

WOLVERINE AREA

PROPERTY BOUNDARY

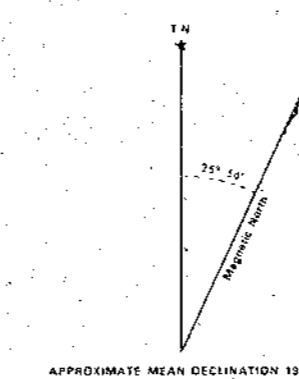
MURRAY AREA

COAL LEASE BOUNDARY #6

COAL LEASE BOUNDARY #6

BABCOCK AREA

FIVE CABIN AREA



BRITISH COLUMBIA



CONTROL SURVEY NOTE

AREA OF 1983 EXPLORATION  
SEE DRAWINGS NO.  
83-601-20-001 &  
84-601-19-001

**METROLOGIC**

U1	UPPER CRETACEOUS
U2	UPPER CRETACEOUS
L1	LOWER CRETACEOUS
L2	LOWER CRETACEOUS
L3	LOWER CRETACEOUS
L4	LOWER CRETACEOUS
L5	LOWER CRETACEOUS
L6	LOWER CRETACEOUS
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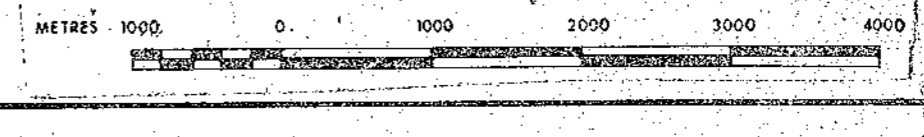
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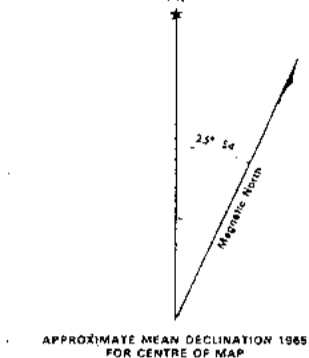
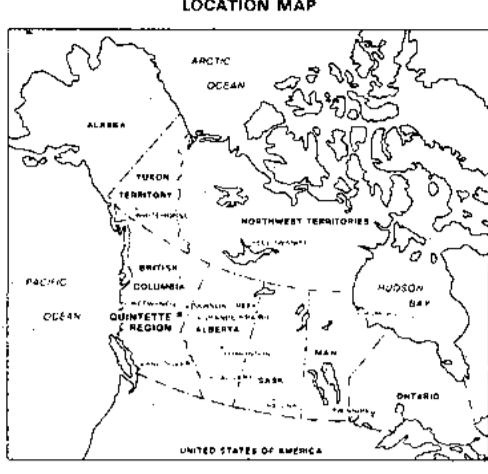
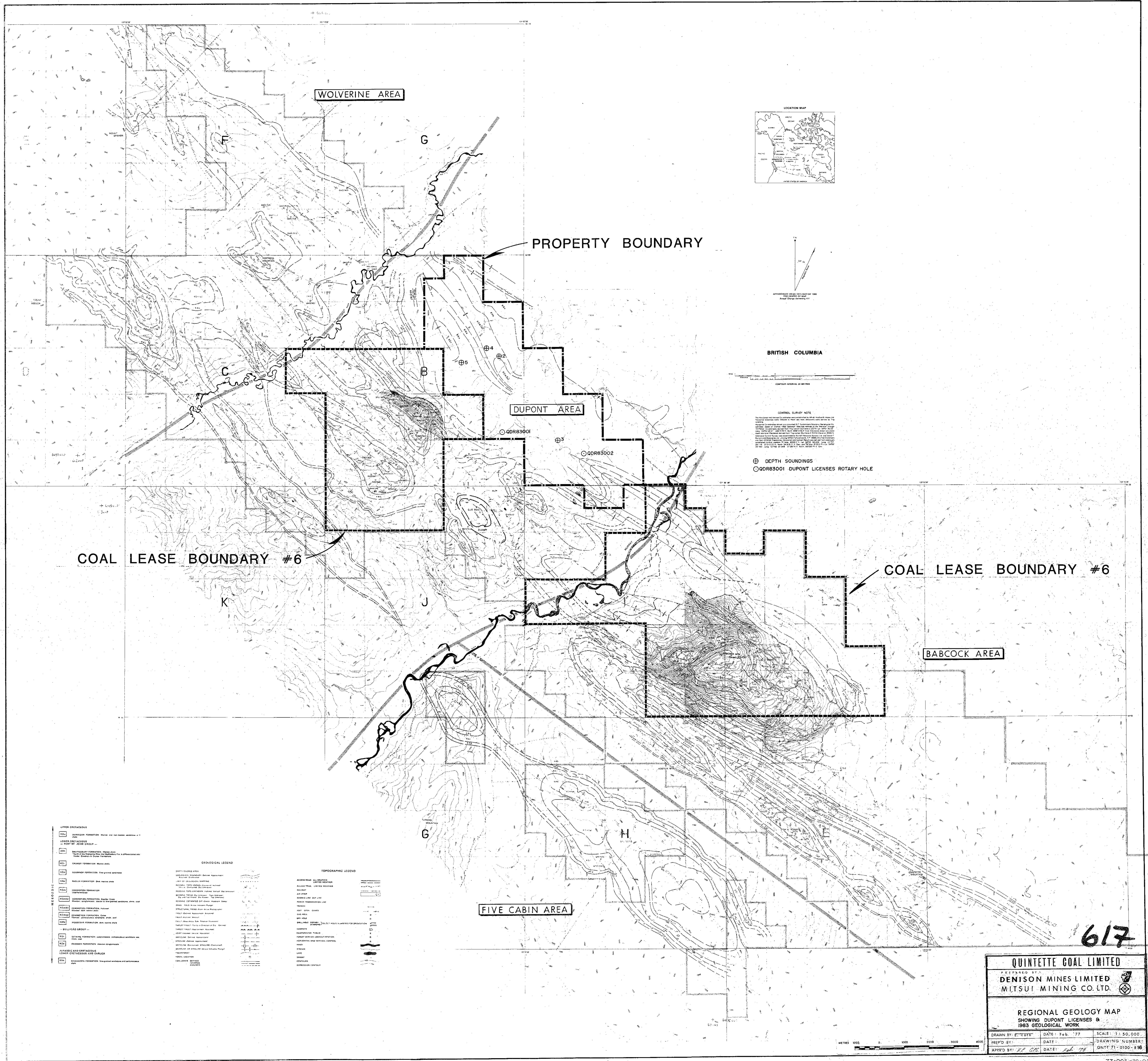
TOPOGRAPHIC LEGEND

QUINTETTE COAL LIMITED  
 PREPARED BY  
 DENISON MINES LIMITED  
 MITSUI MINING CO. LTD.

REGIONAL GEOLOGY MAP  
 1983 EXPLORATION

DRAWN BY: E. TETER	DATE: Feb. '77	SCALE: 1:50,000
PREP'D BY: D.D. CO.	DATE: Feb. '77	DRAWING NUMBER: QNT 71-0100-R20
APPR'D BY: D.D. CO.	DATE: Feb. '77	





BRITISH COLUMBIA



CONTROL SURVEY NOTE  
 The National Topographic Survey of Canada and the Geological Survey of Canada have provided the topographic and geological data for this map. The data were obtained from the National Topographic Survey of Canada and the Geological Survey of Canada. The data were obtained from the National Topographic Survey of Canada and the Geological Survey of Canada. The data were obtained from the National Topographic Survey of Canada and the Geological Survey of Canada.

- ⊕ DEPTH SOUNDINGS
- QDR83001 DUPONT LICENSES ROTARY HOLE

COAL LEASE BOUNDARY #6

COAL LEASE BOUNDARY #6

BABCOCK AREA

FIVE CABIN AREA

**UPPER CRETACEOUS**

**LOWER CRETACEOUS**

**MESOZOIC**

**PALEOZOIC**

**QUATERNARY**

**UNCLASSIFIED**

**GEOLOGICAL LEGEND**

UNIT SYMBOLS

UNIT DESCRIPTIONS

**TOPOGRAPHIC LEGEND**

SYMBOLS

DESCRIPTIONS

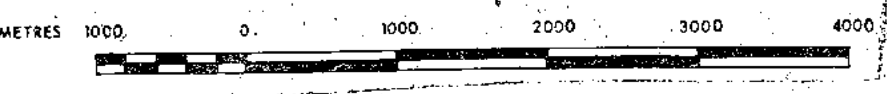
**QUINTETTE COAL LIMITED**

PREPARED BY:  
**DENISON MINES LIMITED**  
**MITSUI MINING CO. LTD.**

**REGIONAL GEOLOGY MAP**  
 SHOWING DUPONT LICENSES &  
 1983 GEOLOGICAL WORK

DRAWN BY: E. J. STRETT    DATE: Feb '77    SCALE: 1:50,000  
 PREP'D BY:    DATE:    DRAWING NUMBER:  
 APP'D BY: H. G. G.    DATE: Feb '78    QNTY 71-0100-R16

617



APPENDIX 1.2  
GEOPHYSICAL LOG

QUINTETTE COAL LIMITED  
DENISON MINES LIMITED (Manager)

BOREHOLE QDR 83002  
LOCATION DUPONT  
AREA \_\_\_\_\_  
DATE LOGGED SEPT 9 1983  
VERT. SCALE 1:200

COAL  
LITHOLOGY  
LOG

NORTHING 6097552  
EASTING 622243  
GROUND EL. 1123  
DEPTH DRILLED 211  
DEPTH LOGGED 209

LOG SUITE  
GAMMA RAY  
DENSITY  
CALIPER

REMARKS \_\_\_\_\_  
HOLE DIAMETER \_\_\_\_\_  
HOLE ANGLE \_\_\_\_\_  
LOGGED BY V.P.

HOR. SCALE — GAMMA - 500c.p.s.  
                  — DENSITY - 5000c.p.s.

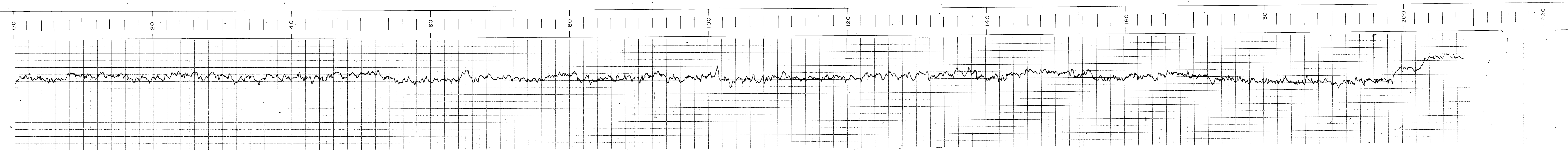
617

CALIPER

DENSITY

DEPTH

GAMMA RAY



APPENDIX 1.3

DUPONT LICENCE AREA - DEPTH SOUNDINGS

RESULTS OF DEPTH SOUNDINGS

<u>I.D. NO.</u>	<u>LOCATION</u>	<u>RESULTS</u>
2	Bulk Explosives Storage (Exploration Access Rd)	0 - 3.2 m OBD 3.2 - 60 m shale (450 ohm metres) Max. depth explored 60 m
3	Dillingham Camp Road	0 - 1.8 m OBD 1.8 - 50 m shale (350 ohm metres) Max. depth explored 50 m
4	Explosives Storage Road	0 - 3 m OBD 3 - 60 m shale (400 ohm metres) Max. depth explored 60 m
5	Settling Pond Road	0 - 10.1 OBD + shale 10.1 m Water Table Max. depth explored 25 m

October 21, 1983

PR-QUINTETTE 83(2)A

617

**CONFIDENTIAL**

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

**00 617**



**APPENDIX 2**

REGIONAL GEOLOGY MAP; 1:50000

**APPENDIX 3**

**ROTARY DRILLING SUMMARY SHEETS**



HOLE NUMBER		HOLE ANGLE		COLLAR BEARING		TOTAL DEPTH		CORE SIZE		MAP / SECTION NUMBER			
QHR 83001		90		0		1 640		Rotary 5½		32018			
U. T. M. COORDINATES										DATE (from / to)			
COLLAR ELEVATION			NORTH				EAST			DRILLED	CORE LOGGED		
1 409.9			6097092.8				618366.9			August 15/83			
GEOPHYSICAL DATA								OVER BURDEN					
SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR	SLANT α	DEPTH	COMPOSITION
1:200	x		x		x				x				

## MINING SECTION

SEAM	ELEVATION (top)	DRILLED INTERVAL	AVG. B.C.N.	TRUE THICKNESS	COAL/ROCK	RECOVERY	INTERSEAM THICKNESS	DATE DRILLED	DATE SAMPLED	SAMPLE TAG No.	COMP. LAB No.	COMMENTS
C		99.7 - 101.5	~45	1.27								
E (top)		151.3 - 152.3										
Fault		???? 152.3										



HOLE NUMBER		HOLE ANGLE		COLLAR BEARING		TOTAL DEPTH		CORE SIZE		MAP / SECTION NUMBER			
QHR 83002						176		Rotary 5 1/2		32154			
U. T. M. COORDINATES										DATE (from / to)			
COLLAR ELEVATION		NORTH				EAST				DRILLED	CORE LOGGED		
1 389.6		6097059.5				618173.7				August 16/83			
G E O P H Y S I C A L   D A T A								O V E R B U R D E N					
SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR	SLANT	DEPTH	COMPOSITION
1:200	x		x		x				x		4		

M I N I N G   S E C T I O N												
SEAM	ELEVATION (top)	DRILLED INTERVAL	AVG. B.C.N.	TRUE THICKNESS	COAL/ROCK	RECOVERY	INTERSEAM THICKNESS	DATE DRILLED	DATE SAMPLED	SAMPLE TAG No.	COMP. LAB No.	COMMENTS
E1	7.7	64.3 - 72.0	53	4.63								
E2	4.2	72.8 - 77.0	53	2.53								
E3	3.7	77.5 - 81.2	53	2.23								
F	1.3	90.0 - 91.3	53	0.78								
G	3.0	107.8 - 110.8	53	1.81								
J	7.1	135.9 - 143.0	53	4.27								
K1	1.6	155.6 - 156.2	53	0.36						zone = 154.1 - 156.2		
K2	1.0	158.8 - 159.8	53	0.60						zone = 156.9 - 159.8		
K3	2.0	161.4 - 163.4	53	1.20								
K4	1.6	165.0 - 165.6	53	0.36						zone = 165.0 - 166.6		



HOLE NUMBER		HOLE ANGLE		COLLAR BEARING		TOTAL DEPTH		CORE SIZE		MAP / SECTION NUMBER			
QHR 8303		90		0		96		Rotary 5 1/4		32168			
U. T. M. COORDINATES										DATE (from / to)			
COLLAR ELEVATION			NORTH				EAST			DRILLED	CORE LOGGED		
1 387.7			6097027.3				618131.1			August 16/84			
GEOPHYSICAL DATA										OVER BURDEN			
SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR	SLANT	DEPTH	COMPOSITION
1:200	X		X		X								

MINING SECTION												
SEAM	ELEVATION (top)	DRILLED INTERVAL	AVG. B.C. N.	TRUE THICKNESS	COAL / ROCK	RECOVERY	INTERSEAM THICKNESS	DATE DRILLED	DATE SAMPLED	SAMPLE TAG No.	COMP. LAB No.	COMMENTS
F		4.8 - 6.3	56	0.84								
G*	32	30.5 - 33.7	56	1.79								* From Gamma
J		60.3 - 67.1	56	3.80								
<K1		78.3 - 80.0 >		zone -	not mineable							
K2		81.2 - 82.3	56	0.62								
K3		84.6 - 86.1	56	0.84								
<K4		87.7 - 89.1 >		zone -	not mineable							



HOLE NUMBER	HOLE ANGLE	COLLAR BEARING	TOTAL DEPTH	CORE SIZE	MAP / SECTION NUMBER								
QHR 83004	90	0	150.0	Rotary 5½	31998								
U. T. M. COORDINATES					DATE (from / to)								
COLLAR ELEVATION	NORTH	EAST		DRILLED	CORE LOGGED								
1 408.1	6096943.5	618280.2		August 17/83									
G E O P H Y S I C A L   D A T A					O V E R B U R D E N								
SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR	SLANT	DEPTH	COMPOSITION
1:200	X		X		X								

M I N I N G   S E C T I O N													
SEAM	ELEVATION (Top)	DRILLED INTERVAL	AVG. B.C.N.	TRUE THICKNESS	COAL/ROCK	RECOVERY	INTERSEAM THICKNESS	DATE DRILLED	DATE SAMPLED	SAMPLE TAG No.	COMP. LAB No.	COMMENTS	
E1	5.5	71.65 - 77.2	47	3.79	}		0.7						
E2	4.1	77.9 - 82.0	47	2.80									(E = 8.90)
E3	2.1	82.6 - 84.7	47	1.43									(includes partings)
F	1.8	94.0 - 94.8	47	0.55									
G	2.4	106.45-108.85	46	1.67									
J	5.1	130.6 - 135.7	43	3.73									



HOLE NUMBER		HOLE ANGLE		COLLAR BEARING		TOTAL DEPTH		CORE SIZE		MAP / SECTION NUMBER			
QHR 83005		90				187 m		Rotary 5½		31713			
U. T. M. COORDINATES										DATE (from / to)			
COLLAR ELEVATION		NORTH				EAST				DRILLED	CORE LOGGED		
1 373.0*		6096807.0*				618534.3*				Sept. 6, 1983			
GEOPHYSICAL DATA								OVER BURDEN					
SCALE	DEN	BRD	LSD	HRD	GAM	NEUT	FBE	FBS	CAL	DIR	SLANT	DEPTH	COMPOSITION
1:200	x		x		x								

\* Not surveyed - distance measured from QHR 8206

## MINING SECTION

SEAM	ELEVATION at top	DRILLED INTERVAL	AVG. B.C.N.	TRUE THICKNESS	COAL/ROCK	RECOVERY	INTERSEAM THICKNESS	DATE DRILLED	DATE SAMPLED	SAMPLE TAG No.	COMP. LAB No.	COMMENTS
C		17.3 - 18.7	40	1.07								
E1		80.6 - 85.5	45	3.47	} 7.92 (includes rock partings)							
E2		86.7 - 89.4	45	1.91								
E3		89.9 - 91.9	45	1.41								
F		99.7 - 100.5		0.57								
G		109.0 - 111.2										
fault		111.2	45	1.98								G seam apparent thickness is estimated @ 2.8 m
G		111.2 - 113.0										(eliminating repeat).
J		142.0 - 151.0	45	6.36								
K		173.0 - 176.0	45	2.12								High number due to rock partings in K. From drillers log: hole blocked @ 123 m

**APPENDIX 4**

**ROTARY DRILLING GEOPHYSICAL LOGS**



P. Quintette 83(3)A \* (a)

# QUINETTE COAL LIMITED DENISON MINES LIMITED (Manager)

BOREHOLE QHR 83001

LOCATION HERMAN

AREA

DATE LOGGED

VERT. SCALE 1:200

NORTHING 6097092.8

EASTING 618366.9

COAL GROUND EL. 1409.9

LITHOLOGY DEPTH DRILLED 164

DEPTH LOGGED 164

REMARKS

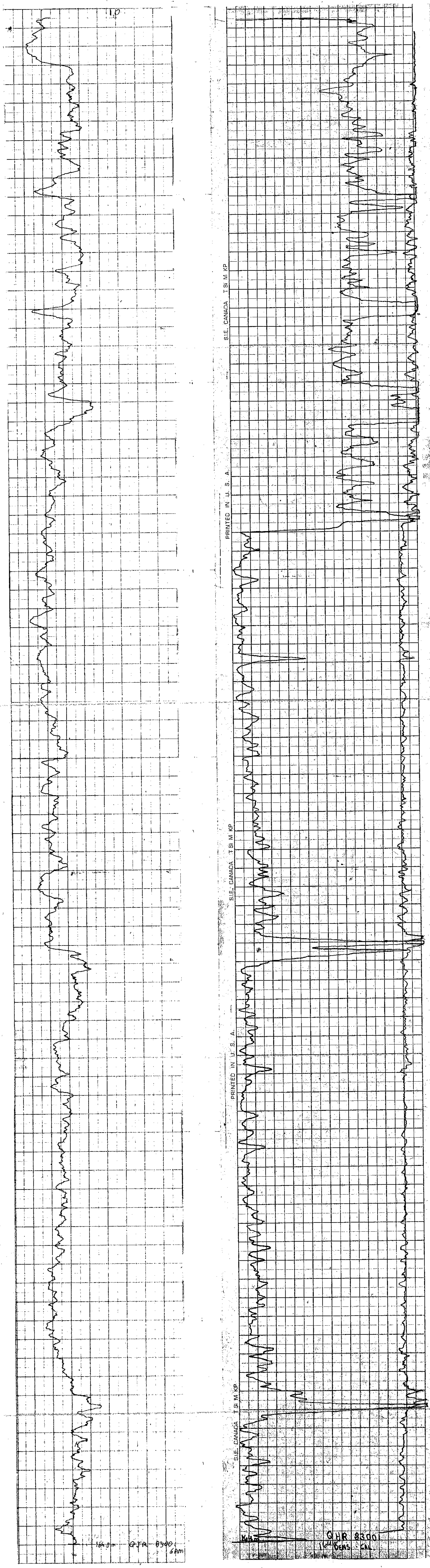
LOG SUITE  
 GAMMA RAY  
 DENSITY  
 CALIPER

HOLE DIAMETER  
 HOLE ANGLE  
 VERT.  
 LOGGED BY

HOR. SCALE  
 GAMMA - 5000 c.p.s.  
 DENSITY - 5000 c.p.s.

# 617

GAMMA RAY      DEPTH      DENSITY      CALIPER



S.I.E. CANADA T S I M K P

PRINTED IN U. S. A.

S.I.E. CANADA T S I M K P

PRINTED IN U. S. A.

S.I.E. CANADA T S I M K P

PRINTED IN U. S. A.

QHR 8300  
164 Dens. Cal

164.0m QJR 83001 6Am

QHR 83001

12. QUINETTE 83(3)A\*(6)

# QUINETTE COAL LIMITED DENISON MINES LIMITED (Manager)

BOREHOLE QHR 83002

LOCATION HERMAN

AREA \_\_\_\_\_

DATE LOGGED \_\_\_\_\_

VERT. SCALE 1:200

NORTHING 6097034.2

EASTING 618139.9

GROUND EL. 1388.5

## COAL LITHOLOGY LOG

DEPTH DRILLED \_\_\_\_\_  
DEPTH LOGGED 176

REMARKS \_\_\_\_\_

### LOG SUITE

GAMMA RAY \_\_\_\_\_  
DENSITY \_\_\_\_\_  
CALIPER \_\_\_\_\_

HOR. SCALE GAMMA - 500c.p.s.  
DENSITY - 5000c.p.s.

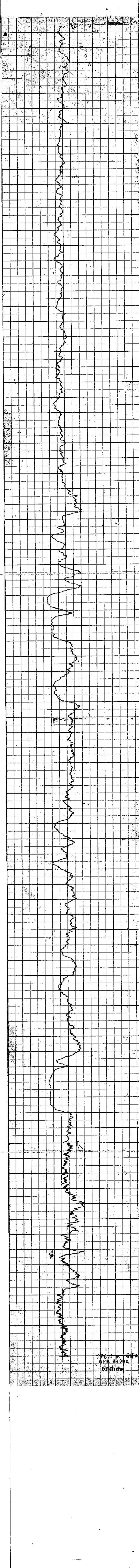
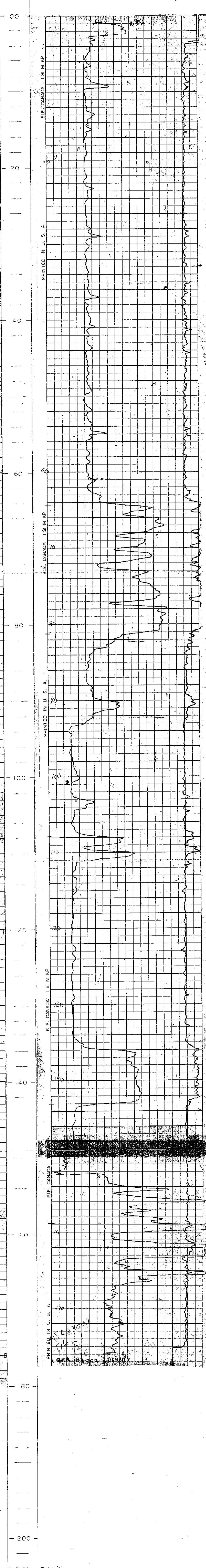
# 617

### CALIPER

### DENSITY

### DEPTH

### GAMMA RAY



QHR 83002  
GAMMA

QHR 83002 DENSITY

QHR 83002

72-Quintette 83(8)A \* (6)

# QUINETTE COAL LIMITED DENISON MINES LIMITED (Manager)

BOREHOLE QHR 83003

LOCATION HERMAN

AREA

DATE LOGGED

VERT. SCALE 1:200

NORTHING 6097027.3

EASTING 618131.1

COAL GROUND EL. 1387.7

LITHOLOGY DEPTH DRILLED 96

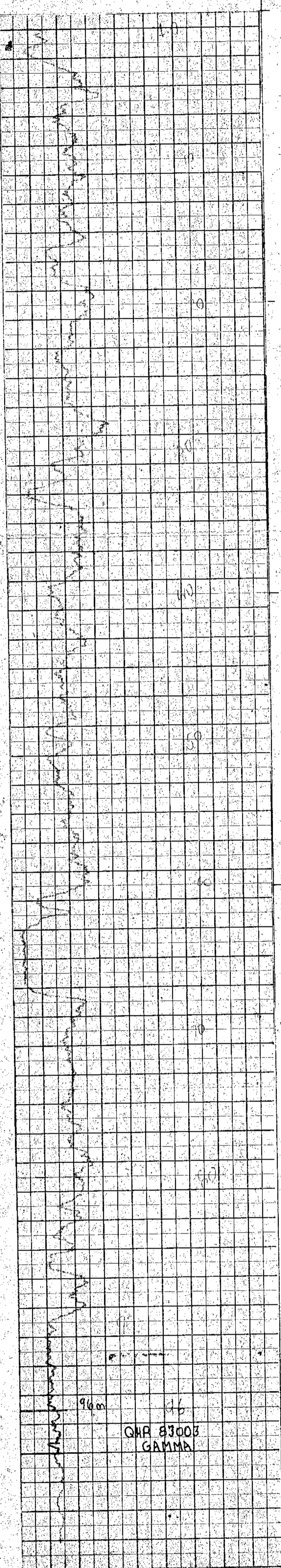
DEPTH LOGGED 96

REMARKS

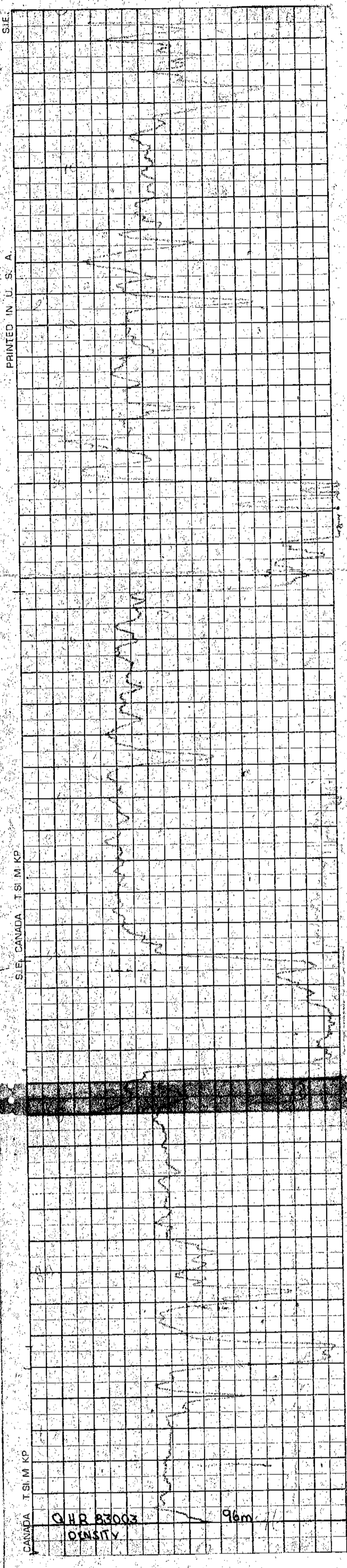
LOG SUITE  
GAMMA RAY  
DENSITY  
CALIPER

HOR. SCALE GAMMA - 500c.p.s.  
DENSITY - 5000c.p.s.

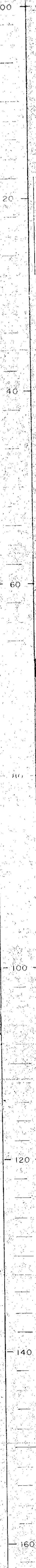
## GAMMA RAY



## DENSITY



## DEPTH



617

PRINTED IN U. S. A.

SIELE CANADA TSI M KP

CANADA TSI M KP

QHR 83003

TR. QUINTETTE 83(S)A \*6)

# QUINTETTE COAL LIMITED DENISON MINES LIMITED (Manager)

BOREHOLE QHR 83004

LOCATION HERMAN

AREA

DATE LOGGED 830818

VERT. SCALE 1:200

NORTHING 6096943.5

EASTING 618280.2

COAL LITHOLOGY GROUND EL 1408.1

LOG DEPTH DRILLED DEPTH LOGGED 150

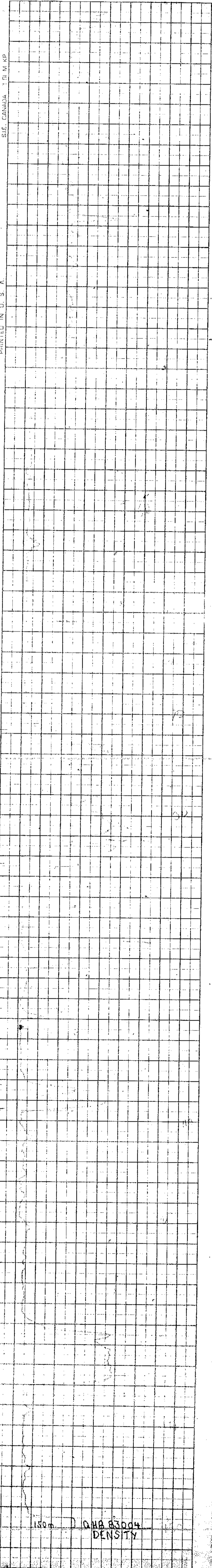
REMARKS

LOG SUITE  
GAMMA RAY  
DENSITY  
CALIPER

HOR. SCALE GAMMA - 500c.p.s.  
DENSITY - 5000c.p.s.

# 617

GAMMA RAY      DEPTH      DENSITY      CALIPER



S.I.E. CANADA I. U. S. A.

PRINTED IN U. S. A.

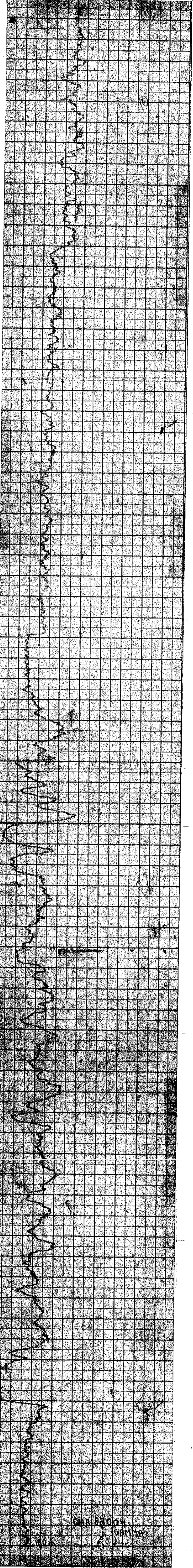
S.I.E. CANADA I. U. S. A.

PRINTED IN U. S. A.

S.I.E. CANADA I. U. S. A.

PRINTED IN U. S. A.

150 QHR 83004 DENSITY



QHR 83004 GAMMA

QHR 83004

TR. QUINETTE 83(3)A\*(6)

# QUINETTE COAL LIMITED DENISON MINES LIMITED (Manager)

BOREHOLE QHR 83005

LOCATION HERMAN

AREA

DATE LOGGED 830909

VERT. SCALE 1:200

NORTHING 6097008.0

EASTING 618122.0

COAL  
LITHOLOGY  
LOG

GROUND EL. 1386.1

DEPTH DRILLED

DEPTH LOGGED 123

LOG SUITE

GAMMA RAY

DENSITY

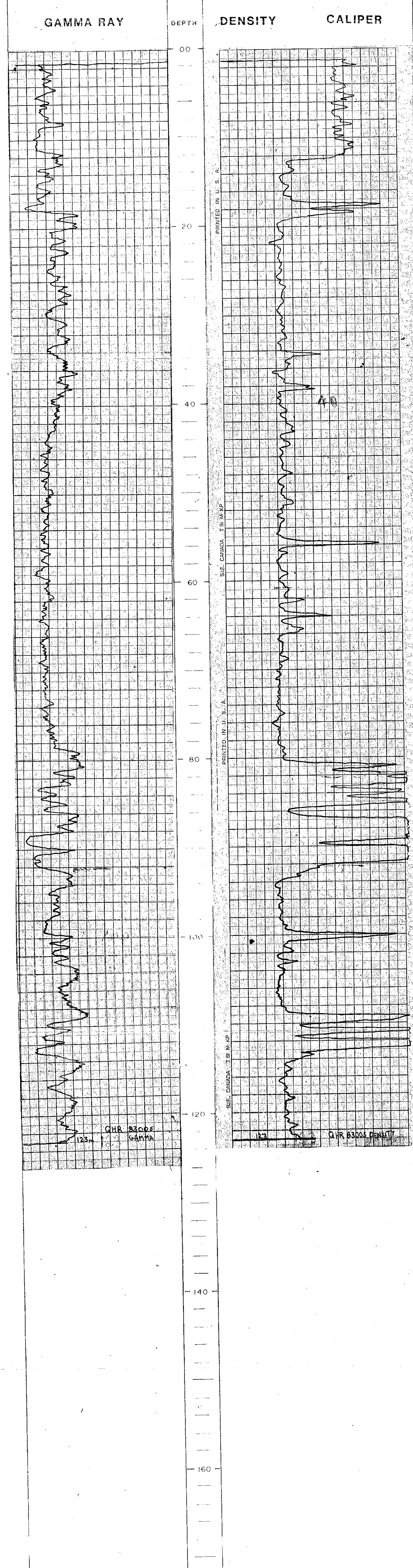
CALIPER

HOR. SCALE

GAMMA - 500c.p.s.

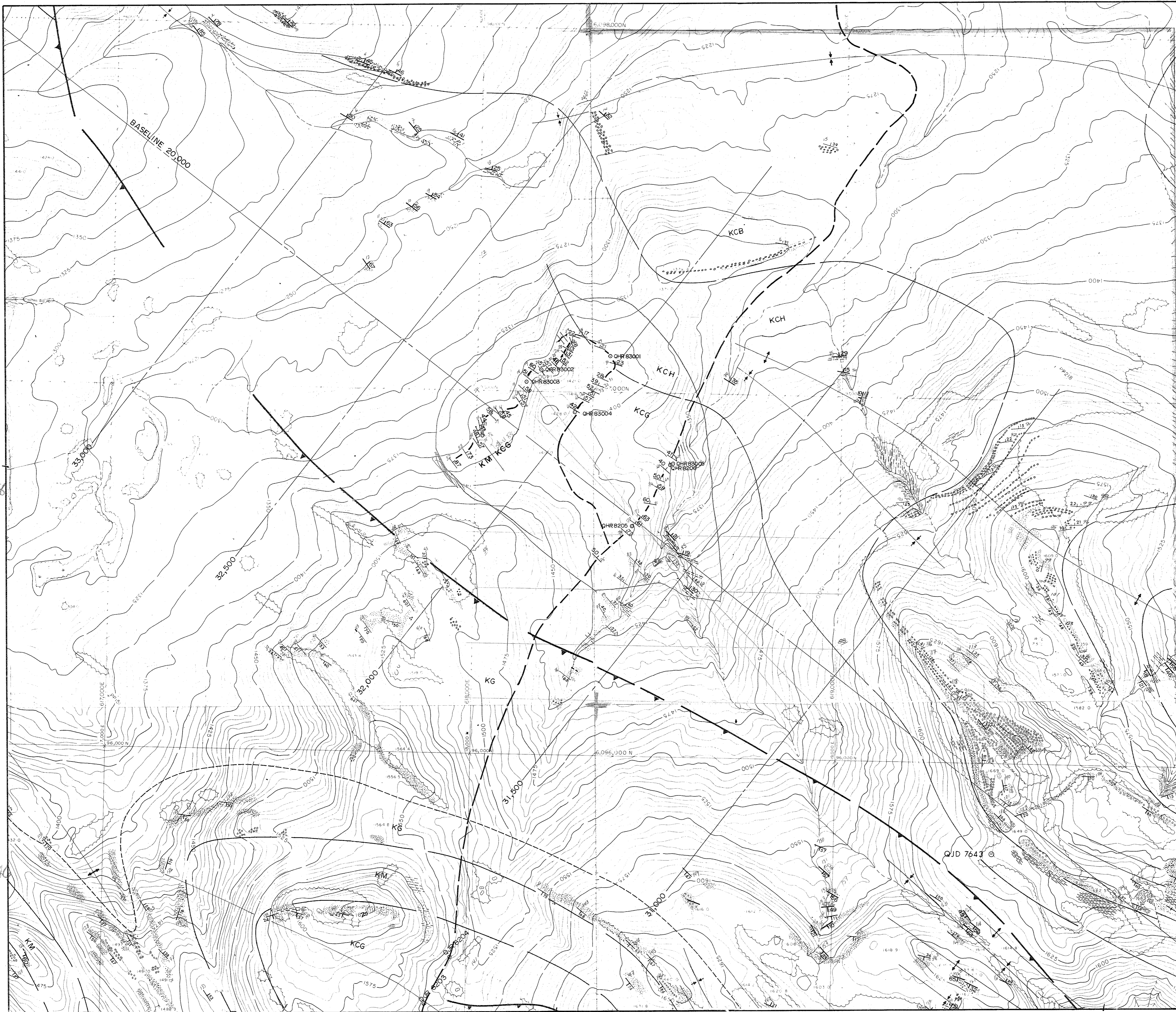
DENSITY - 5000c.p.s.

# 617











**APPENDIX 5**

GEOLOGY PLAN 1:5000 - HERMANN NORTH AREA



**LEGEND**

-  ROAD
  -  DRILL HOLE
  -  STRIKE & DIP
  -  THRUST FAULT
  -  COAL SEAM OUTCROP (TOP OF SEAM)
  -  GEOLOGICAL CONTACT
  -  ANTICLINE
  -  SYNCLINE
- GEOLOGICAL FORMATIONS:**
- KS SHAFTESBURY
  - KCB BOULDER CREEK
  - KCH HULCROSS
  - KCG GATES
  - KM MOOSEBAR
  - KG GETHING



1	13 03 84	ADD NEW GEOLOGY - TITLE CHANGE	KJV	DJ	DJ
0	22 11 83	FOR APPROVAL	EAH	BE	
Rev.	D M Y	Revision Description	Drn.	Des.	App.

**QUINTETTE COAL LIMITED**

Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION *PR - QUINTETTE 83(2)A*

Area **HERMANN** Category **GEOLOGY**

Drawing Title  
**HERMANN NORTH**  
**GEOLOGY**

Scale  
 1 : 5000

Drawing No.  
 83 - 600 - 20 - 001

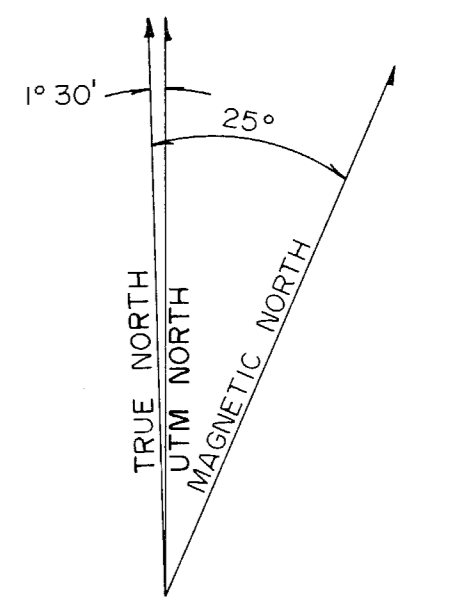
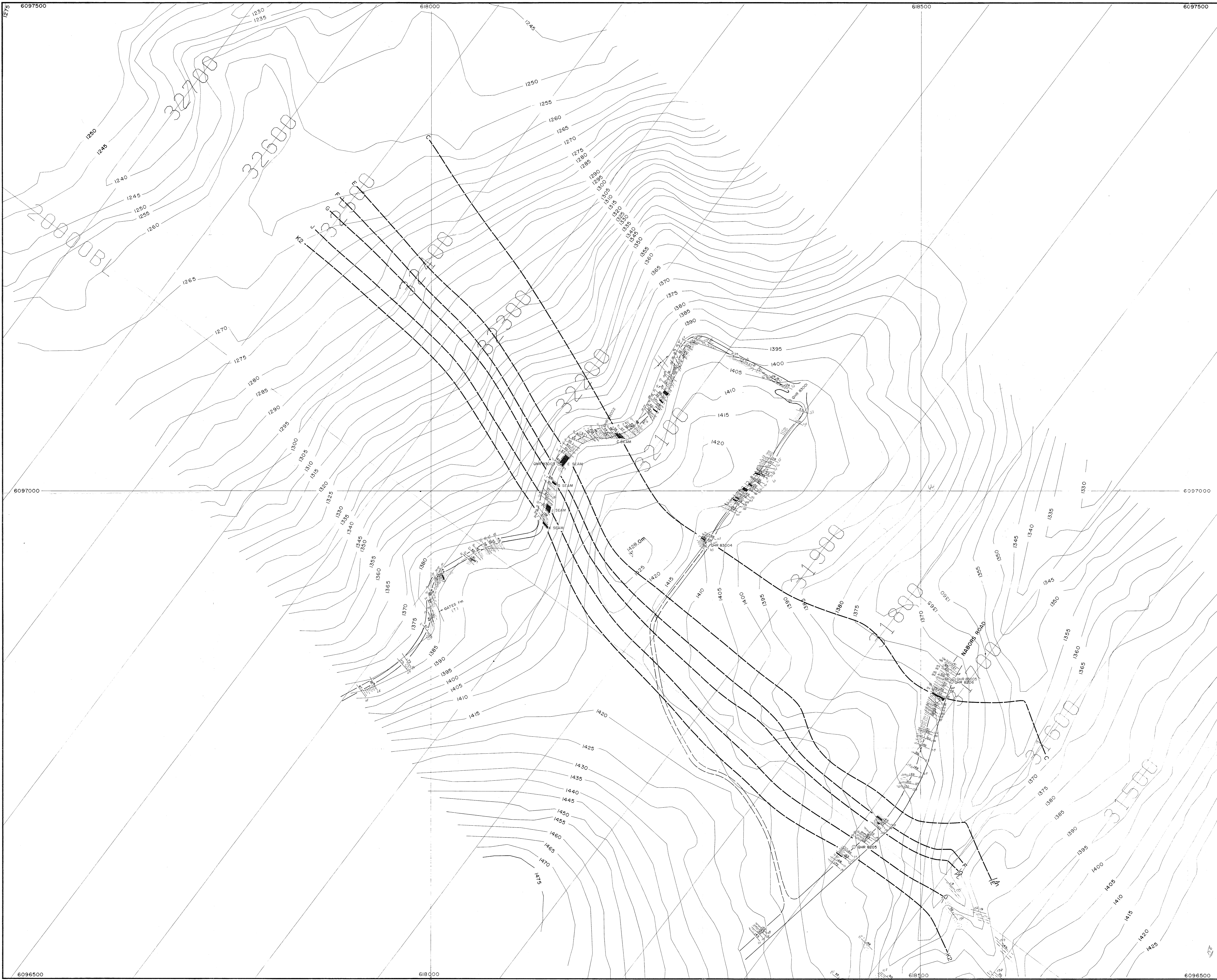
Rev.  
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*617*

**APPENDIX 6**

**GEOLOGY PLAN 1:1250 - HERMANN NORTH AREA**



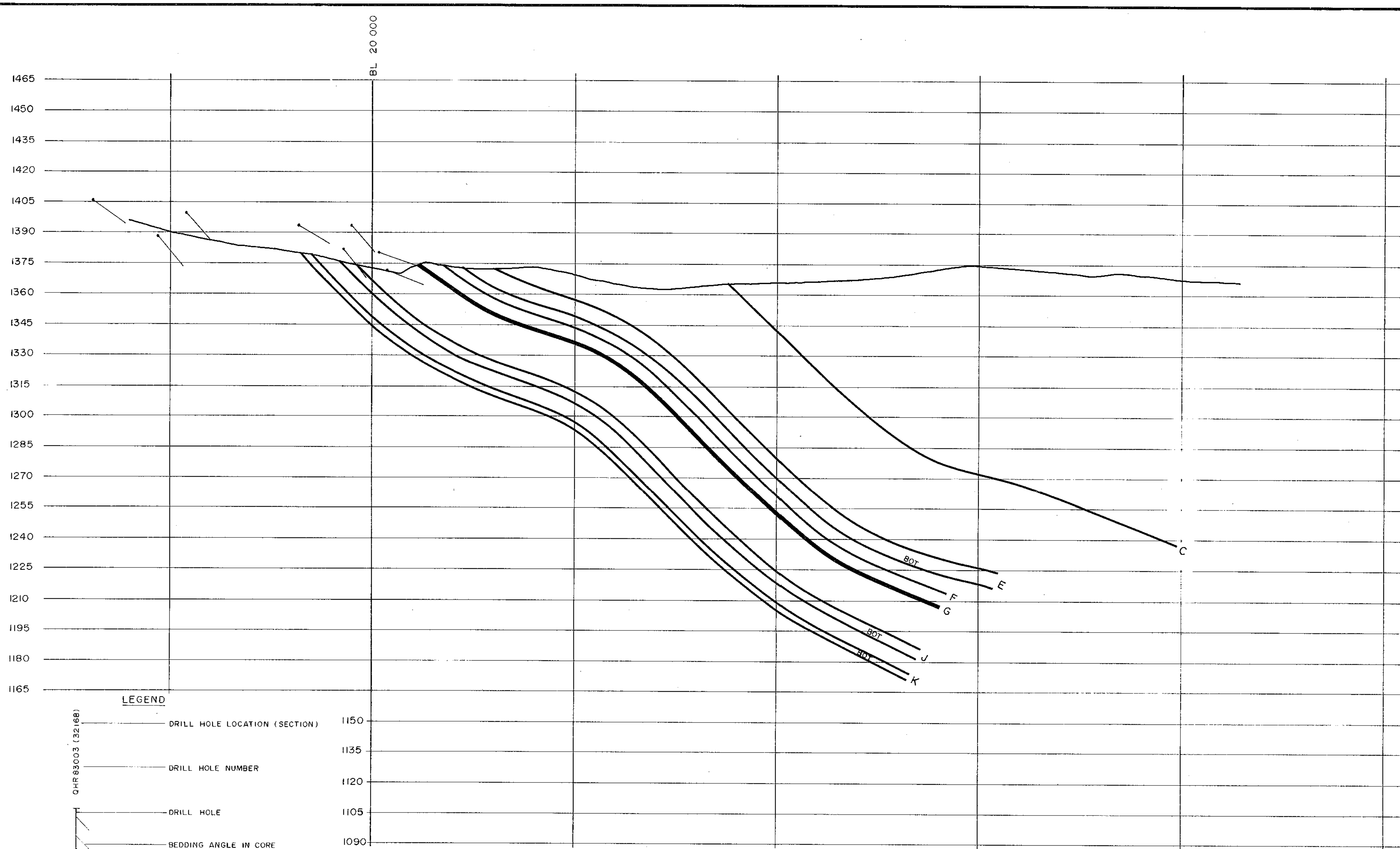


- LEGEND**
- |—| STRIKE & DIP - ROCK
  - |—| STRIKE & DIP - COAL
  - |—| COAL
  - |—| CLAYSTONE
  - |—| SILTY CLAYSTONE
  - |—| SILTSTONE
  - |—| SANDSTONE
  - |—| CONGLOMERATE
  - E —|—| TOP OF COAL SEAM (E)
  - GHR 83002 ROTARY DRILL HOLE
  - |—| MAPPED ROAD
  - |—| APPROXIMATE ROAD LOCATION

0	21/3/84	ORIGINAL DRAFT	KJV	DJ	DJ		
Rev.	D	M	Y	Revision Description	Drn.	Des.	App.
<p><b>QUINETTE COAL LIMITED</b>          Project Manager  <b>DENISON MINES LIMITED</b>          COAL DIVISION</p>							
Area HERMANN NORTH				Category GEOLOGY			
Drawing Title							
HERMANN NORTH							
GEOLOGY							
<b>617</b>							
Scale 1:1250		Drawing No. 84-601-20-001		Rev. 0			

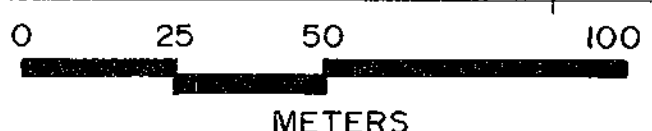
**APPENDIX 7**

CROSS SECTIONS 1:1250 - HERMANN NORTH AREA



**LEGEND**

- DRILL HOLE LOCATION (SECTION)
- DRILL HOLE NUMBER
- DRILL HOLE
- BEDDING ANGLE IN CORE
- SEAM I.D., TOP OF SEAM, TRUE THICKNESS
- PROJECTED APPARENT DIP IN SECTION OF OUTCROP
- TOP OF COAL SEAM
- BOTTOM OF COAL SEAM
- FAULT (WITH RELATIVE MOVEMENT)



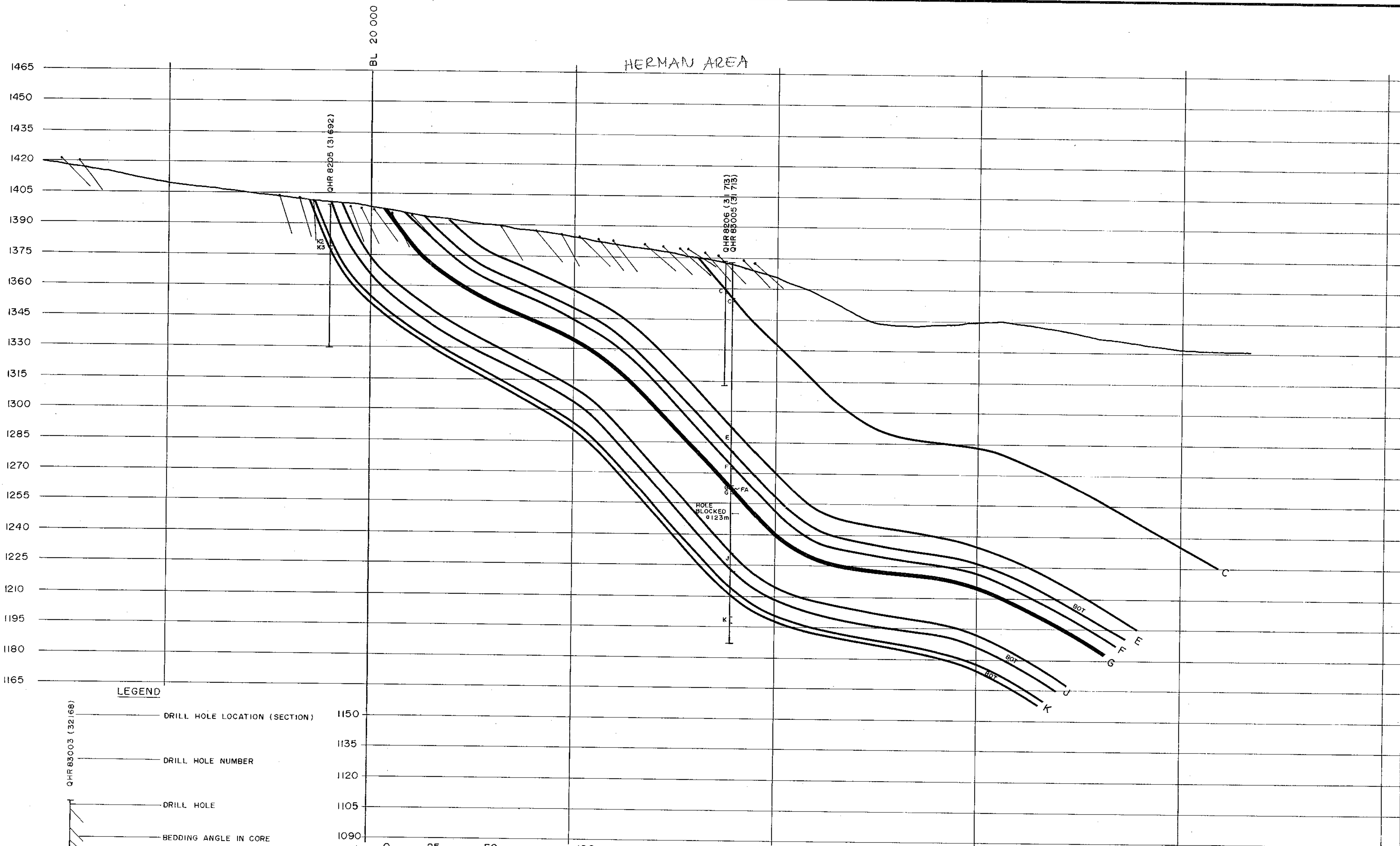
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**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

*PR. QUINTETTE 83/2A*

**617**

AREA HERMANN NORTH		CAT. CROSS SECTIONS	
DRAWING TITLE			
<b>SECTION 31 600</b>			
DRAWING NO.	SCALE	REV.	
84-601-21-001	1:1250	0	



**LEGEND**

- DRILL HOLE LOCATION (SECTION) 1150
- DRILL HOLE NUMBER 1135
- DRILL HOLE 1120
- BEDDING ANGLE IN CORE 1105
- SEAM I.D., TOP OF SEAM, TRUE THICKNESS 1090
- PROJECTED APPARENT DIP IN SECTION OF OUTCROP
- TOP OF COAL SEAM
- BOTTOM OF COAL SEAM
- FAULT (WITH RELATIVE MOVEMENT)

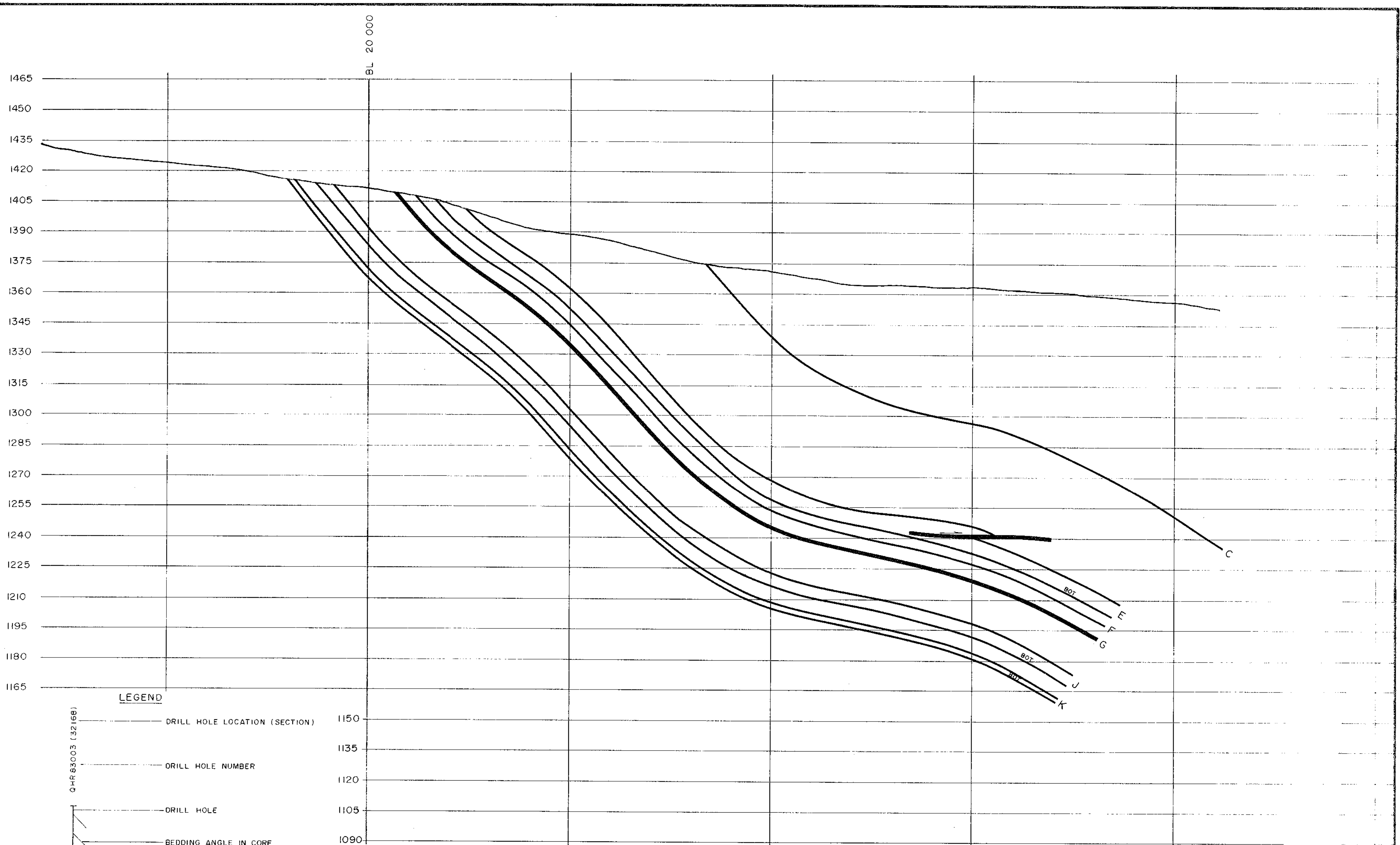


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REV	D	M	Y	REVISION DESCRIPTION	DRAWN	DESIGN	APPROVED

**QUINETTE COAL LIMITED**  
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**DENISON MINES LIMITED**  
 COAL DIVISION

AREA HERMANN NORTH	CAT. CROSS SECTIONS
DRAWING TITLE	
<b>SECTION 31 700</b>	
DRAWING NO. 84-601-21-002	SCALE 1:1250
REV. 0	

617



**LEGEND**

- DRILL HOLE LOCATION (SECTION)
- DRILL HOLE NUMBER
- DRILL HOLE
- BEDDING ANGLE IN CORE
- SEAM I.D., TOP OF SEAM, TRUE THICKNESS
- PROJECTED APPARENT DIP IN SECTION OF OUTCROP
- TOP OF COAL SEAM
- BOTTOM OF COAL SEAM
- FAULT (WITH RELATIVE MOVEMENT)

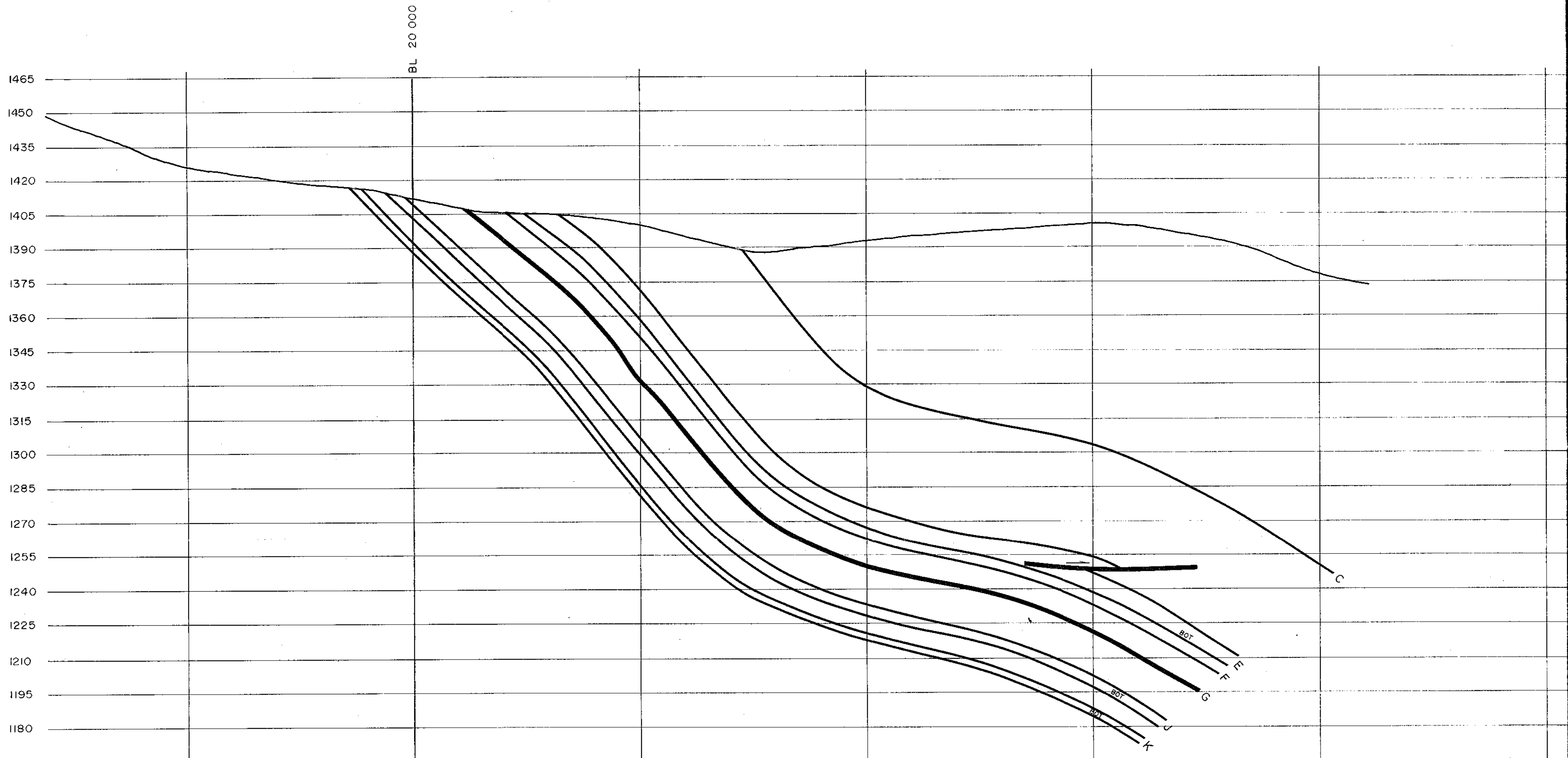


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








**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

AREA HERMANN NORTH | CAT. CROSS SECTIONS  
 DRAWING TITLE  
**SECTION 31 800**  
 DRAWING NO. 84-601-21-003 | SCALE 1:250 | REV 0

**617**



**LEGEND**

-  DRILL HOLE LOCATION (SECTION) 1150
-  DRILL HOLE NUMBER 1135
-  DRILL HOLE 1120
-  BEDDING ANGLE IN CORE 1105
-  SEAM I.D., TOP OF SEAM, TRUE THICKNESS 1090
-  PROJECTED APPARENT DIP IN SECTION OF OUTCROP
-  TOP OF COAL SEAM
-  BOTTOM OF COAL SEAM
-  FAULT (WITH RELATIVE MOVEMENT)

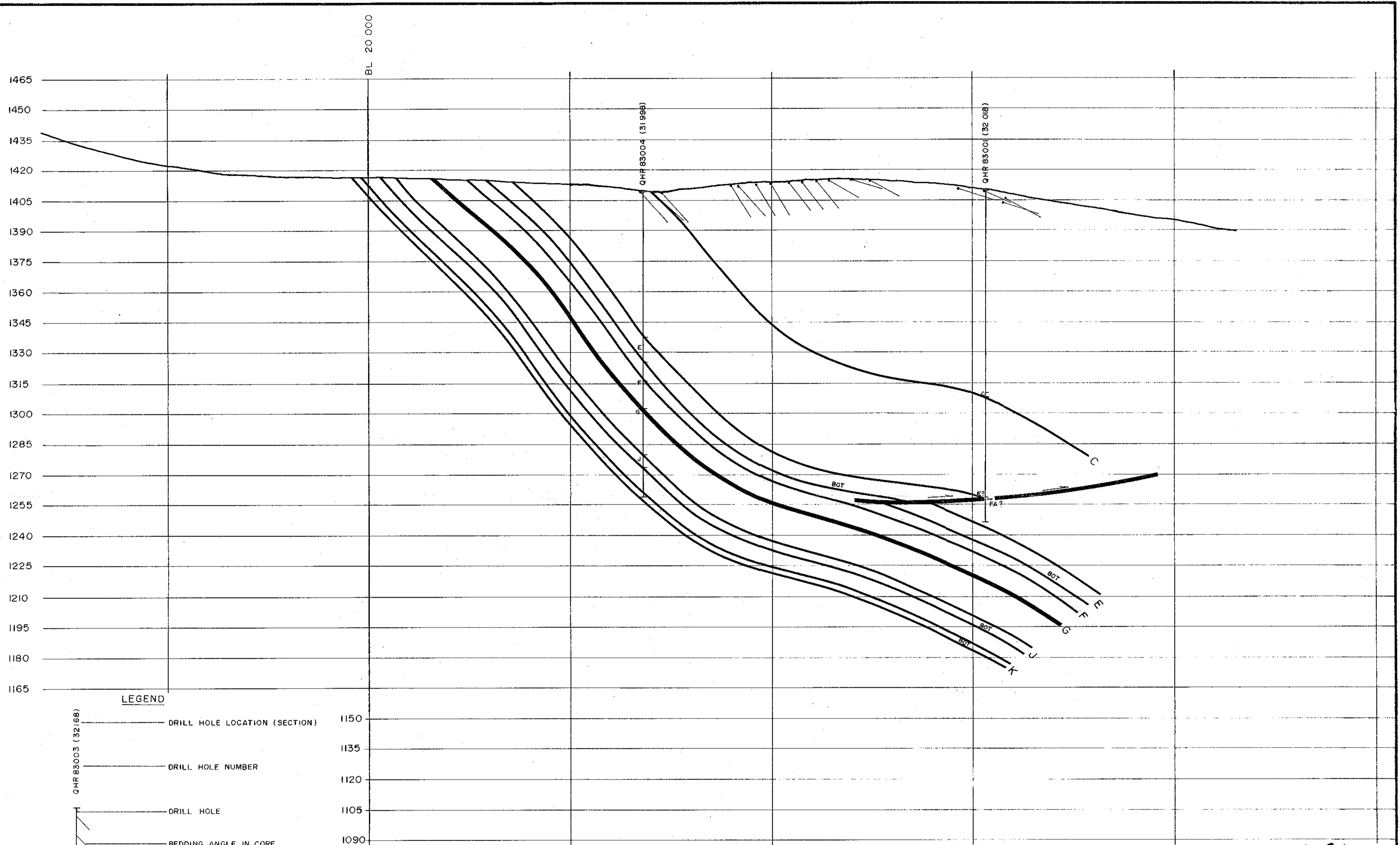


REV.	0	M	Y	ORIGINAL DRAFT	K.J.V.	D.J.	D.J.
				REVISION DESCRIPTION	DRAWN	DESIGN	APPROVED

**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

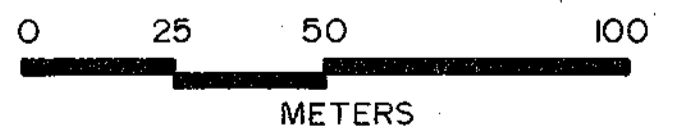
*P.R. Quintette 8362A*

AREA HERMANN NORTH		CAT. CROSS SECTIONS	
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DRAWING NO.	SCALE	REV.	
84-601-21-004	1:1250	0	



**LEGEND**

- DRILL HOLE LOCATION (SECTION)
- DRILL HOLE NUMBER
- DRILL HOLE
- BEDDING ANGLE IN CORE
- SEAM I.D., TOP OF SEAM, TRUE THICKNESS
- PROJECTED APPARENT DIP IN SECTION OF OUTCROP
- TOP OF COAL SEAM
- BOTTOM OF COAL SEAM
- FAULT (WITH RELATIVE MOVEMENT)

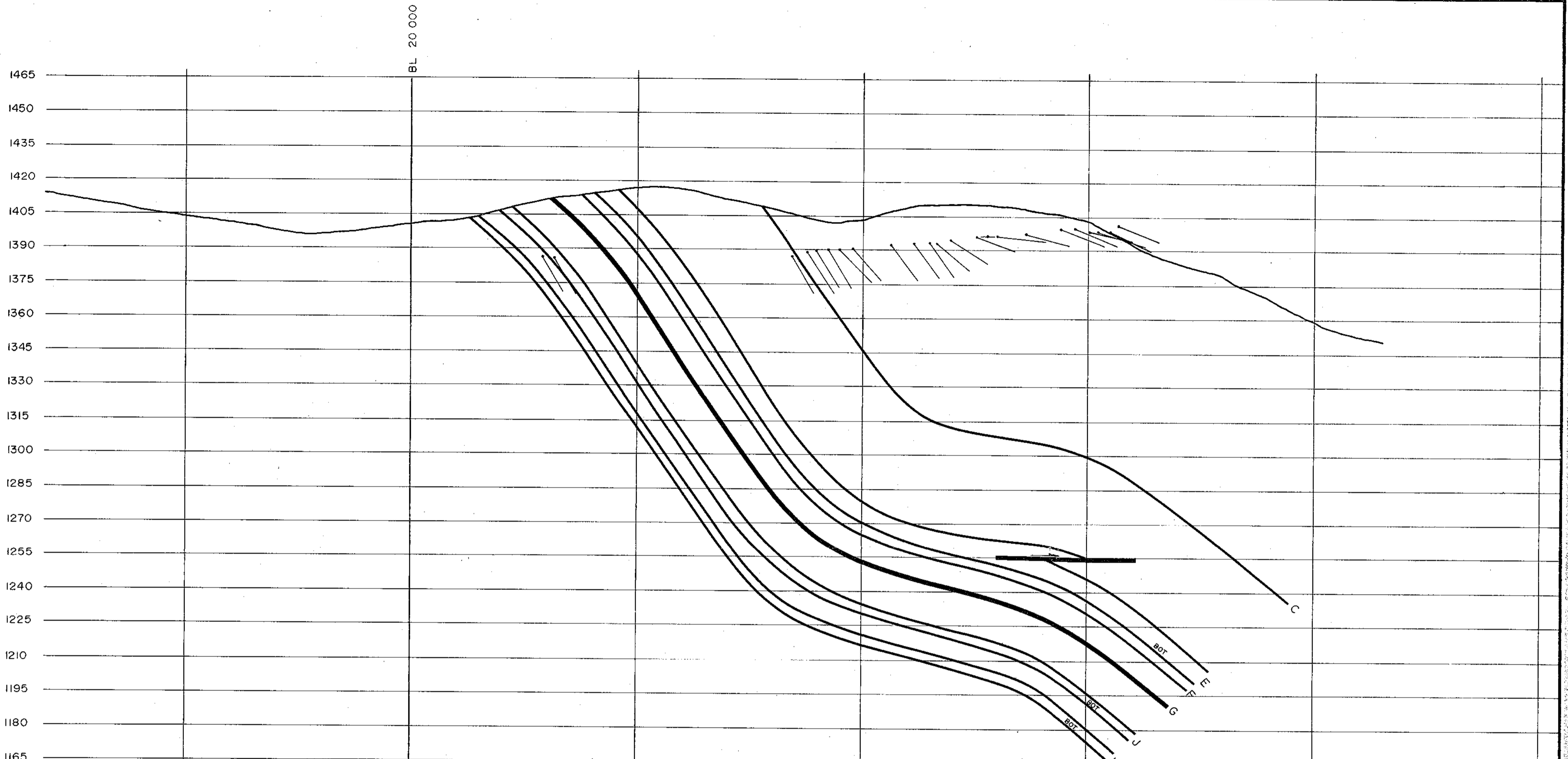


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**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

AREA HERMANN NORTH		CAT. CROSS SECTIONS	
DRAWING TITLE			
<b>SECTION 32 000</b>			
DRAWING NO.		SCALE	REV.
84-601-21-005		1:1250	0

617



**LEGEND**

- DRILL HOLE LOCATION (SECTION)
- DRILL HOLE NUMBER
- DRILL HOLE
- BEDDING ANGLE IN CORE
- SEAM I.D., TOP OF SEAM, TRUE THICKNESS
- PROJECTED APPARENT DIP IN SECTION OF OUTCROP
- TOP OF SEAM
- BOTTOM OF SEAM
- SEAM THICKNESS

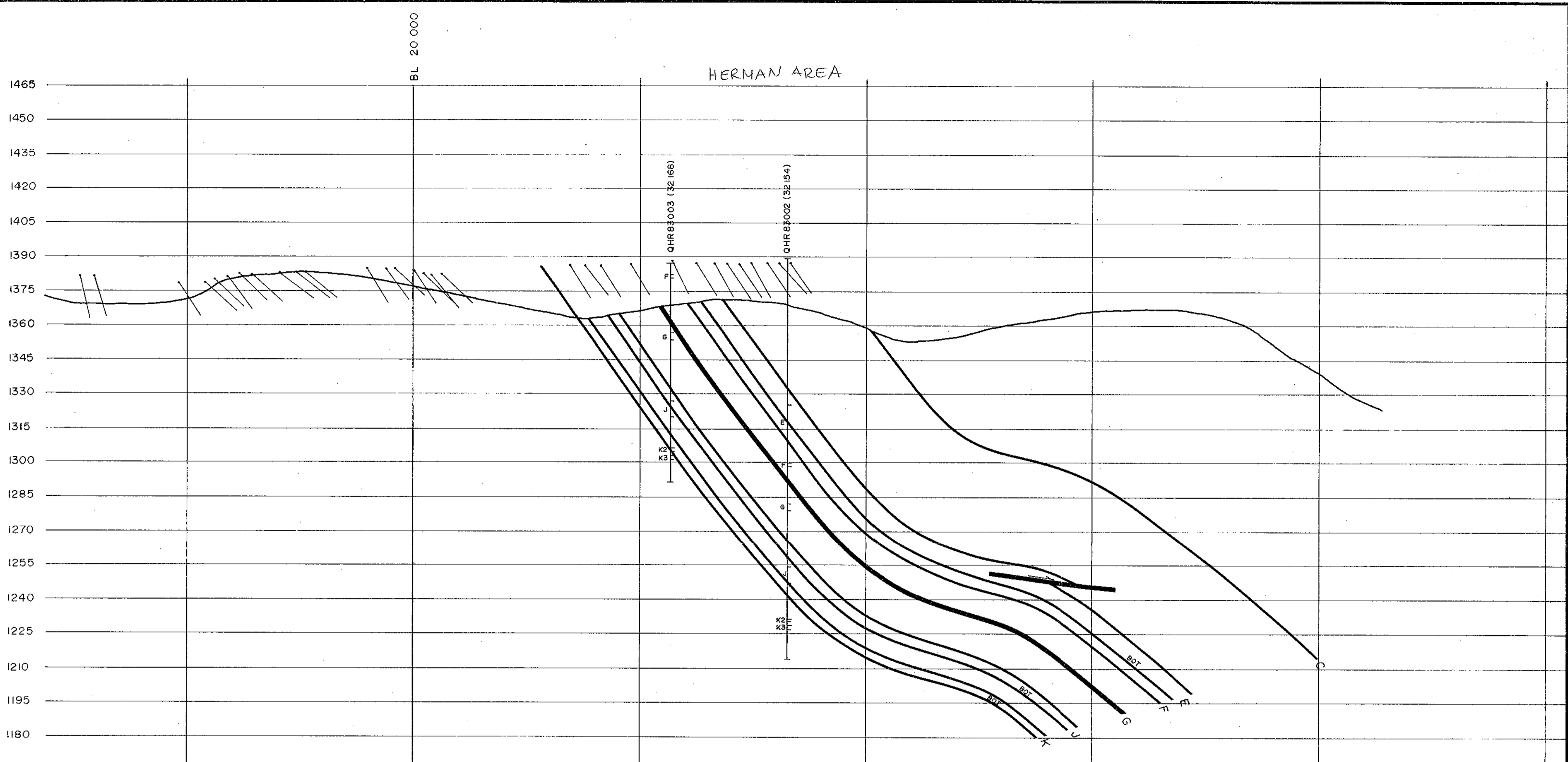



**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

AREA HERMANN NORTH CAT. CROSS SECTIONS  
 DRAWING TITLE  
**SECTION 32 100**  
 DRAWING NO. 84-601-21-006 SCALE 1:1250 REV. 0

**617**





**LEGEND**

- DRILL HOLE LOCATION (SECTION)
- DRILL HOLE NUMBER
- DRILL HOLE
- BEDDING ANGLE IN CORE
- SEAM I.D., TOP OF SEAM, TRUE THICKNESS
- PROJECTED APPARENT DIP IN SECTION OF OUTCROP
- TOP OF COAL SEAM
- BOTTOM OF COAL SEAM
- FAULT (WITH RELATIVE MOVEMENT)

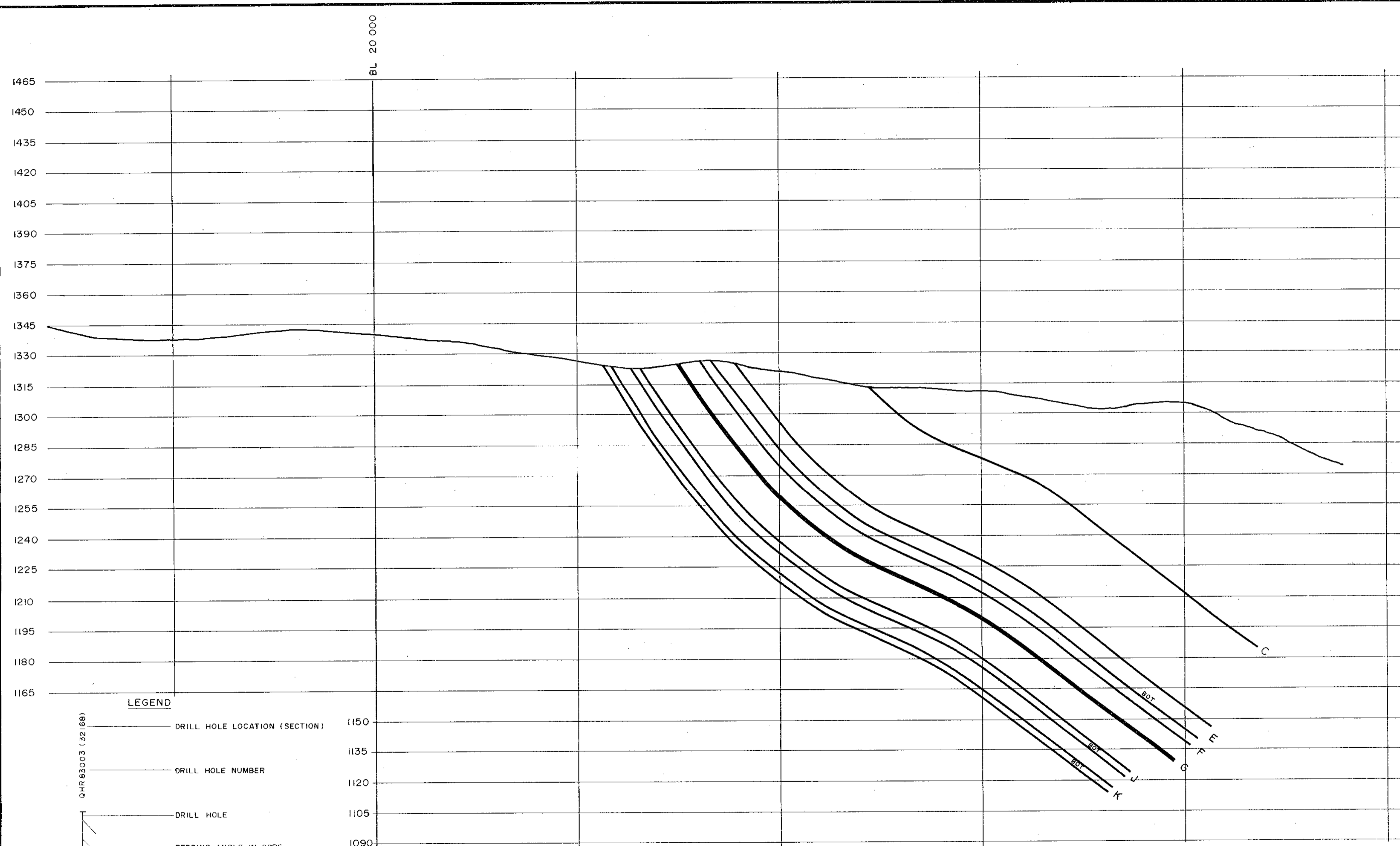


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








**QUINETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

AREA HERMANN NORTH	CAT. CROSS SECTIONS	
DRAWING TITLE		
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DRAWING NO	SCALE	REV.
84-601-21-007	1:250	0

617



**LEGEND**

-  DRILL HOLE LOCATION (SECTION) 1150
-  DRILL HOLE NUMBER 1135
-  DRILL HOLE 1120
-  BEDDING ANGLE IN CORE 1105
-  SEAM ID, TOP OF SEAM, TRUE THICKNESS 1090
-  PROJECTED APPARENT DIP IN SECTION OF OUTCROP
-  TOP OF COAL SEAM
-  BOTTOM OF COAL SEAM
-  FAULT (WITH RELATIVE MOVEMENT)

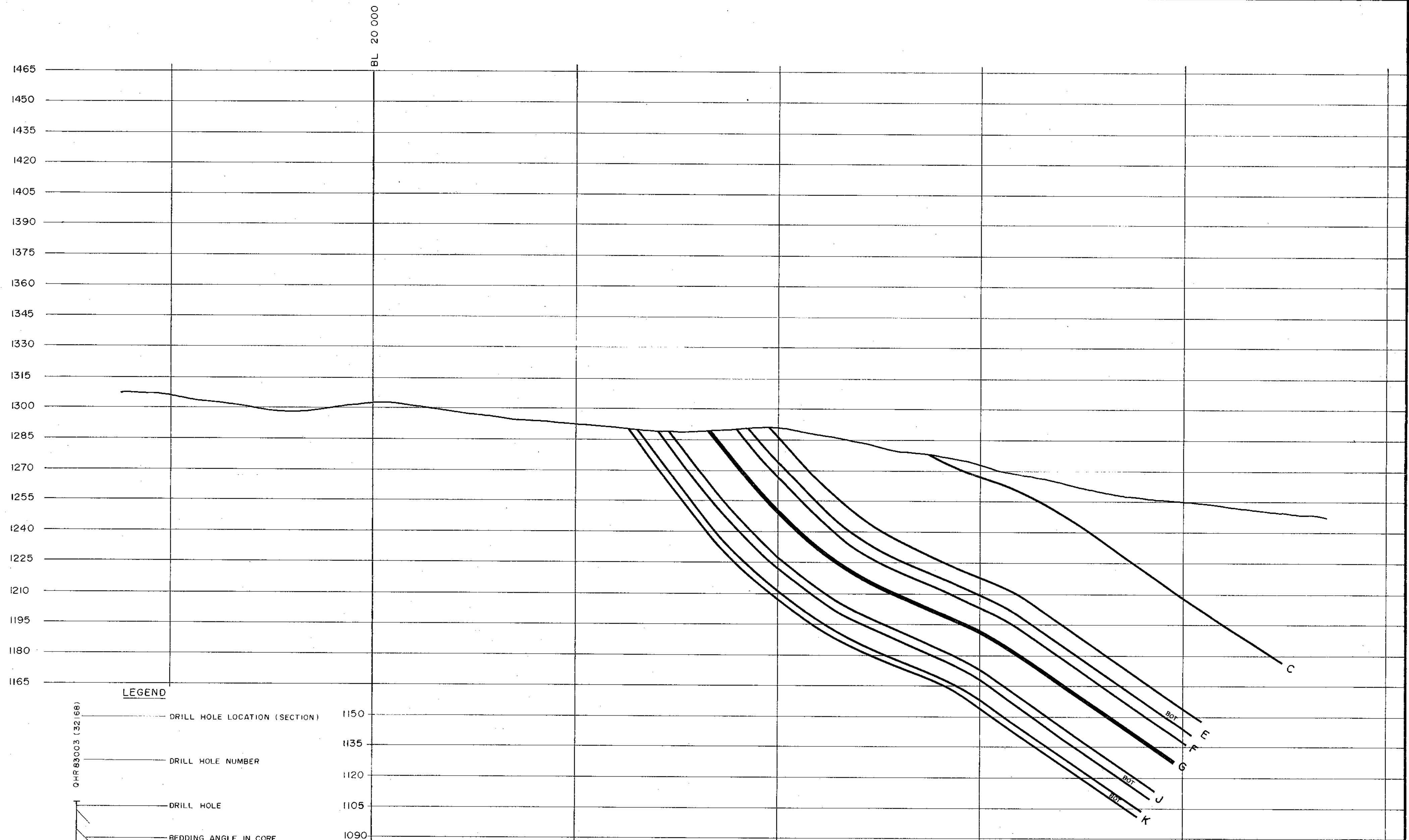


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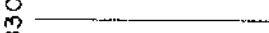


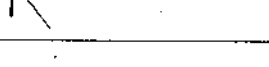




**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

*PR. Quintette 83(2)A* **617**

AREA HERMANN NORTH		CAT. CROSS SECTIONS	
DRAWING TITLE			
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DRAWING NO.	SCALE	REV	
84-601-21-008	1:250	0	



**LEGEND**

-  DRILL HOLE LOCATION (SECTION)
-  DRILL HOLE NUMBER
-  DRILL HOLE
-  BEDDING ANGLE IN CORE
-  SEAM I.D., TOP OF SEAM, TRUE THICKNESS
-  PROJECTED APPARENT DIP IN SECTION OF OUTCROP
-  TOP OF COAL SEAM
-  BOTTOM OF COAL SEAM
-  FAULT (WITH RELATIVE MOVEMENT)

1150  
1135  
1120  
1105  
1090

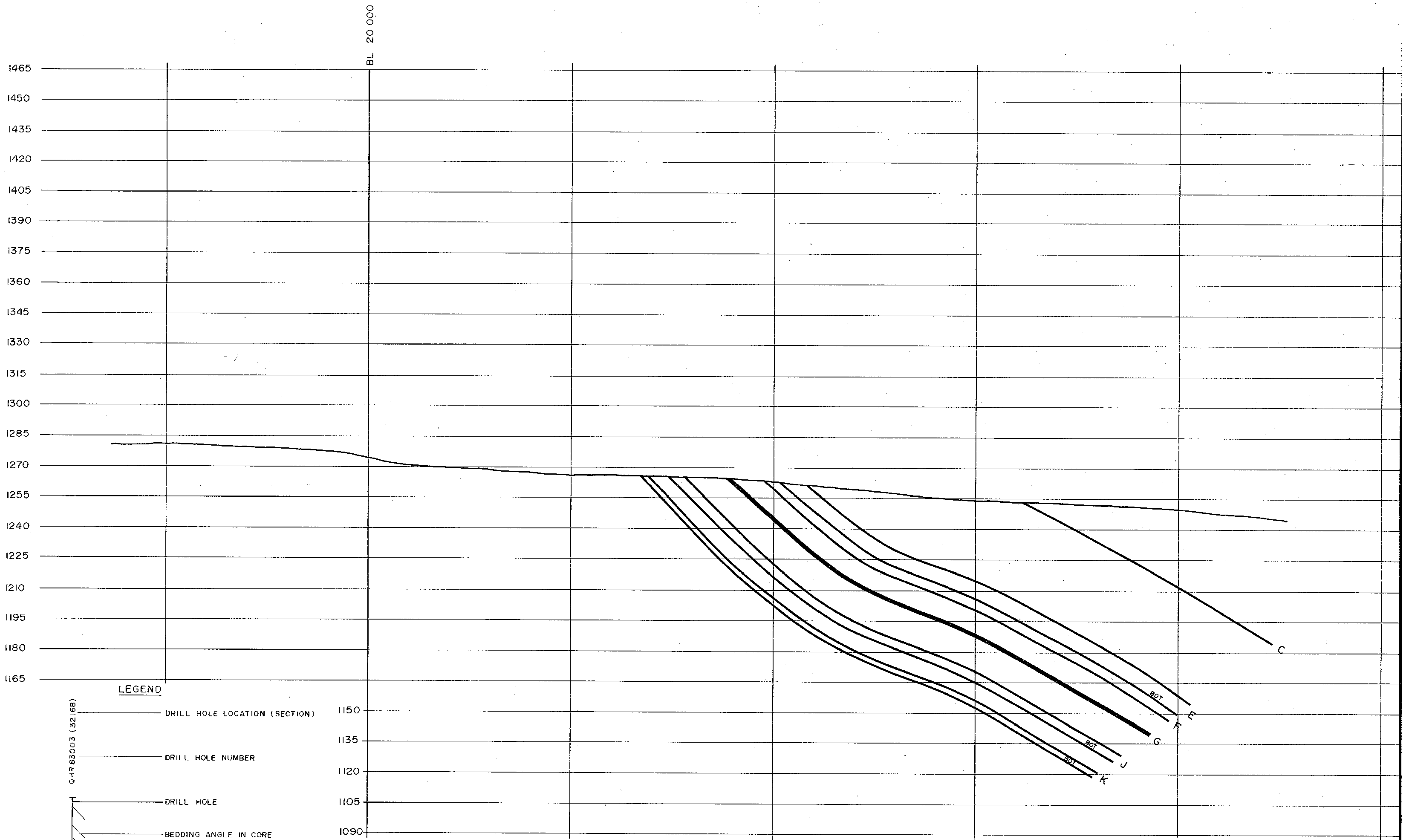


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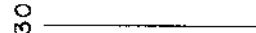


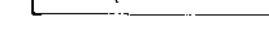




**QUINTETTE COAL LIMITED**  
Project Manager  
**DENISON MINES LIMITED**  
COAL DIVISION

AREA HERMANN NORTH	CAT. CROSS SECTIONS
DRAWING TITLE	
<b>SECTION 32 400</b>	
DRAWING NO. 84-601-21-009	SCALE 1:1250
REV 0	

617



**LEGEND**

-  DRILL HOLE LOCATION (SECTION) 1150
-  DRILL HOLE NUMBER 1135
-  DRILL HOLE 1105
-  BEDDING ANGLE IN CORE 1090
-  SEAM I.D., TOP OF SEAM, TRUE THICKNESS
-  PROJECTED APPARENT DIP IN SECTION OF OUTCROP
-  TOP OF COAL SEAM
-  BOTTOM OF COAL SEAM
-  FAULT (WITH RELATIVE MOVEMENT)



REV.	D	M	Y	REVISION DESCRIPTION	DRAWN	DESIGN	APPROVED
0	13	3	84	ORIGINAL DRAFT	K.J.V.	D.J.	D.J.

**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

AREA HERMANN NORTH CAT. CROSS SECTIONS  
 DRAWING TITLE  
**SECTION 32 500**  
 DRAWING NO. 84-601-21-010 SCALE 1:1250 REV O

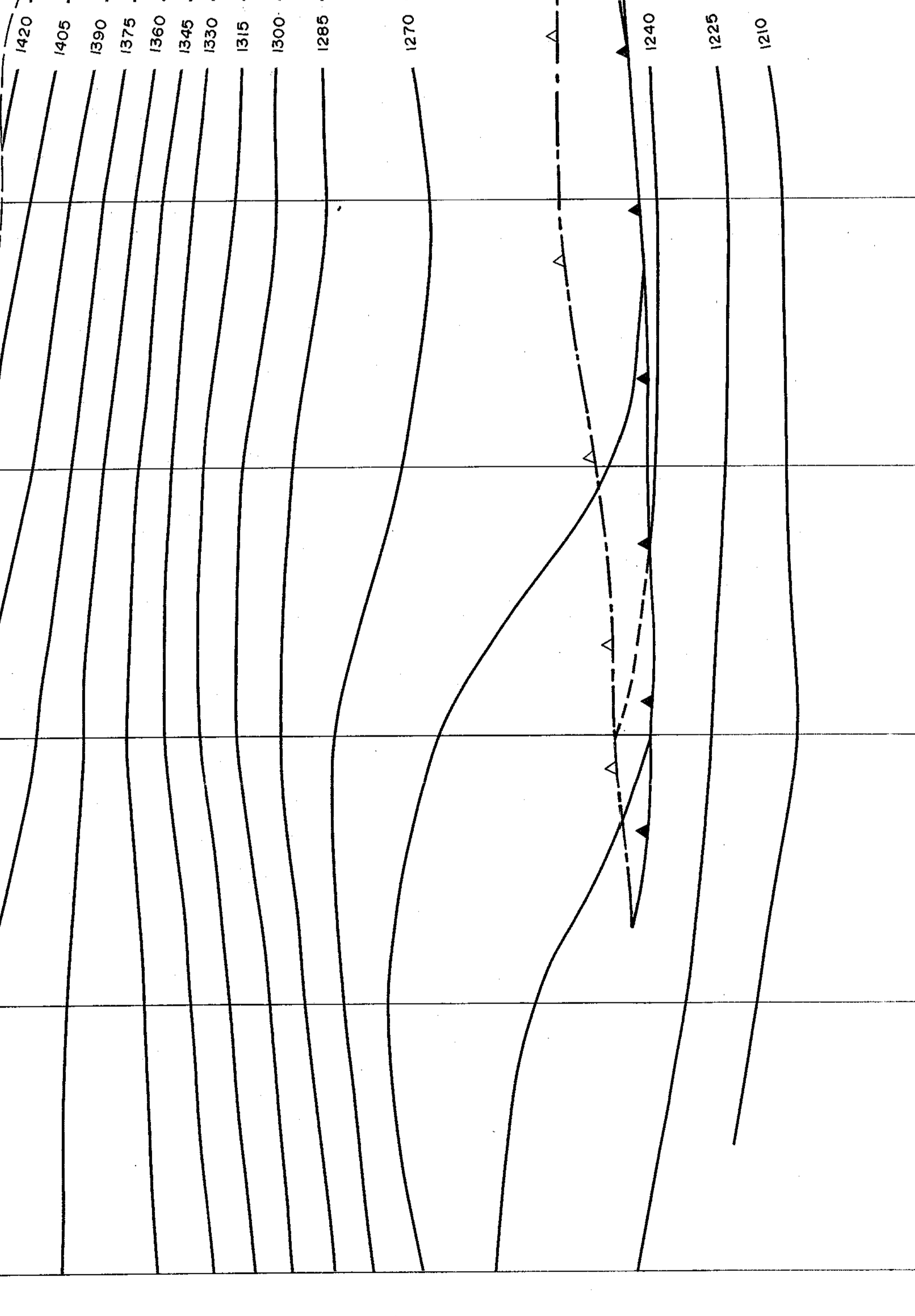
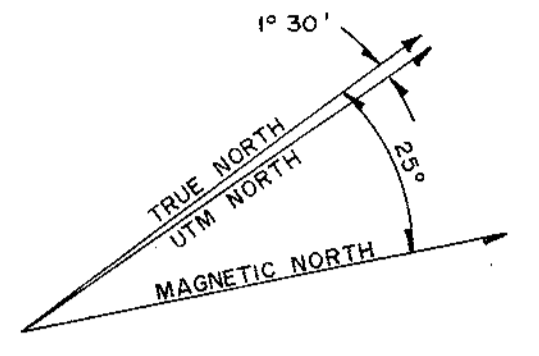
**617**

**APPENDIX 8**

STRUCTURE CONTOURS 1:1250 - HERMANN NORTH AREA

32 500  
32 400  
32 300  
32 200  
32 100  
32 000  
31 900  
31 800  
31 700  
31 600

BL 20 000



- LEGEND**
- 1390 — CONTOUR ELEVATION (15 m INTERVALS)
  - ▲ FAULT CONTACT - UPPER PLATE
  - △ FAULT CONTACT - LOWER PLATE
  - - - - - OUTCROP OR SUBCROP
  - QHR 8206 DRILL HOLE



0	160384	ORIGINAL DRAFT	KJV	DJ	DJ
Rev.	D	M	Y	Des.	App.

**QUINTETTE COAL LIMITED**  
Project Manager  
**DENISON MINES LIMITED**  
COAL DIVISION  
Area **HERMANN NORTH** Category **STRUCTURE CONTOURS**

Drawing Title

TOP OF E SEAM

**617**

Scale	Drawing No.	Rev.
1:1250	84-601-22-001	0

**APPENDIX 9**

COORELATION CHART - HERMANN NORTH AREA

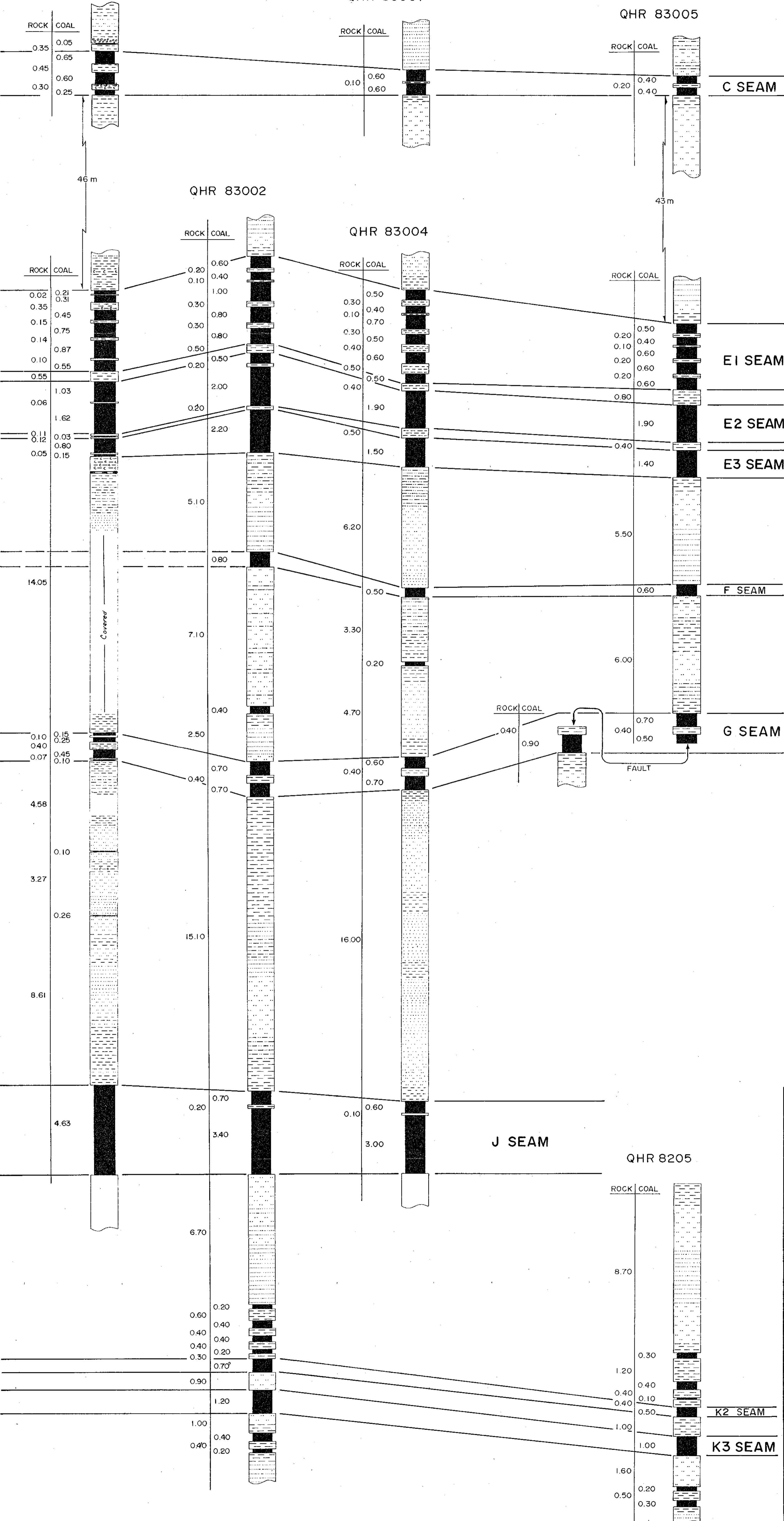
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SE

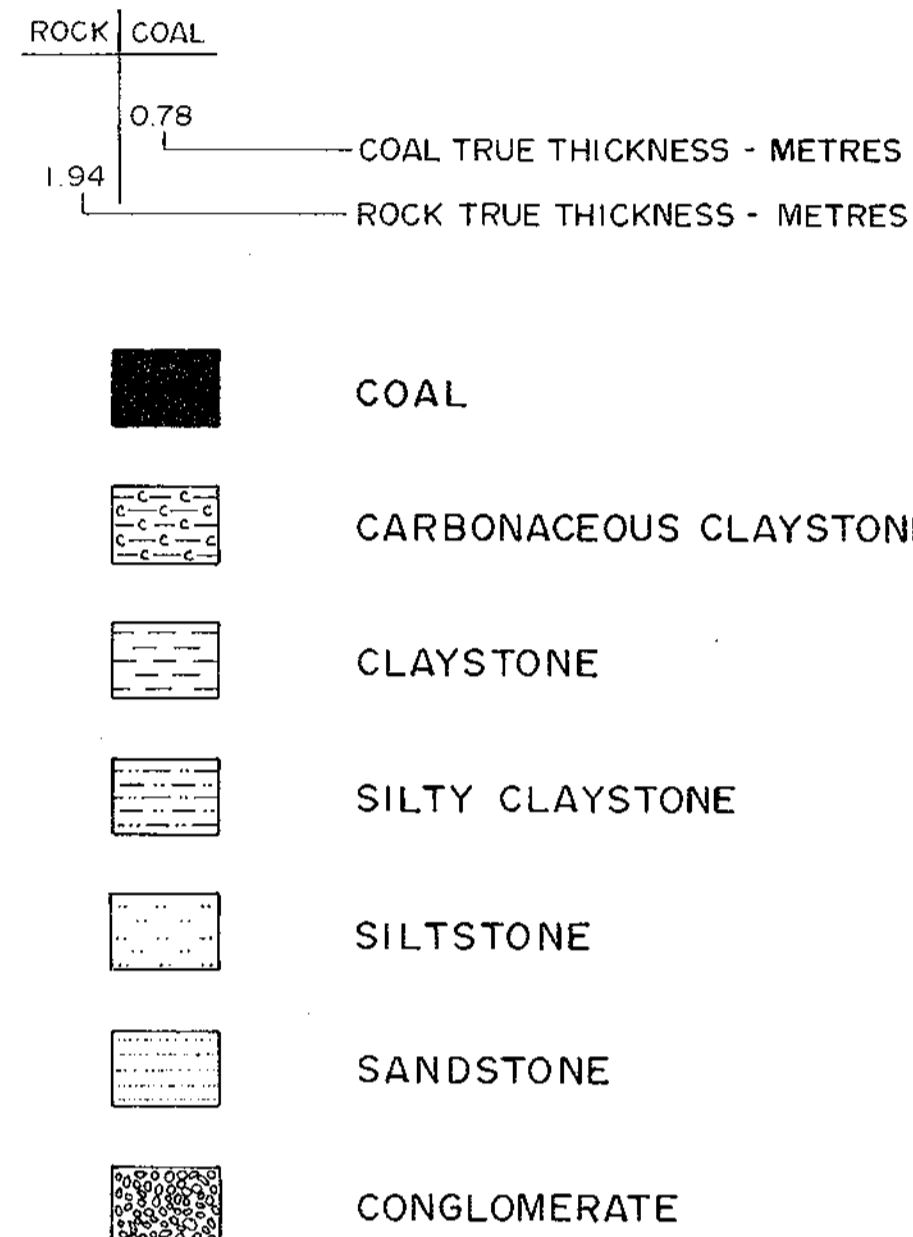
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QHR 83001

QHR 83005

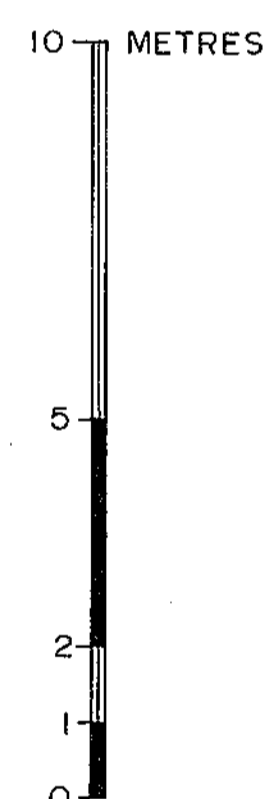


LEGEND



NOTE: THICKNESSES FOR ROTARY HOLES ARE FROM 1:200 SCALE GEOPHYSICAL LOGS AND ARE CORRECTED FOR TRUE THICKNESS BASED ON MARCH, 1984 INTERPRETATION.

VERTICAL SCALE  
1:100



0	30	0384	ORIGINAL DRAFT	EAH	DGSJ	DGSJ	
Rev.	D	M	Y	Revision Description	Drn.	Des.	App.

QUINTETTE COAL LIMITED

Project Manager

DENISON MINES LIMITED

COAL DIVISION *PR. QUINTETTE 83005*

Area HERMANN NORTH Category CORRELATIONS

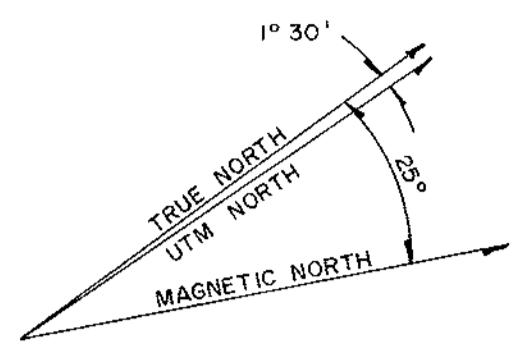
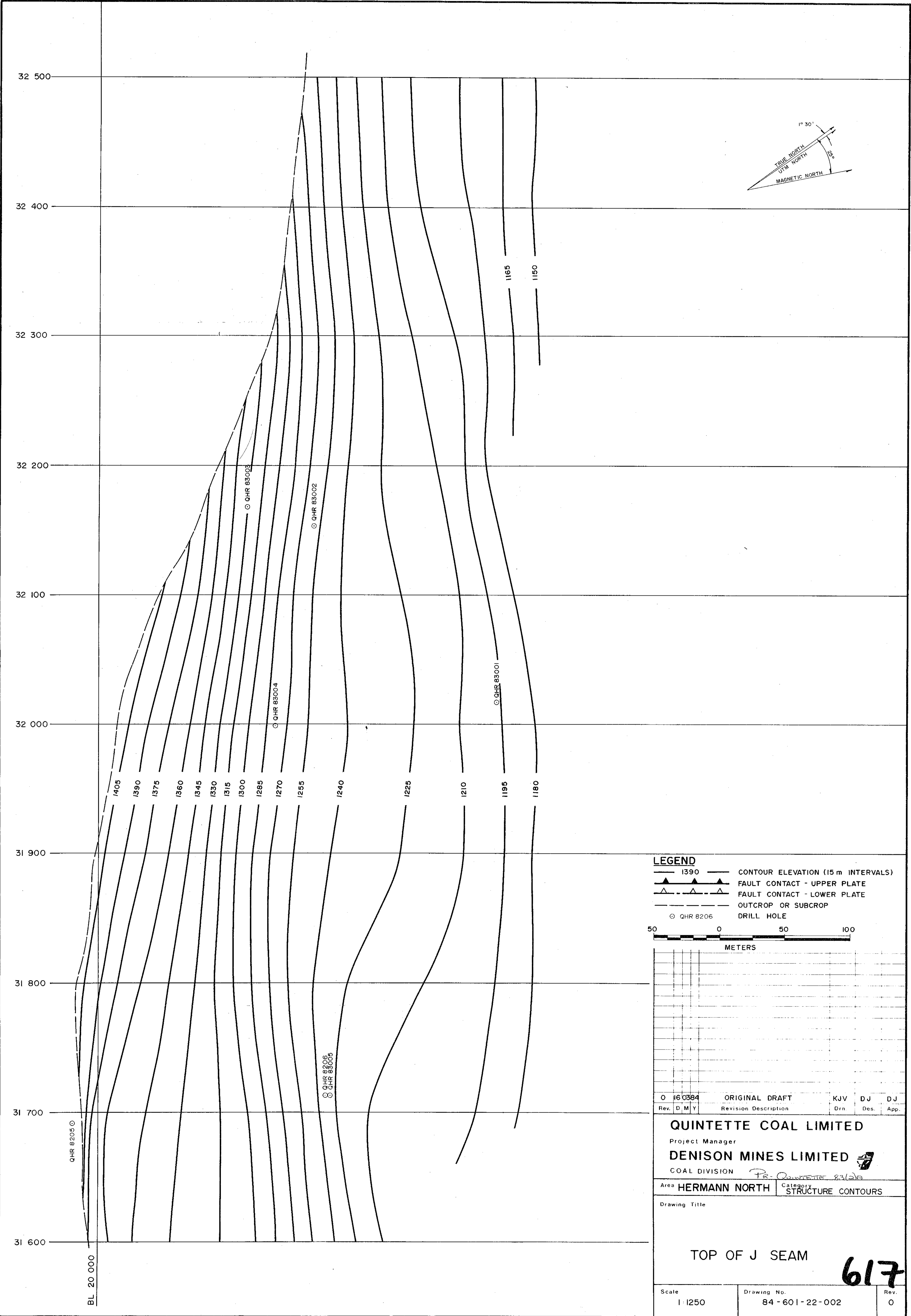
Drawing Title

CORRELATION CHART

617

Scale	Drawing No.	Rev.
VERTICAL 1:100 NO HORIZ'L SCALE	84 - 601 - 26 - 001	0





**LEGEND**

- 1390 — CONTOUR ELEVATION (15 m INTERVALS)
- ▲ FAULT CONTACT - UPPER PLATE
- ▲ FAULT CONTACT - LOWER PLATE
- OUTCROP OR SUBCROP
- QHR 8206 DRILL HOLE



0	16 0384	ORIGINAL DRAFT	KJV	DJ	DJ	
Rev.	D	M	Y	Drn.	Des.	App.

**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION  
 Area **HERMANN NORTH** Category **STRUCTURE CONTOURS**

Drawing Title

TOP OF J SEAM

617

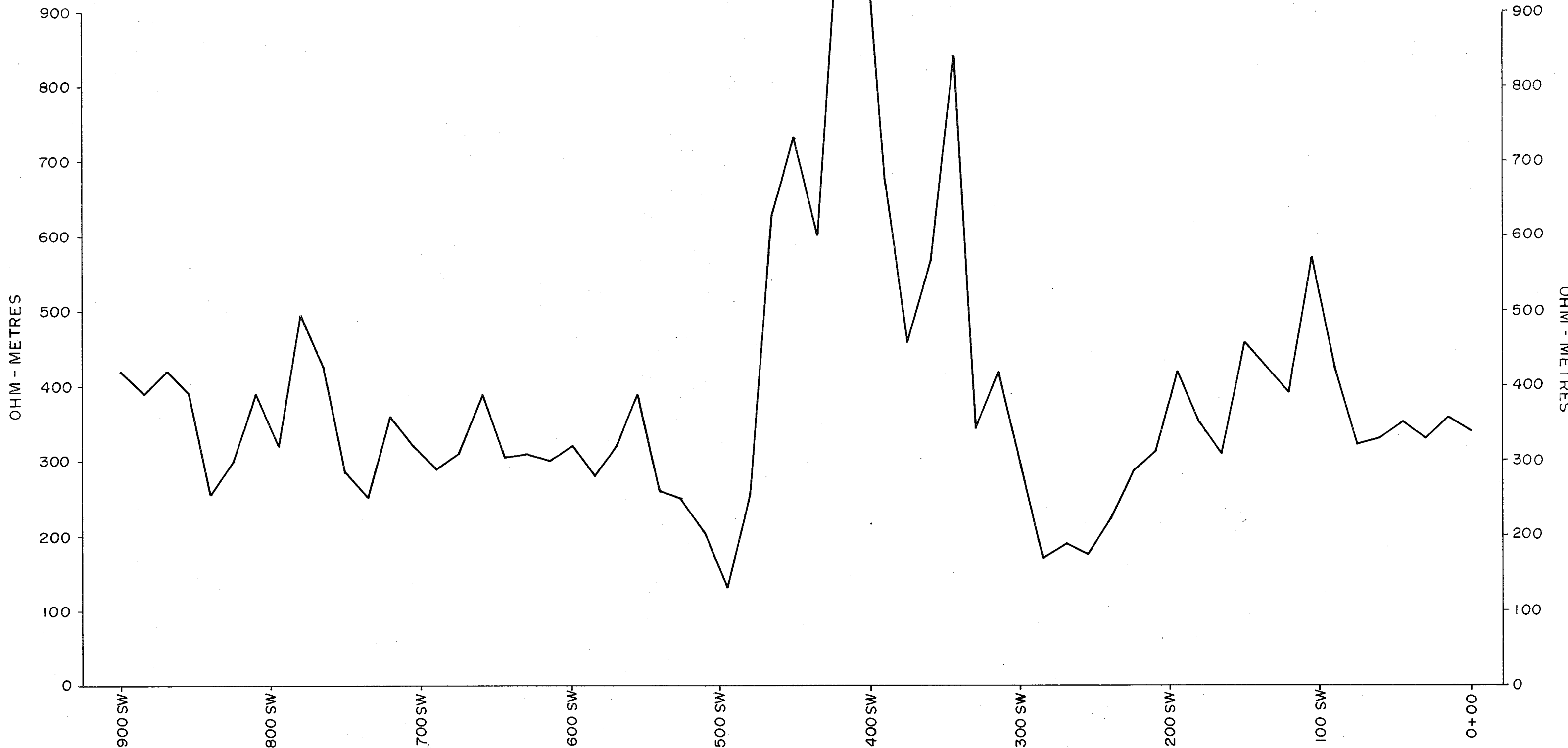
Scale	Drawing No.	Rev.
1:1250	84-601-22-002	0

**APPENDIX 10**

**GEOPHYSICAL SURVEY REPORT - GROUND RESISTIVITY SURVEYS**

SW

NE



**QUINTETTE COAL LIMITED**

Project Manager

**DENISON MINES LIMITED**

COAL DIVISION

EAH	DJ	DJ
DRAWN	DESIGN	APPROVED

AREA HERMANN SYNCLINE | CAT. GEOPHYSICS

DRAWING TITLE

**GEOPHYSICAL SURVEY  
RESISTIVITY - LINE 1**

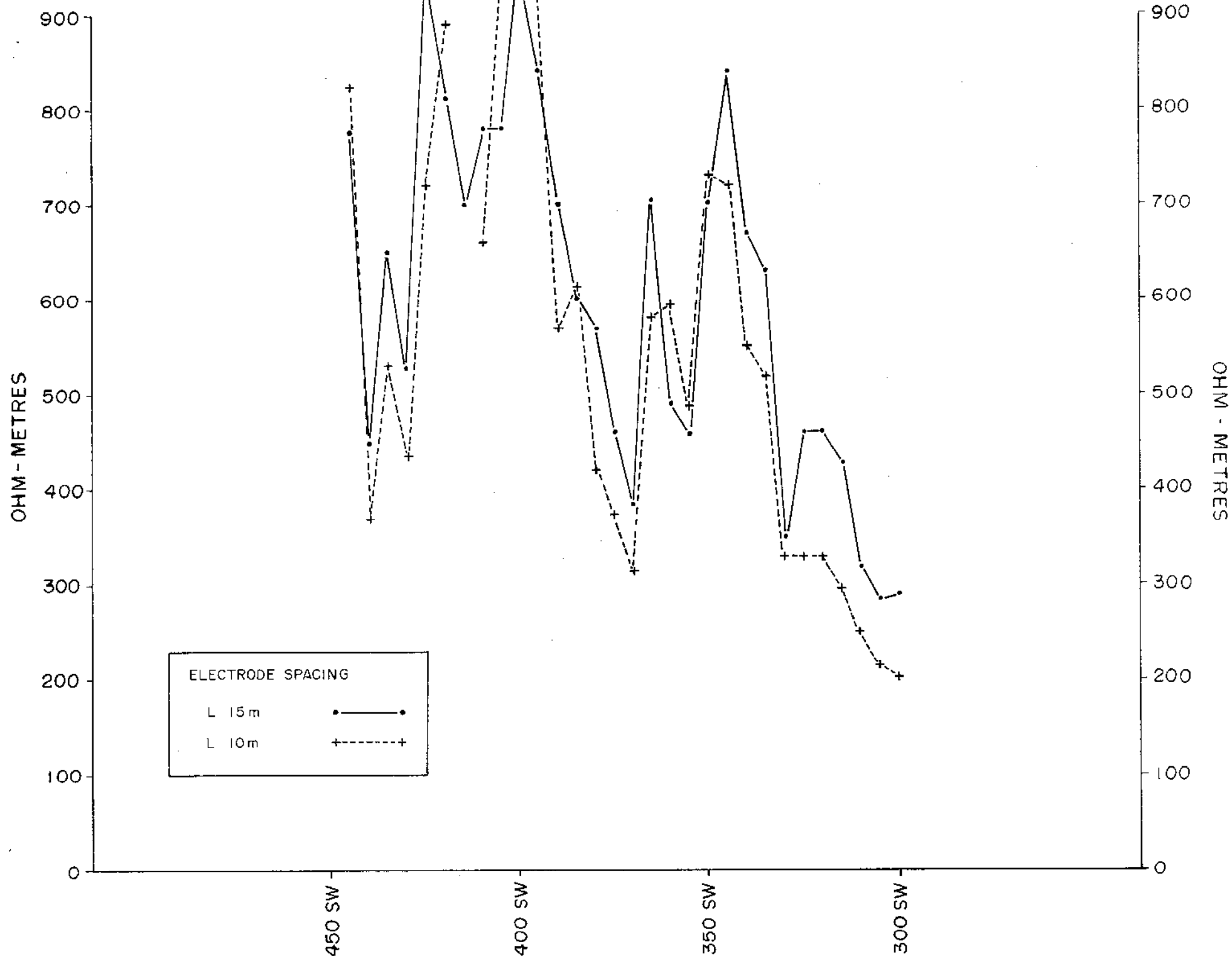
DRAWING NO.  
84-602-19-001

SCALE  
N.A.

REV.  
0

SW

NE



**QUINTETTE COAL LIMITED**

Project Manager

**DENISON MINES LIMITED**

COAL DIVISION

AREA HERMANN SYNCLINE | CAT. GEOPHYSICS

DRAWING TITLE

GEOPHYSICAL SURVEY  
RESISTIVITY - LINE 1 DETAIL

DRAWING NO

84-602-19-003

SCALE

N.A.

REV

0

EAH

DJ

DJ

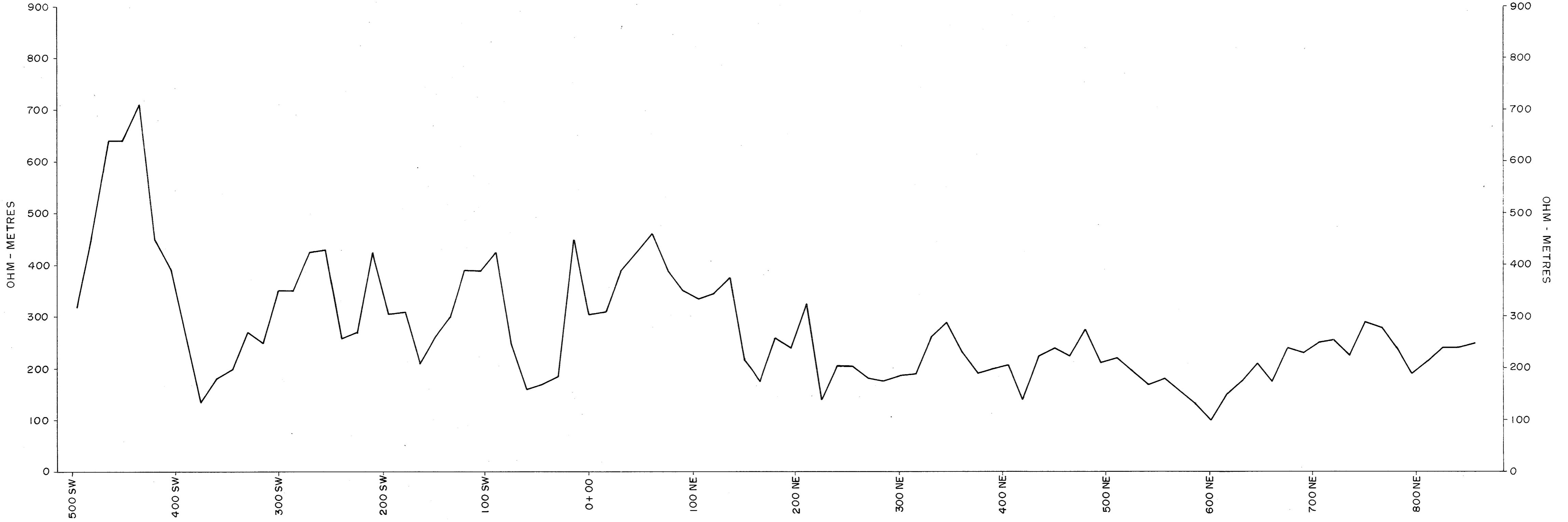
DRAWN

DESIGN

APPROVED

SW

NE



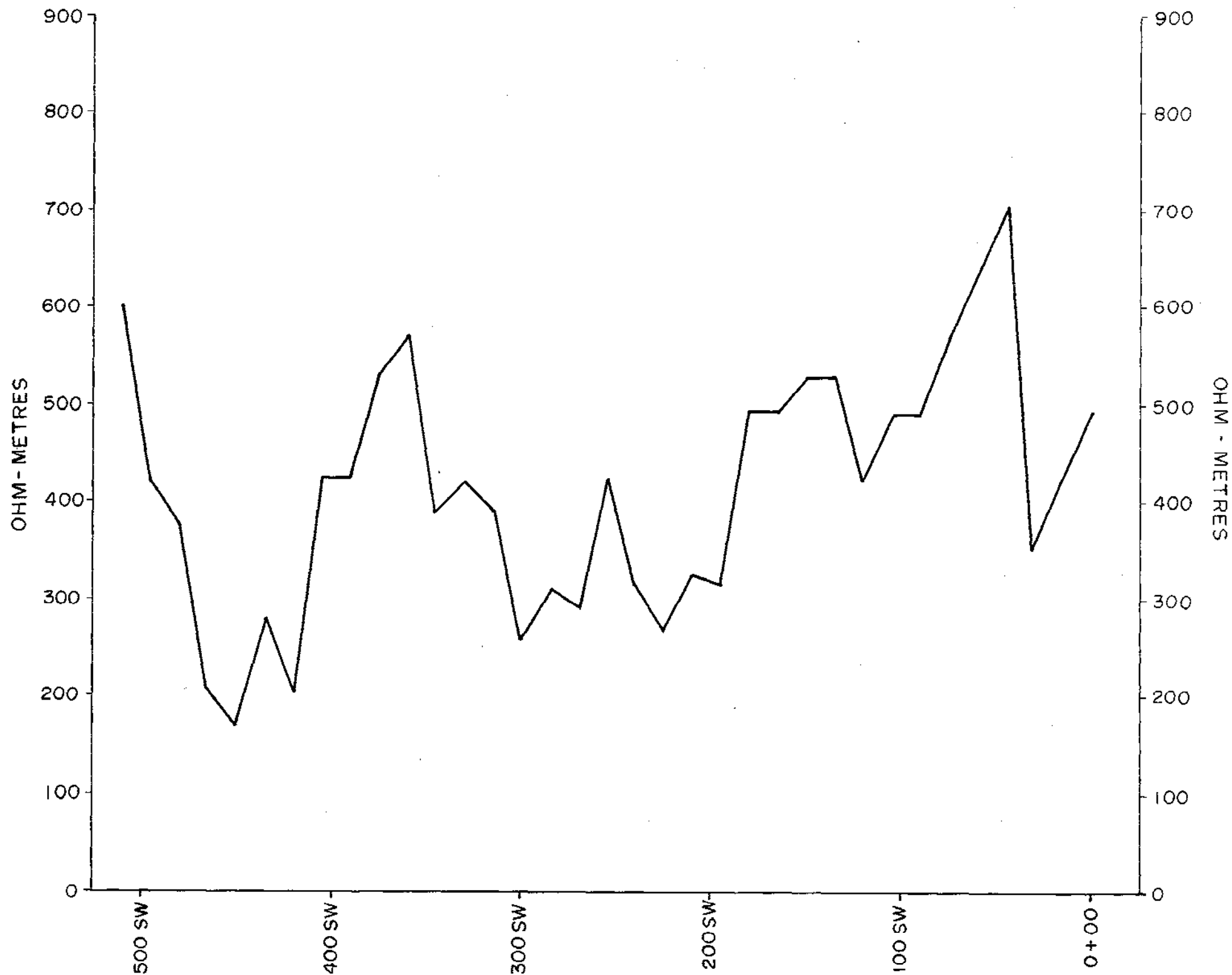
**QUINTETTE COAL LIMITED**  
 Project Manager  
**DENISON MINES LIMITED**  
 COAL DIVISION

EAH	DJ	DJ
DRAWN	DESIGN	APPROVED

AREA HERMANN NORTH	CAT. GEOPHYSICS
DRAWING TITLE <b>GEOPHYSICAL SURVEY    RESISTIVITY - LINE 1'A'</b>	
DRAWING NO. 84-601-19-002	SCALE N.A.
REV. 0	

SW

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AREA HERMANN SYNCLINE | CAT. GEOPHYSICS

DRAWING TITLE

GEOPHYSICAL SURVEY  
RESISTIVITY - LINE 2

DRAWING NO

84-602-19-002

SCALE

N.A.

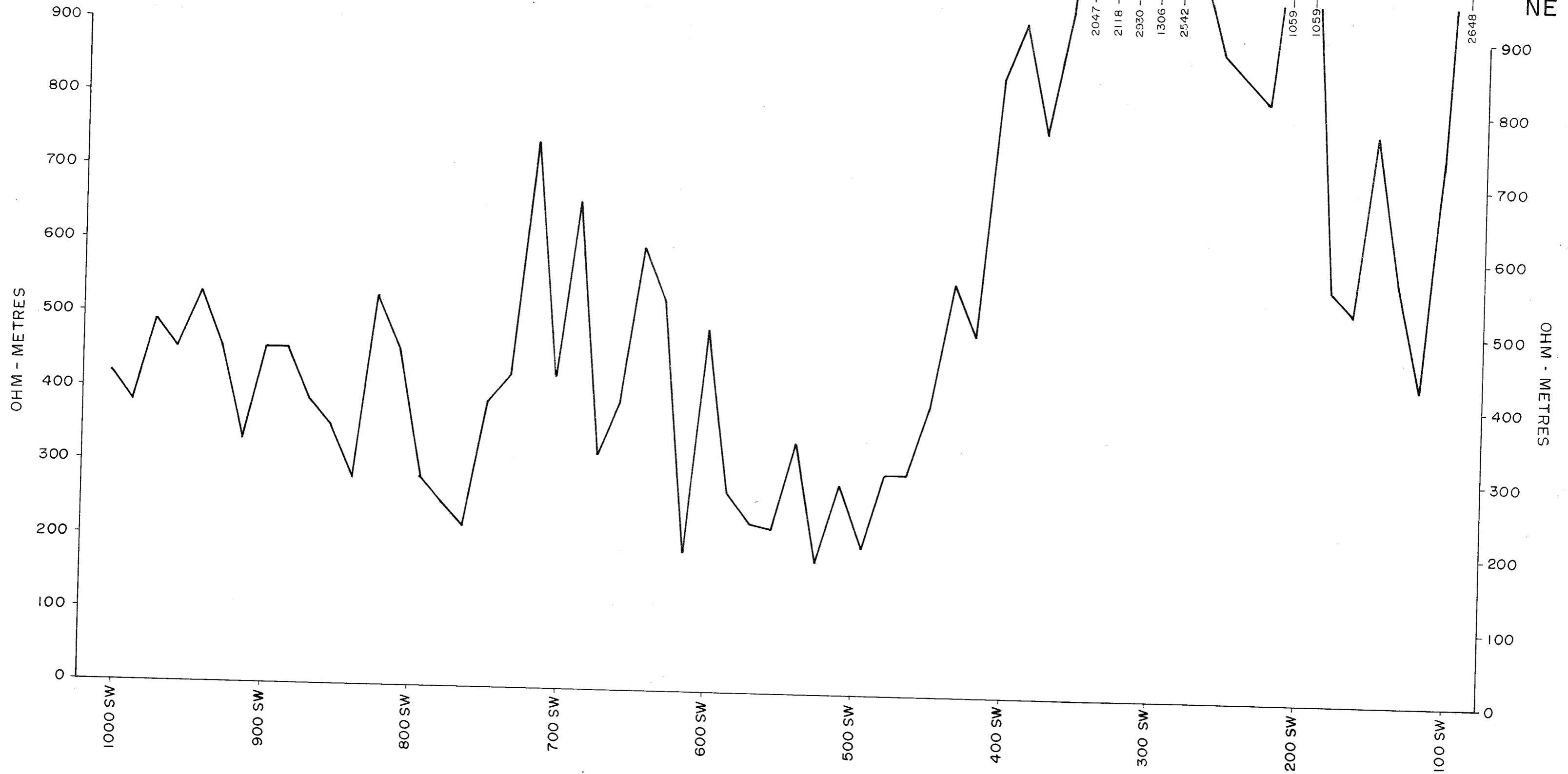
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EAH	DJ	DJ
DRAWN	DESIGN	APPROVED

SW

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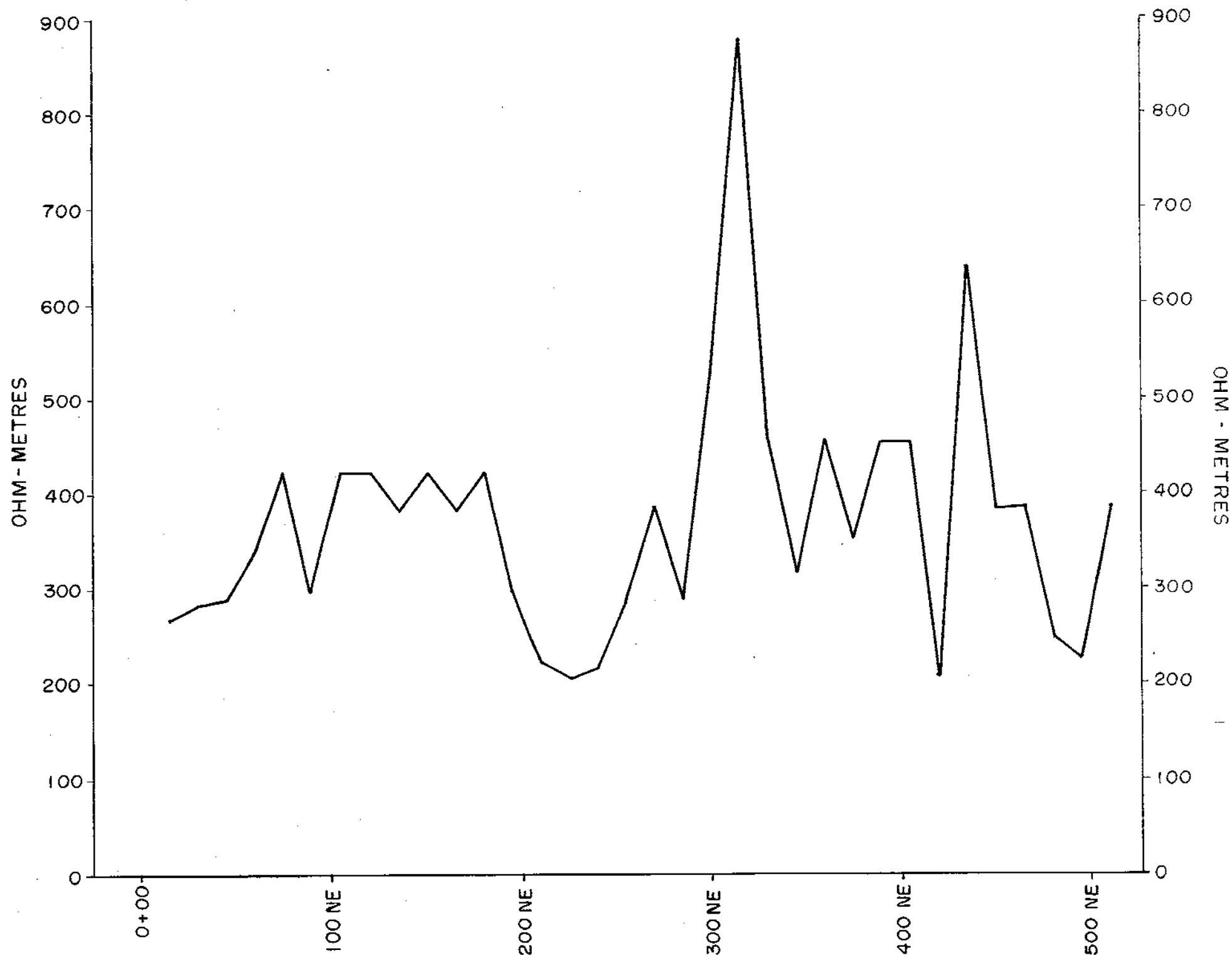
COAL DIVISION

EAH	DJ	DJ
DRAWN	DESIGN	APPROVED

AREA HERMANN NORTH		CAT. GEOPHYSICS
DRAWING TITLE		
GEOPHYSICAL SURVEY RESISTIVITY - LINE 3		
DRAWING NO. 84-601-19-003		SCALE N.A.
		REV. 0

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AREA HERMANN NORTH

CAT. GEOPHYSICS

DRAWING TITLE

GEOPHYSICAL SURVEY  
RESISTIVITY - LINE 4

DRAWING NO.

84-601-19-004

SCALE

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DRAWN	DESIGN	APPROVED



QUINTETTE COAL LIMITED

GROUND RESISTIVITY SURVEYS

by - Milan Hlava

date - November 1, 1983

# QUINTETTE COAL LIMITED

## Ground Resistivity Surveys

### INTRODUCTION

An experimental ground resistivity survey was conducted on the QCL property during the 1983 field season with the following objectives: i) detection and delineation of sub-crop coal seams within 10 m of the surface and ii) prediction of the depth and thickness of coal seams within 100 m of the surface.

The survey was conducted within the McConkey and Frame active mining areas. Two other areas, Hermann and Dupont, were also covered by these surveys. Over 5 line km were surveyed (see Areas Surveyed and Location of Profiles). Depth soundings were intended to be confined primarily to the pit area but due to lack of ground moisture causing poor electrode contact, little success was attained. However, depth soundings outside the pit area, yielded adequate results.

### THE SURVEY TECHNIQUE & FIELD PROCEDURE

Along with its ability to determine sub-surface lithologies, the resistivity method is also a valuable tool in the determination of sub-surface geologic structure, and mapping the relief of the bedrock. Direct current or a current from a very low frequency a.c. source is fed into the ground at two points and the voltage difference between two other points is measured, allowing the determination of the apparent resistivity of the ground. Formations carrying conductive ground water will display low resistivities. Other rock formations will show medium to high resistivities and the coal will show very high resistivity.

The resistivity method may not give meaningful results when the surface material is a very poor conductor, or when this material is frozen and when ground contact is poor.

The instrument used for the surveys was a RSP-6 D.C., Resistivity and Self-Potential unit manufactured by Scintrex Ltd. The maximum power output of this instrument is 180 volts and 645 volts with an auxilliary battery pack which was used for depth soundings.

The Slumberger array with  $L=15m$  and  $MN=2m$  was used. This array had an effective depth penetration of 7-10m. The readings were taken generally at 15 m intervals and occasionally at 10 m intervals.

AREAS SURVEYED AND LOCATION OF PROFILES

Figure 1 shows general location of resistivity survey lines and location of depth soundings. The following table summarizes survey lines by "area" along with Ref. I.D. (section).

1. McConkey Area

<u>LINE</u>	<u>SECTION</u>	<u>LENGTH</u>	<u>NO. OF RDGS.</u>
1	Seismic Line	910 m	91
2	37200	460 m	46
3	37100	675 m	45
4	36600	380 m	38
5	36300	330 m	33
6	36000	310 m	31
7	35800	300 m	30
8	35620	120 m	12
9	Access Rd	120 m	12
10	Vertical Seam	40 m	4
11	Test Line	450 m	45

2. Frame Area

<u>LINE</u>	<u>SECTION</u>	<u>LENGTH</u>	<u>NO. OF RDGS.</u>
1	36400	400 m	40
2	36000	80 m	8
3	36285	165 m	11
4	36100	165 m	11
5	35900	240 m	16

3. Hermann Area - Nabor's Road

<u>LINE</u>	<u>SECTION</u>	<u>LENGTH</u>	<u>NO. OF RDGS.</u>
1	Road	2265 m	151
2	Seismic Line	510 m	34
3	Line 3	1005 m	67
4	Line 4	510 m	34

4. Dupont Licence Area - Depth Soundings

<u>NUMBER</u>	<u>NO. OF RDGS.</u>
1	27
2	20
3	22
4	21
5	20

RESULTS AND INTERPRETATION

The detail results of the surveys are appendet to this summary report. Copies of the same were left with D. Lortie, Exploration Geologist, Quintette Coal Ltd. The profiles show a large variation of resistivity values range from 180 ohm

metres to 6000 ohm metres. A resistivity value of 250 ohm metres is typical of a shale and mudstone layer, while a higher value of 400-500 ohm metres would be associated with a sandstone. The coal seams are well reflected on the profiles showing values greater than 500 ohm metres. The width and magnitude of the anomalies over coal seams is variable and depending upon dip and thickness of the coal seam in question. Very low (< 200 ohm metres) readings are indicative of fault zones.

#### PROBLEMS

Several problems were encountered with the resistivity method during the course of the field survey. Steep topography, resulting in a lack of ground moisture on the hill tops, created poor contact between the electrodes and the ground. Under these circumstances high resistivity and low current readings were recorded making a correlation with other areas impossible. Depth soundings were also hampered by this, but further complicated by concrete-like ground found on the benches making it almost impossible to implant the electrodes.

Finally, due to inadequate waterproofing of the particular equipment used, surveys could not be conducted on rainy days.

#### SUMMARY AND CONCLUSIONS

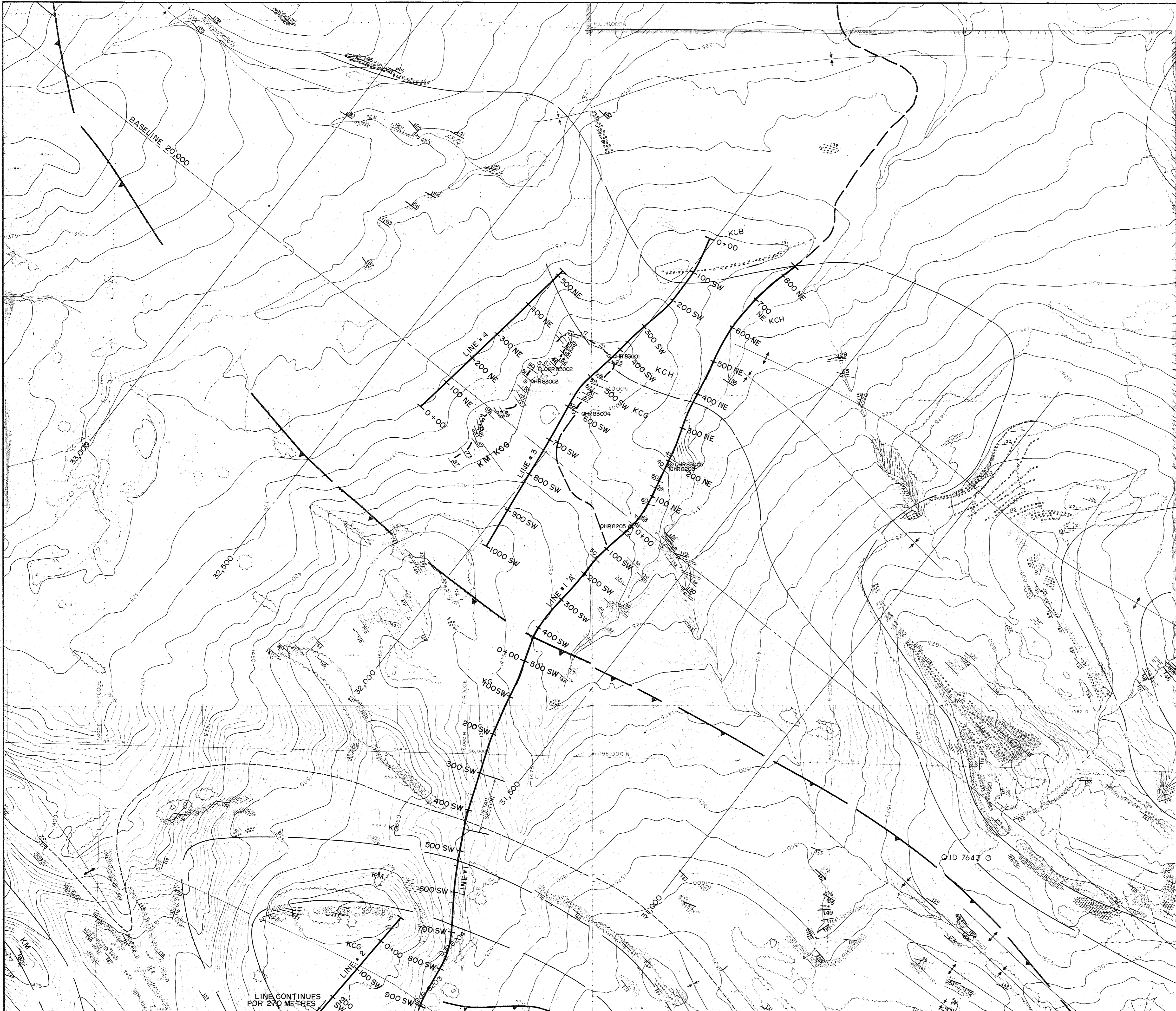
The results of the survey confirmed expectations that the simple electrical resistivity geophysical method can be used as a valuable aid to the coal exploration program. The most important aids are:

- locating the subcrop of the coal seam.
- locating and the detecting of faults.
- mapping of lithological units.

The second objective of the surveys (depth and thickness of coal seam determinations) did not prove to be useful for the reasons mentioned above.

APPENDIX 111

HERMANN AREA - NABOR'S ROAD



N

NOTE: CHAINED DISTANCES DURING GEOPHYSICAL SURVEYING WERE NOT EXACT — THEREFORE THERE ARE USUALLY A FEW METRES MORE OR LESS THAN 100m IN CHAIN MEASURED DISTANCES.

**LEGEND:**

- LINE # 2  
100m NE
- COAL LICENSE BOUNDARY
- ROAD
- QHR83004
- 158
- THRUST FAULT
- COAL SEAM OUTCROP (TOP OF SEAM)
- GEOLOGICAL CONTACT
- ANTICLINE
- SYNCLINE

**GEOLOGICAL FORMATIONS:**

- KS SHAFTESBURY
- KCB BOULDER CREEK
- KCH HULCROSS
- KCG GATES
- KM MOOSEBAR
- KG GETHING

10 0 25 50  
METRES

0	030484	ORIGINAL DRAFT - ON 83-601-20-001	EAH	DJ	DJ		
Rev.	D	M	Y	Revision Description	Drn.	Des.	App.

**QUINETTE COAL LIMITED**  
Project Manager

**DENISON MINES LIMITED**  
COAL DIVISION

Area **HERMANN** Category **GEOPHYSICS**

Drawing Title  
**HERMANN NORTH  
GEOPHYSICAL EXPLORATION**

**617**

Scale 1 : 5000	Drawing No. 84 - 601 - 19 - 001	Rev. 0
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LINE CONTINUES FOR 270 METRES

**APPENDIX 11**

**REGIONAL CORRELATION CHART**



WOLVERINE AREA

FRAME PIT

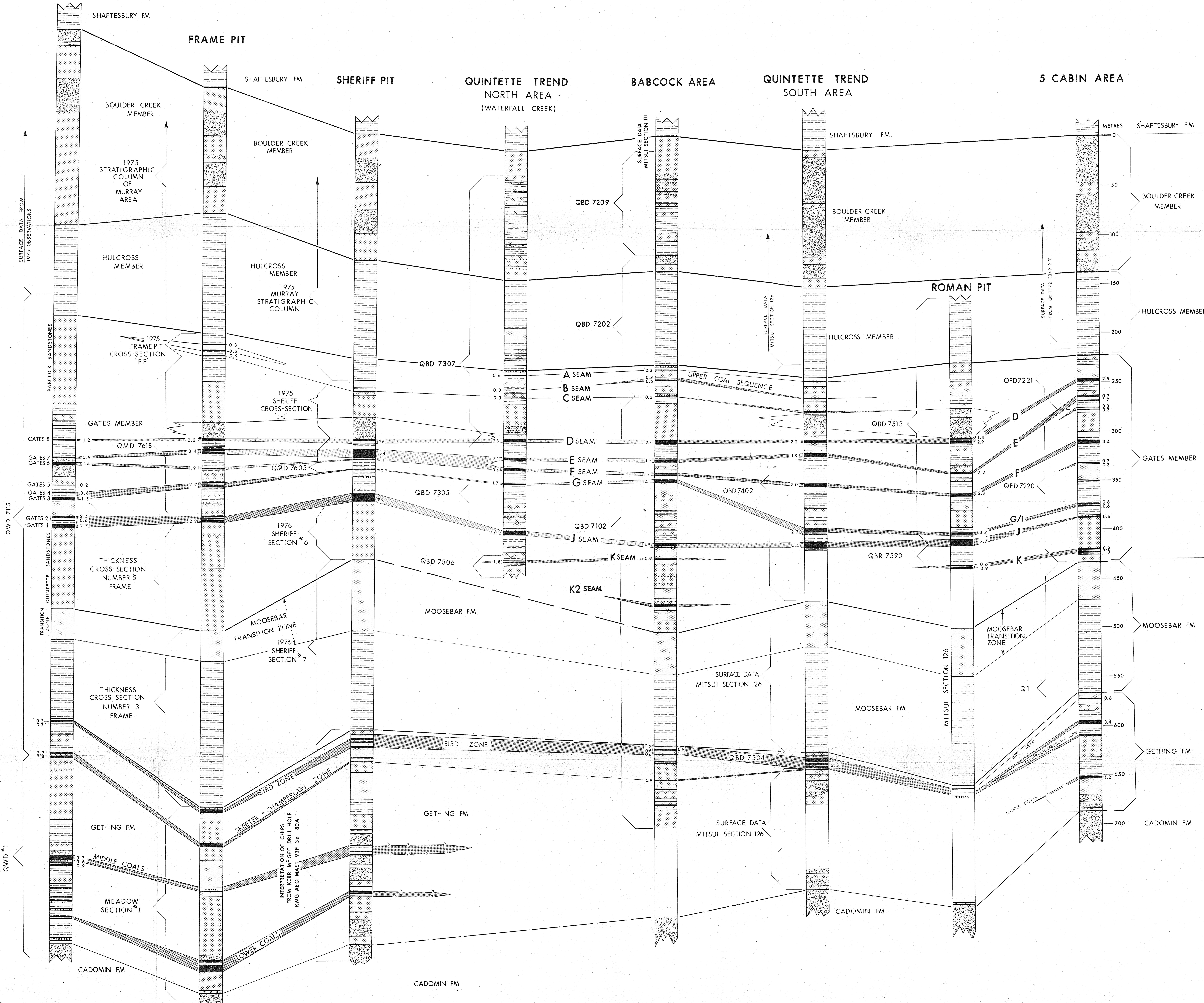
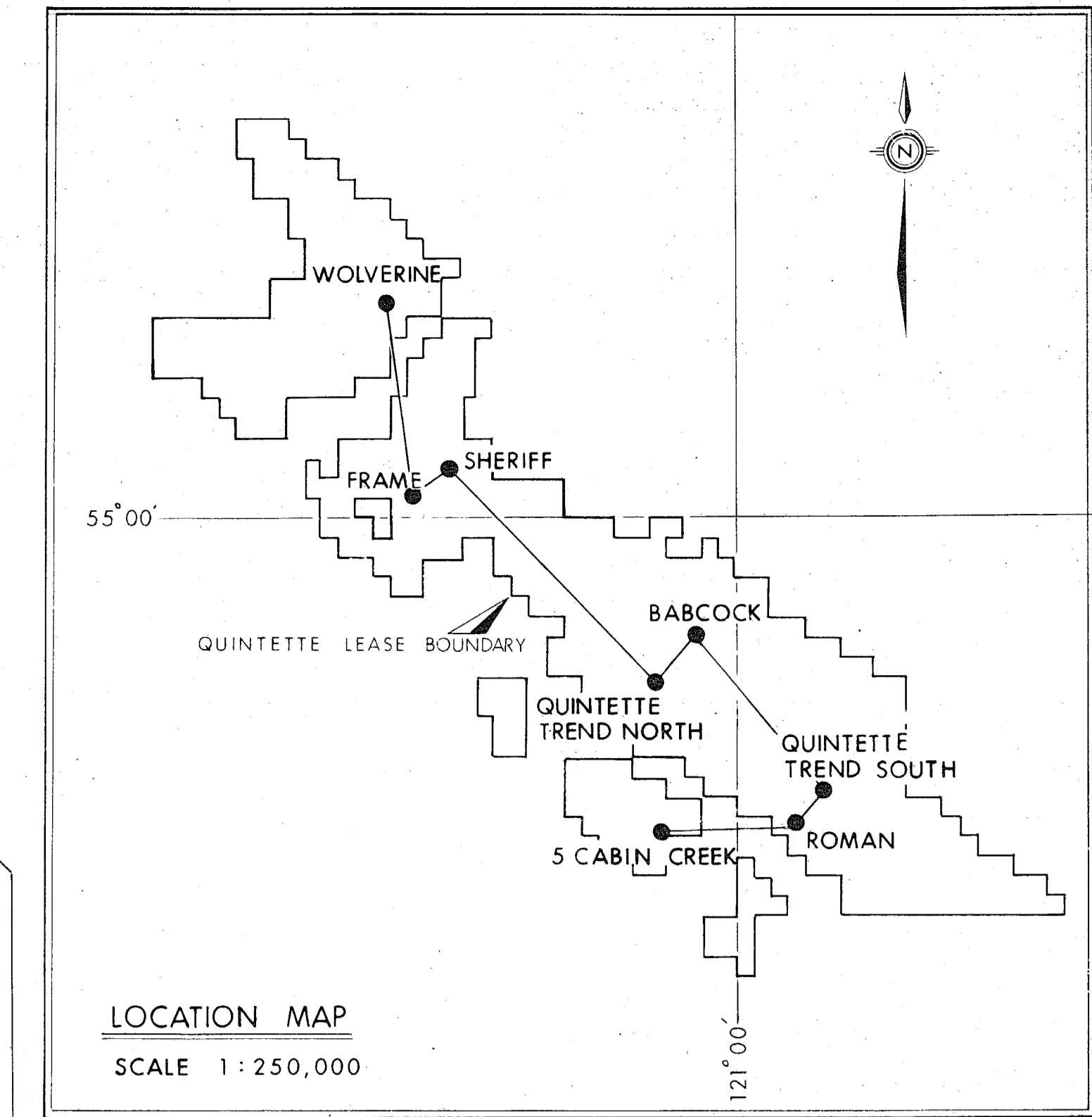
SHERIFF PIT

QUINETTE TREND NORTH AREA (WATERFALL CREEK)

BABCOCK AREA

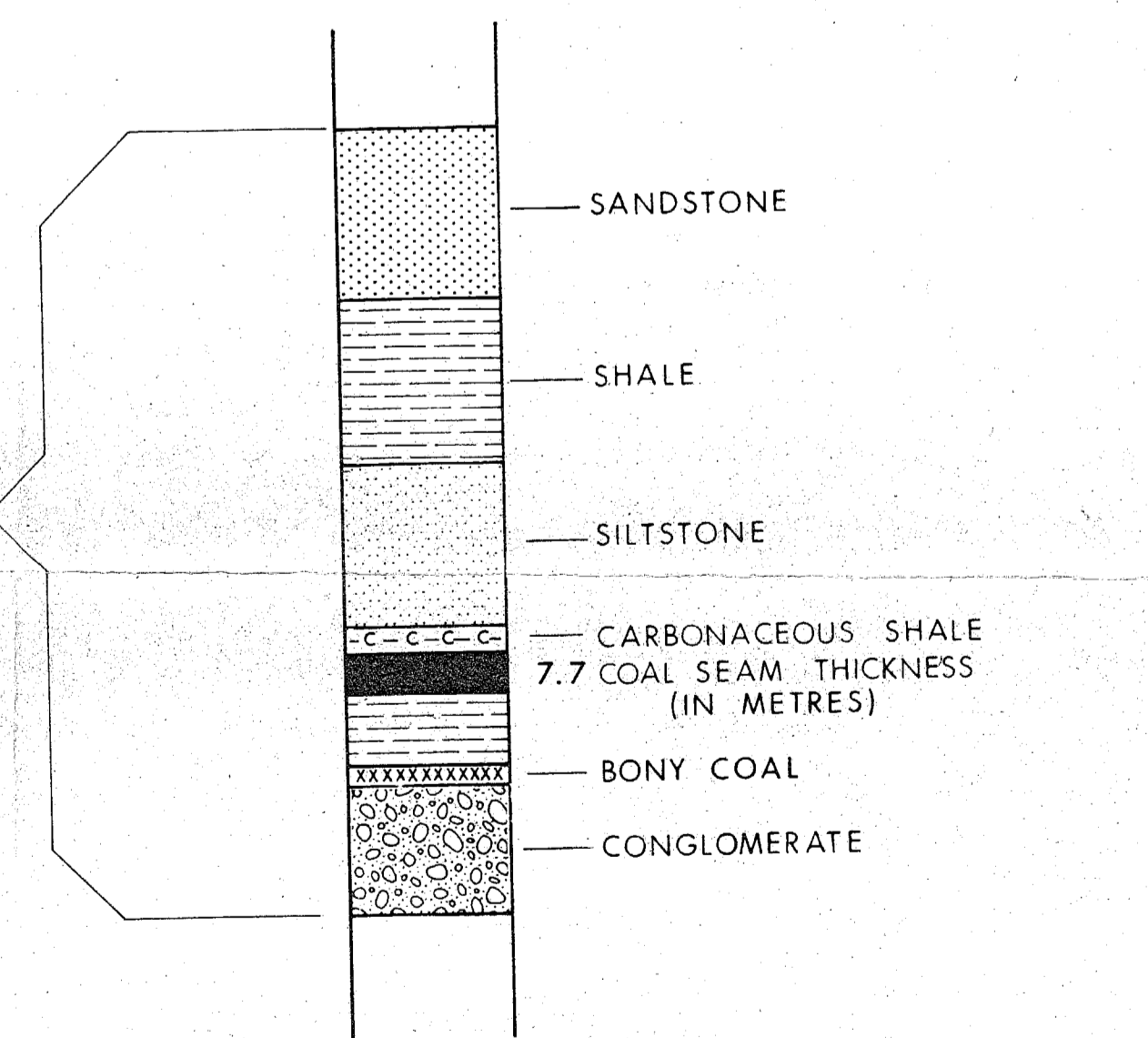
QUINETTE TREND SOUTH AREA

5 CABIN AREA



COMMOTION FORMATION

LEGEND:



617

NO.	DATE
DESCRIPTION	BY
REVISIONS	

**QUINETTE COAL LIMITED**

PREPARED BY DENISON MINES LIMITED

**QUINETTE REGIONAL CORRELATION CHART**

DRAWN BY: C.D.	DATE: Feb '76	SCALE: 1:1,000 vert.
Prepared by:	Date:	
Approved by:	Drawing No. QNIT 76-0647-80.4	