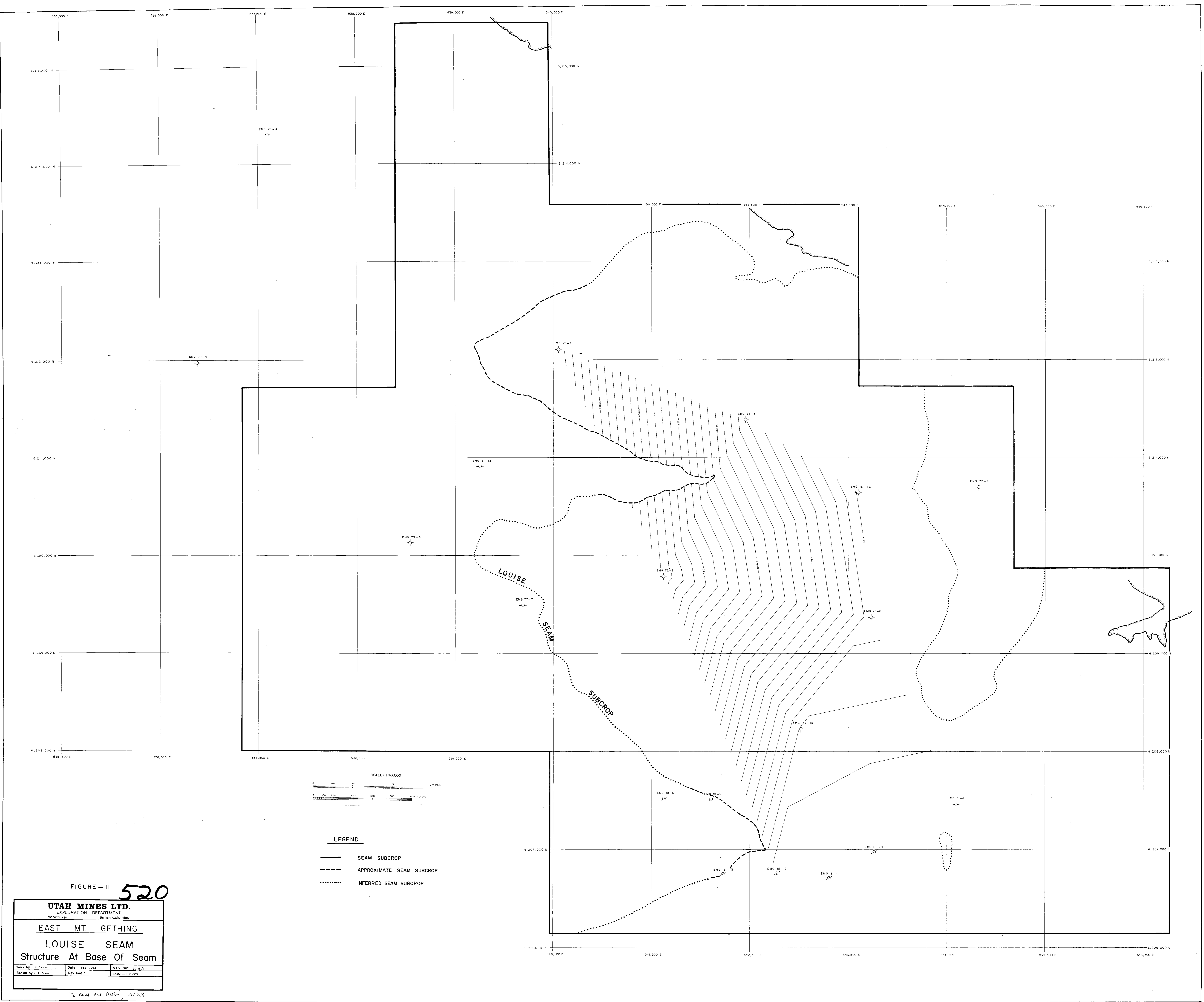
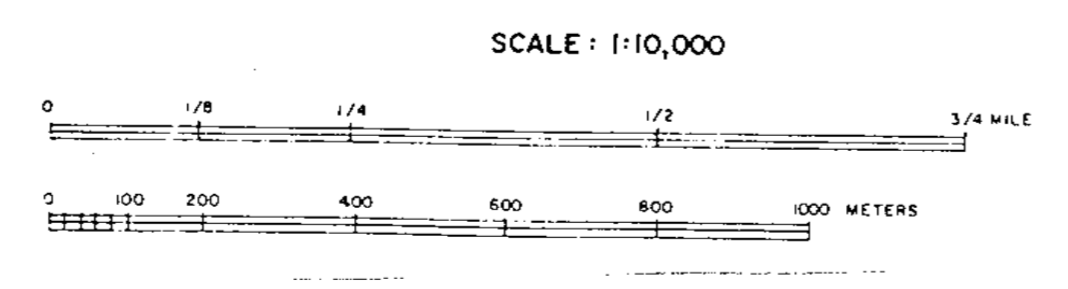


FIGURE - II 520



- LEGEND**
- SEAM SUBCROP
 - - - - APPROXIMATE SEAM SUBCROP
 - INFERRED SEAM SUBCROP

UTAH MINES LTD.
 EXPLORATION DEPARTMENT
 Vancouver British Columbia

EAST MT. GETHING

LOUISE SEAM
 Structure At Base Of Seam

Work by: N. Gordon	Date: Feb 1962	NTS Ref: 04 B/1
Drawn by: T. Davis	Revised:	Scale: 1:10,000

P2-East Mt. Gething 81CA19

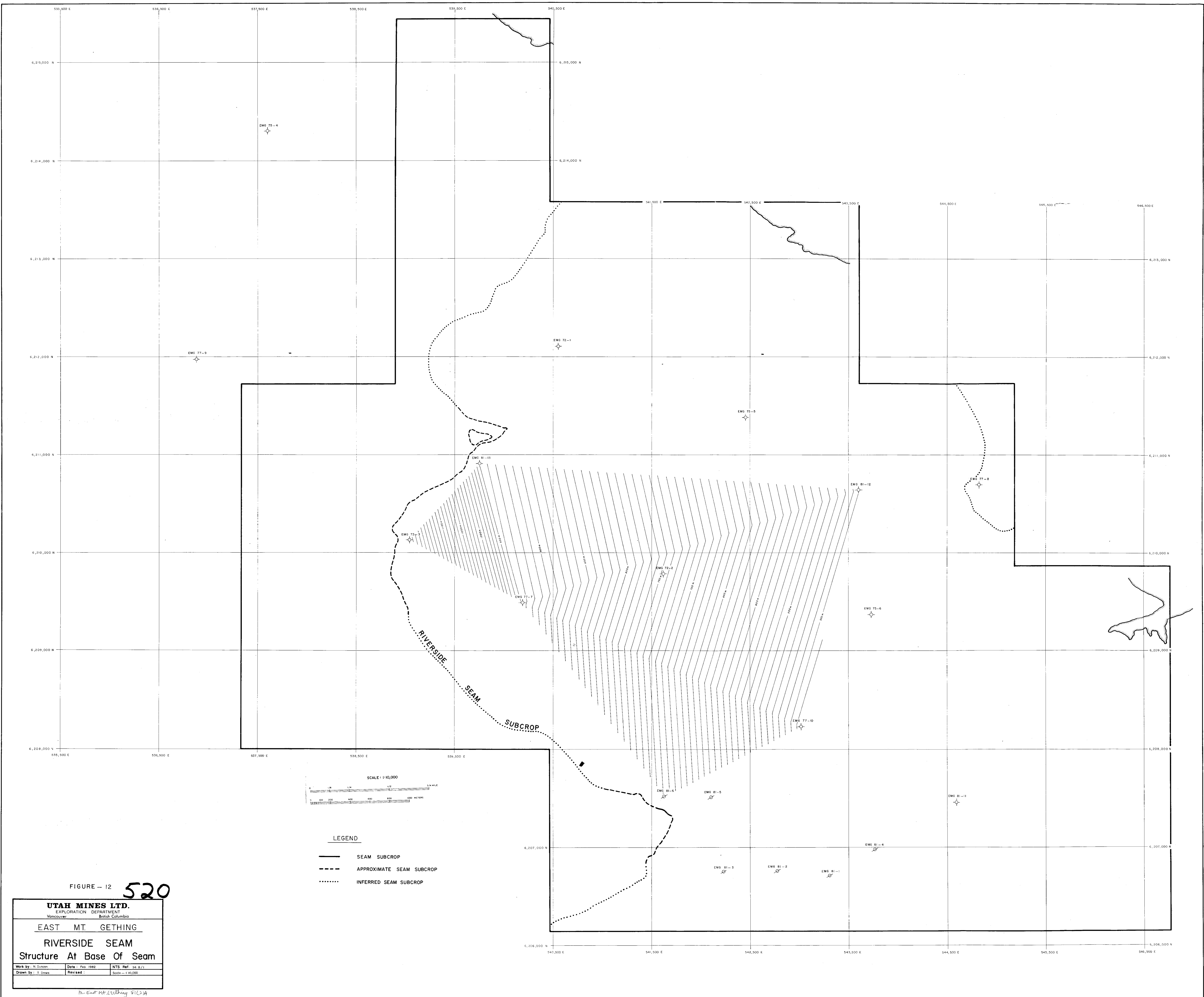
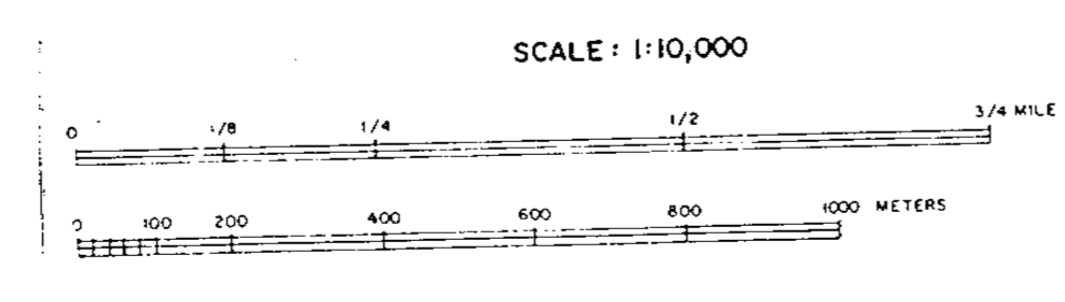


FIGURE - 12 **520**



- LEGEND**
- SEAM SUBCROP
 - - - APPROXIMATE SEAM SUBCROP
 - INFERRED SEAM SUBCROP

UTAH MINES LTD.
 EXPLORATION DEPARTMENT
 Vancouver British Columbia

EAST MT. GETHING

RIVERSIDE SEAM
 Structure At Base Of Seam

Work by: N. Jensen	Date: Feb. 1982	NTS Ref.: 24.2/1
Drawn by: T. Dines	Revised:	Scale: 1:80,000

Re: East Mt. Gething 8103A

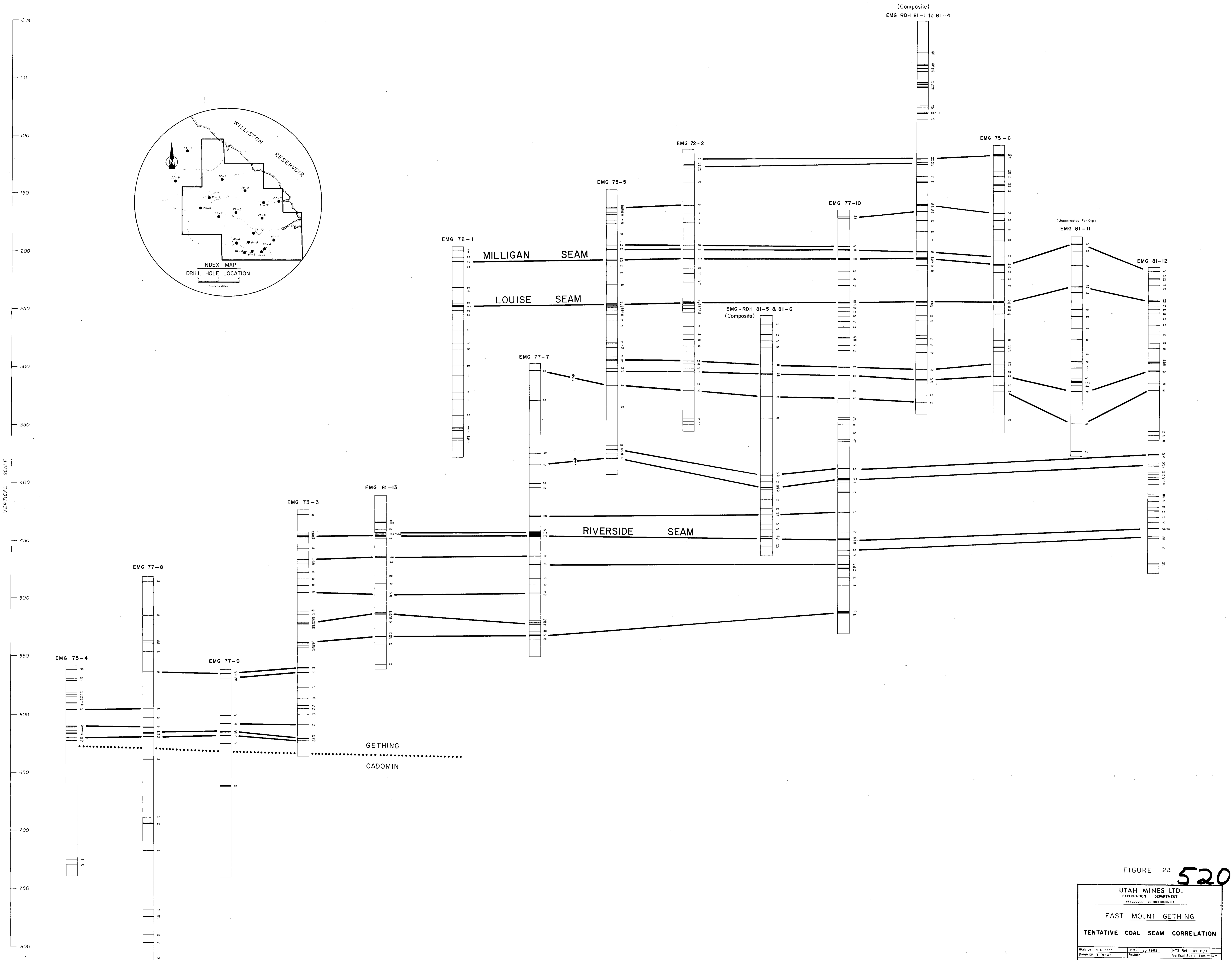


FIGURE - 22 520

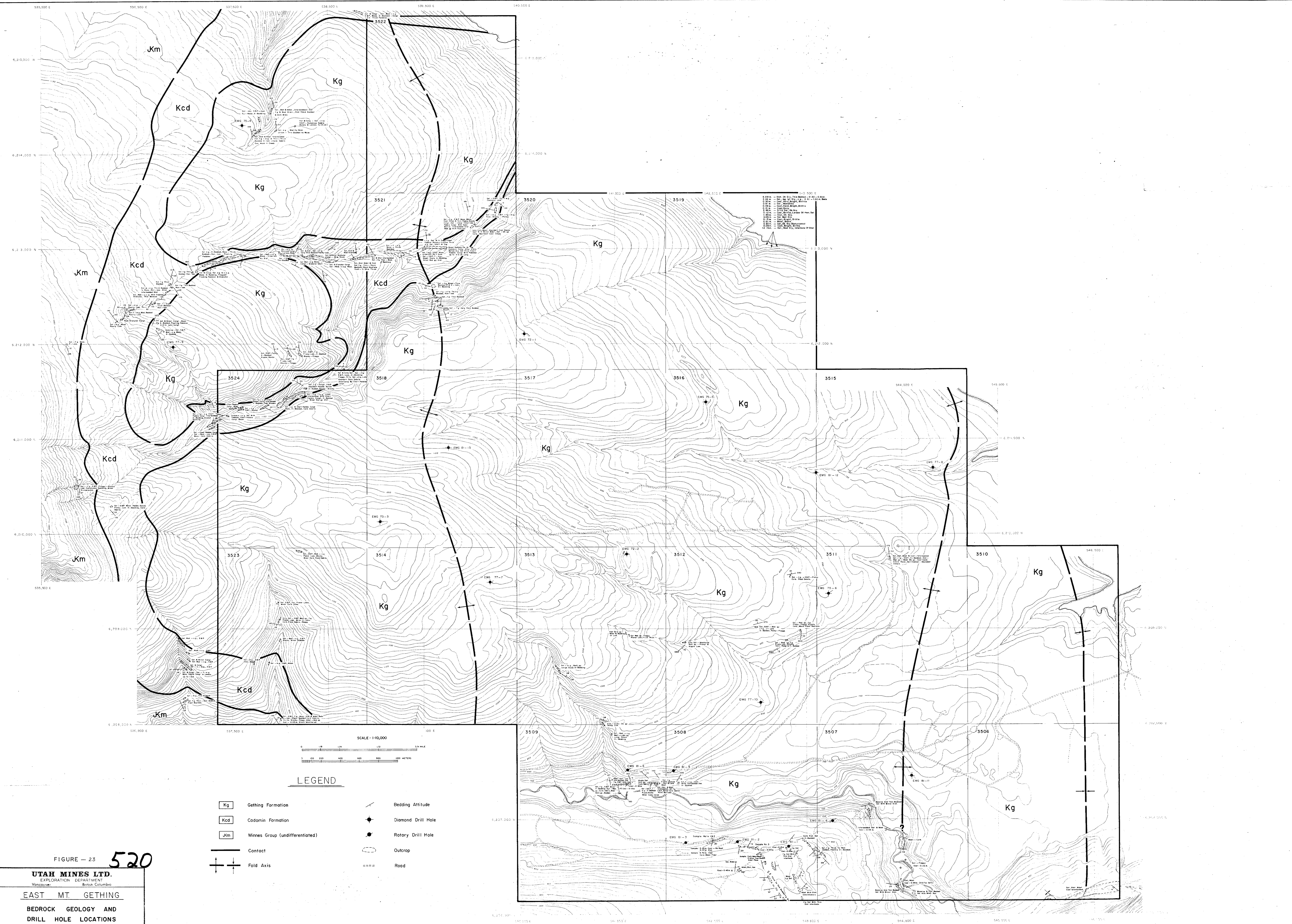
UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

EAST MOUNT GETHING

TENTATIVE COAL SEAM CORRELATION

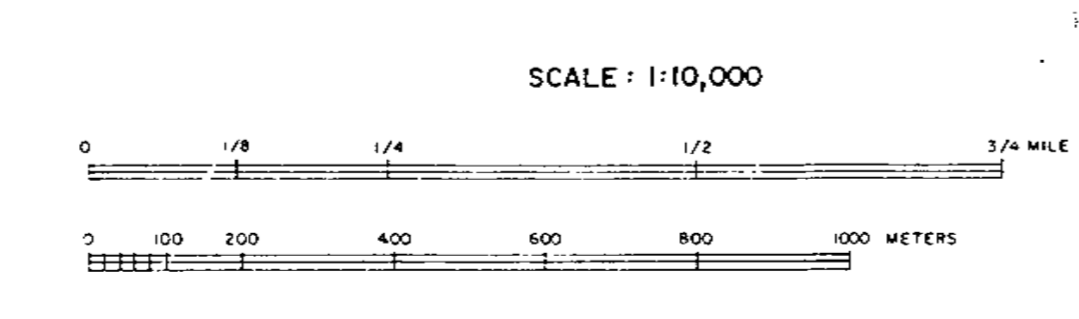
Work By: N. Dutton	Date: Feb 1982	ATS Ref: 84 B/1
Drawn By: J. Dumas	Revised:	Vertical Scale - 1cm = 10m

P2-East Mt Gething 81(2)A



Legend for Drill Hole Symbols:

◆	Diamond Drill Hole
●	Rotary Drill Hole
○	Outcrop
—	Road



LEGEND

- | | | | |
|---|---------------------------------|--|--------------------|
| Kg | Gething Formation | | Bedding Attitude |
| Kcd | Cadomin Formation | | Diamond Drill Hole |
| Jm | Minnes Group (undifferentiated) | | Rotary Drill Hole |
| | Contact | | Outcrop |
| | Fold Axis | | Road |

FIGURE - 23 **520**

UTAH MINES LTD.
EXPLORATION DEPARTMENT
Vancouver British Columbia

EAST MT. GETTING
BEDROCK GEOLOGY AND
DRILL HOLE LOCATIONS

Work By: N. Doran	Date: Feb. 1982	NTS Ref: 98-8/1
Drawn By: T. Drew	Revised:	Scale: 1:10,000

Contour Interval = 10 Metres
SCALE 1:110,000
PG. East Mt. Getting 81C-1A