

REPORT
ON
TEST COAL SAMPLE
FROM
PINE PASS COAL COMPANY LTD.,
PINE PASS, B.C.

4th February, 1969.

D.W.Pringle, P.Eng.,
Richmond, B.C.



Vancouver from Yokohama 4260
 Hong Kong 6750 Calcutta 8730
 Manila 6020
 from Honolulu 2420 Sydney 6820

LOCATION MAP

PINE PASS COAL COMPANY LTD.

T A B L E O F C O N T E N T S

PAGE NO.

LOCATION MAP	
INTRODUCTION	1
LOCATION & ACCESS	1
HISTORY	1
SITE PLAN	
COAL SPECIFICATIONS	2
SAMPLING ADIT DATA	2
GENERAL REVIEW*	3
CONCLUSIONS	4
PRESENT STATUS	5
ATTACHED CHEMICAL ANALYSIS.	
NOMAN CREEK AREA SECTIONS.	
NOMAN CREEK AREA SECTIONS.	
NOMAN CREEK AREA PLAN.	
HASLER NINE AREA PLAN & SECTIONS.	
WILLOW CREEK AREA PLAN.	
WILLOW CREEK AREA SECTIONS.	
WILLOW CREEK AREA SECTIONS.	

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DONALD **W. PRINGLE**, P. ENG.
MINING CONSULTANT

INTRODUCTION:

An exploration **adit** was driven in October **1968**, at the **Noman** Creek coal deposit of Pine Pass Coal Co., Ltd., **so** that a coal **sample** could be obtained for testing. -The writer supervised the extraction and shipment of sixteen barrels of coal, along with the comparison sample for local testing (see attached Coast Eldridge Chemical Analysis).

Previous to this the writer visited the property at various times during **1968** and reported on the **same** 1st December, 1966, and 20th July, **1968**, and so is familiar with the recent history' and development of the property.

LOCATION & ACCESS:

The coal **deposits** are situated 640 rail miles **from** the Port of Vancouver. They lie on both sides of the Pacific Great Eastern Railroad. Highway access is via the John Hart Highway about 150 miles northeast of Prince George, B.C., and 100 miles west of Dawson Creek, B.C., and only 22 miles from Chetwynd, a small local town.

HISTORY:

Some production from the area is recorded in the years 1944 and 1945. A 500 ft. **adit** was driven in 1949 by the **B.C. Department** of Mines (Chemical analysis in main report). A 120 ft. **adit** was driven by Pine Pass Coal Co., in October, **1968**, from which the bulk samples were taken.

0 These tunnels are located 11 miles apart along the strike of the coal within the area of indicated recoverable tonnage of approximately 40 million tons as defined by 48,653 feet of diamond drilling.

COAL SPECIFICATIONS:

0 A large number of tests have been performed by the B.C. Department of Mines and by Pine Pass Coal personnel. The coal is classified according to A.S.T.M. D 388 standard as "Medium Volatile Bituminous Coals" with good coking characteristics, and banded constituents of a Vitrain and/or Clarain nature. The specifications so far ascertained of run of mine samples taken includes about 20% volatile; 13½% ash, 0.6% sulphur and 7 to 8 C.B.I. One sink float test by Coast Eldridge at specific gravity of 1.50 gave the following results:

4.60% Ash, 24.18% Volatile matter and 8½ C.B.I with a 79.75% float fraction recovery;

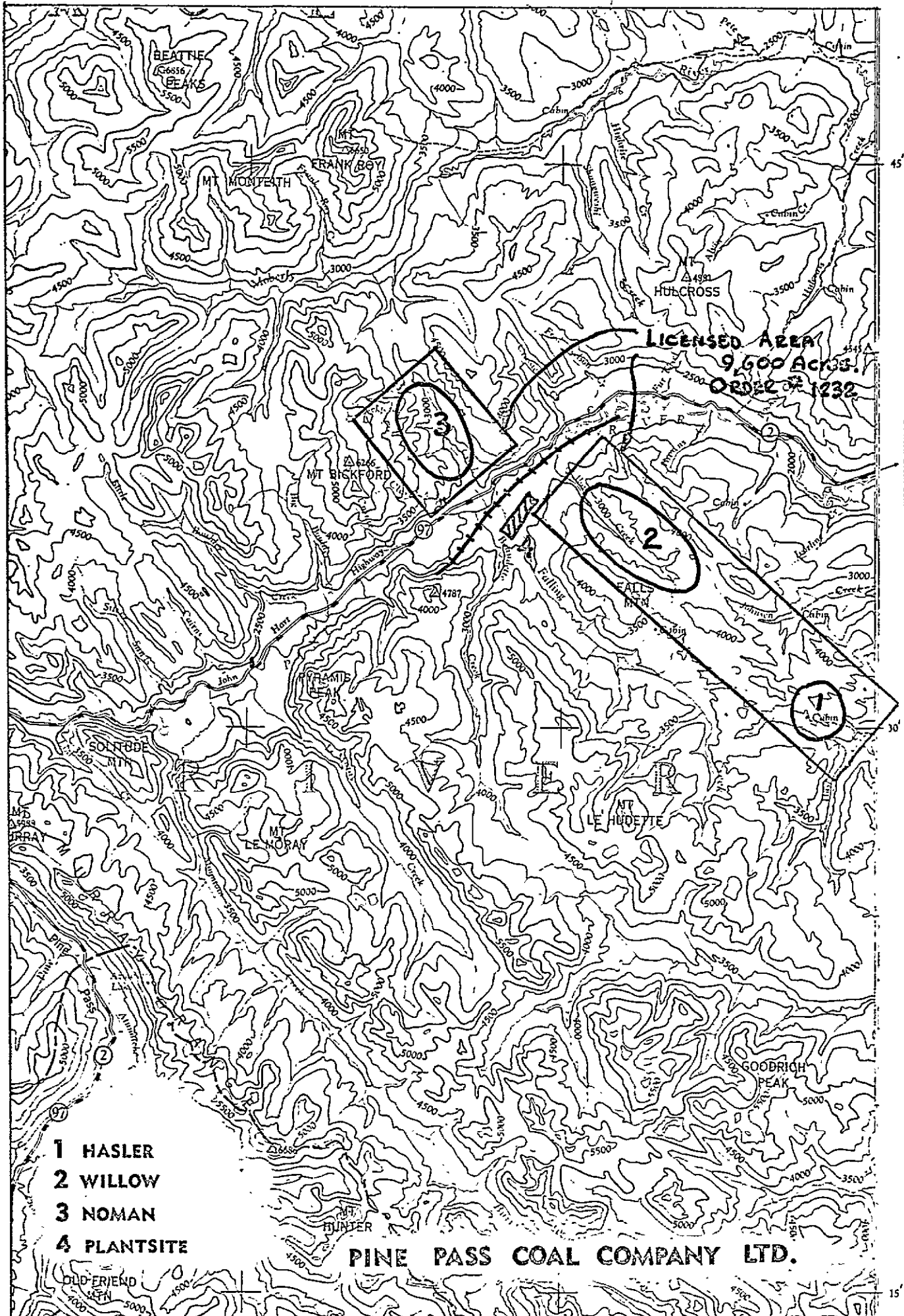
SAMPLING ADIT DATA:

0 The exploration adit was driven on the west limb of Seem 76 on Noman Creek section A - B at an elevation of 1,985 ft, approximately 500 ft. north of the John Hart Highway. Bulldozer work stripped the surface exposure to a depth of 53 feet, opening up a face height of 70 ft. The width of seam at this point was 16ft., with a dip to the northeast of 76 degrees. Timbering commenced on the hanging wall side with timber dimensions of 10 ft. by 10 ft. Drilling a pattern of eight holes, with the centre four on a wedge cut, good extraction and

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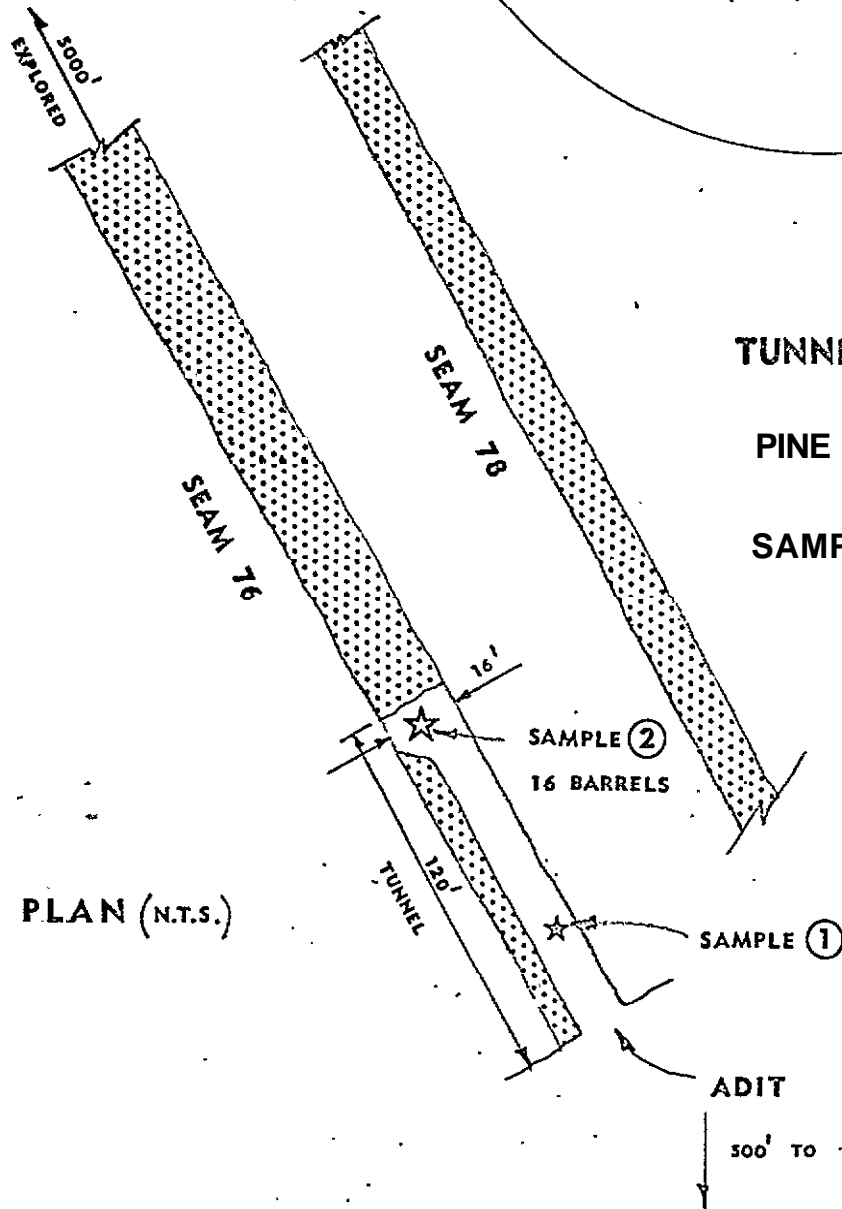
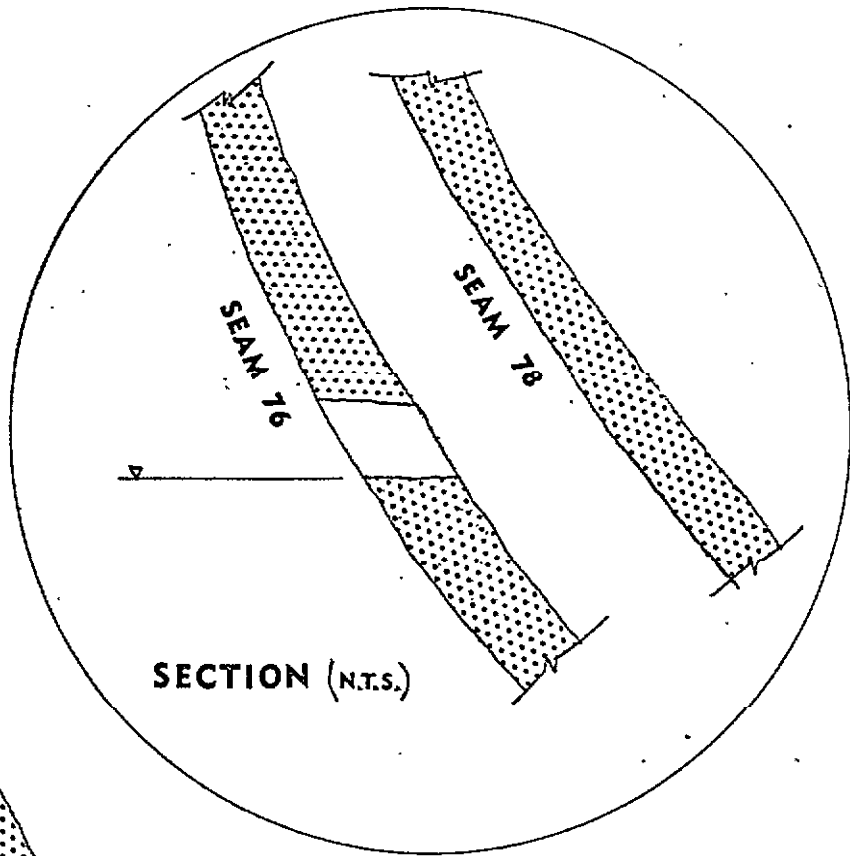
45

Dawson Creek 81m

30

15

TUNNEL
INSIDE TIMBERS 10'x10'



PLAN (N.T.S.)

TUNNEL DRIVEN OCT. '68.
BY
PINE PASS COAL CO.
FOR
SAMPLING PURPOSES

'breakage was accomplished. **Material** was moved by front end loader **and** slusher bucket. Visual **observation** at the **adit** entrance indicated some oxidation. but **good** bright coal was encountered about 25 ft. from the tunnel **entrance** - there was much less oxidation **than** originally believed. At this point timbering was dispensed with, due to good *strong coal and hanging wall*. At this point Sample No. C 3 P 1 - 68 - 2950 (see attached analysis) was **taken** from upper 10 ft. of seam **76**. The **adit** was then advanced a further 80 ft. on strike, -then opened to true width of 16 ft. At this point the bulk sample was taken, split end loaded into sixteen steel **drum** containers lined **with plastic** bags. The sixteen barrels were then shipped via P.G.E. railroad to dock in Vancouver, B.C., addressed to Toyomenka Inc., of Vancouver, B.C. Equivalent samples to the Japanese shipment were then shipped to Coast Eldridge Assayers, Vancouver, B.C., Chemical **analysis** No. **3296 and C3 - P2 - 69 - 4082** relevant to the split fractions are attached.

Tunnel contractor was Frontier **Construction** of Vancouver, B.C.

GENERAL REVIEW:

Initial mining is proposed at the **Noman** Creek section. Three mining methods for an underground operation **have** been evaluated and these vary **depending** upon the pitch of the coal beds. The recent results of good unoxidized coal close to surface would indicate that open pit mining in certain areas could be possible..

The Pine Pass Coal Company's plan formulated at **the outset** of the development included about **one million tons** to be exported to the Japanese market annually, with the distinct possibility of half a million tons **to** the local markets.

Initial capital investment has been estimated at approximately **\$8,000,000.00** for a **plant** producing one and a half million long tons of **clean** coal annually.

Estimated operating costs for mining and transportation are **\$10.95 per long ton**. Sufficient reserves are available for a 15 year contract, with the distinct possibility of further reserves outside of the sections drilled and investigated.

It is possible that production could **commence** in late **1970 if** all phases moved right along. Transportation via P.G.E. railroad is proposed to a ship loading berth at **Squamish, B.C.** or to the new **bulk** loading facilities at North Vancouver **or** to the proposed facilities 'at Roberts **Bank** (just' south of Vancouver).

CONCLUSIONS:

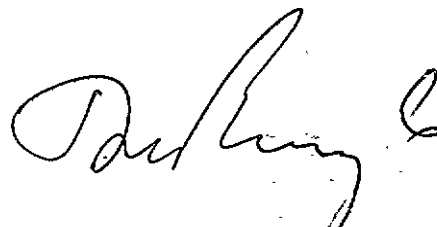
The initial preliminary Market Study was revised following my detailed report on December, 1966. I now feel that it presents a reasonable estimate of the total economic picture. Certain figures have changed since 1967, such as some costs **and also** the selling price - up to around \$13.80.

It is concluded that there are sufficient **reserves** of excellent **cokong coal** suitable for the establishment of a long term profitable mining operation.

PRESENT STATUS:

The sixteen drums of coal arrived in Japan late in December, 1968. Various Japanese steel mills will commence their analysis of the coal upon the completion and delivery of this report.

4th February, 1969.



D.W.Pringle, P.Eng.,
Richmond, B.C.



WARNOCK HERSEY
INTERNATIONAL LIMITED

COAST ELDRIDGE
PROFESSIONAL SERVICES DIVISION

125 East 4th Ave., Vancouver 10. B. C. Phone 876.4111 — Telex 04.50353

REPORT OF: Chemical Analysis
AT Vancouver Laboratory
PROJECT: Coal
REPORTED TO: Pine Pass Coal Co. Ltd.
2 - 515 Granville Street
Vancouver, B.C.

FILE NO: C.3-p.1-68-2950
DATE November 8, 1968
REPORT NO:
ORDER NO:

ATTENTION Mr. McLoughlin

We have tested one sample of Coal submitted by you on November 1 and report as hereunder:

SAMPLE IDENTIFICATION

The sample was not identified. (IN FACT THIS IS SAMPLE NO. 3
25 FT. FROM ADIT ENTRANCE.)

RESULTS

Total Moisture *	.	4.88 %
Inherent Moisture	.	0.58 %
Ash	.	13.63 %
Volatile Matter	.	19.57 %
Fixed Carbon	.	66.22 %
B.T.U. 's/pound	.	13,673
Sulphur	.	0.74 %
Free Swelling Index	.	7 * 1/2

DeSinger

* NOTE: All results are reported on an 'air dry' basis except total moisture which is 'as received' basis.

COAST ELDRIDGE

W. Wong
W. Wong,
CHIEF CHEMIST

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**WARNOCK HERSEY
INTERNATIONAL LIMITED**

**COAST ELDRIDGE
PROFESSIONAL SERVICES DIVISION**

125 East 4th Ave., Vancouver 10, B. C. Phone 876-4111 -Telex 04-50353

REPORT OF: **Chemical Testing**
 AT **Vancouver** Laboratory
 PROJECT: **Coal Samples**
 REPORTED TO: **Pine Pass Coal Company**
2 • 515 Granville Street
 Vancouver, B.C.

FILE NO: **C.3-P.2-69-4082**
 DATE **January 15, 1969**
 REPORT NO:
 ORDER NO:

We have tested the samples of coal submitted by you and report as hereunder:

SINK FLOAT TEST

A sink/float test was carried out at a specific gravity of 1.50 with the following results.

	<u>EIGHT</u> <i>Dub</i> <u>Top Six Feet</u>	<u>EIGHT</u> <i>Dub</i> <u>Bottom Six Feet</u>
Sink Fraction	27.22 %	20.25 %
Float Fraction	72.28 %	79.75 %

CHEMICAL ANALYSIS • Float portion

	<u>TOP Six Feet</u>	<u>Bottom Six Feet</u>
Ash	5.30 %	4.60 %
Volatile Matter	22.01 %	24.18 %
Swelling Index	8	8 - 1/2

COAST ELDRIDGE

W. Wong
W. Wong,
CHIEF CHEMIST

/jp



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REPORT OF: Chemical Analysis
 AT: Vancouver **Laboratory**
 PROJECT: Coal Samples
 REPORTED TO: Pine Pass Coal Co.,
 2 • 515 **Granville** Street,
 Vancouver. B.C.

FILE NO.: 3296
 DATE: January 20, 1969
 REPORT NO:
 ORDER NO:

We have tested two **samples** of Coal submitted by you on November 10, 1968, and report as hereunder:

SAMPLE IDENTIFICATION:

The samples were identified as:

Sample 1 • Top **8** feet (IN FACT SAMPLE NO. 2 A.)
 Sample 2 • Bottom **8** feet (IN PACT SAMPLE NO. 2 B.)

A composite using equal proportions of each sample was **also** prepared. (IN FACT BULK SAMPLE NO. 2.)

RESULTS:

1. Analysis of Coal

	<u>Sample 1</u>		<u>Sample 2</u>		<u>Composite</u>
	<u>As Received</u>	<u>Air Dry</u>	<u>As Received</u>	<u>Air Dry</u>	<u>Air y</u>
Moisture					
Total	5.412	**	4.74%	**	**
Inherent	0.717.	0.74%	0.64%	0.67%	0.702
Surface	4.70%	**	4.102	**	**
Ash	15.34%	16.10%	19.27-z	20.097,	18.07%
Volatile Matter	19.73%	20.70%	17.372	18.112	19.307.
Fixed Carbon	59.52%	62.46%	58.62%	61.13%	61.93%
Sulfur (S)	0.63%	0.66%	0.57%	0.592	0.63%
Calorific Value (BTU/lb)	12,721	13,348	12,202	12,724	13,024
Free Swelling Index	**	6½	**	7	7

...2

0

RESULTS.....CONTINUED

2. Analysis of Coal Ash

A. Chemical Analysis for Major Components

	<u>Sample 1</u>	<u>Sample 2</u>
Silicon Dioxide (SiO ₂)	75.082	77.62%
Iron Oxide (Fe ₂ O ₃)	2.44%	2.06%
Titanium Oxide (TiO₂)	1.02%	1.02%
Aluminium Oxide (Al₂O₃)	16.80%	14.64%
Calcium Oxide (CaO)	0.98%	1.12%
Magnesium Oxide (MgO)	0.78%	0.75%
Sulfur Trioxide (SO ₃)	0.89%	0.87%
Sodium Oxide (Na ₂ O)	0.46%	0.44%
Potassium Oxide (K ₂ O)	1.07%	1.13%
Germanium (Ge)	Less than 0.007%	Less than 0.007%
Uranium (U₃O₈)	Less than 0.0052	Less than 0.005%
Total Radioactivity (as U ₃ O ₈)	Less than 0.005%	Less than 0.005%

B. Fusion Point of Ash

	<u>Sample 1</u>	<u>Sample 2</u>
Initial Deformation Temperature	Greater than 2400°F	Greater than 2400°F
Softening Point	Greater than 2400°F	Greater than 2400°F
Fluid Temperature	Greater than 2400°F	Greater than 2400°F

C. Semi Quantitative Analysis for Minor Components

See the attached spectrographic analysis

3. Classification of Coal by Rank

	<u>Sample 1</u>	<u>Sample 2</u>	<u>Composite</u>
Volatile matter Moisture, Mineral Free Basis)	24.89%	22.86%	23.76%
Fixed Carbon (Moisture, Mineral Free Basis)	75.11%	77.14%	76.24%

According to A.S.T.M. D388, these coals are classified as "Medium Volatile Bituminous Coals".

COAST ELDRIDGE

D.K. Dixon
 D.K. Dixon
 Senior Chemist.

TO:



PHONE: (604) 876-4111
 TELEX: 04-50353
 CABLE ADDRESS:
 ELDRICO

Pine Pass Coal Co.,

2 - 515 Granville Street,

Vancouver, B.C.

COAST ELDRIDGE
 PROFESSIONAL SERVICES DIVISION
 WARNOCK HERSEY INTERNATIONAL LIMITED
 125 EAST 4TH AVE. VANCOUVER 10, B.C., CANADA

SEMI QUANTITATIVE SPECTROGRAPHIC ANALYSES

FILE NO. 3296

DATE January 20, 1969

We Hereby Certify that the following are the results of semi quantitative spectrographic analyses made on Coal Ash samples submitted.

SAMPLE IDENTIFICATION	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Ga	AU	Fe
Top 6 feet	8.0	ND	ND	0.1	ND	ND	ND	ND	1.0	0.03	0.001	0.007	ND	ND	1.0
Bottom 6 feet	8.0	ND	ND	0.1	ND	ND	ND	ND	1.0	0.03	0.001	0.01	ND	ND	1.0
SAMPLE IDENTIFICATION	Pb	Mg	Mn	Mo	Nb	Ni	Si	Ag	Sr	Ta	Sn	Ti	W	V	Zn
Top 6 feet	ND	1.0	ND	0.001	ND	0.02	Matrix	Trace	0.04	ND	ND	1.0	ND	0.01	0.3
Bottom 6 feet	ND	1.0	ND	0.003	ND	0.01	Matrix	Trace	0.03	ND	ND	1.0	ND	0.01	0.2

All results expressed as percent by weight of the coal ash.

Note: Rejects retained one week.

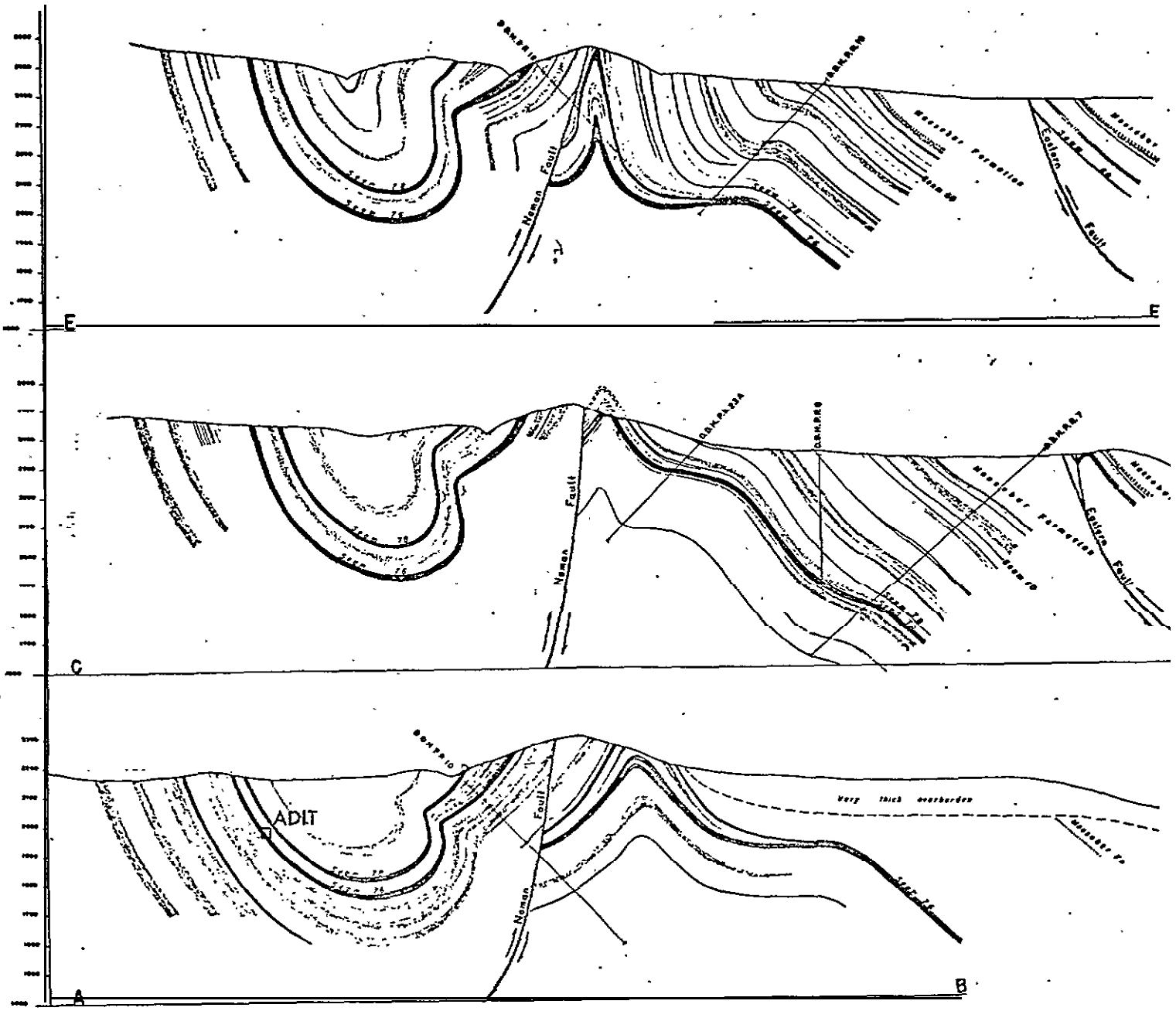
Pulps retained one month.

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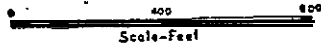
D.K. J...

CHEMIST



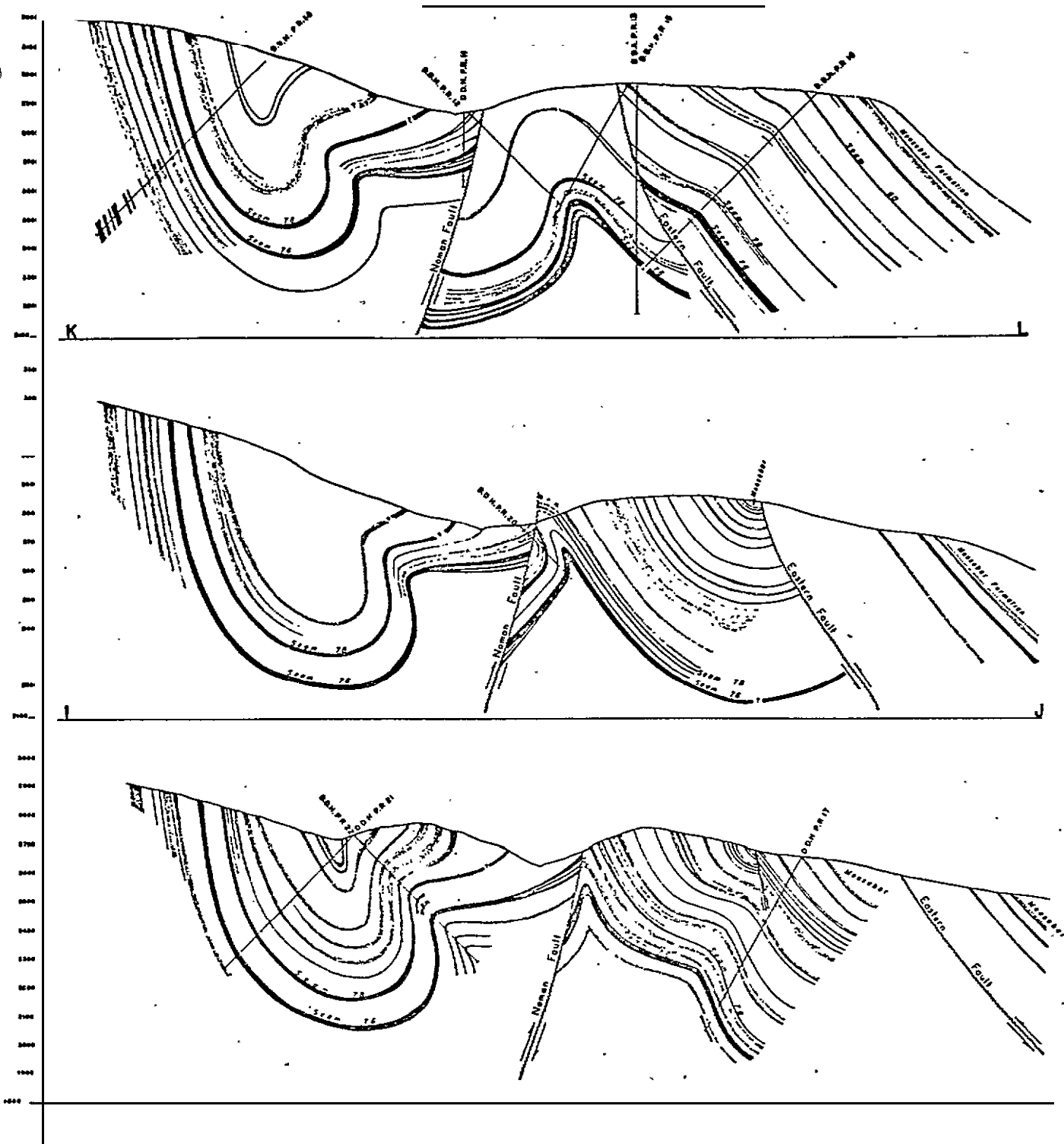
- LEGEND**
- Coal
 - Shale
 - Sandstone
 - Conglomerate
 - Fault
 - Diamond-drill hole

Figure 13
STRUCTURAL SECTIONS
NOMAN CREEK AREA



"Coal reserves of the Hasler Creek-Pine River area"
 by N.D. McKechnie, 1955

PINE PASS COAL COMPANY LTD.

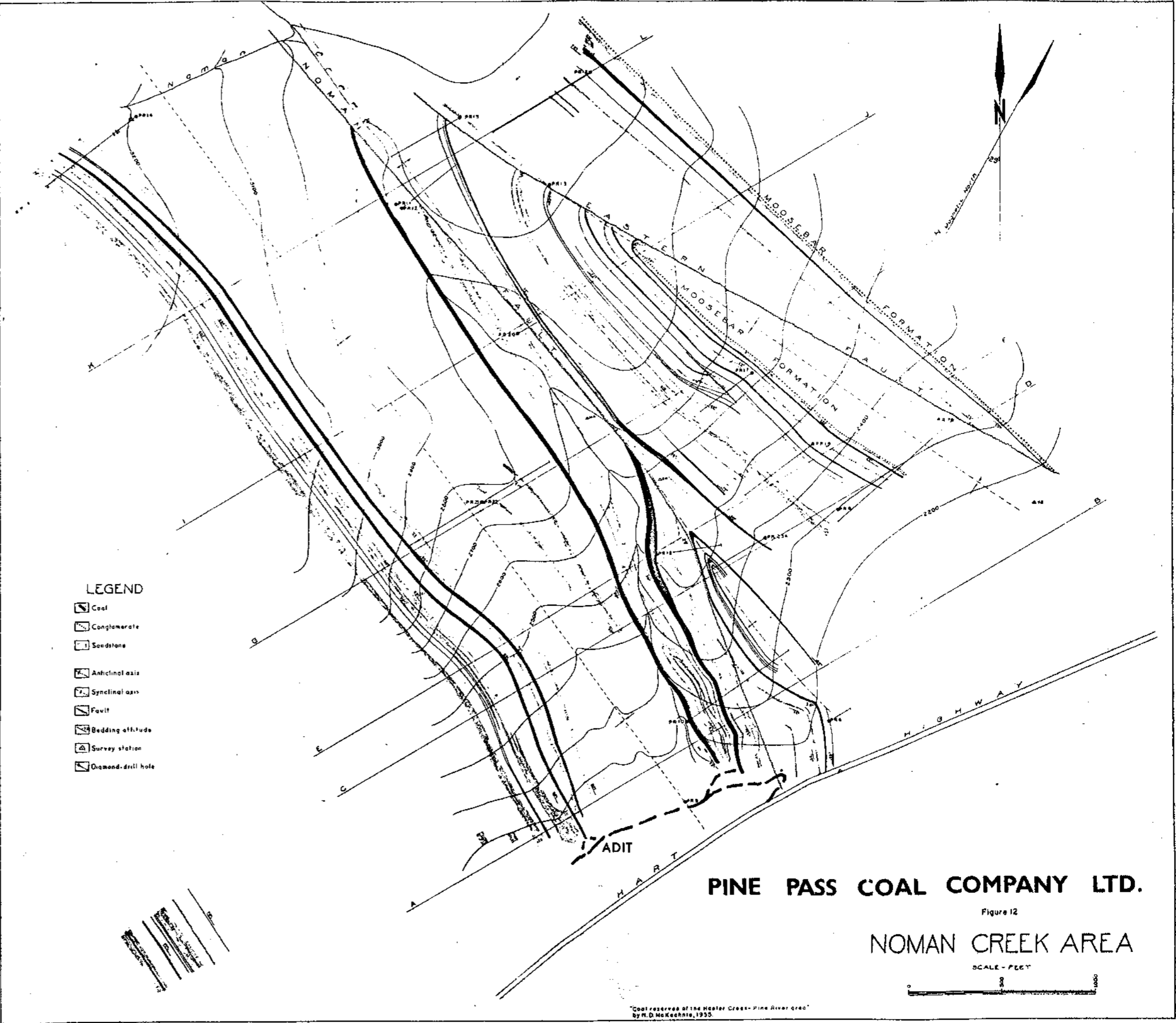


- LEGEND**
- Coal
 - Shale
 - Sandstone
 - Conglomerate
 - Fault
 - Diamond-drill hole

Figure 13
**STRUCTURAL SECTIONS
 NOMAN CREEK AREA**
 0 400 800
 Scale-Feet

"Coal reserves of the Hasler Creek-Pine River area"
 by N.D. McKechnie, 1955

PINE PASS COAL COMPANY LTD.



LEGEND

- ☐ Coal
- ☐ Conglomerate
- ☐ Sandstone
- ☐ Anticlinal axis
- ☐ Synclinal axis
- ☐ Fault
- ☐ Bedding altitude
- ☐ Survey station
- ☐ Diamond-drill hole

PINE PASS COAL COMPANY LTD.

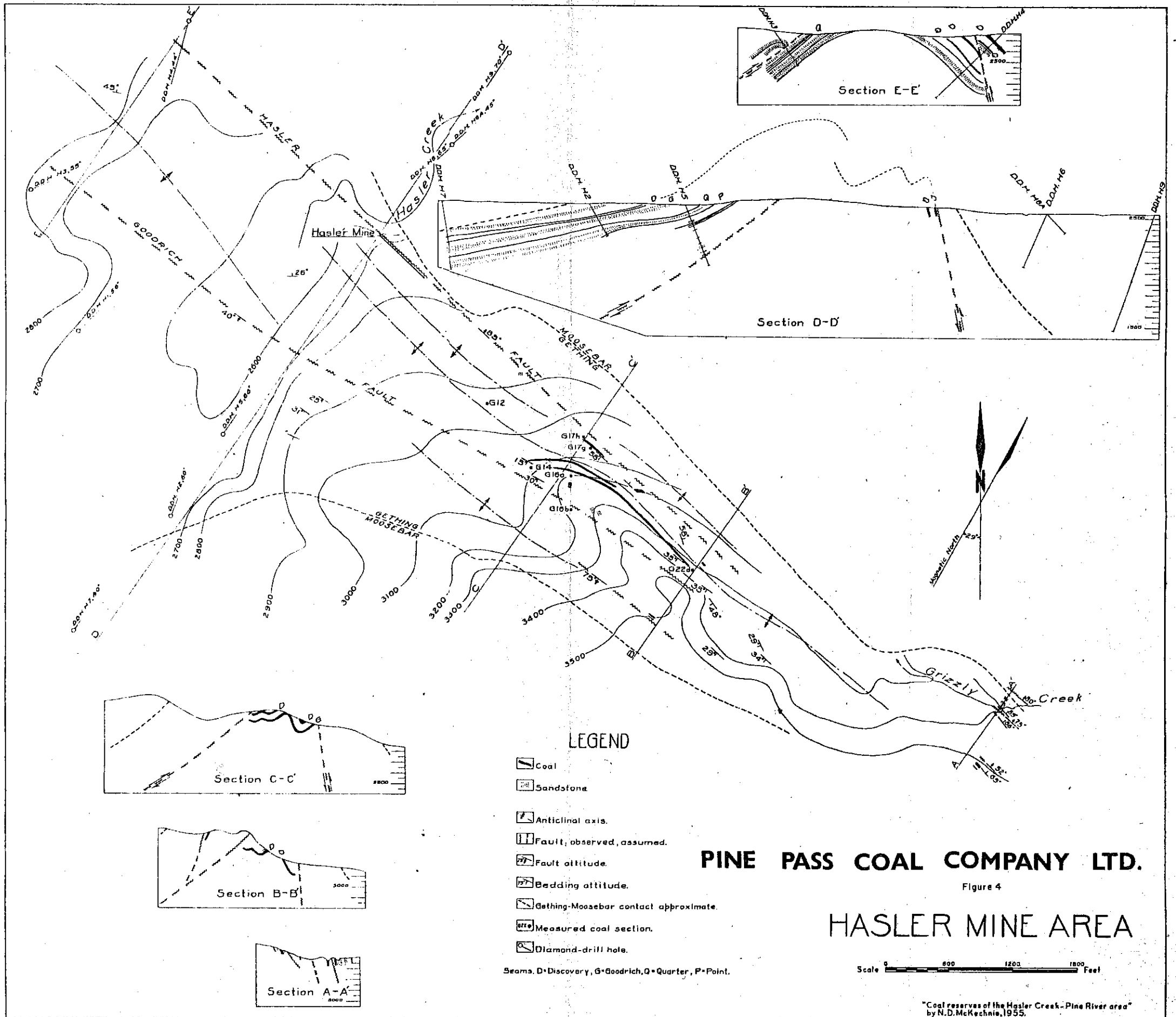
Figure 12

NOMAN CREEK AREA

SCALE - FEET



Coal reserves of the Mosier Creek - Pine River area
by H. D. McKechnie, 1935.



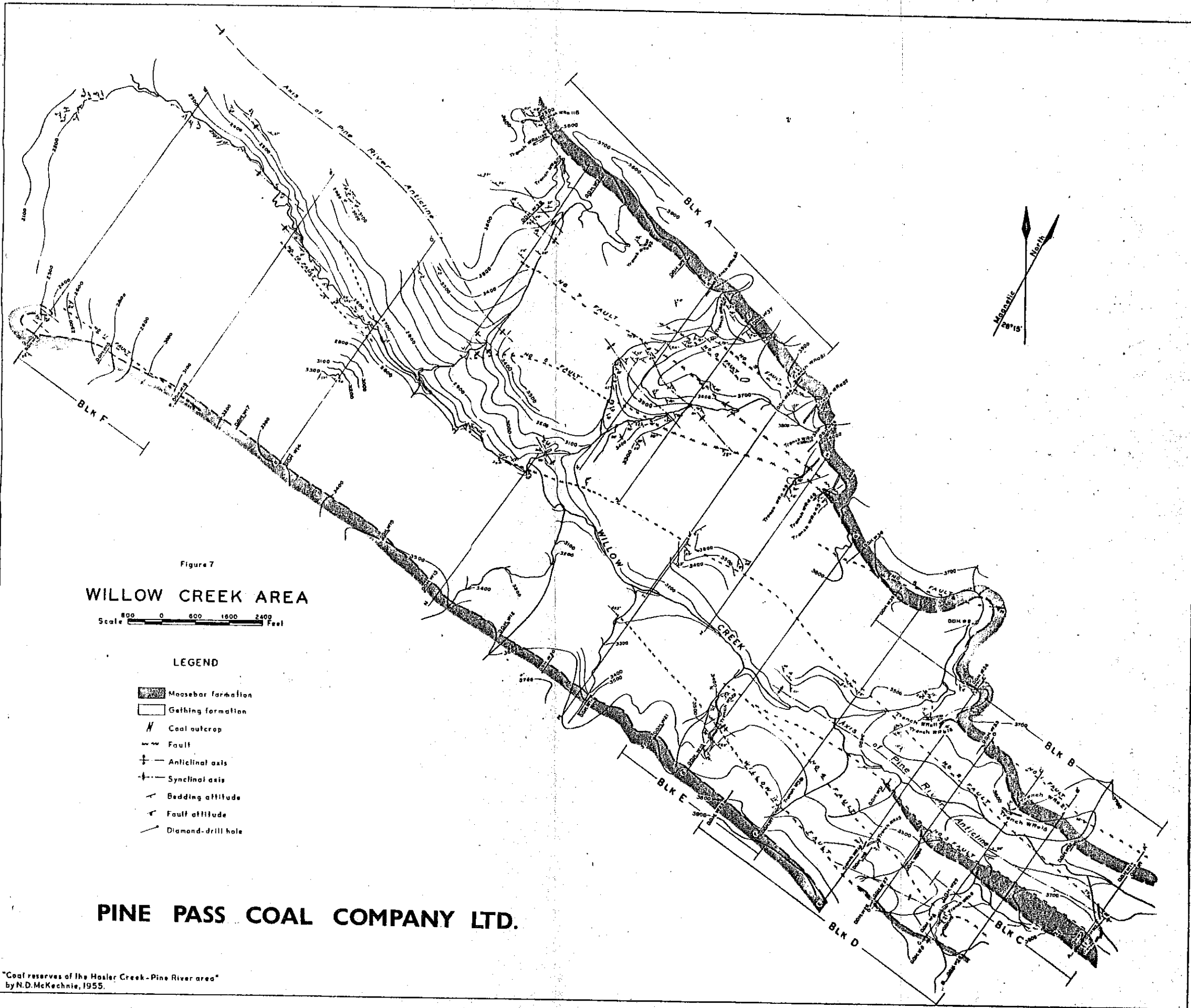


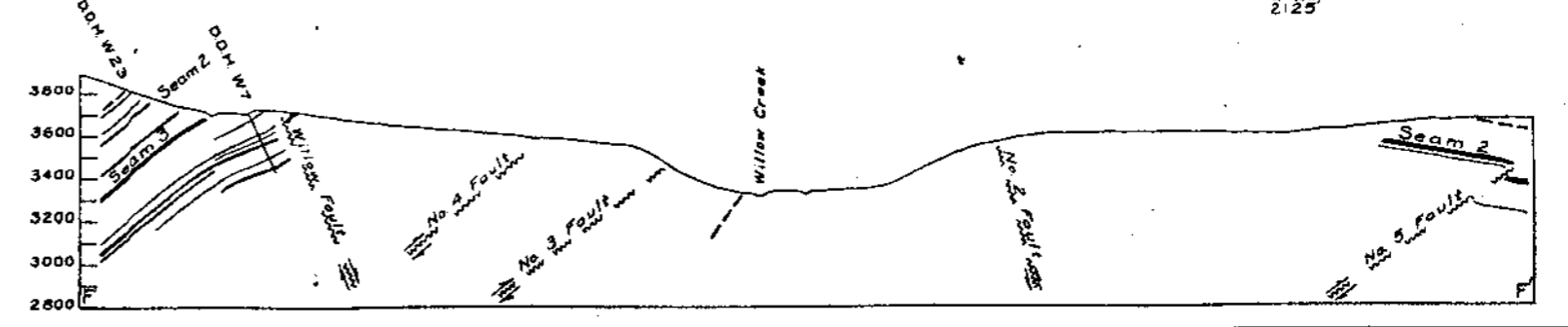
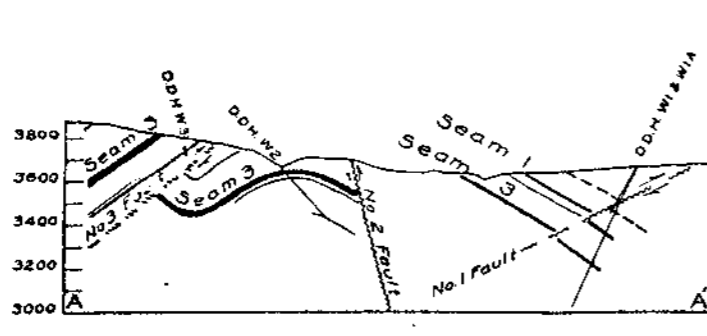
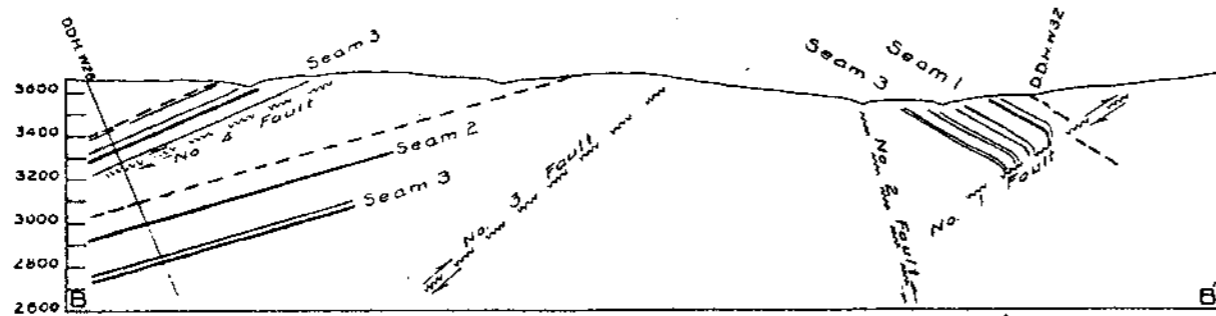
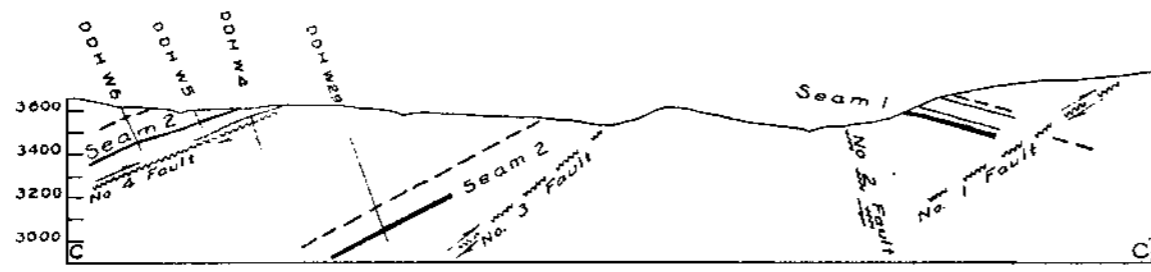
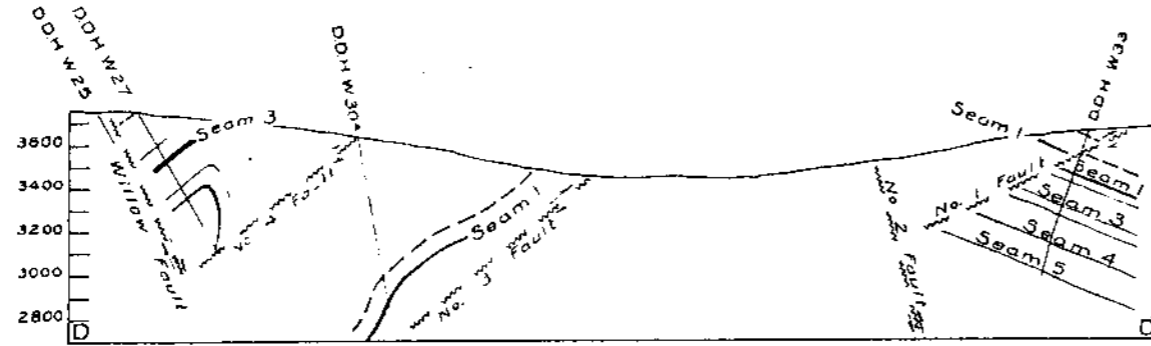
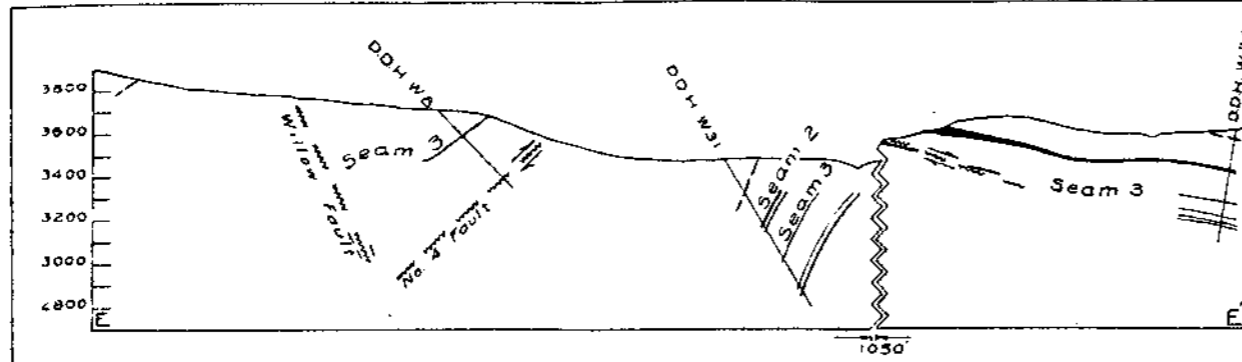
Figure 7
WILLOW CREEK AREA
 Scale 0 600 1200 2400 Feet

- LEGEND**
- Moosebar formation
 - Gething formation
 - Coal outcrop
 - Fault
 - Anticlinal axis
 - Synclinal axis
 - Bedding attitude
 - Fault attitude
 - Diamond-drill hole

PINE PASS COAL COMPANY LTD.

"Coal reserves of the Hasler Creek-Pine River area"
 by N.D. McKechnie, 1955.

T. David
Minerals
Mining Plan
Summary
1981.



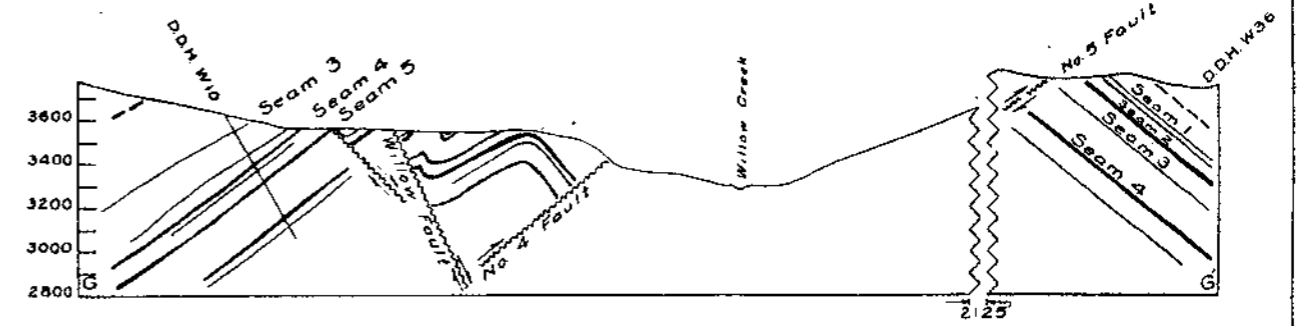
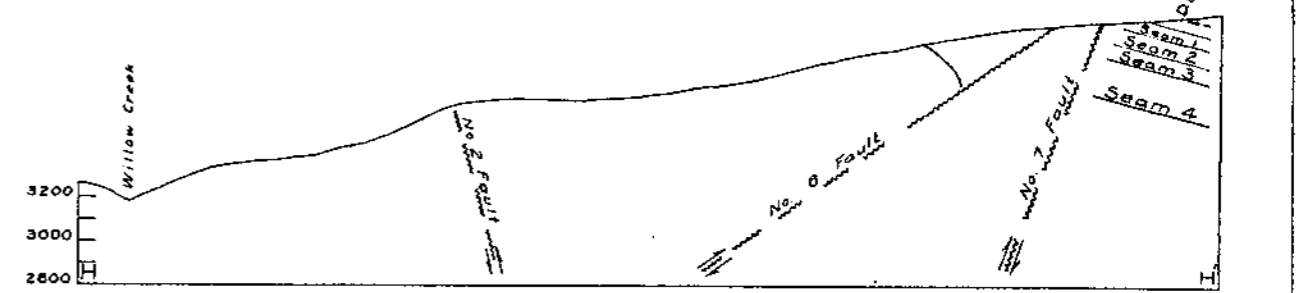
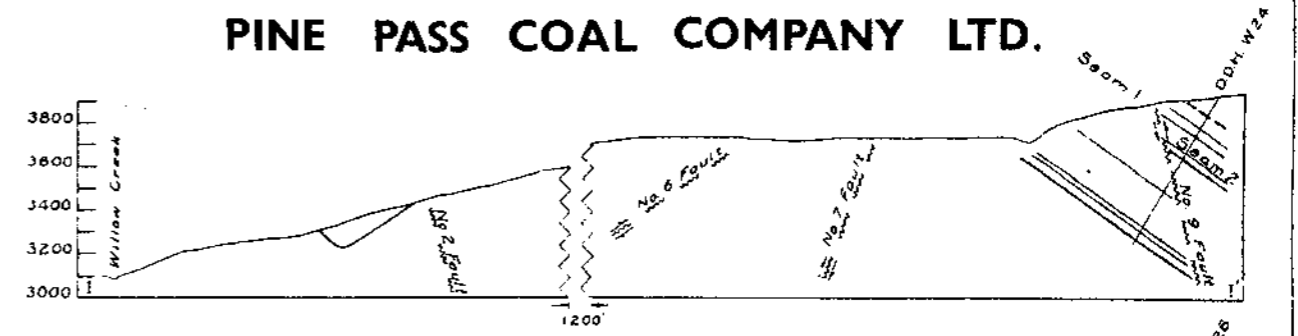
"Coal reserves of the Hasler Creek-Pine River area"
by N.D. McKechnie, 1955

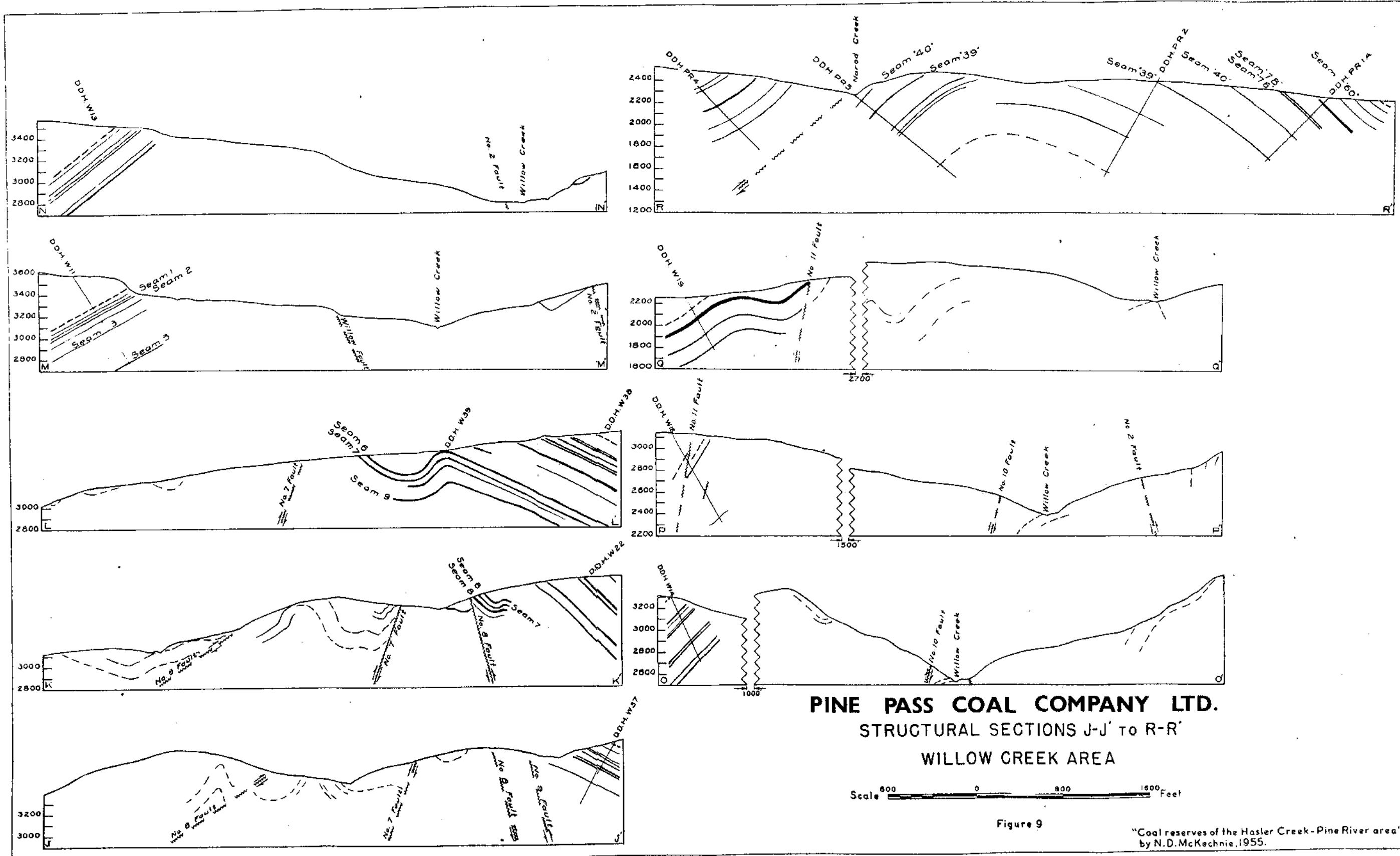
Figure 8

STRUCTURAL SECTIONS A-A' to H-H'
WILLOW CREEK AREA

Scale 800 0 800 1600 Feet

PINE PASS COAL COMPANY LTD.





PINE PASS COAL COMPANY LTD.
STRUCTURAL SECTIONS J-J' TO R-R'
WILLOW CREEK AREA

Scale 0 800 1600 Feet

Figure 9

"Coal reserves of the Hasler Creek-Pine River area"
 by N.D. McKechnie, 1955.