1976 REPORT OF EXPLORATION ACTIVITIES

on the CARBON CREEK PROPERTY

in the LIARD mining division

LICENCE NO. 3445 to 3505 inclusive

45 miles northwest of Chetwynd, B.C.

NTS 93 0/15, 94 B/2

Owned by Utah Mines Ltd.

By

OPEN FILE

D.N. leNobel P.Eng.

of

Utah Mines Ltd.

1600-1050 West Pender Street

Vancouver, B.C.

V6E 3S7

Work performed between 4th June and October 19th, 1976

00,501

TABLE OF CONTENTS

	PAGE
ABSTRACT	1
PROPERTY LOCATION AND ACCESS	3
ECOLOGICAL STUDIES	4
RECLAMATION	4
PREVIOUS WORK	6
1976 FIELD SEASON	7
LOGISTICS	7
ROAD BUILDING	8
DRILLING	9
ADIT WORK	10
GENERAL GEOLOGY	11
STRATIGRAPHY	11
STRUCTURE	15
OBJECTIVES 1976 PROGRAM	16
EXPLORATION DIAMOND DRILLING RESULTS	17
South of Ten Mile Creek	17
Hill 40	18
Hill 58 East	19
Seven Mile Creek Vicinity	19
ROTARY DRILLING	19

TABLE OF CONTENTS - Continued

	PAGE
ADIT GEOLOGY	21
GENERAL	21
Adit 14	23
Adit 15	23
Adit 31	24
Adit 40	25
Adit 51	25
Adit 52	25
COAL QUALITY	26
COAL RESERVES	31

APPENDIX A

ANALYSIS OF ADIT SAMPLES AND DIAMOND CORE AND ROTARY CHIP SAMPLES, CARBON CREEK, 1976 * For analysis data, refer to Confidential Coal Analysis File

APPENDIX B

LIST OF GAMMA LOGS, BULK DENSITY LOGS AND LITHOLOGIC LOGS INCLUDED WITH THIS REPORT

FIGURES

		BETWEEN PAGES
1.	LOCATION MAP, CARBON CREEK	3 & 4
2.	REGIONAL MAP, CARBON CREEK	3 & 4
3.	COAL LICENCE AND LEASE LOCATIONS, CARBON CREEK	3 & 4
4.	EROSION CONTROLS, COAL STORAGE PAD	5 & 6
5.	LOCATION OF DIAMOND DRILLHOLES, 1976	9 & 10
6.	STEREO-PLOT OF POLES TO FRACTURES, ADITS 14, 15, 31, 40, 51, 52	21 & 22
7.	PHYSICAL CHARACTERISTICS, COAL SEAM 14	23 & 24
8.	PHYSICAL CHARACTERISTICS, COAL SEAM 15	23 & 24
9.	" " " " 31	24 & 25
10.	" " " " 40	25 & 26
11.	" " " " 51	25 & 26
12.	" " " " 52	25 & 26
13.	LOCATION OF SEAMS UTILIZED FOR COAL RESERVE ESTIMATE	31 & 32

TABLES

		PAGE
1.	SUMMARY OF EXPLORATION, 1971 to 1975	6
2.	LIST OF FORMATIONS, CARBON CREEK COAL BASIN .	12
3.	FLOW CHART, ANALYSIS OF DIAMOND HOLE SAMPLES .	27
4.	" " " " ROTARY HOLE SAMPLES .	28
5.	" " " " ADIT CHANNEL SAMPLES .	29
6.	COAL ANALYSIS AT 1.40 SPECIFIC GRAVITY	30
7.	INDICATED COAL RESERVES SOUTH OF TEN MILE CREEK 1976	32
8.	1975 CARBON CREEK COAL RESERVE ESTIMATE . . .	33
9.	1975 COAL RESERVE ESTIMATE FOR THE MCALLISTER CREEK AREA OF CARBON CREEK	34

MAPS

PLATE		IN LEAF
1	CARBON CREEK LICENCE BLOCK DRILLHOLE AND ROAD LOCATIONS, 1976	
2	GEOLOGICAL MAP OF THE CARBON CREEK COAL BASIN, WEST HALF	
3	CARBON CREEK WEST HALF, CROSS-SECTION OF DIAMOND DRILLHOLES SHOWING CORRELATION OF COAL BEDS	
4	CARBON CREEK WEST HALF, CROSS-SECTION OF ROTARY DRILLHOLES SHOWING CORRELATION OF COAL BEDS	
5	GAMMA RAY CORRELATION OF DIAMOND DRILLHOLES IMMEDIATELY SOUTH OF SEVEN MILE CREEK	
6	GAMMA RAY CORRELATION OF DIAMOND DRILLHOLES IN THE VICINITY OF SEVEN MILE CREEK	
7	GAMMA RAY CORRELATION OF DIAMOND DRILLHOLES AND ROTARY DRILLHOLES IN THE VICINITY OF SEVEN MILE CREEK	
8	GAMMA RAY CORRELATION OF DIAMOND DRILLHOLES SOUTH OF TEN MILE CREEK AND NORTH OF THE NORTH FORK OF ELEVEN MILE CREEK	
9	BED NO. 58 COAL ISOPACH WITH PANEL SECTION OF COAL BED	
10	BED NO. 55 " " " " " "	
11	BED NO. 54 " " " " " "	

MAPS - Continued

PLATE				IN LEAF
12	BED NO.	52	COAL ISOPACH WITH PANEL SECTION OF COAL BED	
13	"	51A	" " " "	
14	"	51	" " " "	
15	"	47	" " " "	
16	"	46	" " " "	
17	"	40	" " " "	
18	"	31	(North of Seven Mile Creek)	
19	"	31	(South of Seven Mile Creek)	
20	"	29 & 28	" " "	
21	"	27 & 26	" " "	
22	"	15	" " " "	
23	"	14	" " " "	
24	ADIT	14	STRUCTURE MAP	
25	"	15	" "	
26	"	31	" "	
27	"	40	" "	
28	"	51	" "	
29	"	52	" "	

LOGS

POCKET

1 GAMMA RAY AND BULK DENSITY LOGS FOR DIAMOND DRILLHOLES 76-67, 68 AND 76-71 TO 76-81, 76-83, 76-85 AND 76-87.

LITHOLOGIC LOGS FOR THE ABOVE DIAMOND DRILLHOLES

2 GAMMA RAY AND BULK DENSITY LOGS FOR ROTARY DRILLHOLES 76-1 TO 76-89 AND 76-101 TO 76-173

ABSTRACT

During the summer of 1976, Utah Mines Ltd. conducted additional field studies over the west half Carbon Creek Coal Licences located in northeastern British Columbia.

The objectives of this year's program were:

1) To complete a number of adits to obtain unoxidized bulk samples for coal quality analyses, washibility and carbonization tests.

2) To simulate actual underground mining conditions by utilizing underground mining equipment to complete the adits.

3) To define by rotary drilling, with concurrent on-property sample analysis, the depth of oxidation in those seams designated open pittable reserves.

4) To define by exploratory diamond drilling additional areas for potential coal reserves.

5) To construct an access road to the coal licences. Access to date has been by boat or helicopter. To facilitate the anticipated lengthy and large program a sixty man trailer camp was purchased and constructed on location in early June.

Mobilization of the trailer camp by barge across Williston Reservoir began June 4th. By July 1st, the camp construction was completed and the rotary and diamond drills were operative.

Mobilization of adit equipment began in mid July and adit work was initiated on coal seam 15 shortly thereafter.

To facilitate movement of equipment on the property twenty-one (21) miles of additional road were constructed and several miles were upgraded for transportation of the mining equipment from one adit to the next.

By October 19, 1976, 162 rotary drillholes and nineteen (19) diamond drillholes totalling 20,688 feet and 11,225 feet respectively had been completed. Six (6) adits for a cumulative length of 1,689 feet were completed.

Exploratory drillholes 76-72 to 76-80 confirmed continuity of Beds 52, 51A, 51, 47, 46, 40 and 31 south of Ten Mile Creek. Till thickness, coal seam data for beds 40 and 31 and fault delineation were defined by drillholes 76-82, 83 and 84 on licence number 3493 near the west central area of the property. Drillholes 76-67, 68, 85, 86 and 87 were completed north and south of Seven Mile Creek to test for Beds 15 and 14.

Adits were driven using mechanized underground mining equipment on seams 15, 31 and 51-51A and hand driven adits were completed on Beds 40, 52 and 14.

Company personnel and consultants were actively engaged this season collecting data necessary to prepare a Stage One report required by the Environmental and Land Use Committee in Victoria.

All drillholes completed this season were logged for natural gamma and bulk density. Both logs could be taken simultaneously by a new combination tool and associated equipment purchased this year for the program.

A coal sample preparation and assay lab trailer were custom built this spring and installed on the property to provide for analysis of coal samples from the drilling and adit programs.

PROPERTY LOCATION & ACCESS

Licence numbers 3445 to 3505 inclusive totalling 38,047.78 acres or 59.45 square miles and ten (10) alienated coal leases, numbers 319 to 328, comprise the Carbon Creek property.

The licences are located in northeastern British Columbia about twenty (20) miles west of the W.A.C. Bennett Dam and approximately twenty-five (25) miles north of the John Hart Highway which connects Prince George and Dawson Creek. Geographical co-ordinates for the center of the property are 55°55'N Latitude and 122°40'W Longitude.

The Carbon Creek embayment of Williston Reservoir extends five (5) miles southward from the main part of the lake providing access to the northern end of the property. Adequate water depth between Dunlevy Landing (a docking site 10 miles west of the W.A.C. Bennett Dam) and Carbon Creek permits large boat and barge access to the area. Access via chartered float plane or helicopter is available from MacKenzie, Ft.St. John or Chetwynd.

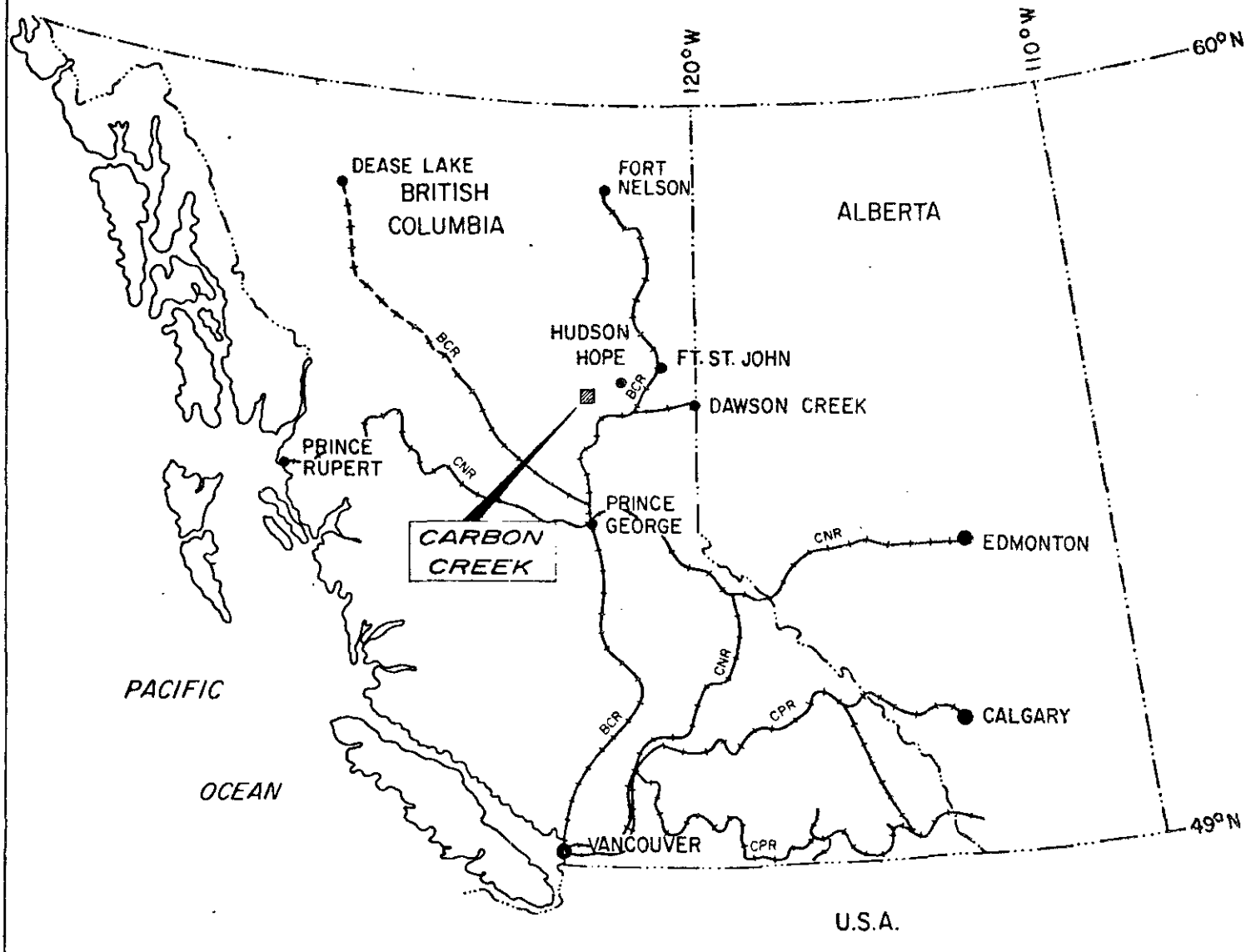


FIGURE I

UTAH MINES LTD.

CARBON CREEK COAL DEVELOPMENT

LOCATION MAP

0 100 200 300 400

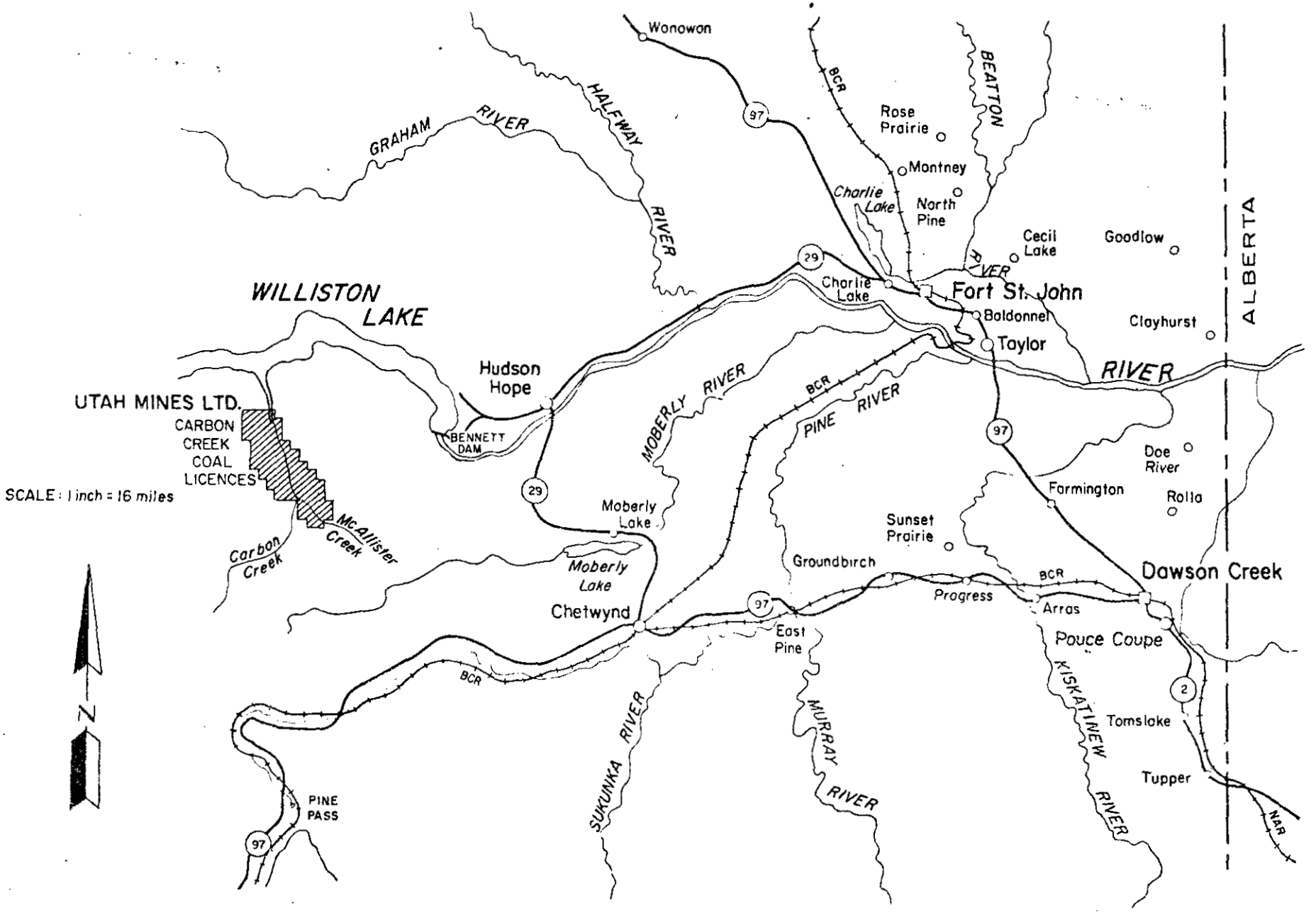
SCALE IN MILES

FIGURE 2

UTAH MINES LTD.

CARBON CREEK COAL DEVELOPMENT

REGIONAL MAP



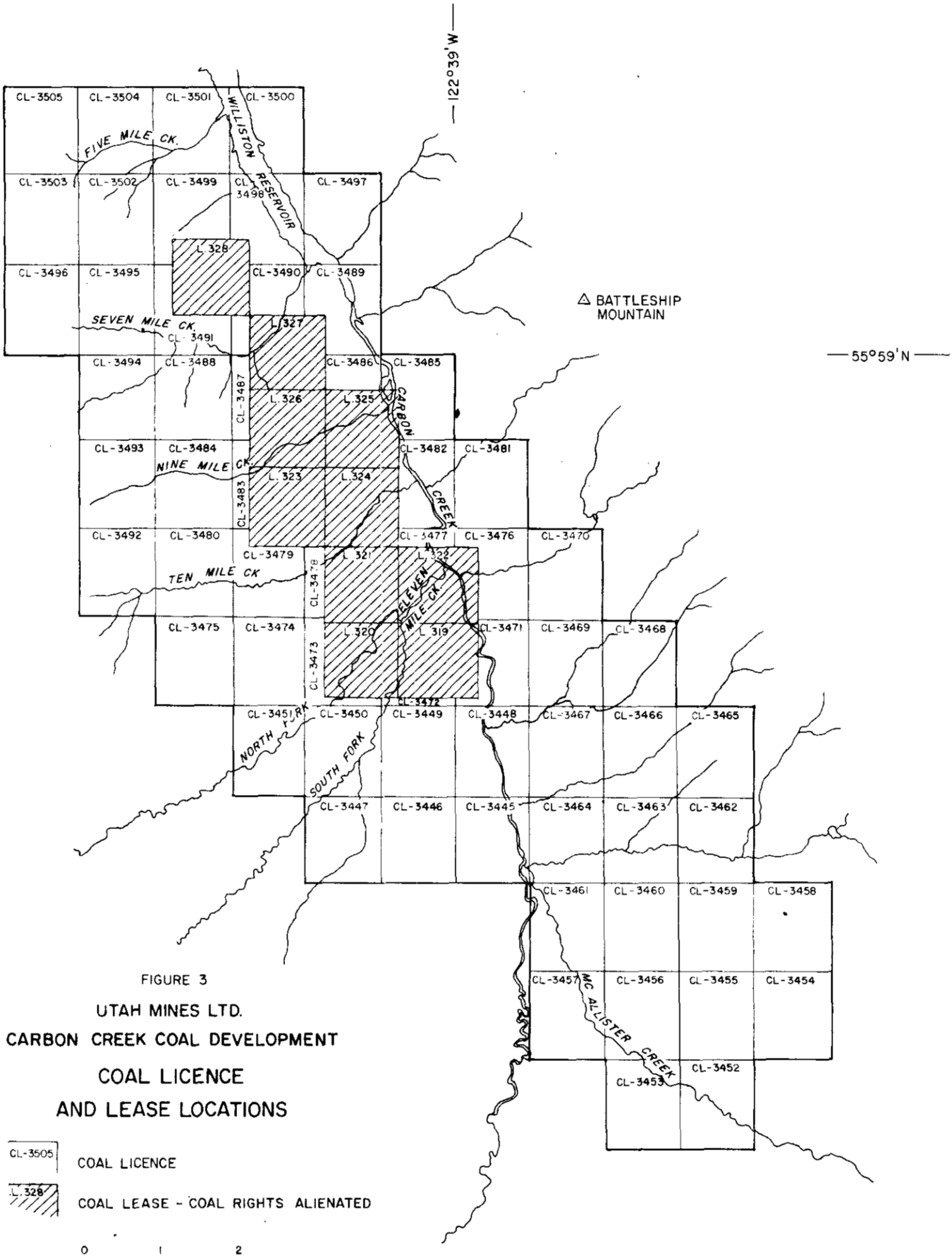


FIGURE 3

UTAH MINES LTD.

CARBON CREEK COAL DEVELOPMENT

COAL LICENCE

AND LEASE LOCATIONS

CL-3505 COAL LICENCE

L.328 COAL LEASE - COAL RIGHTS ALIENATED

ECOLOGICAL STUDIES

Ecological surveys were continued during the 1976 field season at Carbon Creek. A biophysical program of aquatic biology, hydrology noise, vegetation, surficial geology, water quality and wildlife studies were completed this season. Additional off-property study categories were completed which, together with the above, provided input for Utah's Stage One report.

A weather station for monitoring temperature, pressure, rainfall and wind direction, complete with a strip chart recorder was re-installed on the property in the spring. The equipment will remain working on the property during the coming winter.

RECLAMATION

Utah Mines Ltd. continued to observe the British Columbia Forest Service regulations and guidelines with respect to forest and surface disturbance during road construction. Measures were taken to minimize surface disturbance. Excessive road grades were avoided, culverts utilized and all timber felled for road construction, including leaning trees, which were slashed and bucked. Debris was buried beneath road grade wherever possible. Cross ditches or "erosion bars" to control erosion by water were prepared on excessive road grades before leaving the property at the close of the field season. All procedures met the approval of the British Columbia Forest Service.

Prior to the conclusion of the 1975 exploration season, road shoulders, drill sites and campsites of all prior field programs on the property were seeded with a mixture of grasses approved by the British Columbia Forest Service. This program was continued in 1976 with the dispersal of seed over miles of road. A seed mixture similar to 1975 was utilized and consisted of:

Creeping Red Fescue	40%
Alsike Clover	40%
Timothy	20%

Drainage ditches were built at all adit locations to channel runoff water around the adit pad into a catchment basin below the site. Berms were constructed around the periphery of the pad to prevent runoff of coal into the surrounding area.

Trees removed during pad preparation were saved and utilized for mine timbers. Upon completion, the area was graded over with "cats" and seeded with the above mixture.

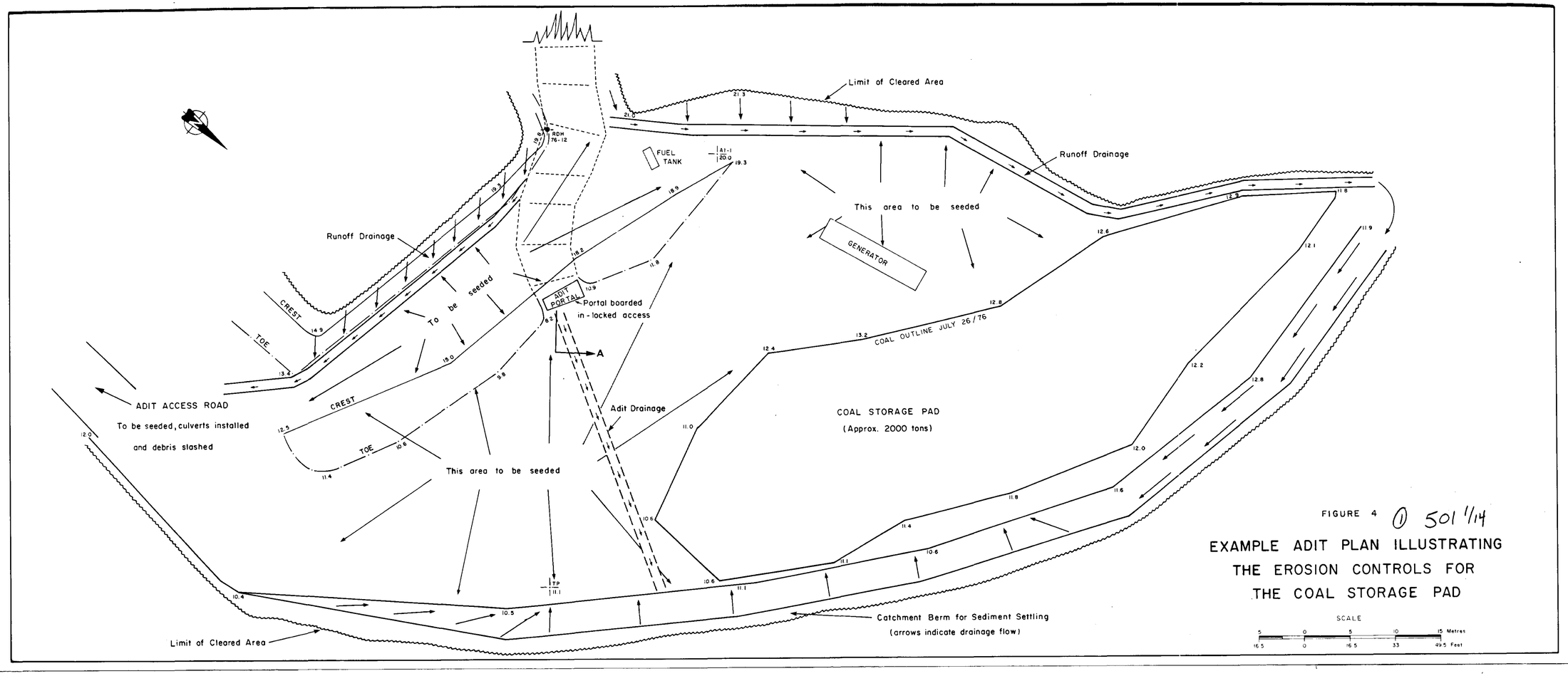


FIGURE 4 ① 501 1/14

EXAMPLE ADIT PLAN ILLUSTRATING THE EROSION CONTROLS FOR THE COAL STORAGE PAD

PREVIOUS WORK

Four (4) field programs, 1971 to 1973 and 1975 saw completion of the following work on the property:

TABLE 1
SUMMARY OF EXPLORATION
1971 to 1975

YEAR	NO. OF DIAMOND DRILLHOLES	FOOTAGE	THICKNESS OF TESTED GETHING FORMATION	CONSTRUCTED ROAD MILEAGE	NO. OF COAL SAMPLES ANALYSED
1971	9	6,752	2,300	19	93
1972	14	9,296	2,600	14	130
1973	17	7,488	2,100	5	95
1975	36	24,946	3,500	24	296

Drillhole correlation of the stratigraphy suggested 3,400 feet of Lower Cretaceous Coal bearing Gething Formation underlays the property. A total in-place coal reserve estimate for seams 58, 55, 54, 52, 51A, 51, 47, 46, 40, 31, 29-28, 27-26, 15 and 14 was calculated out to 132,841,000 short tons.

Minimum coal thicknesses used for strip and underground reserves were 2.0 feet and 3.0 feet respectively. A maximum strip ratio of 15 to 1 was utilized. Using these parameters recoverable reserves of 73,720,000 short tons were estimated.

1976 FIELD SEASON

LOGISTICS

All equipment for the program was mobilized to a docking site on the north shore of Williston Lake, ten (10) miles west of the W.A.C. Bennett Dam. Over-water transportation of equipment to Carbon Creek was facilitated by tug and barge rented on a per trip basis from Findlay Navigation Ltd. of McKenzie, British Columbia.

A sixty man trailer camp complete with first-aid and recreational facilities was constructed during June on a site just north of the confluence of the Carbon and Seven Mile Creeks. The camp will be winterized and remain on location through the coming winter.

Three (3) mobile trailers were brought in as a cushion against extra personnel and three (3) frame tents were erected for storage and shop space.

A 75 kw diesel powered generator provided camp power and a diesel supply pump in combination with a 5,000 gallon storage tank was set up for the camp water supply. Two lagoons were built for waste water discharge from the camp.

A small tank farm was set up at the old camp location nearby for storage of diesel fuel and gasoline. All tanks were set on skids and left on the property this winter with whatever fuel remained after program completion.

Fifteen (15) pickups and one (1) suburban were brought in by Utah and the various contractors for on-site transportation. Utah Mines supplied two (2) tracked vehicles for use on impassable roads; one for access to the diamond drilling and one for mobility of the down-hole geophysical logging unit. A third was supplied by the adit contractor. Quatsino Water Cartage was contracted to supply over-water transportation.

Utah Mines Ltd., Peter and Paul Demeulemeester Ltd., Longyear Ltd. and Quatsino Water Cartage supplied radios for communication purposes to the "outside" world. These were installed in the camp, in some of the vehicles and in the boat. In addition, mobile radios were installed in some of the site vehicles and the camp this year to provide on the job communication.

ROAD BUILDING

All access roads to drillsites and adits were built by Peter and Paul Demeulemeester Ltd. of Chetwynd, British Columbia. 5.5 miles of diamond drill access roads, 13.5 miles of rotary drill access roads and 2.3 miles of adit access roads were built this year bringing the total mileage on the property up to 83 miles.

A D-7 and D-6 bulldozer built most of the roads and two (2) D-8's were used for adit preparation and movement of heavy equipment.

The lack of good weather during the peak construction period, July and August, hampered operations severely. Access to the adit or drill rigs was often not possible by truck. Bombardiers and "cats", or walking, provided slow access during these periods.

All roads and bridges built during prior years were in good condition at initiation of the program. They deteriorated during the rain, especially so when traffic was heavy. The bridge across Carbon Creek remained in position over last winter and was used again this season without any necessary repair work.

Northstar Fabricating Ltd. (Norm Sawchuck) of Chetwynd was contracted to slash and buck trees felled for adit preparation and road building. Four to ten men were employed, depending on the work load. Seeding of road shoulders, drill pads and adit sites was completed by this crew.

DRILLING

Canadian Longyear Ltd. was contracted for the wireline diamond core drilling. Nineteen (19) HQ (2½" core) drillholes totalling 11,225 feet were completed this year. Drillholes were located to test for additional coal reserves south of Ten Mile Creek, check for fault offsets and provide additional information on Bed 40 in the west central area of the property and Beds 15 and 14 in the Seven Mile Creek vicinity.

Garrity and Baker Ltd. were contracted for the rotary drilling. Two (2) Mayhew 1000 Nodwell mounted drill rigs

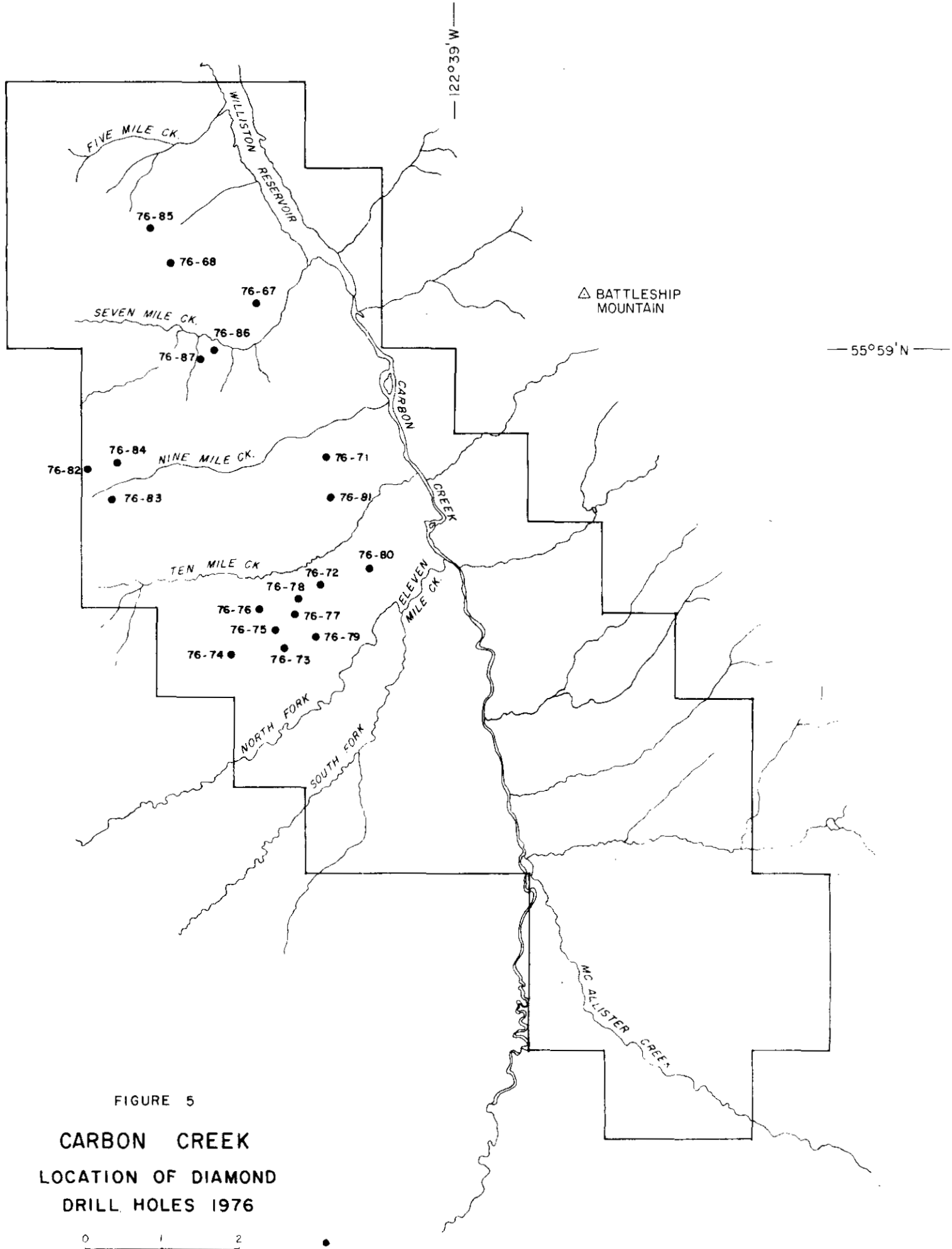


FIGURE 5

CARBON CREEK

LOCATION OF DIAMOND DRILL HOLES 1976

January 1977

completed 20,688 feet or 162 test holes during the season. The equipment was set up to drill with either down hole hammer, conventional rotary drilling or standard core drilling.

The rigs were checking for coal continuity, seam thickness, oxidation of coal by analysis of the sample, structure, aerial extent and location of the subcrop point on those seams selected for adit work.

ADIT WORK

Six (6) underground entries were established on the Carbon Creek property during the 1976 field program. The purpose of these was twofold: to obtain unoxidized bulk samples for coal quality analysis and washability testing and to simulate actual underground mining situations. Selection of the seams for this testing was based on the coal quality as determined by diamond drill core to date and by the quantity of mineable coal estimated to be present in the seam.

Track mounted rotary drills were used to define the point of seam outcrop through the overburden cover in areas of sufficient slope to provide adequate cover for the adit. Face preparation and construction of coal storage pads were completed using Caterpillar D-8 dozers. Three adits (15, 31, 51) were driven using a Joy 6CM continuous miner in conjunction with a Joy 10SC-26 shuttle car. A 750 kilowatt generator driven by a Caterpillar D-349 engine provided electrical power for the continuous miner, shuttle car, ventilation fan and air compressor. Because of machinery breakdown adits 14, 40 and 52 were hand driven.

Post and cap sets of natural timber were used in the portal construction of the 8x18 foot adits and for approximately the first 100 feet of entry. Six (6) foot roof bolts on a four (4) foot by four (4) foot pattern with two (2) foot green timber slabs as half headers were used as roof support for the remainder of the adit length.

A one and a half ton and a half ton bulk sample were obtained from each adit.

Channel samples taken at two (2) meter intervals from both ribs provided current qualitative information. Six (6) adits with a cumulative length of 1,689 feet were completed during the 1976 field season. A cross-cut and an intersection were completed and a section of roof was left unbolted in one adit for pillar design data and for roof stability data.

GENERAL GEOLOGY

STRATIGRAPHY

The property is located within the foothills belt of the Rocky Mountains. This belt, characterized by a series of synclines, anticlines and major west dipping thrust faults, is underlain predominantly by Mesozoic rocks. The high northwesterly trending ridges and steep-sided valleys are generally parallel with the strike of the underlying formations.

The formations in ascending order, as defined by the Geological Survey of Canada, and present in the Carbon Creek vicinity

TABLE OF FORMATIONS
CARBON CREEK COAL BASIN

SERIES	GROUP	FORMATION	THICKNESS	LITHOLOGY
Holocene Pleistocene	erosional	surface	0-1350'	Alluvium Terraced drift Glacial till
Lower Cretaceous	Bullhead Group	Gething	3500' ±	Fine to coarse grained sandstones siltstone, coal carbonaceous shale and conglomerate.
	erosional	Cadomin unconformity	600' ±	Sandstone, coarse grained to massive conglomerate with quartz and chert pebbles.
	Minnes Group	"unnamed" transitional beds	1000' – 1500'	Sandstone, fine grained brown laminated cross bedded coal.
		Monach	300' – 430'	Sandstone, well sorted, fine grained.
		Beattie Peaks	750' – 1200'	Shales, shaley sandstone and sandstone.
		Monteith	1000'	Sandstone, fine to coarse grained, quartzose.
Jurassic		Fernie		Chiefly shale, sandy near the top.

are: Upper Jurassic Fernie Formation, Lower Cretaceous Monteith, Beattie Peaks, Monach, Cadomin and Gething Formation. The Gething Formation is the only unit in the Peace River Canyon area containing coal of commercial interest. This unit underlies most of the surficial area of the Carbon Creek coal licences. The other formations are exposed on the margins and adjacent to the licences.

Conglomerates, sandstones, siltstones, mudstones, shales and coal are representative rock types for the Jurassic and Cretaceous units named above.

The non-marine Gething Formation coal measures are mainly alluvial-deltaic in origin and were deposited on an elongate embayment into a boreal sea of Early Cretaceous time.

The strata consists of an alternating sequence of sandstone, siltstone, mudstone, coal and a few lenticular beds of conglomerate.

Sandstones in the formation occur in units of less than one inch thick up to ninety (90) feet. They are fine to medium grained, quartzose, occasionally carbonaceous, medium to dark grey and laminated or massive. Cross bedding is common on a medium scale. Convoluted beddings, burrows and graded bedding is common. Ripple marks are visible on exposed sandstone slabs and fossilized log impressions are occasionally evident in sandstone exposures.

Carbonaceous shales, mudstones and siltstones are typical of the finer grained sedimentary rocks. Shale units are from one inch to several tens of feet thick and are commonly associated with coal seams. They are blocky to rubbly and show little lamination. The bedded siltstones, often showing graded bedding are commonly interbedded with the shales. Colour ranges from light grey siltstone to greyish-black carbonaceous shale.

Conglomerates from several inches to seven (7) feet occur within the sandy sections of the formation. Grain size is granule to pebble size consisting of quartz and black chert cemented in a siliceous clayey matrix. The rounded to subrounded grains are moderately sorted.

Plant material is abundant within the formation and is especially abundant in the shales.

The coals in the Carbon Creek basin are banded, moderately hard, medium to brightly lustrous, brittle and consisting of vitrain bands alternating with attritus and minor amounts of fusain. Cleat, without secondary mineralization, is common in most seams although marcasite mineralization and carbonates are sometimes present on cleat faces or as disseminations and veinlets.

The seams can exhibit partings of boney coal, carbonaceous shale or carbonaceous siltstone. Occasionally, fine grained, carbonaceous sandstone and rarely, brecciated mudstone and siltstone occur as partings.

STRUCTURE

The Carbon Creek basin is an intervening north-south trending syncline lying between two major anticlinal belts. The embracing eastern anticlinal belt is a faulted continuation of a southerly anticline. The western anticlinal belt consists of several en-echelon folds extending from the southwest corner of the property, northerly along the west edge of the licences. Within the northern part of the licence group the syncline plunges gently southeastward. In general, the coal measures encountered are relatively flat lying ranging from 0° to 20°. In the central area of the licence block the basin is complicated by a high angle westward dipping thrust fault trending N10°W. There are a number of less severe parallel high angle faults to the west of this thrust. The southeastward extent of these faults is presently unknown. It is anticipated that their traces parallel the trend of the major fold axis of the Carbon Creek syncline and are obscured by tight folding in the southeastward part of the area.

A tightly folded zone in the coal measures is seen from the confluence of the north and south forks of Eleven Mile Creek eastward towards Carbon Creek. Several en-echelon folds have been recognized in this area, but to the north and south a thick veneer of glacial drift masks these folded structures.

OBJECTIVES 1976 PROGRAM

This year's program had the following objectives:

1) To locate, by diamond drilling, additional coal reserves in the following areas:

   i) To test for Beds 52 to 31 inclusive south of Ten Mile Creek and north of the North Fork Eleven Mile Creek.

   ii) To test for Bed 40 near the headwaters of Nine Mile Creek.

   iii) To test for Beds 52 to 31 in the vicinity of drillholes 75-46 and 75-64.

   iv) To test for Beds 15 and 14 in the Seven Mile Creek vicinity.

2) To complete a number of adits to obtain unoxidized bulk samples for coal quality analyses, washability and carbonization tests.

3) To simulate actual underground mining conditions by utilizing underground mining equipment to complete the adits.

4) To define by rotary drilling, with concurrent on-property sample analysis the depth of oxidation in those seams designated as strippable reserves.

5) To construct an access road into the property. To date access has been by helicopter or boat.

Completion of categories two to four would provide data for feasibility studies to determine the economic viability of the property.

RESULTS EXPLORATION DIAMOND DRILLING

South of Ten Mile Creek, North of North Fork, Eleven Mile Creek

The nine (9) test holes completed in the area this season confirmed the geological structure suspected from the 1971 and 1972 programs.

Bed numbers 52, 51A, 51, 47, 46, 40 and 31 were intersected in this area's drillholes.

Four parallel north-south faults dissect this area of the property. Throw can be as much as 500 feet on the central two faults.

Nomenclature (reverse versus normal) of the faults is not known at this time due to the uncertainty of the fault plane attitudes. The west block, however, is down in relation to the east block.

Steeper than anticipated east dipping bedrock attitudes were drill indicated and mapped on road cut exposures this year. This will result in a shift eastwards of those coal bed sub-crop lines west of the westerly fault. This effect will reduce anticipated reserve area for these seams.

Hill 40, South of Seven Mile and North of Ten Mile Creeks, Licence Nos. 3484 and 3493

Two test holes were planned to intersect Bed 40 drilled in 1975 in drillholes 61 and 70. Test holes 76-82 and 84 did not reach bedrock and encountered eighty (80) feet and 168 feet of glacial till respectively. A third hole, 76-83, located 2,300 feet southwest of 75-61 spudded into the section 55 feet below Bed 40.

Rotary hole 76-71 was spudded 1,000 feet east of 76-83 towards 75-61. Bed 40 was located 175.6 feet below the collar. The seam is split as in Hole 75-61. Two beds, 4.6 feet and 4.0 feet, are separated by a 22.1 foot stone parting.

There will be a significant coal reserve loss for Bed 40 in this area west of the fault, due to excessive glacial till cover. However, there will be potential for Beds 52 and 51 reserves. These seams, not previously encountered in this area, were drilled in rotary holes 76-53 and 76-65.

To define more precisely the till cover it will be necessary to conduct a seismic survey similar to the 1975 program.

Rotary holes 76-53, 76-65 and 76-84 have proven the existence of north-south faulting in this area. Preliminary work indicates 175 feet of throw on the fault. Bedrock dip at 17 degrees west of the fault and 12 degrees east of the fault.

Hill 58 East, South of Nine and North of Ten Mile Creek
Coal Lease Nos. 323 to 326 Inclusive

Two additional test holes, 76-71 and 76-81 were completed in the vicinity of 75-46 and 75-64 to test for coal thickness and quality and provide data for structure interpretation of the fault immediately west of these holes.

Seven Mile Creek Vicinity and Hill 31

Drillholes 76-85, 76-68 and 76-67 were drilled north of Seven Mile Creek. Beds 15 (4.2 feet) and 14 (7.8/8.5 feet) were intersected at 1,038.6 feet and 1,160.7 feet respectively in 76-85. 76-67 and 76-68, previously drilled to 436 feet and 539 feet in 1975 were deepened to check for Beds 15 and 14.

76-68 could not be completed because of drilling problems and 76-67 was completed to 1,666 feet. Beds 15 (4.7/5.7 feet) and 14 (2.5/3.7 feet) were intersected at 1,483.3 feet and 1,651.1 feet below the collar respectively.

Two holes were drilled south of Seven Mile Creek. 76-86 was not completed due to excessive till cover and drill problems. A 4.0 foot coal intersection in 76-87 at 818.0 feet below the collar is likely Bed 15.

ROTARY DRILLING

The rotary drilling program together with current coal chip sample analysis was designed to test primarily for the depth of oxidation, or locate the approximate position of the boundary dividing the oxidized from the non-oxidized coal, in those seams speculated as open-pittable.

A series of test holes would be drilled at closely spaced intervals (less than 200 feet) along a roadcut perpendicular to the coal seam (or series of coals for closely spaced seams), subcrop. Roadcuts were to be roughly 1,000 feet apart. The program would:

1) determine closely where target seams cropped below the till or soil level, and

2) with sample analysis indicate the boundary between oxidized and non-oxidized coal.

A certain amount of fill-in drilling, together with the above would provide data for close approximation of the actual tonnage of metallurgical grade (oxidized coal and soil thickness taken into account) in those seams deemed open-pittable.

Not all the proposed test holes were completed because:

1) topography did not permit road construction in all the intended drill areas,

2) a certain amount of fill-in drilling was necessary,

3) it was necessary to test for soil thickness, seam thickness and precise subcrop location of the seam below the soil cover before preparation by bulldozer at the anticipated locations for adit pads 14, 15, 31, 40, 51 and 52, and

4) the penetration rate was slower than expected.

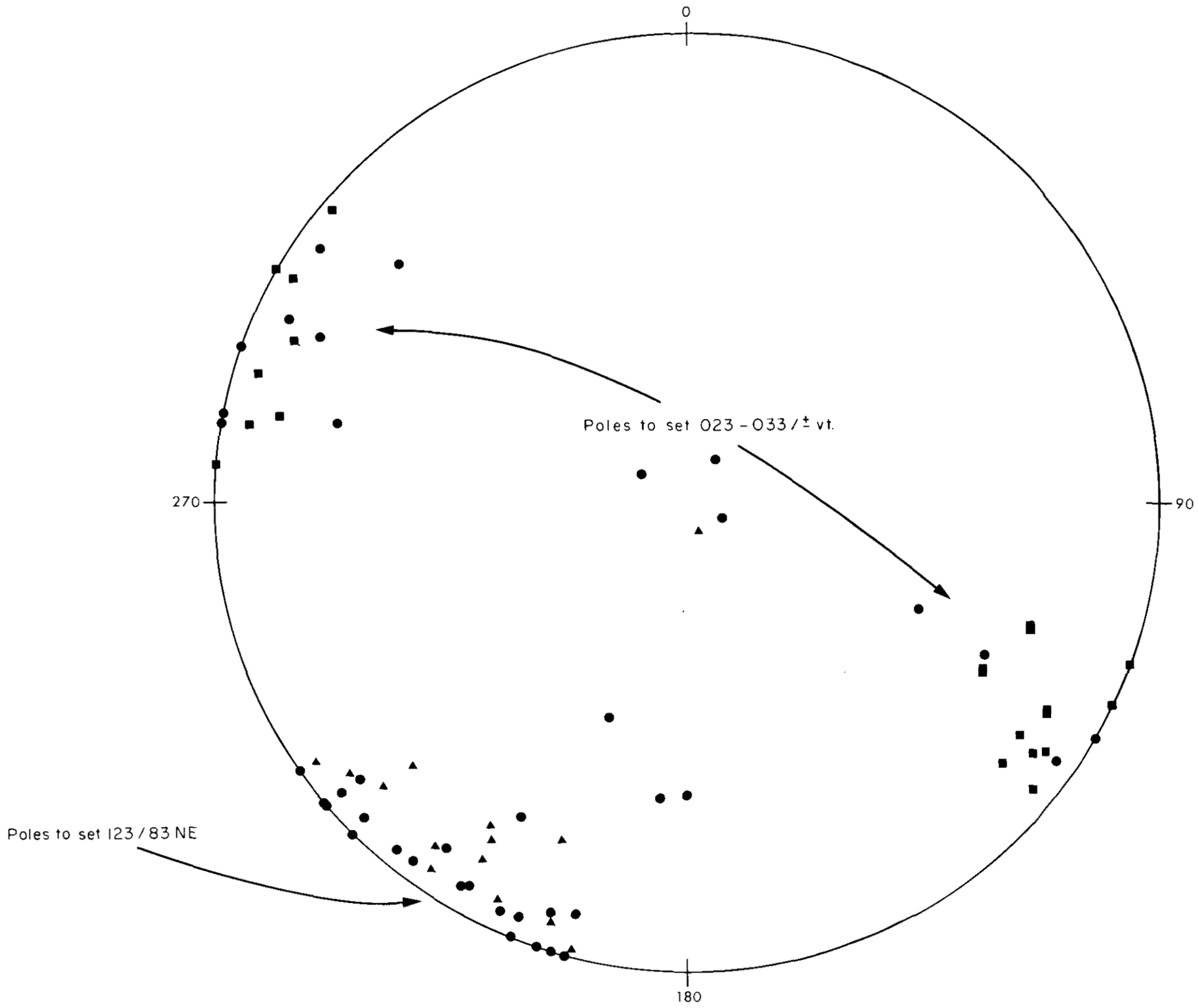


FIGURE 6

STEREO PLOT OF POLES TO ROOF FRACTURES FACE AND BUTT CLEAT FRACTURES FOR ADITS 14, 15, 31, 40, 51 AND 52

LEGEND

- ● Poles to fracture planes in roof of adits
- ■ Poles to face cleat fractures in coal seams
- ▲ Poles to butt cleat fractures in coal seams

ADIT GEOLOGY

GENERAL

Apparent dip attitudes, strike and dip were recorded for roof and seam at the adit portals. Once into the drift the lack of good bedding planes and the generally flat bedding did not permit accurate attitude records by Brunton compass.

The six seams were dry, although water dripped from the back in all adits, especially near the portal or within the oxidized zone. No evidence of methane was detected in any of the six adits.

Roof fractures were generally tight and none entered the seam at the back, though cleat attitudes do approximate roof fracture attitudes (See Figure 5). Near vertical roof fractures were more numerous in adits 15, 31 and 51, with bedded siltstone and mudstone roofrock.

Fractures on bedding planes were evident within the oxidized zone, beyond this though, bedding was tight and the rock broke conchoidally but generally parallel to the approximate bedding. Fractures were two (2) to three (3) feet apart in adit 51 and more widely spaced in adits 15 and 31.

Fractures were not evident in the more competent non-bedded sandstone roofs of adits 14 and 40.

Bedding was clearly evident in the mudstone roof of seam 52 at the portal; beyond the portal neither fractures nor bedding

were apparent in the generally massive mudstone unit above Bed 52. Given time with exposure to air bedding fractures will appear as evidenced at the portal and in diamond drill core left exposed to the air.

No faults were intersected in any of the six adits. Bedding plane movement was not evident in the roofrock, though minor slickensiding was evidenced within each of the seams. Some fractures at angles to the bedding and cleat surfaces were also evident within the seams.

Face and butt cleat was developed in each seam, but not always through the entire seam thickness.

In the six adits it was not evident that the roof fractures were aligning with the coal cleat or transecting and continuing into the seam. However, a stereo-net plot of poles to fractures, Figure 5, reveals a fracture set, roughly 123/83NE, on the roof of the adits which approximates the attitudes for the coal's butt cleat.

A second set, 023-033/±vt approximates the attitude for the face cleat. This second set lies at right angles to the trend, 335° of the Carbon Creek syncline.

Figure 5 does not classify the poles according to adit location but preparation of the plot indicated cleat and roof fracture attitudes are not dependent upon adit location.

ADIT 14

Vertical fractures in the sandstone roof (divides the thin upper split from the thicker lower split) are evident at the portal. At twenty-eight (28) meters from the portal, fractures are no longer evident in the roof which has a non-bedded conchoidal appearance. No mud splits were evident within the lower split. The seam was dry though drippers were evident in the roof.

On a bearing of 230° the adit dimensions averaged 8.5 feet by 18 feet rising at a slope of 2 1/2°. Coal seam thickness was constant at 72 inches.

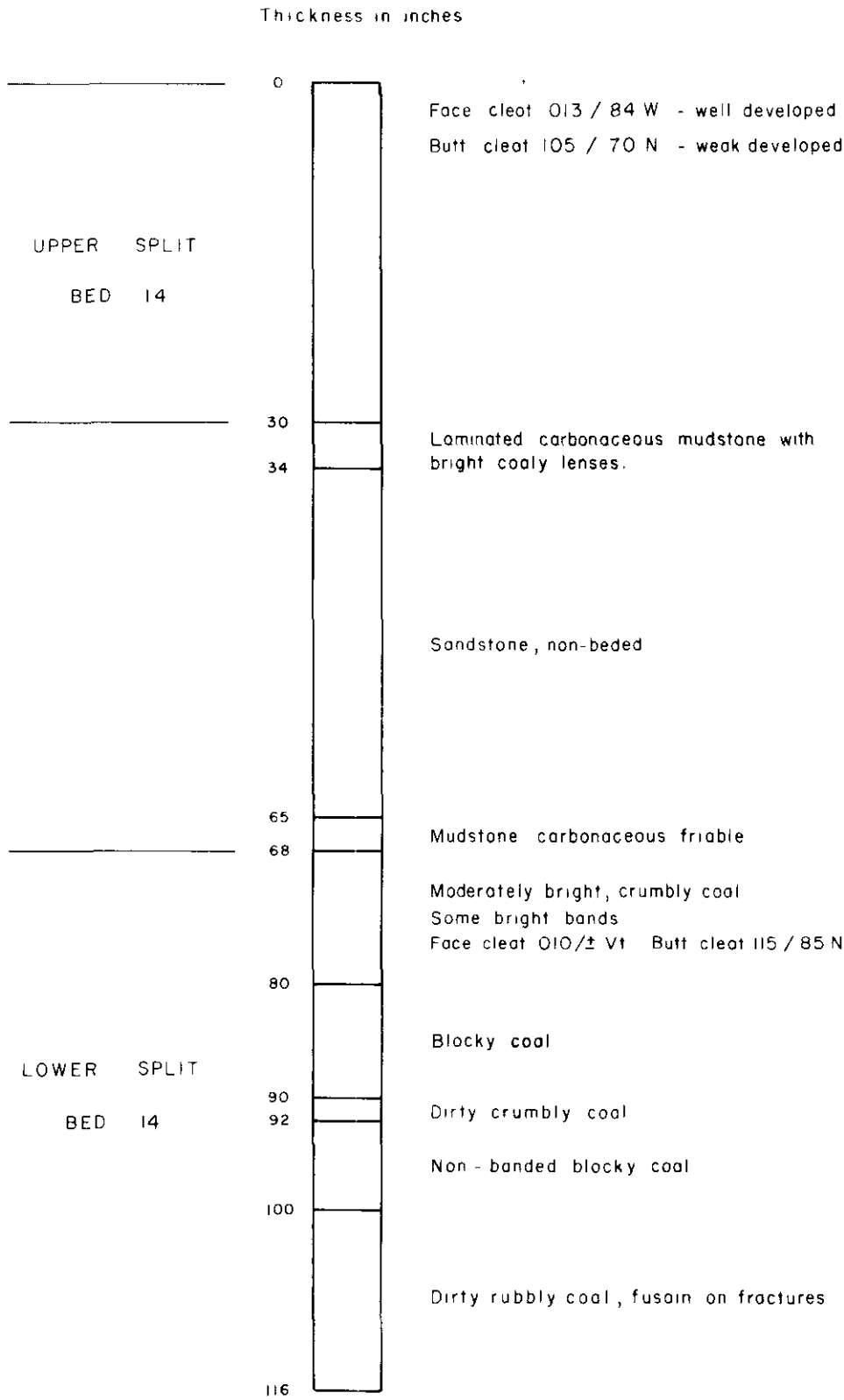
ADIT 15

Two (2) fracture directions, 100-105/70°N to ±vt and 177/±vt, are evident in the roof of the adit throughout its length. The latter set is second generation and does cross cut the east-west set.

Up to three (3) inches of gouge is sometimes evident on the east-west fracture set. Neither fracture system enters the seam at the roof but aligns slightly to the coal cleat.

Collapse or movement in the roof after coal extraction was discernible near fracture intersection; the footwall on the east-west showed movement towards the adit opening.

The caprock is a slabby mudstone and silty mudstone. Very hard elliptical siltstone lenses, up to twelve (12) inches



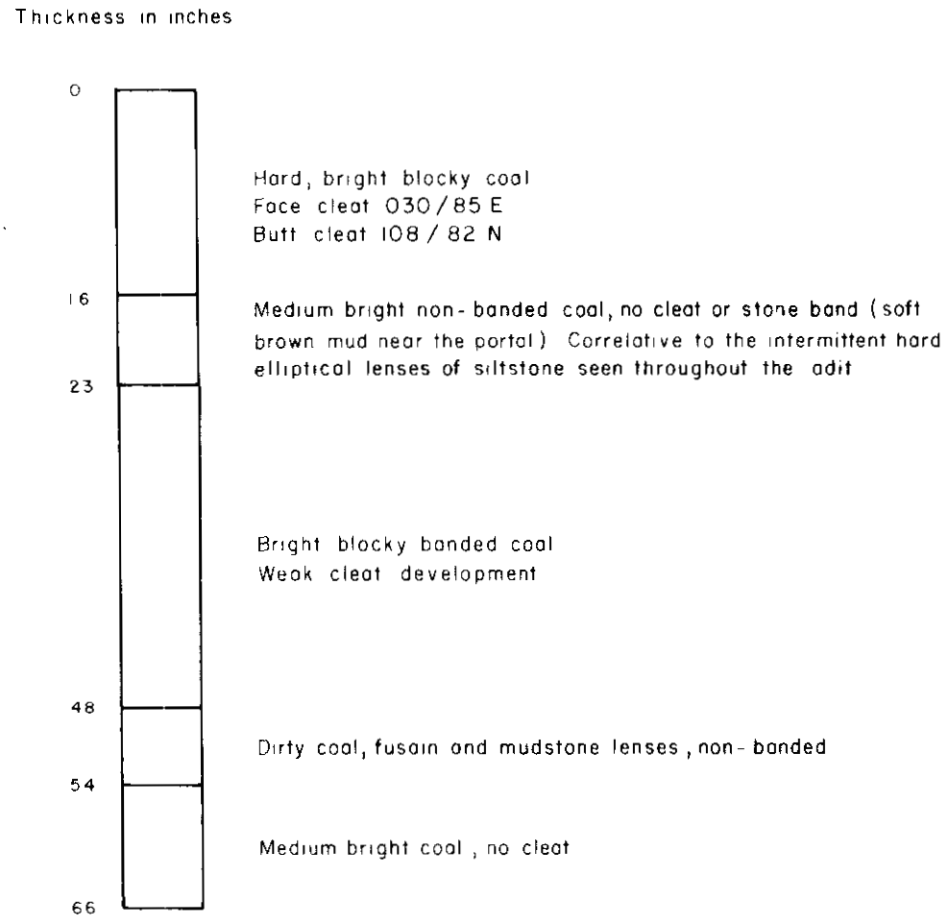
Vertical Scale — 1" = 15'

Nov / 1976

PHYSICAL CHARACTERISTICS

COAL SEAM 14

FIGURE No – 7



PHYSICAL CHARACTERISTICS

COAL SEAM 15

(22 METERS FROM THE PORTAL OF ADIT 15)

Vertical Scale – 1" = 15'

Nov / 1976

FIGURE No. – 8

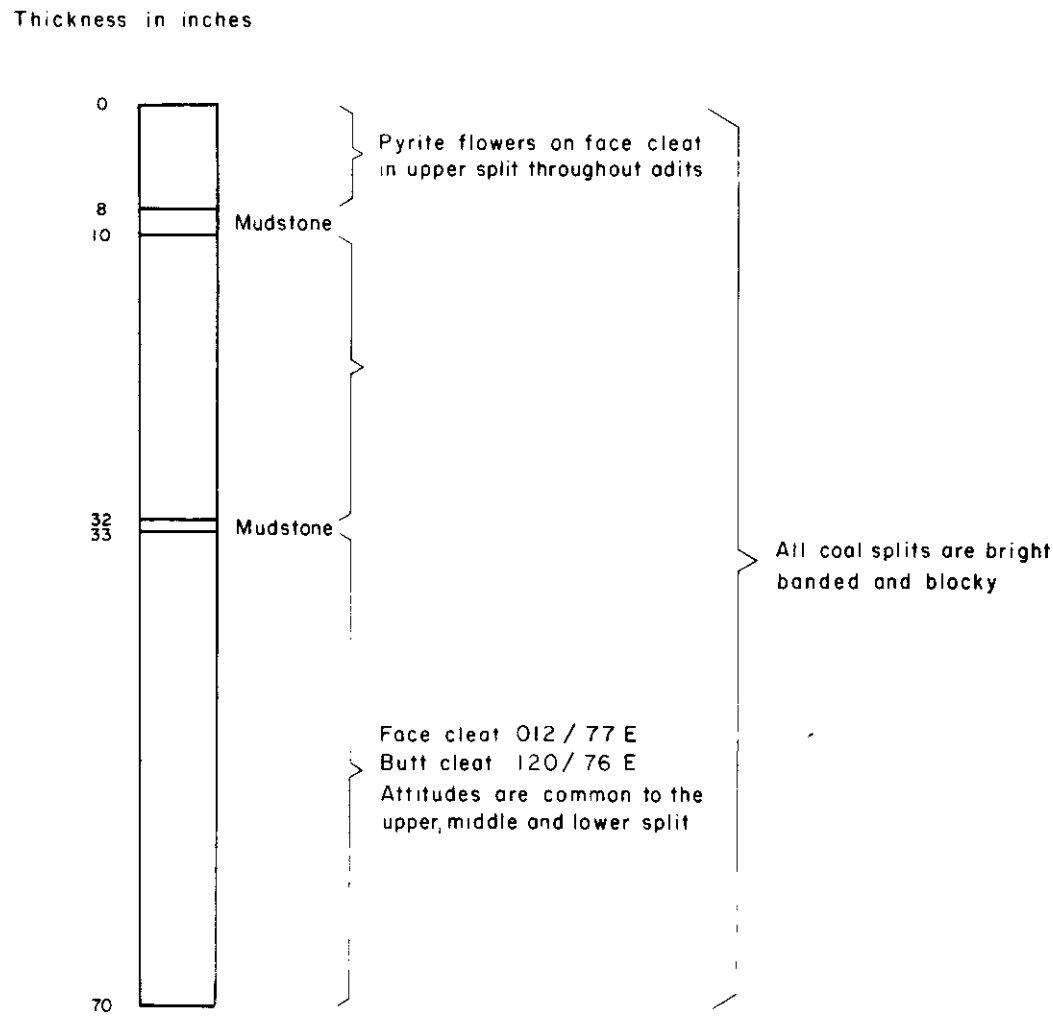
thick and four (4) meters in length, seventeen (17) inches to twenty (20) inches below the roof of the seam were evident throughout the adits length. The coal seam was dry although drippers were evident in the roof.

ADIT 31

No roof rock was evident on Seam 31 after face up at the portal. Glacial till covered the seam and continued for a length of forty (40) feet into the adit. At forty (40) feet from the portal large rotated blocks (glacially disturbed) of coal were evident within the upper split. The blocks were enveloped by six (6) to eight (8) inches of soft fine gray mud with coal inclusions. This phenomena is not evident beyond the point where rock displaces till as the caprock.

Two mud splits, two (2) inches and one (1) inch thick and eight (8) inches and thirty-two (32) inches below the roof were evident through the adit's length. Pyrite flakes were evident within the top eight (8) inches of the seam. The seam is hard, blocky and banded with good cleat development throughout.

A dominant fracture set 130-145/70E to ±vt sometimes carrying up to three (3) inches of gouge was evident in the roof throughout the adit's length. A second set 50/±vt was weakly developed.



PHYSICAL CHARACTERISTICS

COAL • SEAM 31

Vertical Scale — 1" = 15'

Jan. / 1977

FIGURE No. — 9

ADIT 40

Two fracture sets, 077-90/? and 010/? were mapped within the roof. Dip was not ascertained because of their tight nature. The brighter and blockier sections of the seams were exceptionally hard. The adit was wet throughout its length.

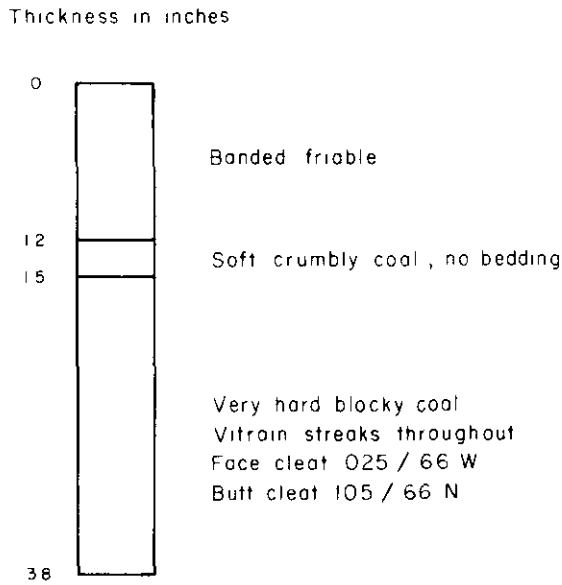
ADIT 51

The portal was completed in the vicinity of diamond drillhole 72-10 where less than six (6) inches of shale separates seams 51 and 51A throughout the adit's length. Average combined seam thickness was 8.5 feet whereas west and southwest twenty (20) to thirty-five (35) feet separate 51 and 51A which average 4.5 and 3.5 feet respectively.

Two tight fracture sets, 120-125/75-85N and 25-35/85S were evident in the roof. The low intensity sinuous north-south set does not transect the high intensity east-west set. The immediate back in the adit is a slabby silty mudstone; when mined away from the oxidized zone it fractures conchoidally on flat surfaces approximating the depositional bedding. Within the oxidized zone it slabs off at bedding planes.

ADIT 52

The mudstone roof at the portal exhibited slabbing along bedding planes and a fracture set trending 035/80N. Within the adit vertical roof fractures were not evidenced.



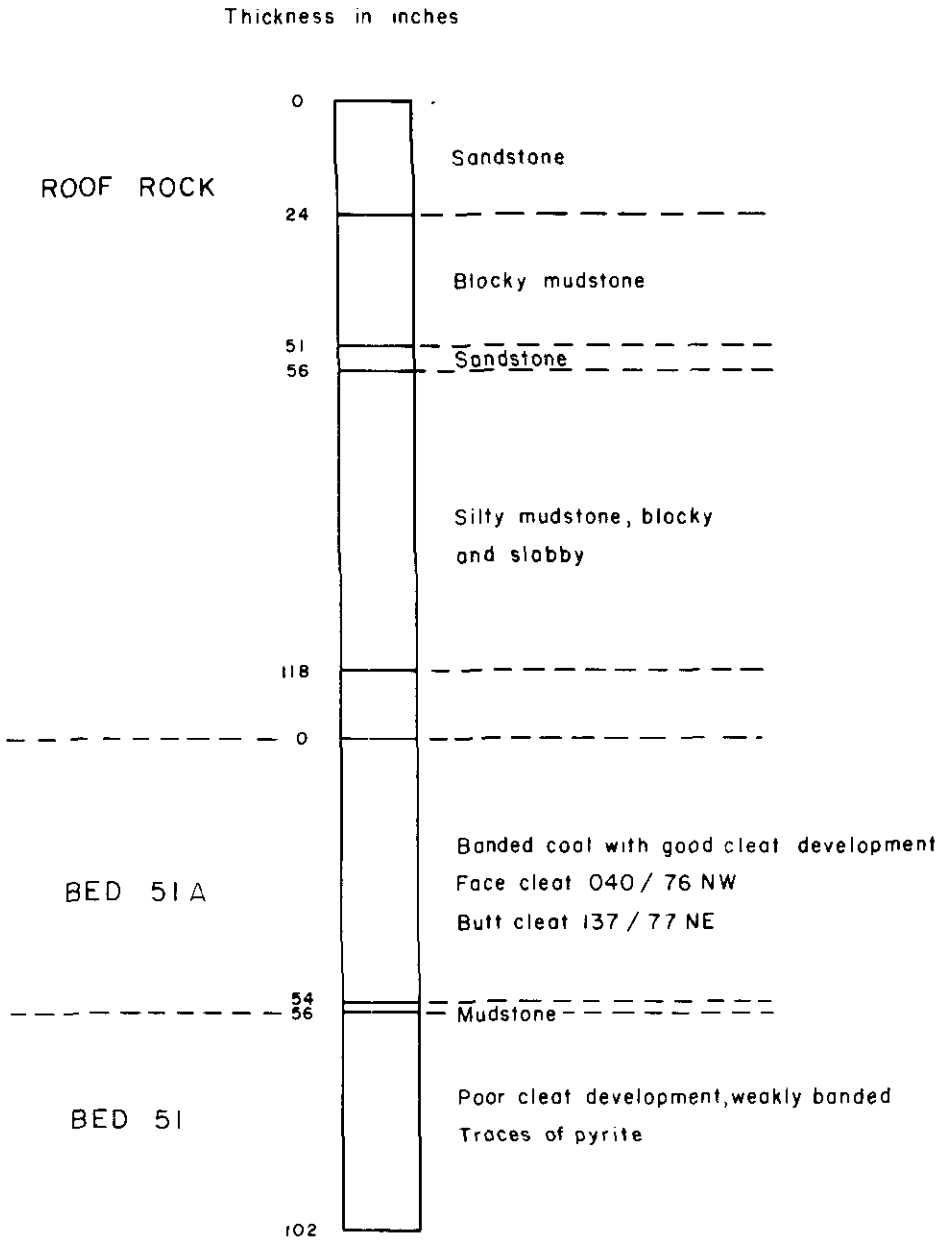
PHYSICAL CHARACTERISTICS

COAL SEAM 40

Vertical Scale – 1" = 15'

Nov / 1976

FIGURE No. - 10



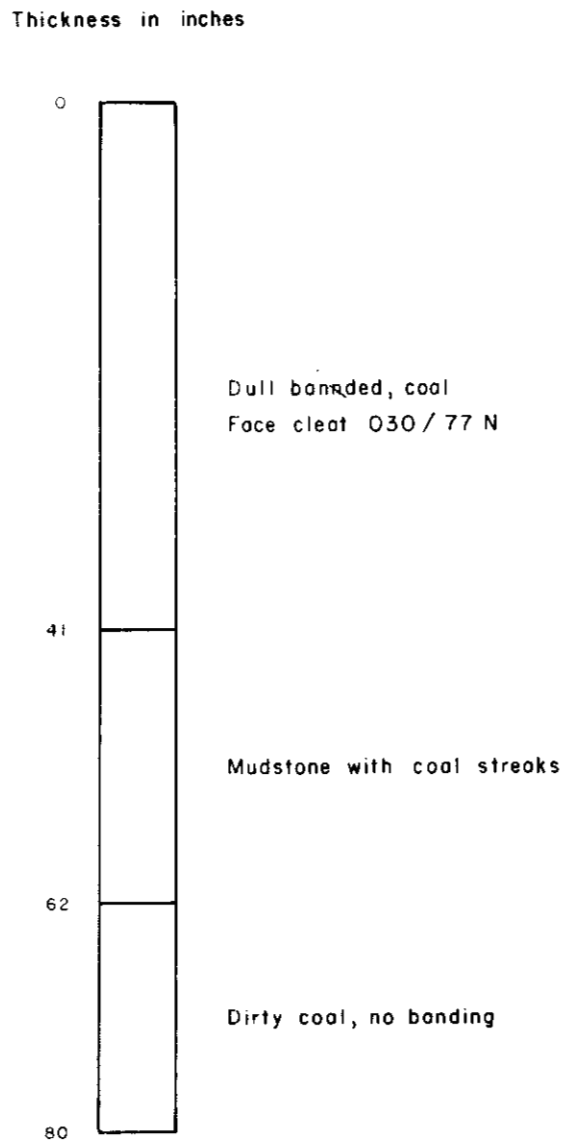
PHYSICAL CHARACTERISTICS

COAL SEAM 51

Vertical Scale — 1" = 40'

Jan / 1977

FIGURE No. — 11



PHYSICAL CHARACTERISTICS
COAL SEAM 52

Vertical Scale — 1" = 15'

Jan. / 1977

FIGURE No. — 12

COAL QUALITY

A sample preparation trailer (10'x40') and an assay lab trailer (10'x52') were custom built, equipped and installed on the property this season for analysis of drill core, rotary chip and adit coal samples. The units ensured quick return of the analytical results so that:

1) the non-oxidized-oxidized coal boundary could be defined using rotary drill samples in those seams deemed open-pittable,

2) representative non-oxidized bulk samples would be collected at the adit, and

3) the on-site labs would be capable of handling large numbers of sample for assay and would ensure quick turn around time between delivery of the sample and receipt of the analysis.

Flowsheets illustrating the methods of analysis for diamond, rotary and adit samples follow.

Duplicates of all samples were made for cross check analysis in the company lab at Palo Alto, California. Analytical data from the 1976 program is not currently available but the average analysis for each major seam from previous year's work follows.

FLOW CHART FOR ANALYSIS OF DIAMOND DRILL HOLE SAMPLES

INCOMING SAMPLE

AIR DRIED

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

SPLIT ~ 1000 GRAMS

WASH (1.4 SPECIFIC GRAVITY)

1.4 FLOAT

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

1.4 SINK

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

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

EXCESS SAMPLE FOR STORAGE

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

HEAD (R.O.M.) ~ 1000 GRAMS

1) PULVERIZE 60 MESH
2) MAKE CARBON CREEK SAMPLE & DUPLICATE
3) RUN ASSAYS
   a) FSI
   b) %MOISTURE
   c) %ASH
   d) %SULPHUR
   e) %VOLATILE MATTER

*WEIGHT RECOVERY OF COAL INSIDE SAMPLE

FOR DDH SAMPLES OVER 3 FEET EXCESS SAMPLE AND EXCESS 1.4 FLOAT & 1.4 SINK SENT TO COMPANY LABORATORY AT PALO ALTO, CALIFORNIA - DUPLICATE SAMPLES ARE ALSO RECOVERED.

FIGURE No. - 3

10/76

FLOW CHART FOR ANALYSIS OF ROTARY DRILL HOLE SAMPLES

INCOMING SAMPLE

AIR DRIED

1) CRUSH TO 3/4"
2) CRUSH TO 3/8"

IF NEEDED

STORAGE (EXCESS SAMPLE)

SPLIT ~ 1000 GRAMS

WASH 1.4 SPECIFIC GRAVITY

1.4 FLOAT

1) AIR DRY
2) PULVERIZE (60 MESH)
3) MAKE CARBON CREEK SAMPLE AND DUPLICATE SAMPLE*
4) RUN ASSAYS
   a) FSI
   b) %MOISTURE
   c) %ASH

1.4 SINK

1) AIR DRY
2) STORAGE

* DUPLICATE SAMPLES RECOVERED FOR ANALYSIS IN THE COMPANY LABORATORY AT PALO ALTO, CALIFORNIA

FIGURE No. - 4

10 / 76

FLOW CHART FOR ANALYSIS OF ADIT SAMPLES

INCOMING SAMPLE

AIR DRIED

1) CRUSH TO 3/4"
2) CRUSH TO 3/8"

SPLIT ~ 1000 GRAMS

WASH (1.4 SPECIFIC GRAVITY)

1.4 FLOAT

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

1.4 SINK

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

4) MAKE CARBON CREEK SAMPLE & DUPLICATE SAMPLE
5) RUN ASSAYS
   a) FSI
   b) %MOISTURE
   c) %ASH
6) RUN FOR SULPHUR R.O.M., 1.4 FLOAT, 1.4 SINK FOR EVERY 3rd SAMPLE IN ADIT

EXCESS SAMPLE FOR STORAGE

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

HEAD (R.O.M.) ~ 100 GRAMS

1) PULVERIZE 60 MESH
2) MAKE CARBON CREEK SAMPLES & DUPLICATE
3) RUN ASSAYS
   a) %MOISTURE
   b) %ASH
   c) FSI

* WEIGHT RECOVERY OF COAL INSIDE SAMPLE. DUPLICATE SAMPLES RECOVERED FOR ANALYSIS IN THE COMPANY LAB AT PALO ALTO, CALIFORNIA.

FIGURE No. - 5

10/76

TABLE 6

COAL ANALYSIS AT 1.40 SPECIFIC GRAVITY

COAL SEAM NUMBER	THICKNESS in feet	RECOVERY	H_2O	ASH %	SULPHUR %	VOLATILE MATTER %	FIXED CARBON %	BTU	FSI
55	5.0	85.8	2.35	3.90	0.73	30.3	65.8	14,169	3.1
54	4.9	90.8	2.32	2.35	0.73	28.0	69.6	14.402	2.0
52	4.4	67.0	1.90	4.61	1.57	30.8	64.6	14.114	5.0
51A	4.4	90.1	2.14	2.92	0.86	26.6	70.6	14.384	2.7
51	5.7	87.2	2.21	2.67	0.79	26.2	71.0	14,412	2.6
47	4.3	76.2	2.52	3.39	0.96	27.1	69.9	14,209	2.3
46	5.1	88.1	2.05	2.96	0.86	28.9	68.6	14,441	3.6
40	4.8	80.0	1.80	3.66	1.00	29.3	67.7	14,420	6.8
31	7.3	59.7	1.50	5.62	1.02	28.4	65.2	14,280	7.9
15	8.4	89.0	1.35	3.53	0.50	22.3	74.9	14,860	4.1
14	7.7	76.1	1.15	4.90	0.56	21.3	74.1	14,710	3.7

RESERVES

Because of a delay in new map preparation for the property revised coal reserves are not currently available.

Preliminary in-place coal reserves for the recent drilling south of Ten Mile Creek in 1977 have been calculated using the old maps. Results are presented in Table 7.

Coal reserves for the remainder of the property (as calculated in 1975-76) are presented in Table 8.

TABLE 7

INDICATED IN-PLACE COAL RESERVES, 1976

South of Ten Mile Creek, North of the
North Fork, Eleven Mile Creek
Carbon Creek Coal Licences

SEAM NUMBER	QUANTITY Metric Tons	SEAM THICKNESS Meters
52	1,156,000	1.37
51A	1,228,000	1.22
51	1,543,000	1.22
47	5,253,000	1.31
46	8,170,000	1.77
40	6,329,000	1.34
31	not calculated as yet	
	23,679,000	

TABLE 8

1975 CARBON CREEK COAL RESERVE ESTIMATE

(metric tons)

Seam Number	In-Place Tons	Recoverable Tons Open-Pit	Recoverable Tons-In-Place Contour Mining 15:1 Avg. Ratio	Balance In-Place For Underground Mine	Recoverable Underground Reserves
58	2,339,000	2,105,000			
55	4,208,000	3,787,000			
54	4,233,000	3,810,000			
52	10,022,000	1,856,000	1,368,000	6,440,000	2,848,000
51A	11,833,000	2,255,000	2,012,000	7,092,000	3,225,000
51	2,105,000	1,895,000	1,296,000		
47	9,098,000		761,000	6,977,000	3,071,000
46	13,655,000		1,331,000	11,810,000	5,161,000
40	20,494,000		1,793,000	17,235,000	7,120,000
31	2,290,000	2,061,000			
29-28	4,891,000	4,402,000			
27-26	5,162,000	4,646,000			
15	14,992,000			14,992,000	5,629,000
14	9,728,000			9,728,000	4,441,000
	115,050,000	26,817,000	8,561,000	74,274,000	31,495,000

42.4%
of geol. resources

TABLE 9

INDICATED IN-PLACE COAL RESERVES, 1975

McAllister Creek Area

Carbon Creek Coal Licences

Seam Name	Quantity Metric Tons	Thickness Meters
Upper Seam	2,087,000	1.52
Lower Seam	2,268,000	1.37
	4,355,000	

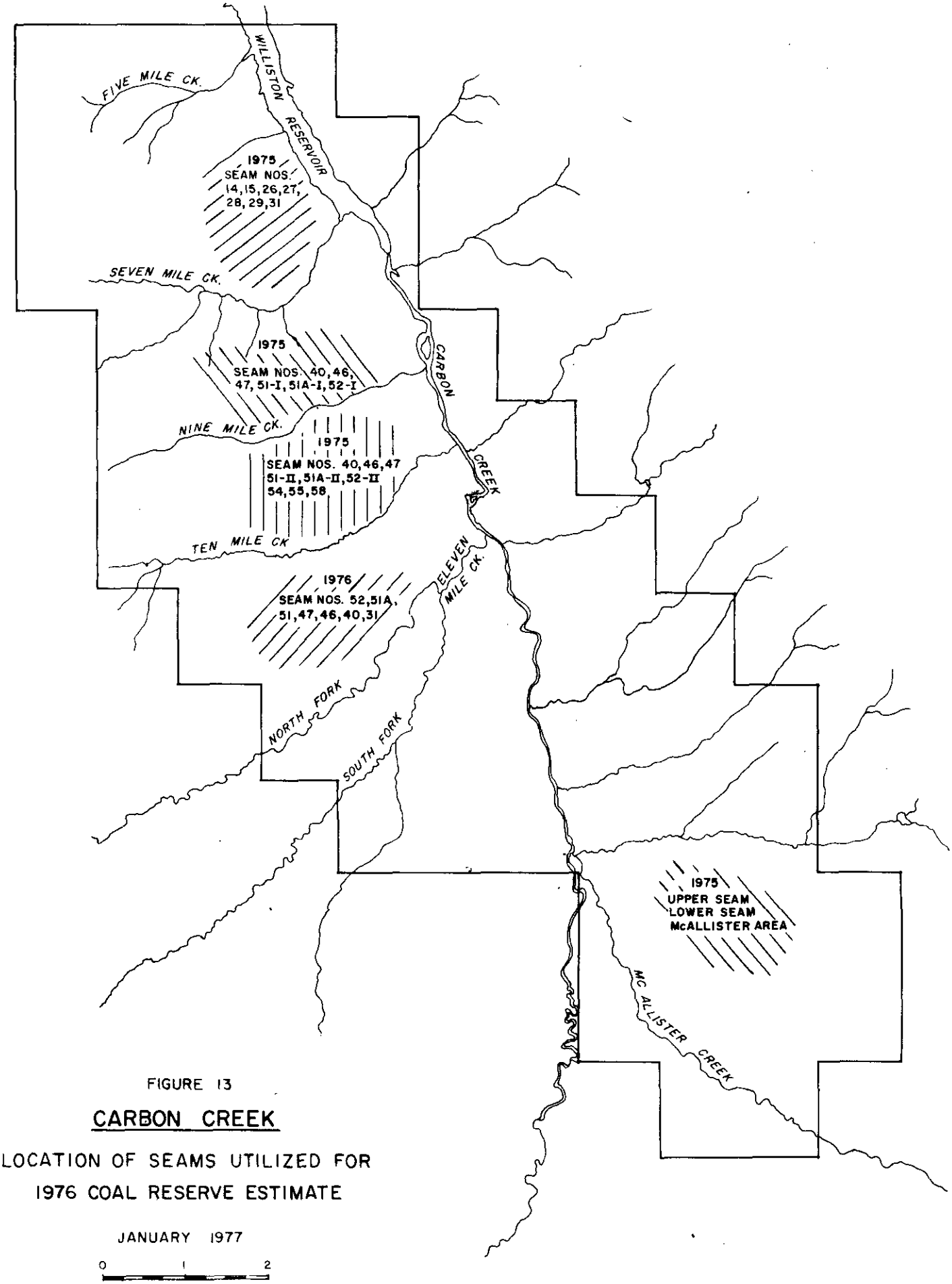


FIGURE 13

CARBON CREEK

LOCATION OF SEAMS UTILIZED FOR
1976 COAL RESERVE ESTIMATE

JANUARY 1977

APPENDIX A

SEE:

*REPORT OF LABORATORY STUDIES ON ADIT SAMPLES, DIAMOND CORE SAMPLES AND ROTARY CHIP SAMPLES CARBON CREEK COAL PROSPECT BRITISH COLUMBIA, CANADA 1976

REPORT OF
UTAH INTERNATIONAL INC.
ORE DRESSING LABORATORY
1033 EAST MEADOW CIRCLE
PALO ALTO, CALIFORNIA
U.S.A. 94303

*Not yet completed
January, 1977

(415) 494-7831
E.W. BURCHERT
S.L. DO FOO

APPENDIX B

LIST OF GAMMA LOGS, BULK DENSITY LOGS AND LITHOLOGIC LOGS INCLUDED WITH THIS REPORT

DIAMOND DRILL HOLES

	Gamma Ray Logs	Density Logs	Lithologic Logs
76-71	X	X	X
76-72	X	X	X
76-73	X	X	X
76-74	X	X	X
76-75	X	X	X
76-76	X	X	X
76-77	X	X	X
76-78	X	X	X
76-79	X	X	X
76-80	X	X	X
76-81	X	X	X
76-82	- *	-	-
76-83	X	X	X
76-84	-	-	-
76-85	X	X	X
76-86	-	-	-
76-87	X	X	X
76-67	X	X	X
76-68	X	X	X

* Drillhole not completed to bedrock, excessive overburden.

ROTARY DRILL HOLES*

	Gamma Ray Logs	Density Logs
76-1	X	X
76-2	X	X
76-3	X	X
76-4	X	X
76-5	-	-
76-6	-	-
76-7	X	X
76-8	-	X
76-9	-	X
76-10	-	-
76-11	X	X
76-12	-	-
76-13	X	X
76-14	X	X
76-15	X	X
76-16	X	X
76-17	-	-
76-18	X	X
76-19	-	-
76-20	X	X
76-21	-	-
76-22	X	X
76-23	X	X
76-24	X	X
76-25	X	X
76-26	X	X
76-27	X	X
76-28	-	-
76-29	X	X
76-30	X	X
76-31	X	X
76-32	-	-
76-33	X	X
76-34	X	X
76-35	X	X
76-36	X	X
76-37	X	X
76-38	X	X
76-39	X	-
76-40	X	X

* Bad hole conditions, unable to probe hole.

** No lithologic logs were compiled from chip samples from the rotary drillholes.

ROTARY DRILL HOLES*

	Gamma Ray Logs	Density Logs
76-41	X	X
76-42	X	-
76-43	X	X
76-44	X	X
76-45	X	X
76-46	X	X
76-47	X	X
76-48	-	-
76-49	X	X
76-50	X	X
76-51	X	X
76-52	X	X
76-53	X	X
76-54	-	-
76-55	-	-
76-56	-	-
76-57	-	-
76-58	-	-
76-59	-	-
76-60	-	-
76-61	-	-
76-62	-	-
76-63	-	-
76-64	-	-
76-65	X	X
76-66	X	X
76-67	X	-
76-68	-	-
76-69	-	-
76-70	-	-
76-71	X	X
76-72	X	X
76-73	X	X
76-74	X	X
76-75	-	X
76-76	X	X
76-77	-	X
76-78	-	X
76-79	-	-
76-80	X	X

* Bad hole conditions, unable to probe hole

** No lithologic logs were compiled from chip samples from the rotary drillholes.

ROTARY DRILL HOLES*

	Gamma Ray Logs	Density Logs
76-81	X	X
76-82	X	X
76-83	-	-
76-84	X	X
76-85	X	X
76-86	-	-
76-87	X	-
76-88	X	-
76-89	X	-

* Bad hole conditions, unable to probe hole.
** No lithologic logs were compiled from chip samples from the rotary drillholes.

ROTARY DRILL HOLES

	Gamma Ray Logs	Density Logs
76-101	X	X
76-102	-	-
76-103	X	X
76-104	X	X
76-105	X	X
76-106	X	X
76-107	X	X
76-108	X	X
76-109	-	-
76-110	X	X
76-111	X	X
76-112	X	X
76-113	X	X
76-114	X	X
76-115	-	-
76-116	X	X
76-117	X	X
76-118	X	X
76-119	X	-
76-120	X	X
76-121	X	X
76-122	-	-
76-123	X	-
76-124	X	-
76-125	X	X
76-126	X	X
76-127	X	X
76-128	X	X
76-129	X	X
76-130	-	-
76-131	X	X
76-132	X	X
76-133	-	-
76-134	X	X
76-135	-	-
76-136	X	X
76-137	-	-
76-138	X	X
76-139	X	X
76-140	-	-
76-141	-	-
76-142	X	X

ROTARY DRILL HOLES

	Gamma Ray Logs	Density Logs
76-143	-	-
76-144	X	X
76-145	X	X
76-146	X	X
76-147	X	X
76-148	X	X
76-149	X	X
76-150	X	X
76-151	X	X
76-152	-	X
76-153	-	-
76-154	-	-
76-155	-	X
76-156	-	X
76-157	-	X
76-158	-	X
76-159	-	X
76-160	-	X
76-161	X	X
76-162	X	-
76-163	X	-
76-164	-	-
76-165	X	X
76-166	X	X
76-167	X	X
76-168	X	X
76-169	X	X
76-170	X	X
76-171	X	X
76-172	X	X
76-173	X	X

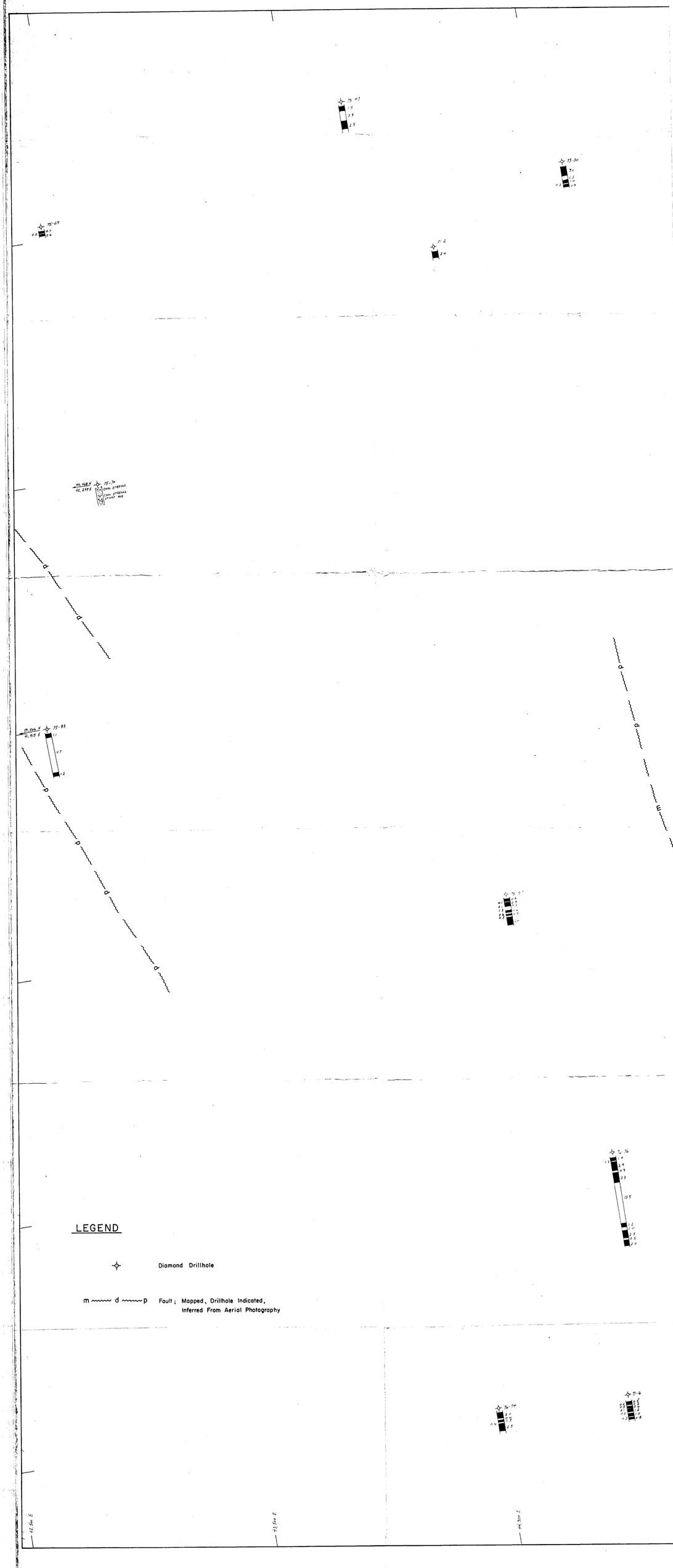
PR- CARBON CREEK 76(2) C-2

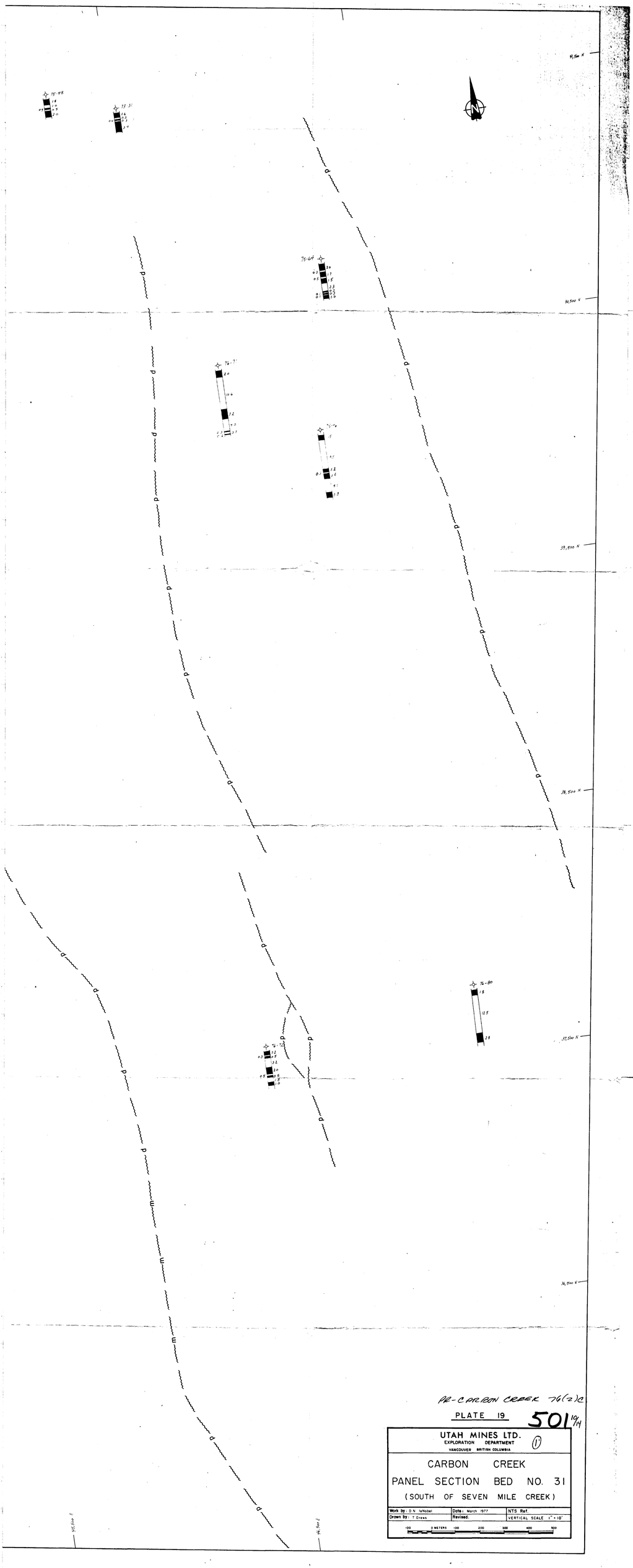
1976 REPORT OF EXPLORATION ACTIVITIES
ON THE CARBON CREEK PROPERTY
(MAPS) 10/14

D.N. LeNOBEL (Book B-2) 1976

GEOLOGICAL BRANCH
ASSESSMENT REPORT

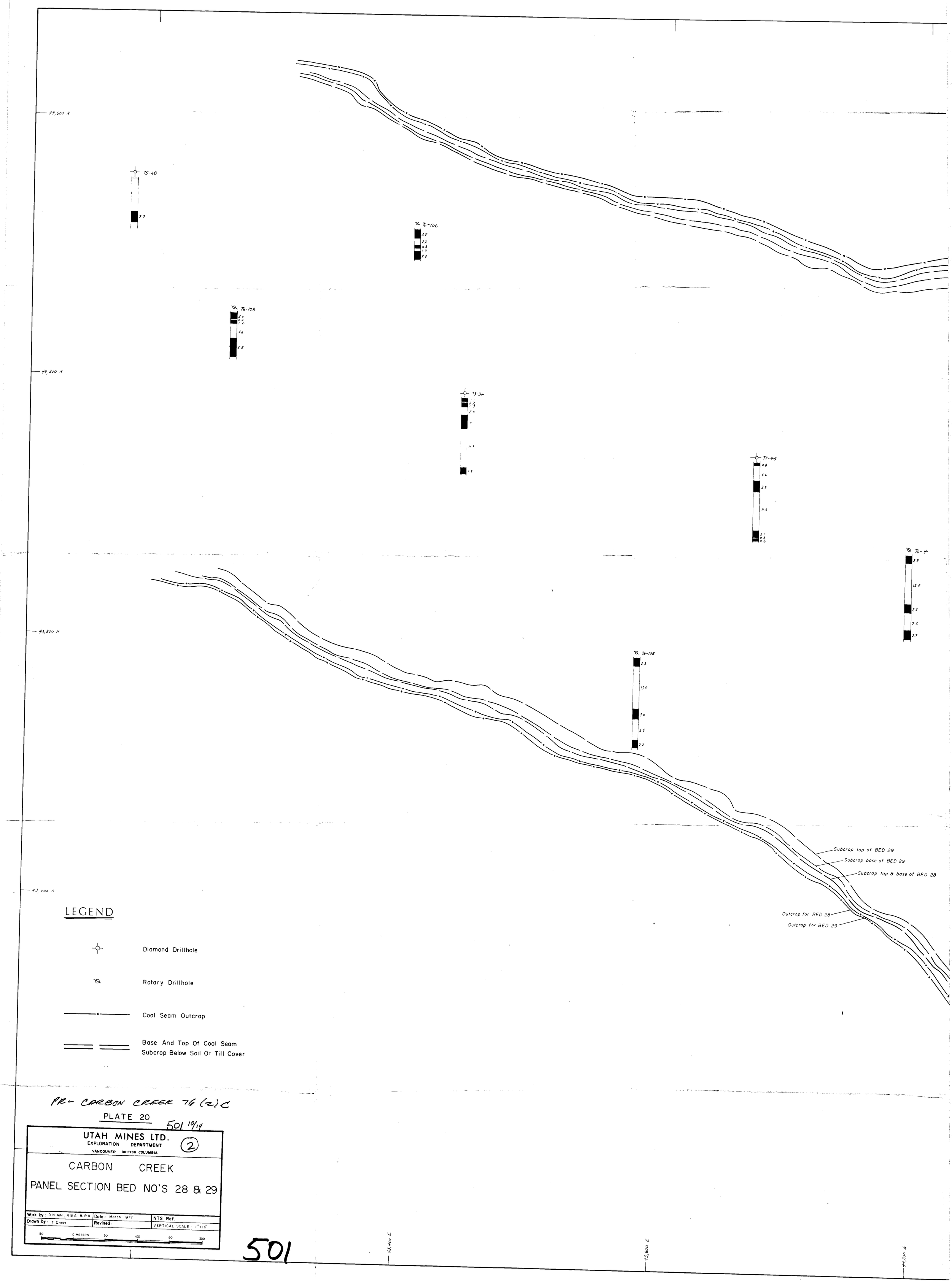
00 501


LEGEND
Diamond Drillhole
m d p Fault ; Mapped, Drillhole Indicated, Inferred From Aerial Photography



AR-CARBON CREEK 76(2)C

501 19/19



LEGEND

Diamond Drillhole

Rotary Drillhole

Coal Seam Outcrop

Base And Top Of Coal Seam Subcrop Below Soil Or Till Cover

PR- CARBON CREEK 76 (2) C

PLATE 20

501 10/14

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

(2)

CARBON CREEK

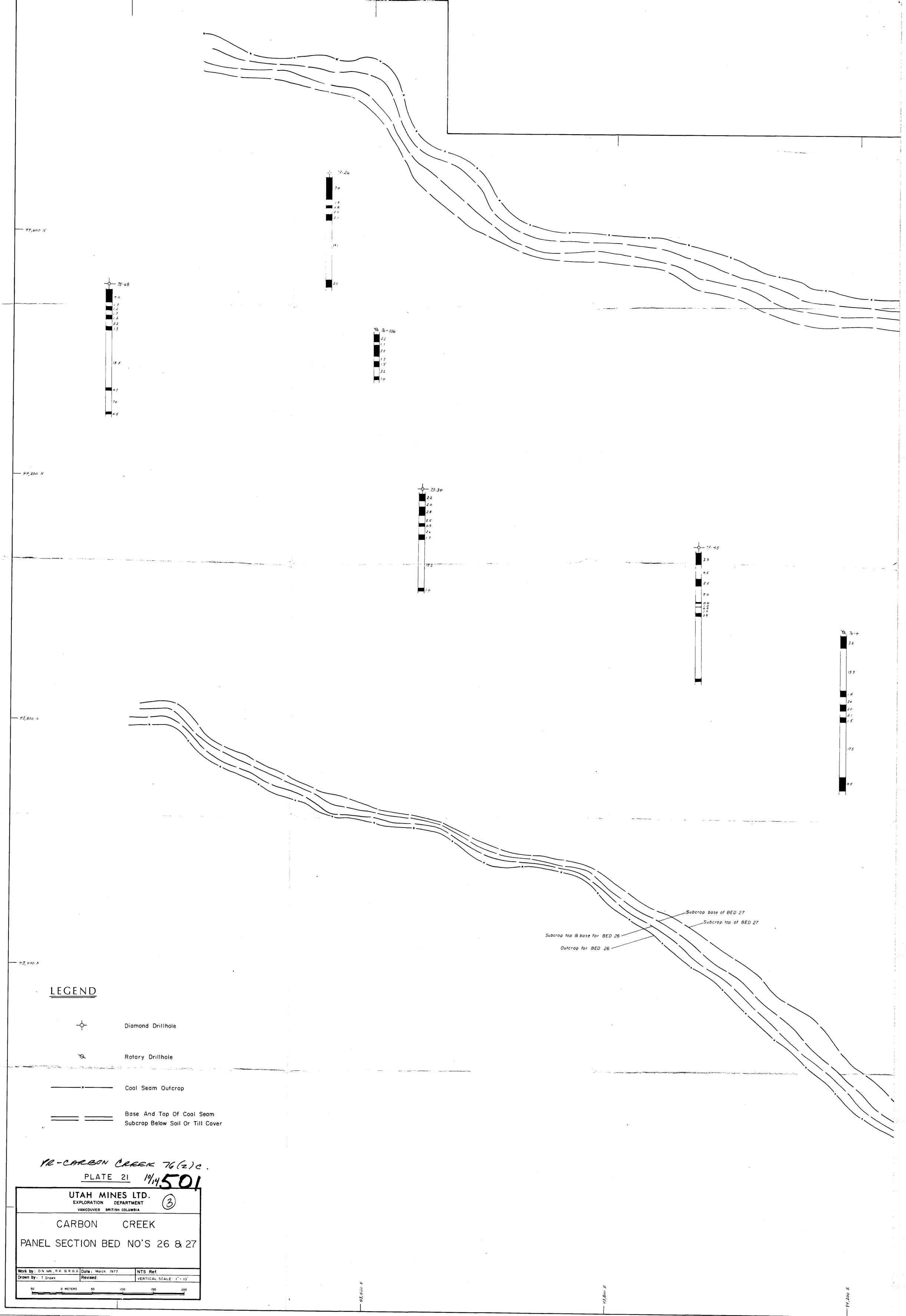
PANEL SECTION BED NO'S 28 & 29

Work by: D N leN, R B A & R K	Date: March 1977	NTS Ref.
Drawn by: T Drews	Revised:	VERTICAL SCALE 1" = 10'

50 0 METERS 50 100 150 200

501

N
Subcrop top of BED 29
Subcrop base of BED 29
Subcrop top & base of BED 28
Outcrop of BED 29
Outcrop of BED 28
73-33
76-101
75-67
76-125
73-25
44,600 E
45,000 E
45,400 E



PR-CARBON CREEK 76(2)c.

PLATE 21 10/14 501

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

(3)

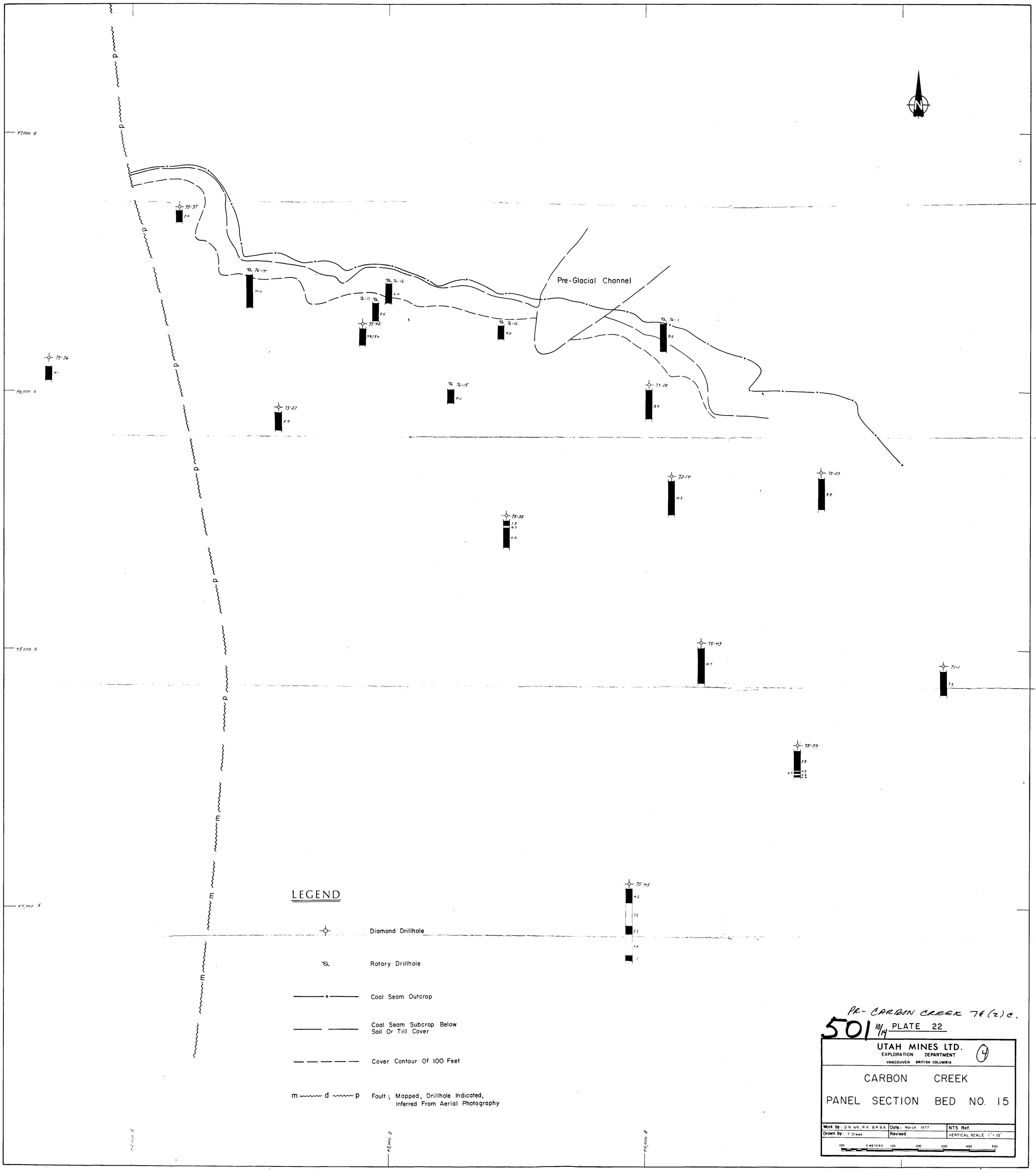
CARBON CREEK

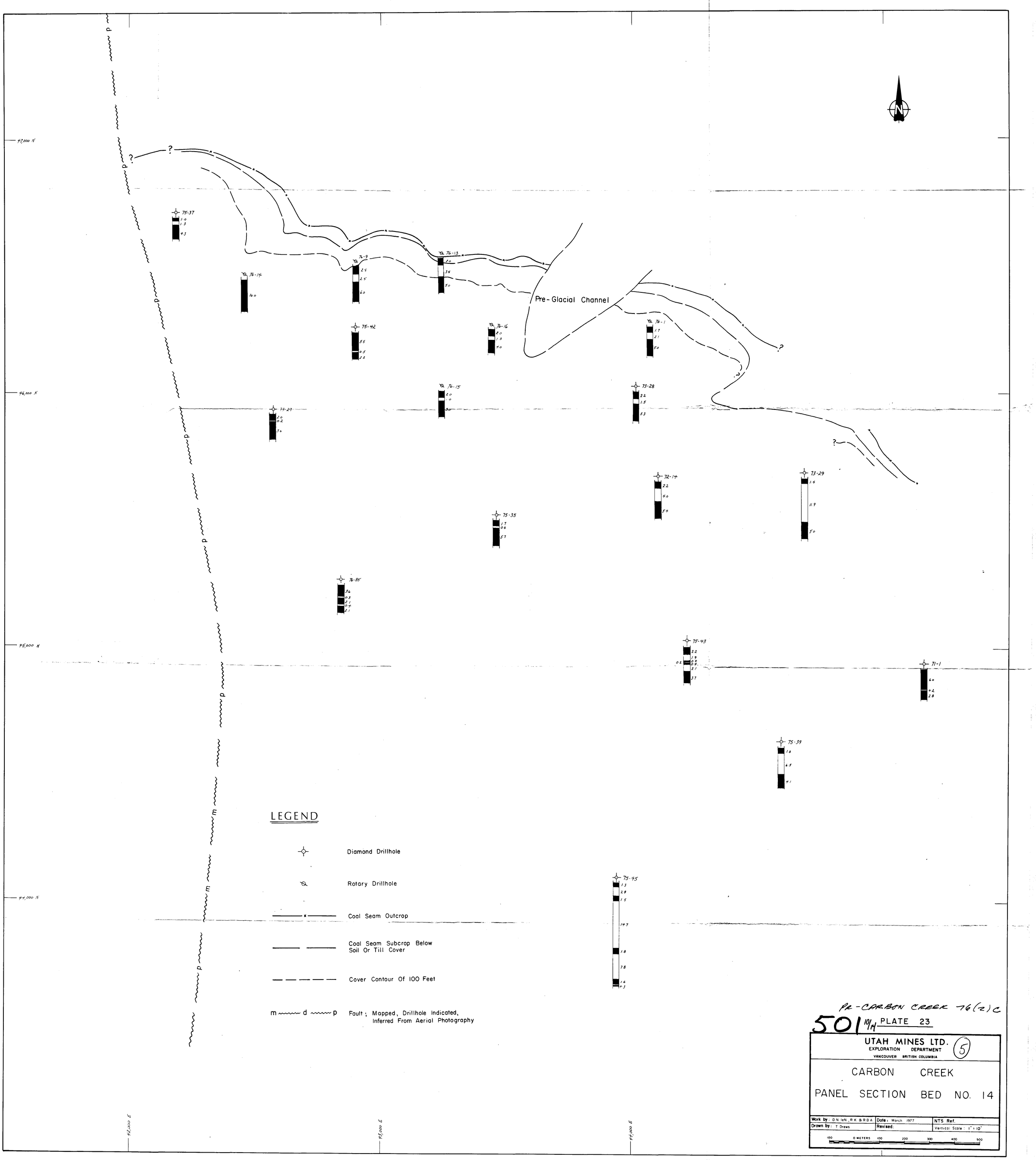
PANEL SECTION BED NO'S 26 & 27

Work by: D.N. leN, R.K. & R.B.A.	Date: March 1977	NTS Ref.
Drawn by: T. Drews	Revised:	VERTICAL SCALE: 1" = 10'

50 0 METERS 50 100 150 200

N
95700 E
95000 E
94300 E
78.05
3.2
18.0
75.41
3.0
17.5
7.5
7.0
6.5
6.8
5.0
7.2
73.25
1.6
1.6
0.9
13.7
10.7
8.7
11.1
15.9
21.1
73.33
2.0
0.9
0.7
15.3
11.1
9.7
8.4
14.4
20.0


47,000 N
46,000 N
45,000 N
44,000 N
43,000 E
44,000 E
Pre-Glacial Channel
75-37
3+
76-14
10.0
76-12
6.0
76-11
5.5
75-42
+8/50
76-16
4.0
76-1
8.5
75-36
4.1
76-15
4.0
73-27
5.4
73-28
8.8
72-14
10.2
75-29
9.5
75-35
1.3
0.7
6.0
75-43
10.7
71-1
7.5
75-39
5.8
0.7
0.3
0.4
0.5
75-45
+2
7.2
2.3
2.6
3
m
d
p
LEGEND
Diamond Drillhole
Rotary Drillhole
Coal Seam Outcrop
Coal Seam Subcrop Below Soil Or Till Cover
Cover Contour Of 100 Feet
m d p Fault ; Mapped, Drillhole Indicated, Inferred From Aerial Photography
PR-CARBON CREEK 76(2)C.
501 10/14 PLATE 22
UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA
4
CARBON CREEK
PANEL SECTION BED NO. 15
Work by: D.N. leN, R.K. & R.B.A.
Date: March 1977
NTS Ref.
Drawn by: T. Drews
Revised:
VERTICAL SCALE: 1" = 10'
100 0 METERS 100 200 300 400 500



PR-CARBON CREEK 76(2)C

501 10/M PLATE 23

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

(5)

CARBON CREEK

PANEL SECTION BED NO. 14

Work by: D.N. IeN, R.K. & R.B.A.	Date: March 1977	NTS Ref.
Drawn by: T. Drews	Revised:	Vertical Scale: 1" = 10'

100 0 METERS 100 200 300 400 500

PR-CARBON CREEK 76(2)C-1

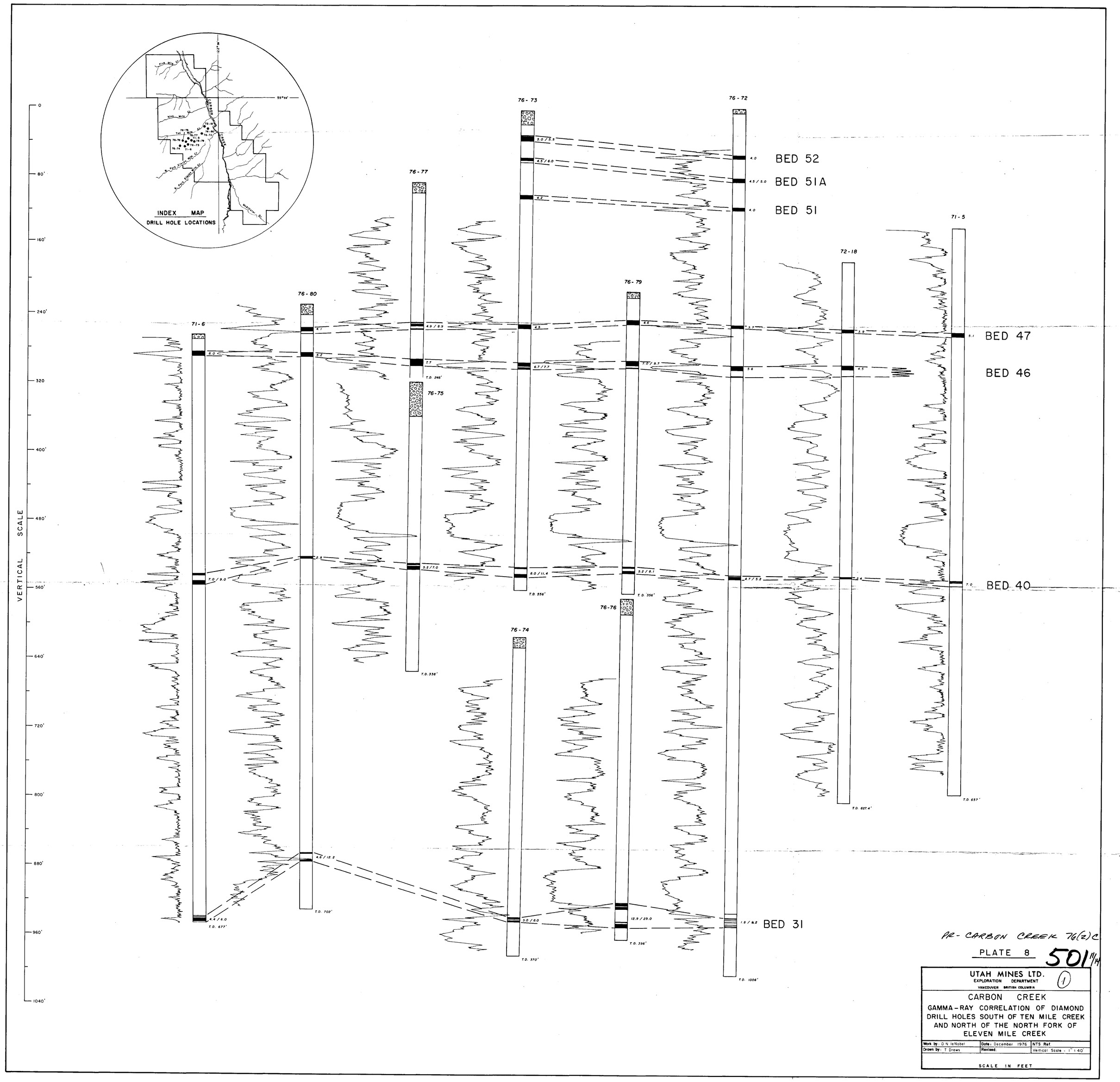
1976 REPORT OF EXPLORATION ACTIVITIES
ON THE CARBON CREEK PROPERTY
(MAPS) 11/14

D.N. LeNOBEL (BOOK B-2) 1976

OPEN FILE

GEOLOGICAL BRANCH
ASSESSMENT REPORT

00 501



PR- CARBON CREEK 76(2)C

PLATE 8 501 11/14

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

(1)

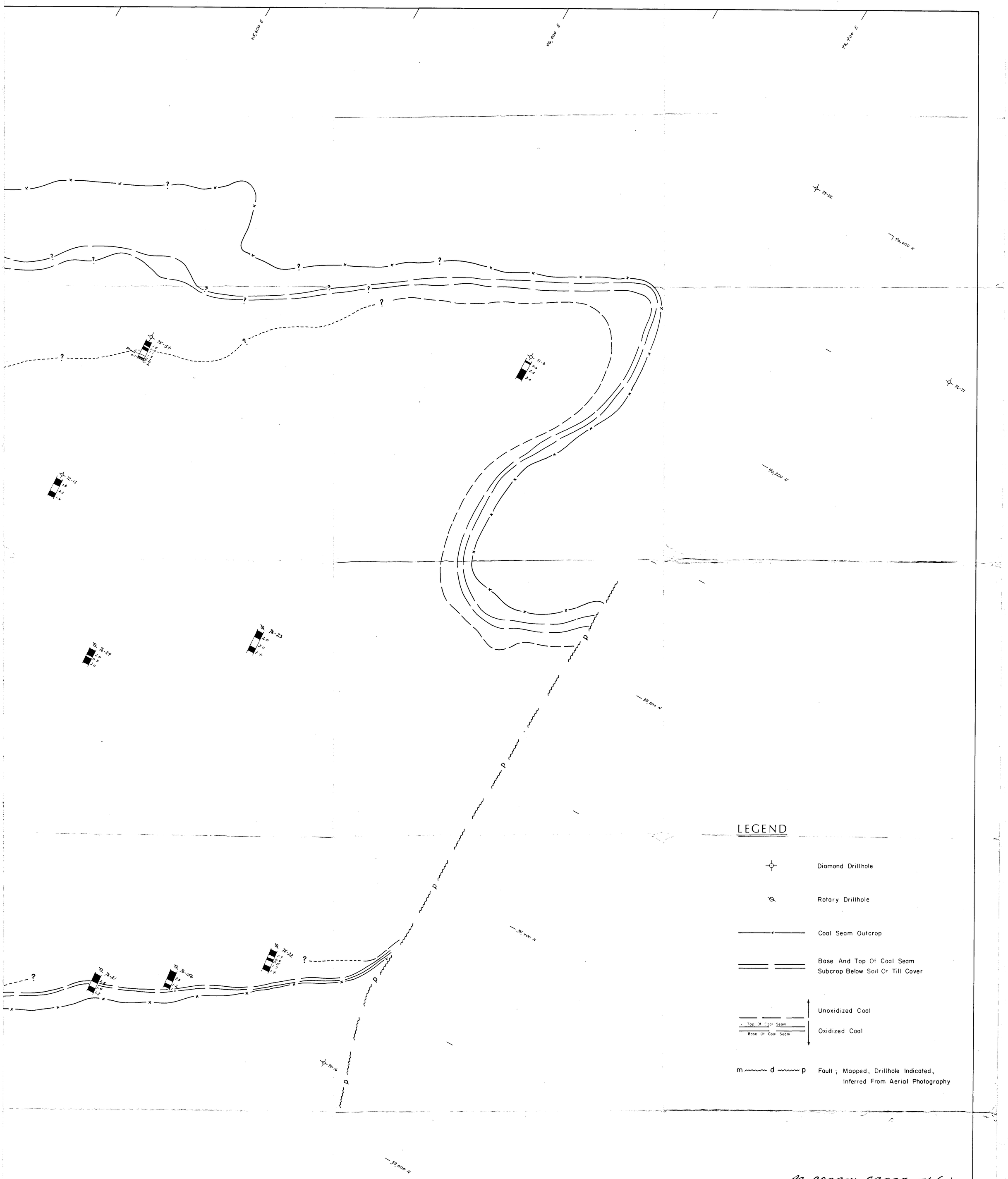
CARBON CREEK

GAMMA-RAY CORRELATION OF DIAMOND DRILL HOLES SOUTH OF TEN MILE CREEK AND NORTH OF THE NORTH FORK OF ELEVEN MILE CREEK

Work by: D N le Nobel	Date: December 1976	NTS Ref.
Drawn by: T Drews	Revised:	Vertical Scale - 1" = 40'

SCALE IN FEET

N
E
p
p
p
p
m
75-51
75-56
72-15
71-4
76-28



PR-CARBON CREEK 76(2)c.

PLATE 9 501 11/14

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

(2)

CARBON CREEK

PANEL SECTION BED NO. 58

Work by: D.N. eN., R.K. & R.B.A.	Date: March 1977	NTS Ref.
Drawn by: T. Drews	Revised:	VERTICAL SCALE: 1" = 10'

50 0 METERS 50 100 150 200

976800 E
976200 E

PR- CARBON CREEK 76(2)C

PLATE 10 501 11/14

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

(3)

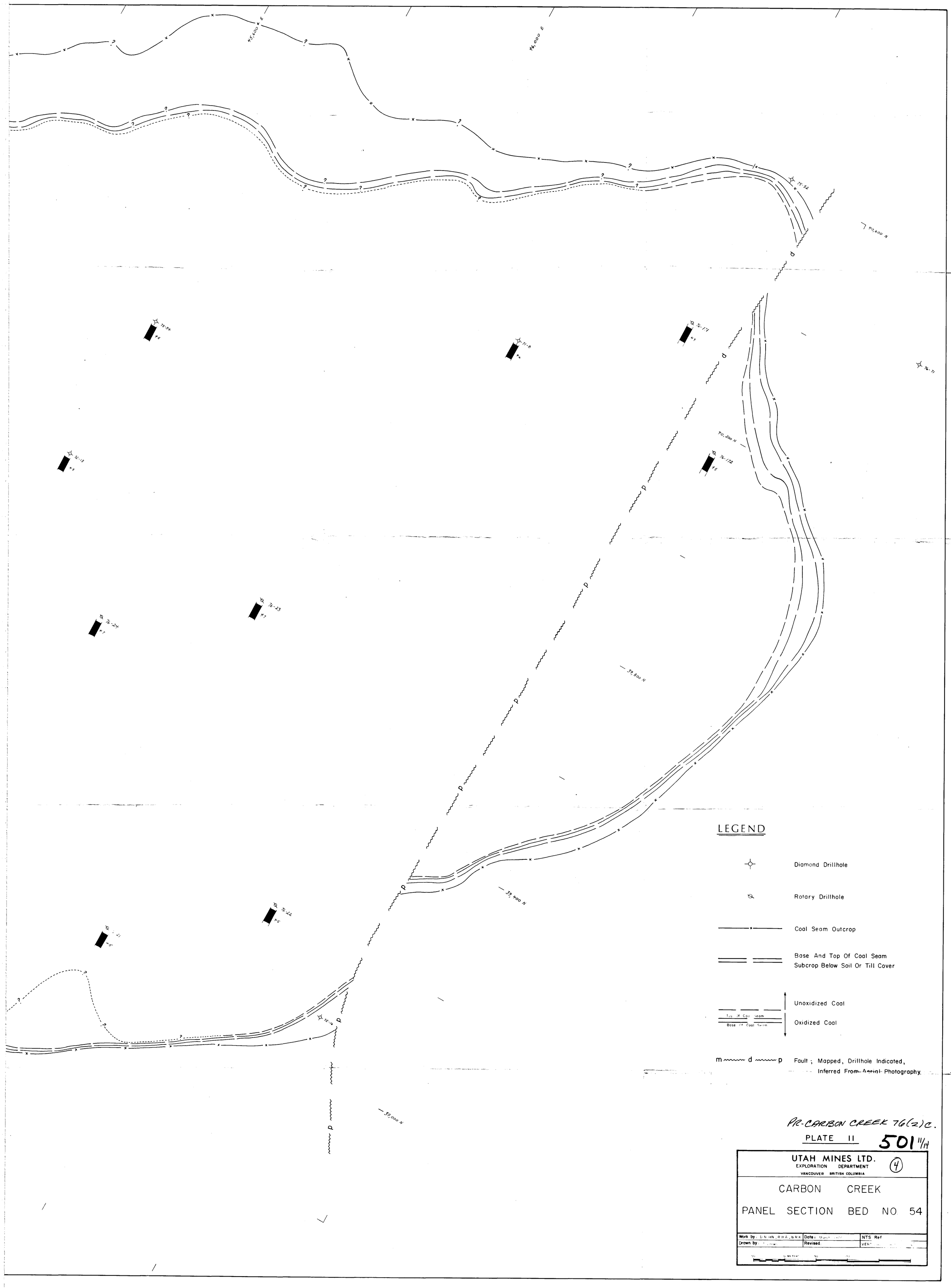
CARBON CREEK

PANEL SECTION BED NO. 55

Work by: D.N. Ien, R.K. Barba	Date: March 1977	NTS Ref.
Drawn by: T. Drews	Revised:	VERTICAL SCALE: 1" = 10'

50 0 METERS 50 100 150 200

77,800 E
75,200 E



PR-CARBON CREEK 76(2)C.

PLATE II

501 11/14

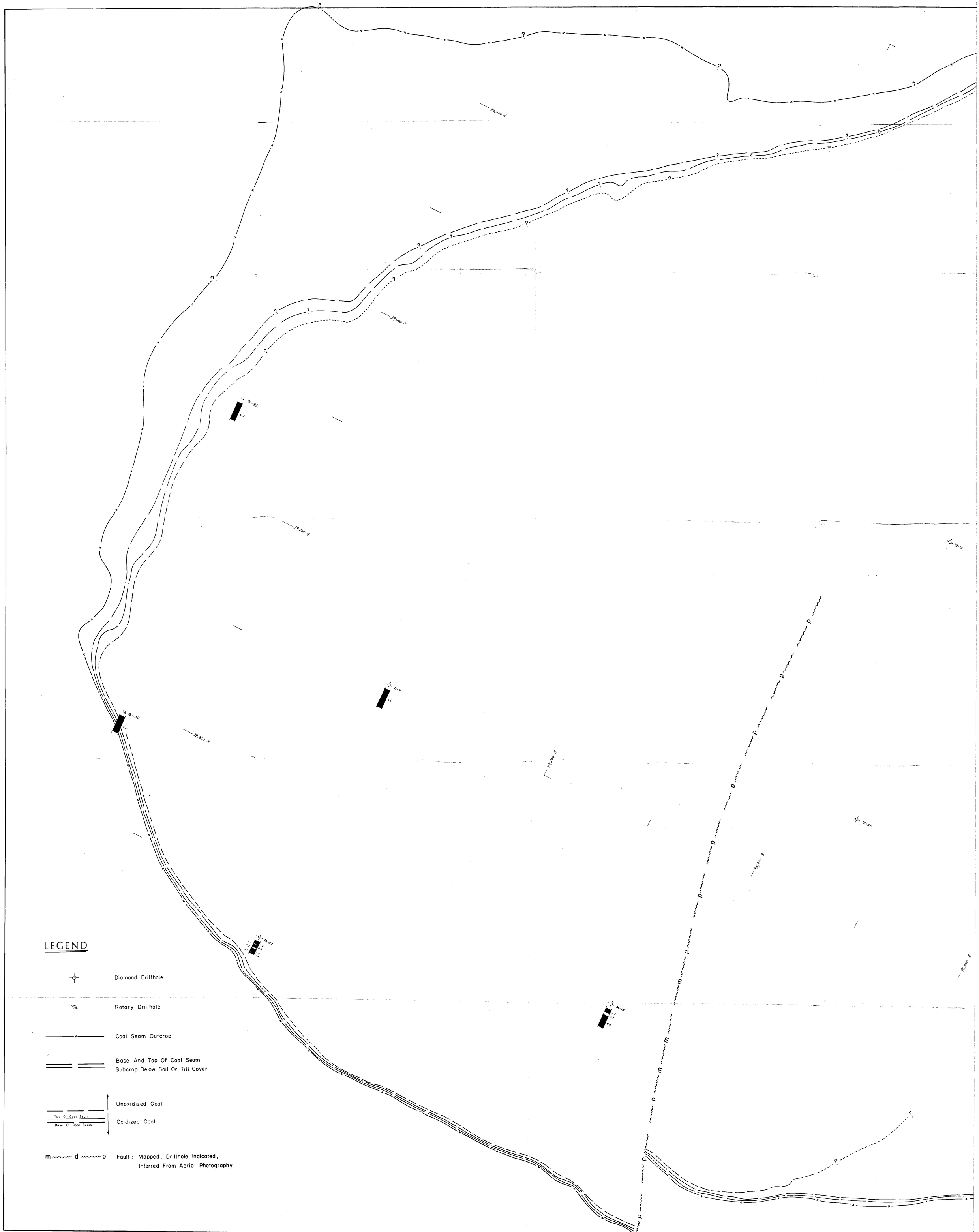
UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

(4)

CARBON CREEK

PANEL SECTION BED NO. 54

Work by: D.N. IeN, R.H.A., B.K.K.	Date: March 1977	NTS Ref.
Drawn by: [illegible]	Revised.	VER[illegible]


40,000 N
39,600 N
39,200 N
38,800 N
38,400 E
39,200 E
39,600 E
40,000 E
76-82
76-139
71-4
75-57
76-15
75-36
72-13
LEGEND
Diamond Drillhole
Rotary Drillhole
Coal Seam Outcrop
Base And Top Of Coal Seam
Subcrop Below Soil Or Till Cover
Unoxidized Coal
Top Of Coal Seam
Base Of Coal Seam
Oxidized Coal
m d p
Fault ; Mapped, Drillhole Indicated,
Inferred From Aerial Photography

AR- CARBON CREEK 76(2)C.

PLATE 12 501 11/14

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

(5)

CARBON CREEK

PANEL SECTION BED NO. 52

Work by: D.N. leN, R.B.A. & R.K.	Date: March 1977	NTS Ref.
Drawn by: T. Drews	Revised:	VERTICAL SCALE: 1" = 10'

50 0 METERS 50 100 150 200

Outcrop of BED 51
Subcrop base of BED 51
Subcrop top of BED 51
Oxidation line for BED 51
Oxidation line for BED 51A
Subcrop top of BED 51A
Subcrop base of BED 51A
Outcrop of BED 51A
Oxidation line for BED 51
Subcrop top of BED 51
Subcrop base of BED 51
Outcrop of BED 51
Oxidation line for BED 51A
Subcrop top of BED 51A
Subcrop base of BED 51A
Outcrop of BED 51A
LEGEND
Diamond Drillhole
Rotary Drillhole
Coal Seam Outcrop
Base And Top Of Coal Seam Subcrop Below Soil Or Till Cover
Top Of Coal Seam
Base Of Coal Seam
Unoxidized Coal
Oxidized Coal
Fault; Mapped, Drillhole Indicated, Inferred From Aerial Photography
501 1/4
Re-CARBON CREEK 76(a)C.
PLATE 13 & 14
UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA
CARBON CREEK
PANEL SECTION BED NO'S 51 & 51A
Drawn By
Date
Scale
Revised
NTS Ref
Vertical Scale

PR- CARBON CREEK 76(2) C-2

1976 REPORT OF EXPLORATION ACTIVITIES
ON THE CARBON CREEK PROPERTY
(MAPS)

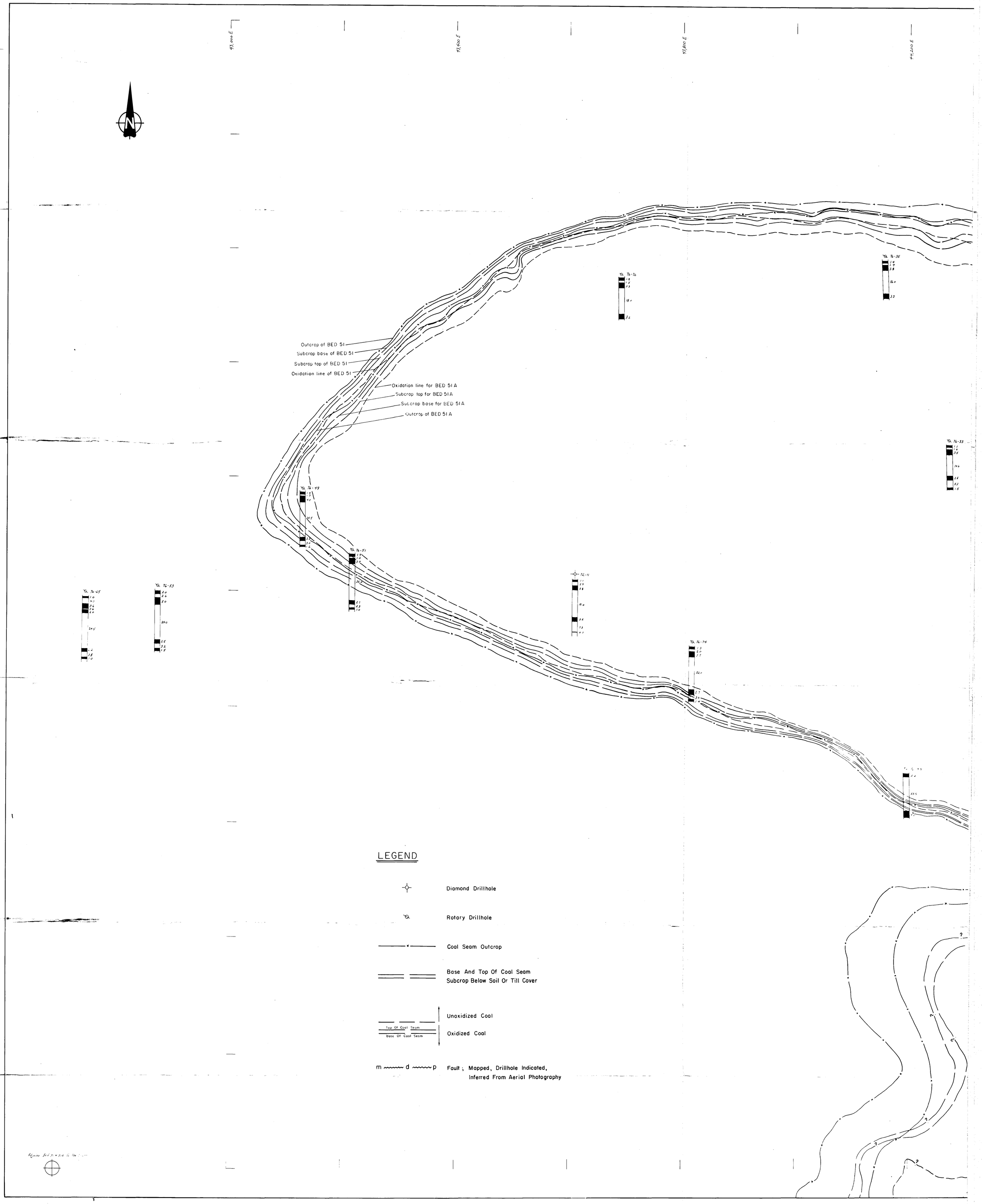
12/14

D.N. LENOBEL (BOOK B-1) 1976

OPEN FILE

GEOLOGICAL BRANCH
ASSESSMENT REPORT

00 501


43,000 E
43,400 E
43,800 E
44,200 E
N
Outcrop of BED 51
Subcrop base of BED 51
Subcrop top of BED 51
Oxidation line of BED 51
Oxidation line for BED 51 A
Subcrop top for BED 51 A
Subcrop base for BED 51 A
Outcrop of BED 51 A
76-76
76-35
76-33
76-49
76-51
72-11
76-74
76-65
76-53
LEGEND
Diamond Drillhole
Rotary Drillhole
Coal Seam Outcrop
Base And Top Of Coal Seam
Subcrop Below Soil Or Till Cover
Unoxidized Coal
Top Of Coal Seam
Base Of Coal Seam
Oxidized Coal
m d p
Fault ; Mapped, Drillhole Indicated,
Inferred From Aerial Photography

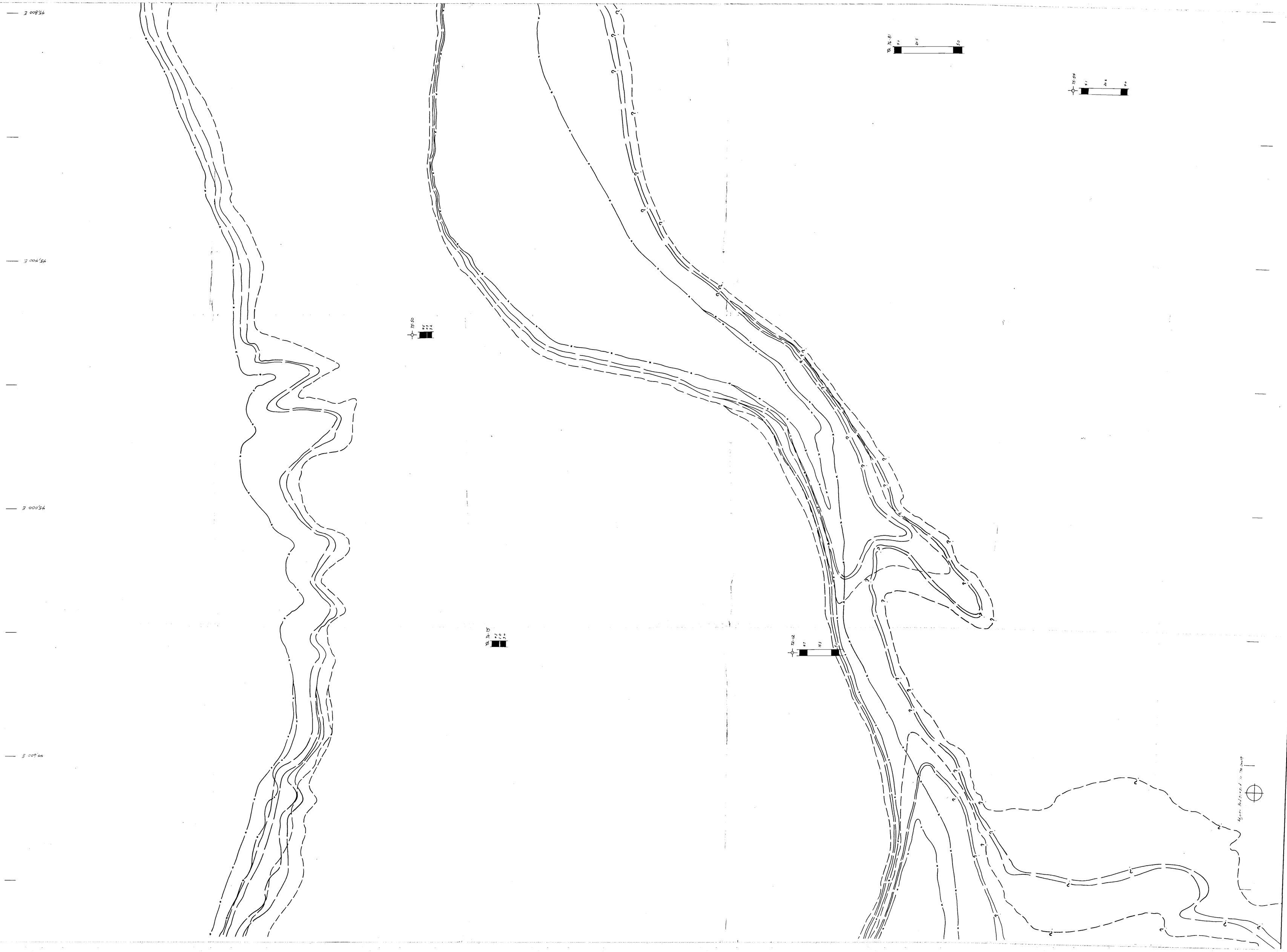

45,800 E
45,900 E
46,000 E
46,100 E

PLATE 13 & 14 12/14 501

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

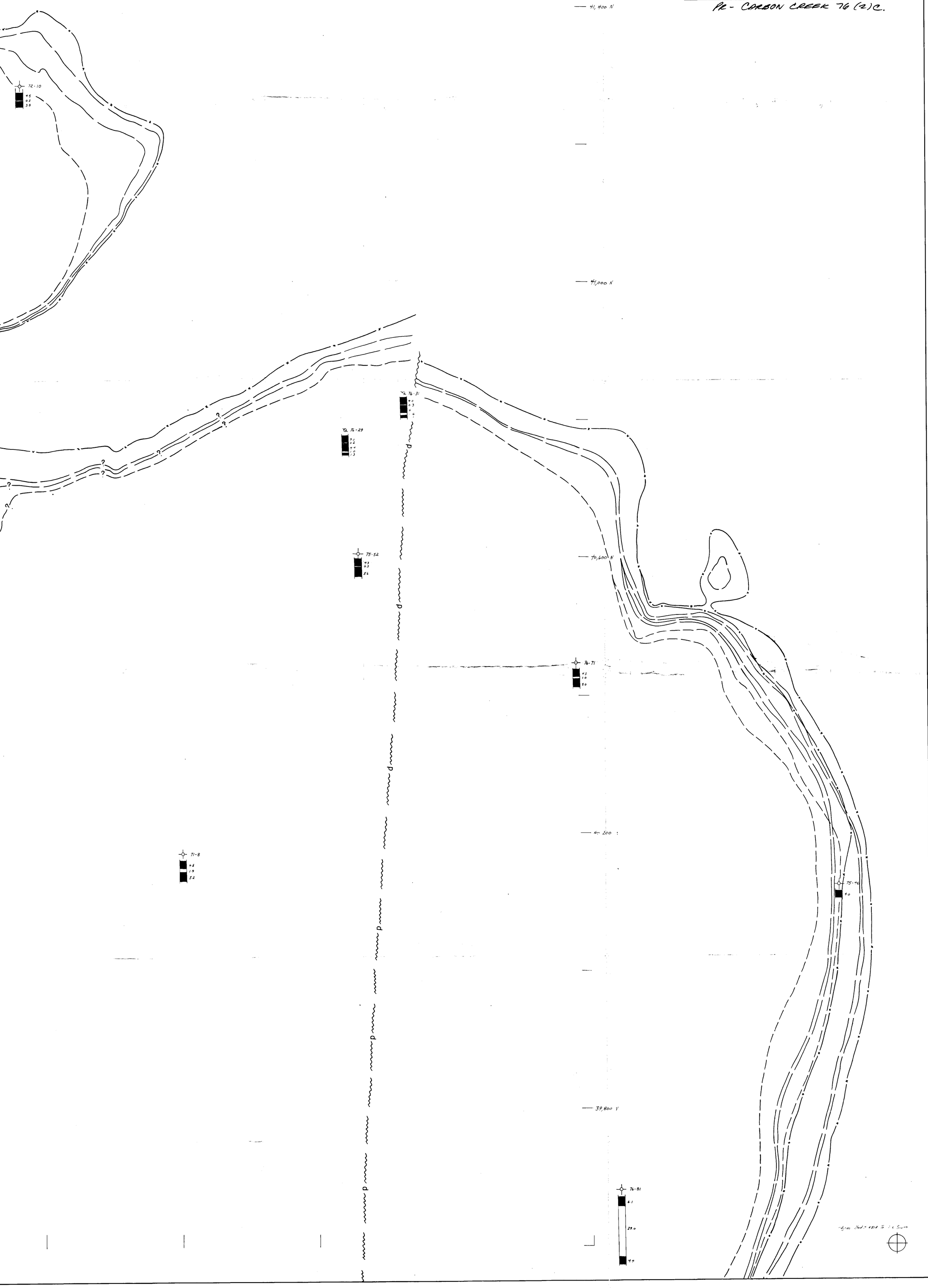
CARBON CREEK (1)

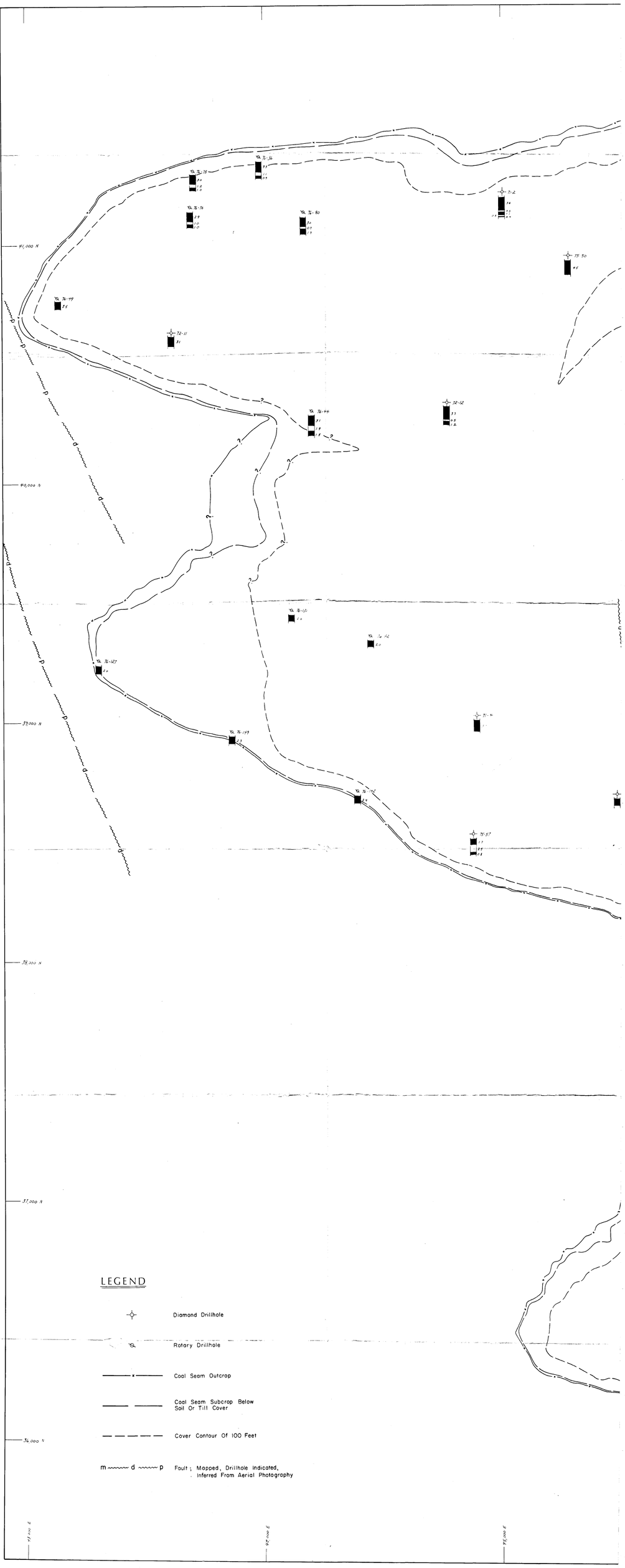
PANEL SECTION BED NO'S 51 & 51A

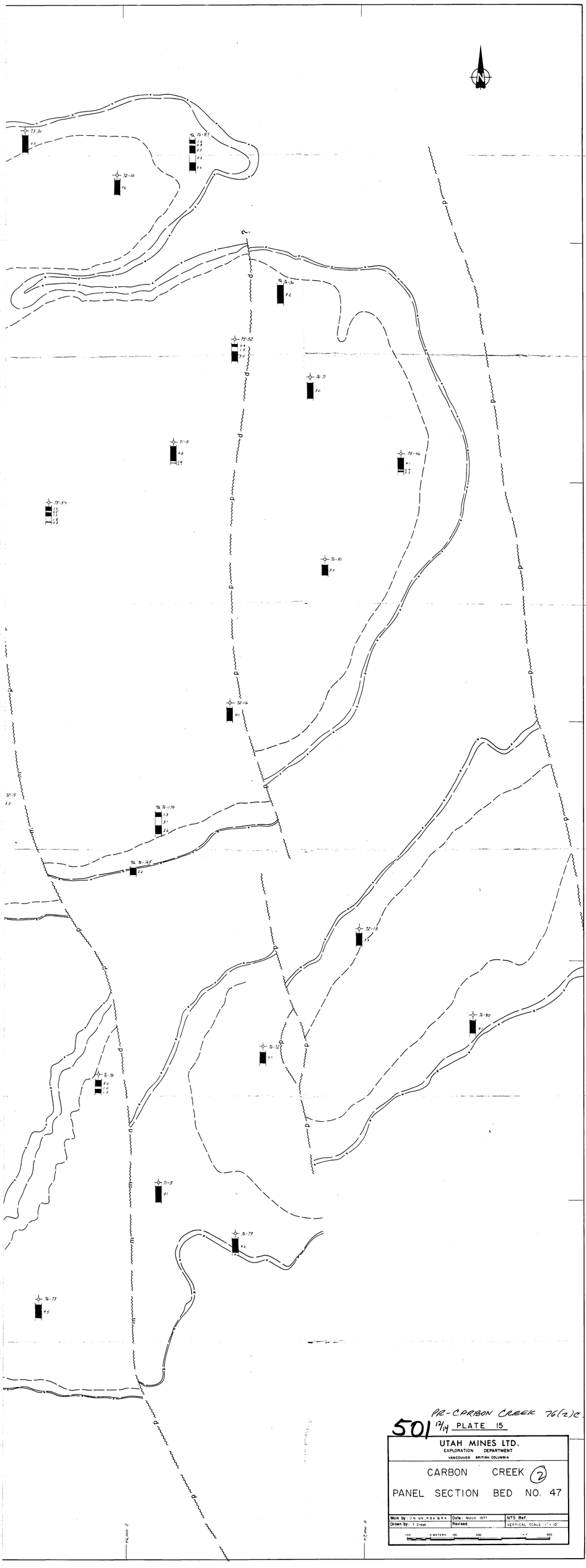
Work by: D.N. Ien, R.B.A. & R.K.	Date: March 1977	NTS Ref.
Drawn by: T. Drews	Revised:	VERTICAL SCALE 1" = 10'

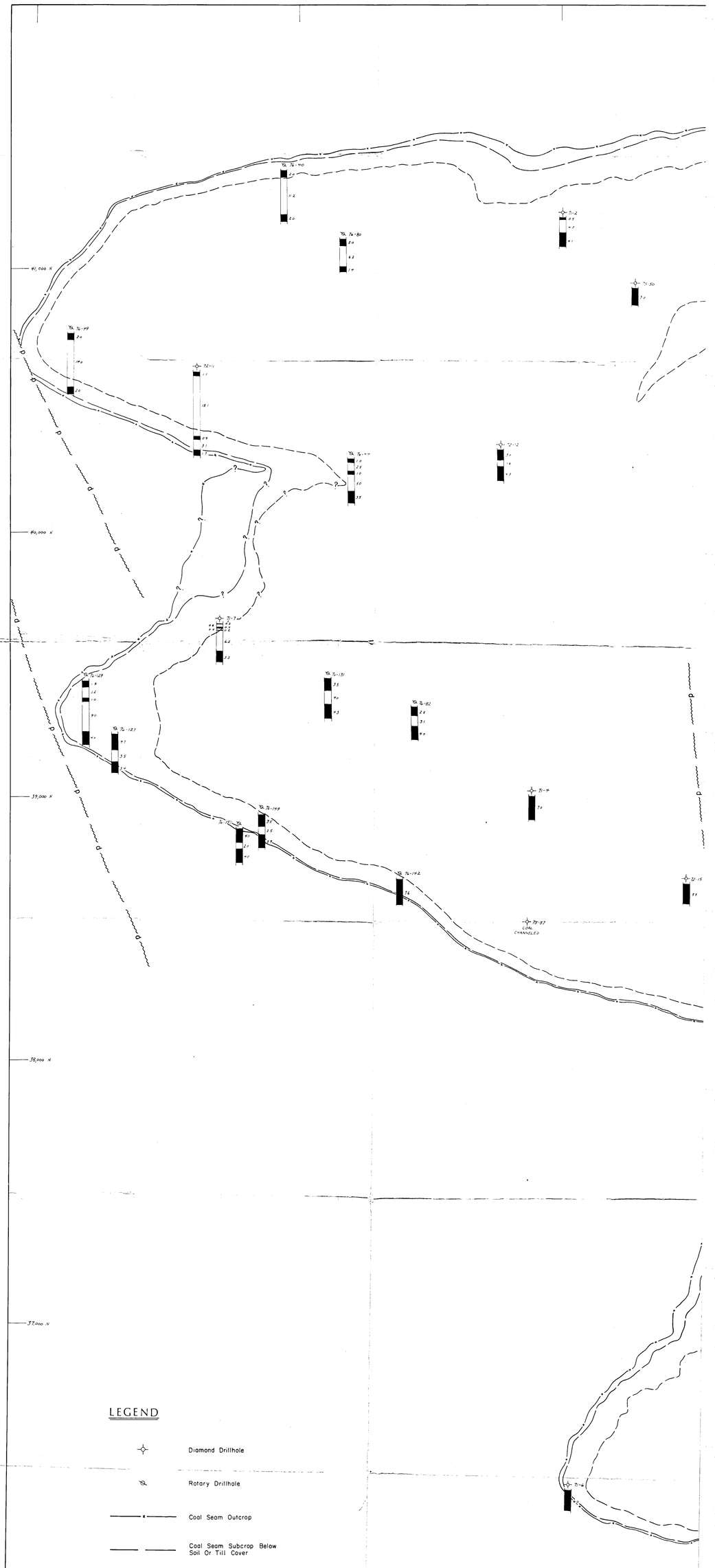
50 0 METERS 50 100 150 200

PR - CARBON CREEK 76 (2) C.




LEGEND
Diamond Drillhole
Rotary Drillhole
Coal Seam Outcrop
Coal Seam Subcrop Below Soil Or Till Cover
Cover Contour Of 100 Feet
m d p Fault ; Mapped, Drillhole Indicated, Inferred From Aerial Photography


N
71-30
76-81
72-10
72-30
75-52
76-77
71-8
75-46
75-54
76-61
72-16
72-15
76-170
76-165
72-18
76-80
76-22
76-78
71-5
76-79
76-73
PR-CARBON CREEK 76(2)C.
501 17/14 PLATE 15
UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA
CARBON CREEK (2)
PANEL SECTION BED NO. 47
Work by: D.N. IAN, R.B.A. & R.K.
Drawn by: T. Crews
Date: March 1977
Revised:
NTS Ref.
VERTICAL SCALE: 1" = 10'
100 0 METERS 100 200 500



LEGEND

Diamond Drillhole

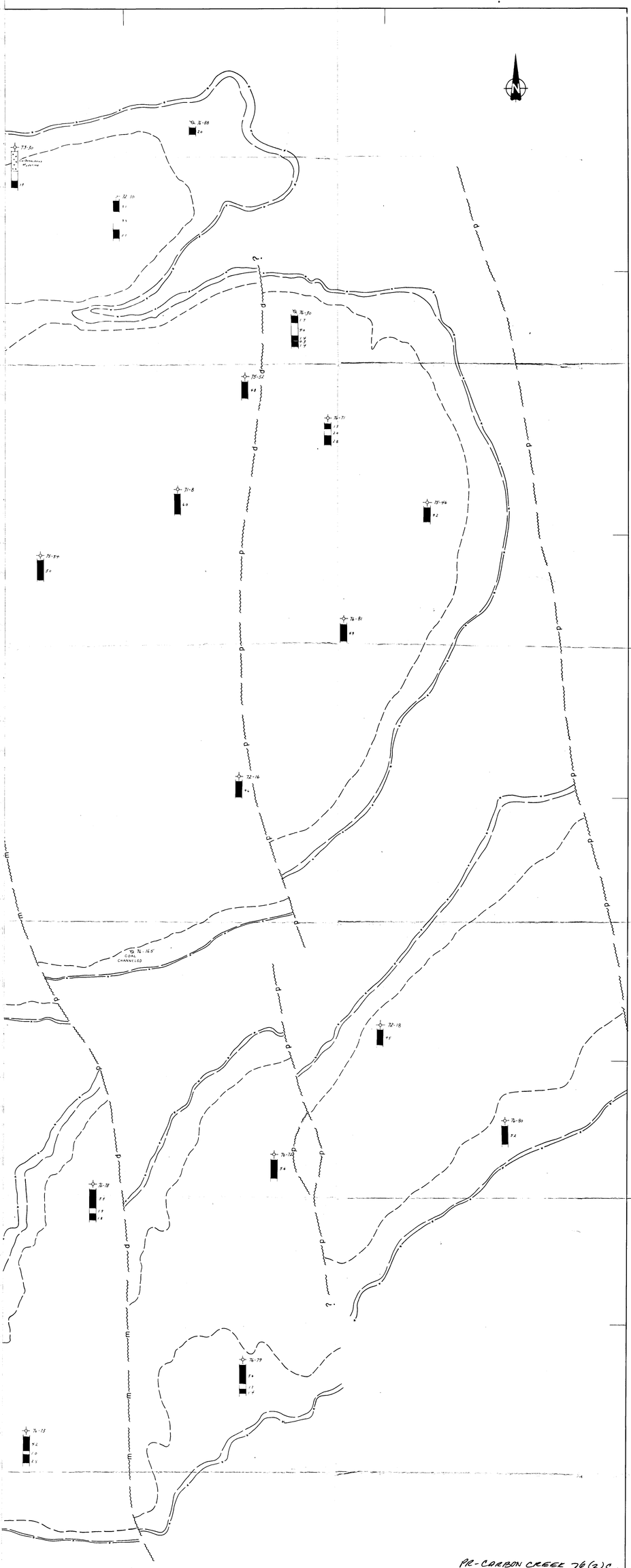
Rotary Drillhole

Coal Seam Outcrop

Coal Seam Subcrop Below Soil Or Till Cover

Cover Contour Of 100 Feet

m d p Fault ; Mapped, Drillhole Indicated, Inferred From Aerial Photography



501 12/14 PR-CARBON CREEK 76(2)C.

PLATE 16

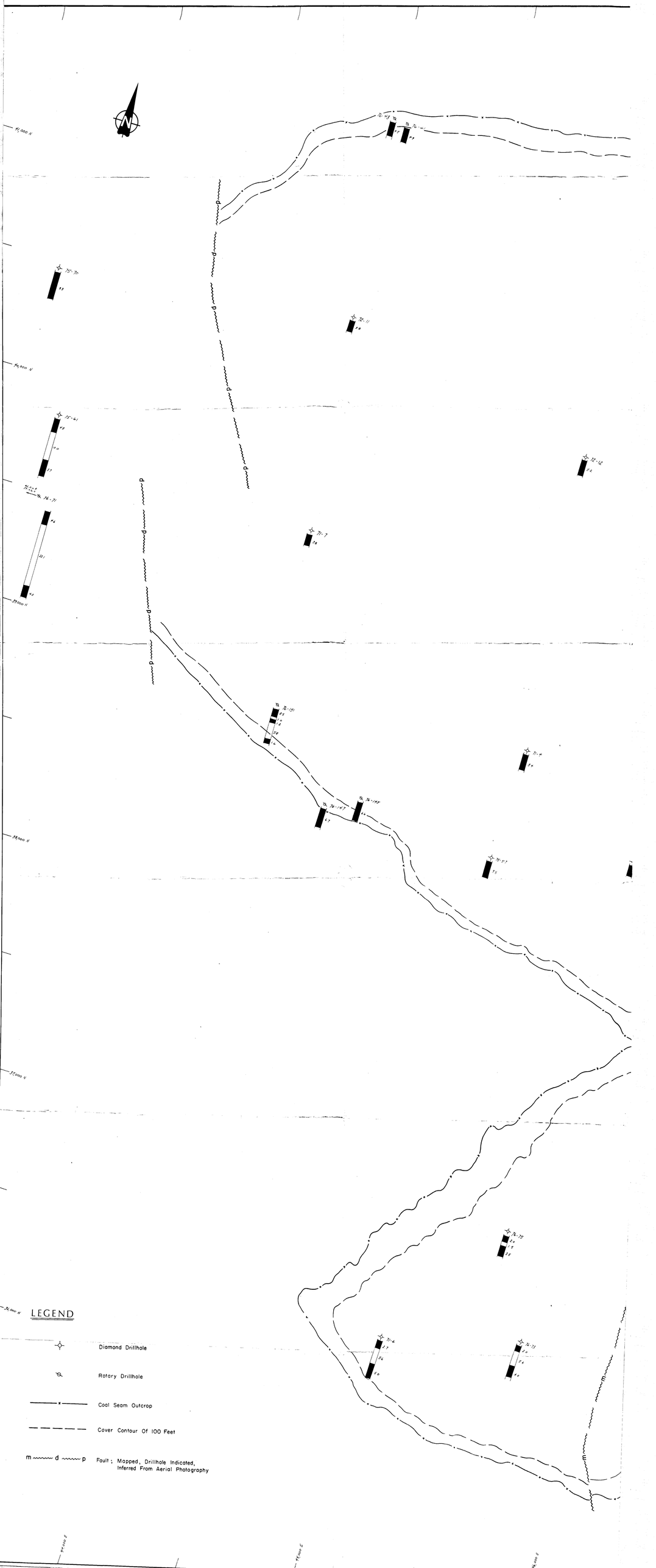
UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

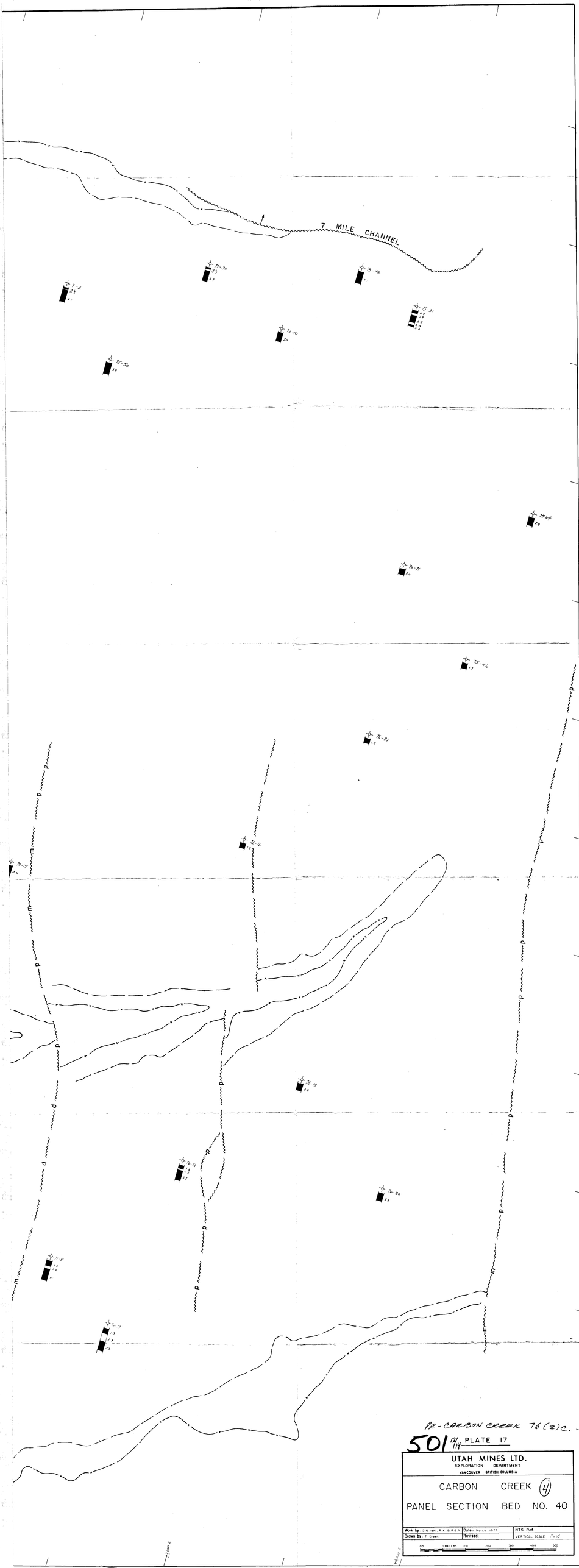
CARBON CREEK (3)

PANEL SECTION BED NO. 46

Work by: G.N. Jeffs, R.B.A. & R.H.	Date: March 1977	NTS Ref.
Drawn by: T. Drew	Revised:	VERTICAL SCALE 1" = 10'

0 METERS 100 200 300 400 500


LEGEND
Diamond Drillhole
Rotary Drillhole
Coal Seam Outcrop
Cover Contour Of 100 Feet
m d p Fault ; Mapped, Drillhole Indicated, Inferred From Aerial Photography



RR-CARBON CREEK 76(2)C.

501 12/14 PLATE 17

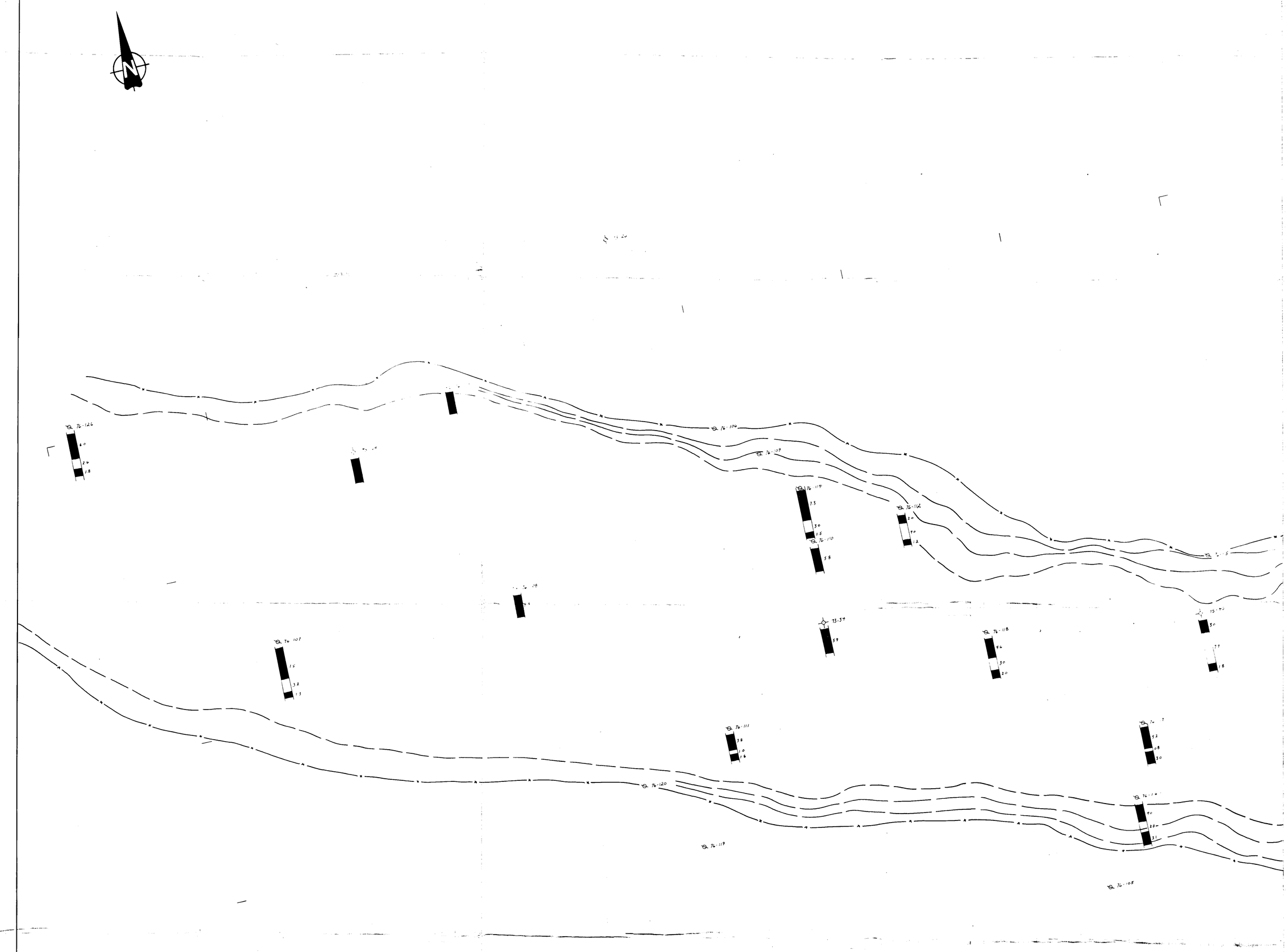
UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

CARBON CREEK (4)

PANEL SECTION BED NO. 40

Work by: C.N. Jeffs, R.K. & R.D.A.	Date: March 1977	NTS Ref.
Drawn by: T. Drew	Revised	VERTICAL SCALE 1"=10'

50 0 METERS 100 200 300 400 500



LEGEND

Diamond Drillhole

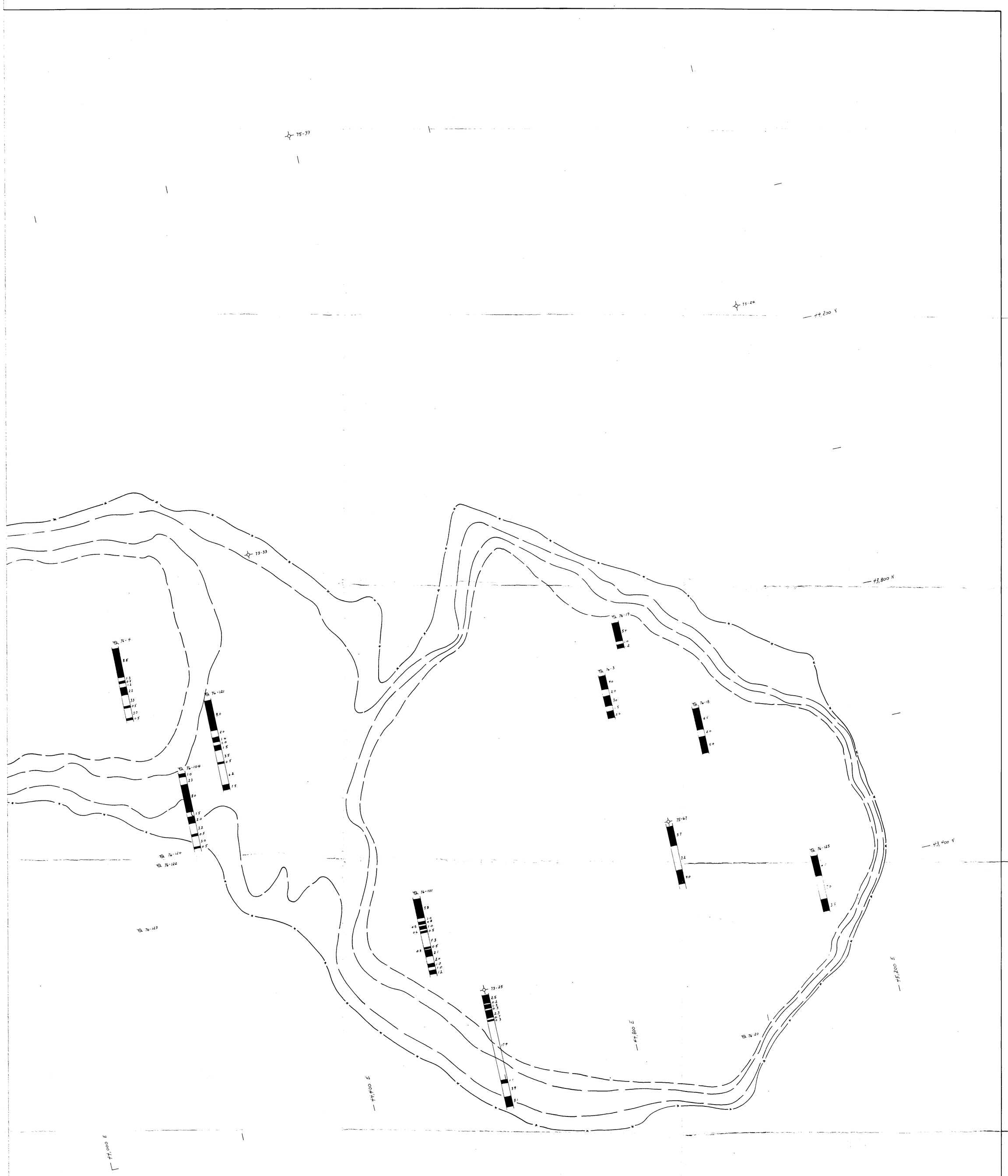
Rotary Drillhole

Coal Seam Outcrop

Base And Top Of Coal Seam
Subcrop Below Soil Or Till Cover

Top Of Coal Seam — Unoxidized Coal
Base Of Coal Seam — Oxidized Coal

m ~~~ d ~~~ p — Fault ; Mapped, Drillhole Indicated, Inferred From Aerial Photography



PR- CARBON CREEK 76 (2) C

PLATE 18 12/14 501

UTAH MINES LTD.
EXPLORATION DEPARTMENT
VANCOUVER BRITISH COLUMBIA

CARBON CREEK (5)

PANEL SECTION BED NO. 31

(NORTH OF SEVEN MILE CREEK)

Work by: D.N. leN, R.B.A. & R.K.	Date: March 1977	NTS Ref.
Drawn by: T. Drews	Revised:	VERTICAL SCALE 1" = 10'

50 0 METERS 50 100 150 200