

~~CONFIDENTIAL~~

PR-EAST MT. GETHING 73(1)A

EAST MOUNT GETHING PROJECT

REPORT OF EXPLORATION ACTIVITIES

1973 FIELD SEASON

UTAH MINES LTD.

COAL EXPLORATION DEPARTMENT

412-510 WEST HASTINGS STREET

VANCOUVER, BRITISH COLUMBIA

V6B 1L9

SUBMITTED TO: E.S. RUGG, MANAGER

BY: D.S. FULLERTON, DISTRICT GEOLOGIST
D.N. NOBEL, P. ENG., GEOLOGIST

DATE: DECEMBER 15, 1973

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REPORT OF EXPLORATION ACTIVITIES

EAST MOUNT GETHING PROJECT

1973

ABSTRACT

During July, 1973, Utah Mines Ltd., a wholly owned subsidiary of Utah International Inc., conducted a coal exploration program in the East Mount Gething area (Licence Nos. 1651 to 1678 inclusive) of northeastern British Columbia.

The main objective of the 1973 program was to core drill the untested lower part of the Lower Cretaceous Gething Formation and to define its economic coal potential. Approximately 900 feet of the coal bearing upper part of the Gething Formation was core drilled in 1972.

A drill platform was readied and all equipment was mobilized to the area by a Sikorsky S58T helicopter. A B-1 helicopter was retained full-time to service the drillsite and provide transportation for personnel to and from our Carbon Creek base camp.

Drilling operations (Canadian Longyear, drilling contractor) commenced on 18th July, 1973 and were completed on 22nd July, 1973. One HQ (2½") core hole was drilled to a total depth of 750 feet.

The lowermost 700 feet of the Lower Cretaceous Gething Formation was cored in the East Mount Gething area. Core hole EMG 73-3 (coal licence No. 1670)

spudded into the Gething Formation approximately 1,050 feet below the base of the overlying Moosebar shale. The hole bottomed in typical Cadomin of the Peace River area, coarse, grain sandstone and fine pebble conglomerate sediments.

Correlation of strata, seen in DDH EMG 73-3, in the East Mount Gething area, can be made with Gething Formation sections measured in the Peace River Canyon by the Geological Survey of Canada and with core hole data obtained from the 1972 exploration project.

INTRODUCTION

This report provides supplementary geological data to an initial exploration program conducted by Utah Mines Ltd., in 1972, on twenty-eight licences, Nos. 1651 to 1678, inclusive.

An exploration program in 1972 of two HQ (2½") diamond drill holes tested the upper part of the Lower Cretaceous Gething Formation. Sediments of fluvial-deltaic origin, consisting of an alternating sequence of fine grain sandstones, siltstones, mudstones and numerous thin coal seams were encountered.

This initial exploration phase indicated a poor potential for the development of an economic mining venture producing sufficient quantities of metallurgical grade coking coal from the upper part of the Gething Formation. No coal seams were encountered greater than six feet in thickness.

One additional HQ (2½") core hole was completed in 1973 to a total depth of 750 feet. The 1973 exploration had the following objectives:

(1) To test by diamond core drilling the economic potential of the lower part of the Gething Formation.

(2) To obtain unweathered coal samples suitable for laboratory and washability studies.

(3) To determine the agglomerating properties of the coal.

PROPERTY

The East Mount Gething property consists of a total of twenty-eight coal licences, Nos. 1,651 to 1,678, as shown on Figure 1. These licences were acquired through negotiated agreement in late 1970.

Details as to the ownership and interests concerning the licences are not contained in this report. Utah Mines Ltd. is the owner of the licences at this time and has all available information concerning working agreements.

LOCATION AND ACCESS

The East Mount Gething area lies adjacent to the Williston Reservoir in northeastern British Columbia, approximately 80 miles due west of Fort St. John and approximately 480 miles due north of Vancouver. An all weather paved road extends from both Dawson Creek and Fort St. John to within two miles of the southeast corner of the coal licenced property. An existing exploration road in the southeast section of the licenced area from the vicinity of W.A.C. Bennett Dam to Gaylard Creek is also present.

The exploration work took place in the central part of the licensed block (fig. 1). Drilling equipment was mobilized to the drillsite using a Sikorsky S58T helicopter. A camp was established prior to the drilling at Carbon Creek and a B-1 helicopter was retained full-time to provide access to and from the property.

1973 FIELD SEASON

Logistics

Owing to the anticipated short exploration program, it was decided to maintain a fully serviced camp already established at Carbon Creek and service the East Mount Gething area with a B-1 helicopter retained on a full-time basis.

Drillsite EMG 73-3 was located on coal licence No. 1670, approximately 5,500 feet west of EMG 72-2, and 7,500 feet south of EMG 72-1. A platform was prepared prior to drilling and equipment was mobilized using a Sikorsky S58T helicopter on 17th July, 1973. (See Photo 1).

After completion, equipment was mobilized back to Carbon Creek. All debris was removed and felled timber was bucked according to British Columbia Forestry specifications.

GEOLOGY

The geology of the Peace River Canyon area is not described in detail in this report. Numerous excellent descriptions of the various rock formations are



Photo 1: Aerial View of D.D.H. EMG 73-3

0 contained in the referred literature. However, a few comments with regard to both the general stratigraphy and structure follow.

STRATIGRAPHY

The exposed bedrock in and near the Peace River Canyon consists mostly of Lower Cretaceous Formations. Studies by noted scientists have shown the difficulty of stratigraphic relationships for these sediments by the numerous alternative nomenclature systems proposed. Some of these systems are illustrated on Table I. The nomenclature of Stott, 1971, has been used in this report.

Cadomin Formation

The Cadomin Formation is the oldest formation occurring in the East Mount Gething area. The Cadomin Formation consists mainly of a succession of massive, crossbedded, coarse-grained, grey to brown weathering, conglomeratic sandstones and fine conglomeratic beds. Interbedded with these conglomeratic units are thin beds of buff-weathering, soft, fine-grained sandstone, dark carbonaceous shales, and thin coaly seams. Some beds consist entirely of conglomerate with sub-rounded pebbles of dark chert, white quartz, and quartzite strongly cemented in a matrix of coarse to medium-grained sandstone.

Coarse sandstones of Cadomin Formation grade laterally into interbedded coal, sandstone, and shale of the Gething Formation. The two formations

- 7 -

LOWER CRETACEOUS FORMATIONAL NOMENCLATURE

Table 1

PEACE RIVER CANYON AREA

STOTT 1971 (This Report)		BEACH & SPIVAK 1944	MATHEWS 1947	HUGHES 1964	McL EARN 1923	
FORT ST. JOHN GROUP	COMMOTION FM.	GATES FM.	GATES FM.	COMMOTION FM.	UP GATES FM.	
	BOULDER CRK. MB. HULCROSS MB. GATES MB.					
MOOSE BAR FM.		MOOSEBAR FM.	MOOSEBAR FM.	MOOSEBAR FM.	FORT ST. JOHN GRO. MOOSEBAR FM.	
BULLHEAD GROUP	GETHING FM.	GETHING FM.	NON-MARINE BULLHEAD	BULLHEAD SUCCESSION	CRASSIER GROUP GETHING FM.	
	CADOMIN FM.	DUNLEVY FM.				MARINE BULLHEAD
MINNES GR.	MONACH FM.		DUNLEVY FM.	MARINE BULLHEAD	BEAUDAETTE GROUP MONACH FM.	
	BEATTIE PEAKS FM.	MONACH FM.				
	MONTEITH FM.	BEATTIE PEAKS FM.				MONTEITH FM.

are, therefore, in part lateral equivalents, although, in, general, the Cadomin underlies the Gething.

Gething Formation

The Gething Formation directly overlies the Cadomin Formation. In general, the Gething Formation consists of interbedded mudstones, coals, silt-stones, and sandstones. (See lithologic logs in Pockets 1). The sandstones are usually in thin units and the frequent repetitions of these units are a characteristic feature of the Gething. The thickness of the Gething Formation in the Peace River Canyon is believed to be approximately 1,600 feet to 1,800 feet. A detailed description of the Gething Formation of the Peace River Canyon area has been published by Stott, 1969. It is the coal beds of the Gething Formation that are the objective of the coal exploration activities being carried out in the Peace River area, these coal beds vary in thickness from a few inches up to ten to fifteen feet, with isolated occurrences being reported of, greater thicknesses.

Moosebar Formation

The Moosebar Formation directly overlies the Gething Formation. The Moosebar Formation has been removed by erosion from the East Mount Gething area, but is present approximately three miles southward from the property's southern boundary.

The formation consists of a monotonous sequence of dark grey to black friable shale. In places, thin layers of clayed ironstone occur and a few thin sandstone lenses are present in the upper part of the formation. The

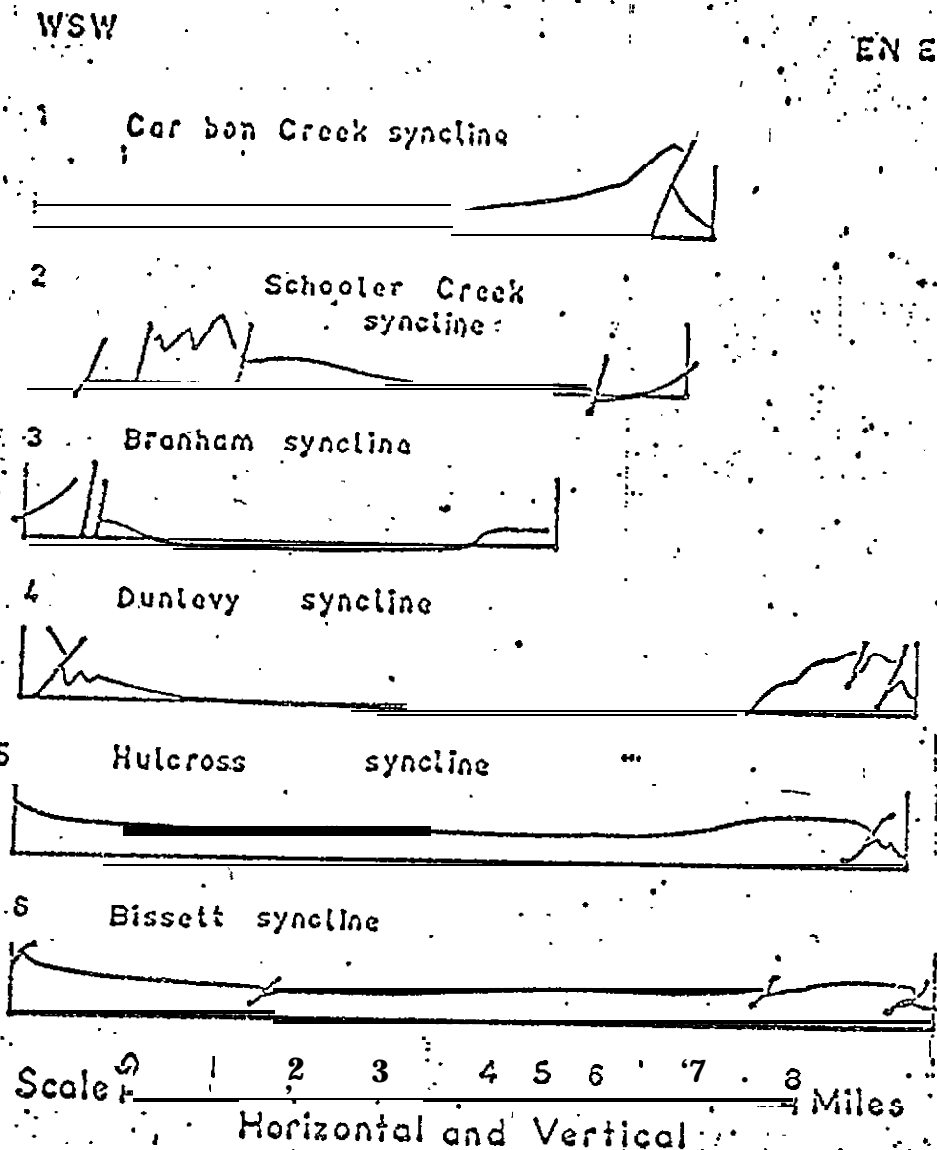
formation has been measured at 1,336 feet by Beach and Spivak, 1944, on Track Creek.

STRUCTURE

The East Mount Gething coal licences lie within the foothills structural belt of the Rocky Mountains. The structural belt extends from the United States border to the Yukon along the east side of the Rocky Mountains.

It is characterized by a series of anticlines, synclines and west-dipping thrust faults. The intensity of deformation varies from one area to another and the Peace River area is characterized by a particular structural style. This structural pattern has been well illustrated by Hughes, 1967, (Fig. 2) with detailed discussions by Irish, 1969, and Fitzgerald, 1968. Essentially, the Peace River area consists of a large relatively broad syncline between sharply faulted anticlines. (See. Fig. 3).

In Figure 3, a prominent anticline is shown on the west side of the East Mount Gething block, while on the east side of the map, west dip is prominent. The axis of Dunlevy Syncline is shown by the heavy dashed line through the property. The East Mount Gething property occupies part of the western flank of the Dunlevy Syncline, south of the Willis-ton Reservoir. Geological field work has confirmed the gentle dipping of the syncline which is illustrated in cross sections A-B and C-D, Figure 3.



Structural Styles, Peace River Area (Hughes 1967)

PR-EMG-73(1)A

RESULTS OF EXPLORATION 1973

GENERAL DISCUSSION

The 1973 exploration program was directed towards continuing an evaluation of the metallurgical coal potential of the Gething Formation in the East Mount Gething area.

An initial program in 1972 on the East Mount Gething block had been orientated towards the coal potential of the Gething Formation, especially three principal coal seams; the Trojan, Murray and Grant seams all exposed in the nearby Peace River Canyon and discussed by MacLearn (1922) of the Geological Survey of Canada.

This initial phase tested 900 feet of upper Gething Formation lying roughly 250 feet below the top of the overlying Moosebar Shale Formation. Two diamond core holes indicated a poor potential and insufficient coal reserves for development of an economic mining venture.

It was recommended to evaluate the untested lower part of the Gething Formation and define its economic potential. The 1973 exploration program was based on this premise.

RESULTS

One HQ (1½") diamond core hole (drilling contracted to Canadian Longyear) with a total depth of 750 feet penetrated 700 feet of the lower part of

the Gething Formation. The results of this core hole follows. A strip log and geophysical log from the hole are found in Pockets I.

CORE HOLE - EMG 73-3
 COALLIGENCE- C.L. 1670
 LOCATION - 300 FWL X 2,650 FSL of C.L. 1670
 ELEVATION. - 4,040 feet
 TOTAL DEPTH - 750 feet

<u>COAL SAMPLE</u>	<u>BED NAME</u>	<u>THICKNESS</u>	<u>DEPTH</u>
1	?	1.2	65.6
2	?	6.4	119.9
3	GRANT	6.4	122.6
4	RIVERSIDE	2.5	195.6
5	?	2.0	288.0
6	?	1.4	438.7
7	?	2.3	500.9
8	?	2.1	515.9
9	?	2.5	609.5
10	?	2.0	617.9
11	?	1.6	664.4
12	MURRAY	2.9	703.1

Approximately 700 feet of the Gething Formation was cored in the East Mount Gething Block. Gething sediments of fluvial-deltaic origin consist

of alternating sequences of fine grained sandstone, siltstones, mudstones and thin coal seams. The hole bottomed in typical Cadomin of the Peace River area; coarse grained sandstone and fine pebble conglomerate.

A tentative correlation exists between the geophysical logs of EMG 73-3 and EMG 72-1. Correlation with a section in the Peace River Canyon (Fig. 2) and core hole EMG 72-1 indicates that EMG 73-3 spudded into the lowermost section of the Gething Formation approximately 1,050 feet below the base of the overlying Moosebar Shale Formation.

For:

COAL, ASSAYS (p. 13) AND

TABLE 11: (p. 14)

"EAST MT GETHING - HEAD ANALYSIS"
for borehole EMG 73-3

Refer to:

PR - EAST MT. GETHING 73(4)A
CONFIDENTIAL ANALYSIS FILE

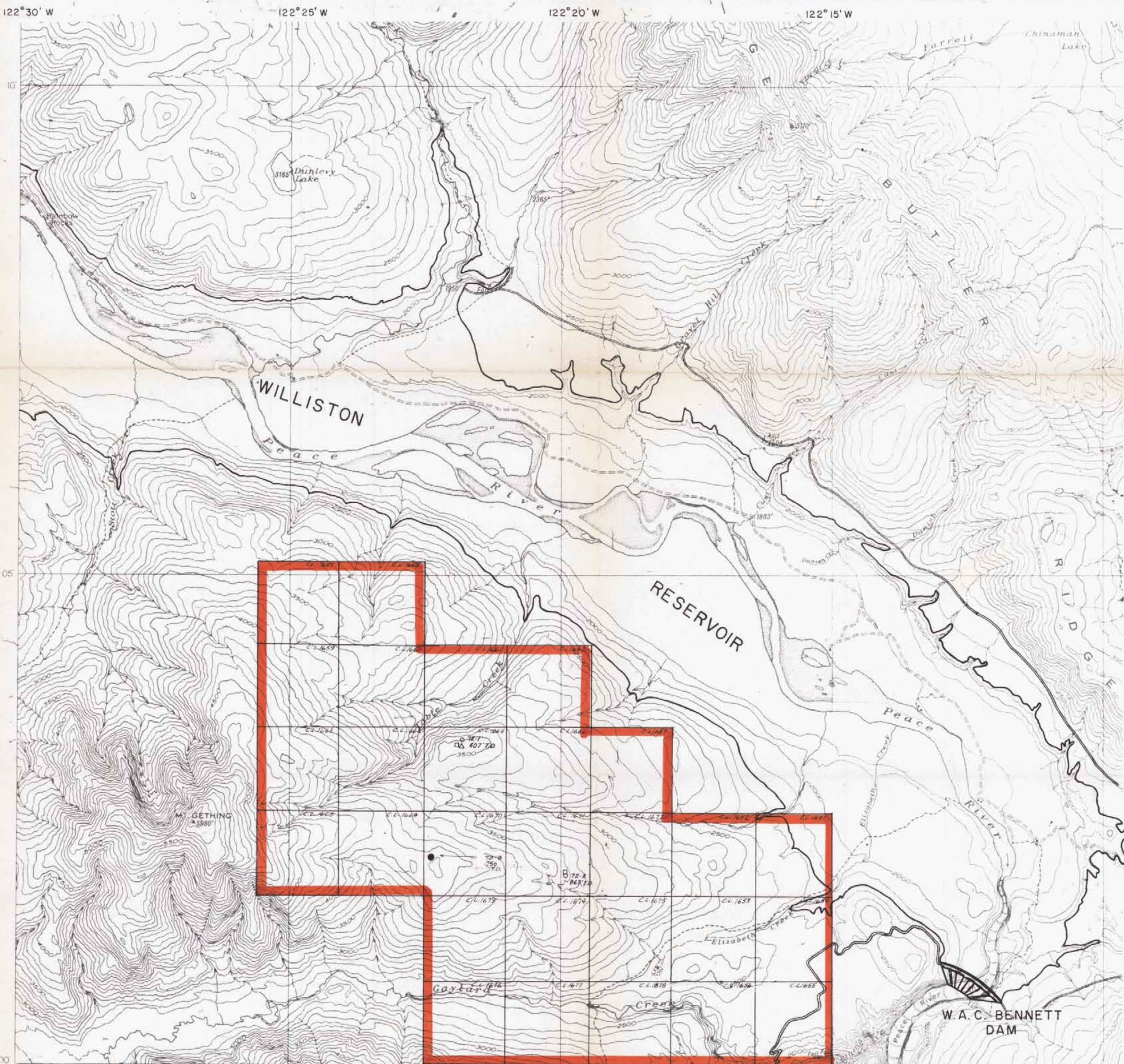
COSTS

The following statement covers expenditures by Utah Mines Ltd. for coal exploration through 31st October, 1973, in the East Mount Geth ing licence area of the Peace River District.

ITEM	<u>TOTAL COST</u>
1. DRILLING - 750 feet	\$ 9,540.95
2. LABOUR Salaries for geologists	750.50
3. VEHICLE RENTAL	177.50
4. AIRCRAFT CHARTER	8,943.84
5. SUPPLIES	177.50
6. FREIGHT AND CUSTOMS BROKERAGE	8.73
7. LABORATORY WORK Sample preparation and analysis	2,305.20
8. RECLAMATION	250.00
	<hr/>
	\$22,153.72

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EXPLANATION	
	UTAH MINES LTD.
	EXISTING ACCESS ROAD
	HELICOPTER PAD
	DRILL SITE 1972
	DRILL SITE 1973
	CAMP SITE 1972

FIGURE 1

COAL-BRITISH COLUMBIA

EAST MT. GETHING

UTAH MINES LTD.
MINERAL EXPLORATION & DEVELOPMENT DEPT.
515 WEST HASTINGS ST.
VANCOUVER 2, B. C.

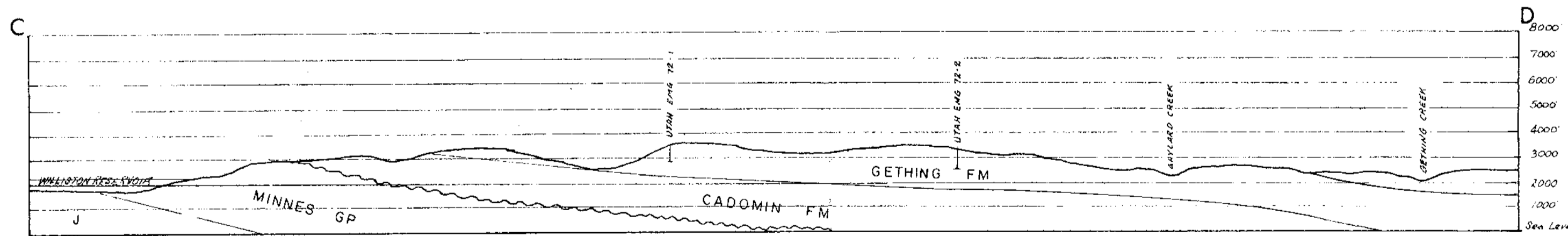
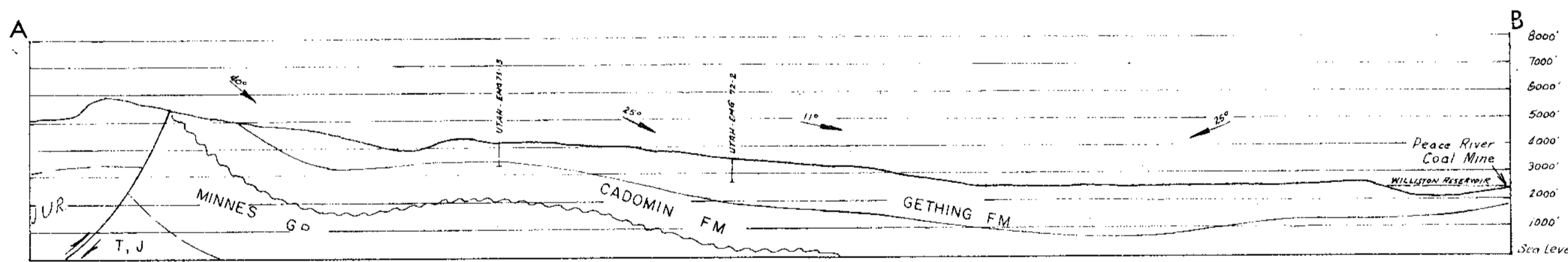
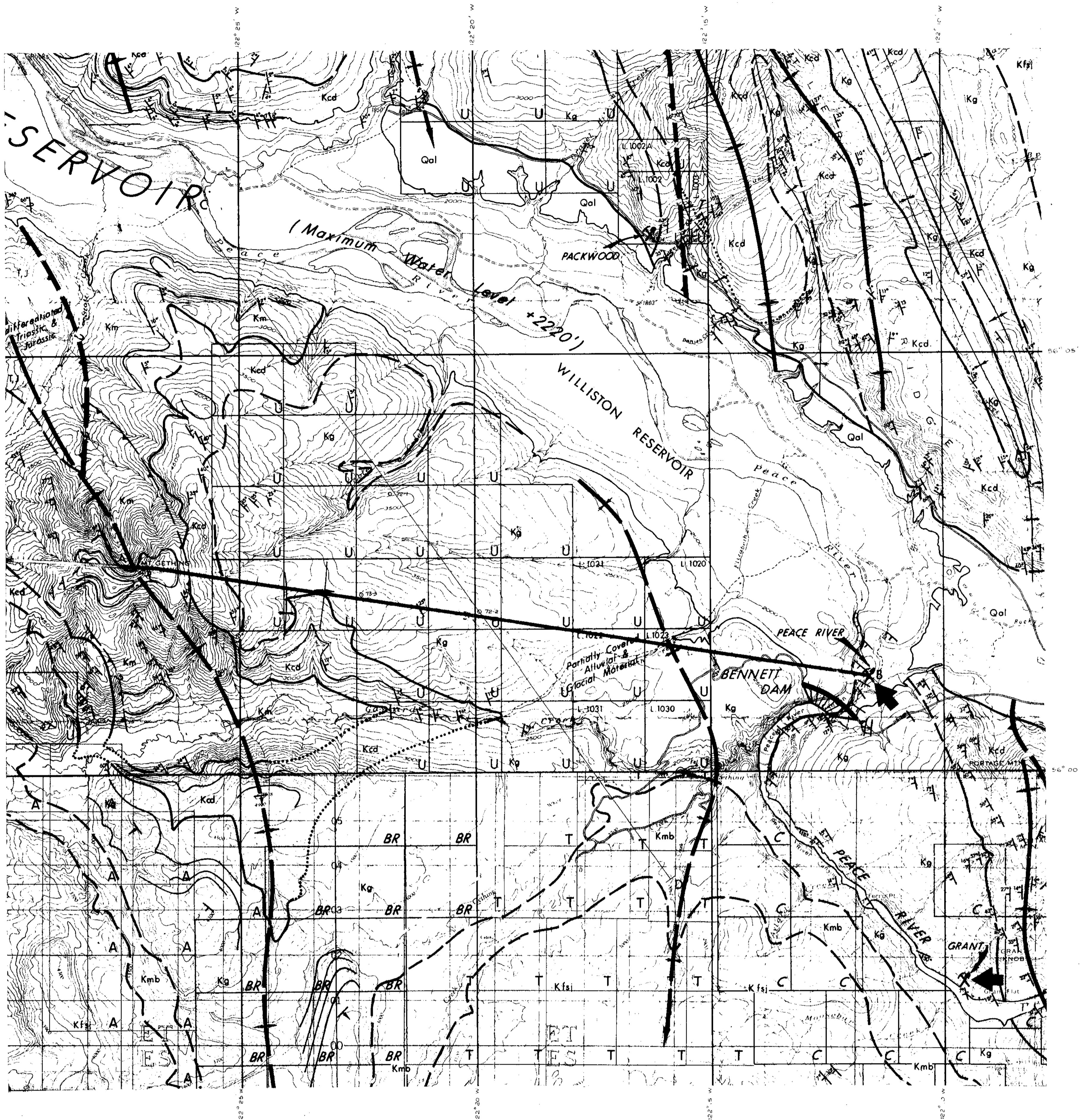
DATE: Sept., 1973 BY D.S.F.

SCALE 1:50,000

1/2 0 1 mile

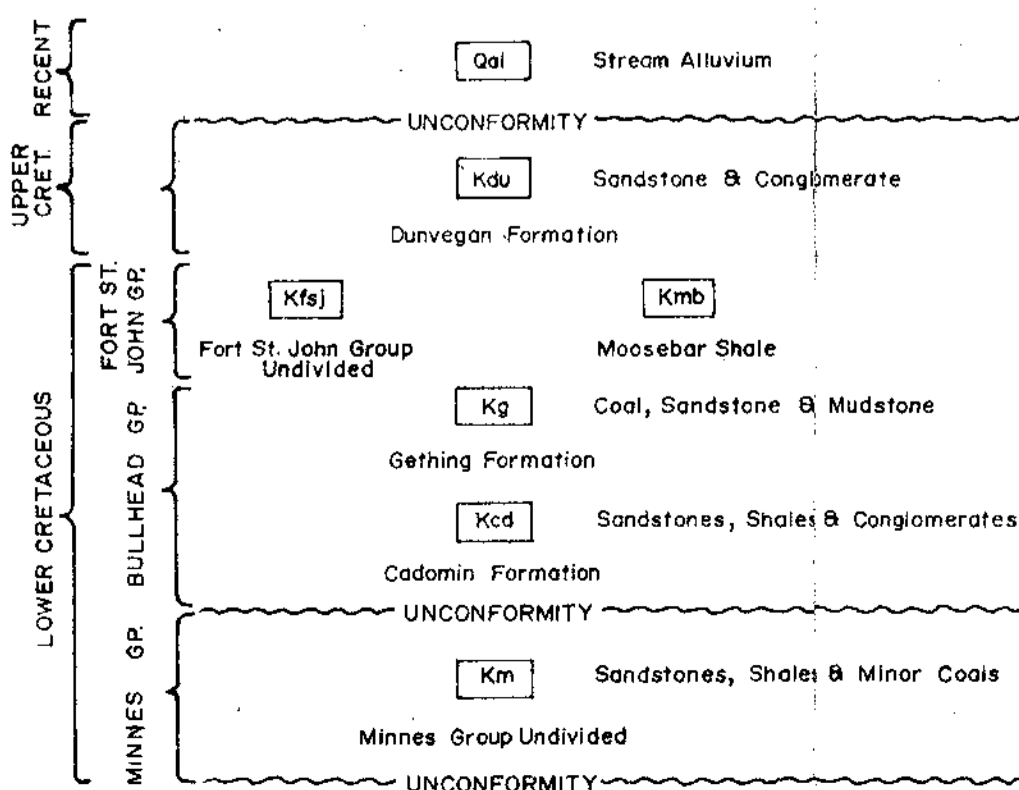
517

PR-EMG 73(2)A



- LEGEND**
- Formation Boundary
 - Anticline
 - Syncline
 - Thrust Fault
 - Strike & Dip - Published
 - Strike & Dip - Measured
 - Coal Mine (Abandoned)
 - Coal Occurrence Greater Than 5' Other Than Trojan Seam.
 - Drill Hole
 - Roads - Existing

- T** TEXACAL - HOGAN COAL LICENCES
- A** AMAX COAL LICENCES
- U** UTAH MINES LTD COAL LICENCES
- C** CINNABAR PEAK COAL LICENCES
- BR** BRAMEDA COAL LICENCES



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PR-EMG 73(2)A

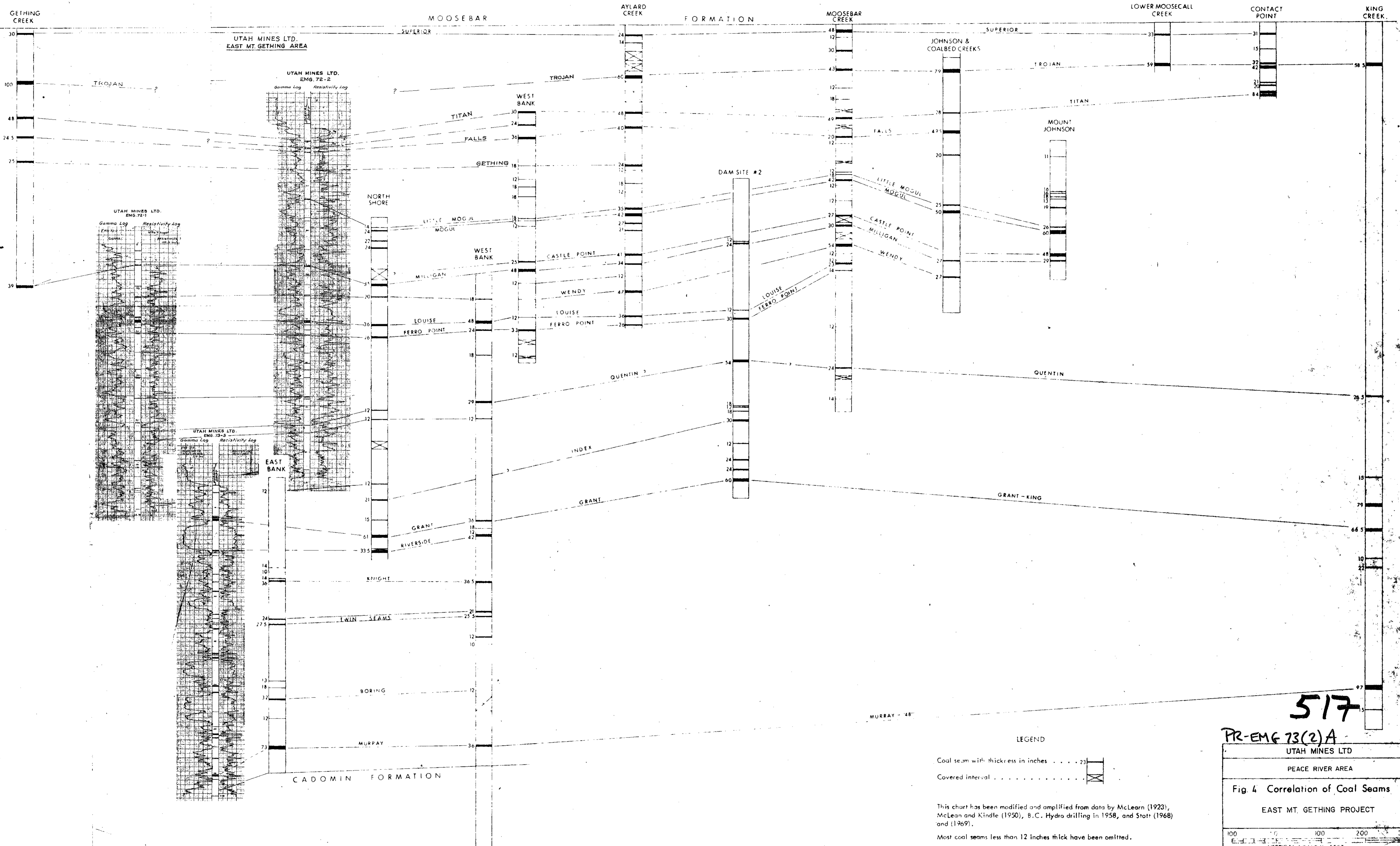
UTAH MINES LTD
MINERAL EXPLORATION & DEVELOPMENT DEPT.
412 - 510 WEST HASTINGS ST.
VANCOUVER 2, BRITISH COLUMBIA

PEACE RIVER AREA

GEOLOGICAL MAP OF THE
EAST MT. GETHING BLOCK

December, 1973

SCALE: 1:50,000
1 1/2 0 1 Mile



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PR-EMG 73(2)A

UTAH MINES LTD.
PEACE RIVER AREA
Fig 4 Correlation of Coal Seams
EAST MT. GETHING PROJECT
100 200 300 VERTICAL SCALE IN FEET
SEPT 1973

LEGEND

Coal seam with thickness in inches 23

Covered interval

This chart has been modified and amplified from data by McLearn (1923), McLean and Kindle (1950), B.C. Hydro drilling in 1958, and Stott (1969) and (1969).

Most coal seams less than 12 inches thick have been omitted.

UTAH MINES LTD.
DRILL & CORE LOG

HOLE NO. EMG-73-3

HOLE NO. EMG 73-3

LOG BY: U.M. and L.G.

ELEV: 4040'

HOLE SIZE: HQ (2 1/2")

PROJECT: EAST MOUNT GETTING

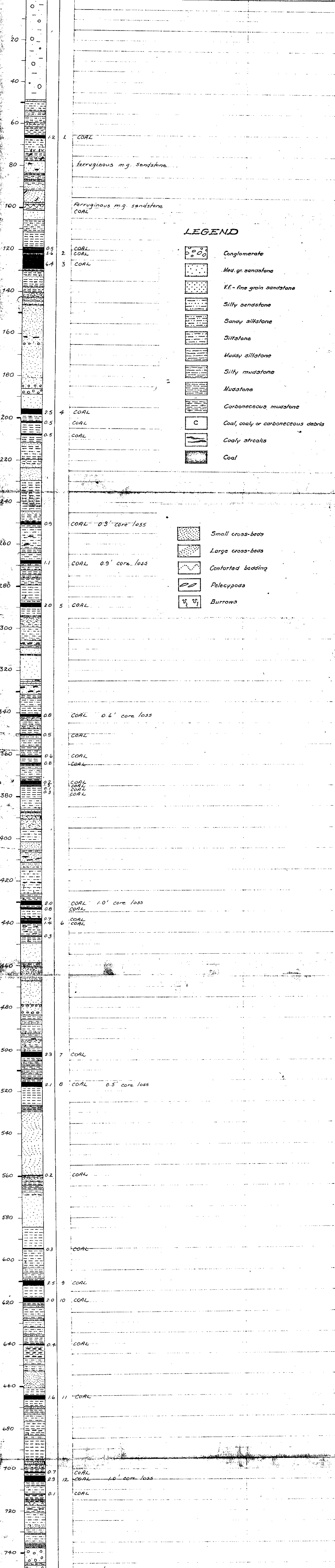
DATE: July 19, 73

N: _____
E: _____

AIR WATER
T.D. 750 P.D. _____

LEASE: C.L. 1670
SEC. _____ T. _____ R. _____

REC #	DEPTH	STRIP LOG	THICK	SAMPLE NO.	LITHOLOGY
-------	-------	-----------	-------	------------	-----------



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PR-EMG 73(3)A

Widco WELL LOG

COMPANY Utah Mines Ltd.
 AREA East Mount Gehring Block
 WELL EMG73-3
 COUNTY FLACE RIVER AREA STATE BRITISH COLUMBIA

COORDINATES:
 N _____
 S _____
 ELEVATION 4040'
 D.F. _____
 K.B. _____
 C.L. 4040.

LOCATION EAST MOUNT GEHRING BLOCK
 WELL EMG 73-3
 COMPANY UPMI MINES LTD.

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Date	Run No. 1	Run No. 2	MUD	Run No. 1		Run No. 2	
				a	F	a	F
July 22, 1973							
First Reading			Nature				
Last Reading			Density				
Footage Logged			Viscosity				
Bottom (Driller)			Resistivity				
Casing (From Log)			Res. @ 8HT				
Casing (Driller)			pH				
Casing Size			Circ. Temp				
Bit Size			B.H. Temp				
			logged by	D.N. Leibel			
			Witnessed by	U. Malachowski			

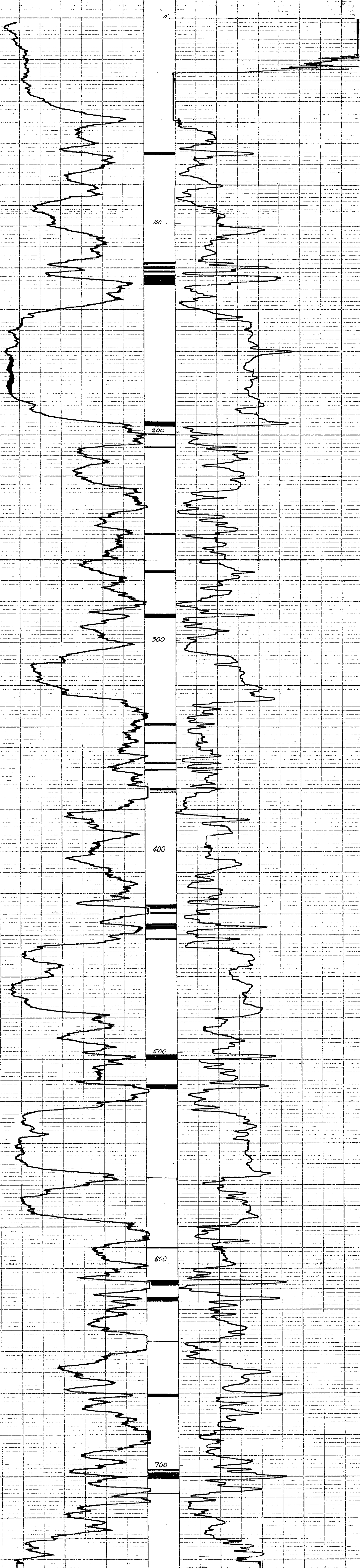
REMARKS Location: 300 feet from westline
 2650 feet from southline of coal license 1070

GAMMA RAY LOG
 SCALE = .010 MR/HR
 3TC . secs

RESISTIVITY LOG
 SCALE = 200 ohms

* Reg. U.S. Pat. Off.

FO-159



PR-EMG-73(3)A

NOTE: COAL ANALYSIS DATA HAS BEEN TAKEN
FROM OPEN FILE 73(1)A

EAST MOUNT GETTING PROJECT
REPORT OF EXPLORATION ACTIVITIES
1973 FIELD SEASON

UTAH MINES LTD.
COAL EXPLORATION DEPARTMENT
412-510 WEST HASTINGS STREET
VANCOUVER, BRITISH COLUMBIA
V6B 1L9

OPEN FILE
CONFIDENTIAL

SUBMITTED TO: E. S. RUGG, MANAGER

BY: D.S. FULLERTON, DISTRICT GEOLOGIST
D.N. le NOBEL, P. ENG., GEOLOGIST

DATE: DECEMBER 15, 1973

COAL

0 Numerous thin coal seams were found to be present in the 700 feet of Gething Formation cored in the East Mount Gething block. Thicknesses ranged from a few inches to 6.4 feet. In DDH EMG 73-3, a 6.4 foot seam (with shale partings) at 122.6 feet correlates (Fig. 2) with the Grant Seam cropping out in the north shore of the Peace River Canyon. A 2.5 foot seam at 195.6 feet and a 2.9 foot seam at 703.1 feet, correlate with the Riverside and Murray seams, respectively.

ASSAYS

0 All cored coal samples 1.0 feet thick and greater were analyzed for their various properties. The head analyses for the cured coal samples tested from the East Mount Gething area are summarized on Table II. The samples were submitted to Utah International Inc., laboratories in Palo Alto, California for Free Swelling Indices and then forwarded to Utah's Navajo mine laboratories for proximate natural and dry basis analyses.

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

Natural Basis

Dry Basis

Navajo Mine Assay

Navajo Mine Assay

Sample NO.	Footage	No. of Feet	Lab. Assay FSI	Natural Basis						Dry Basis				
				%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	13,504	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	⁹⁴ 67.49	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

*Note: Seam Name
 G: Grant
 R: Riverside
 M: Murray