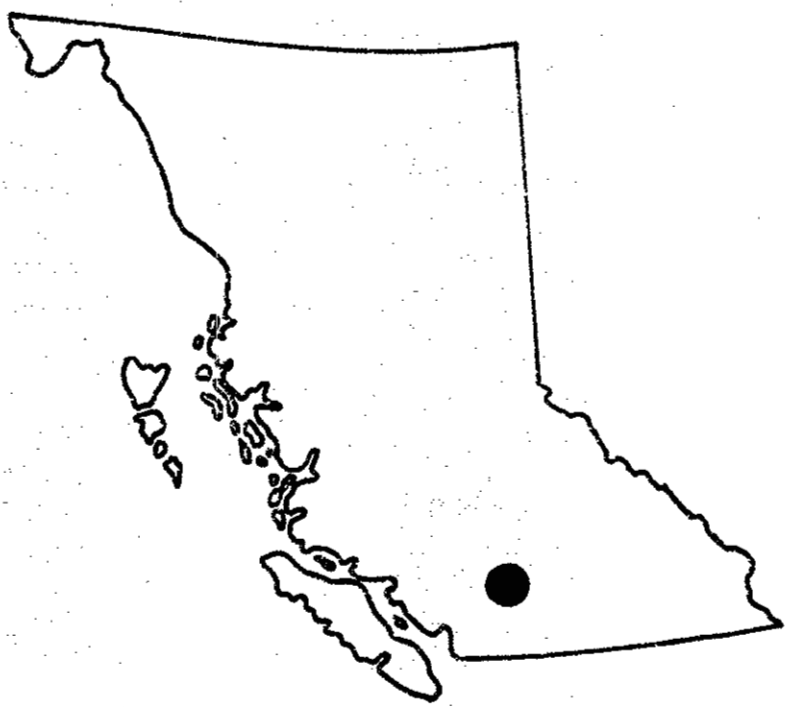
HC - HAT CREEK 78 (1) B.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

HAT CREEK COAL EXPLORATION PROJECT



ASSESSMENT REPORT ON COAL LICENCE NUMBERS 12, 144, 2753-2762, 3003-3004, 3009-3013.

NTS AREA 92 I/12 & 13

APRIL, 1979.

THERMAL DIVISION · MINING DEPARTMENT

HC - HAT CREEK [illegible] 18(1)B.

B. C. HYDRO AND POWER AUTHORITY
THERMAL DIVISION
MINING DEPARTMENT
BOX 12121
555 WEST HASTINGS STREET
VANCOUVER, B. C. V6B 4T6

Assessment Report for the

HAT CREEK
COAL EXPLORATION PROJECT

On Coal License Numbers
12, 144, 2753-2762, 3003-3004,
3009-3013

NTS AREA 92 I/12 & 13

APRIL 1979

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

INTRODUCTION

This assessment report summarizes the exploration work conducted by British Columbia Hydro and Power Authority (B. C. Hydro) on coal licences in Upper Hat Creek Valley (Figure 1) for the period from 1 May 1978 to 1 May 1979.

Geological, geotechnical and hydrogeological studies which have been conducted and discussed here may not be strictly confined to the above mentioned licences but to the No. 1 Deposit in general and may slightly overlap the assessment period.

The project was managed by the Mining Department under the supervision of J. J. Fitzpatrick, P.Eng. of B. C. Hydro & Power Authority.

LOCATION

Upper Hat Creek Valley, in which the coal licences are situated, is accessible by road 192 km northeast of Vancouver, B. C., midway between the towns of Lillooet and Ashcroft (Figure 2). Railheads can be reached at Pavilion, on the B. C. Railroad, 24 km to the northwest, and at Ashcroft, on the C. P. and C. N. railroads, 48 road km to the east. Easiest access to the property is from the Trans-Canada Highway at Cache Creek, 37 road km to the east, via the secondary highway (No. 12) between Cache Creek and Pavilion. The closest regularly serviced airport is at Kamloops, 109 km to the east.

The coal licences are situated in the broad, north-trending, grassland valley, about 24 km in length, through which flows the upstream portion of Hat Creek. From the north end of this valley Hat Creek flows northeastward through a narrow valley into the Bonaparte River, which flows south to join the Thompson River at Ashcroft.

Upper Hat Creek Valley lies within the Interior Plateau Dry Belt of British Columbia at a mean elevation of about 1,070 m. The valley is flanked by somewhat subdued mountains that rise to elevations of 1,800-2,100 m, 7 km

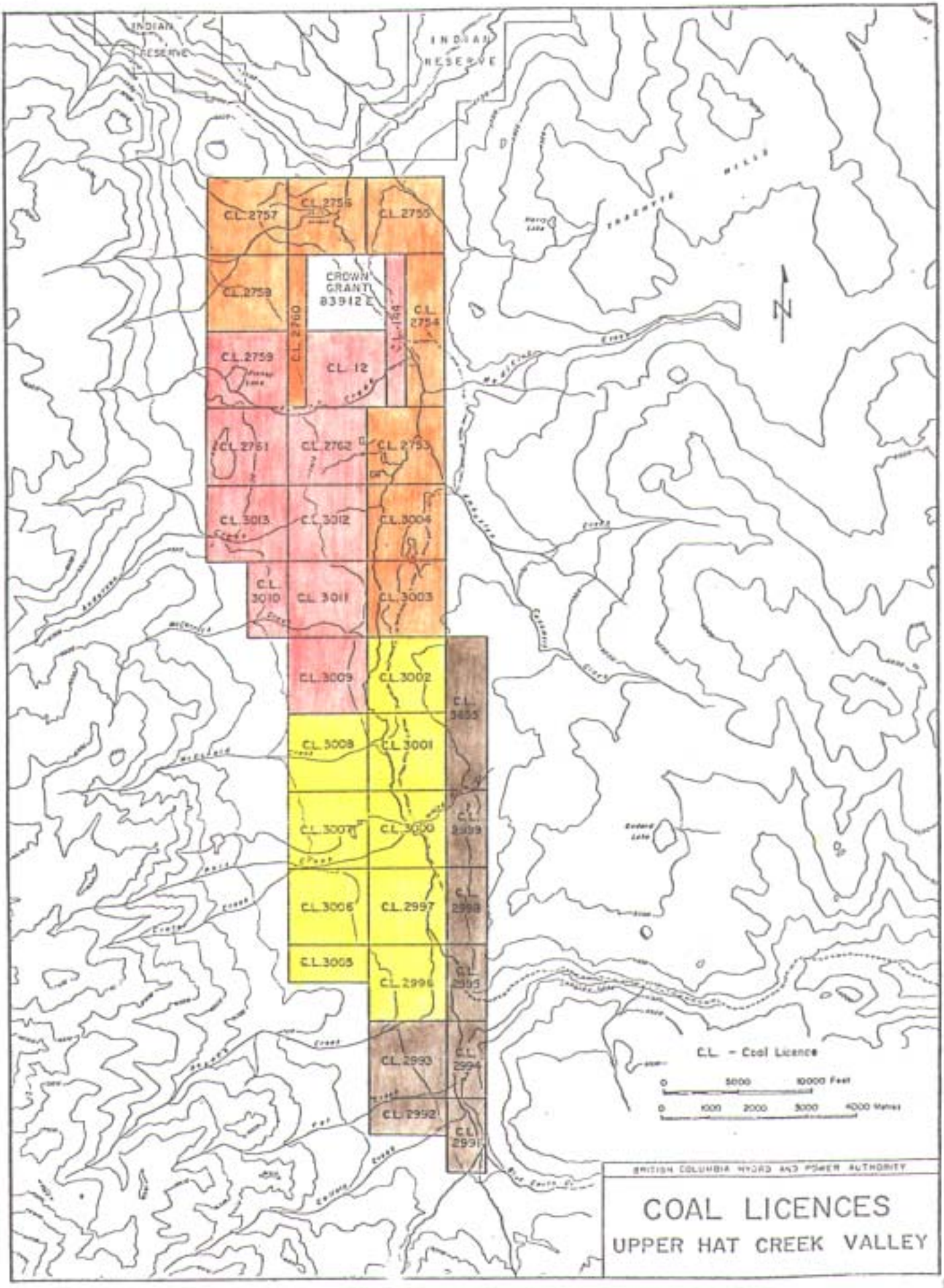
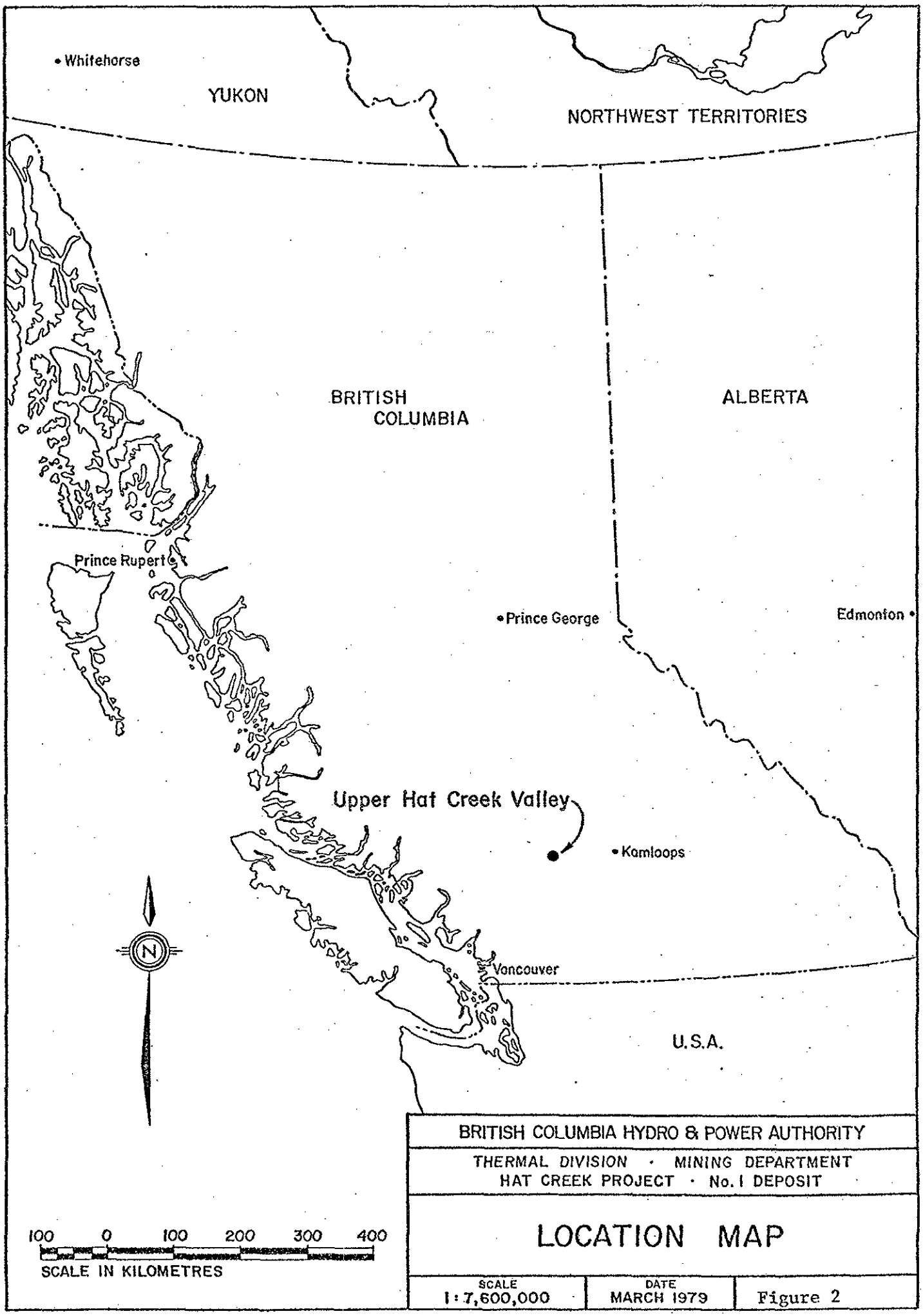

INDIAN RESERVE
INDIAN RESERVE
C.L. 2757
C.L. 2756
C.L. 2755
C.L. 2758
CROWN GRANT 83912 E
C.L. 2760
C.L. 2754
C.L. 2759
C.L. 12
C.L. 2761
C.L. 2762
C.L. 2753
C.L. 3013
C.L. 3012
C.L. 3004
C.L. 3010
C.L. 3011
C.L. 3003
C.L. 3009
C.L. 3002
C.L. 3008
C.L. 3001
C.L. 3007
C.L. 3000
C.L. 3006
C.L. 2997
C.L. 3005
C.L. 2996
C.L. 2993
C.L. 2992
C.L. 2991
C.L. - Coal Licence
0 5000 10000 Feet
0 1000 2000 3000 4000 Metres
BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
COAL LICENCES
UPPER HAT CREEK VALLEY

FIGURE 1



BRITISH COLUMBIA HYDRO & POWER AUTHORITY

THERMAL DIVISION · MINING DEPARTMENT
HAT CREEK PROJECT · No. 1 DEPOSIT

LOCATION MAP

SCALE	DATE	
1 : 7,600,000	MARCH 1979	Figure 2

to the west of Hat Creek and to elevations 1,500-1,800 metres, 10 kilometres to the east. The uplands are covered by thin forests and the valleys are sparsely-treed open ranges of grass and sage.

Rock outcrops are sparse in the floor of the valley, which is covered by glacial deposits. Overburden, consisting of loosely compacted sand and gravel, ranges in depth from 3 to 150 metres in the drilled portions of the coal licences.

COAL LICENCES

All of the coal licences in Upper Hat Creek Valley are listed below and shown in Table 1.

Table 1

	Licence No.	Area (acres)	Location*
	2753	640	31/20/26
	2754	638	E½ of 6/21/26 & E½ of 7/21/26
GROUP	2755	636	18/21/26
NO. 21	2756	639	13/21/27
ORANGE	2757	636	14/21/27
	2758	630	11/21/27
	2760	319	W½ of W½ of 12/21/27 & W½ of W½ of 1/21/27
	3003	640	19/20/26
	3004	640	30/20/26
	9 licences	5,418 acres	
	12	640	E½ of E½ of W½ of 1/21/27 & W½ of W½ of 6/21/26
	144	320	E½ of W½ of 6/21/26 & E½ of W½ of 7/21/26
	2759	588	2/21/27
	2761	640	35/21/27
GROUP	2762	640	36/20/27
NO. 22	3009	640	13/20/27
RED	3010	320	E½ of 23/20/27
	3011	640	24/20/27
	3012	640	25/20/27
	3013	640	26/20/27
	10 licences	5,708 acres	

	Licence No.	Area (acres)	Location*
	2996	635	30/19/26
	2997	642	31/19/26
	3000	642	6/20/26
GROUP	3001	642	7/20/26
NO. 23	3002	640	18/20/26
YELLOW	3005	320	N½ of 25/19/27
	3006	640	36/19/27
	3007	640	1/20/27
	3008	640	12/20/27
	9 licences	5,441 acres	
	2991	320	W½ of 17/19/26
	2992	316	N½ of 18/19/26
GROUP	2993	640	19/19/26
NO. 24	2994	321	W½ of 20/19/26
BROWN	2995	320	W½ of 29/19/26
	2998	320	W½ of 32/19/26
	2999	320	W½ of 5/20/26
	3655	641	W½ of 8 & 17/20/26
	8 licences	3,198 acres	
Totals	36 licences	19,765 acres	

* Section/Township/Range (West of the 6th Meridian, Kamloops Land District).

GEOLOGY

The Hat Creek Coal Deposit of the Tertiary period lies in a northerly trending topographic depression within the southwest part of the Intermontane Belt of the Canadian Cordillera and represents one of three main basins in a similar tectonic environment - the others being the Merritt and Similkameen.

This basin, or graben structure, was formed primarily by downward movement on a series of north-south tensional faults, which are subparallel to the regional tectonic stress. The walls of the graben in the central east of the No. 1 Deposit have been offset in places by transverse faults, which trend generally to the north-west.

The regional stratigraphy of the Hat Creek No. 1 Deposit is shown in Table 2.

The lowest stratigraphic unit is the Cache Creek group of the Permian period, which has been divided into the Marble Canyon Formation above, and the Greenstone sequence below. The limestone near the Marble Canyon has been intruded and locally metamorphosed to marble by the Mount Martley Stock of the Cretaceous or later period. It is composed of granodiorite and tonallite, coeval to the Lytton Batholith intrusion. The Spences Bridge group of the Cretaceous period consists of gently dipping lavas and pyroclastics with mainly dacitic and andesitic composition.

The Kamloops group of Miocene and/or Eocene epoch consists of a wide variety of rocks but can be generally divided into two units, which are the sedimentary assemblage above, and the volcanic rocks below. The lavas and pyroclastics of the Kamloops group are exposed on the hills of the western and eastern flanks of the Hat Creek Valley. These exposures are made up of rhyolite, dacite and basalt.

The sedimentary rocks in the Kamloops group are semi-indurated and are believed to be derived from the underlying, older igneous, sedimentary and metamorphic assemblages, viz Cache Creek Group, Kamloops Group, Mount Martley Stock and the Spences Bridge Group. The sediments of this group have

REGIONAL STRATIGRAPHY - HAT CREEK COAL BASIN

Period	Epoch	Million Years	Formation or Group	Thickness (m)	Rock Types
Quaternary	Recent			Not Determined	Alluvium, Colluvium, fluvial sands and gravels, slide debris, lacustrine sediments.
	Pleistocene	1.5 - 2			Glacial till, glacio-lacustrine silt, glacio-fluvial sands and gravels, land slides.
	Unconformity				
	Miocene	7 - 26	Plateau Basalts	Not Determined	Basalt, olivine basalt (13.2 m.y.), andesite, vesicular basalt.
	Unconformity (?)				
Tertiary	Miocene or Middle Eocene ?		Finney Lake Formation	Not Determined	Lahar, sandstone, conglomerate.
	Unconformity				
	Late Eocene		Medicine Creek Formation	600+	Bentonitic claystone and siltstone.
	Paraconformity				
	Late Eocene to Middle Eocene	* 36 - 42	Hat Creek Coal Formation	550	Mainly coal with intercalated siltstone, claystone, sandstone and conglomerate.
			Coldwater Formation	375	Siltstone, claystone, sandstone, conglomerate, minor coal.
	Fault Contact or Nonconformity				
	Middle Eocene	43.6-49.9	Kamloops Group	Not Determined	Rhyolite, dacite, andesite, basalt and equivalent pyroclastics.
	Unconformity (McKay 1925; Duffell & McTaggart 1952)				
Cretaceous or Later	Coniacian to Aptian **	88.3±3 m.y.	Spences Bridge Group	Not Determined	Andesite, dacite, basalt, rhyolite; tuff breccias, agglomerate.
	Erosional Unconformity (Duffell & McTaggart 1952)				
		98	Mount Martley Stock	Not Determined	Granodiorite, tonallite.
	Intrusive Contact (Duffell & McTaggart 1952)				
Pennsylvanian to Permian or earlier		250-330	Cache Creek Group:		
			Marble Canyon Formation	Not Determined	Marble, limestone, argillite
			Greenstone	Not Determined	Greenstone, chert, argillite; minor limestone and quartzite, chlorite schist, quartz-mica, schist.

* Based on palynology by Rouse 1977

** Based on plant fossils by Duffell & McTaggart 1952.

TABLE 2

been divided in ascending stratigraphic order into the Coldwater Formation, Hat Creek Coal Formation (the principle coal bearing formation) and the Medicine Creek Formation.

During the Pleistocene epoch the entire Hat Creek area, along with much of the Interior Plains, underwent extensive glaciation resulting in the deposition of a variety of glacial and glacio-fluvial sediments. Bedrock in the west side of the valley is masked by a thick mantle of till and by glaciofluvial material on the east.

Figure 3 shows the Bedrock Geology within the Hat Creek No. 1 Deposit.

Based on lithological and geophysical logs and coal quality, four broad zones were recognized in the Hat Creek Formation. Successive detailed studies indicated two distinct waste and four coal-bearing zones which have been identified and correlated over the entire deposit. With close pattern drilling and better understanding of the geophysical logs, these were further subdivided into 16 subzones. The development of the stratigraphy of Hat Creek Coal Formation is shown in Table 3.

STRUCTURE

The main body of No. 1 Deposit forms a broad synclinal feature, the Hat Creek syncline. It strikes north-south and plunges southerly at 15° to 25°. The trough of the syncline is relatively open in the north and rapidly closes in the south. The west limb is fairly continuous and dips 20° to 40° to the east. The east limb, which parallels the synclinal axis is modified to a broken anticline with the bedding dips steepening to 70° to 90° and partially truncated by a northwesterly trending "Creek Fault". The Hat Creek syncline structure itself as a whole is truncated in the south by northeasterly trending "Finney Fault" as shown in the geological cross sections (Figure 4,5, & 6).

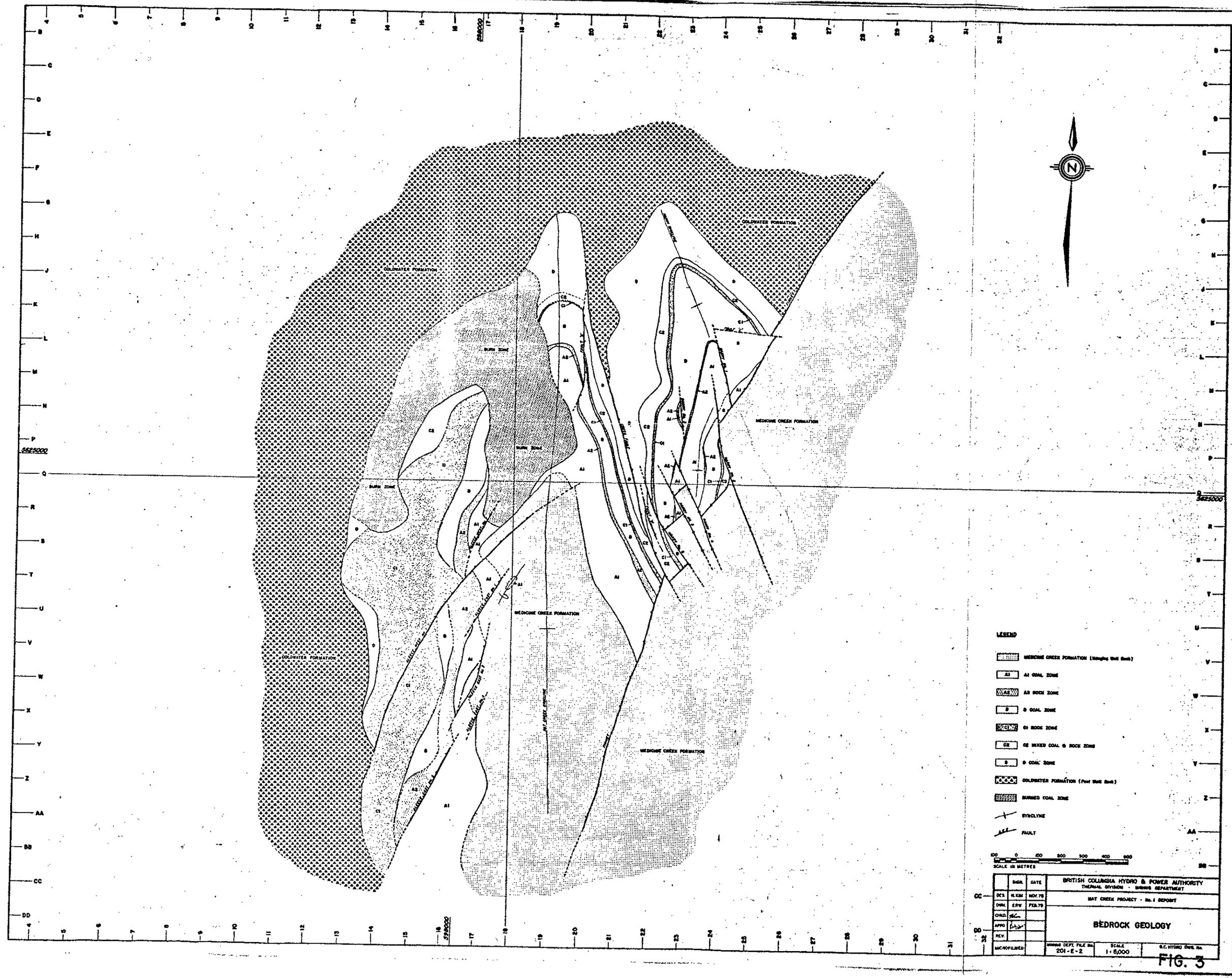
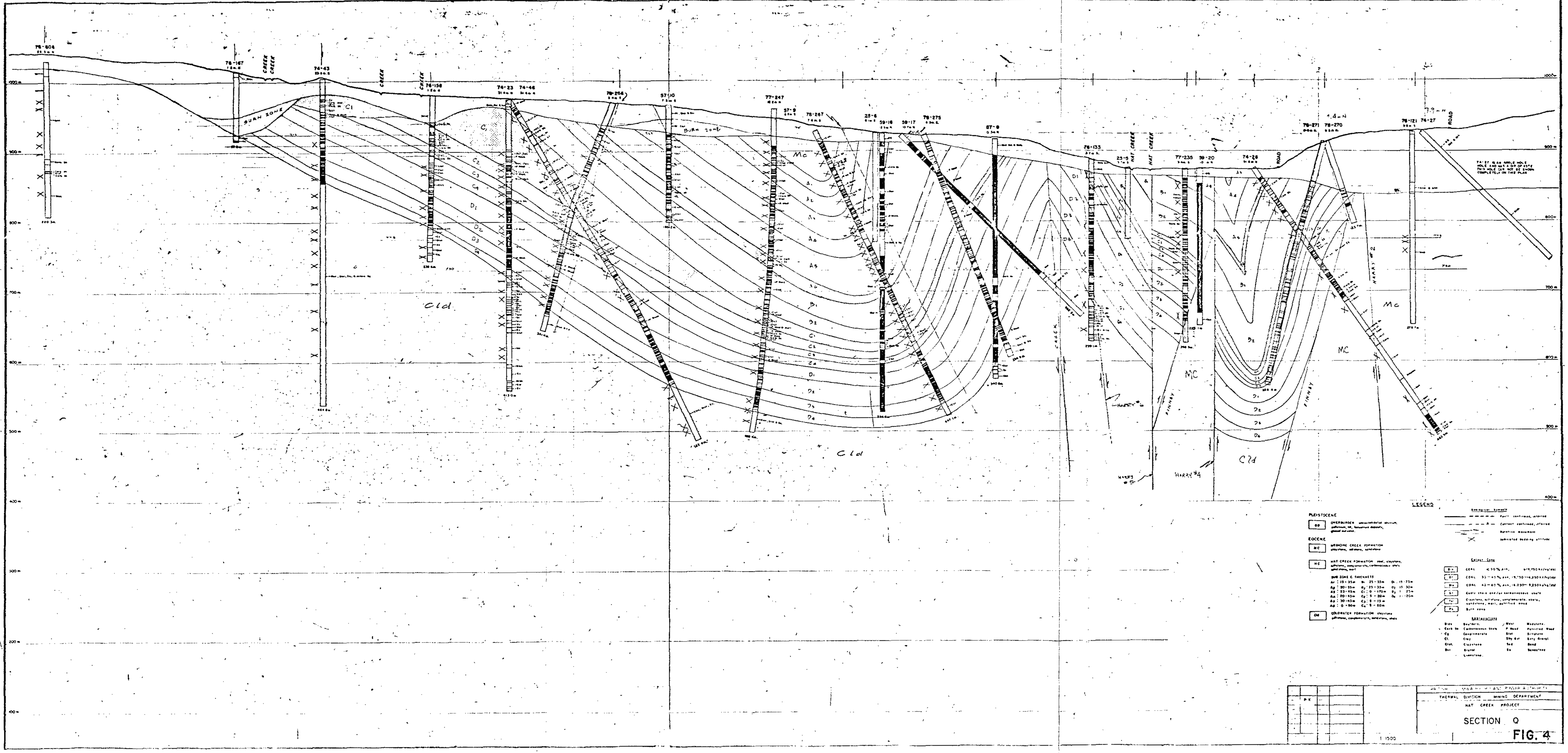

COLDWATER FORMATION
BURN ZONE
MEDICINE CREEK FORMATION
LEGEND
MEDICINE CREEK FORMATION (Hanging Wall Rock)
A1 COAL ZONE
A2 ROCK ZONE
B COAL ZONE
C1 ROCK ZONE
C2 MIXED COAL & ROCK ZONE
D COAL ZONE
COLDWATER FORMATION (Foot Wall Rock)
BURNED COAL ZONE
SYNCLYNE
FAULT
SCALE in METRES
BRITISH COLUMBIA HYDRO & POWER AUTHORITY
THERMAL DIVISION - MINING DEPARTMENT
HAT CREEK PROJECT - No. 1 DEPOSIT
BEDROCK GEOLOGY
MINING DEPT. FILE No. 201-E-2
SCALE 1:5,000
B.C. HYDRO Dwg. No.

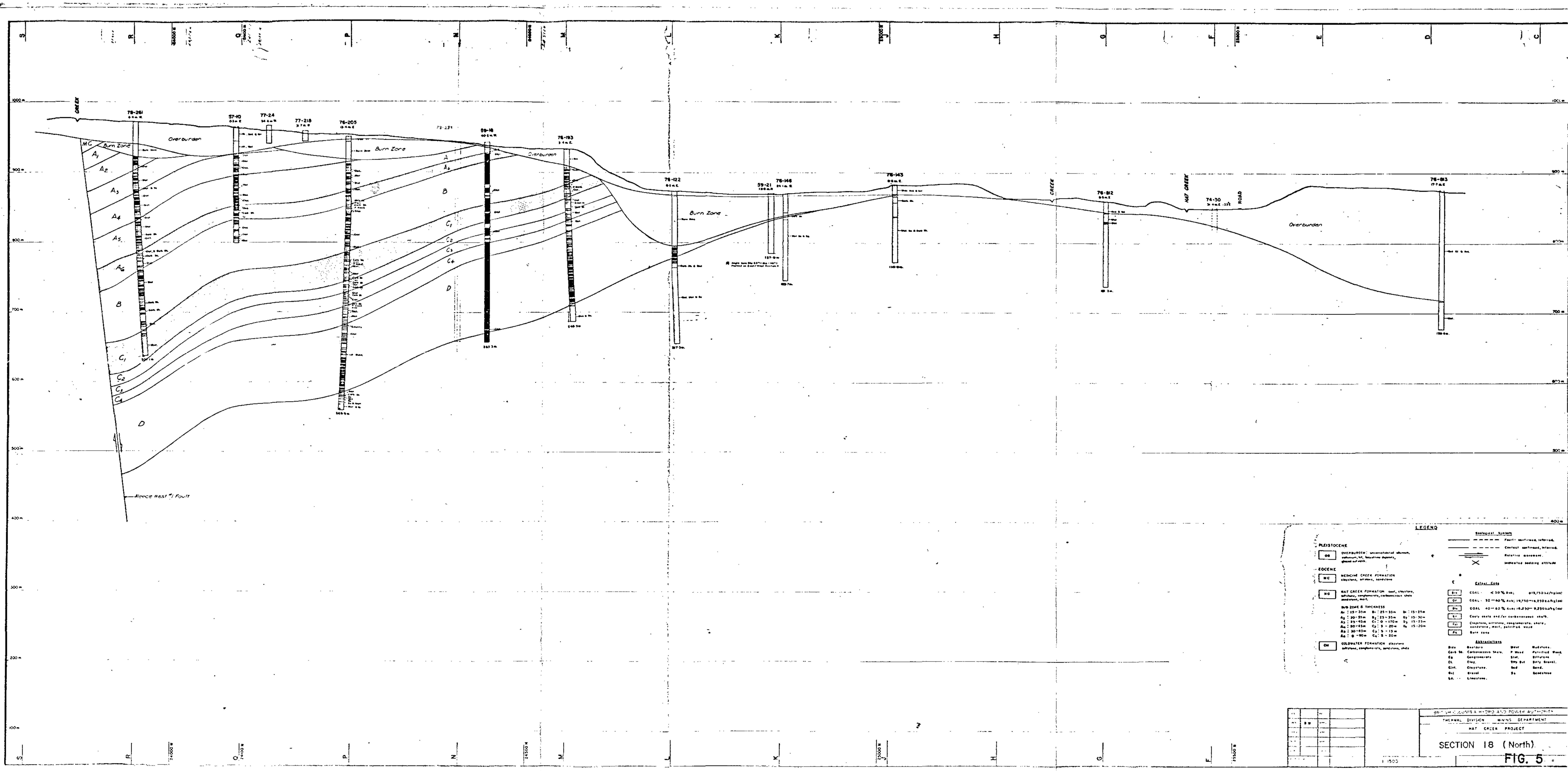
FIG. 3

Table 3

DEVELOPMENT OF STRATIGRAPHIC SUBDIVISION IN HAT CREEK COAL FORMATION

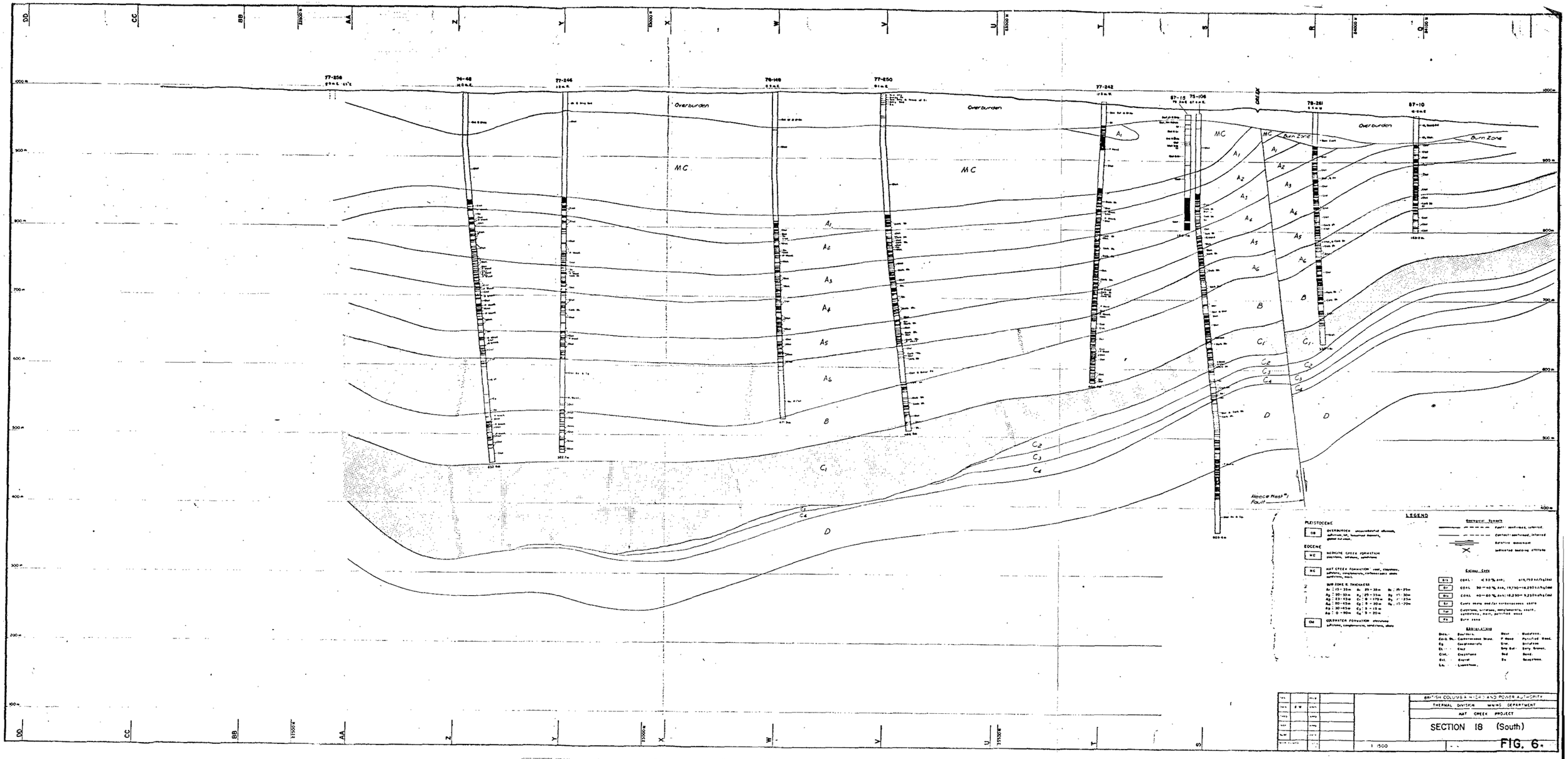
STAGE I	STAGE II	STAGE III	STAGE IV	STAGE V
A	A_1	A_{1-1} A_{1-2} A_{1-3} A_{1-4}	A_{1-1} A_{1-2} A_{1-3} A_{1-4} A_{1-5}	A1 A2 A3 A4 A5
	A_2 (waste zone)	A_{2-1}	A_{2-1}	A6
B	B_1	B_{1-1} B_{1-2}	B_{1-1} B_{1-2}	B1 B2
C	C_1 (waste zone)	C_{1-1}	C_{1-1}	C1
	C_2	C_{2-1} C_{2-2}	C_{2-1} C_{2-2} C_{2-3}	C2 C3 C4
D	D_1	D_{1-1} D_{1-2} D_{1-3} D_{1-4}	D_{1-1} D_{1-2} D_{1-3} D_{1-4}	D1 D2 D3 D4
Recognition of four broad zones in the normal depositional sequence.	Identification of two waste zones - A_2 and C_1.	Coal bearing zones A_1 - subdivided into four subzones separated by three partings. B_1 - subdivided into two subzones varying in quality. C_2 - subdivided into two subzones separated by lenticular waste continuity. D_1 - subdivided into four subzones of varying quality.	The following subzones were introduced: A_{1-5} - to represent the transitional phase from waste material of A_2 to distinct coal beds of A_{1-4}. C_{2-1} - C_2 zone also represents a transitional phase, trending from high quality D zone to waste zone (C_{1-1}). Its irregular distribution makes definite correlation of the subzones impossible. It is, therefore, proposed to subdivide the zone into lower (C_{2-3}) middle (C_{2-2}) and upper (C_{2-1}) subzones strictly on the basis of thickness. C_{2-2} C_{2-3}	For uniformity and convenience of computerization each subzone was assigned its own suffix. Thus A_{2-1} and C_{1-1} the principle waste zones are represented by A6 and C1 respectively.


BURN ZONE
CREEK
ROAD
LEGEND
PLEISTOCENE
OVERBURDEN
EOCENE
MEDICINE CREEK FORMATION
HAT CREEK FORMATION
SUB ZONE & THICKNESS
COLDWATER FORMATION
THERMAL DIVISION MINING DEPARTMENT
HAT CREEK PROJECT
SECTION Q
1:1500
FIG. 4



SECTION 18 (North)

FIG. 5


DD
CC
BB
AA
Z
Y
X
W
V
U
T
S
R
Q
77-258
74-48
77-246
76-148
77-250
77-242
87-15
75-106
78-261
87-10
Overburden
MC
Burn Zone
A1
A2
A3
A4
A5
A6
B
C1
C2
C3
C4
D
Hanna Peak Fault
LEGEND
PLEISTOCENE
OVERBURDEN
EOCENE
MC
COALMONT FORMATION
NC
HAT CREEK FORMATION
COQUAHALLA FORMATION
Geological Symbols
Coal Symbols
Abbreviations
BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
THERMAL DIVISION MINING DEPARTMENT
HAT CREEK PROJECT
SECTION 18 (South)
1:500
FIG. 6.

DESCRIPTION OF EXPLORATION WORK CONDUCTED

Surveying:

All holes and excavation sites were surveyed by closed traverses. Elevation controls were established by running third-order levels from a Dominion Govt. geodetic bench mark at Carquile, near the junction of Hwy. 12 and 97. Bearings were obtained by solar observations. The grid system that had been set up earlier by McElhanney was continued (converted to metrics) for this program. The coordinates were converted to the UTM system for formal reports.

Drilling Site Reclamation:

All drill sites were cleaned up and levelled off after the drilling operation was completed. The pits were emptied of chemical or drilling mud and trucked to a central disposal pit.

After reclamation, the affected area was seeded and fertilized.

Drillhole collars were marked by 4" X 4" posts, painted white with black numbers for identification purposes.

ARCHAEOLOGICAL SURVEY

A team of archaeologists from the University of British Columbia conducted an extensive survey program to outline the sensitive areas. Due care was exercised to minimize the damage to archaeological sites. All drill sites were selected with the concurrence of the archaeologists before preparing drill sites and approach roads to the sites.

DRILLING

Table 4 gives the distribution of the total amount of diamond drilling carried out within each group of licences. Drill hole locations are shown in Figure 7.

All of the exploration and development coring was done by D. W. Coates Enterprises Ltd.; the slope stability and plant site coring was done by Tonto Drilling Co. Both companies employed skid-mounted Longyear

TABLE 4

DRILLING DETAILS - GROUPS 21,22 - MAY'78 - MAY'79

EXPLORATION CORE DRILLING

HOLE NUMBER	LIC.	LIC. GP.	COORDINATES		METRES DRILLED		
			LAT.	DEP.	O.B.	B.R.	TOTAL
78-270	144	22	5,625,007.7	599,136.6	71.0	52.7	123.7
78-271	144	22	5,624,976.6	599,134.2	60.8	297.6	358.4
78-272	144	22	5,624,504.2	598,939.5	40.1	41.0	81.1
78-273	144	22	5,624,504.2	598,939.2	38.0	237.2	275.2
78-277	12	22	5,624,325.0	597,478.0	104.3	43.8	148.1
78-278	12	22	5,623,882.7	598,371.4	40.0	449.5	489.5
78-279	12	22	5,624,182.8	598,045.4	40.3	366.6	406.9
78-280	12	22	5,623,879.7	598,437.0	45.0	426.2	471.2
78-281	12	22	5,624,191.0	598,417.3	46.0	413.0	459.0
78-283	144	22	5,624,884.9	599,088.1	20.5	72.2	92.7
78-284	2755	21	5,626,960.1	599,703.0	183.0	32.5	215.5
78-285	144	22	5,624,884.9	599,087.4	26.1	113.3	139.4
78-286	144	22	5,624,887.4	599,092.9	28.0	21.7	49.7
78-287	144	22	5,625,199.6	599,128.7	39.6	0	39.6
78-288	144	22	5,624,823.5	599,065.1	26.2	54.9	81.1
78-290	144	22	5,625,724.7	599,116.3	108.5	158.8	267.3
78-291	144	22	5,625,429.1	599,275.5	140.2	4.0	144.2
78-292	2755	21	5,625,884.8	598,927.4	84.4	134.1	218.5
				TOTAL	1,142.0	2,919.1	4,061.1

SLOPE STABILITY CORE DRILLING

HOLE NUMBER	LIC.	LIC. GP.	COORDINATES		METRES DRILLED		
			LAT.	DEP.	O.B.	B.R.	TOTAL
78-857	2759	22	5,624,391.7	596,799.8	9.5	93.2	102.7
78-861	2759	22	5,624,122.6	596,158.6	9.2	240.8	250.0
78-866	2759	22	5,624,398.5	596,806.1	9.5	128.7	138.2
78-867	2754	21	5,624,363.5	599,525.5	60.4	119.7	180.1
78-868	2758	21	5,624,964.2	596,245.9	11.4	188.6	200.0
78-870	2755	21	5,626,188.9	599,407.1	182.2	68.0	250.2
				TOTAL	282.2	839.0	1,121.2

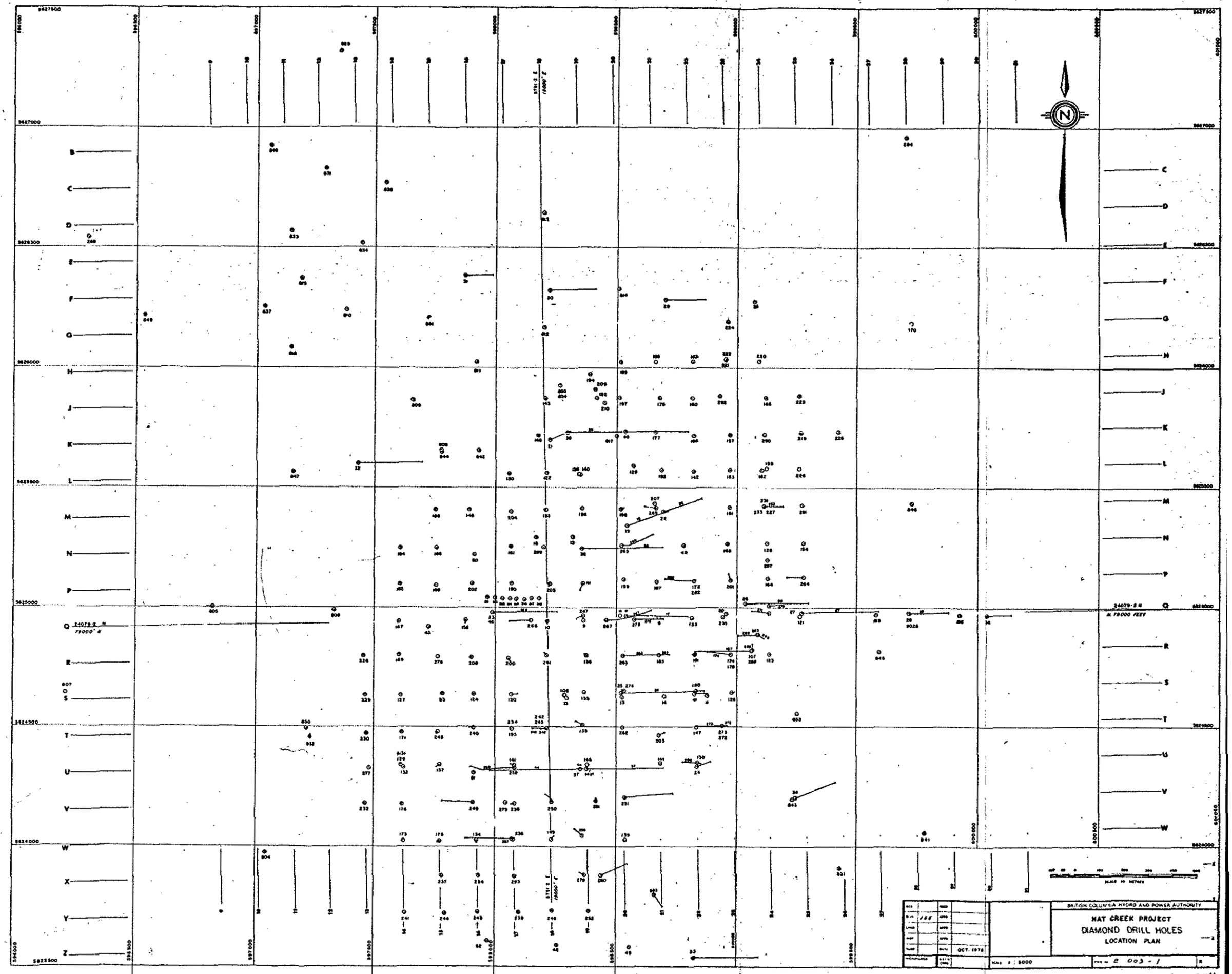

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT
DIAMOND DRILL HOLES
LOCATION PLAN
OCT. 1978
SCALE 1 : 5000
DWG. E 003 - 1
SCALE IN METRES
24079.2 N
79000' N
24079.2 E
79000' E
N 79000 FEET

FIG. 7

44 and Boyles "Super 38" diamond drill rigs. For most of the coring, NQ-size wireline equipment was used and usually overburden was triconed. For some of the geotechnical holes, HQ-size wireline equipment was used, and overburden as well as bedrock was cored. All the cores have been photographed and geologically logged. The cores are stored on the property in well constructed core storage sheds mounted on log skids.

GEOPHYSICAL SURVEY

All drill holes, reported herein have been geophysically logged with the exception of some holes that were abandoned due to drilling problems. It was necessary that all holes be logged through the casing and drill rods before they were pulled out of the holes. Gamma ray, bulk density, caliper and focussed beam logs have been run, but only Gamma and density were normally used.

All down-hole logging was conducted by Roke Oil Enterprises Ltd. employing a truck-mounted recorder and probe winch. Results were recorded on transparent logs with a scale of 1:250.

For each hole in the No. 1 Deposit, in which gamma and density logs were run, the logs have been carefully analyzed. The logs were broken down into segments which represents one of five different classifications, depending on the combined analysis of the gamma and density logs.

The segments derived from this work were plotted on cross sections and used to aid in the interpretation of the structure of the deposit. Correlation of the data lead to the concept of 16 subzones within the four major zones previously postulated.

The geophysical logging carried out in the various claim groups is shown in Table 5.

TABLE 5

DOWN-HOLE GEOPHYSICAL LOGGING - MAY'78-MAY'79

HOLE NUMBER	LIC.	LIC GP.	GEOPHYSICAL LOGGING IN METRES			
			GAMMA	DENSITY	FOC. BEAM	CALIPER
78-270	144	22	116	116		
78-271	144	22	356	356		
78-272	144	22	76	76		
78-273	144	22	270	259		
78-277	12	22	142	142		
78-278	12	22	484	484		
78-279	12	22	400	400		
78-280	12	22	462	462		
78-281	12	22	450	450		
78-283	144	22	87	87		
78-284	2755	21	209	209		
78-285	144	22	133	133		
78-286	144	22	44	44		
78-288	144	22	74	74		
78-290	144	22	405.5	405.5	285	
78-292	2755	21	212	212	124	
78-861	2759	22	245	245		
78-866	2759	22	132.5	132		
78-867	2754	21	175.5	175		
78-868	2758	21	194	193.5		
78-870	2755	21	424.5	424.0	283.5	177.5
RH 78-70	144	22	110	108.5		
RH 76-19	2756	21	115	115		
	TOTAL		5,317	5,302.5	692.5	177.5

GEOLOGICAL LOGGING

All drill cores were megascopically examined and logged. The core interval contacts were adjusted in accordance with the geophysical logs. The cuttings were examined under binocular microscope.

A copy of the geological logs of all the holes drilled during the period under review is submitted herewith as Appendix I.

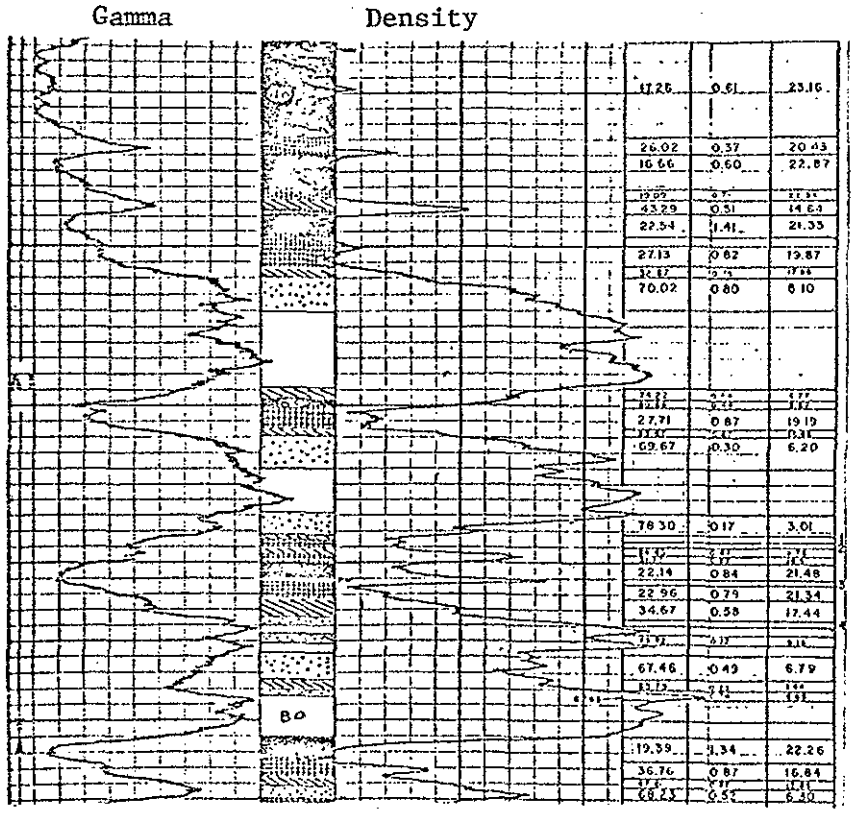
SAMPLING AND ANALYSIS

All cores with up to 15-20% carbonaceous material were sampled and analyzed. Ash, thermal value and sulphur determinations were run on all such samples. Thermal values were not determined for coal with greater than 80% ash.

The sampling methods used during the 1978 drilling program provided valuable data which greatly increased the potential of geophysical interpretation.

Figure 8

SAMPLE INTERVAL SELECTION



The sample intervals were determined to agree with the segments picked from the geophysics. The intervals varied from 0.2 m to a maximum of 6 m. The core was split along the length, with one half sent for analyses, and the other half retained in the core boxes.

The average quality of the coal contained in a 35-year trial pit is shown in Table 6.

A summary of the drilling done and the geophysics run in the different claim groups is shown in Table 7.

EXPLORATION RESULTS

The 1978 exploration provided data for geological and structural reinterpretation (Figure 4,5 & 6) with a high degree of confidence.

Based on geophysical and geological logs, sixteen subzones have been established which form correlatable stratigraphic units in the Hat Creek Formation. A complex fault system has been recognized in No. 1 Deposit - two major faults (Finney and Creek Fault) along with at least 17 minor or subsidiary transverse faults.

The sampling intervals based on discernable geophysical segments have helped in identifying waste partings, and have thus increased the potential of selective mining. The quality prediction can be based on geophysical parameters.

A potential coal bearing, tight folded synclinal structure has been recognized which had contributed significantly to low ratio strippable coal reserves on Section Q.

Summing up, this program has raised the confidence level in geology, structure, quality and reserves to a level sufficient for mine planning and development.

Table 6

Coal Quality

These estimates apply only to boiler fuels which have been blended to fall in the target range of 7327±300 Btu (17,043±700 Kj/Kg)

Proximate (% dry basis)	Expected Value	Range (95% confidence)	Sample Count
Ash	36.7	±2.5	4305
Volatile Matter	33.1	±2.6	1965
Fixed Carbon	30.4	±2.7	1965
Ultimate (% dry basis)			
Carbon	43.5	±2.1	1179
Hydrogen	3.8	±0.5	1179
Nitrogen	0.84	±0.14	1146
Oxygen (By difference)	14.5	±1.1	
Sulphur	0.52	±0.22	3916
Chlorine	0.02	±0.03	1153
Ash	36.7	±2.5	4304
Ash Analyses (% dry ash)			
SiO_2	52.4	±4.7	1154
Al_2O_3	27.7	±3.1	1154
CaO	3.3	±2.1	1154
MgO	1.6	±0.5	1154
Fe_2O_3	8.6	±4.1	1154
K_2O	.55	±0.19	1212
Na_2O	1.3	±0.5	1212
Mn_3O_4	.17	±0.16	1155
V_2O_5	.05	±0.03	1155
P_2O_5	0.39	±0.43	1154
SO_3	1.9	±0.7	1154
TiO_2	.93	±0.19	1154
Undetermined	1.1		

Table 6

Coal Quality (Cont'd)

	Expected Value	Range (95% confidence)	Sample Count
Carbon Dioxide (% dry basis)	1.7	±1.3	1918
Water Soluble Alkalies			
as Na_2O	0.25	±0.03	21
as K_2O	0.06	±0.10	22
Ash Fusion Temperatures*			
Reducing atmosphere:			
Initial deformation	1314°C	±200°	775
Ash softening (H=W)	1328		608
Ash softening (H=½ W)	1343		518
Fluid	1400+		436
Oxidizing atmosphere:			
Initial deformation	1340°C	±200°	76
Ash softening (H=W)	1349		70
Ash softening (H=½ W)	1357		64
Fluid	1400+		60
Hardgrove Grindability Index*	46.6	5.2	81

Table 6

Coal Quality (Cont'd)

MOISTURE	EXPECTED VALUE	RANGE (95% CONFIDENCE)	SAMPLE COUNT
AS RECEIVED	21.53	±3.24	2731
AIR DRY	12.98	11.46	2605
RESIDUAL	8.92	±3.03	4033
EQUILIBRIUM	23.77	±2.24	122
SPECIAL MOISTURES			
AS RECEIVED	22.0	±2.4	121
SULPHUR FORMS			
PYRITIC	0.13	0.13	1911
SULPHATE	0.01	0.02	1166
ORGANIC	0.37	0.13	1166

TABLE 7

DRILLING - MAY'78 - MAY'79

DRILLING TYPE	GROUP 21		GROUP 22		TOTAL		PURPOSE
	HOLES	METRES	HOLES	METRES	HOLES	METRES	
Coring	2	434.0	16	3,627.1	18	4,061.1	Coal exploration.
Coring	3	630.3	3	490.9	6	1,121.2	Slope stability & gen. exploration.
Total	5	1,064.3	19	4,118.0	24	5,182.3	

GEOPHYSICS - MAY'78 - MAY'79

GEOPHYSICAL TYPE	GROUP 21		GROUP 22		TOTAL	
	HOLES	METRES	HOLES	METRES	HOLES	METRES
Gamma	6	1,330.0	17	3,987.0	23	5,317.0
Density	6	1,328.5	17	3,974.0	23	5,302.5
Focus Beam	2	407.5	1	285.0	3	692.5
Caliper	1	177.5	-	-	1	177.5
TOTAL	6	3,243.5	17	8,246.0	23	11,489.5

CONCLUSIONS

Exploration work in the Hat Creek Valley conducted within the portions of these licences, Group No. 21 & 22 during the period of this Assessment Report - 1 May 1978 to 1 May 1979 were directed towards establishing and confirming structure, (especially subsidiary faults), quality and lithology. Some of the older holes with large sampling intervals were replaced and sampled in more detail.

Detailed sampling of Hole 274 has provided us with the basis for correlating geophysical logs and the corresponding chemical analyses.

Improved definition of the structure based on the additional drilling has identified additional reserves in the No. 1 Deposit.

Six geotechnical holes were drilled for slope stability in the western edge of the proposed pit and in the Houth Meadows waste area.

Ground water studies, based on a series of pump tests, have demonstrated that pumping from wells is only of limited value as a means of slope depressurization.

Submitted by,

J. J. Fitzpatrick, P.Eng.
Manager
Mining Department
B. C. Hydro & Power Authority