

K-FORDING RIVER 56 (1)A  
See L.S. 9573/57  
File 2244

UTAH CO. OF THE AMERICAS

SUMMARY REPORT

1956 FIELD INVESTIGATION - FORDING RIVER COAL AREA  
BRITISH COLUMBIA

**OPEN FILE**

INTRODUCTION

During the 1956 field season an investigation was made of the coal deposits of twenty-six square miles of the Fording River coal basin covered by twenty-seven coal licences held by Utah Co.

The field work consisted of geologic and topographic mapping of selected parts of this area with some underground work to obtain samples suitable for coking tests on the coal. This work required an average crew of nine men in the field from June 10 to October 31. In addition, three miners and a fire boss were employed in driving the tunnels.

FIELD WORK

Since suitable geologic and topographic maps were not available for the area, the following preliminary base maps were compiled from 1:30,000 vertical air photographs:

- Photo-mosaic Sheet - 1" - 2640 feet
- Topographic Sheet 1" - 1000 feet
- Photo-geologic interpretation - 1" - 1000 feet

Transit and tape traverses were run along the ridge crests from triangulation stations established from valley base lines. This net was required for detailed mapping along the ridges. The survey crew consisted of four men and the field work extended over a period of three months.

Preliminary geologic mapping was done on air photographs and this data was transferred to a 1:31,680 planimetric base sheets and covered Bear Mountain, Grouse Mountain, Todhunter Ridge, Fording Ridge and Smith Ridge.

Surface trenching was laid out to test the continuity of the thickest seam encountered and to aid in correlation of the seams between Grouse Mountain and Todhunter Ridge. Five-pound samples were taken for preliminary F.S.I. tests from some of these trenches and from trenches on Grouse and Bear Mountains.

The section of Kootenay beds exposed on both Grouse Mountain and Todhunter Ridge was mapped in detail to aid in seam correlation.

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

Bulldozer stripping was used to locate the more promising coal seams near valley level along the east slope of Todhunter Ridge prior to drifting on the seams to obtain suitable bulk samples.

**00 305**

First, a rough road of about two miles length was constructed along the west side of Todhunter Creek. About one mile of subsidiary access road was then built to the prospective tunnel sites at a maximum grade of 10%. A second road was built for about one mile up the south side of Ewen Creek to give access to the seams originally explored by the Imperial Coal and Coke Company on the northwest end of Bear Mountain.

In stripping the coal seams, difficulty was experienced both in locating the area to be trenched and in exposing the coal at a suitably low elevation due to the heavy drift cover.

A total of sixteen seams were exposed - ten on Todhunter Ridge and six on Bear Mountain. Six of the seams on Todhunter Ridge were selected for bulk sampling and faced up in preparation for the tunnel driving. Four of the seams on Bear Mountain were similarly exposed although these tunnels were not driven during the 1956 field season.

A total of 370 feet of drifting was completed in 81 eight-hour shifts, with an average rate of advance of 4.6 feet in coal per shift. The drifts were made  $6\frac{1}{2}$  feet by  $7\frac{1}{2}$  feet in the clear, using three-post sets at roughly five-foot intervals. As a safety measure, the portal sets were placed six feet from the coal outcrop.

Two tunnels were driven simultaneously using two miners to each drift. This procedure entailed a complete mining cycle on every shift. Huwood air picks were used for mining the coal and a Victor auger drill with tungsten carbide insert bits was used in the drilling. Air for these tools was supplied by a 125 c.f.m. compressor which delivered about ninety pounds pressure at each of the two faces. Broken material was removed with one-half-yard and one-yard buggies built on the property.

Five-pound samples were taken at regular intervals across the exposed width of coal to check the free swelling index. The final bulk sample was cut from the tunnel face to yield approximately 600 pounds of coal.

### GEOLOGY

The Kootenay formation is a thick series of non-marine sediments of Jurassic to Lower Cretaceous age. In the Fording and upper Elk coal basin, Kootenay strata underlie about 150 square miles of a large canoe-shaped structure.

The formation consists of fine to medium-grained grey to brown sandstones, interbedded grey black and brown shales, several conglomerate beds and a number of coal seams of economic interest. Three beds of pebble conglomerate have been mapped in the Kootenay section in the Fording River area. These beds, though up to thirty feet thick, are of limited areal extent. The basal Kootenay sandstone, which is the most useful marker bed in the formation, occurs at the bottom of a 350-foot section of sandstone which includes many massive beds. At Ewen Creek it is a 50-foot bed of medium to coarse-grained grey sandstone, generally rust-weathered, which forms a prominent outcrop in contrast to the underlying thin bedded shales and sands.

The Kootenay strata are characteristically lensy as indicated by the variation in the interval between successive coal seams measured on both Grouse Mountain and Todhunter Ridge about one mile apart. In the Fording Valley at Ewen Creek, the Kootenay is at least 3500 feet thick on the east limb of the syncline.

The Fording coal basin consists of a broad south-plunging syncline up to six miles wide with the axis following the Fording River valley northwestward into Elk River valley. Minor folds of small amplitude are present in the Kootenay strata on both limbs of the major syncline, but at some distance from the axis.

No positive field evidence was seen of major faulting in the Fording coal basin; however, several small thrust faults were mapped along the east limb of the structure.

#### DESCRIPTION OF COAL SEAMS

At least twenty-two coal seams were mapped in the Kootenay formation on the east limb of the syncline. Fourteen of these are considered of sufficient thickness to be of economic interest.

These coal seams were first located along the five main mountain segments in the area: Grouse Mountain, Bear Mountain, Todhunter Ridge, Fording Ridge and Smith Ridge. The entire stratigraphic section was carefully mapped on both Grouse Mountain and Todhunter Ridge, but due to lack of time was not completed on the other ridges.

A fairly good correlation was made between the seams exposed on Grouse Mountain and on Todhunter Ridge. This correlation could not be extended to include the coal seams on Bear Mountain since the stratigraphic mapping was not completed for this section. For convenience, the seams were designated by upper case letters from the top of the Kootenay. The seams exposed on the northwest end of Bear Mountain are indicated by the same lower case letters as used by Dowling<sup>1</sup>. These seams occur in the upper Kootenay section well above the coal-bearing strata of Grouse Mountain and Todhunter Ridge.

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<sup>1</sup> DOWLING, D.B. (1915) - Coal Fields of British Columbia,  
Geological Survey of Canada, Memoir No. 69.

COAL SEAMS OF ECONOMIC IMPORTANCE - EWEN CREEK SECTION, FORDING COAL BASIN

<u>Seam</u>	<u>Location</u>	<u>Stratigraphic Position above base of Kootenay (feet)</u>	<u>Average Thickness (feet)</u>	<u>Key to Location</u>
d	(1)	2900	14.4	(1) Bear Mountain
e	(1)	2755	20	(2) Grouse Mountain
f	(1)	2675	8.2	(3) Todhunter Ridge
h	(1)	2445	7.1	(4) Tunnel area, Todhunter Creek
i	(1)	2400	9.0	
I	(2) (3) (4)	1829 - 2060	12.5	
J	(2) (3) (4)	1721 - 1886	13.0	
L	(2) (3)	1461 - 1605	12.0	
N	(2) (3)	1211 - 1398	10	
O	(2) (3) (4)	1028 - 1135	20	
P	(2) (3)	903	20	
Q	(3) (4)	648	14.5	
R	(2) (4)	550	14	
S	(2) (4)	430	8	

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### SAMPLING AND TESTING

Five-pound channel samples of all important seams were taken for swelling index tests. These samples were cut in the respective coal seams as exposed by surface trenches, bulldozer cuts and underground workings.

From the six drifts, 600-pound channel samples were cut across the full width of each coal face to include all partings, sand streaks and inclusions. These channels were made two feet wide and one-foot deep across the seam width. This material was mixed on a sampling sheet, coned and quartered to make up the desired quantity. All of the bulk samples were taken a sufficient distance from the portal as to render most weathering effects negligible. The bulk samples were shipped in lined sealed containers to avoid excessive hydration of the coal.

From the results of the swelling index tests on near-surface samples, it was concluded that significant F.S.I. values could only be obtained from samples taken below the zone of oxidation.

A complete proximate analysis was run on each of the bulk samples. These analyses are shown below for the raw coal on the wet ("as received") basis:

#### PROXIMATE ANALYSES - FORDING RIVER COAL (AS RECEIVED BASIS)

Sample	%-Moisture	%-Ash	%-Volatile	%-Fixed Carbon	%-Sulfur	Calorific Value Btu/pound	Swelling Index A.S.T.M.	Coking Prop.
a*	1.4	8.1	19.1	70.1	-	-	-	Good
b*	0.9	8.0	21.6	69.5	-	-	-	Good
c*	2.8	5.0	22.8	69.4	-	-	-	Good
e*	4.4	10.9	22.2	62.5	-	-	-	Non-coking
f*	1.4	11.3	23.1	64.2	-	-	-	Good
g*	1.3	11.2	24.7	62.8	-	-	-	Good
I	2.4	16.3	30.2	51.2	0.64	12,344	7.5	Good
J	3.7	12.1	28.5	55.7	0.65	12,511	1.5	Non-coking
O	2.8	16.1	21.6	59.5	.47	12,169	3.5	Fair
Q	3.7	11.5	21.1	63.7	0.59	12,629	1.0	Non-coking
R	1.4	11.6	22.9	64.0	0.78	13,417	8.0	Good
S	1.6	18.0	21.2	59.3	0.54	12,306	7.5	Good

\* Analyses of Imperial Coal Company seams (Dowling, 1915 - p.48)

The washability characteristics of the coal were investigated by Commercial Testing and Engineering Co. of Chicago, using a 1.60 specific gravity heavy liquid. This sink-float test was made on the raw coal crushed to one-quarter inch by 0-inch size. These washing tests indicate that a considerable reduction in ash content can be achieved with effective separation of a coal product containing less than 10% ash.

FLOAT AND SINK ANALYSES OF FORDING RIVER COAL

<u>COAL SEAM</u>	<u>PRODUCT</u>	<u>% - WEIGHT</u>	<u>% - DRY ASH</u>	<u>% - SULFUR</u>
I	Float	83.2	7.97	0.65
	Sink	<u>16.8</u>	<u>57.58</u>	<u>0.39</u>
	Total	-100.0	16.30	0.61
J	Float	91.2	7.77	0.63
	Sink	<u>8.8</u>	<u>58.78</u>	<u>0.47</u>
	Total	- 100.0	12.26	0.62
O	Float	88.3	9.90	0.51
	Sink	<u>11.7</u>	<u>59.88</u>	<u>0.38</u>
	Total	- 100.0	15.75	0.49
Q	Float	89.6	8.52	0.58
	Sink	<u>10.4</u>	<u>49.71</u>	<u>0.29</u>
	Total	- 100.0	12.80	0.55
R	Float	91.5	7.15	0.62
	Sink	<u>8.5</u>	<u>63.25</u>	<u>0.47</u>
	Total	- 100.0	11.92	0.61
S	Float	80.5	9.01	0.51
	Sink	<u>19.5</u>	<u>57.08</u>	<u>0.32</u>
	Total	- 100.0	18.38	0.47

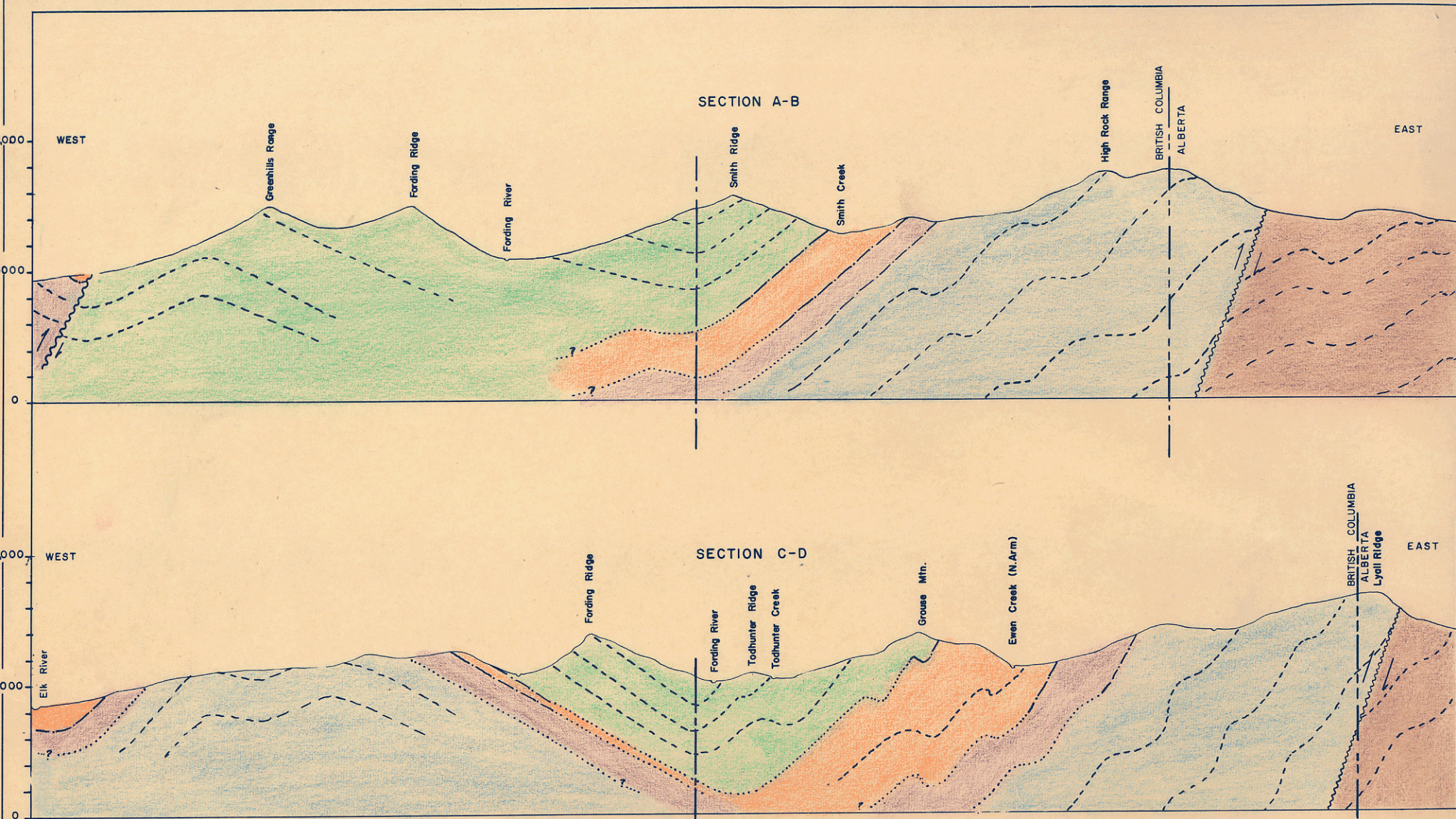
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LIST OF MAPS

Map No.

VB-70B-2-1	Structural Sections - Upper Elk & Fording River
VD-70B-2-6	Regional Geology & Topography - North, 1" - 1000'
VD-70B-2-7	Regional Geology & Topography - South, 1" - 1000'
VB-70B-2-8	Sections of Kootenay Formation
VB-70B-2-11	Sections of Lower Kootenay Coal Seams (1)
VB-70B-2-12	Sections of Lower Kootenay Coal Seams (2)
VC-70B-2-13	Detail, Coal Seams, Todhunter Ridge
VC-70B-2-14	Detail, Tunnel Area, Todhunter Creek
VC-70B-2-15	Longitudinal & Vertical Sections, Fording coal basin
VC-70B-2-16	Detail, Coal Seams, Ewen Creek
VC-70B-2-17	Detail, Coal Seams, Grouse Mountain

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- LEGEND
- BELLY RIVER FORMATION
  - KOOTENAY FORMATION
  - FERNIE FORMATION
  - SPRAY RIVER FORMATION
  - ROCKY MOUNTAIN, RUNDLE, and BANFF FORMATIONS

Datum - Sea Level

- SYMBOLS
- GEOLOGIC CONTACT (DEFINED)
  - GEOLOGIC CONTACT (INFERRED)
  - INFERRED BEDDING
  - FAULT
  - AXIS OF COAL BASIN

Note: Sections indicated on drawing number VC-70B-2-5

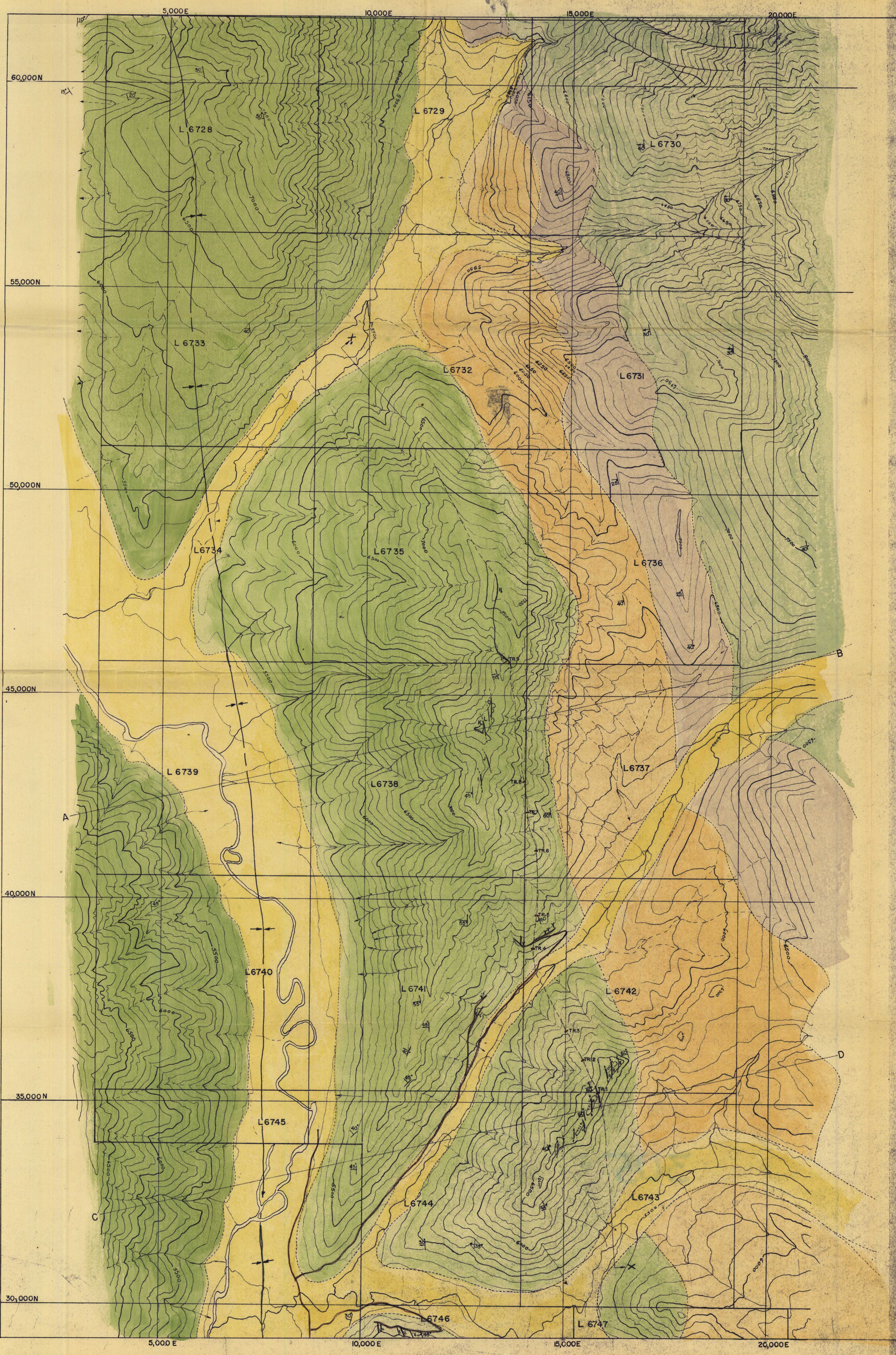
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FR 56(2)A

UTAH CO. OF THE AMERICAS EXPLORATION DEPT. VANCOUVER, B. C.	
STRUCTURAL SECTIONS UPPER ELK AND FORDING RIVERS FORDING RIVER COAL AREA BRITISH COLUMBIA	
DRAWN G.M.B.H.J. 30.4.57	TRACED
APPROVED	REVISED
SCALE Horiz. 8 Vert.	
VB-70B-2-1	

FIGURE 5





**LEGEND**

- QUATERNARY**  
 (ALLUVIUM)
- LOWER CRETACEOUS**  
 KOOTENAY FORMATION  
 (SANDSTONE, SHALE, MINOR CONGLOMERATE)
- JURASSIC**  
 FERNIE FORMATION  
 (SHALE)
- TRIASSIC**  
 SPRAY RIVER FORMATION  
 (QUARTZITE, SHALE, LIMESTONE)
- PERMO-PENNSYLVANIAN**  
 ROCKY MOUNTAIN FORMATION  
 (SANDSTONE, CHERT, QUARTZITE)

**GEOLOGIC SYMBOLS**

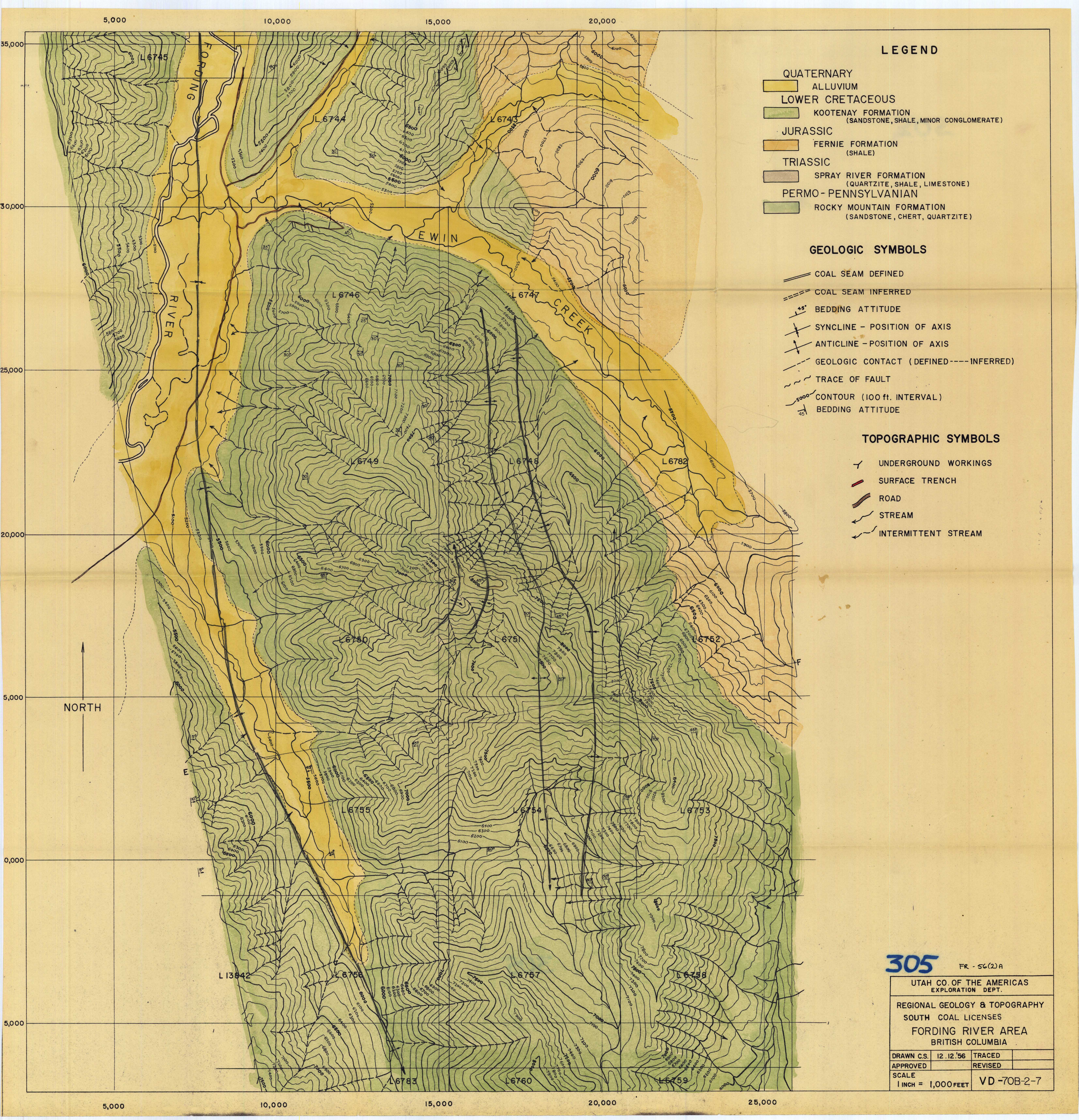
- COAL SEAM DEFINED
- - - COAL SEAM INFERRED
- 45° BEDDING ATTITUDE
- ∩ SYNCLINE - POSITION OF AXIS
- ∪ ANTICLINE - POSITION OF AXIS
- - - GEOLGIC CONTACT (DEFINED----INFERRED)
- - - TRACE OF FAULT
- 5000 CONTOUR (100ft. INTERVAL)
- 45° BEDDING ATTITUDE

**TOPOGRAPHIC SYMBOLS**

- ∩ UNDERGROUND WORKINGS
- SURFACE TRENCH
- ROAD
- STREAM
- - - INTERMITTENT STREAM

**305** FR - 56(2)A

UTAH CO. OF THE AMERICAS EXPLORATION DEPT.			
REGIONAL GEOLOGY & TOPOGRAPHY			
NORTH COAL LICENCES			
FORDING RIVER AREA			
BRITISH COLUMBIA			
DRAWN T.S.	11-11-56	TRACED	
APPROVED		REVISED	
SCALE:	DWG NO:		
1 INCH = 1,000 FEET	VD-70B-2-6		



**LEGEND**

- QUATERNARY**  
 ALLUVIUM
- LOWER CRETACEOUS**  
 KOOTENAY FORMATION  
 (SANDSTONE, SHALE, MINOR CONGLOMERATE)
- JURASSIC**  
 FERNIE FORMATION  
 (SHALE)
- TRIASSIC**  
 SPRAY RIVER FORMATION  
 (QUARTZITE, SHALE, LIMESTONE)
- PERMO-PENNSYLVANIAN**  
 ROCKY MOUNTAIN FORMATION  
 (SANDSTONE, CHERT, QUARTZITE)

**GEOLOGIC SYMBOLS**

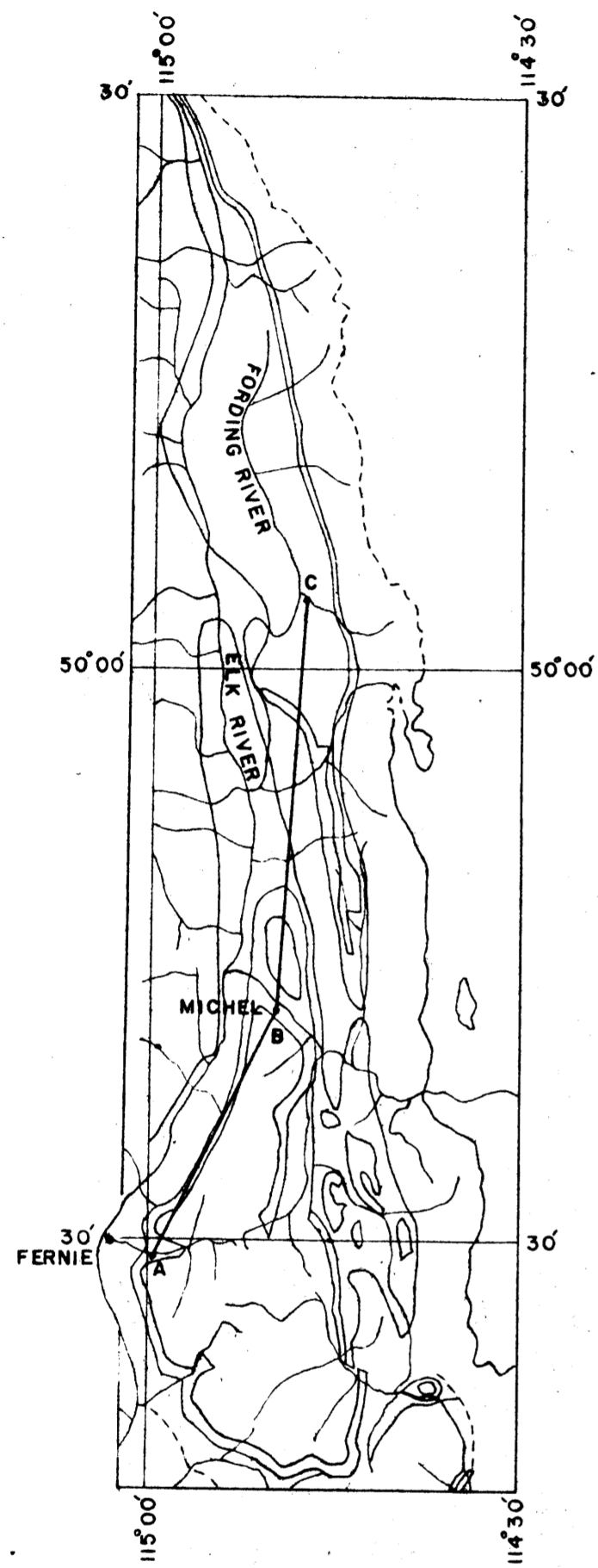
- COAL SEAM DEFINED
- COAL SEAM INFERRED
- BEDDING ATTITUDE
- SYNCLINE - POSITION OF AXIS
- ANTICLINE - POSITION OF AXIS
- GEOLOGIC CONTACT (DEFINED----INFERRED)
- TRACE OF FAULT
- CONTOUR (100 FT. INTERVAL)
- BEDDING ATTITUDE

**TOPOGRAPHIC SYMBOLS**

- UNDERGROUND WORKINGS
- SURFACE TRENCH
- ROAD
- STREAM
- INTERMITTENT STREAM

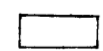
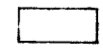
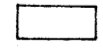
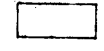
**305** FR - 56(2)A

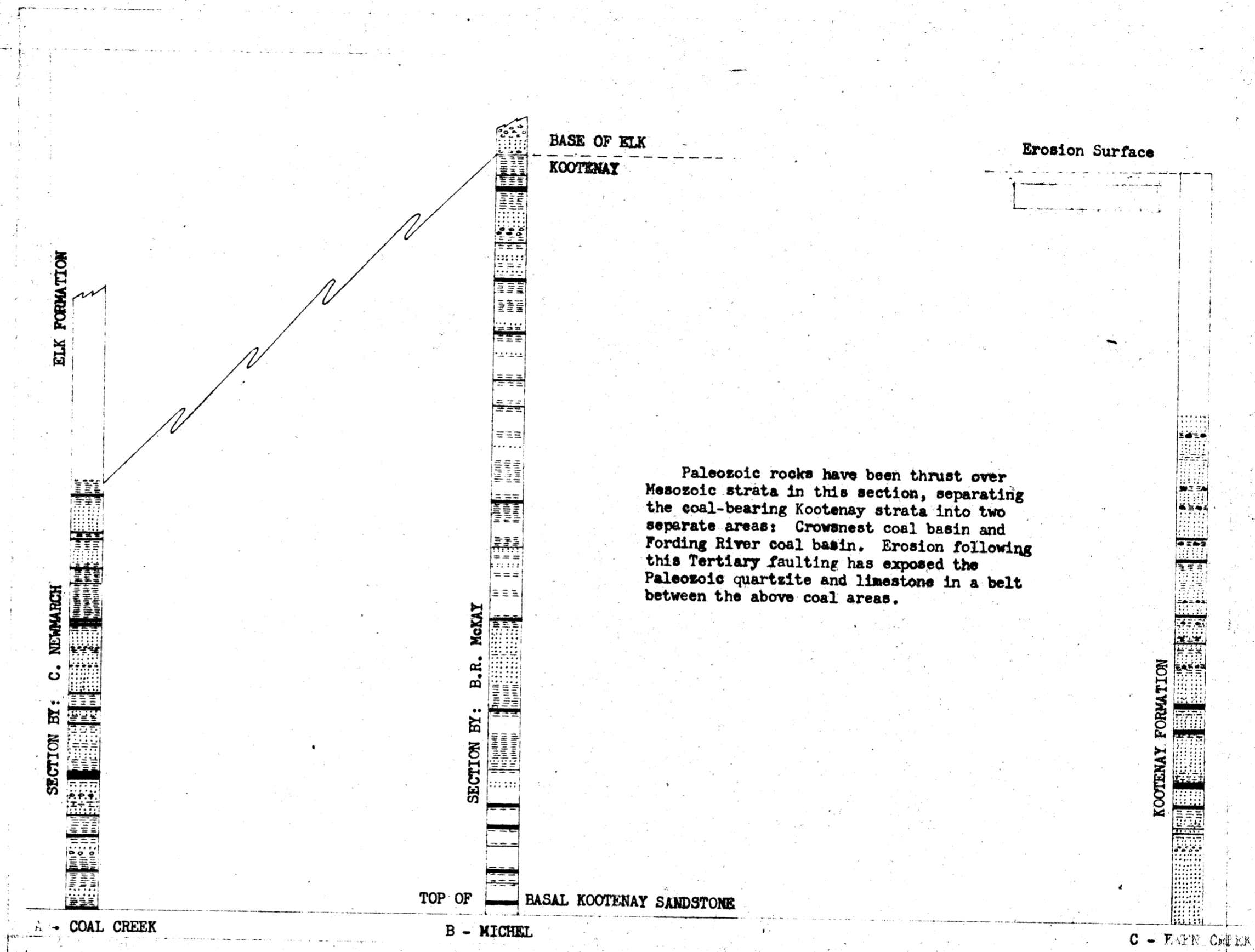
UTAH CO. OF THE AMERICAS EXPLORATION DEPT.			
REGIONAL GEOLOGY & TOPOGRAPHY SOUTH COAL LICENSES FORDING RIVER AREA BRITISH COLUMBIA			
DRAWN C.S.	12.12.56	TRACED	
APPROVED		REVISED	
SCALE 1 INCH = 1,000 FEET		VD-70B-2-7	



SCALE. 1 INCH = 10 MILES.



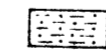

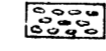
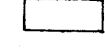
LEGEND

-  BLAIRMORE
-  KOOTENAY (COAL BEARING FORMATION)
-  FERNIE
-  PALEOZOIC



Paleozoic rocks have been thrust over Mesozoic strata in this section, separating the coal-bearing Kootenay strata into two separate areas: Crowsnest coal basin and Fording River coal basin. Erosion following this Tertiary faulting has exposed the Paleozoic quartzite and limestone in a belt between the above coal areas.

LEGEND

-  COAL
-  SHALE
-  SANDY SHALE
-  SANDSTONE
-  CONGLOMERATE
-  CONCEALED

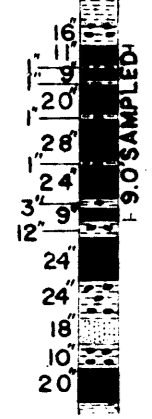
305

K-FR 56(2)A

UTAH CO. OF THE AMERICAS EXPLORATION DEPT. VANCOUVER, B. C.			
SECTIONS OF KOOTENAY FORMATION FERNIE, MICHEL & EWEN CREEK. FORDING RIVER, B. C.			
DRAWN	F. G. T.	16-4-57	TRACED
APPROVED			REVISED
SCALE		No.	
VERTICAL. 1 INCH = 500 FT.		VB-70B-2-8	
HORIZONTAL. 1 INCH = 4 MILES.			

FIGURE 4

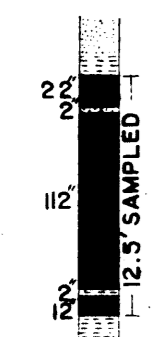
SEAM I  
Section B  
FACE AVERAGE  
Width - 12.0ft.



PROX ANALYSIS

H <sub>2</sub> O	- 2.4 %
ASH	- 16.3 %
VOL	- 30.2 %
F.C	- 51.2 %
S	- 0.64%
F.S.I.	- 7.5
BTU	12,344/LB

SEAM J  
Section B  
FACE AVERAGE  
Width - 12.5ft.



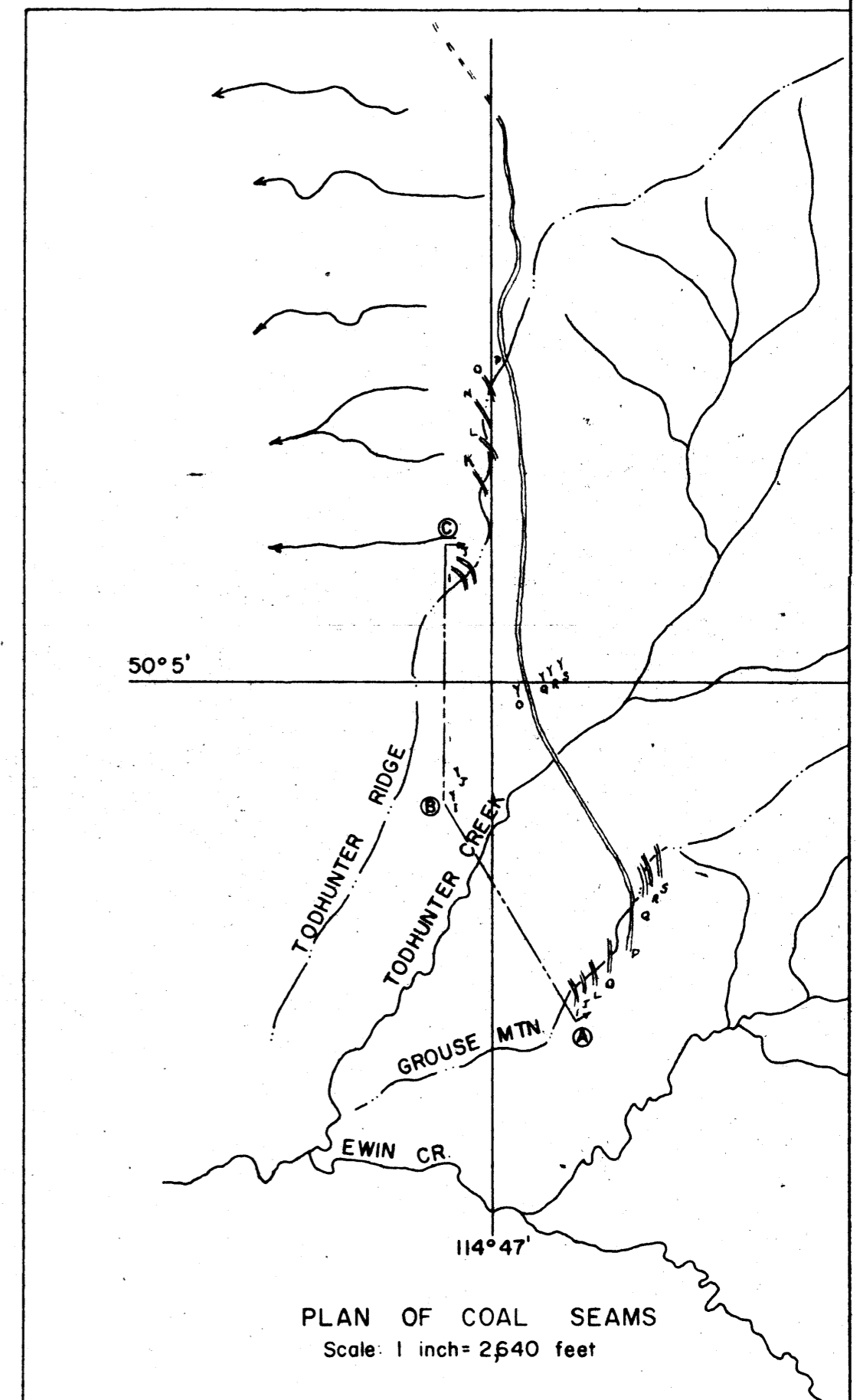
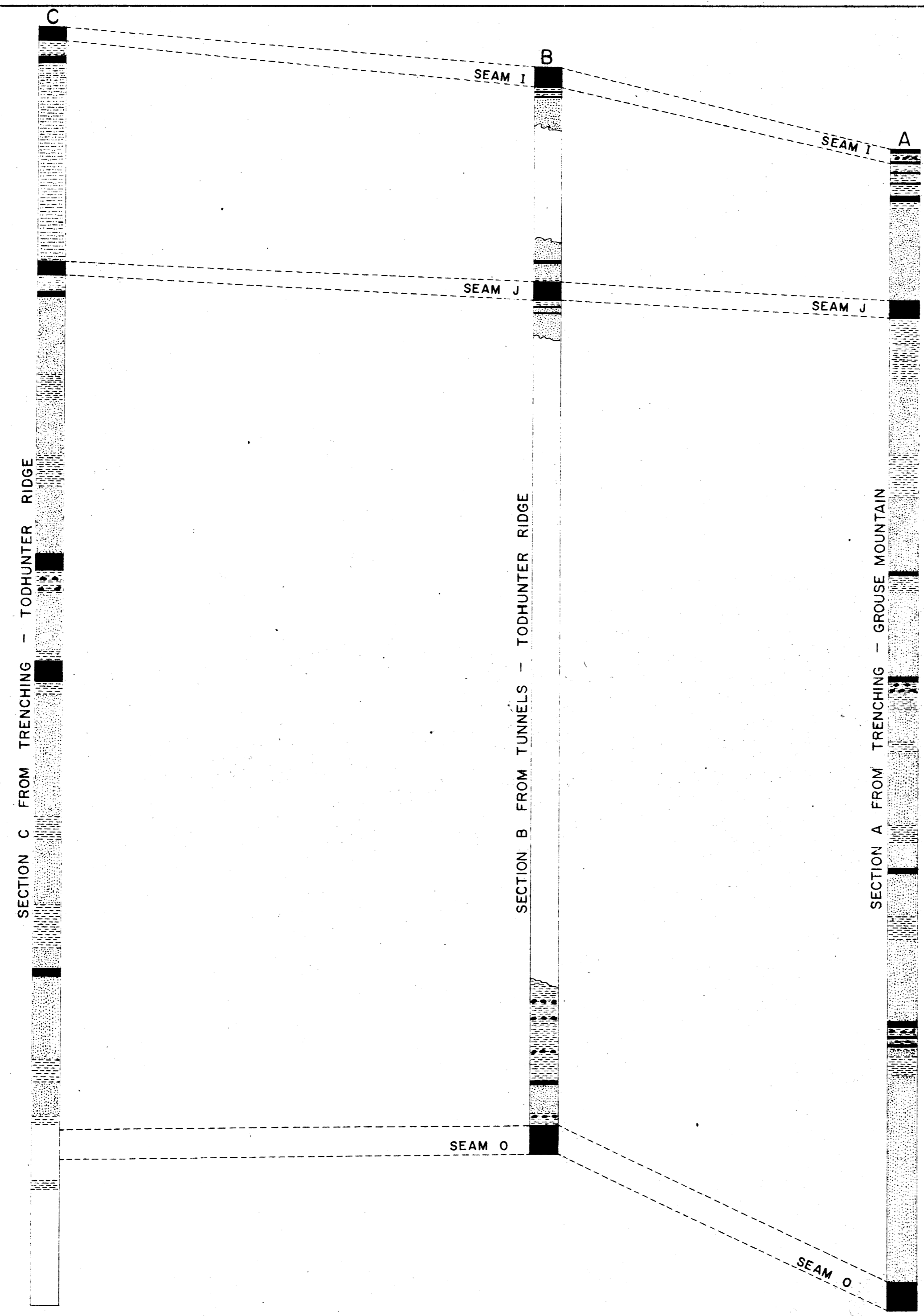
PROX ANALYSIS

H <sub>2</sub> O	- 3.7 %
ASH	- 12.1%
VOL	- 28.5%
F.C	- 55.7%
S	- 0.65%
F.S.I.	- 1.5
BTU	12,511/LB

DETAIL OF SEAMS  
AT TUNNELS (Section B)  
SCALE 1 in. = 10ft.

LEGEND

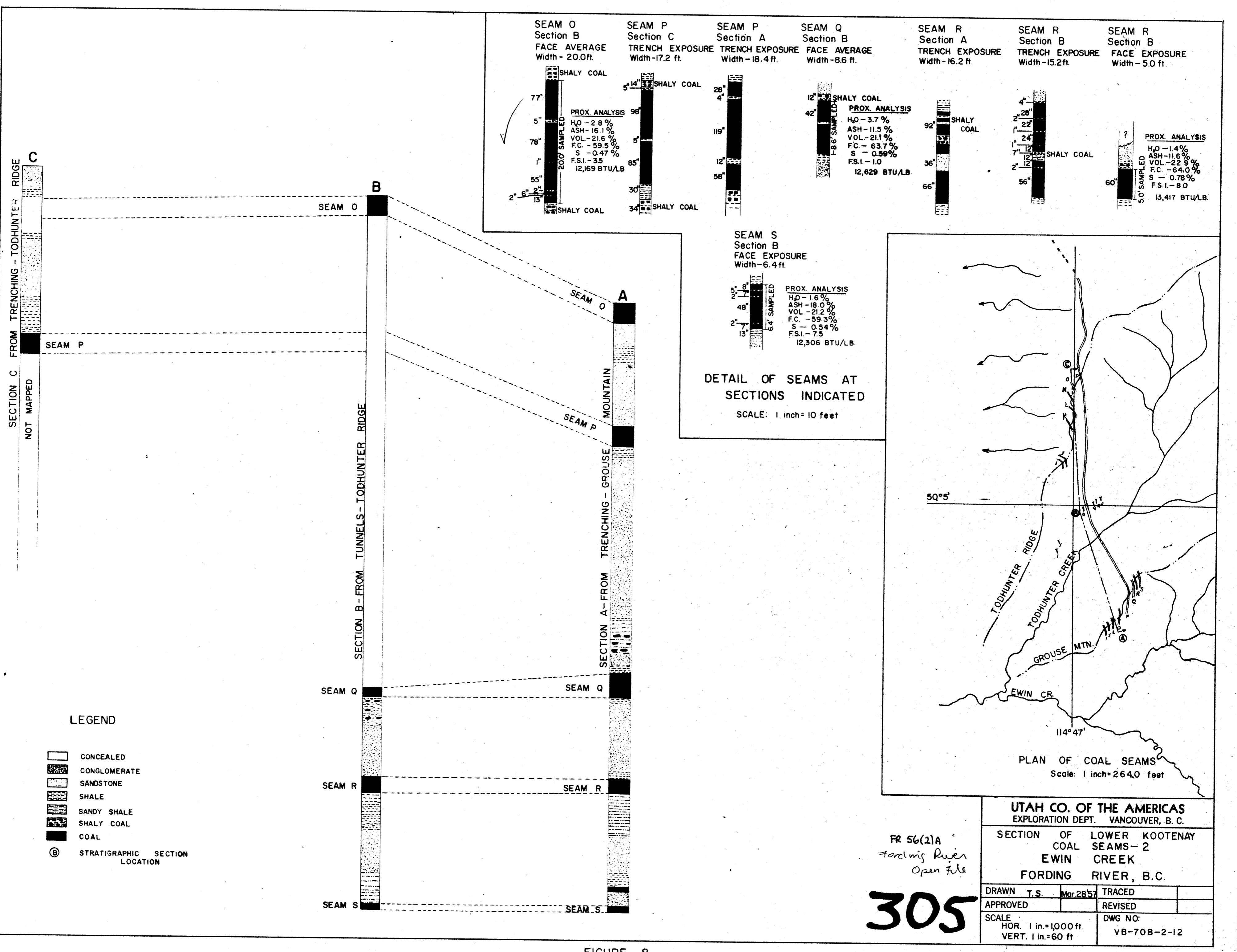
- CONCEALED
- CONGLOMERATE
- SANDSTONE
- SHALE
- SANDY SHALE
- SHALY COAL
- COAL
- STRATIGRAPHIC SECTION LOCATION



FR 56(2)A  
**305**

UTAH CO. OF THE AMERICAS EXPLORATION DEPT. VANCOUVER, B. C.	
SECTION OF LOWER KOOTENAY COAL SEAMS - I EWIN CREEK FORDING RIVER, B.C.	
DRAWN F.G.T.	23-4-57 TRACED
APPROVED	REVISED
SCALE HOR 1 in.=1,000ft. VERT. 1 in.=60 ft.	DWG NO: VB-70B-2-11

FIGURE 7



<b>SEAM O</b> Section B FACE AVERAGE Width - 20.0ft. 77" SHALY COAL 5" 200' SAMPLED 78" SHALY COAL 1" SHALY COAL 55" SHALY COAL 2" 6" 13" SHALY COAL	<b>SEAM P</b> Section C TRENCH EXPOSURE Width - 17.2 ft. 5' 14" SHALY COAL 5" SHALY COAL 85" SHALY COAL 30" SHALY COAL 34" SHALY COAL	<b>SEAM P</b> Section A TRENCH EXPOSURE Width - 18.4 ft. 28" 4" SHALY COAL 119" SHALY COAL 12" SHALY COAL 58" SHALY COAL	<b>SEAM Q</b> Section B FACE AVERAGE Width - 8.6 ft. 12" SHALY COAL 42" 1-86' SAMPLED 1-86' SAMPLED	<b>SEAM R</b> Section A TRENCH EXPOSURE Width - 16.2 ft. 92" SHALY COAL 36" SHALY COAL 66" SHALY COAL	<b>SEAM R</b> Section B TRENCH EXPOSURE Width - 15.2 ft. 4" SHALY COAL 2" 28" SHALY COAL 1" 22" SHALY COAL 1" 24" SHALY COAL 7" 12" SHALY COAL 2" 12" SHALY COAL 56" SHALY COAL	<b>SEAM R</b> Section B FACE EXPOSURE Width - 5.0 ft. ? 50' SAMPLED
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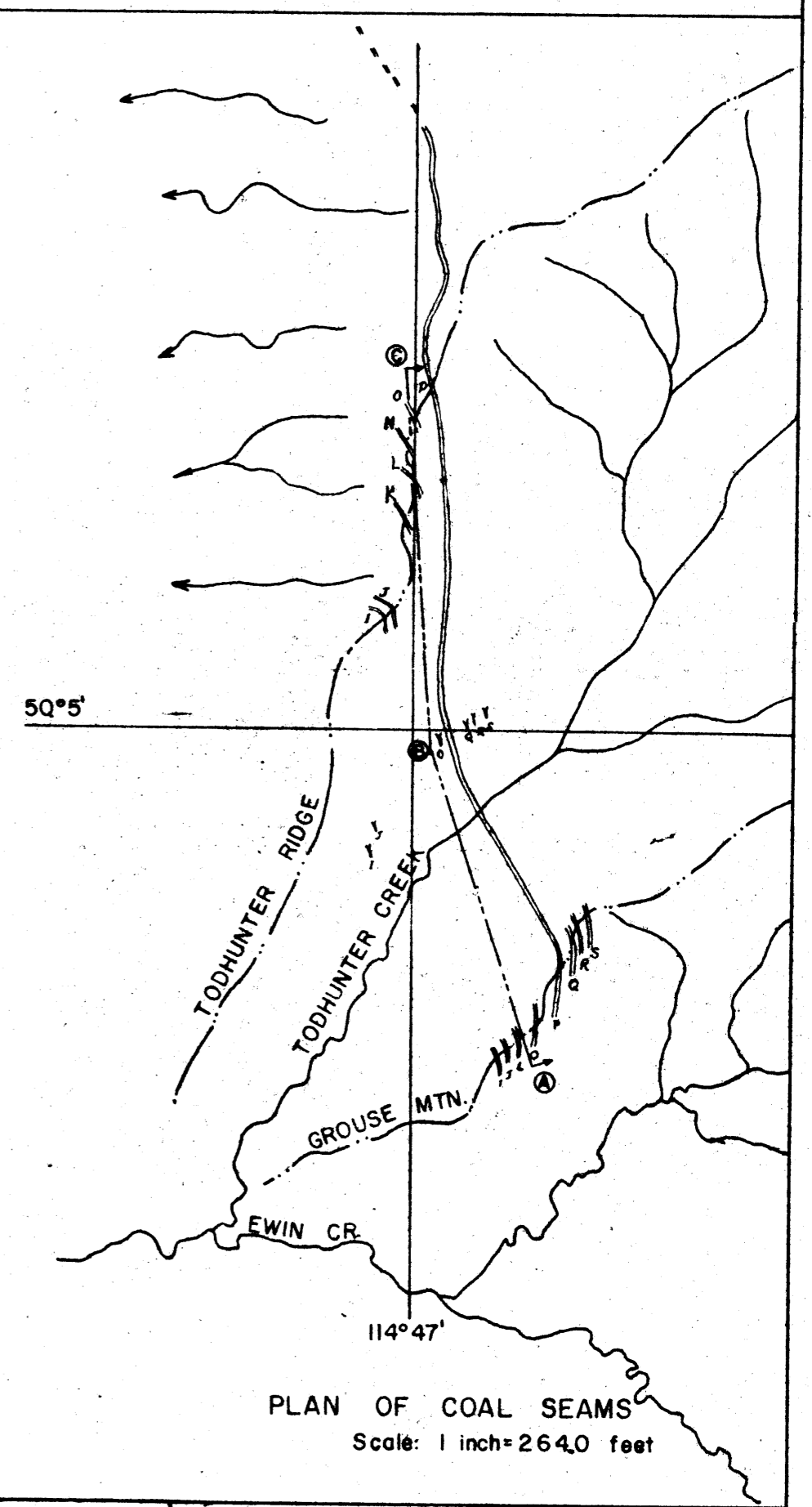
PROX. ANALYSIS  
 H<sub>2</sub>O - 2.8 %  
 ASH - 16.1 %  
 VOL - 21.6 %  
 F.C. - 59.5 %  
 S - 0.47 %  
 F.S.I. - 3.5  
 12,169 BTU/LB

PROX. ANALYSIS  
 H<sub>2</sub>O - 3.7 %  
 ASH - 11.5 %  
 VOL - 21.1 %  
 F.C. - 63.7 %  
 S - 0.59 %  
 F.S.I. - 1.0  
 12,629 BTU/LB.

PROX. ANALYSIS  
 H<sub>2</sub>O - 1.4 %  
 ASH - 11.6 %  
 VOL - 22.9 %  
 F.C. - 64.0 %  
 S - 0.78 %  
 F.S.I. - 8.0  
 13,417 BTU/LB.

**SEAM S**  
 Section B  
 FACE EXPOSURE  
 Width - 6.4 ft.  
 5" 8" SHALY COAL  
 2" 7" SHALY COAL  
 48" SHALY COAL  
 2" 7" SHALY COAL  
 13" SHALY COAL  
 6.4' SAMPLED  
 PROX. ANALYSIS  
 H<sub>2</sub>O - 1.6 %  
 ASH - 18.0 %  
 VOL - 21.2 %  
 F.C. - 59.3 %  
 S - 0.54 %  
 F.S.I. - 7.5  
 12,306 BTU/LB.

DETAIL OF SEAMS AT SECTIONS INDICATED  
 SCALE: 1 inch = 10 feet




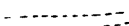
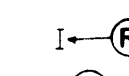
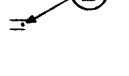

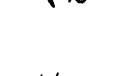


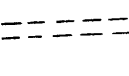
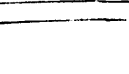

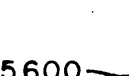

- LEGEND
- CONCEALED
  - CONGLOMERATE
  - SANDSTONE
  - SHALE
  - SANDY SHALE
  - SHALY COAL
  - COAL
  - ⓑ STRATIGRAPHIC SECTION LOCATION

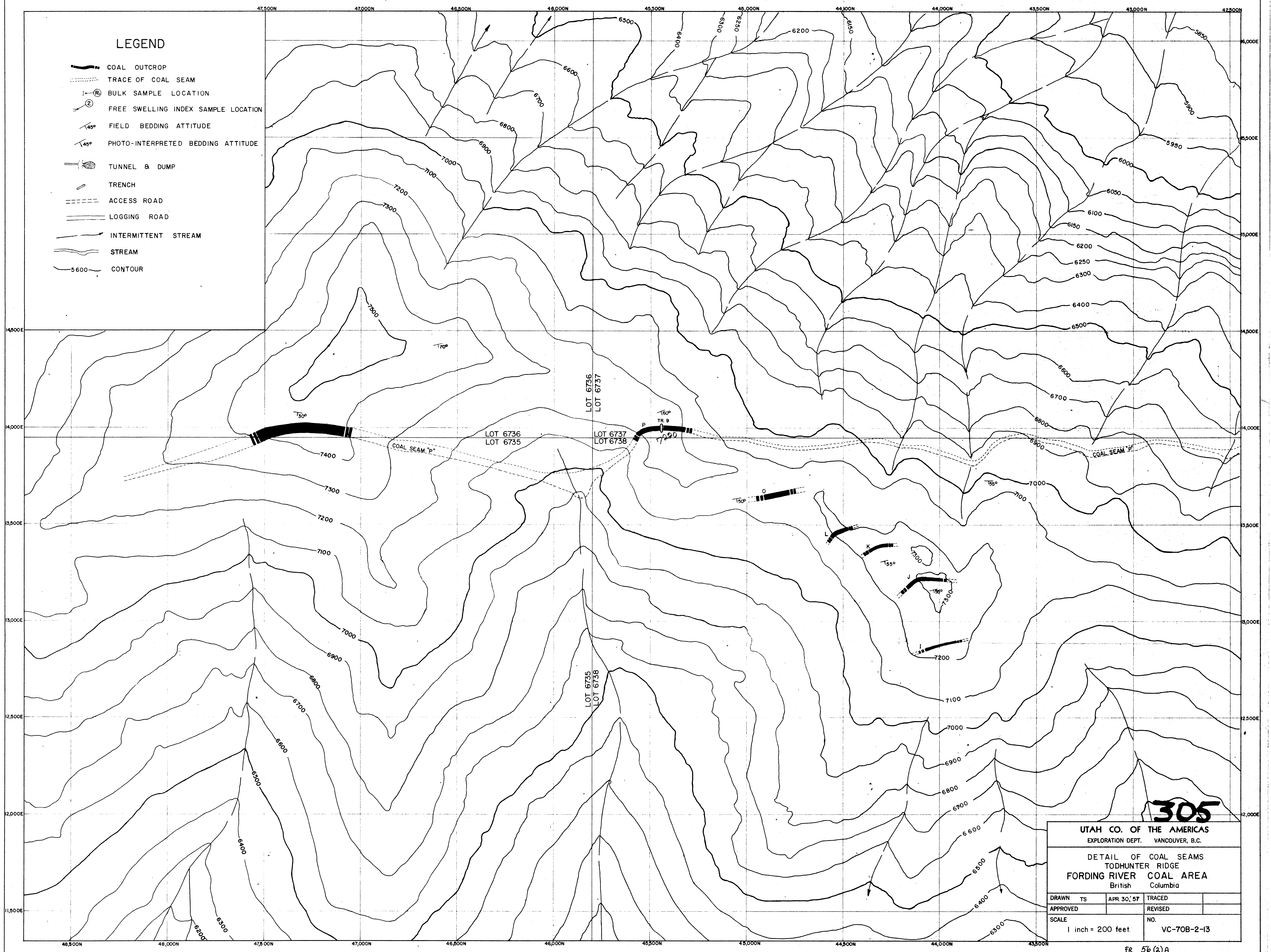
<b>UTAH CO. OF THE AMERICAS</b> EXPLORATION DEPT. VANCOUVER, B. C.			
SECTION OF LOWER KOOTENAY COAL SEAMS - 2 EWIN CREEK FORDING RIVER, B.C.			
DRAWN	T.S.	Mar 28 57	TRACED
APPROVED			REVISED
SCALE		DWG NO:	
HOR. 1 in. = 1,000 ft.		VB-70B-2-12	
VERT. 1 in. = 60 ft			

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 Fording River  
 Open file  
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FIGURE 8

**LEGEND**


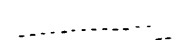


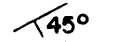



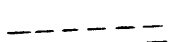




-  COAL OUTCROP
-  TRACE OF COAL SEAM
-  BULK SAMPLE LOCATION
-  FREE SWELLING INDEX SAMPLE LOCATION
-  FIELD BEDDING ATTITUDE
-  PHOTO-INTERPRETED BEDDING ATTITUDE
-  TUNNEL & DUMP
-  TRENCH
-  ACCESS ROAD
-  LOGGING ROAD
-  INTERMITTENT STREAM
-  STREAM
-  CONTOUR

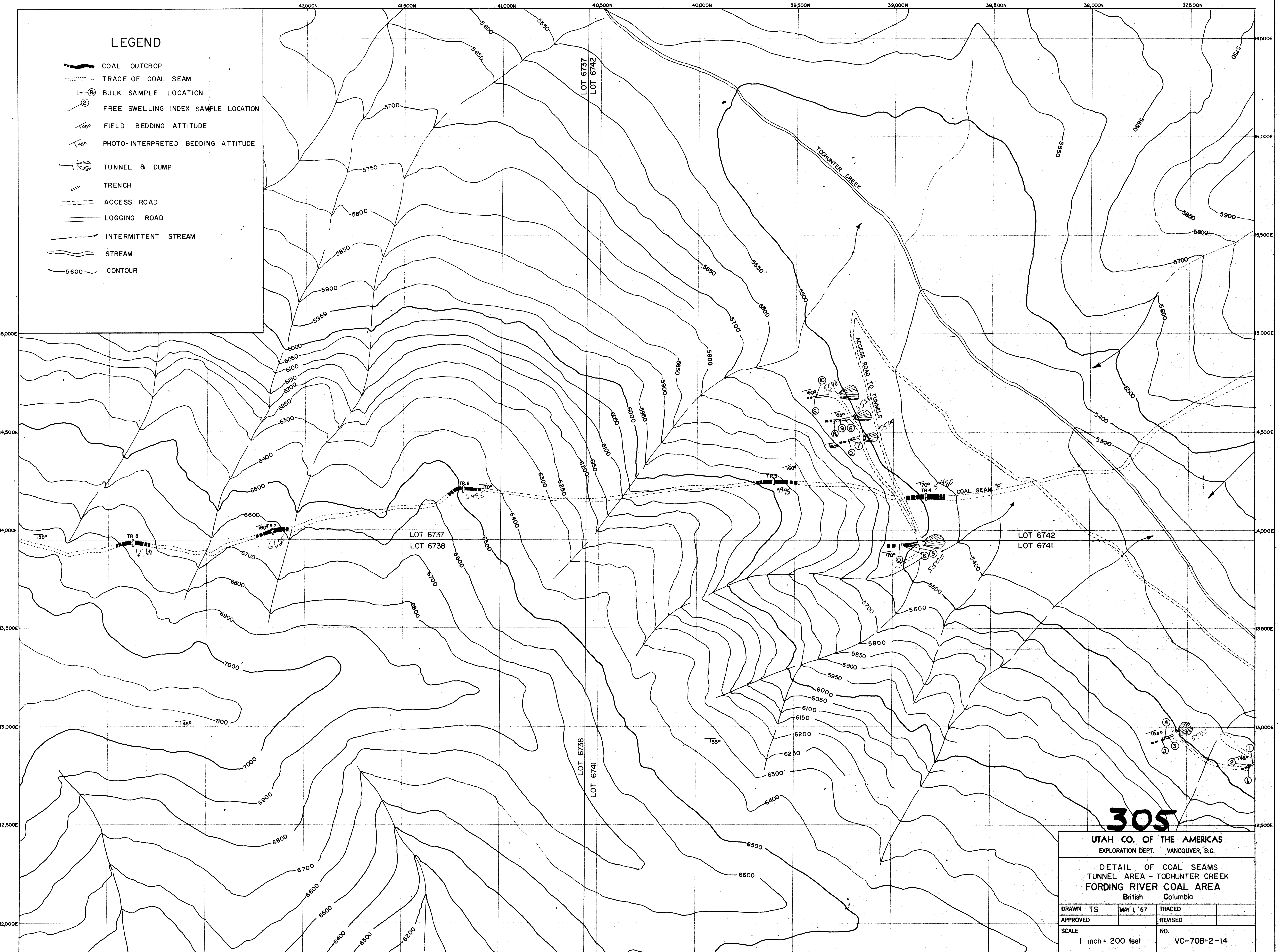


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<b>UTAH CO. OF THE AMERICAS</b> EXPLORATION DEPT. VANCOUVER, B.C.			
DETAIL OF COAL SEAMS TODHUNTER RIDGE FORDING RIVER COAL AREA British Columbia			
DRAWN	TS	APR 30, 57	TRACED
APPROVED			REVISED
SCALE			NO.
1 inch = 200 feet.			VC-70B-2-13

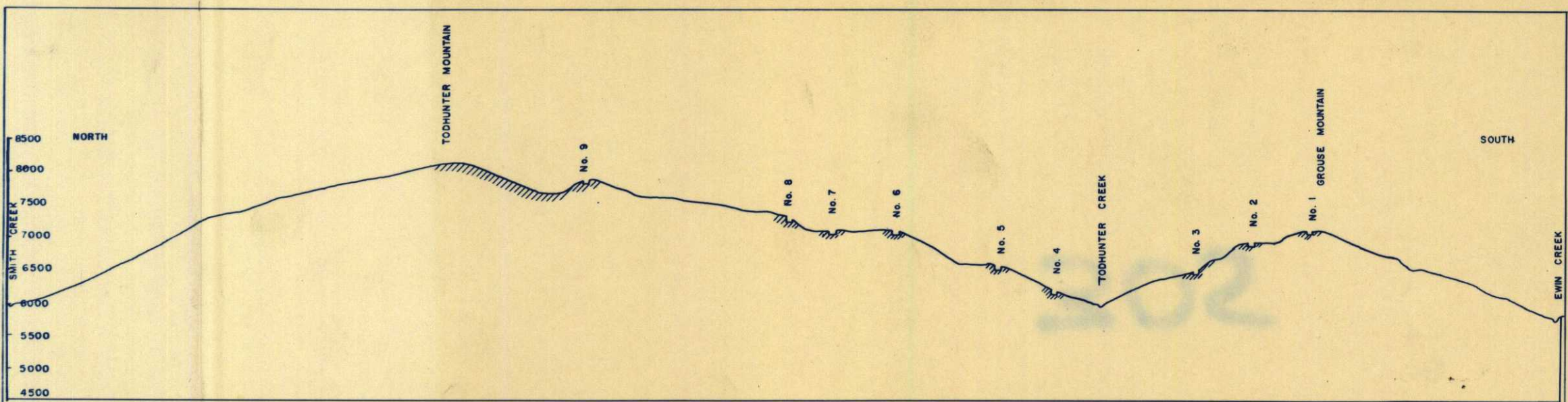
**LEGEND**

-  COAL OUTCROP
-  TRACE OF COAL SEAM
-  BULK SAMPLE LOCATION
-  FREE SWELLING INDEX SAMPLE LOCATION
-  FIELD BEDDING ATTITUDE
-  PHOTO-INTERPRETED BEDDING ATTITUDE
-  TUNNEL & DUMP
-  TRENCH
-  ACCESS ROAD
-  LOGGING ROAD
-  INTERMITTENT STREAM
-  STREAM
-  CONTOUR

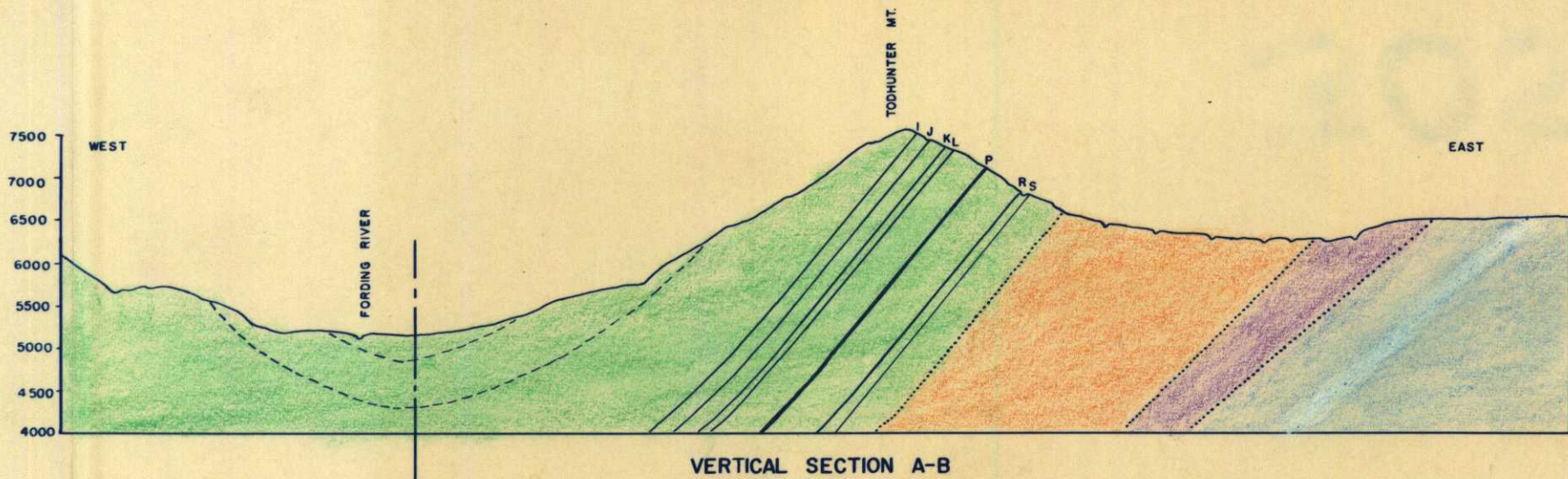


**305**

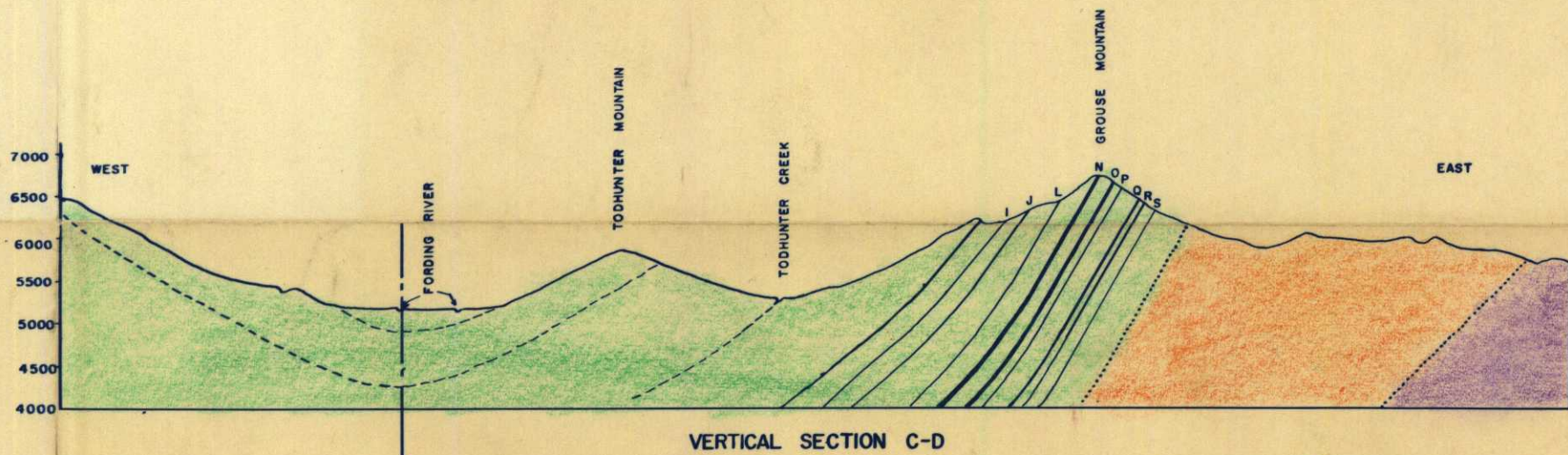
UTAH CO. OF THE AMERICAS		
EXPLORATION DEPT. VANCOUVER, B.C.		
DETAIL OF COAL SEAMS		
TUNNEL AREA - TODHUNTER CREEK		
FORDING RIVER COAL AREA		
British Columbia		
DRAWN TS	MAY 1, '57	TRACED
APPROVED		REVISED
SCALE	NO.	
1 inch = 200 feet	VC-70B-2-14	



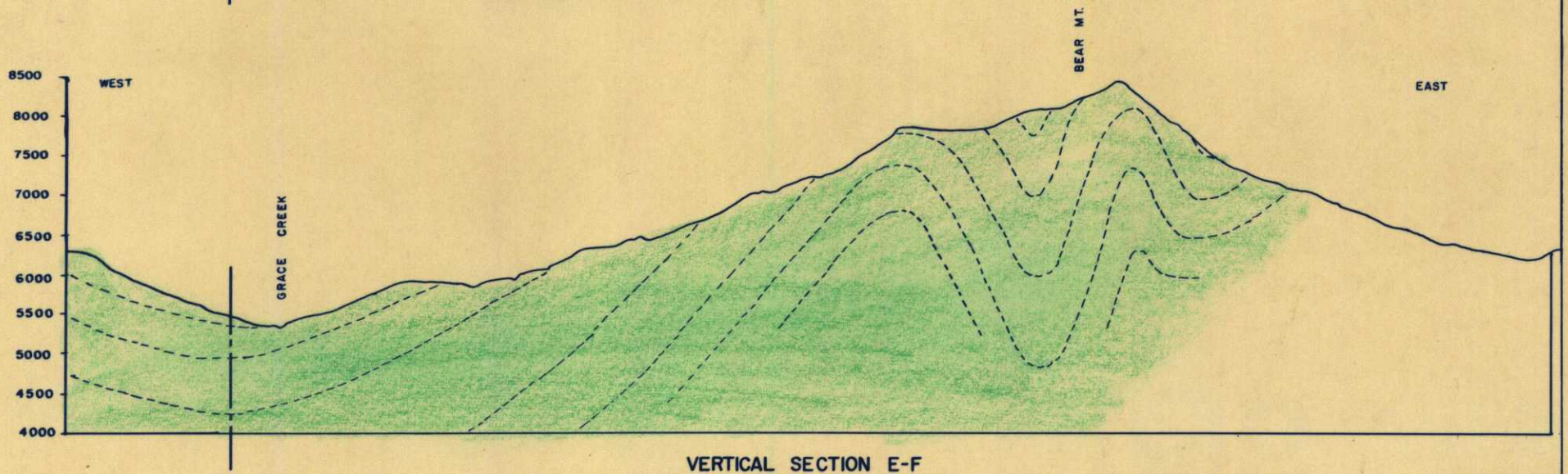
LONGITUDINAL SECTION X-X IN PLANE OF COAL SEAM P  
AVERAGE DIP 60° SW



VERTICAL SECTION A-B



VERTICAL SECTION C-D



VERTICAL SECTION E-F

- LEGEND**
- KOOTENAY FORMATION
  - FERNIE FORMATION
  - SPRAY RIVER FORMATION
  - ROCKY MOUNTAIN FORMATION

- SYMBOLS**
- COAL EXPOSURE
  - COAL SEAM
  - TRENCH
  - GEOLOGIC CONTACT
  - INFERRED BEDDING
  - SYNCLINAL AXIS

Note: All sections indicated on drawing number VD-70B-2-6

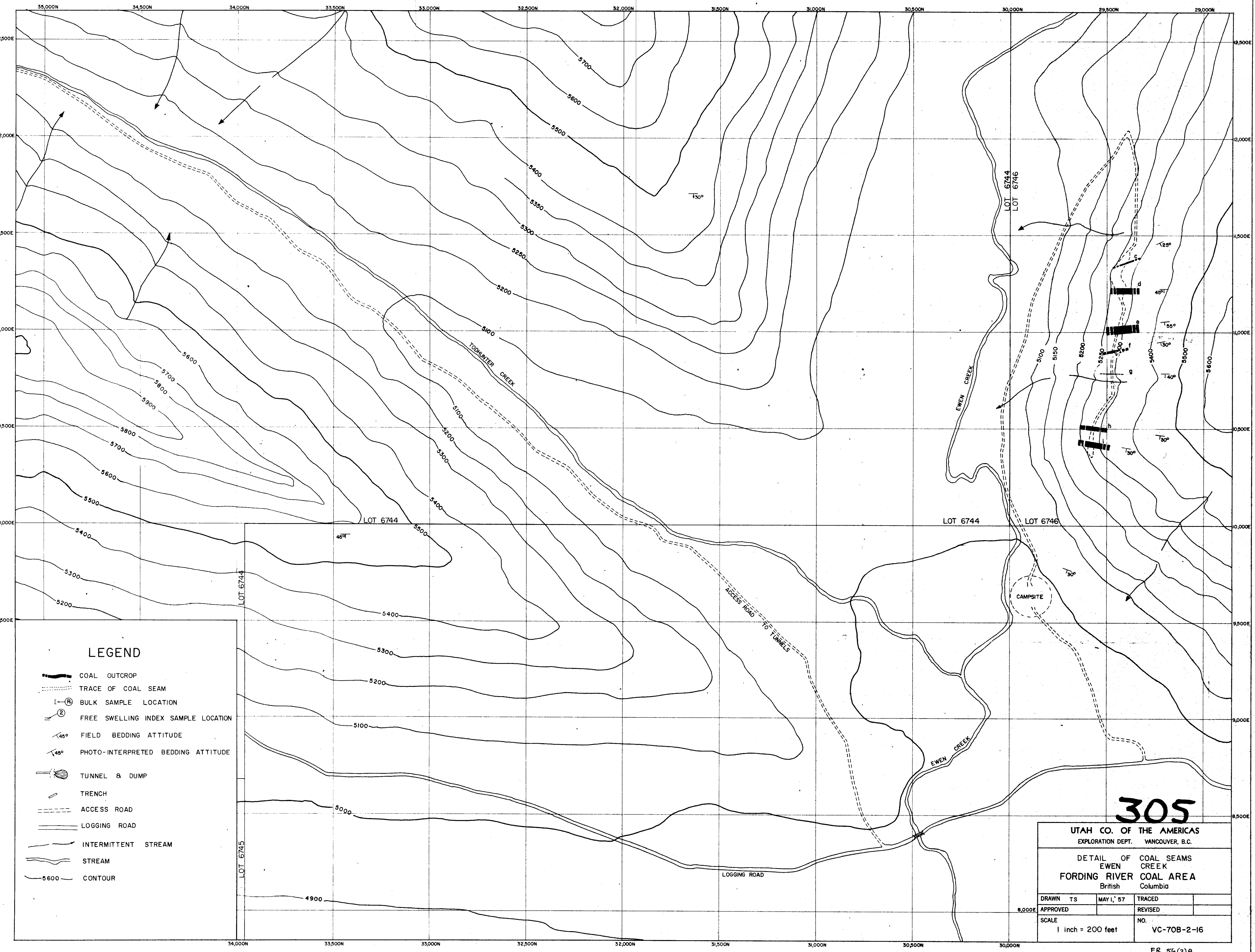
305

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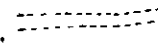
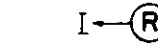
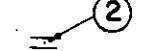

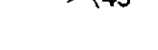
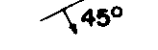
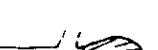


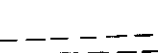

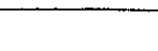
UTAH CO. OF THE AMERICAS	
EXPLORATION DEPT.	VANCOUVER, B.C.
LONGITUDINAL & VERTICAL SECTIONS	
FORDING RIVER AREA	
BRITISH COLUMBIA	
DRAWN T.S. SHJ 25-4-57	TRACED
APPROVED	REVISED
SCALE: Horiz & Vert.	DWG. NO.
0 1000 2000 Feet	VC-70B-2-15

FIGURE 6






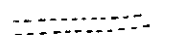
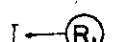


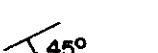


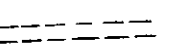
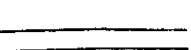
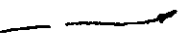

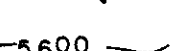
**LEGEND**

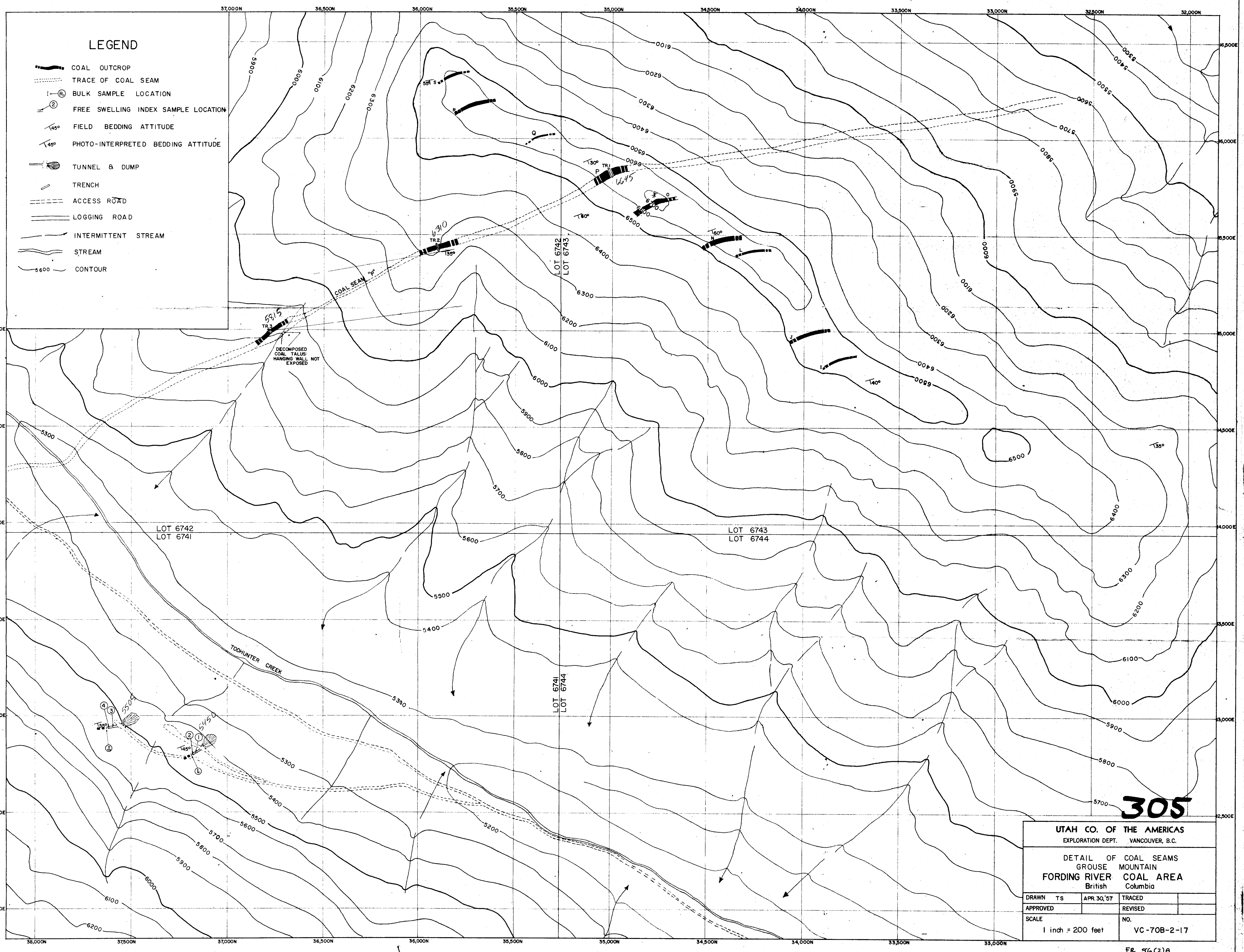
-  COAL OUTCROP
-  TRACE OF COAL SEAM
-  BULK SAMPLE LOCATION
-  FREE SWELLING INDEX SAMPLE LOCATION
-  FIELD BEDDING ATTITUDE
-  PHOTO-INTERPRETED BEDDING ATTITUDE
-  TUNNEL & DUMP
-  TRENCH
-  ACCESS ROAD
-  LOGGING ROAD
-  INTERMITTENT STREAM
-  STREAM
-  CONTOUR

**305**

UTAH CO. OF THE AMERICAS EXPLORATION DEPT. VANCOUVER, B.C.			
DETAIL OF COAL SEAMS EWEN CREEK FORDING RIVER COAL AREA British Columbia			
DRAWN TS	MAY 1, '57	TRACED	
APPROVED		REVISED	
SCALE		NO.	
1 inch = 200 feet		VC-70B-2-16	

**LEGEND**

-  COAL OUTCROP
-  TRACE OF COAL SEAM
-  BULK SAMPLE LOCATION
-  FREE SWELLING INDEX SAMPLE LOCATION
-  FIELD BEDDING ATTITUDE
-  PHOTO-INTERPRETED BEDDING ATTITUDE
-  TUNNEL & DUMP
-  TRENCH
-  ACCESS ROAD
-  LOGGING ROAD
-  INTERMITTENT STREAM
-  STREAM
-  CONTOUR



**305**

UTAH CO. OF THE AMERICAS EXPLORATION DEPT. VANCOUVER, B.C.			
DETAIL OF COAL SEAMS GROUSE MOUNTAIN FORDING RIVER COAL AREA British Columbia			
DRAWN	TS	APR 30, '57	TRACED
APPROVED			REVISED
SCALE			NO.
1 inch = 200 feet			VC-70B-2-17