PR - CARBON CREEK (WEST) 78(1)A

1978 REPORT OF EXPLORATION ACTIVITIES

on the

WEST CARBON CREEK PROPERTY

Coal Licences Numbered 4104 to 4123 inclusive
in the Liard Mining Division approximately
36km west from W.A.C. Bennett Dam
centered on
55°57'N, 122°50'W

Owned By: Utah Mines Ltd.

by:

A. T. Armstrong

of

Utah Mines Ltd.,
1600 - 1050 West Pender St.,
Vancouver, B.C.
V6E 3S7

Work performed between May 27 and October 19, 1978.

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* For further analysis data, refer to Confidential Coal Analysis File.

ILLUSTRATIONS

Abstract

Twenty contiguous coal licences, numbered 4104 to 4123 inclusive were issued to Utah Mines Ltd. on August 15, 1978. These licences comprise the West Carbon Creek Property located in the Peace River area of the Liard Mining Division. An exploration program was formulated for the 1978 field season both to fulfill the work requirements to keep the licences in good standing and to provide data useful in the preliminary evaluation of the property. Geological mapping and the drilling of two holes were planned to accomplish these objectives.

Utah Mines Ltd. personnel completed a large amount of geological mapping on and adjacent to the property and in conjunction with an air photo interpretation, produced the present geological interpretation. A broad syncline underlain by the coal-bearing Gething Formation was outlined on the western part of the property. 371.55 metres of diamond drilling was completed in two holes in order that an appraisal of the stratigraphic section could be made. Data collected throughout this program has facilitated this preliminary evaluation of the West Carbon Creek Property.

PROPERTY AND TITLE

The West Carbon Creek Property comprises twenty contiguous coal licences numbered 4104 to 4123 inclusive. These licences encompass an area of 5807 hectares (rounded upward from, more precisely 5797.16 hectares. They are located within the area commonly referred to as the Northeast Coal Block in the Liard Mining Division (see Figure 1, page 3).

Application was made in the prescribed manner by Utah Mines Ltd. for the coal licences included in the West Carbon Creek Property early in summer of 1978.. The Coal Licences were issued on August 15, 1978 and were subsequently signed by the Minister of Energy, Mines and Petroleum Resources. This property adjoins the Carbon Creek Property on the west side.

LOCATION AND ACCESS

The twenty 'coal licences comprising the West Carbon Creek Property are arranged in an irregular "horseshoe" configuration centred on and surrounding Mount Rochfort at approximately 55°57'N; 122°50'W. They are located within the area covered by the National Topographic System designation 93-O-15. The northeast corner of the property lies approximately 36 kilometres west from W.A.C. Bennett Dam on the west side of and adjoining the Carbon Creek Property of Utah Mines Ltd. Vancouver is approximately 770 kilometres almost due south fromtheproperty (see Figures 1, page 3 ; 2, page 4 ; 3, page 5).

Direct access to many parts of the property is possible by helicopter while treed areas must be reached on foot from the handiest available landing site. A gravel road,

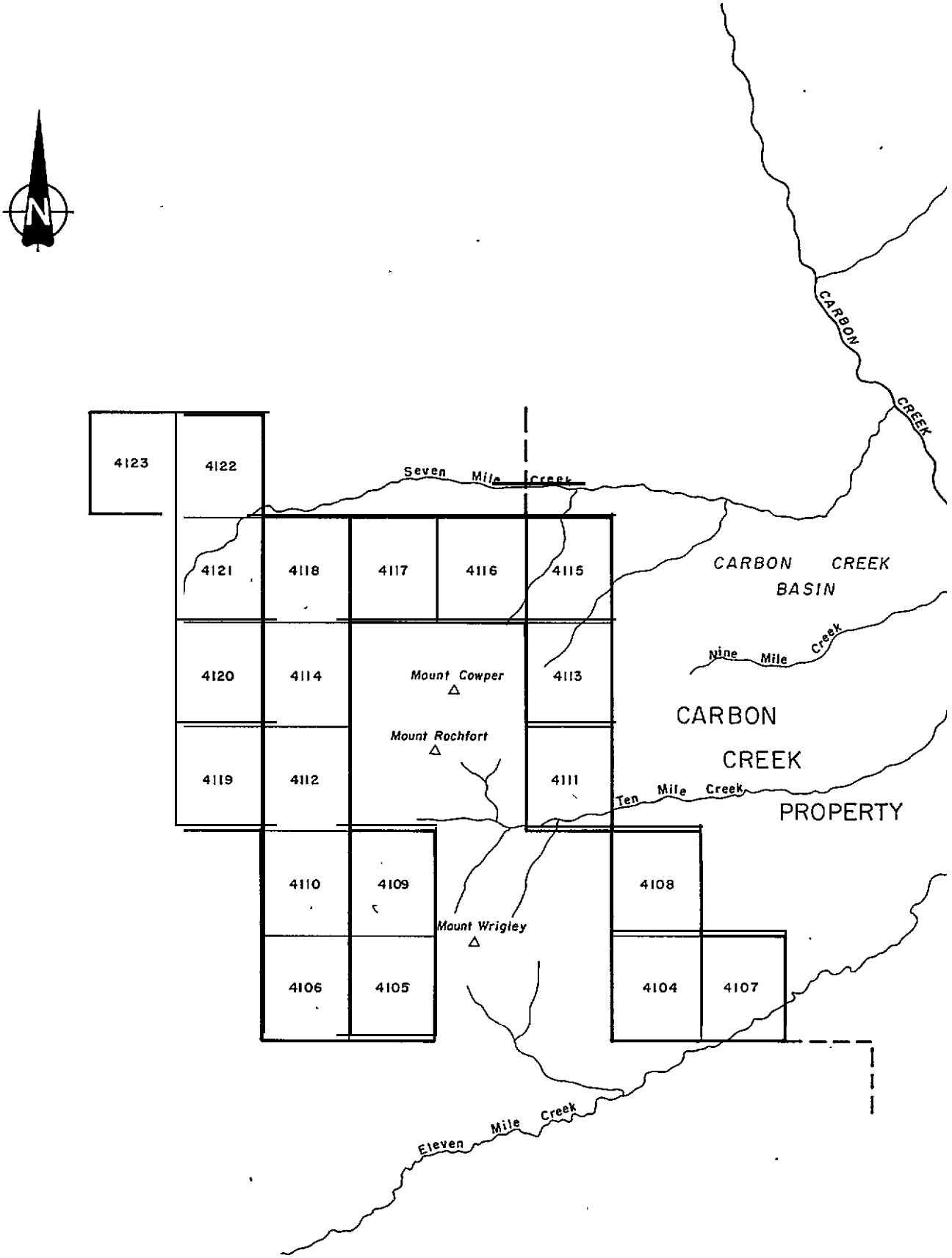


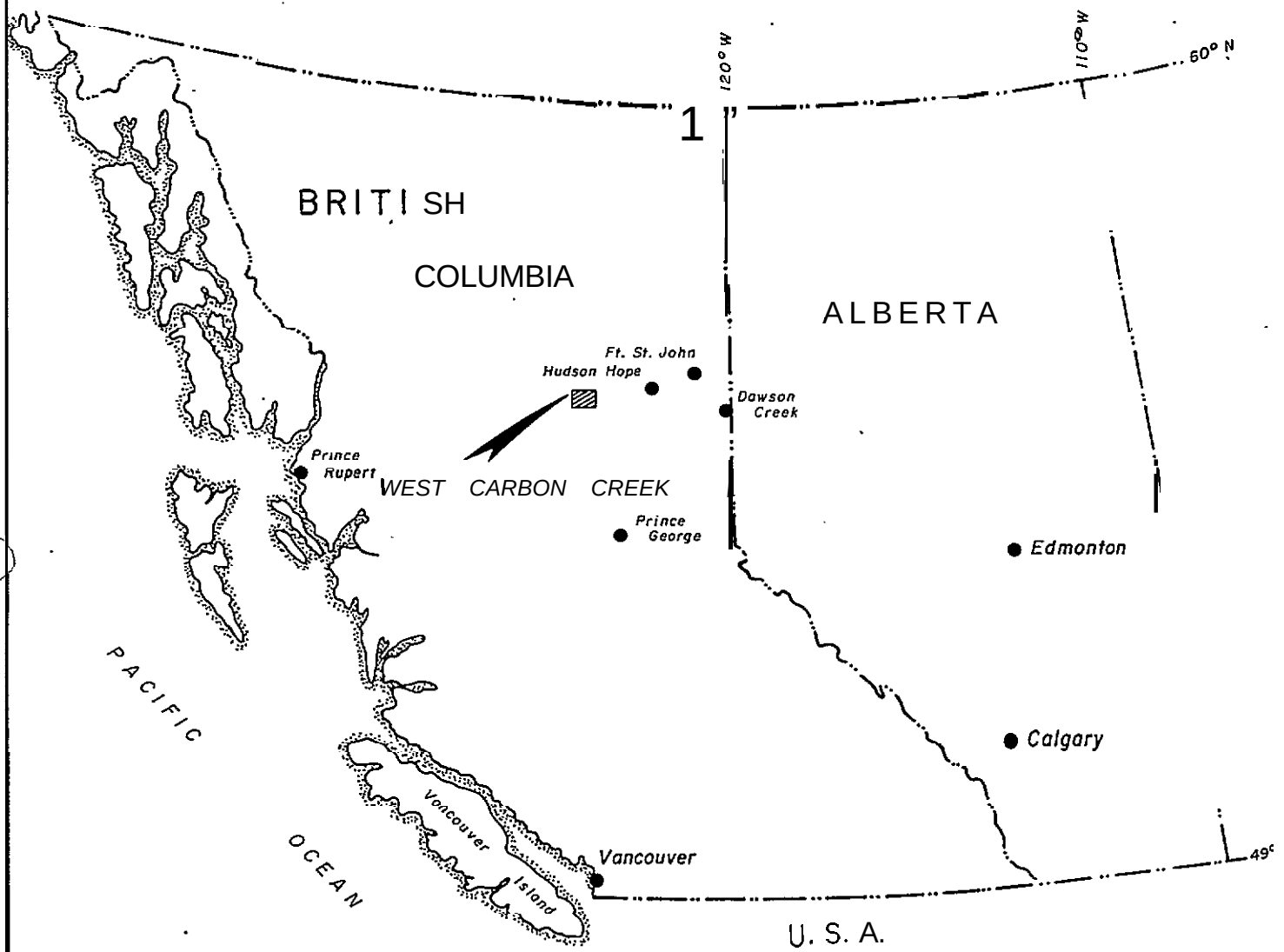
FIGURE — 1

WEST CARBON CREEK

COAL LICENCES

0 2 4 Miles

Scale — 1:100,000 Nov. 1978



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WEST CARBON CREEK

LOCATION MAP

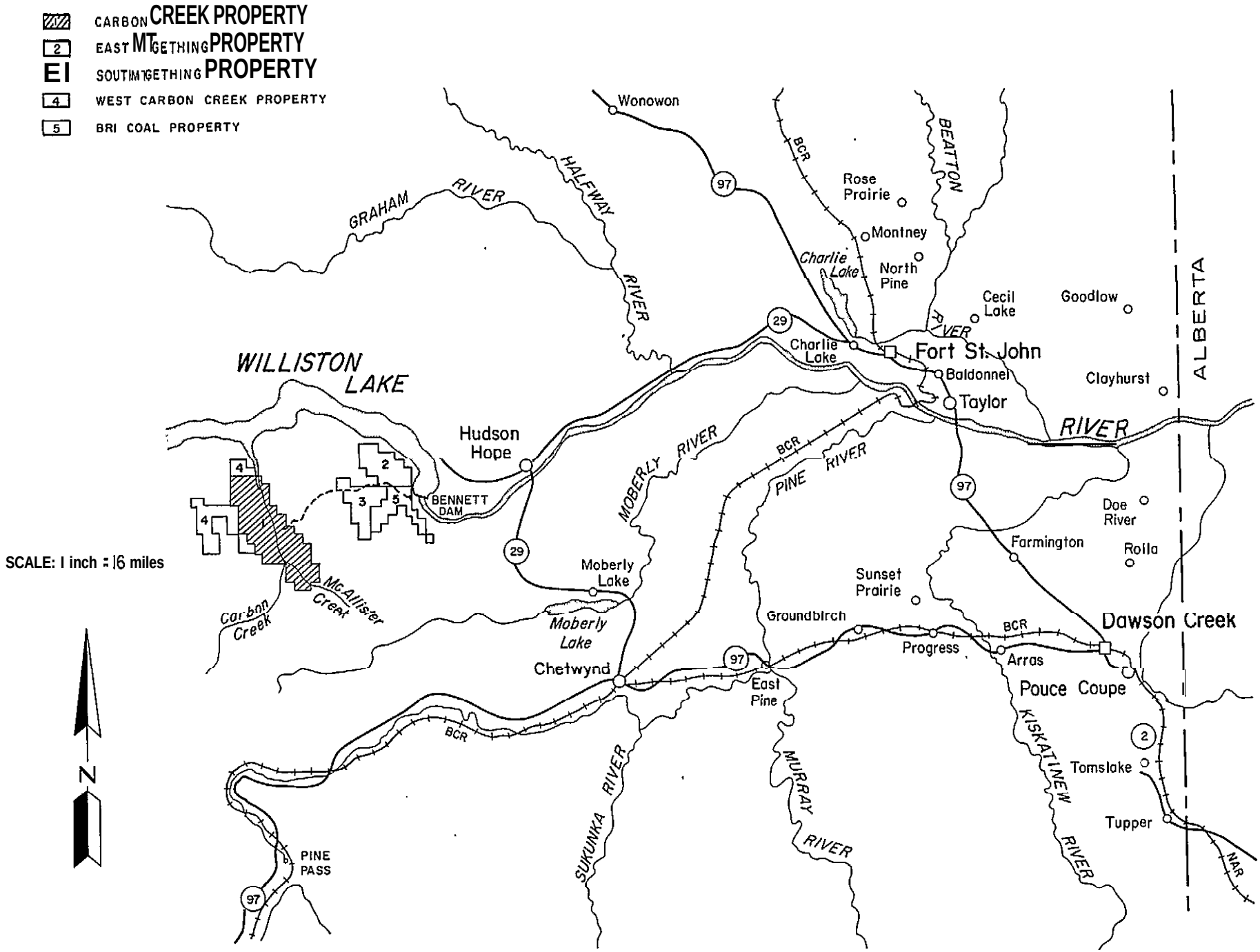
0 100 200 300 400

SCALE IN MILES

FIGURE -2

FIGURE-3

PROPERTY LOCATION MAP



presently nearing completion as a joint venture between Utah Mines Ltd. and Canfor Ltd. (a logging and wood products company) provides access by truck to Carbon Creek valley, eight kilometres to the east. The joint venture road is reached at mile 33 on Canfor's Johnson Creek - Track Creek road which proceeds westward from Highway 29, 19 kilometres south from Hudson's Hope. Alternately, this road can be reached by paved road west from Hudson's Hope to W.A.C. Bennett Dam and from the dam, 13.7 kilometres by Utah Mines Ltd. road to the joint venture road (see Figure 3, page 5).

EXPLORATION OF THE WEST CARBON CREEK PROPERTY

Previous Exploration

The geology of the area of the West Carbon Creek Property has been included in several Geological Survey of Canada and British Columbia Department of Mines and Petroleum Resources publications (e.g. McLearn and Kindle, 1950; Stott, 1968; Hughes, 1964; Irish, 1968). Geological Survey of Canada geology map 11-1961, entitled Pine Pass, British Columbia by J. E. Muller (1961) provides a useful basic interpretation of the local and surrounding geology. Several general reports or reports dealing with specific adjacent map areas contain information useful in the interpretation of the geology of this property (e.g. Irish, 1965, 1970; Stott, 1969; le Nobel, 1976).

From August 13 to September 4, 1975, G. H. Rayner undertook a reconnaissance evaluation of the area of the present West Carbon Creek Property on behalf of Utah Mines Ltd. This

work outlined an area of shallow dipping Gething Formation strata lying along and adjacent to the synclinal axis which underlies the western part of the present property. Numerous coal seams were noted (one seam measured 2.23 metres in thickness). The maximum thickness of the Gething Formation in this area was estimated to be approximately 1040 metres. Thus, although relatively limited in areal extent, the central part of the syncline was considered to be worthy of further exploration (see Figure 5, page 15).

1978 Exploration Program

The 1978 Exploration program planned for the West Carbon Creek Property was designed to test the economically recoverable coal potential of the property. The economic considerations required both discovery of a coal seam (or seams) of adequate thickness and quality and the outlining of an area of adequate dimensions and form underlain by this coal. Detailed geological mapping and exploratory diamond drilling were planned to provide the information necessary to appraise this potential.

Geological mapping was undertaken intermittently from May 27 to August 26, 1978. Numerous traverses were made in areas of maximum exposure (i.e. along creek valleys, ridge crests and upland slopes). This work was done by Utah Mines Ltd. field crews made up of R. B. Anderson,. A. T. Armstrong, R. P. Hill, M. Carr, A. Kay, D. Schmidt and B. Riehl. Field data combined with an air photo interpretation facilitated development of the present geological interpretation (see Maps 1 & 2, in map pocket). A 1:10,000 scale topographic

map, prepared by McElhanney Surveying and Engineering Ltd., covering the area of the property, provided an excellent base for this mapping.

The diamond drilling of two holes during the 1978 field season was planned *for* the West Carbon Creek Property. It was considered desireable to test as much of .the Gething section as possible in the least structurally disturbed area of the western coal licences. Diamond drilling was undertaken by Canadian Longyear Ltd. using a Longyear 38 drilling rig. Initially, the drill crew included M. Bouchard (runner, acting foreman), R. Gagne (runner), G. Rohrback (helper) and G. Dupuis (helper). W. Castle (runner, foreman) returned from holidays on September 26 and R. Gagne left the-job site.

'Site preparation for D.D.H. WCC-78-l was completed on September 12 and, after delays caused by poor weather, the drill move to this site was completed on September 16. Drilling commenced on September 17 and the hole was completed on September 21. Mechanical logs were run the following day. On September 24, following preparation of the site, the drill and related equipment were moved to site WCC-78-2 and drilling continued until the hole was completed on September 30. Mechanical logs were run the same day.

Maple Leaf Helicopters Ltd. supplied Bell 206 Jet Rangers on an hourly basis for crew changes and the movement of supplies, small equipment and drill core. Transportation required for geological mapping was also provided by Maple Leaf Helicopters Ltd. All larger equipment was moved to and

from the property and between drill sites by Okanagan Helicopters Ltd. using an S-58-T helicopter.

Slashing of the drill sites preparatory to diamond drilling. was completed by North Star Fabricating and Contracting Ltd.' Site WCC-78-l was cleaned up and the hand-dug mud sump was refilled and levelled on September 22 and on October 22 this work was completed at site WCC-78-2. Disturbed areas' at both sites were sown with the grass seed mixture recommended" by the Reclamation Branch of the Ministry of Energy, Mines and Petroleum Resources for forested areas of the Northeast Coal Block; site WCC-78-1 on September 22 and site WCC-78-2 on October 19.

In total, 371.55 metres of diamond drilling were completed in two holes. The core was logged by R. B. Anderson and A. T. Armstrong of Utah Mines Ltd., Vancouver, B.C. (descriptive lithologic logs are included with this report in the map pocket; graphic lithologic logs *are* included in the map pocket). Mechanical logs consisting of a density log and a gamma log (note: the gamma log did not function properly and should be disregarded) were run in each hole by Utah Mines Ltd. personnel using a Gearhart-Owens, Model 06-3200 Widco Logger and a combination down hole tool (geophysical logs are included in the map pocket).

Twenty-one samples, numbered 55 to 75 inclusive, were taken from the core recovered from these two holes. Field F.S.I. tests were conducted on samples 69 to 75 inclusive. The samples were submitted for analysis to the Utah International Inc. Minerals Laboratory at 1190 Bordeaux Drive, Sunnyvale,

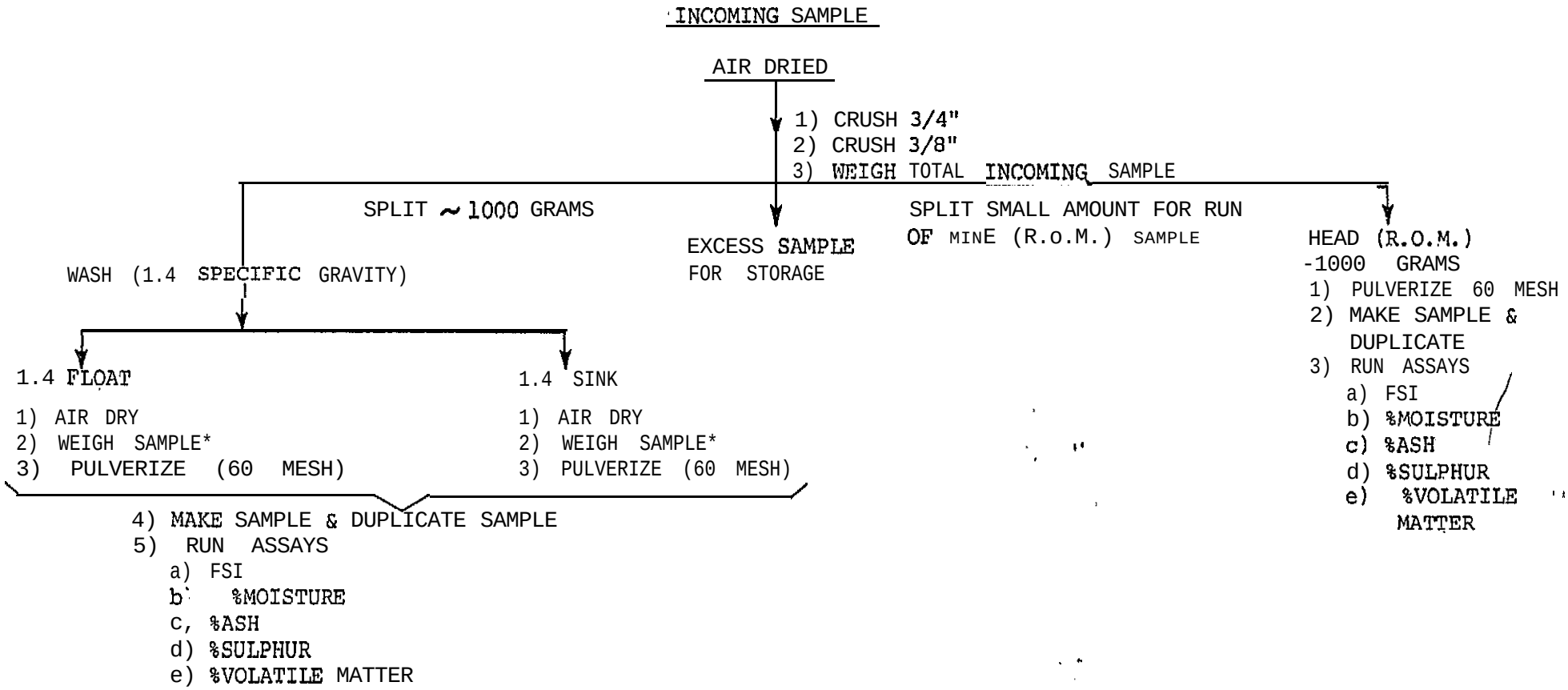
California, 94086. Tests were preformed on each sample using procedures outlined in the laboratory flow chart on the following page (Table 1). On completion of the 1978 field program, the core was shipped to the Charlie Lake core storage facility of the British Columbia Ministry of Energy, Mines and Petroleum Resources.

PHYSIOGRAPBY

The West Carbon Creek Property is situated in a mountainous region toward the western margin of the Rocky Mountain Foothills. The Foothills belt trends north-northwest and, in the area of Peace River, is approximately 72 kilometres wide. To the west, the margin of the belt is considered to be the easternmost major fault which thrusts Paleozoic strata over Mesozoic strata (Holland, 1976). The eastern margin is less precisely defined but occurs where the deformed strata of the Foothills meets the flat lying to gently dipping strata of the Alberta Plateau (see Figure 4, page 12). Folding and thrust faulting within the Foothills belt trend north-northwesterly, closely paralleling the belt. The thrust faults dip to the southwest. Bedrock structure and litholoqy are commonly reflected by the topography.

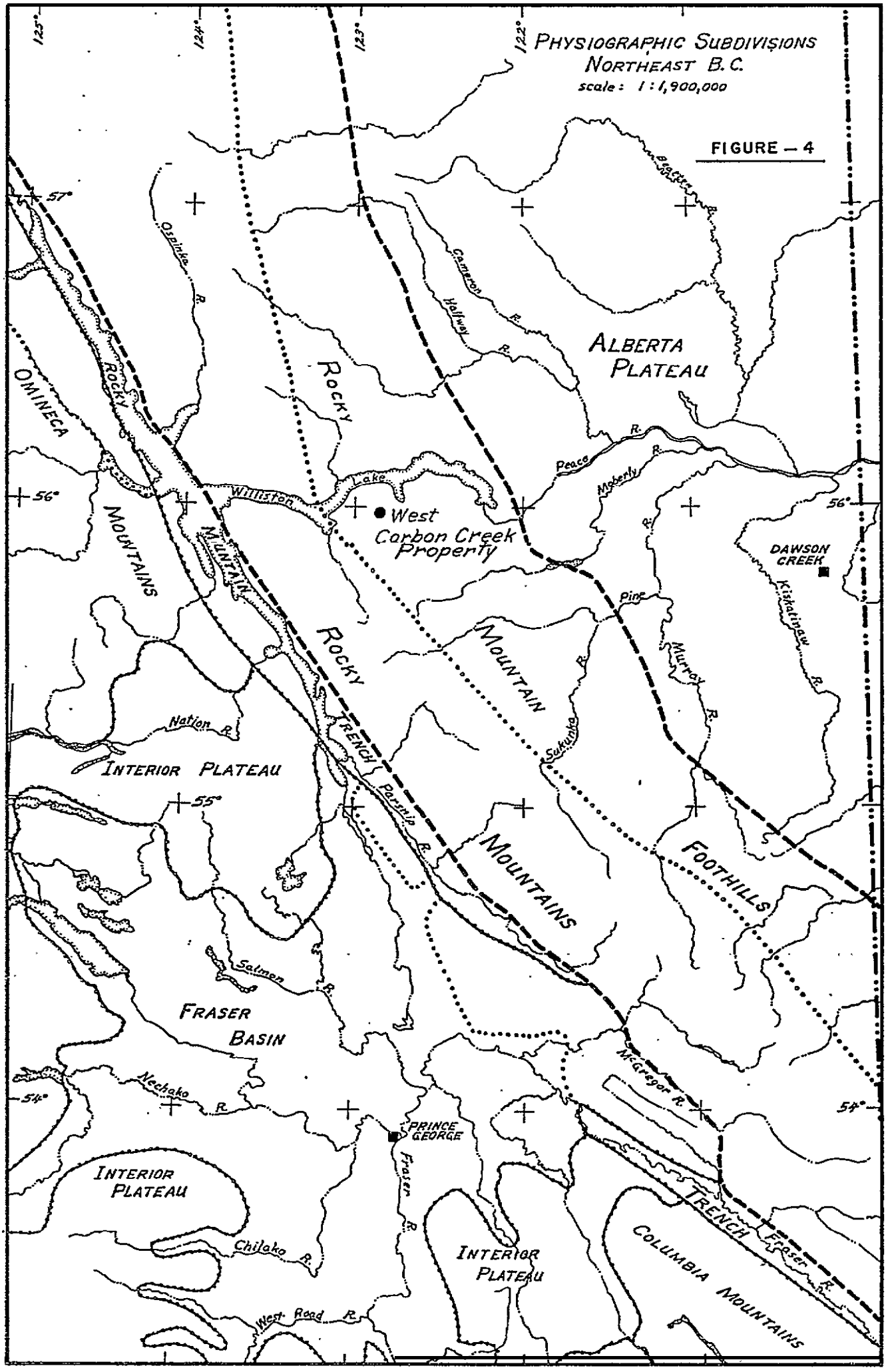
Within the boundaries of the property, maximum relief is in the order of 850 metres. The lowest elevations occur in the valley bottoms of Eleven Mile Creek to the south and' a north-flowing tributary of Seven Mile Creek to the north. Where these creeks cross the property boundary they have elevations of approximately 1130 metres and 1015 metres

FLOW CHART FOR ANALYSIS OF DIAMOND DRILL HOLE SAMPLES:



*WEIGHT RECOVERY OF COAL INSIDE SAMPLE

TABLE - 1


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

respectively, above sea level. Elevations of peaks and ridge crests witin the property boundaries rarely exceed 1850 metres above sea level. Mount Rochfort, which is surrounded by the property reaches an elevation of 1989.1 metres above sea level.

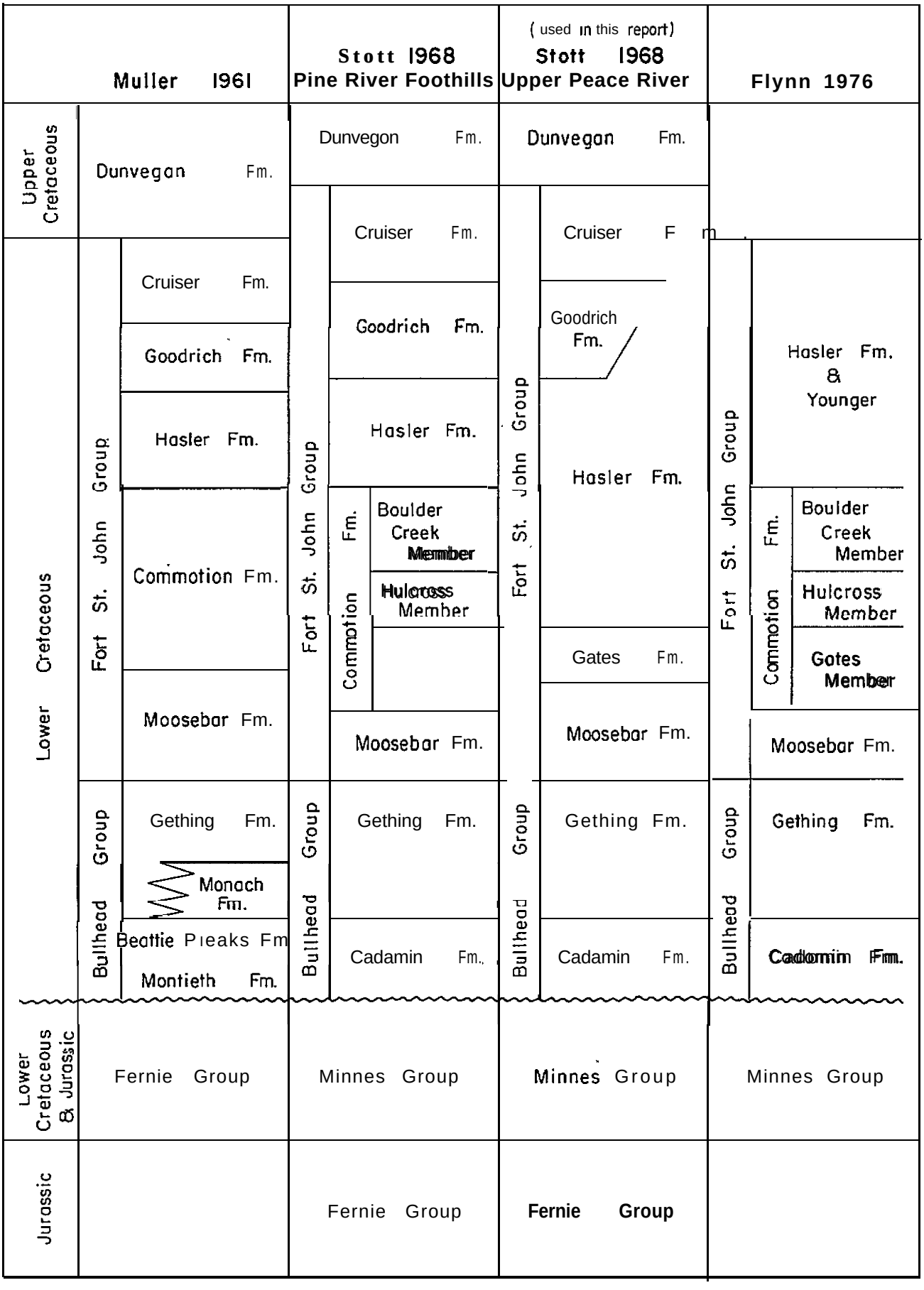
Peaks and ridges range in form from flat or rounded to acute and rugged. Slopes range from gentle to very steep. Dip slope surfaces are common as are vertical cliffs formea by thick resistant sandstone beds. Eleven Mile Creek valley is generally broad with a flat gravel floor but most valleys are V-shaped in form with minor gravel deposits in their bottoms. Many streams have cut deep, steep to vertical walled canyons over a part of their length. Great variability in all of the components of the topography imparts a very irregular character to the area.

GEOLOGY - GENERAL AND LOCAL

West Carbon Creek Property is underlain by folded rocks of the Lower Cretaceous Bullhead Group and the Jurassic. (?) to Lower Cretaceous Minnes Group (see Table 2, page 14). The western arm of the "horseshoe" shaped licence group straddles a prominent synclinal structure. The axis of the anticlinal structure, adjacent and to the east, crosses the northern part of the licence group and continues southward through the open. ground enclosed by the "horseshoe" (see Figure 5, page 15). Further to the east, the licence group is underlain by Cadomin Formation and overlying Gething Formation sediments which form the basal sequence of the adjacent Carbon Creek Property.

NOMENCLATURE OF THE LOWER CRETACEOUS BULLHEAD AND FORT ST. JOHN GROUP

TABLE – 2



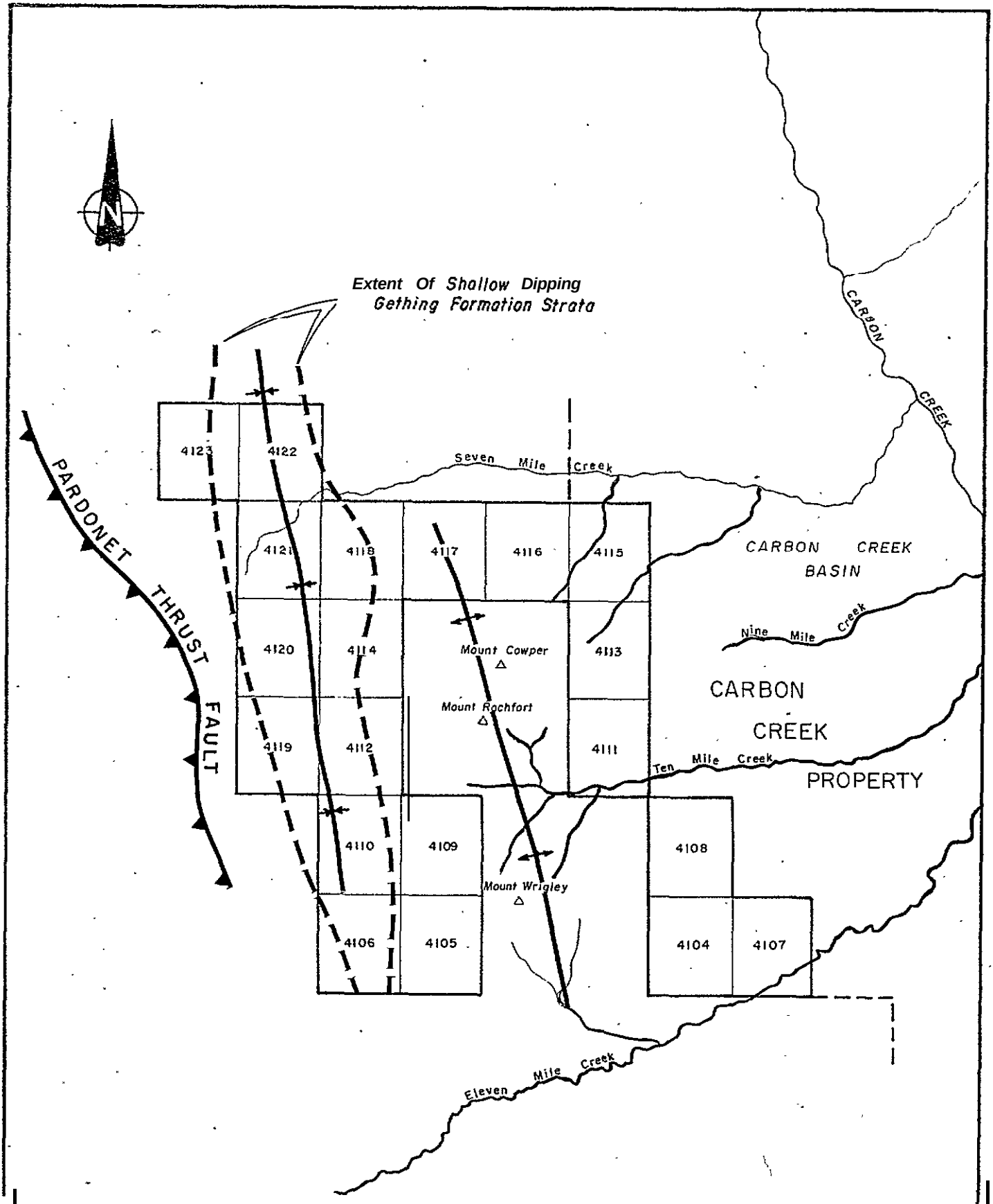


FIGURE - 5

WEST CARBON CREEK

MAJOR. STRUCTURAL FEATURES

0 | 2 4 Miles

Scale – 1:100,000 January 1979

The axes of the syncline and adjacent anticline trend slightly west of north, conforming closely to the general trend of structures of the Rocky Mountain Foothills. This syncline forms the area of principal interest. Bedding is flat lying to gently dipping (thought to be less than 15°) in a band up to 2.5 kilometres wide in the central area along the fold axis (see Figure 5, page 15). This band narrows to the north and south, possibly the result of: (1) tighter folding to the north and south, (2) a double plunging nature to the fold axis, (3) elevation changes resulting in the land surface intersecting the folded strata at varying elevations and consequently at varying stratigraphic levels (see Figure 6, page 17). A combination of a double plunging fold form intersected by a highly irregular land surface is thought to provide the most plausible explanation for the form of this band.

The Upper Jurassic (?) to Lower Cretaceous Minnes Group and Bullhead Group sediments underlying West Carbon Creek Property are terminated immediately to the west of the property by the Pardonet Fault and do not recur west of the fault. Triassic Pardonet Formation sediments have been thrust over younger sediments (see Figure 7, page 18). On the eastern side of the property, the extent of deformation diminishes. Cadomin Formation and basal Gething Formation sediments continue smoothly into the broad Carbon Creek syncline.

The oldest rocks represented on the West Carbon Creek Property are assigned to the Minnes Group of Upper Jurassic (?) to Lower Cretaceous age. The group is made up of marine

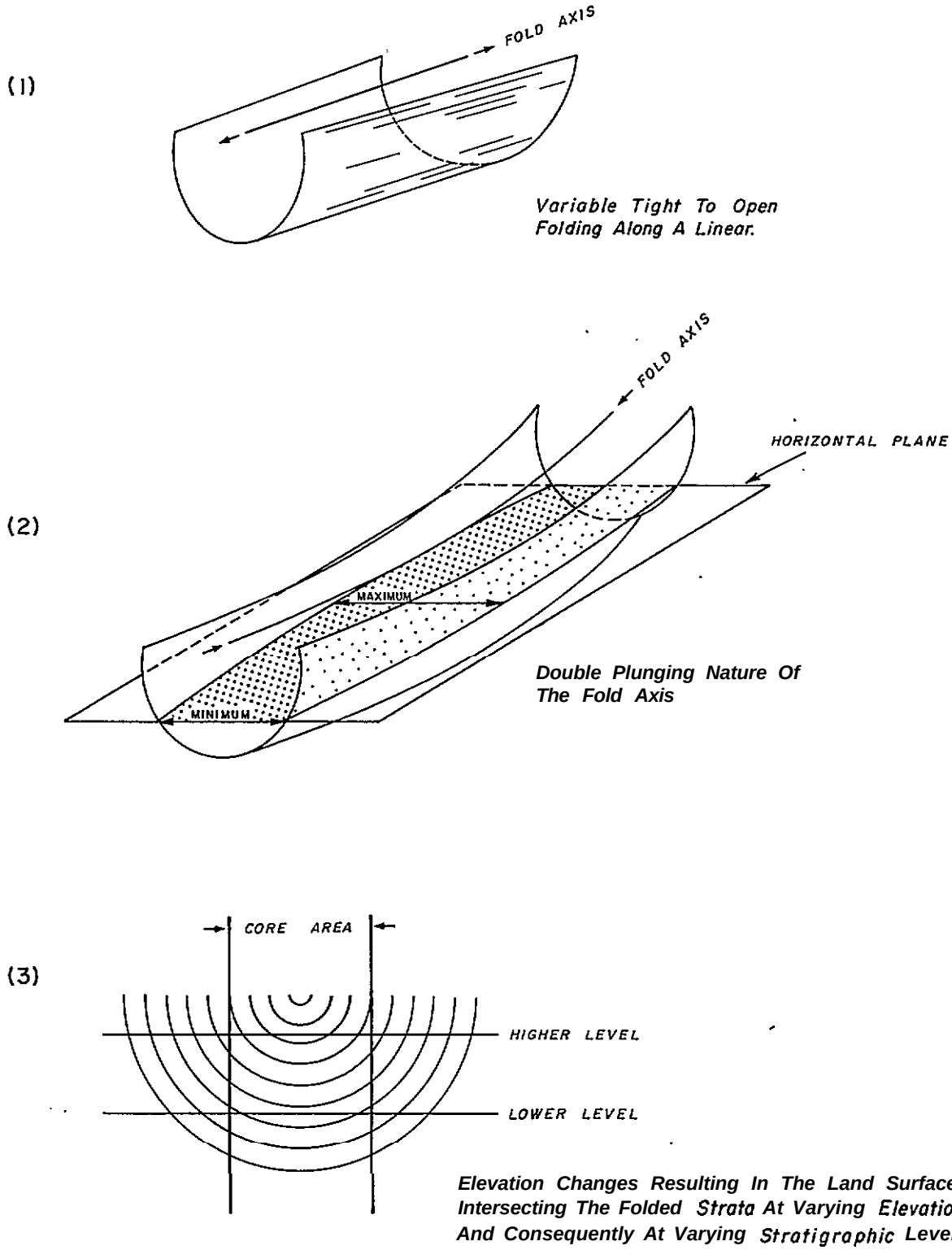
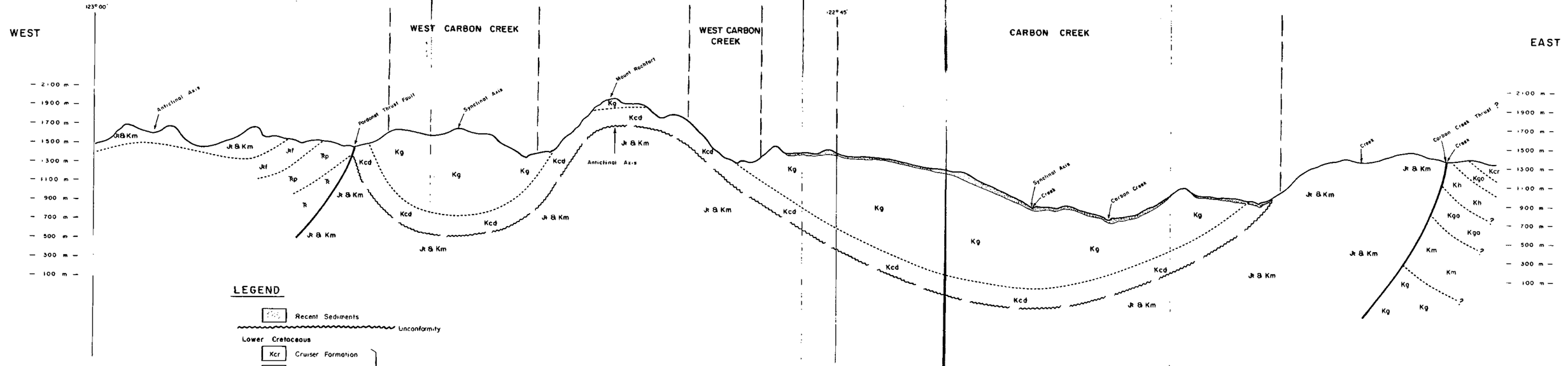


FIGURE — 6

DIAGRAM ILLUSTRATING MECHANISMS THAT COULD PRODUCE THE VARIATIONS IN THE WIDTH OF THE BAND OF FLAT-LYING TO SHALLOW-DIPPING SEDIMENTS IN THE WESTERN SYNCLINE



LEGEND

- Recent Sediments
- Unconformity

Lower Cretaceous

- Kcr — Cruiser Formation
- Kgo — Goodrich Formation
- Kh — Haslar Formation
- Kgo — Gates Formation
- Km — Moosebar Formation

} Fort St. John Group

- Kg — Gething Formation
- Kcd — Cadomin Formation

} Bullhead Group

- Unconformity

Jurassic & Cretaceous

- JrKm — Minnes Group Undifferentiated

Jurassic

- Jf — Fernie Group Undifferentiated

Triassic

- Rp — Pardonet Formation
- R — Undefined

FIGURE – 7

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

WEST CARBON CREEK
EAST — WEST SECTION
@ 55° 56' 50" N.
LOOKING NORTH

Work by: A. Armstrong	Date: January 1979	NTS Ref.
Drawn by: T. Drews	Revised:	Horizontal Scale – 1:50,000
		Vertical Scale – 1:25,000

sediments including quartzitic and argillaceous sandstones, argillaceous siltstones and shales. Several shaley pelecypod beds also were noted. Although structure within these sediments has not been defined, wide variation of bedding orientations and numerous minor folds (often parallel isoclinal folds) were noted which indicate significant deformation. Minnes Group sediments form the core of the major anticline crossing the centre of the property. They outcrop primarily in the valley of Seven Mile Creek below the summit of Mount Cowper and at the headwaters of Ten Mile Creek between Mount Rochfort and Mount Wrigley. These sediments undoubtedly underlie the remainder of the property at depth.

The Lower Cretaceous Bullhead Group overlies the Minnes Group. The boundary between the two groups is stated as being "a profound regional erosional unconformity" (Stott, 1968, p.14). Although the boundary is distinct, unconformable relationships have not been defined. Stott, (1968, p.7) considers the Bullhead Group to represent the non-marine component of a complete non-marine to marine sedimentary sequence. The Fort St. John Group represents the marine component but does not occur on the property. A typical section of the Bullhead Group comprises predominantly massive quarts and chert pebble conglomerate of the Cadomin Formation overlain by carbonaceous interbedded and interlaminated fine-grained sandstones, siltstones, mudstones and coal seams of the Gething Formation. The Bullhead Group in the area of West Carbon Creek Property is, in part, atypical. A large increase in the thickness of the section is indicated as are variations in lithology.

In the Peace River area, the Cadomin Formation is largely composed of massive to coarsely crossbedded, coarse-grained sandstones containing thin beds and lenses of pebble conglomerate. These sediments are generally very much finer grained than their equivalents in areas to the south where the formation may be entirely a cobble to boulder conglomerate. Since the formation is considered to have originated as piedmont alluvial plain deposits (Stott, 1968, p.108), the finer character of the sediments in the property area indicates a greater distance of transport from the source. Thickening of the formation to the west has been established from measured sections and petroleum drilling information (Stott, 1968, pp. 16-7). Irish, (1970, p.68) has noted that, "in Peace River Canyon, coarse sandstones of the Cadomin Formation grade laterally into interbedded coal, sandstones and shale of the Gething Formation and therefore these formations are in part lateral equivalents". Precise contacts for the Cadomin Formation were not established on the property but by means of air photo interpretation and field mapping a section of resistant, massive, conglomeratic, coarse-grained sandstones was outlined and assigned to the Cadomin Formation (see Figures 8, p.22; 9, p. 23; maps 1 & 2 in map pocket).

The coal-bearing Gething Formation overlies and possibly intertongues with the Cadomin Formation. Sediments observed in outcrop and in drill core are typical of the formation and include sandstones, siltstones, mudstones and coal seams deposited in an aggrading alluvial plain environment. Rayner, (1975) estimated a thickness in the order of 1040 metres for the Gething Formation in the West Carbon Creek area. This

thickness is comparable with the section underlying Carbon Creek Property but is vastly greater than measured sections elsewhere. This formation contains the metallurgical grade coals which are explored for throughout the Northeast Coal Block-and are the objective of present exploration activities on West Carbon Creek Property.

Sandstones of several origins are found in the sedimentary section at West Carbon Creek. Coarse-grained, coarsely bedded to massive sandstones are considered to represent deposits within major drainage channels. Some of the fine- to medium-grained sandstones may represent bar finger and levée deposits and others may represent flood plain splay deposits (Stott, 1968, p. 111). Sedimentary features attributable to these types of deposits are present in drill core and outcrop on the West Carbon Creek Property. Stott (1968, p. 111) lists some of the features found in sandstones: well sorted nature but often containing considerable matrix, festoon crossbeds, laminae of plant debris and thin layers of silt and clay.

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

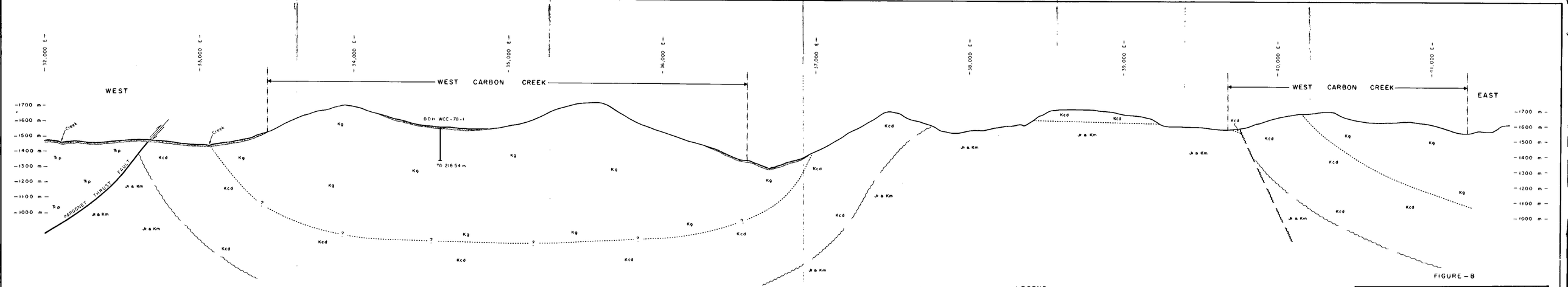


FIGURE – 8

LEGEND

- Recent Sediments — Unconformity
- Kg — Gething Formation
- Kcd — Cadomin Formation — } Bullhead Group — Unconformity

Jurassic & Cretaceous

- Ja&Km — Minnes Group Undifferentiated

Triassic

- Tp — Pardonet Group Undifferentiated

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

WEST CARBON CREEK

EAST – WEST SECTION
THROUGH D.D.H. WCC-78-1
@ 39,500 m. N.
LOOKING NORTH

Work by J. Armstrong	Date- January 1979	NTS Ref.
Drawn by T. Drews	Revised	Horizontal Scale – 1:10,000
		Vertical Scale – 1:10,000

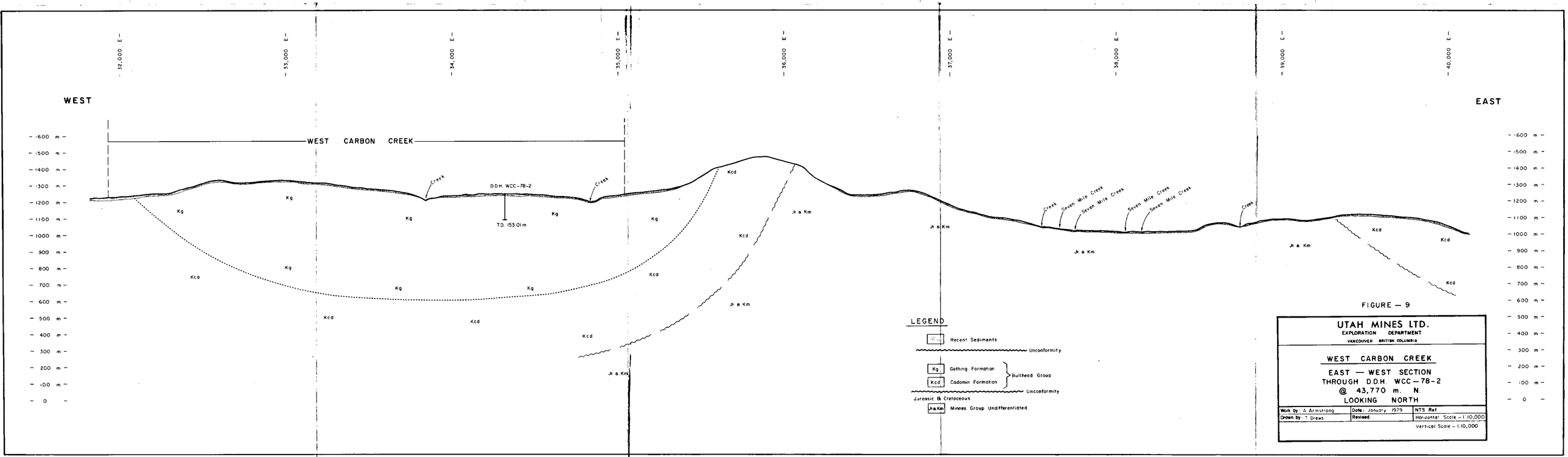


FIGURE — 9

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

WEST CARBON CREEK

EAST — WEST SECTION
THROUGH D.D.H. WCC — 78-2
@ 43,770 m. N.
LOOKING NORTH

Work by: A. Armstrong	Date: January 1979	NTS Ref.
Drawn by: T. Drews	Revised:	Horizontal Scale — 1:10,000
		Vertical Scale — 1:10,000

DRILL HOLE DATA, DESCRIPTIONS & ANALYTICAL DATA

D.D.H. WCC-78-1

Location: In the alpine valley (cirque) of the south fork of Seven Mile Creek

- McElhanney Coordinates: 39,500mN x 34,560mE.
- Coal Licence No. 4120

Elevation: 1565m

Orientation: Vertical

Date Collared: September 17, 1978

Date Completed: September 22, 1978

Overburden Depth: 7.92m soil and strongly broken and weathered rock.

Casing Depth: 8.23m

Final Depth: 214.54m

Formations Encountered: 0 to 7.92m overburden
7.92m to 214.54m Gething Fm

Coal Seams Sampled:

Sample No.	Seam Name	Interval	Thickness Core	Thickness Density Log	
55		21.06m to 21.85m	0.79m	1.13m	
56		32.16m to 32.31m	0.15m	0.15m	
57		32.61m to 34.14m	1.53m	1.83m	
58		56.42m to 57.00m	0.56m	0.73m	
59		70.68m to 71.02m	0.34m	1.89m	with
60		71.15m to 72.48m	1.33m	0.14m	split
61		84.81m to 85.65m	0.84m	0.61m	
62		127.31m to 127.71m	0.40m	0.55m	
63		128.02m to 128.93m	0.91m	0.85m	
64		134.39m to 135.33m	0.94m	1.01m	
65		157.43m to 158.07m	0.64m	0.67m	
66		159.87m to 160.48m	0.61m	0.91m	
67		163.68m to 164.84m	1.16m	1.28m	
68		176.27m to 176.84m	0.57m	0.67m	

Comments : Site WCC-78-1 was cleaned up and the hand-dug mud sump was refilled and levelled on September 22, 1978. Disturbed areas at the drill site were then sown with the grass seed mixufre recommended by the Reclamation Branch of the Ministry of Energy, Mines and Petroleum Resources for forested areas of the Northeast Coal Block.

Below 7.92 metres of soil and strongly broken and weathered bedrock, D.D.H. WCC-78-1 penetrated 206.62 metres of Gething Formation sediments. The sediments encountered *in this* hole *are* typical of non-marine flood plain deposits. These include interbedded and interlaminated sandstones, siltstones, mudstones and coal seams.

Mudstones, *siltstones and various mixtures of* these *components* comprise the bulk of the section. The mudstones are dark grey to black, often contain carbonaceous plant debris and in some cases contain coal streaks. They occur *as* thin interlaminations with siltstone and as individual homogeneous beds up *to* two metres thick. *Siltstones range* from light grey to medium grey in colour. Typically, they are thinnly laminated and finely crossbedded but bedding may be moderately to strongly disturbed or convoluted. Rocks that originated as mixtures of silt and mud are common, with compositions rang*ing* between these two end members. Worm burrows are common in these fine sediments and are particularly noticeable in the interlaminated sequences. These fine sediments *were* deposited from water under low energy or stagnant conditions.

Most sandstones encountered in D.D.H. WCC-78-1 are fine- to medium-grained, light grey to light medium grey, thinnly laminated and often crossbedded. They are a coarser component of normal deltaic sedimentation and often contain a minor amount of silt or mud. Sands of this type occur as bar finger sands, levée deposits or flood plain splay deposits. Four sandstone beds were penetrated which may represent channel deposits. Grain size ranges from fine to coarse and in part is graded. Individual laminations are up to 10 centimetres thick. Foreset bedding is indicated by 15° to 20° changes in the bedding angle to the core axis.

D.D.H. WCC-78-l is thought to have been drilled in close proximity to the axis of a major syncline. Bedding dip angles of 85° to 90° to the vertical core axis confirm this. The few bedding dip angles that vary significantly from this nearly horizontal configuration are thought to be from large scale foreset beds.

Thirty-two coal seams ranging in thickness from 0.05 metres to 1.53 metres were cored in D.D.H. WCC-78-l. Of these, 14 seams were removed for analysis. The coals encountered . were generally black, cleated and banded with varying amounts of vitrain and durain present. Several seams were, at least in part, bone coal. Discrete. shale partings were found in some seams which undoubtedly contributed to the high ash analyses of the seams. Analytical resultsshow a wide variability in the character of these coals. Ash content ranges from 2.38% to 44.00%, volatile matter content ranges from 20.87% to 34.53%, B.T.U. values range from 7948 BTU/lb. to 14358 BTU/lb. and F.S.I. values range from 1 to 8 1/2. With the exception of Sample No. 65 which has a sulphur

content of 2.67%, these coals all have sulphur contents of less than 0.84%. Although the quality of these coals is widely variable, many may prove acceptable as low sulphur, medium to high volatile coking coals.

Coal core recovery ranged from approximately 25% to 100%. and was commonly between 50% and 80%. Incomplete seam sampling, necessitated by incomplete coal core recovery must be considered when reviewing the analyses. The possibility of fallacious analyses is great.

WEST CARBON CREEK

Hole WCC-78-1

Head Analyses

mple o.	Depth	Thickness	Grams Received.	Air Dry Basis % H_2O	% Ash	% S	% VM	% FC	Btu	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu
55	69.1- 71.7	2.6	1445	2.19	2.38	0.78	28.10	67.33	14358	5	2.43	0.80	28.73	68.84	14679
56	105.5-106.0	0.5	310	1.45	44.00	0.83	20.87	33.68	7948	1	44.65	0.84	21.18	34.17	8065
57	107.0-112.0	5.0	3730	2.03	3.77	0.58	27.59	66.61	14180	4 1/2	3.85	0.59	28.16	67.99	14474
58	185.1-187.0	1.9	1460	1.81	7.20	0.75	27.57	63.42	13744'	6 1/2	7.33	0.76	28.08	64.59	13997
59	231.9-233.0	1.1	1158	1.42	9.54	0.71	32.19	56.85	13477	8	9.68	0.72	32.65	57.67	13671
60	233.45-237.8	4.35	3799	1.72	4.57	0.70	29.22	64.49	14245.	7 1/2	4.65	0.71	29.73	65.62	14494
61	278.25-281.0	2.76	1345	1.12	16.68	0.80	31.86	50.34	12544	2 1/2	16.87	0.81	32.22	50.91	12686
62	417.7-419.0	1.3	1659	1.52	28.77	0.73	22.59	47.12	10514	5	29.21	0.74	22.94	47.85	10676
63	420.0-423.0	3.0	2140	1.66	25.94	0.75	25.25	47.15	10652	7 1/2	26.38	0.76	25.68	47.94	10832
64	440.9-444.0	3.1	2487	1.52	14.40	0.70	26.05	58.03	12686	5	14.62	0.71	26.45	58.93	12882
65	516.5-518.6	2.1	2060	1.35.	30.53,	2.67	25.48	42.64	10149	7	30.95	2.71	25.83	43.22	10288
66	524.5-526.5	2.0	1502	1.28	20.94	0.75	34.53	43.25	10905	8 1/2	21.21	0.76	34.98	43.81	11046
67	537.0-540.8	3.8	4191	1.53	5.99	"0.76	28.29	64.19	13982	6 1/2	6.08	0.77	28.73	65.19	14199
68	578.3-580.2	1.9	2005	1.39	26.68.	0.69	27.26	44.67	9873	1	27.06	0.70	27.64	45.30	10012

D.D.H. MCC-78-2

Location: On the edge of a swamp on a spur, between two south flowing headwater tributaries of Seven Mile Creek.

- McElhanney Coordinates: 43,770mN x 34,320mE
- Coal Licence No.: 4122

Elevation: 1245m

Orientation: Vertical

Date Collared: September 25, 1978

Date Completed: September 29, 1978 .

Overburden Depth: 8.23m of soil and strongly broken and weathered rock.

Casing Depth: 8.23m

Final Depth: 153.01m

Formations Encountered: 0 to 8.23m overburden
8.23m to 153.01m Gething Fm.

Coal Seams Sampled:

Sample No.	Seam Name	Interval	Thickness Core	Thickness Density Log
69		21.67m to 22.59m	0.92m	0.92m
70		37.46m to 38.71m	1.25m	1.49m
71		72.76m to 73.49m	0.73m	0.85m
72		79.16m to 79.34m	0.18m	0.49m
73		87.48m to 88.15m	0.67m	0.64m
74		120.24m to 120.76m	0.52m	0.61m
75		130.91m to 131.49m	0.58m	0.64m

Comments: Site WCC-78-2 was cleaned up and the hand-dug mud sump was refilled and levelled on October 19, 1978. Disturbed areas at the drill site were then sown with the grass seed mixture recommended by the Reclamation Branch of the Ministry of Energy, Mines and Petroleum Resources for forested areas of the Northeast Coal Block.

D.D.H. WCC-78-2 penetrated 144.78 metres of Gething Formation sediments below 8.23 metres of soil and broken and weathered bedrock. Throughout this interval, a sequence of interbedded and interlaminated sandstones, siltstones, mudstones and coal seams, typical of non-marine flood plain deposition, was cored.

Sandstone forms a relatively minor component of the sequence of sediments encountered in D.D.H. WCC-78-2. Most sandstone units are fine- to medium-grained and light grey to light medium grey. Bedding is generally thin and varies in form from planar to convolute. Crossbedding is common. Thin films of carbonaceous plant debris are often present on bedding surfaces. Many sandstones contain silt as a minor component either thoroughly mixed to form a homogeneous unit or as the fine-grained upper sections of graded beds. These sandstones are thought'to have originated as bar finger sands, levée deposits or flood plain splay deposits. Several sandstone beds were encountered in D.D.H. WCC-78-2 which have features indicative'of channel deposition. They are largely coarse-grained, thick bedded to massive and may display coarse crossbedding or foreset bedding;

Siltstone and mudstone occur as discrete units, as interlaminated sequences occasionally with associated sandstone laminations and as mixtures of varying composition. The mudstones are dark grey to black and often contain carbonaceous plant debris. Those adjacent to coal seams often contain coal streaks. Siltstones vary from light grey to dark medium grey. Bedding ranges from planar to convolute in

form. Crossbedding of various sytles is common. Ripple marks, worm burrows, small-scale scour channels and load casts. are frequently present. These sediments are the product of deposition under low energy or stagnant conditions.

Dip angles measured throughout the length of the core from D.D.H. WCC-78-2 indicate that the bedding is flat lying to very gently, dipping. This conforms well with anticipated bedding orientation near the axis of the major syncline. Significant fracturing and calcite veining were encountered at 143.3 metres below the surfaces and continued to the bottom of the hole. This. fracturing and veining is'probably associated with the fault that was intersected at 151.4 metres below the surface. The fault plane forms an angle of 50° with the core axis but no indication of the'strike'of the fault plane or the amount of. displacement is presently available.

Nineteen coal seams were cored in D.D.H. WCC-78-2 ranging in-thickness from 0.03 metres to 1.25 metres. Of these; seven seams were removed for analysis. The sampled coals were generally bright, black and banded. Analytical results show wide variations in the qualities of these coals. Ash content ranges from 3.45% to 22.99%, volatile matter content ranges from 22.18% to 32.11%, F.S.I. values range from 1½ to 8½ and BTU values range from 9608 BTU/lb. to 14,643 BTU/lb. With the exception of Sample No. 73 which contained 1.27% sulphur these coals all have sulphur contents of less than 0.83%. Although there is significant variability in.the qualities of these coals, many may be classified as medium volatile;

low sulphur, coking coal. A 1.4 S.G. float separation reduced the ash content to acceptable levels in all cases. The sulphur content in Sample No. 73 was reduced to 0.80%, probably as a result of pyrite loss in the high specific gravity component.

WEST CARBON CREEK

Hole WCC-78-2

Head Analyses

Sample No.	Depth	Thickness	Grams Received	% H_2O	% Ash	% S	% VM	% FC	Btu	FSI	% Ash	% S	% VM	% FC	Btu
			Air Dry Basis								Moisture Free Basis				
69	71.1- 74.1	3.0	2890	0.97	22.99	0.55	32.11	43.93	9608	1 1/2	23.22	0.56	32.42	44.36	'9702
70	122.9-127.0	4.1	3765	1.08	15.15	0.61	23.17	60.60	12819	6 1/2	15.32	0.62	23.42	61.26	12959
71	238.7-241.1	2.4'	1943	1.05	14.98	0.63	25.49	b8.48	12905	8 1/2	15.14	0.64	25.76	59.10	13042
72	259.7-260.3	0.6	590	1.26	3.45	0.69	22.18	73.11	14643	1 1/2	3.50	0.70	22.46	74.04	14830
73	287.0-289.2	2.2	1918	1.18	5.46	1.27	24.50	68.86	14361	6	5.53	1.29	24.79'	69.68	14532
74	394.5-396.2	1,7	1023	1.12	4.61	0.82	27.77	66.50	14582	8 1/2	4.66	0.83	28,09	67.25	14747
75	429.5-431.4	1.9	2199	1.02	8.12	0.60	26.20	64.66	14014	7 1/2	8.20	0.61	26.47	65.33	14158

TRENCH SAMPLES

Four samples, taken from outcrops were submitted for analysis. The locations of these samples are given as coordinates that refer to the 1:10,000 scale topographic maps prepared by McElhanney Surveying and Engineering Ltd. Sample sites, are plotted on Map 2 (in map pocket). These samples were considered to be dirty', possibly with some of the confining rock and soil material included with the coal. The low B.T.U. values, zero F.S.I. values and generally high water contents indicate extensive weathering and oxidation.

WEST CARBON CREEK

Trench Samples

Head Analyses

Trench No.	Coordinates	No. of Feet	Air Dry Basis: Grams Received	% H_2O	% Ash	% S	% VM	% FC	Btu	FSI	Moisture Free Basis: % Ash	% S	% VM	% FC	Btu
1	38350N-34055E	2.4	3257	3.81'	42.74,	0.45	16.37	37.08	7275	0	44.43	0.47	17.02	38.55	756:
2	38230N-34110E	2.7	912	11.83	10.98	0.74	30.52	46.67	9333	0	12.45	0.84	34.62	52.93	10585
3	39260N-33970E	1.1	1218	11.45	9.93	'0.74	28.25	50.37	9892	0	11.22	0.84	31.90	56.88	1117:
4	37500N-34750E	4.1	1042	10.74	10.57	0.57	27.95	50.74	9859	0	11.84	0.64	31.31	56.85	11045

COAL SEAM CORRELATION

At present it is not realistic to suggest the correlatability of coal seams between D.D.H. WCC-78-1 and D.D.H. WCC-78-2. These two holes were drilled approximately 4280 metres apart horizontally and they were collared approximately 320 metres apart vertically. Although a complete section of the Gething Formation has not been measured in this area, Rayner (1975) has suggested that the. formation is in the order of 1040 metres thick. Even given incomplete sections at each drill site, enough room should be available for these holes to be drilled without overlap. Both holes were drilled in close proximity to the axis of the major syncline. This syncline is thought to be doubly plunging and therefore "canoe" shaped. One might easily speculate on an orientation for this "canoe" to bring the two drill holes to the same stratigraphic level but it would be equally easy to imagine a sizeable stratigraphic separation.

CONCLUSIONS & RECOMMENDATIONS

The north-northwest trending band of flat lying to gently dipping, Gething Formation, sediments which forms the central *area* of the western syncline holds the greatest potential for the discovery of economically mineable coal. Geological mapping and air photo interpretation have indicated an area of adequate dimensions to sustain a mining operation, given sufficient coal seam thickness, continuity and quality. Numerous coal seams were intersected in diamond drill holes WCC-78-1 and WCC-78-2 with individual seam thicknesses ranging up to 1.52 metres. Significant variation in thickness, typical of coal seams in the Peace River area, may enhance

the tonnage potential and therefore the mining potential of some seams. Many of the coals sampled show good coking characteristics and are fairly low in sulphur although ash and volatile matter contents are frequently relatively high.

Work by G.H. Rayner, on behalf of Utah Mines Ltd., during the summer of 1975 has indicated a thickness for the Gething Formation in this area of approximately 1040 metres. Diamond drilling during the 1978 exploration program penetrated a maximum of 371.6 metres of this section if one assumes no overlap between the two holes. Al though the existence of a complete section is unlikely in the trough of the syncline; much of the section remains untested..

Significant deformation, including highly variable bedding orientations and minor folding, has been noted in the limbs of the syncline in close proximity to the area of primary interest. The possibility for encountering structural disruptions within the band of relatively flat-lying sediments should not be overlooked.'

Further exploration work should be undertaken on the western coal licences of West' Carbon Creek Property-;' Where possible, geological mapping should be done to establish more exactly, the width and configuration of the band of relatively flat-lying sediments. Within this band, minor folding or other structural problems that could hinder or disrupt mining should be carefully mapped. Additional drilling should be done in order that a more complete appraisal of the coal potential of the property may be made. The coal bearing Gething section should be more fully tested for additional coal seams. It is important-that adequate stratigraphic overlap be planned between adjacent drill holes to

facilitate correlation of coal seams with reasonable certainty. Any drill holes located away from the synclinal axis will also provide data useful in defining the form of the syncline and the width of the band of flat-lying to gently dipping sediments.

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APPENDICES

ACKNOWLEDGEMENTS

Extensive discussions with R. B. (Bob) Anderson and his interest in this project were most beneficial in the preparation of this report.

Maps and diagrams accompanying this report were prepared by, T. Drews and the layout and typing of the text were completed by D. Sturhahnboth of Utah Mines Ltd., Vancouver, B.C.

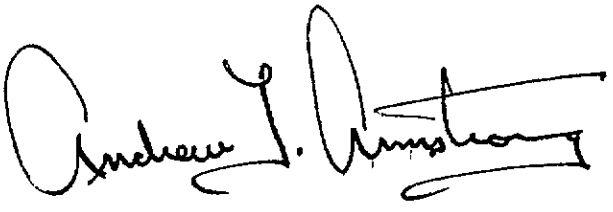
CERTIFICATION

I, ANDREW T. ARMSTRONG of #105 - 1001 Mount Seymour Parkway, North Vancouver, British Columbia, do hereby certify that:

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

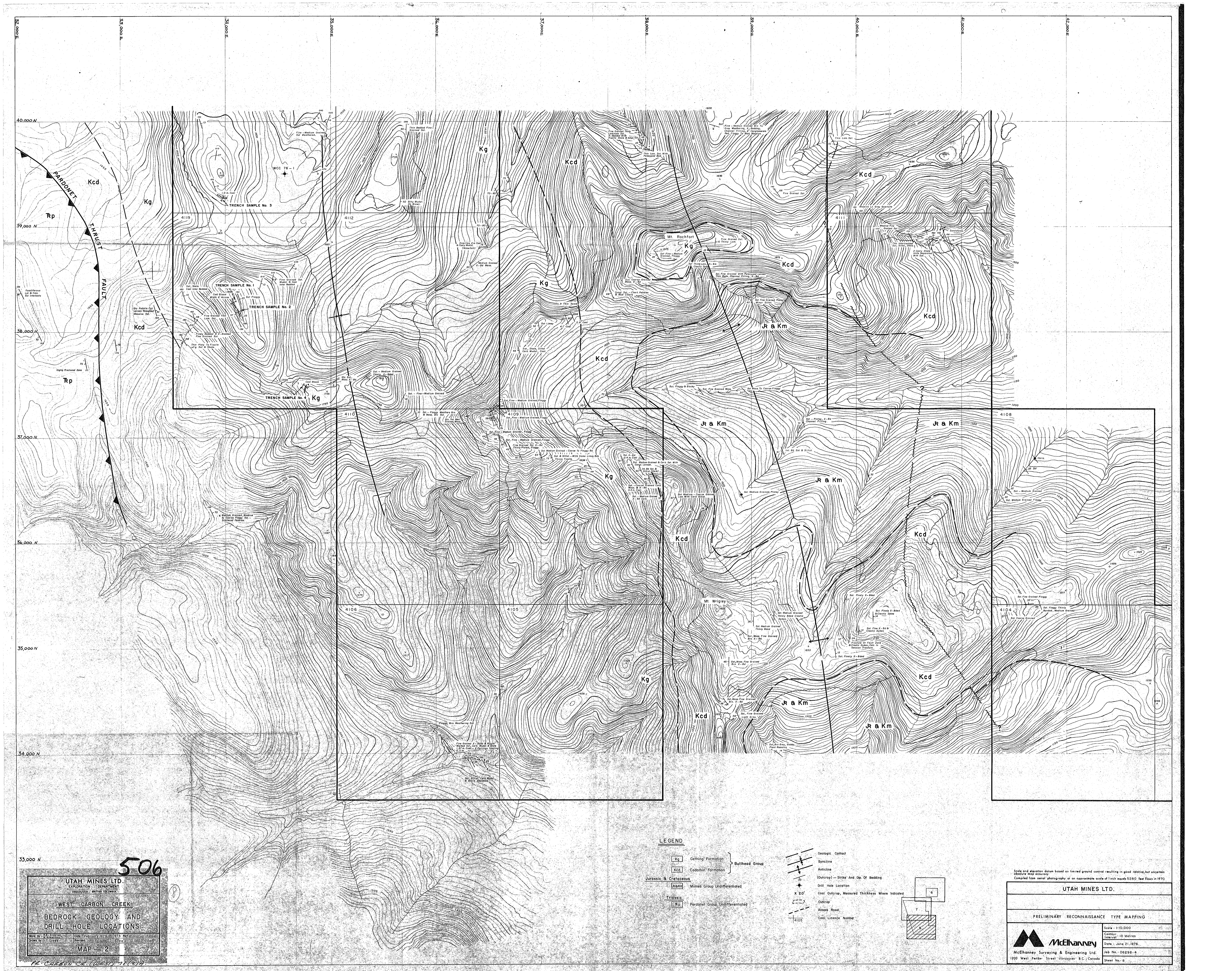
I have been continuously employed in various mining exploration activities from May 1970 to the present, throughout British Columbia.

I am an Associate of the Geological Association of Canada.



Vancouver, B. C.

Andrew T. Armstrong
Geologist



506

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

WEST CARBON CREEK

BEDROCK GEOLOGY AND DRILL HOLE LOCATIONS

Work by R.B. Anderson A. Armstrong	Date: February 1979	NTS Ref.
Drawn by T. Drews	Revised:	Scale 1:10,000

MAP — 2

PR-CARBON CR. (WEST) 78(2)A.

(8)

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

UTAH MINES LTD.

PRELIMINARY RECONNAISSANCE TYPE MAPPING

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

Scale - 1:10,000	
Contour Interval - 10 Metres	
Date - June 21, 1978.	
Job No. - 06298-4	
Sheet No. - 8	

31,000 E | 32,000 E | 33,000 E | 34,000 E | 35,000 E | 36,000 E | 37,000 E | 38,000 E | 39,000 E | 40,000 E | 41,000 E

47,000 N
45,000 N
44,000 N
43,000 N
42,000 N
41,000 N
40,000 N

Kg — Gething Formation
Kcd — Cadomin Formation
Bullhead Group
JR & Km — Minnes Group Undifferentiated
Rp — Pardonet Group Undifferentiated

4121 | 4118 | 4117 | 4116 | 4115 | 4120 | 4114 | 4113 | 4123 | 4122

PARDONET THRUST FAULT

Mt. Cowper

WCC 78-2

Coal — Thickness ? Coal — 1.0 m. Or Less

506

(9)

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

WEST CARBON CREEK

BEDROCK GEOLOGY AND DRILL HOLE LOCATIONS

Work by: P.S.Andersen	Date: February, 1979	NTS Ref.
Drawn by: J.D.Fewer	Revised:	Scale — 1:10,000

MAP — 1

PR - CARBON CR. (WEST) 78-(2)-A

LEGEND

Kg — Gething Formation } Bullhead Group
Kcd — Cadomin Formation }

Jurassic & Cretaceous
JsKm — Minnes Group Undifferentiated

Triassic
Rp — Pardonet Group Undifferentiated

Geologic Contact
Syncline
Anticline
(Outcrop) — Strike And Dip Of Bedding
Drill Hole Location
Coal Outcrop, Measured Thickness Where Indicated
Outcrop
Access Road
Coal Licence Number (4118)

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

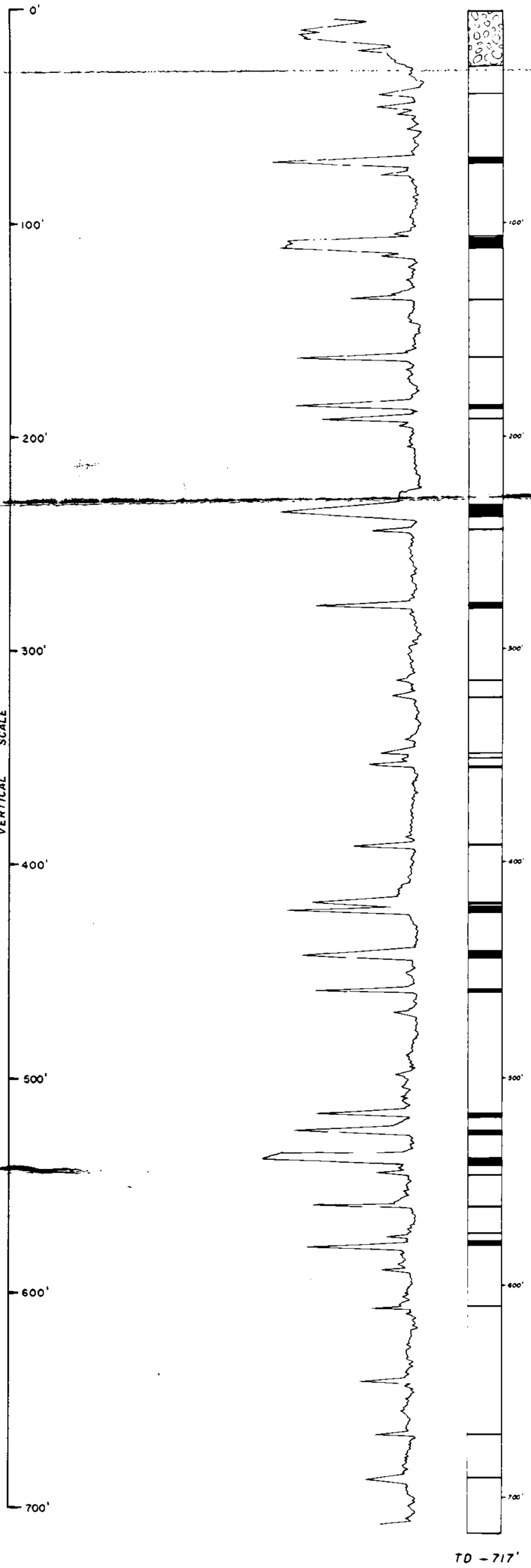
UTAH MINES LTD.

PRELIMINARY RECONNAISSANCE TYPE MAPPING

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

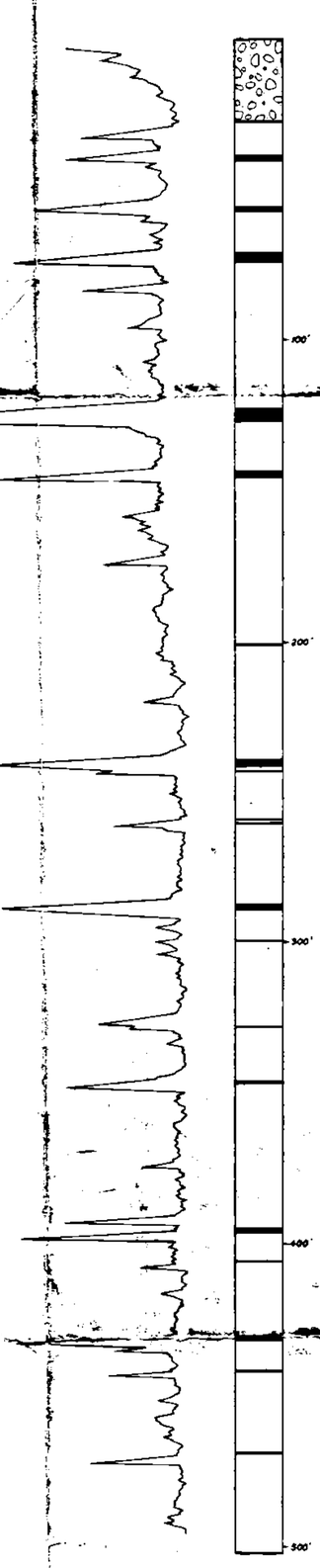
Scale - 1:10,000	
Contour Interval - 10 Metres	
Date - June 21, 1978.	
Job No. - 06298-4	
Sheet No. - 7	

WCC 78 - 1

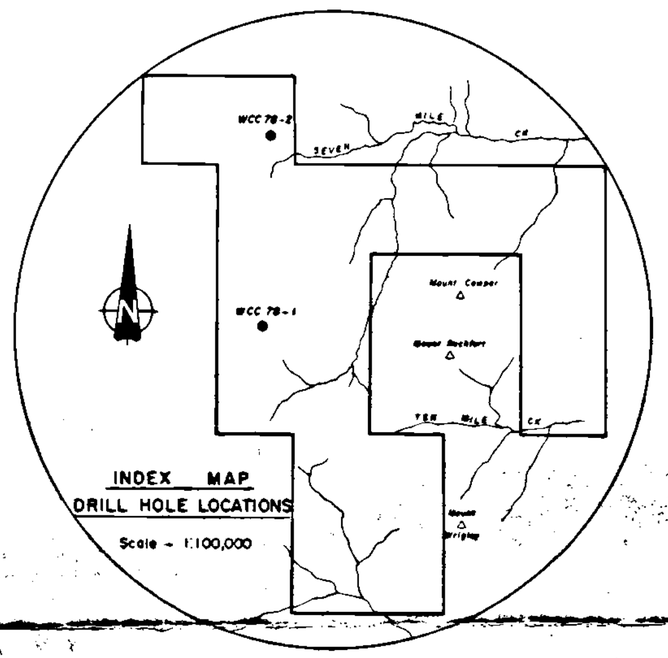


TD - 717'

WCC 78 - 2



TD - 502'



Note: No Definite Correlation

FIGURE - 10

506

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EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

WEST CARBON CREEK

COAL SEAM CORRELATION

Work by: R.B. Anderson	Date: January 1979	NTS Ref.
Drawn by: T. Drews	Revised:	Vertical Scale - 1" = 40'

PR - CARBON CR. (WEST) 78(2)A.

UTAH MINES LTD.
EXPLORATION DEPARTMENT
INTER-OFFICE MEMO
SUITE 1600, 1050 W. PENDER STREET . VANCOUVER. B.C., CANADA "GE 3S7
(604) 683-6921

DATE: Oct. 3/78

FILE NO :

TO: Arthur W. Lankenau

COPIES TO: M.J. Young
R. Hickman
R.O. Wheaton
S. Do Foo
J. Phebus
Files

FROM: R.B. Anderson

SUBJECT: COAL SAMPLES - SHIPMENTS TO SUNNYVALE

REFERENCE:

The following coal samples have been shipped to Sunnyvale via Adanac Customs, Vancouver on Oct. 3, 197 8.

PROPERTY: West Carbon Ck.

HOLE NO.: W.C.C. 78-2

COAL LICEMCE NO.: 4122

LOCATION: 34,320mE x 43,770mN (McElHanney)

ELEVATION: 4084 ± (1245m)

TOTAL DEPTH: 502.0 (153m)

SAMPLE NO.	BED NO.	THICKNESS		DEPTH
		Core	Density Log	
69		3.0	7 5/3 0	71 1
70		4.1	4.9	122.9
71		2.4	2.8	238.7
72		0.6	1.6	259.7
73		2.2	2.1	287.0
74		1.7	2.0	394.5
75		1.9	2.1	429.5

RBA:ds

WELL COMPLETION REPORT

HOLE NO, W.C.C. 78-2 West Carbon Creek AREA

LOCATION 34,320m ± E FWL, FEL, FNL, FSL X 43,770mN FWL, FEL, FNL, FSL OF

LSD _____, SEC _____, TWP _____, R _____, W _____ MER

GR. ELEV. 1245 ± m

PROVINCE B.C.

SURFACE OWNER Crown

COMMENCED Sept. 25/78

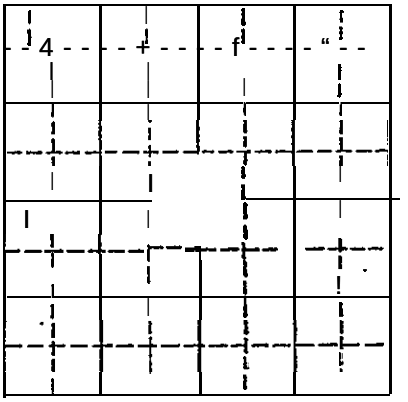
COMPLETED Sept. 29/78

TOTAL DEPTH 502.0'

HOLE SIZE HQ - 3.782 in.

AIR TO _____ WATER (MUD) TO 502.0'

CORED: (YES) (NO): INTERVALS 27.0' to 502.0'



Scale: 2"=1 mile
(test hole location in section)

LOGS RUN: E-LOG ( ),

GAMMA RAY (✓), OTHER Density

PH _____ TEMP. _____

LOST CIRCULATION AT DEPTH (S) 290 and 499 REGAINED (YES) -(NO)

NOTICEABLE WATER INVASION: (NO) (YES); INTERVALS _____

NOTICEABLE GAS INVASION: (NO) (YES); INTERVALS _____

CASING: DEPTH 27' (8.23m) DIAMETER HW - 4.5in. RECOVERED (YES) (NO)

PLUGGED: (YES) (NO): IF NO EXPLAIN _____

IF HOLE PLUGGED BY OTHER THAN CONTRACTOR, GIVE NAME AND

ADDRESS _____

INVOICE NUMBER FOR ABOVE _____

CONTRACTOR: Canadian Longyear Ltd.

SAMPLES DESCRIBED AND REPORTED BY: A.T. Armstrong & R.B. Anderson

COMMENTS: Gamma Log problems - the log looks like a mirror image of the Density.

WELL COMPLETION REPORT

WEST CARBON CREEK Prospect

Hole No. W.C.C. 78-2

Location: North side lower headwaters of Seven Mile Ck. 34,320mE x 43,770mN

Gr. Elev.: 1245± m

Province B.C.

Surface Owner Crown C.L. ~~Option~~ No. 4122 -

Spudded Sept. 25, 1978 Completed Sept. 29, 1978

Depth: 502.0' Air to _____ Water (Mud) to 502.0'

Hole Size: HQ 3.782 in. Bits: Surface tricone (4.75 in)

Main Hole diamond inserts (3.782 in)

Cored: (Yes) (No); intervals 27' to 502.0' (wireline, convention)

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

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

Mfgr. Gearhart-Owens

Logging Co. Utah Mines Ltd.

Chemicals: _____

Lost Circulation at depth(s) 290 and 499 ; Regained (Yes) (No)

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

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

Casing: Depth 27' (8.23m) ; Diameter HW - 4.5 in. Recovered (Yes) (No)

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

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

Invoice Number for above _____

Contractor: Name & Address Canadian Longyear Ltd.

Samples and Core Description by: _____

Report Prepared by: A. T. Armstrong & R.B. Anderson Date Sept. 30/78

Comments: _____

Gamma log problems - the log looks like a mirror image of the Density.

CORE DESCRIPTION

HOLE # WCC - 78-2 AREA West Carbon Creek

FROM 0' TO 82.0' BY A.T. Armstrong

FROM	TO	DESCRIPTION
0	27	OVERBURDEN & BROKEN BEDROCK
27	29	INTERLAMINATED MUDSTONE & SILTSTONE - light medium grey to dark grey - irregularly laminate to lensy siltstone in mudstone - predominantly mudstone - worm burrows common - very strongly shattered near the top
29	32.5	MUDSTONE - dark grey to black
32.5	38.6	MIXED SILTY MUDSTONE & SILTSTONE - medium grey to dark grey - mottled appearance to strongly disturbed bedding
38.6	38.8	COALY MUDSTONE - black, coal streaked
38.8	40.2	COAL-1.4'? -black and bright, (very little recovery -5%-10%, interval may not be entirely coal)
40.2	40.6	MUDSTONE - dark brownish grey - minor silt content
40.6	55.6	INTERLAMINATE TO MIXED MUDSTONE & SILTSTONE - light medium grey to dark grey - thinly laminate at 85° to core axis to lensy to strongly disturbed blotchy and mottled in appearance
55.6	57.7	COAL-2.1'?- black, bright, banded (25% recovery, badly broken, some mudstone included in this interval)
57.7	58.3	MUDSTONE - black
58.3	60.6	INTERLAMINATE MUDSTONE & SILTSTONE - moderately disturbed - thinly laminate to lensy light medium grey to dark grey
60.6	64.3	INTERLAMINATED SILTY SANDSTONE & MUDDY SILTSTONE - light medium grey to dark grey - fine grained sandstone - weakly disturbed to well mixed
64.3	65.5	SILTY MUDSTONE - medium grey to dark grey - fine bands of shell fragments 64.5' to 65'
65.5	71.1	MUDDY SILTSTONE - minor sand content - strongly disturbed to regularly laminate at 85° to core axis - medium grey to dark grey - coal streaks at the base
71.1	74.1	COAL-3.0' - black, banded, dull to bright (solid to broken, dull to bright 75% recovery) Note: about 0.8' coaly mudstone
74.1	74.8	MUDSTONE - dark grey to black
74.8	82.0	INTERLAMINATED MUDSTONE & SILTSTONE - distinctly banded light medium grey to dark grey - weakly to moderately distrubed - worm burrows throughout - Predominantly mudstone with siltstone lenses toward the base

CORE DESCRIPTION

HOLE # WCC - 78-2 AREA West Carbon Creek

FROM 82.0' TO 127.0' BY A.T. Armstrong

FROM	TO	DESCRIPTION
82.0	83.6	COALY MUDSTONE - black with numerous coal streaks (strongly broken - 50% recovery)
83.6	85.3	MUDSTONE/SILTSTONE - strongly disturbed, laminate medium grey to dark grey
85.3	90.4	SANDSTONE - light medium grey salt and pepper colouring - laminate and cross-bedded - fine laminations at 75° to core axis - fine to medium grained - strongly disturbed and carbonaceous at the top - few scattered mud clasts throughout
90.4	92.0	INTERLAMINATED MUDSTONE AND SILTSTONE - light medium grey to dark grey - thin well developed laminations at top becoming increasingly lensy and disturbed downward - some carbonaceous bedding surfaces - bedding at 85° to core axis
92.0	95.4	MUDSTONE - dark grey to black - coal streaked in middle of interval
95.4	102.2	INTERLAMINATE MUDDY SILTSTONE & SILTY SANDSTONE - light medium grey to dark grey - fine grained sandstone - predominantly muddy siltstone - weakly to moderately disturbed, thinly laminate
102.7	106.0	INTERLAMINATE MUDSTONE & SILTSTONE - predominantly mudstone with siltstone as thin laminae and lenses - light medium grey to dark grey - bedding at 85° to 90° to core axis
106.0	107.2	MUDSTONE - dark grey to black
107.2	108.3	MIXED SILTSTONE/MUDSTONE - strongly disturbed with blotchy appearance
108.3	114.6	INTERLAMINATED TO MIXED SILTY SANDSTONE & MUDDY SILTSTONE - well developed fine lamination to very strongly disturbed - worm burrows common
114.6	119.5	SANDSTONE - fine to medium grained - light medium to dark medium grey - thinly laminate with some cross-bedding - calcite veining at 116.7' to 117.2', 118.4' to 118.6'
119.5	120.7	INTERLAMINATED MUDSTONE & SILTSTONE - medium grey to dark grey - thinly laminate at the top to lensy at base - predominantly mudstone
120.7	122.9	MUDSTONE - dark grey to black - brownish claystone band at 120.9'
122.9	127.0	COAL-4.1'?- black, bright, banded (solid to strongly broken core 75% recovery)

CORE DESCRIPTION

HOLE # WCC - 78-2 AREA West Carbon Creek

FROM 127.0' TO 194.4' BY A.T. Armstrong

FROM	TO	DESCRIPTION
127.0	141.4	MUDSTONE - dark grey to black - brownish at the base - numerous coal streaks INTERBEDDED MUDDY SILTSTONE & SANDSTONE - light medium to dark grey - fine grained sandstone - graded bedding, muddy siltstone upward into sandstone - fine feathery cross-bedding in sands Note: Cyclic Sedimentation
141.4	142.7	INTERLAMINATE MUDSTONE/SILTSTONE - light medium grey to dark grey - thinly laminate and moderated disturbed
142.7	143.5	SANDSTONE - light medium grey medium to coarse grained - massive
143.5	145.3	COAL-1.8'?- black, bright, banded weakly eleated (35% recovery)
145.3	148.2	MUDSTONE & SILTY MUDSTONE - dark grey few fine widely spaced coal streaks
148.2	155.6	SANDSTONE - light medium grey, fine to medium grained - moderately thick laminations - strongly disturbed silty laminations near the top
155.6	157.0	MUDSTONE - dark grey - few silty laminations and fine lenses - several brownish claystone laminations
157.0	157.7	COALY MUDSTONE - black coal streaked and dirty coal bands
157.7	160.1	MUDSTONE - dark grey to black - coal streaked near the top
160.1	166.2	MIXED SILTY MUDSTONE & MUDDY SILTSTONE - medium grey to dark grey - strongly disturbed to irregularly laminate and lensy - worm burrows in laminate areas
166.2	167.4	INTERLAMINATED & MIXED SILTSTONE & SANDSTONE - fine grained - light medium to dark medium grey - small scale cross-bedding - regular bedding at 85° to 90° to core axis
167.4	169.4	INTERLAMINATED MUDSTONE & SILTSTONE - thinly laminate to fine lenses of silt in mudstone matrix - bedding at 85° to core axis
169.4	173.7	MUDSTONE - dark grey to black - brownish claystone bands 170' to 171' - coal streaked 172' to 173.7'
173.7	194.4	SILTY SANDSTONE - light medium grey, fine grained - massive - disturbed bedding some sand filled burrows at 192'

CORE DESCRIPTION

HOLE # WCC - 78-2 AREA West Carbon Creek

FROM 194.4' TO 250.3' BY A.T. Armstrong

FROM	TO	DESCRIPTION
194.4	195.5	SILTY MUDSTONE - dark medium grey - occasional thin silt lenses and minor burrows
195.5	196.2	SANDSTONE - light medium grey - medium grain - massive
196.2	200.3	SILTY MUDSTONE - dark medium grey - numerous disturbed thin siltstone lenses at 200 - small silty mudstone clasts floating in a thin sandy siltstone lense - occasional thin silt filled vertical burrows
200.3	200.5	SANDSTONE - light medium grey - medium grain - occasional mudstone clasts
200.5	200.7	SILTY MUDSTONE - dark medium grey - bedding 85° to core axis
200.7	218.5	SANDSTONE - light medium grey - medium grey - cross-bedded - large scale rounded pebble clasts at 206.1 to 207.5 - calcite on fracture 10° to core axis - coarse grained 205' to 218'
218.5	220.4	CARBONACEOUS MUDSTONE - dark grey - black - numerous coal streaks throughout
220.4	224.9	CARBONACEOUS MUDDY SILTSTONE - medium grey with plant remains throughout and occasional thin coal streaks - no apparent bedding
224.9	233.7	SILTY SANDSTONE medium light grey - fine to medium grain - carbonaceous debris on irregular bedding - occasional thin wispy mudstone streaks - also distorted - becoming less sandy towards the base
233.7	237.0	INTERLAMINATED SILTSTONE & MUDSTONE - medium grey to dark grey mudstone predominant with silt filled burrows and clasts throughout - wavy bedding
237.0	238.7	MUDSTONE - dark grey to black
#71 238.7	241.1	COAL-2.4'- black, banded, bright - badly broken 70% recovery
241.1	242.4	COALY MUDSTONE - black to coal streaks
242.4	242.7	COAL-0.3' - bright
242.7	243.3	COALY MUDSTONE - dark grey - black
243.3	246.2	SILTSTONE - light medium grey - cross-bedded (small scale) muddy streaks & films on cross-bed surfaces, numerous vertical and horizontal worm burrows
246.2	247.0	MUDDY SILTSTONE _ dark medium grey
247.0	250.0	SILTY MUDSTONE - dark grey to black occasional thin coal streaks
250.0	250.3	SILTY SANDSTONE - light medium grey - disturbed bedding

CORE DESCRIPTION

HOLE # WCC - 78-2 AREA West Carbon Creek

FROM 250.3' TO 310.2' BY A.T. Armstrong

	FROM	TO	DESCRIPTION
	250.3	251.0	SILTY MUDSTONE - dark grey - massive
	251.0	253.8	MUDDY SILTSTONE - medium light grey - small scale cross-beds - mudstone films on cross-bed surfaces
	253.8	255.1	SILTY MUDSTONE - dark grey - occasional silt laminae
	255.1	257.0	SANDSTONE - medium light grey - thin silt and mudstone laminae at top
	257.0	259.0	SILTY MUDSTONE - dark grey to black - disturbed bedding at surface numerous silt clast fillings 258' to 259.0'
	259.0	259.1	COAL-0.1' - black, bright
	259.1	259.7	CARBONACEOUS MUDSTONE - black
#72	259.7	260.3	COAL-0.6' - bright - clean
	260.3	262.0	SEAT EARTH - coaly silty mudstone - carbonaceous and plant debris throughout - thin coal at 261.8'
	262.0	275.0	SILTSTONE - light medium grey - small scale cross-beds - mudstone films on cross-bed surfaces towards top
	275.0	287.0	INTERLAMINATED SILTSTONE/MUDSTONE - light medium grey to dark grey - silt filled worm burrows throughout vertical most common
#73	287.0	289.2	COAL-2.2' - bright black banded
	289.2	291.3	MUDSTONE - dark grey to black - thin coal streaks throughout
	291.3	291.8	MUDDY SILTSTONE - medium grey - disturbed lower surface
	291.8	293.6	SILTSTONE - light medium grey - muddy upper bed surfaces vertical worm burrows throughout
	293.6	295.7	CARBONACEOUS MUDSTONE - dark grey to black -numerous coal streaks
	295.7	297.5	SILTY MUDSTONE - dark grey - occasional thin silt streaks
	297.5	299.1	MUDSTONE - dark grey - massive
	299.1	299.5	COAL-0.4' - dirty
	299.5	300.6	SILTY MUDSTONE - dark medium grey - worm burrows
	300.6	302.6	INTERLAMINATED SILTSTONE & MUDSTONE - medium grey to dark grey - silt predominates - bedding bioturbated
	302.6	303.7	MUDSTONE (SILTY) - dark grey - occasional thin siltstone laminae
	303.7	303.9	COAL MUDSTONE - dark grey to black
	303.9	304.3	CARBONACEOUS MUDSTONE - dark grey
	304.3	307.8	SILTY SANDSTONE - light medium grey - very fine grain - small scale cross-beds
	307.8	310.2	INTERLAMINATED MUDSTONE/SILTSTONE - dark grey to medium grey - mudstone predominates siltstone are thin laminae and burrow fillings

CORE DESCRIPTION

HOLE # WCC - 78-2 AREA West Carbon Ck.

FROM 310.2' TO 372.7' BY A.T. Armstrong

FROM	TO	DESCRIPTION
310.2	311.1	INTERLAMINATED SILTSTONE/SANDSTONE/MUDSTONE - light grey to medium dark grey bedding at ~80° to core axis
311.1	313.8	SILTSTONE - light medium grey - crossbedded - mudstone on lower bedding surfaces
313.8	315.4	SILTY MUDSTONE - dark grey with occasional thin siltstone laminae
315.4	320.3	INTERLAMINATED SILTSTONE & MUDSTONE - light medium grey - dark grey - bedding very nearly 90° to core axis
320.3	325.4	SILTY MUDSTONE - dark grey with numerous thin siltstone laminae
325.4	328.0	COALY MUDSTONE - dark grey - black
328.0	328.3	COAL-0.3' - bright black shiny
328.3	329.0	COAL MUDSTONE - black - coal streaks
329.0	332.0	SILTY SANDSTONE - medium light grey - siltstone at base - cross-bedded occasional thin mudstone streaks
332.0	333.3	MUDSTONE - dark grey
333.3	339.4	SILTY MUDSTONE - dark medium grey - massive
339.4	340.4	INTERLAMINATED MUDSTONE/SILTSTONE - light medium grey to dark grey occasional worm burrows
340.4	346.2	SILTY MUDSTONE - dark grey with occasional thin siltstone laminae
346.2	347.2	COAL-1.0' - bright - black banded
347.2	348.0	COALY MUDSTONE - black
348.0	348.1	COAL- 0.1'
348.1	348.6	COALY MUDSTONE
348.6	350.2	MUDDY SILTY SANDSTONE - light medium grey to dark grey; distorted bedding
350.2	351.4	MUDSTONE - black
351.4	351.8	SILTY MUDSTONE - dark medium grey
351.8	353.3	MUDSTONE - friable black - crumbling
353.3	355.5	MUDDY SILTSTONE - dark medium grey - cross-bedded usually distorted bedding
355.5	358.8	SILTSTONE - medium grey massive
358.8	360.1	MUDSTONE - dark grey - weakly silty
360.1	361.5	SILTSTONE - medium grey - cross-bedded
361.5	371.8	INTERLAMINATED SILTSTONE/MUDSTONE - light medium grey to dark grey - siltstone is cross-bedded - silt filled vertical burrows throughout siltstone predominates down to 367' mudstone predominates after 367'
371.8	372.0	CARBONACEOUS MUDSTONE – dark grey with some thin coal veinlets
372.0	372.7	CARBONACEOUS SILTSTONE - medium dark grey-carbonaceous

CORE DESCRIPTION

HOLE # WCC - 78-2 AREA West Carbon Creek

FROM 372.7' TO 429.5' BY A.T. Armstrong

FROM	TO	DESCRIPTION
372.7	374.0	CARBONACEOUS SANDSTONE
374.0	376.1	INTERLAMINATED MUDSTONE/SILTSTONE - mudstone predominant - dark grey - light medium grey
376.1	377.3	MUDSTONE - dark grey with thin siltstone laminae
377.3	378.2	INTERLAMINATED MUDSTONE/SILTSTONE - medium light grey to dark grey - irregular wavy bedding
378.2	379.4	SANDSTONE - light medium gray - medium light grey
379.4	388.8	INTERLAMINATED MUDSTONE - SILTSTONE - dark grey to light medium grey mudstone predominates - worm burrows throughout
388.8	389.9	MUDSTONE - dark grey with occasional
389.9	390.5	COALY MUDSTONE - dark grey to black, microcrystalline pyrite veinlet at 390'
390.5	393.3	INTERLAMINATED MUDSTONE/SILTSTONE - dark grey - light medium grey worm burrows common - bedding 85° to core axis
393.3	394.5	MUDSTONE — dark grey - friable - ground to the top of coal
#74 394.5	396.2	COAL-1.7'- black - bright
396.2	396.4	MUDSTONE - dark grey
396.4	404.3	SILTSTONE - light medium grey - occasional thin mudstone laminae bedding generally distorted
404.3	405.2	INTERLAMINATED MUDSTONE/SILTSTONE - light medium grey to dark grey irregular bedding
405.2	405.4	COAL-0.2' - black-banded
405.4	406.5	SILTY MUDSTONE - medium dark grey
406.5	412.3	SANDSTONE - fine to medium grain - light medium grey disturbed bedding at top, massive and medium grain in centre 1.0 foot and very fine grain cross-bedded at base
412.3	415.5	INTERLAMINATED MUDSTONE/SILTSTONE - dark grey - medium light grey - mudstone predominant
415.5	424.2	SANDSTONE - very fine to coarse grain, light medium grey - small scale cross-beds near top -top erosional and irregular - silty mudstone clasts (angular) at 318.8'; large scale cross-beds at 420.6' to 422.9'
424.2	426.4	INTERLAMINATED MUDSTONE/SILTSTONE - dark grey to medium light grey - bioturbated worm burrows throughout (silt filled)
426.4	428.2	SILTY MUDSTONE - dark grey - thin silt filled clasts throughout
428.2	429.3	MUDSTONE - dark grey
429.3	429.5	CARBONACEOUS SANDSTONE - irregular bedded, mudstone and carbonaceous debris filled

CORE DESCRIPTION

HOLE # WCC - 78-2 AREA West Carbon Creek

FROM 429.5' TO 480.2' BY A.T. Armstrong

	FROM	TO	DESCRIPTION
#75	429.5	431.4	COAL-1.9' - bright, clean
	431.4	432.2	MUDDY SANDSTONE - medium grey - "seat-earth" carbonaceous debris and plant material throughout
	432.2	434.2	COALY MUDSTONE - dark grey to black - pyrite nodule at base - gradation
	434.2	439.2	SILTY SANDSTONE — medium light grey - small scale wavy cross-beds mudstone on bedding surfaces
	439.2	441.0	INTERLAMINATED SILTSTONE/MUDSTONE - medium grey to dark grey - mudstone predominates bedding distorted
	441.0	441.8	COAL-0.8' - good clean bright coal
	441.8	442.6	CARBONACEOUS MUDSTONE — dark grey - occasional thin coal struck and calcite film parallel to bedding
	442.6	446.0	MUDDY SILTSTONE - medium dark grey - massive - occasional siltstone flute
	446.0	447.3	INTERLAMINATED SILTSTONE/MUDSTONE - light medium grey to dark grey
	447.3	450.4	MUDSTONE - dark grey in occasional thin siltstone laminae
	450.5	451.8	SILTSTONE - medium grey - wavy bedding - mudstone films on bedding surfaces
	451.8	457.7	SILTY MUDSTONE - medium dark grey - occasional siltstone laminae and worm burrow
	457.7	465.0	MUDDY SILTSTONE — medium grey - with numerous thin mudstone laminae and worm burrows - becomes courser to base - distortion also more pronounced
	465.0	467.5	SILTSTONE - light medium grey - small scale cross-beds carbonaceous debris and mudstone films on bedding surfaces
	467.5	468.2	SANDSTONE - light medium grey - very fine grain - mud chips incorporated near base
	468.2	468.4	MUDSTONE - dark grey - minor siltstone laminae
	468.4	469.4	COAL-1.0' - 0.3' coal present - 0.7' core loss probably coal
	469.4	470.6	MUDSTONE — dark grey — with thin calcite stringers throughout
	470.6	471.1	SILTSTONE - medium grey - wavy bedding, mudstone on bedding surfaces
	471.1	477.3	SILTY MUDSTONE - medium dark grey - occasional thin calcite stringer parallel to bedding
	477.3	480.2	SILTSTONE - medium grey - small scale cross-beds occasional calcite stringers parallel to bedding - calcite welded fracture at 479.9'

CORE DESCRIPTION

HOLE # WCC--78-2 AREA West Carbon Creek

FROM 480.2' TO 502.0' BY A.T. Armstrong

FROM	TO	DESCRIPTION
480.2	481.0	INTERLAMINATED SANDSTONE/SILTSTONE/MUDSTONE - light grey to dark grey - calcite welded fractures at various angles to core axis
481.0	481.5	PEBBLE CONGLOMERATE - medium grey - pebbles appear to be rounded to subrounded silty mudstone - calcite fracture at 70°
481.5	483.2	SILTY MUDSTONE - medium grey - with numerous thin siltstone laminae throughtout
483.2	485.5	MUDSTONE - dark grey - coaly at base
485.5	487.6	SILTSTONE - medium grey - wavy disturbed bedding
487.6	488.9	INTERLAMINATED MUDSTONE/SILTSTONE - medium grey to dark grey, mudstone predominates wavy bedding
488.9	490.7	MUDSTONE - dark grey - highly fractured
490.7	496.7	SILTY MUDSTONE - medium dark grey - highly fractured from 495' to base - calcite stringers on fractures at 65° to core axis - fault gouge contact to next unit at 50° to core axis
496.7	502.0	SILTSTONE - medium grey - extremely shattered - calcite veinlets and stringers running in all directions - expecially shattered from 500' to 502.0'
		T.D. 502.0' (couldn't regain circulation)

UTAH MINES LTD.
EXPLORATION DEPARTMENT
INTER OFFICE MEMO
SUITE 1600, 1050 W. PENDER STREET • VANCOUVER, B.C., CANADA V6E 3S7
(604) 683-6921

DATE: FILE NO:

TO: Arthur W. Lankenau

COPIES TO: M.J. Young
R. Hickman
R.O. Wheaton
S. Do Foo
J. Phebus
F i l e s

FROM: R.B. Anderson

SUBJECT: COAL SAMPLES - SHIPMENTS TO SUNNYVALE

REFERENCE:

The following coal samples have been shipped to Sunnyvale via Adanac Customs, -Vancouver on September. 28 , 1978.

PROPERTY: Nest Carbon Creek.
HOLE NO.: WCC-78-1
COAL LICENCE NO.: 4120
LOCATION: 39,500mN x 34,560mE (McElhanney Coord.)
ELEVATION: 1565m
TOTAL DEPTH: 717' (218.54m)

SAMPLE NO.	BED NO.	THICKNESS		DEPTH
		Core	Density Log	
55		2.6'	3.7'	69.1' to 71.7'
56		0.5'	0.5'	105.5' to 106.0'
57		5.0'	6.0'	107.0' to 112.0'
58		1.9'	2.4'	185.1' to 187.0'
59		1.1'	.2' with	231.9' to 233.0'
60		4.35'	0.45' split	233.45' to 237.8'
61		2.75'	2.0'	278.25' to 281.0'
62		1.3'	1.8'	417.7' to 419.0'
63		3.0'	2.8'	420.0' to 423.0'
64		3.1'	3.3'	440.9' to 444.0'
65		2.1'	2.2'	516.5' to 518.6'
66		2.0'	3.0'	524.5' to 526.5'
67		3.8'	4.2'	537.0' to 540.8'
68		1.9'	2.2'	578.3' to 580.2'

RBA:ds

WELL COMPLETION REPORT

BOLE NO, WCC-78-1 WEST - CARBON CREEK AREA

LOCATION 39,500mN FWL,FEL,FNL,FSL X 34,560mE FWL,FEL,FNL,FSL OF

LSD _____, SEC _____, TWP _____. R _____, W _____ M E R

GR. ELEV. 1565 meters

PROVINCE British Columbia --

SURFACE OWNER Crown

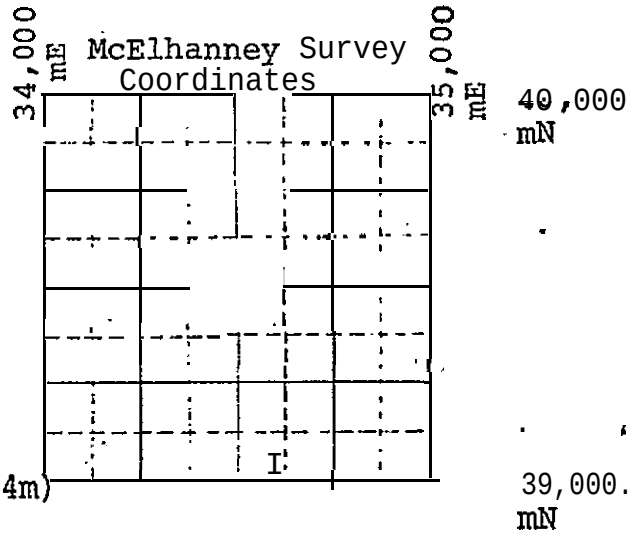
COMMENCED September 17, 1978

COMPLETED September 22, 1978

TOTAL DEPTH 717' (218.54m)

HOLE SIZE HQ 3.782 in.

AIR TO - WATER (MUD) TO 717'(218.54m)



Scale: 2"=1 mile
(test hole location in section)

CORED: (YES) (NO) : INTERVALS 27' (8.23m) to 717'(218.54m)

LOGS RUN: E-LOG ( ),

GAMMA RAY (x), OTAER Density

PH _____ - - TEMP. _____

LOST CIRCULATION AT DEPTH (S) 27'(8.23m) to 40'(12.19m) REGAINED (YES) (NO) partially

NOTICEABLE WATER INVASION: (NO) (YES); INTERVALS - -

NOTICEABLE GAS INVASION: (NO) (YES); INTERVALS _____

CASING: DEPTH 27'(8.23m) DIAMETER HW-4.5 in. -RECOVERED (YES) (NO)

PLUGGED: (YES) (NO) : IF NO EXPLAIN _____

IF HOLE PLUGGED BY OTHER THAN CONTRACTOR, GIVE NAME AND ADDRESS _____

INVOICE NUMBER FOR ABOVE _____

CONTRACTOR: Canadian Longyear Ltd.

SAMPLES DESCRIBED AND REPORTED BY: A. T. Armstrong

COMMENTS: _____

WELL COMPLETION REPORT

West Carbon Creek Prospect

Hole No. WCC-78-1

Location: Head waters of Seven Mile Creek @ 39,500 m N. x 34,560 m. E

Gr. Elev.: 1565 metres

Province British Columbia

Surface Owner Crown ~~Option~~ C.L. No. 4120

Spudded September 17, 1978 Completed September 22, 1978

Depth: 717' (218.54m) Air to - Water (Mud) to 717' (218.54m)

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

Main Hole diamond inserts (3.782 in.)

Cored: (Yes) (No); intervals 27' (8.23 m) to 717' (218.54m) (wireline, convention)

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

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

Mfgr. Gerhart - Owens

Logging Co. Utah Mines Ltd.

Chemicals:

Lost Circulation at depth(s) 27' (8.23 m) to 40' (12.19 m) approx.; Regained (Yes) (No) Partially

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

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

Casing: Depth 27'(8.23m); Diameter HW-4.5 in. Recovered (Yes) (No)

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

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

Invoice Number for above

Contractor: Name & Address Canadian Longyear Ltd.

Samples and Core Description by: A.T. Armstrong

Report Prepared by: A. T. Armstrong Date September 25, 1978

Comments:

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek Property

FROM 0 TO 101.7 BY A.T. Armstrong

FROM	TO	DESCRIPTION
0	26	OVERBURDEN: Strongly broken and weathered bedrock (hole cased to 26')
26	39	SANDSTONE, SILTSTONE, MUDSTONE: very finely laminate and finely cross bedded - light medium to dark grey - fine grained sandstone predominated near the top of the sequence with increasing siltstone and mudstone downward - mudstone predominates at the base with lenses of siltstone - small scale channeling and small worm burrows common throughout - bedding at 85° to core axis
39.0	39.2	COAL--0.2'-black, thin banded (very strongly broken)
39.2	53.7	SILTSTONE: medium grey to dark grey - generally siltstone with areas of mudstone and sandstone - strongly disturbed, laminate 39.2' to 42.4' becoming more homogeneous and massive downward - 39.2' to 39.6' shattered with calcite veining - shell bands at 41.3', 47.2' 49.1' - 49.3'
53.7	55.5	MUDSTONE - dark grey to black
55.5	66.8	INTERLAMINATED AND MIXED MUDSTONE - SILTSTONE: light medium grey to dark medium grey - indistinct strongly disturbed bedding - muddy with siltstone lenses at the top becoming more silty downward
66.8	69.1	CARBONACEOUS SANDSTONE - light medium grey to medium grey - fine grained - carbonaceous debris in thin bands and streaks throughout - massive to thin bedded at 85° to core axis
#55 69.1	71.7	COAL--2.6'-black, weakly banded, 25% bright bands (broken to solid, 50% recovery)
71.7	72.0	MUDSTONE - dark grey to black, coal streaked
72.0	77.2	MUDDY SILTSTONE - medium grey to dark grey - strongly mixed - few fine coal streaks
77.2	79.1	SANDSTONE- fine grained - light grey to light medium grey - thinnly laminate and crossbedded - some small scale channeling evident - muddy near the base
79.1	80.1	SILTY MUDSTONE - dark grey, massive
80.1	84.4	INTERLAMINATED & MIXED SANDSTONE & MUDDY SILTSTONE - light medium grey to dark medium grey - strongly disturbed bedding
84.4	101.7	SANDSTONE--light medium grey - fine to medium grained, massive to indistinctly bedded - coarser grained toward the base - fine calcite veining at 0.2' to 1.5' spacing

Note: Underlined footages are approximate- core is badly broken wi some core loss.

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek Property

FROM 101.7 TO 155.7 BY A.T. Armstrong

	FROM	TO	DESCRIPTION
			cont'd - and oriented 85° to 75° to core axis - one vein at 5° to core axis
			- bedding commonly at 60° to core axis (probably foreset bedding in channel sands)
			- fine mud clasts at 88'
			- muddy laminations in fine grained sands 100.4' to 101.7'
			- carbonaceous debris 101.3' to 101.7'
	101.7	105.5	MUDSTONE - dark grey, massive, silty in places
#56	105.5	106.0	COAL--0.5'-bone coal, black, dull (strongly broken, recovery 50%)
	106.0	107.0	MUDSTONE - dark grey, silty
#57	107.0	112.0	COAL--5.0'-black, clean & bright, banded & cleated (solid to broken -recovery about 80%)
	112.0	116.0	COALY MUDSTONE - black, strongly broken strongly coal streaked
	116.0	122.6	MUDDY SILTSTONE - dark grey - inhomogeneous mixture with minor sand fraction
			- shattered with calcite veining 117.3' - 117.7'
			- few irregular calcite veins throughout
			- irregular coal streaks near the top
	122.6	134.1	INTERBEDDED & INTERLAMINATED SILTSTONE, SANDSTONE & MUDSTONE - predominantly siltstone
			- light medium grey to dark grey - fine grained sandstone - irregular to strongly disturbed bedding - worm burrows common
			- irregular calcite veining present throughout
	134.1	135.6	MUDSTONE - dark brownish-grey - coal streaks 134.2 to 134.4 - silty clasts 134.4 to 134.7
			- coaly near basal contact - contact irregular at 50° to core axis
	135.6	136.1	COAL--0.5'--black, some bright coal, irregular contacts, (recovery 75%)
	136.1	147.2	SILTY MUDSTONE - dark grey mottled appearance
	147.2	149.5	INTERLAMINATED SILTSTONE & MUDSTONE - predominantly mudstone with thin laminae and lenses of silt - medium grey to dark grey
	149.5	155.7	SANDSTONE - light medium to medium grey - fine to medium grained (coarser sand toward base)
			- thinly laminate with some disturbed areas - distinct small scale cross-bedding in places - bedding at ≈ 75° to core axis
			- some carbonaceous debris
			- shattered area with calcite veining at 150' to 150.2'

otages are approximate - broken th some core loss.

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek

FROM 155.7 TO 229.0 BY A.T. Armstrong

	FROM	TO	DESCRIPTION
	155.7	162.4	SILTY MUDSTONE - dark medium grey to dark grey massive
			- coal streaks near base
	162.4	163.0	COAL--0.6'--black, generally bright and cleated
			(recovery 95%)
	163.0	176.4	INTERLAMINATED SILTSTONE, MUDSTONE, SANDSTONE - light
			medium grey to black, carbonaceous, fine
			grained sandstone
			- generally very thin rhythmic laminations
			predominantly siltstone
			- cross-bedding in fine sands, channeling
			(small scale) worm burrows in muddy laminations
			silty clasts in mud
			- increasing mudstone content toward the base
	176.4	179.7	SANDSTONE - light medium grey, fine to medium grained
			with few laminations and clasts of muddy
			siltstone
	179.7	185.1	MUDSTONE - dark grey to black
			- fine silty lenses and laminations 182' - 184'
			- black and coal streaked toward base
#58	185.1	187.0	COAL--1.9'--black dull with bright bands (65% recovery)
	187.0	191.3	SILTY SANDSTONE - fine grained sandstone light-medium
			to medium grey - generally disturbed to
			well mixed
			- fine coal streaks at the base
	191.3	191.6	COAL--0.3'--black, bright banded (100% recovery)
	191.6	194.0	COALY MUDSTONE - dark grey to black carbonaceous with
			many thin coal seams and coal streaks
	194.0	197.9	SANDSTONE - medium grey - fine grained dirty sand,
			homogeneous - some carbonaceous debris
	197.9	204.7	SILTY MUDSTONE - dark grey, some coal streaks and
			carbonaceous debris
	204.7	210.9	SANDSTONE - light medium grey to medium grey
			- irregularly bedded to strongly disturbed
			- few narrow irregular lenses and laminae of
			silty mudstone caught up in sandstone
	210.9	214.8	SILTY MUDSTONE - medium to dark grey - mottled to
			indistinctly bedded
			- calcite veins at 213.5', 213.9' & 214'
	214.8	226.1	SANDSTONE - very minor muddy and silty laminations
			- light medium grey to dark grey - fine
			grained
			- generally well bedded at 85° to core axis
			- some cross-bedded areas - worm burrows in
			silty fraction
	226.1	229.0	INTERLAMINATED MUDSTONE & SILTSTONE - light medium grey
			and dark grey

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek

FROM 229.0 TO 322.3 BY A.T. Armstrong

	FROM	TO	DESCRIPTION
		299.0	cont'd - thin laminations and lenses of siltstone in predominantly mudstone
			- bedding at 85° to core axis
	229.0	231.9	MUDSTONE - dark grey to black
#59	231.9	233.0	COAL--1.1'--dull and boney to bright (broken, 80% recovery)
	233.0	233.45	COALY MUDSTONE - black, coal streaked
#60	233.45	237.8	COAL--4.35'-black, bright streaks in moderately bright mass (solid to broken - 80% recovery)
	237.8	238.2	COALY MUDSTONE - black, coal streaked
	238.2	243.4	MUDSTONE - dark grey, few silty of siltstone laminations
	243.4	244.0	COAL--0.6'--black, banded (strongly broken 50% recovery)
	244.0	245.9	MUDSTONE - dark grey - few coal streaks
			- very thin coal seams at 244.4' - 245.4'
	245.9	278.25	SANDSTONE - light medium to medium grey, dirty fine grained at the top
			- uniformly medium grained from 248.9'
			- massive to bedded - foreset bedding at 65° to core axis - widely spaced carbonaceous laminations and thin clasts
			- pebble bands at 272.2', 274.4', to 275', 275.4'
#61	278.25	281.0	COAL--2.75'-black (badly broken - 50% recovery)
	281.0	284.3	MUDSTONE - dark grey to black - sandy at the base and grading into sandstone
	284.3	314.15	SANDSTONE - fine grained at top and becoming medium grained downward
			- light medium grey to medium grey
			- strongly disturbed bedding down to 289.3' then regular lamellar to cross-bedded to massive - bedding in fine sands at 85° to core axis, steeper foreset bedding toward base
			- brown rounded mud clasts at 300.3', 304.5'
			- few widely spaced carbonaceous laminations and clasts
			- thin calcite veining nearly parallel to core axis toward base
	314.15	314.9	COAL--0.75'-black, banded dull to bright (broken - 50% recovery)
	314.9	317.8	MUDSTONE - dark grey to black - coal streaked at the top, silty toward the base
	317.8	322.3	SANDSTONE - light grey with black fine carbonaceous laminations and streaks - fine grained, thin bedded with feathery cross-bedding

e approximate - ith some core loss.

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek

FROM 322.3 TO 400.8 BY A.T. Armstrong

FROM	TO	DESCRIPTION
322.3	322.45	COAL-0.15' - black and bright
322.45	325.0	MUDSTONE - dark grey - sandy at the base and gradational into sandstone
325.0	333.4	SANDSTONE - light medium grey - fine to medium grained - indistinctly bedded to massive - few carbonaceous streaks toward the base
333.4	335.5	MUDSTONE - dark grey to black
335.5	346.5	INTERLAMINATED MUDSTONE & SILTSTONE - medium grey to dark grey - thinly interlaminate regular to strongly disturbed - predominantly mudstone - worm burrows common
346.5	348.75	MUDSTONE - dark grey to black - coal streaked toward the base
348.75	349.2	COAL-0.45'- bright, black (100% recovery)
349.2	349.5	MUDSTONE - black, coal streaked
349.5	350.8	SILTSTONE - medium grey to dark medium grey thinly bedded at 90° to core axis - worm burrows near top
350.8	351.0	COAL-0.2'- black, bright & banded
351.0	351.2	MUDSTONE - black, coal streaked
351.2	352.4	SILTSTONE - light medium grey, finely laminate at 90° to core axis
352.4	354.75	MUDSTONE - black, coal streaked
354.75	355.5	COAL-0.75'- bright, black, banded (100% recovery?)
355.5	356.0	MUDSTONE - dark grey - coal streaked
356.0	364.5	SILTSTONE - medium grey to dark medium grey - irregularly bedded to strongly disturbed - some muddy areas and clasts of more muddy material
304.5	380.9	SANDSTONE - light medium grey - fine grained - thin bedded at 85° to 90° to core axis - carbonaceous - small black mud clasts common throughout
380.9	387.8	MUDSTONE TO SILTY MUDSTONE - dark grey - sandy area 382.6' to 383.3'
387.8	390.8	MIXED MUDSTONE & SILTSTONE - dark medium grey to dark grey - irregularly laminate to mixed
390.8	391.2	MUDSTONE - dark grey
391.2	392.2	COAL-1.0' - bright, black 90% recovery
392.2	392.6	MUDSTONE - dark grey
392.6	400.8	SILTY MUDSTONE - dark medium grey to dark grey irregularly laminate to mixed with mottled appearance - zoned calcite veins at 394.6' to 395.2' 396.3' possibly with some sphalerite

are approximate -
h with some core loss.

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek

FROM 400.8 TO 464.5 BY A.T. Armstrong

	FROM	TO	DESCRIPTION
	400.8	406.0	INTERLAMINATED SANDSTONE MUDSTONE & SILTSTONE - medium grey to dark grey banded - regular to disturbed bedding - bedding at 90° to core axis - worm burrows in muddy laminations
	406.0	409.6	SANDSTONE - light medium grey to medium grey fine grained - few scattered mud clasts
	409.6	416.5	MIXED SANDSTONE & SILTY MUDSTONE - very strongly disturbed bedding - light medium grey to dark grey
	416.5	417.7	MUDSTONE - dark grey to black
#62	417.7	419.0	COAL-1.3' - black, dull to bright, (recovery about 80%)
	419.0	420.0	MUDSTONE - medium greyish brown mottled
#63	420.0	423.0	COAL-3.0' - black and bright (broken, 60% recovery)
	423.0	423.2	MUDSTONE - black
	423.2	427.5	SILTY MUDSTONE - dark medium grey to dark grey - strongly mixed, mottled appearance - brownish grey mud clasts present in silty mudstone matrix
	427.5	430.0	MUDDY SANDSTONE - medium grey to dark medium grey - fine grained sandstone - massive sand to mixed muddy sandstone
	430.0	438.5	MUDDY SILTSTONE - medium grey to dark grey - irregularly laminate to strongly disturbed bedding - worm burrows common
	438.5	440.9	MUDSTONE - dark grey to black - coaly 439.6' to 440'
#64	440.9	444.0	COAL-3.1' - black, bright, cleated, banded (strongly broken, 75% recovery)
	444.0	445.0	COALY MUDSTONE - black, strongly coal streaked
	445.0	448.5	MUDDY SILTSTONE - medium grey to dark grey - distrubed to mixed bedding
	448.5	451.6	MUDSTONE - dark grey and dark brownish grey - coal streaks at 449' to 449.2' 451.5' to 451.6'
	451.6	458.0	INTERLAMINATED TO MIXED SANDSTONE MUDSTONE SILTSTONE - banded to mottled medium grey to dark grey - bedding at 85° to core axis - fine grained sandstone - some crossbedding and worm burrows
	458.0	458.2	MUDSTONE - black
	458.2	459.8	COAL-1.6' - bright and black, some shearing present (50% recovery)
	459.8	460.3	MUDSTONE - dark grey to black - coal streaked at the top
	460.3	464.5	SANDSTONE - light medium grey to medium grey - fine grained - some silt present - many fine mud clasts from 464' to 464.5' - indistinct bedding and cross-bedding

approximate -- h. some core loss

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek

FROM 464.5 TO 545.2 BY A.T. Armstrong

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

	FROM	TO	DESCRIPTION
	464.5	467.7	MUDSTONE - dark grey to dark brownish grey - silty patches
	467.7	471.1	COALY MUDSTONE - dark brownish grey to black with numerous coal streaks and narrow coal seams <0.05' thick
	471.1	498.8	MUDDY SILTSTONE AND SILTSTONE - medium grey to dark medium grey - bedding at 85° to core axis but generally irregular to very strongly disturbed - 475.4' fine calcite veins (possibly shell fragments) - 483.4' to 483.8' - several calcite veins - 488' to 491' calcite veins at 5° to core axis
	498.8	512.5	SILTSTONE & MUDSTONE (COALY) - predominantly a medium grey siltstone with black mudstone areas with numerous large irregular coal streaks - carbonaceous and coaly sandstone at base - bedding in siltstone 507' - 508' at 85° to core axis
	512.5	516.5	MUDSTONE - dark grey to black - few small medium grey silty lenses
#65	516.5	518.6	COAL-2.1' - black banded with few narrow ashy bands (75% recovery)
	518.6	519.3	MUDSTONE - dark grey to black
	519.3	524.3	INTERLAMINATED & MIXED MUDSTONE & SILTSTONE - light medium to dark grey
	524.3	524.5	MUDSTONE - dark grey
#66	524.5	526.5	COAL-2.0' - black, bright - weakly cleated (strongly broken - 50% recovery)
	526.5	527.3	COALY MUDSTONE - black - coal streaks
	527.3	528.9	SILTSTONE - light medium grey to medium grey thinly laminate regular to strongly disturbed - bedding at 85° to core axis
	528.9	532.0	MUDSTONE - dark grey
	532.0	537.0	SILTSTONE & SANDSTONE (fine grained) - light medium grey to medium grey - some fine muddy laminations - carbonaceous debris on bed's surfaces - numerous fine worm burrows
	537.0	540.8	COAL-3.8' - black, banded, bright - generally solid with some grinding (95% recovery)
	540.8	541.2	MUDSTONE - black, coal streaked
	541.2	544.9	MIXED & INTERLAMINATED SILTSTONE & MUDSTONE - light medium grey to dark grey - coal streaks in mudstone at 541.8' and 543.1' to 543.3'
	544.9	545.2	COAL-0.3' - black, very bright, cleated (80% recovery broken)

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek

FROM 545.2 TO 613.0 BY A.T. Armstrong

	FROM	TO	DESCRIPTION
	545.2	546.0	MUDSTONE - dark grey - coal streaked at top
	546.0	559.5	MIXED MUDSTONE & SILTSTONE - predominantly mudstone - light medium grey and dark grey silty (with minor sand) area 551.5 to 555.0' with silt laminae and lenses in mud above and below - mudstone toward the base with silty lenses dying out at 556.5'
	559.5	560.4	COAL-0.9' - black, banded, dull to bright (strongly broken, 80% recovery)
	560.4	561.5	MUDSTONE - dark grey
	561.5	568.0	SILTSTONE - light medium to medium grey - generally massive with some disturbed indistinct bedding
	568.0	574.5	MUDSTONE/CLAYSTONE - dark grey with light medium brownish-grey indistinct bands
	574.5	575.0	COAL-0.5' - black bright banded (100% recovery)
	575.0	575.5	MUDSTONE - dark grey
	575.5	578.3	SILTSTONE - light medium grey thinly laminate at 85° to 90° to core axis - muddy at the top
#68	578.3	580.2	COAL-1.9' - black banded moderately bright to bright - few dirty bands and 0.15' mudstone split (broken at the top - 75% recovery)
	580.2	580.4	MUDSTONE - dark grey
	580.4	587.0	SILTSTONE - light medium to brownish dark medium grey - disturbed bedding
	587.0	588.5	MUDSTONE - dark grey - shaley
	588.5	589.5	SILTSTONE - light medium to medium grey disturbed bedding
	589.5	589.7	MUDSTONE - dark grey
	589.7	590.4	COALY MUDSTONE - dark grey to black with coal streaks
	590.4	591.4	MUDSTONE - dark grey
	591.4	600.5	SANDSTONE/SILTSTONE - predominantly fine grained sandstone - light medium to medium grey - thin bedded with cross-bedding to massive - minor dark grey mud content in few narrow bands - some carbonaceous bedding surfaces - mud clasts at 594.2'
	600.5	608.8	INTERLAMINATED MUDSTONE & SILTSTONE - banded light medium grey to dark grey - predominantly mudstone and grading to mudstone at the base with siltstone as fine lenses
	608.8	609.6	MUDSTONE - black
	609.6	609.95	COAL-0.35' -black - very bright (strongly broken - 60% recovery)
	609.95	613.0	MUDSTONE - dark grey - dark medium silty zone at 610.5' to 611.5'

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek

FROM 613.0 TO 692.1 BY A.T. Armstrong

FROM	TO	DESCRIPTION
613.0	619.5	SANDSTONE - light medium grey - fine grained thinly laminate and cross-bedded - some carbonaceous bedding surfaces - bedding at 85° to 90° to core axis
619.5	643.4	INTERLAMINATED SILTSTONE & MUDSTONE - light medium grey siltstone to dark grey mudstone - generally well bedded with small scale cross bedding in siltstone - bedding at 85° to 90° to core axis - predominantly mudstone with thin silt laminae and lenses 624' to 629.3', 639.0' to 640.6', 643' to 643.4'
643.4	644.5	COALY MUDSTONE - black with coal streaks
644.5	647.6	MUDSTONE - dark grey, silty toward the base
647.6	648.0	SANDSTONE - fine grained, light medium grey
648.0	653.0	SILTY MUDSTONE - variable light medium grey to dark grey massive - mess of fine calcite veins at 649.6' to 650.1'
653.0	665.8	INTERLAMINATED TO MIXED MUDSTONE AND SILTSTONE - light medium grey to dark grey thinly banded to strongly disturbed to massive - regular fine laminations at 90° to core axis - predominantly mudstone - dense mess of calcite veins at 664.5' to 664.8'
665.8	669.35	MUDSTONE - dark grey to black - massive few coal streaks near the base
669.35	669.9	COAL-0.55'- black, dull to bright, (very strongly broken - 30% recovery)
669.9	670.7	MUDSTONE - dark grey to black, coal streaked
670.7	679.8	SANDSTONE - light grey to light medium grey, fine grained, thinly laminate with some small scale cross-bedding - numerous carbonaceous bedding surfaces - regular laminations generally at 85° to core axis
679.8	688.4	INTERLAMINATED TO MIXED MUDSTONE/SILTSTONE - light medium grey to dark grey - thin laminae and lenses of siltstone in a mudstone matrix - at 684' rock is disturbed with siltstone as diffuse rounded blobs in mudstone matrix - carbonaceous debris common from 684' to base
688.4	690.05	MUDSTONE - dark grey to black
690.05	690.4	COAL-0.35' -black, boney (recovery 100%)
690.4	691.8	MUDSTONE - black
691.8	692.1	COALY MUDSTONE - black with numerous coal streaks

approximate - h some core loss.

CORE DESCRIPTION

HOLE # WCC - 78-1 AREA West Carbon Creek

FROM 692.1 TO 717 BY A.T. Armstrong

FROM	TO	DESCRIPTION
692.1	693.3	MUDSTONE - dark grey - medium grey silty band at 692.3' to 692.5'
693.3	707.0	DISTURBED TO STRONGLY MIXED SANDSTONE - light medium to dark medium grey - inhomogeneous with minor silt and mudstone - carbonaceous debris common - scattered shell fragments - brecciation with calcite veining 700.9' to 701.1'
707.0	709.7	MUDSTONE - dark grey, massive, immature pelecypod shells common - carbonaceous debris common
709.7	712.4	COALY MUDSTONE/SILTSTONE - medium grey to black - silty to siltstone zone 710' - 710.9' - strongly coal streaked 711' to 712.3' with few coal streaks beyond this zone
712.4	717	INTERLAMINATED SILTSTONE & MUDSTONE - medium grey to dark grey generally regularly laminate to moderately disturbed - carbonaceous debris common

In - CARBON CREEK (WEST) 78(3)D

506

Widco WELL LOG

COMPANY Utah Mines Ltd.

AREA West Carbon Creek - headwaters (south) of 7 Mile Ck.

WELL WCC-78-1 C.L. 120

COUNTY STATE Province - British Columbia

COORDINATES N 14,560mN
E 39,510mW

ELEVATION D.F.
K.B.
G.L. 1565 metres

LOCATION WCC-78-1 14,560mN 39,510mW

COMPANY Utah Mines Ltd.

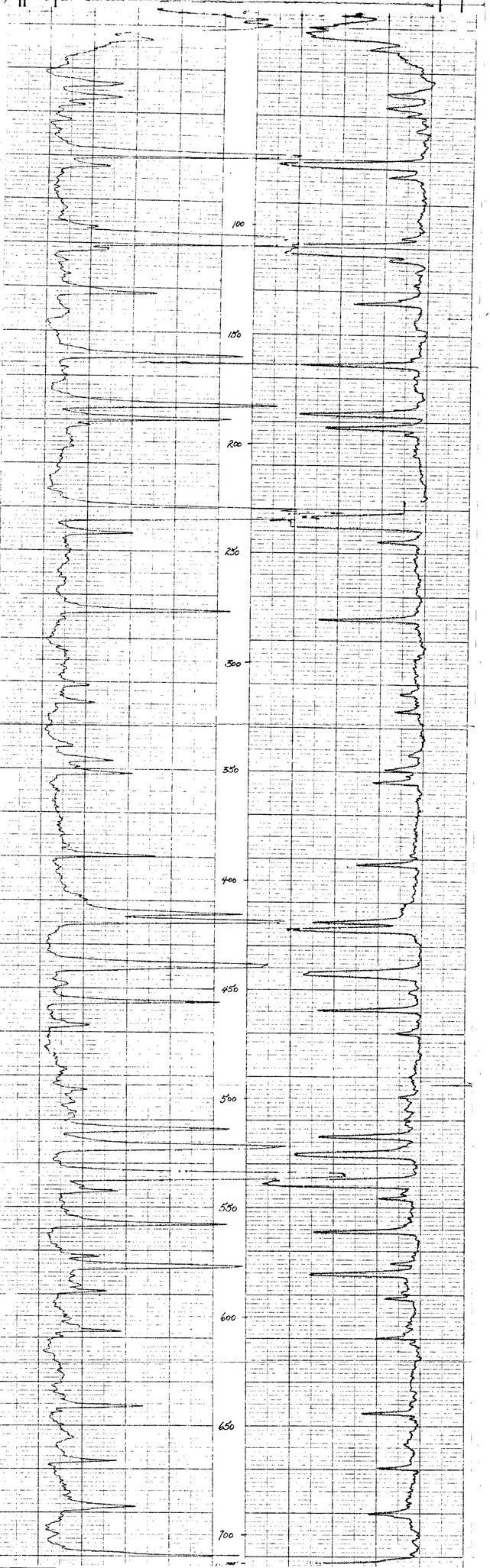
	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	September 27/78		Nature		
First Reading	703' (214.27m)		Density		
Last Reading	0' (0m)		Viscosity		
Footage Logged	703'		Resistivity	@ °F	@ °F
Bottom (Driller)	713'		Res. @ BHT	@ °F	@ °F
Casing (From Log)			pH		
Casing (Driller)	27'		Circ Temp.		
Casing Size	HW 4.5 in.		BHT Temp.		
Bit Size	HQ 3.782 in.				
Bit Size			Logged by	A.T. Armstrong	
			Witnessed by		

REMARKS

* Reg. U.S. Pat. Off.

GAMMA
500 CPS

DENSITY
500 CPS



506

UTAH CONSTRUCTION & MINING CO.

DRILL & CORE LOG

HOLE NO. W.C.C. 78-2

LOG BY: R.B. ANDERSON

DATE: Oct. 2 1978

ELEV: 1245 meters (4084 ft)

N. 43,770 m

E. 34320 m

HOLE SIZE: H.Q. 4.5"

AIR ☐ WATER ☑

T.D. 502.0' P.D.

HOLE NO. W.C.C. 78-2

PROJECT: WEST CARBON CREEK

C.L. ~~LEASE~~ 4122

SEC. T. R.

Pe - Carbon Cr. (West) 78(3)4.

% REC	DEPTH	STRIP LOG	THICK	SAMPLE NO	GRAV.	LITHOLOGY	ANALYSIS
	0						
			1.4			black, bright - 5-10% recovery	
	85°						
	50		2.1'				
	85°		3.0'	#69		COAL - black, bright to dull, banded, 75% recovery. - Mudstone split 0.8' Density log thickness - 2.5'/3.0	
	95°						
	100					calcite veins - 116.7' to 117.2 and 118.4' to 118.6'	
			4.1'	#70		Density Log thickness - 4.9'	
			1.8			COAL - black, bright, banded, weakly cleated, 35% recovery	
	150						
	85°						
	200					pebble clasts @ 206.1' - 207.5' - calc. on fracture @ 10° to C.A.	
			2.8	#71		COAL - bright, banded, badly broken, 7% recovery	
			0.3				
	250		0.1				
			0.6	#72		dark mudstone 'seat-earth'	
			2.2	#73			
	300		0.4			dirty	
	95°						
			0.5				
	350		1.0'			coal	
			0.1'				
			1.7	#74		COAL	
	400		0.2				
			1.9	#75		'seat earth'	
			0.8			COAL	
	450						
			1.0				
						pebble congl	
						- calcite stringers on fractures @ 65° to C.A. - Contact - fault gouge extremely sheared calcite runlets and stringers running in all directions	
	500					TD 502.0'	

506

Mt. Carbon Creek (West) 78(3)4

Widco WELL LOG

COMPANY Utah Mines Ltd.

AREA West Carbon Creek

WELL W.C.C. 78-2 C.L. 4122

COUNTY ____ STATE B.C.

COORDINATES: 34,320mE
N S 43,770mN
E
ELEVATION: 1245+m
D.F.
K.B.
G.L.

COMPANY Utah Mines Ltd.
WELL W.C.C. 78-2
LOCATION Headwaters 7 mile
34,320mE x 43,770mN

	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	Sept. 30/78		Nature		
First Reading	495.0'		Density		
Last Reading	0'		Viscosity	@ °F	@ °F
Footage Logged	495.0'		Resistivity	@ °F	@ °F
Bottom (Driller)	502.0'		Res. @ BHT	@ °F	@ °F
Casing (From Log)	27.0'		pH		
Casing (Driller)	27.0'		Circ. Temp.		
Casing Size	HW		B.H. Temp.		
Bit Size	HQ				
Bit Size			Logged by	R.B. Anderson	
			Witnessed by		

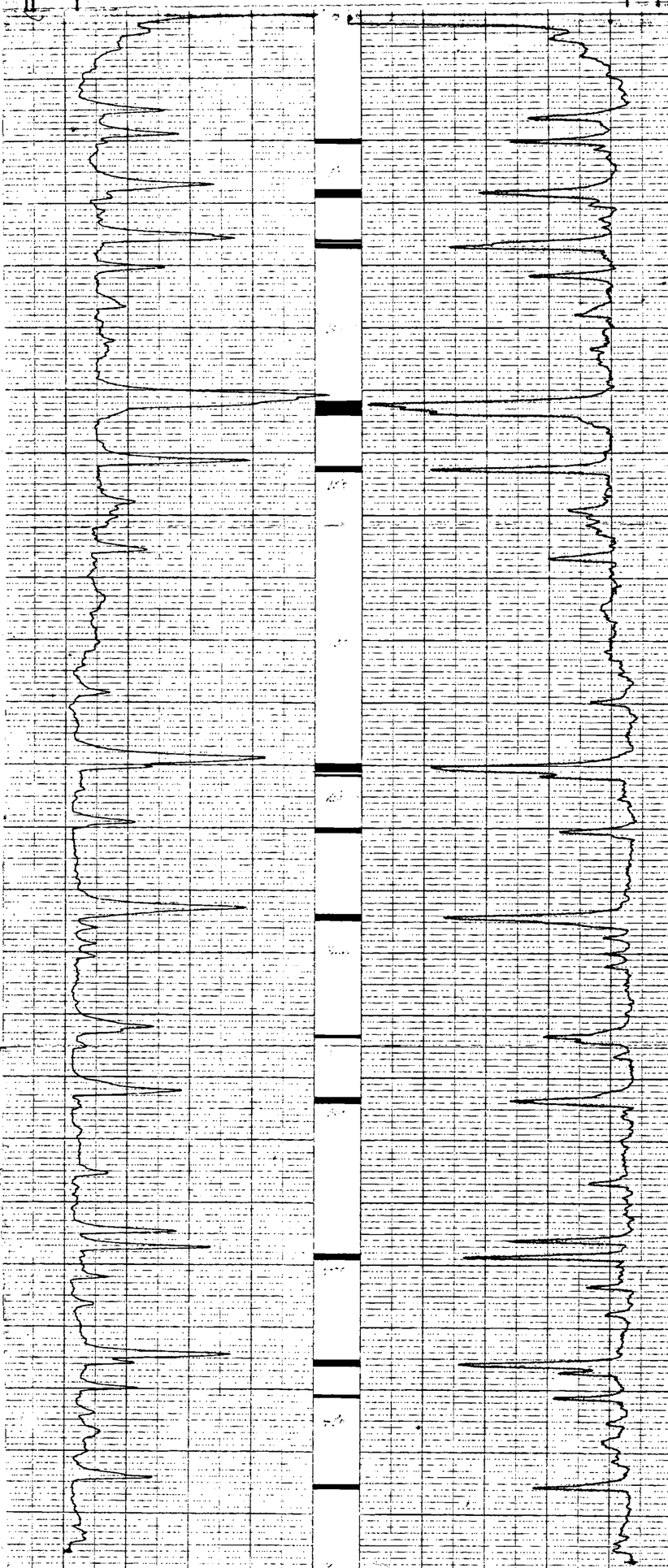
REMARKS GAMMA - log peaks in coal to the right - no change made in the Gamma control module would fix this problem. A curve like this is too much like the Density to be a gamma at all. Cross-over or interference of some sort is producing a density instead of a gamma.

* Reg. U.S. Pat. Off.

FO-139

Gamma
500 CPS

Density
500 CPS



506

In - CARBON CREEK (WEST) 72(8)10

Widco WELL LOG

COMPANY Utah Mines Ltd.

AREA West Carbon Creek - Headwaters (south) of 2 Mile Ck.

WELL WCC-78-1 Est. #120

COUNTY ____ STATE Province - British Columbia

COORDINATES N 34,560mN / E 39,500mN

ELEVATION: 1565 metres D.F. ____ K.B. ____ G.L. ____

LOCATION 34,560mN, 39,500mE

WELL WCC-78-1

COMPANY Utah Mines Ltd.

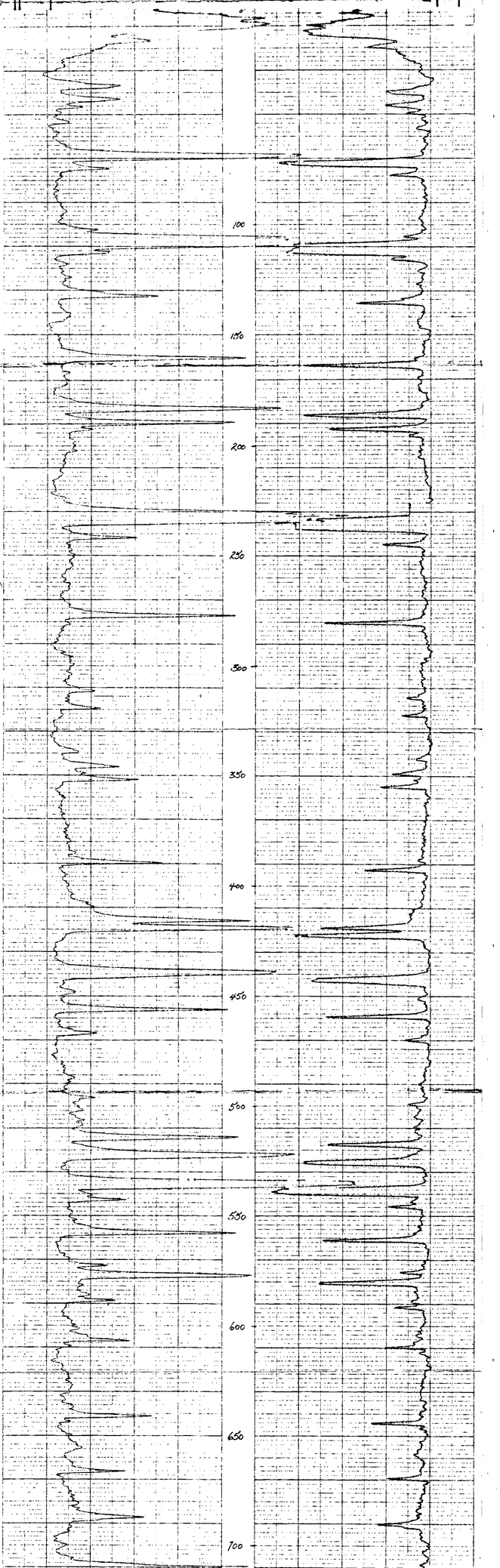
	Run No. 1	Run No. 2	MUD	Run No. 1	Run No. 2
Date	September 22/78		Nature		
First Reading	703' (214.27m)		Density		
Last Reading	0' (0m)		Viscosity	@ ° F	@ ° F
Footage Logged	703'		Resistivity	@ ° F	@ ° F
Bottom (Driller)	713'		Res. @ BHT	@ ° F	@ ° F
Casing (From Log)			pH		
Casing (Driller)	27'		Circ. Temp.		
Casing Size	HW 4.5 in.		B.H. Temp.		
Bit Size	HQ 3.782 in.				
Bit Size					
			Logged by	A.T. Atherton	
			Witnessed by		

REMARKS

* Req. U.S. Pat. Off

GAMMA
500 CPS

DENSITY
500 CPS



CONFIDENTIAL

WEST CARBON CREEK
Hole WCC-78-1
Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	Elementary Data FSI	% Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #55 3/8" x 0												
1.400 F	97.81	4 1/2	1.35	0.80	29.26	69.39	14895	43.54	99.62	98.91	99.76	99.71
1.400 S	2.19	0	78.18	0.12	14.39	7.43	1943	56.46	0.38	1.09	0.24	0.29
Total	100.00		3.03	0.79	28.93	68.04	14612	100.00	100.00	100.00	100.00	100.00
Sample #56 3/8" x 0												
1.400 F	24.75	8	13.90	0.89	29.67	56.43	12981	7.74	24.31	34.85	40.48	39.97
1.400 S	75.25	1/2	54.47	0.91	18.24	27.29	6412	92.26	75.69	65.15	59.52	60.03
Total	100.00		44.43	0.91	21.07	34.50	8038	100.00	100.00	100.00	-100.00	100.00
Sample #57 3/8" x 0												
1.400 F	98.25	4	2.95	0.60	29.29	67.76	14613	77.18	98.83	98.79	99.19	99.18
1.400 S	1.75	0	48.95	0.38	20.16	30.89	6782	22.82	1.17	1.21	0.81	0.82
Total	100.00		3.76	0.60	29.13	67.11	14476	100.06	100.00	100.00	100.00	100.00
Sample #58 3/8" x 0												
1.400 F	87.24	7	3.67	0.80	28.98	67.35	14554	40.51	90.41	90.60	91.53	91.66
1.400 S	12.76	1/2	36.85	0.58	20.56	42.59	9058	59.49	9.59	9.40	8.47	8.34
Total	100.00		7.90	0.77	27.91	64.19	13853	100.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-L

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	Elementary FSI	% Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #59 3/8" x 0												
1.400 F	77.87	9	3.23	0.79	34.28	62.49	14748	24.99	83.00	81.83	84.91	84.62
1.400 s	22.13	1 1/2	34.12	0.57	26.79	39.09	9433	75.01	17.00	18.17	15.09	15.38
Total	100.00		10.07	0.74	32.62	57.31	13572	100.00	100.00	100.00	100.00	100.00
Sample #GO 3/8" x.0												
1.400 F	96.05	7 1/2	2.53	0.68	30.62	66.85	14863	53.18	89.57	'97.53	98.37	98.27
1.400 s	3.95	1	54.14	1.92	18.88	26.98	6384	46.82	10.43	2.47	1.63	1.73
Total	100.00		4.57	0.73	30.16	65.27	14528	100.00	LOO.00	100.00	100.00	100.00
Sample #61 3/8" x 0												
1.400 F	70.84	4	5.42	0.91	36.91	57.67	34478	22.88	78.66	80.31	80.65	81.02
1.400 s	29.16	1/2	44.39	0.60	21.99	33.62	8238	77.12	21.34	'19.69	19.35	18.98
Total	100.00		16.78	0.82	32.56	50.66	12658	100.00	100.00	100.00	100.00	100.00
Sample #62 3/8" x 0												
1.400 I?	51.48	8	3.07	0.93	29.88	67.05	I.4582	5.50	64.64	.65.81	72.07	70.79
1.400 s	48.52	1 L/2	55.96	0.54	16.47	27.57	6383	94.50	35,36	34.19	27.93	29.21
Total	100.00		28.73	0.74	23.37	47.90	10604	100.00	100,00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-1

Single Gravity Tests

Moisture Free Basis

Product and sp. Gr.	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #63 3/8" x 0												
1.400 F	53.36	9	4.19	0.96	30.23	65.58	14468	8.51	66.24	61.78	73.48	71.40
1.400 S	46.64	2	51.52	0.56	21.40	27.08	6630	91.49	33.76	38.22	26.52	28.60
Total	100.00		26.27	0.77	26.11	47.62	10812	100.00	100.00	100.00	100.00	100.00
Sample #64 3/8" x 0												
1.400 F	72.85	6 1/2	4.04	0.78	27.57	68.39	14563	20.10	78.56	69.67	88.14	82.26
1.400 S	27.15	1 1/2	43.10	0.57	32.20	24.70	8429	79.90	21.44	30.33	11.86	17.74
Total	100.00		14.64	0.72	28.83	56.53	12897	100.00	100.00	100.00	100.00	100.00
Sample #65 3/8" x 0												
1.400 F	42.39	9	7.49	1.66	33.33	59.38	14037	10.57	25.08	54.55	56.94	57.32
1.400 S	57.61	3	46.65	3.65	20.31	33.04	7690	89.43	74.92	45.45	43.06	42.68
Total	100.00		30.05	2.81	25.75.	44.20.	10380	100.00	100.00	100.00	100.00	100.00
Sample #66 3/8" x 0												
1.400 F	61.39	8 1/2	6.64	0.88	33.62	59.74	14039	19.39	74.48	60.93	81.31	78.93
1.400 S	38.61	1 1/2	43.89	0.48	34.27	23.84	5960	80.61	25.52	39.07	18.69	21.07
Total	100.00		21.02	0.73	33.87	45.11	10920	100.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-1

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample 167 3/8" x 0												
1.400 F	89.87	7	2.50	0.77	28.35	69.15	14831	41.22	82.78	90.18	93.74	93.14
1.400 S	10.13	1	31.63	1.42	27.38	40.99	9695	58.78	17.22	9.82	6.26	6.86
Total	100.00		5.45	0.84	28.25	66.30	14311	100.00	100.00	100.00	100.00	100.00
Sample #68 3/8" x 0												
1.400 F	61.27	4 1/2	4.04	0.98	26.80	69.16	14517	9.16	81.97	59.67	93.18	88.67
1.400 S	38.73	0	63.34	0.34	28.65	8.01	2935	90.84	18.03	40.33	6.82	11.33
Total	100.00		27.01	0.73	27.51	45.48	10032	100.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-1

Sample #57 107.0'-112.0'

Washability Test

Moisture Free Basis

Specific Gravity	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
Minus 3/8" x 28m Fraction													
1.300 F	69.64	6 1/2	1.80	0.65	30.67	67.53	14787	69.64	1.80	0.65	30.67	67.53	14787
1.350 F	27.56	1	5.14	0.53	24.78	70.08	14224	97.20	2.75	0.62	29.00	68.25	14628
1.400 F	1.11	1 1/2	10.52	0.57	24.73	64.75	13242	98.31	2.84	0.62	28.95	68.21	14612
1.450 F	0.25												
1.500 F	0.10												
1.550 F	0.05												
1.600 F	0.04	2	20.33	0.71	27.79	51.88	11469	98.75	2.91	0.62	28.95	68.14	14597
1.600 S	1.25	0	70.20	0.31	16.88	12.92	3429	100.00	3.75	0.61	28.80	67.45	14458
Total	100.00		3.75	0.61	28.80	67.45	14458						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	82.90	4 1/2	2.60	0.61	29.89	67.51	14655	38.92	84.05	84.70	85.83	84.82
Conc. II	13.63	4	19.78	0.56	26.17	54.05	12721	61.08	15.95	15.30	14.17	15.18
Refuse	3.47											
Total	100.00		5.54	0.60	29.25	65.21	14324	100.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-l

Sample #60 233.45'-237.8'

Washability Test

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
Minus 3/8" x 28m Fraction													
1.300 F	85.81	7 1/2	2.19	0.72	32.18	65.63	14842	85.8:	2.19	0.72	32.18	65.63	1484;
1.350 F	9.19,	1 1/2	4.95	0.64	27.67	67.38	14440	95.00	2.46	0.71	31.74	65.80	1480:
1.400 F	0.68	1 1/2	12.48	0.69	25.63	61.89	13198	95.68	2.53	0.71	31.70	65.77	1479;
1.450 F	0.27												
1.500 F	0.33	4 1/2	21.83	1.79	26.96	51.21	11572	96.28	2.65	0.72	31.67	65.68	14771
1.550 F	0.39	2 1/2	30.30	1.90	25.86	43.84	10369	96.67	2.76	0.72	3i.65	65.59	1475:
1.600 F	0.46	1	33.53	2.28	22.85	43.62	9837	97.13	2.91	0.73	31.60	65.49	14730
1.600 S	2.87	1/2	67.76	1.88	14.99	17.25	4096	100.00	4.77	0.76	31.13	64.10	14425
Total	100.00		4.77	0.76	31.13	64.10	14425						

Flotation Test on -28m Fraction

Product	% Weight	FST	Moisture Free Basis: % Ash	% S	% VM	% FC	Btu	% Distribution: Ash	S	VM	FC	Btu
Conc. I	87.38	9	2.39	0.72	30.40	67.21	14798	59.17	86.64	88.36	88.44	88.53
Conc. II	51.46	6	11.42	0.77	27.74	GO.84	13277	'40.83	13.36	11.64	11.56	11.47
Refuse	1.16											
Total	100.00		3.53	IO.73	30.06	66.41	'14606	100.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-1

Sample #64 440.9'-444.0'

Washability Test

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
Minus 3/8" x 28m Fraction													
.300 F	44.08	7 1/2	2.20	0.86	30.73	67.07	14870	44.08	2.20	0.86	30.73	67.07	1487C
,350 F	20.39	1/2	5.05	0.75	23.02	71.93	14385	64.97	3.12	0.82	28.25	68.63	14714
,400 F	7.73	1 1/2	12.46	0.74	23.93	63.61	13236	72.70	'4.11	0.82	27.79	68.10	14557
.450 F	1.65	6 1/2	21.35	0.79	25.83	52.82	11825	74.35	4.49	0.82	27.75	67.76	14496
.500 F	1.48	4 1/2	26.71	0.75	24.80	48.49	10985	75.83	4.93	0.81	27.69	67.38	14428
,550 F	1.89	3 1/2	31.70	0.72	22.67	45.63	10189	77.72	5.58	0.81	27.57	66.85	14326
,600 F	2.34	3	36.53	0.57	21.57	41.90	9170	80.06	6.48	0.80	27.39	66.13	14176
,600 S	19.94	1	48.43	0.48	17.83	33.74	7599	100.00	14.85	0.74	25.48	59.67	12864
otal	100.00		14.85,	0.74	'25.48	59.67	12864						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis: % Ash	% S	% VM	% FC	Btu	% Distribution: Ash	S	VM	FC	Btu
Conc. I	83.36	6 1/2	8.13	0.76	26.63	65.24	'13934	57.67	85.79	86.67	86.83	87.00
Conc. II	14.08	1 1/2	29.90	0.63	20.51	49.59	30430	42.33	14.21	13.33	13.17	13.00
Refuse	2.56.)											
TotaL	100.00		1L.75	0.74	25.61	62.64'	13351	LOO.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-1

Sample #67 537.0'-540.8'

Washability Test

Moisture' Free Basis

Specific Gravity	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight & Ash	% S	% VM	% FC	Btu
Minus 3/8" x 28m Fraction												
1.300 F	67.19	6 1/2	1.95	0.72	30.26	67.79	14903	67.19	1.95	0.72	30.26	67.79	14903
~1.350 F	18.16	1 1/2	4.02	0.75	23.99	71.99	14545	85.35'	2.39	0.73	28.93	GE.68	1482G
1.400 F	3.30.	1 1/2	11.29	1.22	25.48	63.23	13193	88.65	2.72	0.74	28.80	68.48	14765
1.450 F	2.44	1 1/2	17.23	1.69	25.51	57.26	11551	91.09	3.11	0.77	28.71	GE.18	14679
1.500 F	1.84	1 1/2	22.20	2.19	25.97	51.83	11385	92.93	3.49	0.80	28.65	67.86	14613
1.550 F	1.05	1.	28.24	1.91	24.74	47.02	10410	93.98	3.76	0.81	28.61	67.63	14566
1.600 F	1.37	1 1/2	33.29	1.06	26.51	40.20	9523,	95.35	4.19	0.81	28.58	67.23	14493
1.600 S	4.65	1	44.12	0.70	29.77	26.11	6971	100.00	6.04	0.81	28.64	65.32	14143
Total	100.00		6.04	0.81	28.64	65.32	14143					

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	88.26	7	3.43	0.79	27.94	'68.63	14624	54.82	86,80	89.20	90.63	90.49
Conc. II	9.59	2	21.25	0.90	25.44	53.32	I.1554	45,18	13.20	10.80	9.37	9.51
Refuse	2.15											
Total	100.00		5,52	0.80	27.65	66.83	14263	~00.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-l

Structures

	Sample #57		Sample #GO		Sample #64		Sample #67	
Size	% Weight	Cum. % wt.	% Weight	Cum. % Wt.	% Weight	Cum. % Wt.	% Weight	Cum. % Wt.
-3/8" +1/4"	45.07	45.07	43.95	43.95	47.85	47.85	43.29	43.29
-1/4" +6m	24.03	69.10	25.24	69.19	24.57	72.42	25.33	68.62
-Gm +10m	13.53	82.63	13.70	82.89	12.73	85.15	13.67	82.29
-10m +28m	10.30	92.93	10.18	93.07	8.97	94.12	10.74	93.03
-28m	7.07	100.00	6.93	100.00	5.88.	100.00	6.97	100.00
Total.	100.00		100.00		100.00		100.00	

WEST CARBON CREEK
Hole WCC-78-2

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% weight	FSI	Elementary Data % Ash	% S	% VM	% FC	B t u	% Distribution Ash	S	VM	FC	Btu
Sample #69 3/8" x 0												
1.400 F	56.95	6	2.02	0.80	25.87	72.11	14970	5.02	81.57	44.47	93.44	89.19
1.400 s	43.05	0	SO.56	0.24	42.74	6.70	2399	94.98	18.43	55.53	6.56	10.81
Total	100.00		22.92	0.56	33.1.3	43.95	9558	100.00	100.00	100.00	100.00	100.00
Sample #70 3/8" x 0												
1.400 F	83.47	9	3.97	0.68	26.43	69.60	14459	22.90	92.96	91.48	94.60	94.19
1.400 s	16.53	1 1/2	67.50	0.26	12.43	20.07	4506	77.10	7.04	a.52	5.40	5.81
Total	100.00		14.47	0.61	24.1.2	61.41	12814	100.00	100.00	100.00	100.00	100.00
Sample #71 3/8" x 0												
1.400 F	81.03	9	6.95	0.70	28.44	64.61	14403	36.90	89.57	88.10	89.37	89.41
1.400 s	18.97	1	50.76	0.35	16.41	32.83	7292	63.10	10.43	11.90	10.63	10.59
Total.	100.00		15.26	0.63	26.16	58.58	13054	100.00,	100.00	100.00'	100.00	100.00
Sample 1172 3/8" x 0												
1.400 F	97.26	2	2.37	0.69	23.22	74.41	14916	50.59	96.27	97.41	99.30	99.21
1.400 s	2.74	0	59.45	0.94	21.88	18.67	4219	41.41	3.73	2.59	0.70	0.79
Total	100.00		3.94	0.70	23.18	72.88	14682	100.00	100.00	100.00	100.00	100.00

WEST CARBON: CREEK

Hole WCC 78-2

Single Gravity Tests

Moisture Free Basis

Product and Sp. Gr.	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	% Distribution Ash	S	VM	FC	Btu
Sample #73 3/8" x 0												
1.400 F	89.48	7 1/2	2.84	0.80	25.37	71.79	14985	48.07	62.64	91.35	91.95	92.01
1.400 s	10. 5.2	1/2	26.09	4.06	20.44	53.47	11061	51.93	37.36	8.65	8.05	7.99
Total	100.00		5.29	1.14	24.85	69.86	14573	100.00	100.00	100.00	100.00	100.00
Sample 474 3/8" x 0												
1.400 F	95.60	9	1.90	0.86	28.30	69.80	15165	47.07	94.16	'97.11	97.73	97.74
1.400 s	4.40	1/2	46.40	1.16	18.30	35.30	7607	52.93.	5.84	2.89	2.27	2 . 2 6
Total	100.00		3.86	0.87	27.86	68.28	14833	100.00.	100.00	100.00	100.00	100.00
Sample $75 3/8" x 0												
1.400 F	89.54	8 1/2	5.14	0 . 6 5	25.49	69.37	14696	58.00:	92.23	89.80,	93.20	92.73
1.400 s	LO.46	3	31.86	0.47	24.78	43.36	9866	42.00	7.77	10.20	6.80	7.27
Total	100.00		7.93	0.63	25.42	66.65	14191	100.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-2

Sample #69 71.1'-74.1'

Washability Test

Specific Gravity	% Weight	FSI	Moisture Free Basis: Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
Minus 3/8" x 28m Fraction													
1.300 F	54.27	5 1/2	1.41	0.81	25.96	72.63	15119	54.27	1.41	0.81	25.96	72.63	15119
1.350 F	2.56	1 1/2	5.41	0.73	24.15	70.44	14389	56.83'	1.59	0.81	25.88	72.53	15085
1.400 F	0.75	3	12.53	0.77	27.43	60.04	12784	57.58	1.73	0.81	25.90	72.37	15056
1.450 F	0.52	5	17.27	0.70	30.51	52.22	11528	58.10	1.87	0.81	25.94	72.19	15024
1.500 F	0.67	6	21.06	0.68	31.28	47.66	10882	58.77	2.09	0.81	26.00	71.91	14977
1.550 F	0.53												
1.600 F	0.41	4	23.00	0.71	31.93	45.07	10025	59.71	2.42	0.81	26.09	71.49	14895
1.600 S	40.29	0	54.48	0.12	42.86	2.66	2049	100.00	23.39	0.53	32.85	43.76	9725
Total	100.00		23.39	0.53	32.85	43.76	9722						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis: % Ash	% S	% VM	% FC	Btu	% Distribution: Ash	S	VM	FC	Btu
Conc. I	78.04	G	G.21	0.76	28.21.	65.58	14085	30.18	92.95	86.87	87.33	94.69
Conc. II	6.73	1/2	35.01	0.45	36.51	28.48	6871	14.67	4.70	9.70	3.27	3.98
Refuse	15.23	0	58.14	0.10	5.71	36.15	1008	55.15	2.35	3.43	9.40	1.33
Total	100.00		16.06	0.64	25.34	58.60	11608	100.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-2

Sample #70 122.9'-127.0'

Washability Test

Moisturd Free Basis

Specific Gravity	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
Minus 3/8" x 28m Fraction													
.300 F	54.30	7 1/2	2.51	0.76	28.08	69.41	14898	54.30	2.51	0.76	28.08	69.41	14898
.350 F	24.60	3 1/2	5.56	0.64	25.71	68.73	14441	78.90	3.46'	0.72	27.34	69.20	14755
.400 F	3.80	6	13.82.	0.66	28.00	58.18	13035	82.70	3.94	0.72	27.37	68.69	14676
,450 F	1.63	6 1/2	20.91	0.61	25.32	53.77	11998	84.33	4.27	0.72	27.33	68.40	14625
.500 F	1.18	5 1/2	27.68	0.56	22.79	49.53	10974	85.51	4.59	0.72	27.27	68.14	14574
.550 F	0.61	6 1/2	30.92	0.54	21.71	47.37	10474	86.12	4.78	0.71	27.23	67.99	14545
.600 F	0.39	6 1/2	35.66	0.51	20.68	43.66	9689	86.51	4.92	0.71	27.20	67.88	14523
.600 S	13.49	0	80.01	0.17	9.12	10.87	2593	100.00	15.05	0.64	24.76	60.19	12914
Total	100.00		15.05	0.64	24.76	60.19	12914						

Flotation Test on -28m Fraction

Product	% Weight	FSI	Moisture Free Basis % Ash	% S	- 8 VM	% FC	- Btu	% Distribution Ash	S	VM	FC	Btu
Conc. I	91.91	7 1/2	5.31	0.69	21.72	66.97	14533	49.43	96.06	95.63	96.96	96.96
Conc. II	3.73	4 1/2	30.87	0.58	21.27	47.86	10228	11.66	3.33	2.98	2.81	2.77
Refuse	4.36	0	88.13	0.09	8.53	3.34	855	38.91	0.61	1,39	0.23	0.27
Total	100.00		9.87	0.66	26.64	63.49	13776	100.00	100.00	100.00	100.00	100.00

WEST CARBON CREEK

Hole WCC-78-2

Structures

	Sample #69		Sample #70	
Size	% Weight	Cum. % wt.	% Weight	Cum- % Wt.
-3/8" +1/4"	42.81	42.81	35.28	35.28
-1/4" +6m	26.15	68.96	27.71	62.39
-6m +10m	12.28	81.24	15.33	78.32
-10m +28m	10.18	91.42	12.19	90.51
-28m	8.58	100.00	9.49	100.00
Total	100.00		100.00	

WEST CARBON CREEK

Trench Samples

Single Gravity Tests

Product and Sp. Gr.	% Weight	FSI	Moisture Free Basis — Elementary Data: % Ash	% S	% VM	% FC	Btu	% Distribution: Ash	S	VM	FC	Btu
Trench #1 3/8" x 0												
1.400 F	22.69	0	5.19	0.84	21.76	73.05	13924	2.64	39.38	31.34	41.81	41.66
1.400 S	77.31	.0	5G.17	0.38	13.99	29.84	5723	97.36	60.62	68.66	58.19	58.34
Total	100.00		44.60	0.49	15.75	39.65	7583	100.00	100.00	100.00	100.00	100.00
Trench #2 3/8" x 0												
1.400 F	9.97	0	6.15	0.88	'34.90	58.95	11664	4.97	10.89.	10.45	LO.81	10.89
1.400 S	90.03	0	13.02	0.80	33.13	53.85	10573	95.03	89.11	89.55	89.19	89.11
Total	100.00		12.33	0.81	33.31	54.36	I.0682	100.00	100.00	100.00	100.00	100.00
Trench #3 3/8" x 0												
1.400 F	31.25	0	6.95	0.93	32.62	60.43	12119	19.75	35.19	31.34	33.44	34.19
1.400 s	G8.75	0	12.84	0.78	32.48	54.68	10604	80.25	64.81	68.66	66.56	65.81
Total	100.00		11.00	0.83	32.52	56.48	11077	100.00	100.00	100.00	100.00	100.00
Trench #4 3/8" x 0												
1.400 F	29.41	0	4.52	0.77	33.71	61.77	12476	11.42	34.17	30.41	32.58	33.25
1.400 s	70.59	0	14.60	0.60	32.14	53.26	10433	88.58	65.23	69.59	67.42	66.75
Total	100.00		11.64	0.65	32.60	55.76	11034	100.00	100.00	100.00	100.00	100.00