

CROW RIDGE

(BURNT RIDGE EXTENSION)

PROGRESS REPORT

1996

FORDING COAL
GREENHILLS MINE

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INTRODUCTION

Location

Crow Ridge (Burnt Ridge Extension) is located between the Elk River and Fording River valleys, some 6 km. north east of the town of Elkford in south-eastern British Columbia. The ridge is centered at approximately $50^{\circ} 06'$ latitude and $115^{\circ} 50'$ longitude and extends south from the southern end of the Greenhills Range to the Fording River valley, some 7 km. long and 2km. wide. A location map is in appendix 1.

Access

Access to Crow Ridge is gained by traveling from Elkford, along the Fording Coal mine access road, 5km to the Fording Greenhills mine gatehouse. From the gatehouse, continue east along mine facility roads to the Crow Ridge exploration road. The exploration road is about 6 km. in length.

Land Description

In 1968, Kaiser Resources Ltd. acquired the coal rights to 44,000 ha. of land previously held by Crows Nest Industries. The Crow Ridge portion of that area is approximately 1,100 ha. of coal bearing land which is presently owned by Fording Coal and managed by Fording's Greenhills mine. The adjacent property to the east of Crow Ridge is under license to Manalta Coal whereas, land to the north, south and west is owned by Fording Coal. The property boundary for Crow Ridge is shown on the location map in appendix 1.

Topography

Crow Ridge is a north-south trending ridge approximately 7 km. in length and 2 km in width. The total relief is 600 metres; from the Fording River valley floor at 1530m., to the ridge top at 2130m. The area is bound on the north, east and south by the Fording River valley and to the west by the Greenhills Creek drainage. The slope of the upper portion of the west side of the ridge is steep, 33° , with sandstone cliffs and sparse conifers while the lower section has a 23° slope and is heavily treed. Small creeks on the

west slope merge with the Greenhills Creek and flow south into the Fording River. The east side of the ridge is also steep, 28° slope over all, while the slope of the bottom 200m. is steeper at some 32°. The north-east facing areas are moderately treed and the south-east facing areas, of the lower portion of the ridge, are open grassland with scattered trees. Seasonal creeks on the east side flow directly into the Fording River.

PREVIOUS EXPLORATION

In 1970, the Crow Ridge main access road and several branch exploration roads were constructed. A road, some 2.5km. in length, roughly tracing 010 seam on the top west side of the ridge was also built at this time. The following year, 1971, Adit #1 was driven in 010 seam at the southern end of the present study area.

In 1977, dozer work was done to upgrade roads for the 1978 field season.

The exploration program in 1978 was fairly extensive with five diamond drill holes completed, totaling 1,788 metres. Construction of new roads totaled 2,600m. and 1,700m. of road was upgraded. Stratigraphy was mapped and measured and coal seams were hand trenched, measured and sampled. Outcrop samples were analyzed at Kaiser Resources Central Laboratory. All roads, some 11km., and the drill holes were surveyed. The program took five months, July to November, to complete.

In 1979, seven (7) rotary drill holes were done for a total of 1312 metres. A second adit, Adit #26, was driven in the north end outcrop of 010 seam and Adit #27 was started in 030 seam but was not completed. New road construction for drill site access totaled 1600m and a road connecting Crow Ridge to the Greenhills mine site, 6100m., was built. More mapping and hand trenching of coal seams took place.

Under the new name of Westar Mining Ltd., in 1984, seven (7) reverse circulation rotary drill holes were completed for a total of 1020 metres drilled. In 1985, two (2) more holes were drilled for a total of 292m. No exploration took place between 1986 and 1995.

1996 EXPLORATION

The 1996 exploration program consisted of sixteen (16) reverse circulation rotary drill holes completed for a total of 2919 metres. New road constructed totaled 4.5 km., with 8.5 km. of existing road upgraded. Drill hole samples were analyzed at both the Fording Greenhills mine and Elk Valley Environmental laboratories.

GENERAL GEOLOGY

Stratigraphy

Jurassic - Fernie Formation

The Fernie Formation, which lays beneath the Kootenay Group, forms most of the west side of Crow Ridge. The formation is very thick but the lower contact is not observed, so a thickness is not available. Sediments in the Fernie Fm. are mainly silty and calcareous shales deposited in a marine environment.

Cretaceous - Mist Mountain Group

The Kootenay Group of sediments conformably overlies the Fernie Formation. This Group was deposited in a deltaic environment. The bottom 250 to 450m of the Kootenay is present on Fording Coal's Crow Ridge; a function of the position of the property boundary. At the north end of Crow Ridge, beyond 49,000 N, the upper portion of the Kootenay Gp., east of Fording property, is on Manalta Coal licenses.

The Morrissey Formation, the lower most portion of the Kootenay Gp., contains the Weary Ridge Member and the Moose Mountain Member. The Weary Ridge Mbr. is composed of interbedded sandstones and siltstones and the Moose Mtn. Mbr. is a medium to coarse grained sandstone. The Moose Sandstone is massive at the top, becoming finer and bedded towards the bottom. It is 25 to 45m thick and is a prominent cliff former on the upper west side of Crow Ridge. It is also the base of the coal-bearing, Mist Mtn. Formation.

The Mist Mountain Formation overlies the Morrissey Fm. with only the bottom 180 to 400m present on Fording's property. It is made up of interbedded sandstones, siltstones, mudstones and coal seams. The sandstones are fine to medium grained and typically cross-bedded. The siltstones and mudstones are usually thinly bedded. Coal seams of commercial thickness and quality occur throughout the Mist Mtn. Formation.

The Elk Formation overlies the Mist Mtn. Fm. and consists of interbedded siltstone, very thick sandstone units and several minor, lens-shaped coal seams. The Elk Fm. is not present on Crow Ridge.

The position of the formations is shown on the geologic map in appendix 1 and below in Table 1.

Table 1

TABLE OF FORMATIONS						
ERA	PERIOD	FORMATION		LITHOLOGY	THICKNESS (M)	
Mesozoic	Lower Cretaceous	Cadomin Fm.		non-marine: sandstone, conglomerate and shale	360-1980	
		Pocaterra Creek		non-marine: sandstones, conglomerate, siltstones and shales		
	Lower Cretaceous and Jurassic	Kootenay Group	Elk Formation		non-marine: interbedded medium to coarse grain sandstone, chert-pebble conglomerate with minor siltstone shale and uneconomic coals	150-490
			Mist Mtn. Formation		non-marine and brackish: interbedded coal, siltstones, shales and sandstones	380-650
			Morrissey Formation	Moose Mtn	non-marine: massive cliff-forming sandstone	40-60
	Weary Ridge					
Jurassic	Fernie Fm.		marine: shales, siltstone, sandstone, limestone	180-380		

Structure

Sediments on Crow Ridge make up the west limb of the Alexander Creek Syncline. The bedding dips to the east and the angle varies from 35° to 65° and in places dip-slope conditions occur on the east side of the ridge. The axis of the syncline strikes north - south, approximately follows the Fording River and has a very slight plunge to the north.

ECONOMIC GEOLOGY

Crow Ridge can be separated into two parts based on available geologic data. North of 49,000N latitude, good outcrop, drill hole and adit data exists. This is the area under investigation for potential strip mining. South of 49,000N, there is very little outcrop data and the existing three drill holes are 1.6km apart. Therefore, at this time there is insufficient data to evaluate the southern portion of the ridge.

Coal Seams

Although the coal seams are laterally continuous, they can vary a great deal in thickness. The major coal seam in the northern portion of Crow Ridge is 010 seam, with 030 and 012 being the next most important. Those seams of lesser significance are 050, 011, 014 and 001. See Table 2 for coal volumes.

010 seam This is the lower-most major seam in the Mist Mtn. Fm. which lies some 35 metres above the top of the Moose Mtn. sandstone. The seam averages 8.0m in thickness and both the hangingwall and footwall rock composition is a silty shale.

030 seam Three seam lies approximately 75 metres above the Moose Mtn. sandstone and has an average thickness of 3.4m. The hangingwall and footwall rock is a shale also.

012 seam This seam is a 'lower' split of 010 seam which lies about seven (7) metres below 010 seam and 25 metres above the Moose Mtn. sandstone. It has an average thickness of 1.7m. The hangingwall rock is a silty shale while the footwall is a shale.

Coal Quality

Analysis of drill hole and adit samples indicate the coal is low volatile, bituminous rank. The major seams have vitrinite reflectance values ranging from 1.29 to 1.38, inert maceral values ranging from 30 to 37 % and dilatation and fluidity values are low with predicted stability indices between 50 and 60. Clean ash values range between 7 and 8% at 1.50 s.g. separation, clean sulphur is between 0.40 and 0.55% and clean volatiles between 20 and 22%. A summary of drill hole quality information for all seams and as well as adit data on 010 seam is listed in appendix 2.

Coal Reserves

Coal volumes on Crow Ridge can be classified as "measured resources". These are volumes computed from information revealed in outcrops, trenches, mine workings and boreholes. The spacing of points of observation, necessary to justify confidence in the character and continuity of coal seams, are separated by distances of less than 300 metres. The volume of coal contained within the area bounded by the property line on the east side and the outcrop of 001 seam on the west (see the reserves map in appendix 1) is shown on Table 2.

TABLE 2 Total Coal Resources

<u>Seam</u>	<u>Volume (kbcm)</u>
050	480.8
030	1029.4
011	392.5
010	4049.3
012	723.0
014	210.9
001	<u>21.4</u>
Total coal resources	6907.3 (kbcm)

Recoverable coal refers to that portion of the coal in mineable seams that can be recovered with the mining techniques considered in the feasibility study (see the reserves map and geologic sections in appendix 1 for the "dipper L06" pit outline). In the Lerchs-Grossmann volumes analysis, consideration for mining loss and dilution of the seams as well as a 45° slope (representing a footwall push-back, as recommended by Golder Associates, 1986) for the final pit footwall are factored into the volumes shown on Table 3.

TABLE 3 Mineable Coal Reserves

<u>Seam</u>	<u>Met (kbcm)</u>	<u>Ox (kbcm)</u>
050	266.3	99.7
030	576.8	141.8
011	247.8	23.7
010	2506.2	280.2
012	367.3	28.5
014	87.7	8.2
001	<u>0.0</u>	<u>0.0</u>
Totals	4052.0	582.1
Total recoverable coal		4634.1 (kbcm)
Total waste		35690.2 (kbcm)
Strip ratio (bcm waste/ bcm raw coal)		7.7:1

CROW RIDGE EAST

Crow Ridge East is the portion of the ridge adjacent to and east of Fording's property and presently under licence to Manalta Coal Ltd. A report on the area, published by Dr. Barry Ryan for Crows Nest Resources (1986) resides in the Fording Greenhills Engineering library. The report describes the geology, coal reserve volumes and contains seam quality information. A copy of the quality is in appendix 3.

Using outcrop and drill hole data, obtained by Westar Mining from Crows Nest Resources back in the 1980's, in conjunction with data from the report by Dr. Ryan, a geologic model was constructed of this area. For the purpose of maintaining continuity of seam names from Fording Greenhills mine to Crow Ridge East, seam names in the Crows Nest data were changed to Fording's nomenclature. This change was based on each seams stratigraphic position relative to 010 seam. A chart of seam name equivalency appears in appendix 3.

Coal volumes for Crow Ridge East would be considered "indicated resources". These are volumes computed partly from specific measurements and partly from reasonable geological projections. The points of observation should be separated by less than 600 metres but more than 300 metres. The "indicated resources" are listed below in Table 4.

Recoverable coal refers to that portion of the coal in mineable seams that can be recovered with the mining techniques considered in the feasibility study (see the reserves map and geologic sections in appendix 1 for the "dipper L06" pit outline). In the Lerchs-Grossmann volumes analysis, consideration for mining loss and dilution of the seams as well as a 45° slope (representing a footwall push-back) for the final pit footwall are factored into the mineable coal volumes, for Crow Ridge East, shown on Table 5.

TABLE 4 Total Coal Resources (Crow Ridge East)

<u>Seam</u>	<u>Volume (kbcm)</u>
160	790.2
164	217.4
130	513.6
110	1440.8
112	402.7
114	37.5
100	1283.2
102	640.9
104	723.0
090	1833.3
092	1911.5
070	3325.2
072	5256.7
050	933.8
030	2224.5
010	3934.9
012	<u>781.9</u>
Total coal resources	26476.3 (kbcm)

TABLE 5 Mineable Coal Reserves (Crow Ridge East)

<u>Seam</u>	<u>Met (kbcm)</u>	<u>Ox (kbcm)</u>
160	294.7	122.9
164	109.5	36.8
130	266.2	50.5
110	856.0	131.9
112	310.3	43.9
114	36.1	0.5
100	824.2	115.7
102	487.6	74.4
104	560.4	74.6
090	1390.0	128.1
092	1428.9	116.6
070	2409.7	182.9
072	3512.7	315.8
050	11.9	0.2
030	5.8	3.7
010	6.2	2.5
012	<u>2.0</u>	<u>0.4</u>
Totals	12512.3	1401.4
Total recoverable coal		13913.7 (kbcm)
Total waste		104384.8 (kbcm)
Strip ratio (bcm waste / bcm raw coal)		7.5:1

Crow Ridge East Quality

The following is taken from Dr. Ryan's report:

All the proximate analysis data available for the upper seams are tabulated on a seam by seam basis in Enclosures 13 and 14. Enclosure 13 lists, by seam, all the drill hole quality data available for seams 5 to 18; this includes all the data for 1986 drill holes and some of the data from the 1981 and 1985 holes. All core samples were washed at 1.6 s.g. and all the moistures are on an air-dried basis. Enclosure 14 lists, by seam, all the trench quality data available for seams 6 to 18; this includes all the 1986 data and some 1980 and 1981 data. In some cases trench samples were washed at 1.6 s.g.; in other cases only raw analysis were performed. A copy of the data is attached in this report in enclosures 13 and 14.

Tables 7 and 8 provide mass weighted average quality data, on a seam by seam basis, for drill hole data and trench data. It should be appreciated that in some cases "averages" are based on only one or two intercepts. A copy of each table is given below.

BURNT RIDGE EXTENSION

TABLE 7

DRILL HOLE QUALITY - UPPER MIST MOUNTAIN SECTION

SEAM	RAW					WASH 1.6 SG							
	INTERCEPT THICKNESS	HOLE THICKNESS	RECOVERY	AIR DRIED BASIS	ASH	YIELD	AIR DRIED BASIS	ASH	VOLS	FIXED CARBON	FSI	CALS	SULPHUR
6	3.39	4.54	72.9	0.74	23.4	76.5	1.04	8.6	25.0	65.4	8.0	7653	0.79
7	4.38	4.38	51.4	0.75	38.9	52.7	1.14	7.2	26.8	64.1	7.0	7769	0.99
8	1.08	1.44	75.0	0.96	9.4	91.1	1.34	4.7	27.8	67.8	9.0	8071	1.03
9	3.32	3.32	60.7	0.86	15.4	85.3	0.98	5.7	27.2	66.9	8.5	7963	0.82
10	3.08	3.08	74.0	0.90	31.4	71.5	0.83	6.9	28.1	63.7	8.0	7676	0.79
11	1.76	4.70	85.8	0.92	30.2	67.3	1.07	8.7	27.8	62.4	8.0	7613	0.90
12	1.94	2.59	74.6	0.85	24.6	76.3	0.97	8.7	28.8	60.7	8.0	7572	0.81
13	2.12	2.82	82.4	0.93	19.7	80.8	1.14	5.3	30.4	63.6	8.0	7879	0.77
14	0.65	0.65	?	0.94	30.9	64.0	0.90	10.3	28.5	60.3	8.0	7541	0.91
15	1.30	1.95	80.9	0.92	17.0	86.7	0.80	7.5	29.4	61.1	7.5	7563	0.94
16	0.32	0.32	?	1.04	31.6	65.0	0.79	11.4	30.0	57.9	8.5	7419	0.79
17	1.96	2.94	78.5	1.76	26.6	61.0	1.65	6.6	29.2	62.4	1.0	7249	0.57
18	2.40	2.40	53.0	4.81	6.5	94.1	2.81	3.4	30.1	65.5	0.5	7112	0.64

NOTE 1: Some drill intercepts near collar oxidized ie. seams 17 and 18.

NOTE 2: Some drill holes only intersect lower part of seam resulting in an unrealistically thin average thickness.

NOTE 3: If the seam has thinned to zero in a drill hole, this does not influence calculation of average thickness which will then be unrealistically thick.

BURNT RIDGE EXTENSION

TABLE 8

TRENCH QUALITY DATA - UPPER MIST MOUNTAIN SECTION

<u>SEAM</u>	<u>INCREMENT THICKNESS</u>	<u>TRENCH THICKNESS</u>	<u>RAW DATA</u>		<u>WASH 1.65G</u>		
			<u>AIR DRIED BASIS</u>	<u>ASH</u>	<u>AIR DRIED BASIS</u>	<u>ASH</u>	<u>YIELD</u>
6	3.60	9.36	3.80	28.1	3.7	9.1	64.7
7	1.62	2.16	4.70	26.2	3.4	9.8	51.2
8	1.55	1.55	6.20	20.6	3.2	8.7	74.4
9	4.18	4.18	4.50	16.5	2.7	7.6	72.8
10	2.23	3.13	5.50	23.1	2.8	7.4	62.8
11	2.63	4.39	4.60	31.8	2.7	6.5	22.0
12	1.68	2.24	6.70	20.6	3.2	6.5	67.0
13	2.44	3.25	4.20	20.3	3.1	5.7	74.0
14	1.13	2.26	3.36	27.3			
15							
16	0.93	0.93	4.21	21.3			
17	1.78	5.34	3.37	29.4			
18	2.94	2.94	3.84	42.5			

CONCLUSIONS

Most of the coal reserves in Fording's Crow Ridge are low volatile, bituminous rank with higher values of vitrinite reflectance and inert maceral content, but lower rheological values than similar seams presently mined at Fording Greenhills Operation. Within the study area there are 6907.3 kbcm of coal resource of which 4634.1 kbcm are mineable at a strip ratio of 7.7:1, based on present economic parameters. This coal should be a suitable addition to the coals being mined at the Greenhills mine. In considering the Crow coals for blending purposes, further quality testing should be done on larger bulk samples.

As well, a more detailed pit design will be required. Particular attention should be paid to the stability of the pit footwall because of the steep bedding dips associated with the rock types in the stratigraphy below 010 seam. The 30 to 40 metres of rock below 010 seam composed of interbedded mudstones, carbonaceous mudstones and coal seams is prone to failure at steep dip angles.

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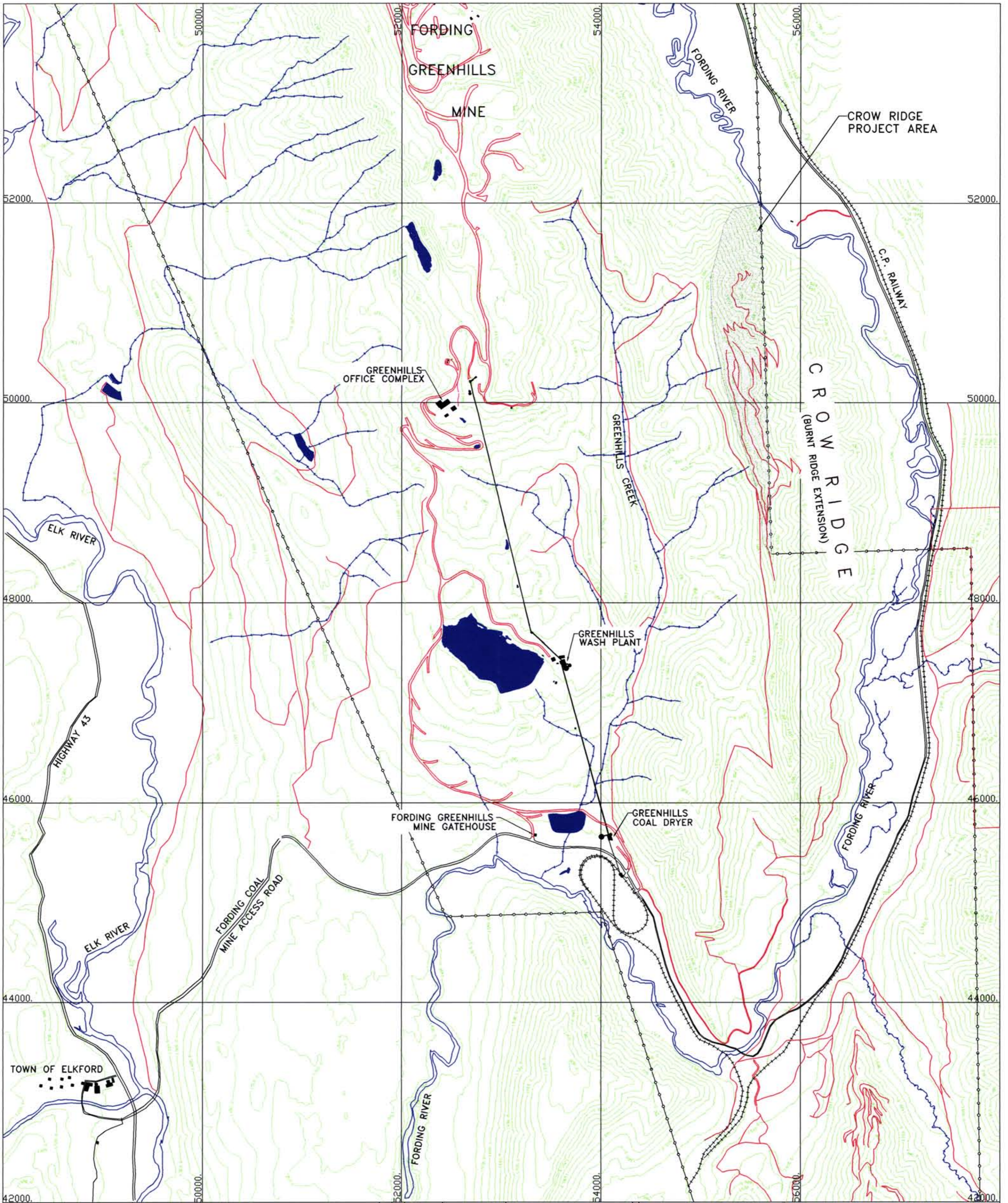
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APPENDIX 1



MAP SCALE



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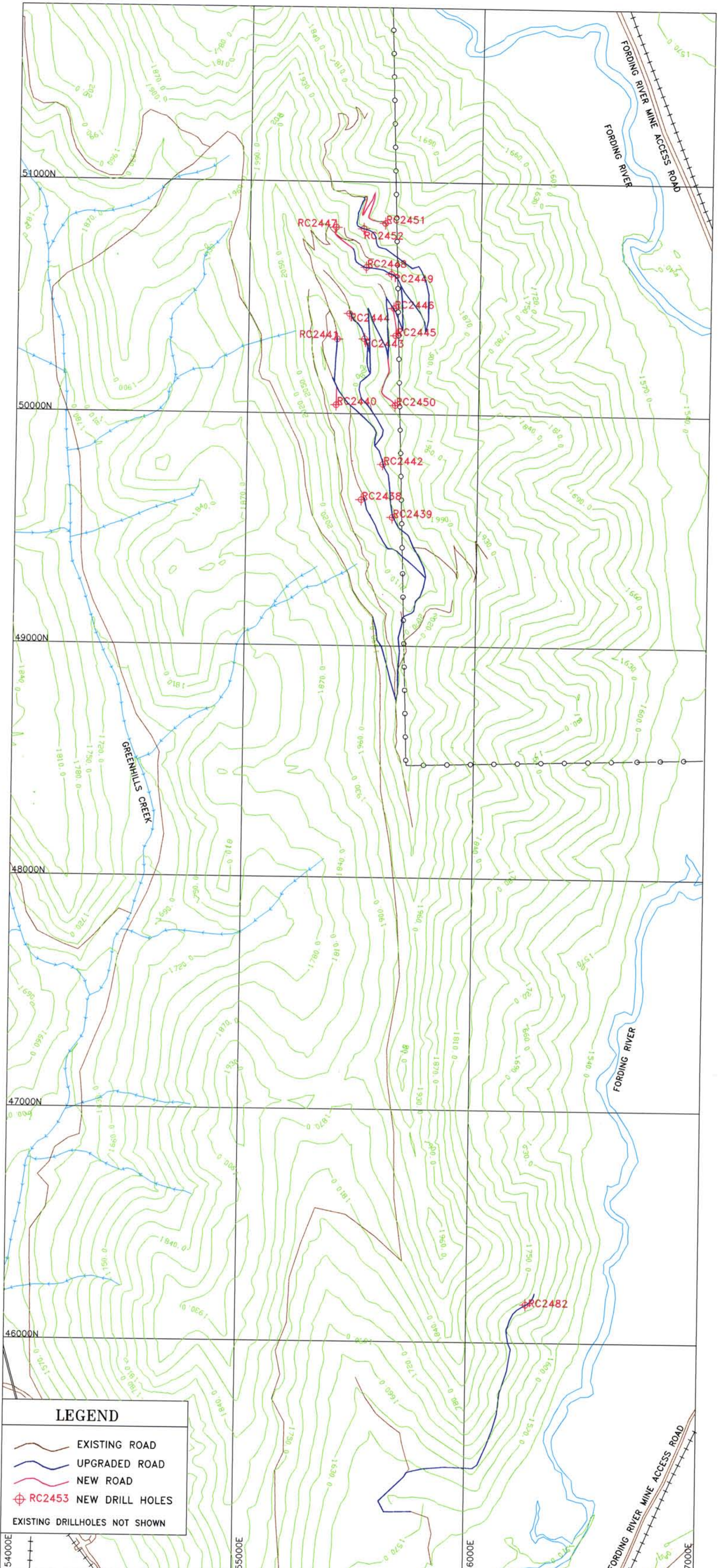
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LOCATION MAP CROW RIDGE

851

MAP INDEX NUMBER	SCALE	DRAWING NUMBER
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LEGEND

-  EXISTING ROAD
-  UPGRADED ROAD
-  NEW ROAD
-  RC2453 NEW DRILL HOLES
- EXISTING DRILLHOLES NOT SHOWN

MAP SCALE

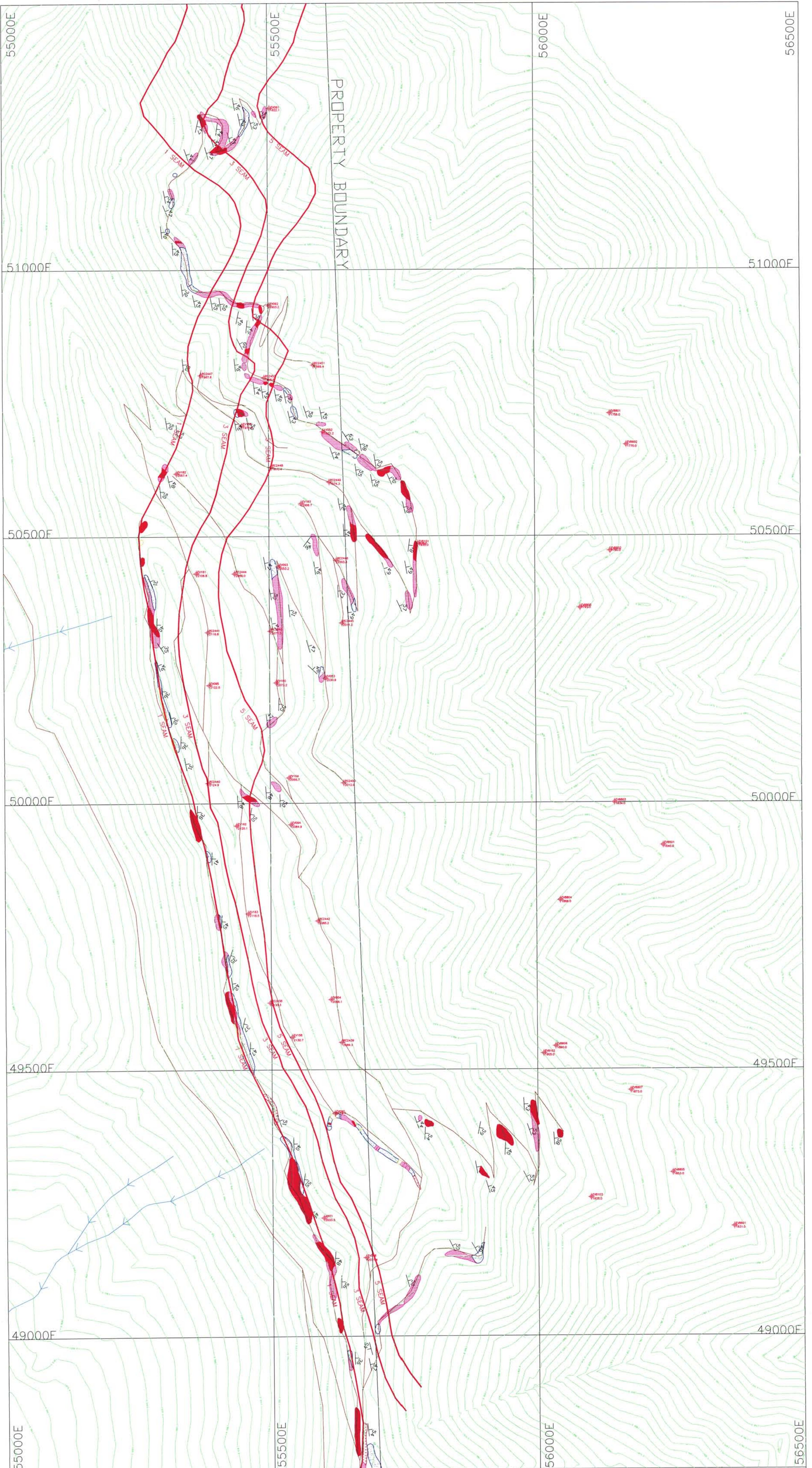


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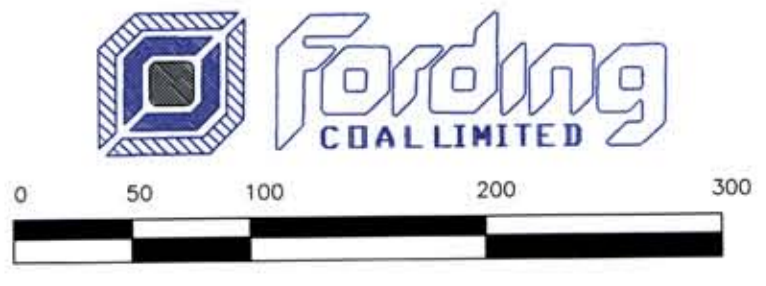
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WORK COMPLETED 1996**

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PROPERTY BOUNDARY

MAP SCALE

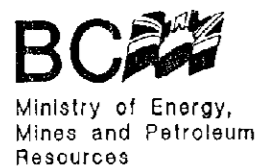


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FORDING CROW RIDGE 251
OUTCROP GEOLOGY MAP

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Geological Survey Branch

BULLETIN 82

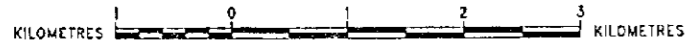
Figure 6, South Half

GEOLOGY OF THE ELK VALLEY COALFIELD

NTS 82G/10, 15; 82J/2, 6, 7, 10, 11

Geology by D. Grieve

Scale 1:50 000



LEGEND

CRETACEOUS

BLAINFORD GROUP

- bl Lower Blainford: Presence inferred; no exposures
- bc Cadomin Formation: Conglomerate

JURASSIC AND CRETACEOUS

KOOTENAY GROUP

- ke Elk Formation: Sandstone, siltstone, mudstone, minor coal, conglomerate locally
- kml Mt. Michael Formation: Siltstone, mudstone, sandstone, coal, conglomerate locally
- kmo Marissey Formation: Sandstone, locally conglomeratic, minor carbonaceous shale and coal

JURASSIC

- f Farnia Formation: Shale, siltstone, sandstone

TRIASSIC

- sr SPRAY RIVER GROUP: Siltstone, shale, limestone

PENNSYLVANIAN AND PERMIAN

- rm ROCKY MOUNTAIN SUPERGROUP: Quartzitic, calcareous and dolomitic sandstone

MISSISSIPPIAN

RUNDLE GROUP

- el Etherington Formation: Limestone

SYMBOLS

- Geological boundary: defined, approximate, assumed, gradational
- Bedding: inclined, vertical, overturned, tops unknown
- Thrust fault (teeth in direction of dip): defined, approximate, assumed
- Normal fault (its indicates downthrow side): defined, approximate, assumed
- Transverse fault (arrows indicate direction of movement): defined, approximate, assumed
- Syncline (upright arrow indicates direction of plunge): defined, approximate, assumed
- Syncline (overturned): defined, approximate, assumed
- Anticline (upright arrow indicates direction of plunge): defined, approximate, assumed
- Anticline (overturned): defined, approximate, assumed
- Contour (100 metre interval): defined, approximate, assumed
- Coal mines: defined, approximate, assumed
- High volatile bituminous: defined, approximate, assumed
- Medium volatile bituminous: defined, approximate, assumed
- Low volatile bituminous: defined, approximate, assumed
- Trmax on sample from basal coal zone: defined, approximate, assumed
- Location of measured sections (see list below): defined, approximate, assumed
- Location of drill cores used in this study (see list below): defined, approximate, assumed
- Limit of interpretation: defined, approximate, assumed
- Cross sections: defined, approximate, assumed
- Coal property and/or area names: LINE CREEK

LIST OF MEASURED SECTIONS

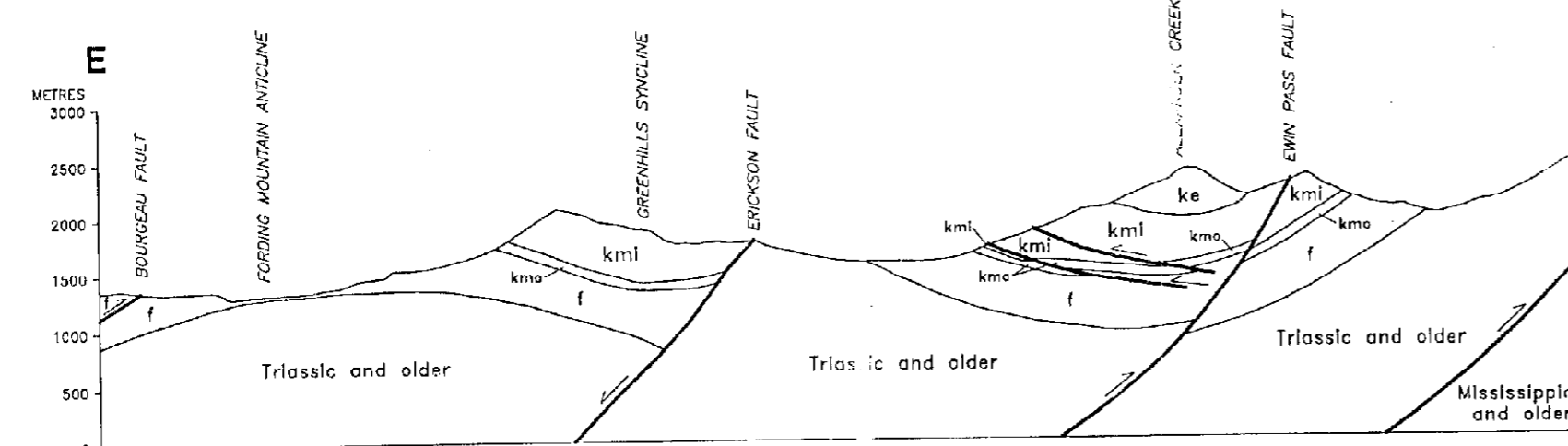
RANGE OF Trmax

- 1 Weary Ridge 1.54-1.07
- 2 Coal Creek 0.85-0.59
- 3 Mt. Vele 1.49-1.38
- 4 Mt. Tuxford 1.53-1.02
- 5 Greenhills Range 1.24-0.71
- 6 Burnt Ridge Extension 1.47-1.01
- 7 Imperial Ridge 1.29-1.02
- 8 Ewin Pass 1.32-1.07
- 9 Burnt Ridge 1.32-0.59
- 10 Burnt Ridge South 1.25-0.83
- 11 Mt. Michael upper sheet 1.17-0.52
- 12 Mt. Michael lower sheet 1.27-0.85
- 13 Nomsa Ridge 1.19-0.92
- 14 Horseshoe Ridge 1.38-1.14
- 15 Tee Pee Mountain 1.30-1.18
- 16 Crown Mountain 1.63-1.29

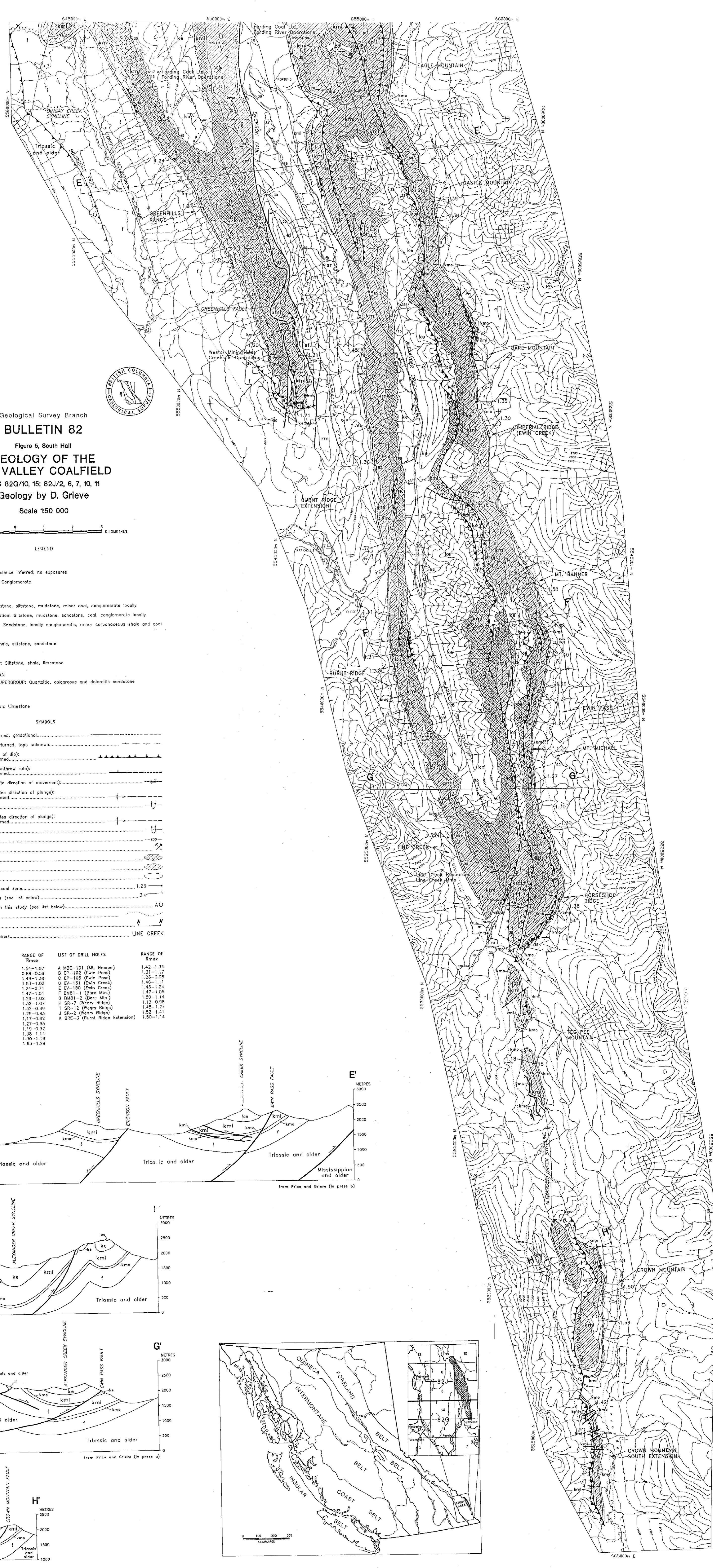
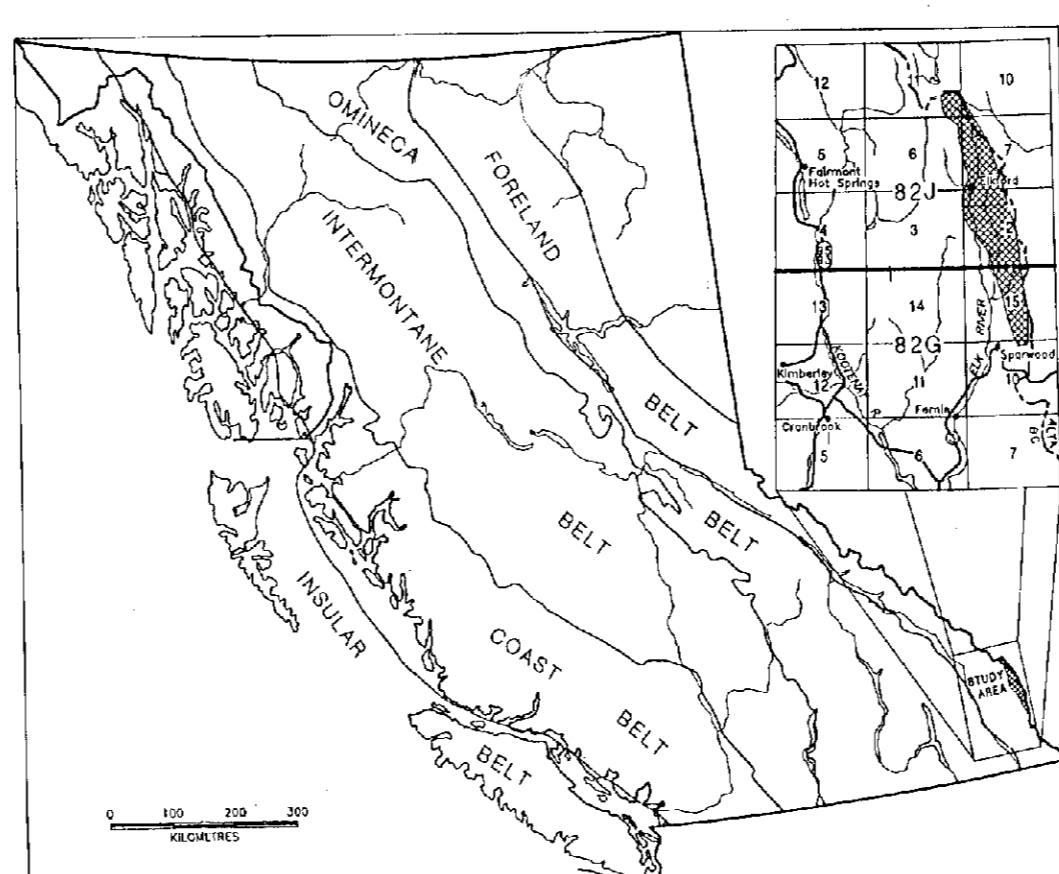
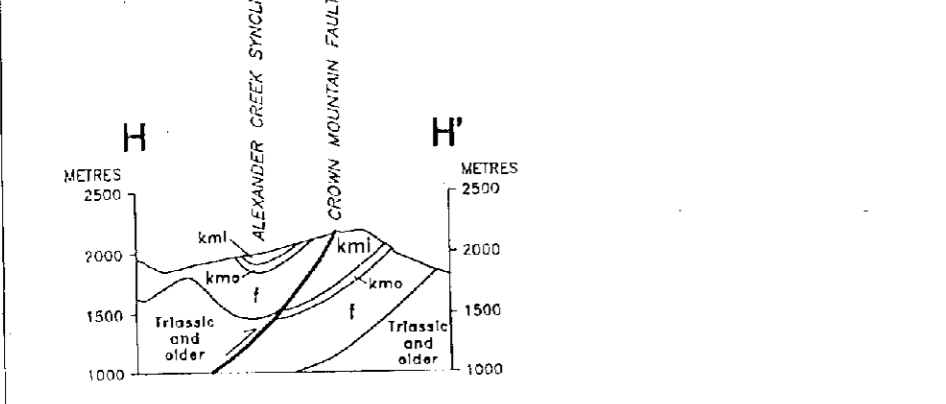
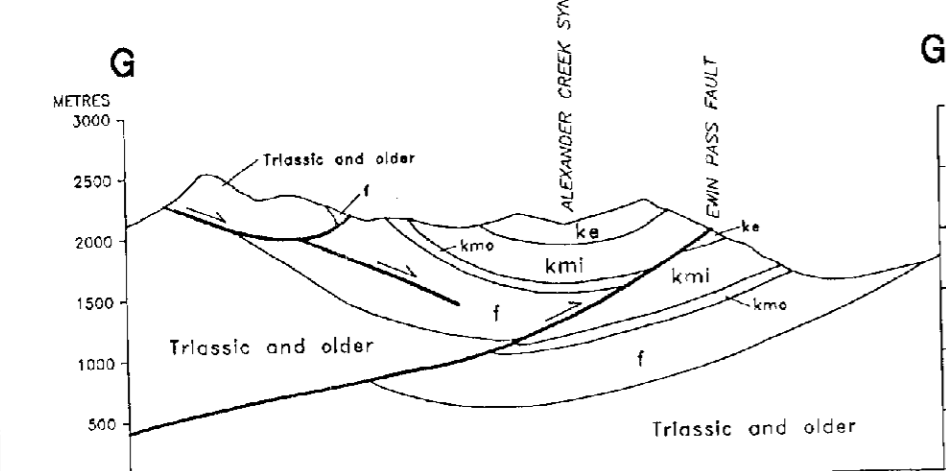
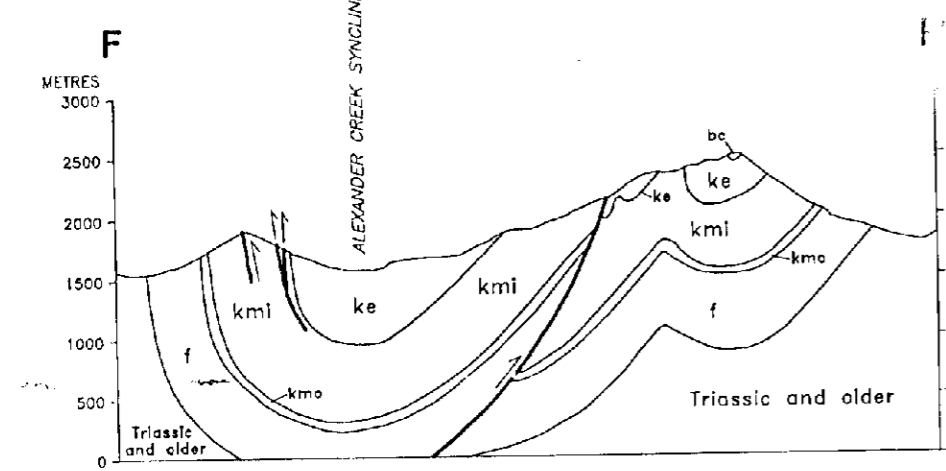
LIST OF DRILL HOLES

RANGE OF Trmax

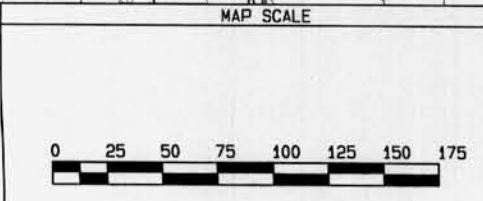
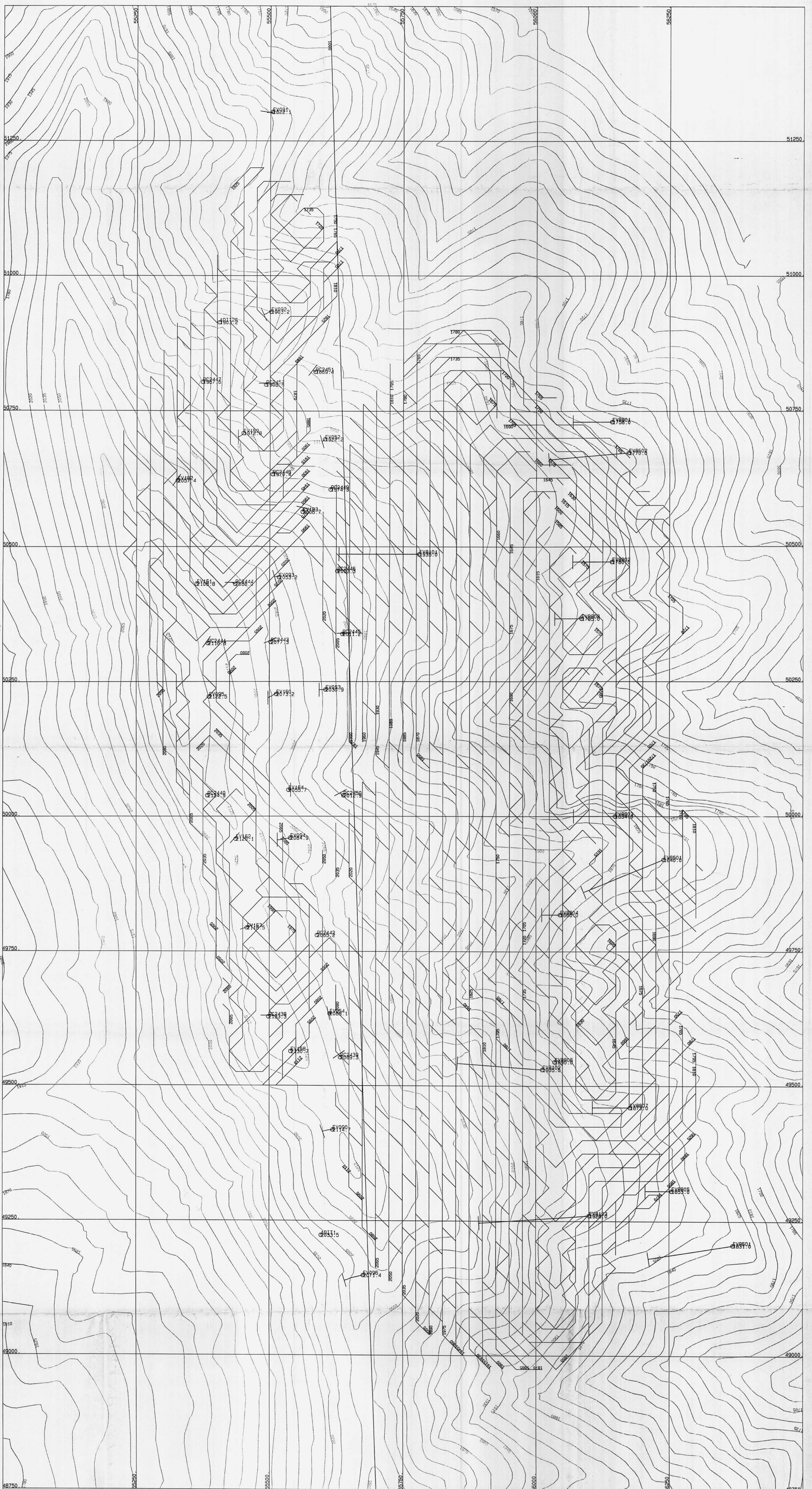
- A MDE-101 (Mt. Banner) 1.42-1.34
- B EP-102 (Ewin Pass) 1.31-1.17
- C EP-103 (Ewin Pass) 1.26-0.98
- D SR-151 (Ewin Creek) 1.46-1.11
- E EV-150 (Ewin Creek) 1.43-1.24
- F BMS1-1 (Bare Mt.) 1.47-1.05
- G BMS1-2 (Bare Mt.) 1.50-1.14
- H SR-7 (Weary Ridge) 1.13-0.98
- I SR-12 (Weary Ridge) 1.45-1.27
- J SR-2 (Weary Ridge) 1.52-1.41
- K BRE-3 (Burnt Ridge Extension) 1.50-1.14



From Price and Grieve (in press b)

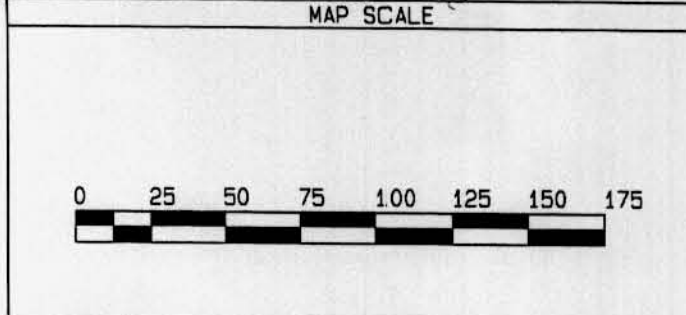
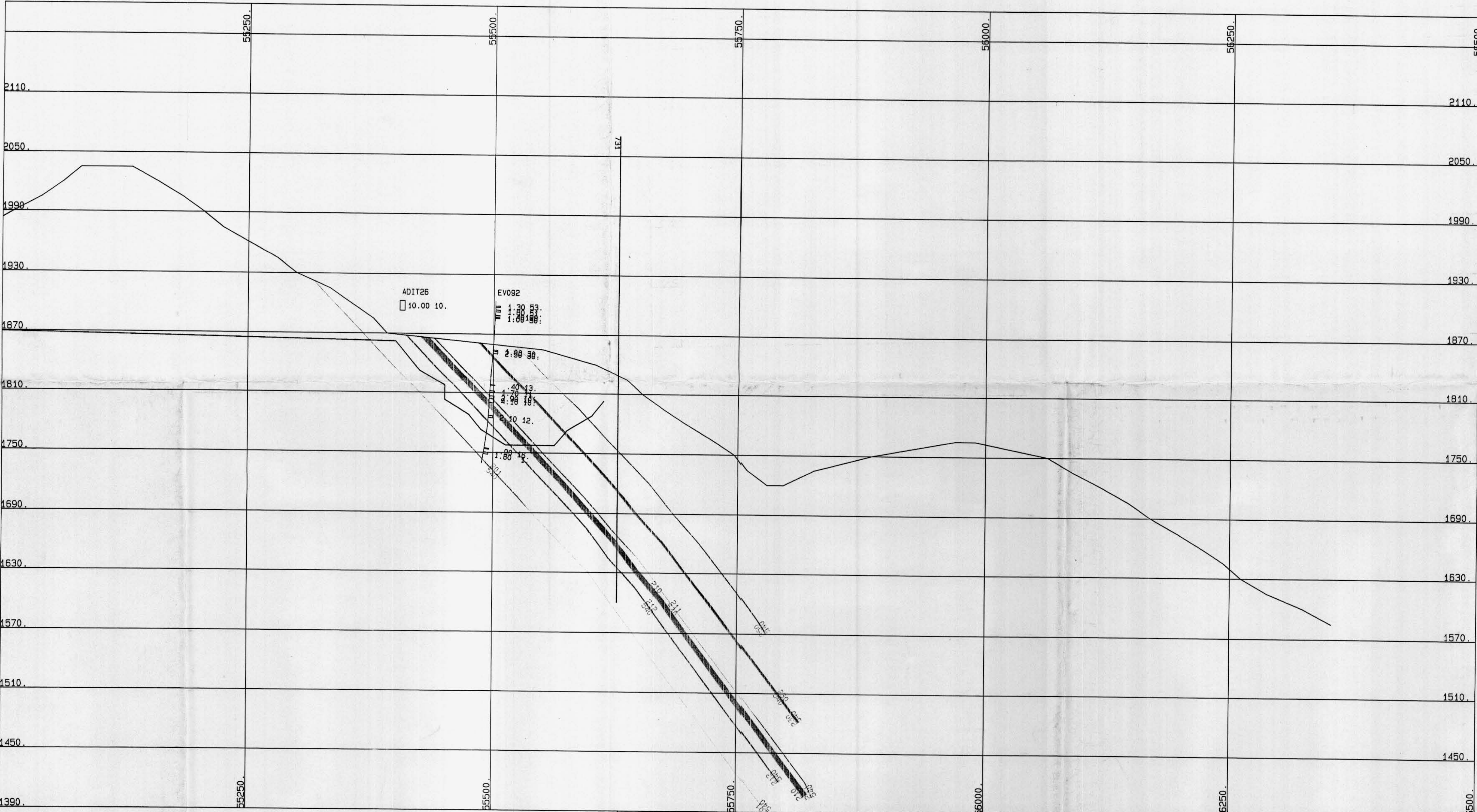
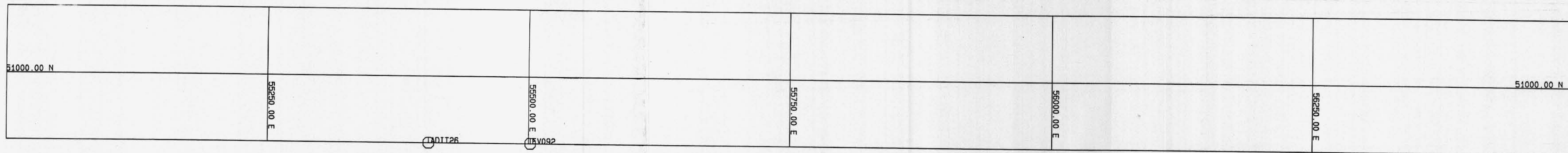


663000 E



NO	DATE	MADE BY	DESCRIPTION
1			
2			
3			
4			
5			

CROW RIDGE RESERVES (DIPPER PIT L06)			
DATE	DRAWN BY	CHECKED	APPROVED
10-31-96	LOWIE		
MAP INDEX NUMBER	DRAWING NUMBER		
			1:2500 N

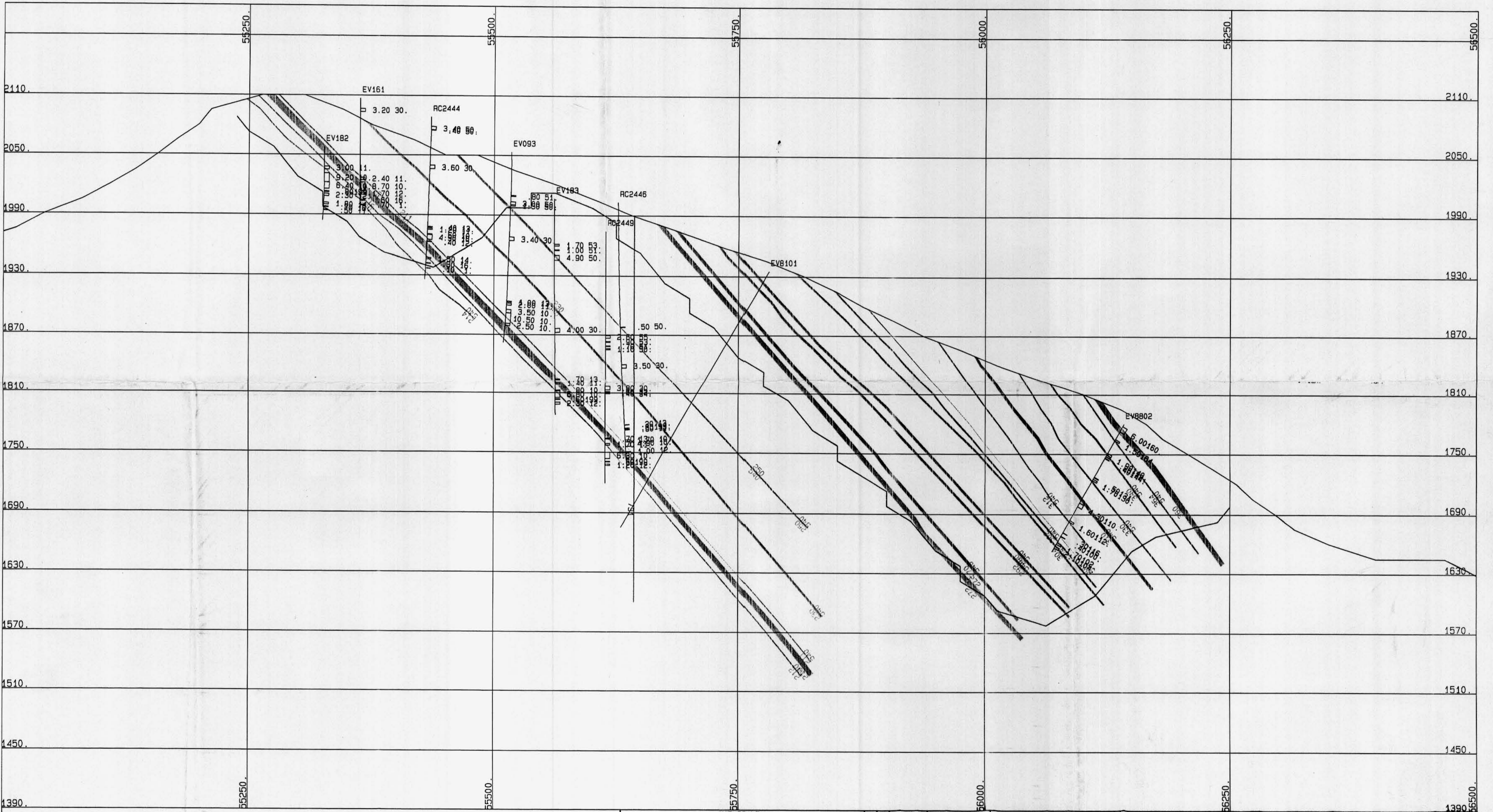
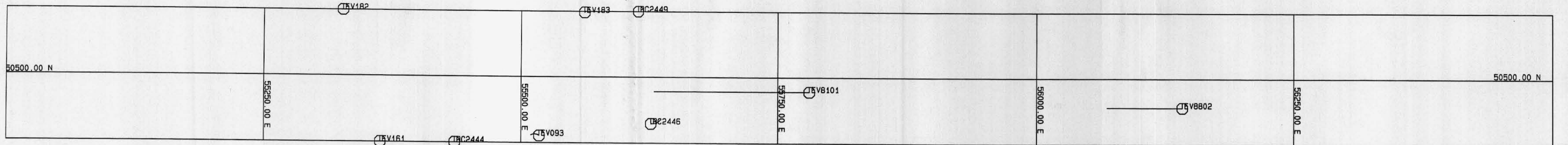


REVISIONS	No	DATE	MADE BY	DESCRIPTION
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2				
3				
4				
5				

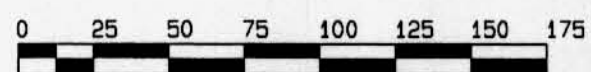
DATE	DRAWN BY	CHECKED	APPROVED
10-31-96	LORNE		

**CROW RIDGE SECTION 51000 N
(DIPPER PIT L06)**

MAP INDEX NUMBER	SCALE	DRAWING NUMBER
	1: 2500 .M	



MAP SCALE



REVISIONS	No	DATE	MADE BY	DESCRIPTION
	1			
	2			
	3			
	4			
5				

DATE	DRAWN BY	CHECKED	APPROVED
10-31-96	LORNE		

**CROW RIDGE SECTION 50500 N
(DIPPER PIT L06)**

MAP INDEX NUMBER	SCALE	DRAWING NUMBER
	1: 2500 . M	

APPENDIX 2

CROW RIDGE SEAM QUALITY SUMMARY

Drill hole id	From	To	Vert. thick	Sample recovery	Raw ash	Yield @1.5	Clean ash	Clean sulphur	Clean volatiles	P2O5 in ash	Phosph in coal	Dilatat'n	Fluidity	Melt range	Reflect	Inerts	Stab. index
EV052	75.5	77	1.5	72	13.1	82	7.5	0.57	18.9				1				
EV053	107	109.5	2.5	66.2	19.4	72.2	7.5	0.38	19.7						1.33	38.9	53
EV054	52.7	57.5	4.8	66	37.6	48.5	9.4	0.55	21			-11	3	47	1.32	35.7	55.8
EV090	62.5	66.5	4	6	54.9	29.3	8	0.58	21			40			1.28	21	64.4
EV092	23.6	24	0.4	8	28.3	50.4	7.3	0.52	19.3						1.36	29.5	61.3
EV093	47.7	53.7	6	0	53.9	40.6	8.3	0.54	21.1			-17	10	47	1.22	26.5	62
EV094	45.9	49.7	3.8	0	62.2	30.9	8.6	0.54	20.7			-19	17.4	42	1.23	27.8	61.5
EV158	28.2	29	0.8	79.6	26.7	59.5	7	0.59	24			2	43.7	46	1.29	27.3	62.8
EV164	26.6	34.5	7.9	80	30.5	51.2	6.4	0.38	23.1			-12.5	90.6	57		31.1	
EV183	56.2	61.2	5	68.3	24												
RC2439	61.7	62.5	0.8	60	34												
RC2442	26.3	29	2.7	70	38.8												
RC2443	40.2	44	3.8	37													
RC2444	9.2	13	3.8	25	33												
RC2445	123.1	125.2	2.1	71													
RC2446	125.2	125.7	0.5	45	33												
RC2449	118.1	119.2	1.1	90	57.9												
RC2450	75.4	75.5	0.1	50	50.6												
RC2451	37	37.7	0.7	70	51.8												
		050 SEAM	ave.		38.22	51.62	7.78	0.52	20.98			-2.92	27.62	47.80	1.29	29.73	60.11

CROW RIDGE SEAM QUALITY SUMMARY

Drill hole id	From	To	Vert. thick	Sample recovery	Raw ash	Yield @1.5	Clean ash	Clean sulphur	Clean volatiles	P2O5 in ash	Phosph in coal	Dilatat'n	Fluidity	Melt range	Reflect	Inerts	Stab. index
EV052	113.5	118	4.5	62.6	14.9	78.6	6.9	0.5	21.4						1.36	31.7	47.3
EV053	132.6	138.3	5.7	38.2	32.9		6.9	0.43	20.4						1.36	37.6	55
EV054	86.5	92.3	5.8	61.1	36.4	51.1	7.7	0.57	19.3				1		1.32	38.5	53
EV091	7.5	12.5	5	11	25.2	67.7	7.3	0.48	18.7						1.34	32.8	58.5
EV095	18.2	22.1	3.9	0	42.6	36.8	8	0.5	20.1						1.2	29.7	60.5
EV158	30	33.2	3.2	68.3	28	42.1	9.3	0.42	20.9			2	0.3	0	1.37	42.8	50.2
EV159	13.3	15.8	2.5	22.7	16.9	72	7.6	0.42	23.4				1.1	6			
EV160	71.8	72.5	0.7	48.5	23												
EV161	10.5	12.1	1.6	16.2	21.3												
EV162	20.7	24.2	3.5	22	40.3	44.1	6.9	0.39	22.1				2	30	1.36	33.3	58.4
EV163	11.1	15.1	4	21	20.9	66	6.2	0.4	21.3				2.3	30	1.36	33.3	58.5
EV164	64	67.3	3.3	60	24.6	58.9	6.5	0.36	22			-26	14.4	45	1.36	30.6	60.8
EV183	130.1	134.1	4	22.8	28	48	6.2	0.45	23						1.321	38.7	48
RC2438	29.3	30.2	0.9	0													
RC2439	89.5	90.3	0.8	70	28												
RC2441	19.6	21.3	1.7	100	44												
RC2442	60.9	63.9	3	63	32.8												
RC2443	74.5	76.2	1.7	0													
RC2444	47.9	51.5	3.6	80	26												
RC2445	160.7	164	3.3	35													
RC2446	163.5	167	3.5	30	34.5												
RC2448	27.6	35	7.4	50	25.8										1.37	52.9	34
RC2449	157.4	161.2	3.8	43	24.8												
RC2450	103	105.5	2.5	42	27.5												
RC2451	72.3	75.9	3.6	71	32.8	60	11.6	0.43	18.6	1.24	0.0628	-21					
RC2452	19.3	23.2	3.9	82	34.8	72	7.1	0.5	19.4	2.26	0.0701	-18					
		030 SEAM	ave.		28.96	58.11	7.55	0.45	20.82	1.75	0.07	-15.75	3.52	22.20	1.34	36.54	53.11

CROW RIDGE SEAM QUALITY SUMMARY

Drill hole id	From	To	Vert. thick	Sample recovery	Raw ash	Yield @1.5	Clean ash	Clean sulphur	Clean volatiles	P2O5 in ash	Phosph in coal	Dilatat'n	Fluidity	Melt range	Reflect	Inerts	Stab. index
EV052	167.8	169.8	2	43.3	25.2	63.3	5.3	0.62	22.1				36	58	1.38	16.9	65
EV053	189.3	189.8	0.5	100	21.1	72	8.3	0.62	21.8				2.1	40			
EV054	158	161.1	3.1	84.8	40.4	48.5	6.8	0.5	22.2				7.8	48	1.34	20.3	65
EV159	75.3	78	2.7	69	40.9	34.5	7	0.45	24			53	143.9	55	1.33	16.8	65
EV160	155.5	158	2.5	76.5	32.8	51.7	6	0.36	24.2			44	136.9	64	1.36	16.8	65
EV161	79.5	81.5	2	59.3	41.4	37.9	6.1	0.4	24.2						1.25	13.4	61.9
EV164	136.5	140.8	4.3	36	54.4	31.4	7.2	0.38	24			88	276.7	64	1.34	17.9	65
EV183	186.3	187.6	1.3	29	25.1												
RC2439	159.7	161.3	1.6	70	46												
RC2440	57	57.2	0.2	0													
RC2441	87	87.1	0.1	0													
RC2442	139.9	140.3	0.4	50	33.3												
RC2443	138.9	140.5	1.6	50	46												
RC2444	111.4	112.6	1.2	70	42												
RC2445	218.6	220.3	1.7	27													
RC2446	230.6	231.1	0.5	0													
RC2447	3.4	4	0.6	65	40.7												
RC2448	107.5	108.2	0.7	0													
RC2449	215.3	217	1.7	45	52.4												
RC2450	177.9	178.5	0.6	30	31.5												
RC2451	122.9	123.3	0.4	45	35.6												
RC2452	68.2	68.5	0.3	30	62.9												
		011 SEAM	ave.		39.51	48.47	6.67	0.48	23.21			61.67	100.57	54.83	1.33	17.02	64.48

CROW RIDGE SEAM QUALITY SUMMARY

Drill hole id	From	To	Vert. thick	Sample recovery	Raw ash	Yield @1.5	Clean ash	Clean sulphur	Clean volatiles	P2O5 in ash	Phosph in coal	Dilatat'n	Fluidity	Melt range	Reflect	Inerts	Stab. index
ADIT1	0.1	7.5	7.4	100	19.3	82.6	9.4		20.6	2.5	0.1026	-20	1.8	23	1.34	36.1	50.5
EV052	175.6	182.8	7.2	70.8	8.4	90.3	6.4	0.41	20.6						1.37	30.5	60.8
EV053	199	207.6	8.6	66.3	22.4	73.1	8.6	0.43	19.7			8	7.9	47	1.39		60.6
EV054	162.5	171.3	8.8	69	13	86.4	8	0.43	21.2			-20	2.7	41	1.34	31.6	60
EV090	148.3	161.1	12.8	3.4	57.8	24.9	10.8	0.42	18.5						1.36	31.6	56.9
EV091	60.4	66	5.6	9	25.7	66.2	9.1	0.58	18.4						1.33	34	57
EV092	96.5	103.5	7	14	36.4	44.1	7.9	0.42	18.8						1.37	34.6	57.8
EV158	129.8	131.5	1.7	67	22.6	66.7	7.4	0.36	22.3				2	23	1.33	31.6	60
EV159	84	94.5	10.5	73.6	11.7	82	6.5	0.36	22.6				6		1.38	41	51.8
EV160	165	182.3	17.3	67.8	14.4	72.5	5.3	0.38	22.5				2.2	36	1.34	36.9	55.2
EV161	82.4	92	9.6	40.6	29.9	59.8	7.5	0.3	22.1				1.2	18	1.37	35.2	57.4
EV162	91	100.3	9.3	63	18.8	68.9	6.2	0.32	23.6			-12	36.9	53	1.28	34.5	56.1
EV163	83.5	91.5	8	48.8	16.1	65.2	5.8	0.38	23.8				9.4	48	1.35	28.8	62
EV164	150.1	154.1	4	74	22.2	51.9	7.3	0.36	23			-15	14.9	54			
EV182	25.7	41.4	15.7	96.5	14.2	94	10	0.5	21				1.1	1	1.338	34.57	52.38
EV183	194.1	201.8	7.7	33.6	14.6	81.5	7.4	0.4	21				2.9	27	1.388	37.2	56.3
RC2438	102.6	113	10.4	47	21												
RC2439	163.2	171.2	8	49	20												
RC2440	59.2	69.2	10	49	24.1												
RC2441	88.7	93.6	4.9	47	19.9												
RC2442	144.2	152.8	8.6	42	19.5												
RC2443	147.3	151.7	4.4	20													
RC2444	117	122.5	5.5	68	10.8												
RC2445	228.6	236	7.4	25													
RC2446	240.9	247.5	6.6	19	23.5												
RC2447	8	18.4	10.4	74	18.6	80	10.3	0.36	19.7	1.19	0.0535	-24			1.38	46.9	44
RC2448	113	119.3	6.3	33	18												
RC2449	224.2	230.5	6.3	35	20.9												
RC2450	187.9	196.8	8.9	24	18.8												
RC2451	128.7	135.2	6.5	59	23.5					1.1							
RC2452	73.9	81.7	7.8	41	17.6												
		010 SEAM		ave.	20.82	70.01	7.88	0.40	21.14	1.60	0.08	-13.83	7.42	33.73	1.35	35.00	56.17

CROW RIDGE SEAM QUALITY SUMMARY

Drill hole id	From	To	Vert. thick	Sample recovery	Raw ash	Yield @1.5	Clean ash	Clean sulphur	Clean volatiles	P2O5 in ash	Phosph in coal	Dilatat'n	Fluidity	Melt range	Reflect	Inerts	Stab. index
EV052	219.1	220.1	1	70	33.4	49.6	9.6	0.78	20				38	65			
EV053	229.3	230.1	0.8	53.6	48	37.3	9.2	0.5	17.8				1				
EV054	197.8	198.6	0.8	73.3	17.4	78.6	9.3	0.62	18.1				5.6	48			
EV095	99.4	100	0.6	0	61.5	23.2	11.2	0.43	19.9			12	75.3	59	1.34	29.7	61.1
EV162	109.5	112.5	3	57	48.6												
EV164	165.5	166.3	0.8	24	39.1	30.9	10.2	0.38	20.6			-2	44.3	61	1.44	32.8	58.7
EV182	55.2	57	1.8	75.5	45.2	33	10.3	0.53	21.4			12	45.5	62	1.39	26.69	60.18
RC2438	135.6	135.9	0.3	60	33.7												
RC2440	79.1	80.9	1.8	49	40.5												
RC2441	100.7	101.4	0.7	50	31												
RC2442	173.2	174.2	1	60	46												
RC2443	175.2	177.1	1.9	25													
RC2444	140.5	142	1.5	45	32.6												
RC2447	46	48.3	2.3	58	48.6												
RC2450	218.3	218.5	0.2	30	26.4												
RC2451	176.9	177.1	0.2	0													
RC2452	117.4	117.5	0.1	0													
		014 SEAM	ave.		39.43	42.10	9.97	0.54	19.63			7.33	34.95	59.00	1.39	29.73	59.99

CROW RIDGE SEAM QUALITY SUMMARY

Drill hole id	From	To	Vert. thick	Sample recovery	Raw ash	Yield @1.5	Clean ash	Clean sulphur	Clean volatiles	P2O5 in ash	Phosph in coal	Dilatat'n	Fluidity	Melt range	Reflect	Inerts	Stab. index
EV160	194.5	196	1.5	83.9													
RC2438	148.2	148.4	0.2	0													
RC2440	89.3	89.5	0.2	0													
RC2441	108.4	108.5	0.1	50	29.2												
RC2442	184.2	184.4	0.2	60	27.2												
RC2443	187	187.3	0.3	30													
RC2444	151.1	151.2	0.1	0													
RC2447	59.7	59.8	0.1	30	34.4												
RC2450	226.4	226.5	0.1	0													
RC2451	185.6	185.9	0.3	50	32.6												
RC2452	126.2	126.4	0.2	55	33.7												
		001 SEAM	ave.		31.42												

COMPOSITE WASHABILITY

ADIT #1 ELK VALLEY
#2 X-CUT @ 170 FT.

RAW COAL

SEAM NO. 010
SEAM THICKNESS 31.8 FT. (9.7m)
TRUE

VTHICK 13.7m

PROX. ANALYSIS - MOIST. % V.M.% ASH % F.C. F.S.I.
2.4 19.1 19.3 59.2 2 1/2

SCREEN ANALYSIS	WT.	WT. %	ASH %	CALCULATED ASH
-2" x 7/8"		5.3		
-7/8" x 3/8"		9.1	21.3	14.1
-3/8" x 28M		51.9		
-28M x 100M		20.2	13.1	2.6
100M x 0		13.5	12.4	1.7
				18.4

WASHABILITY OF -2" + 28M FRACTION:

66.3

SP. GR.	WT. %	ASH %	CUM. WT. % FLOAT	CUM ASH % FLOAT	CUM WT. % SINK	CUM ASH % SINK	DIFFERENTIAL CURVES
Fl. 1.30	13.4	1.9	13.4	1.9	100.0	21.3	
1.30 - 1.35	13.1	5.1	26.5	3.5	86.6	24.3	
1.35 - 1.40	22.3	9.1	48.8	6.0	73.5	27.8	74.5
1.40 - 1.45	18.9	13.2	67.7	8.0	51.5	35.7	
1.45 - 1.50	6.8	19.0	74.5	9.0	32.3	49.2	36.7
1.50 - 1.55	3.6	25.1	78.1	9.8	25.5	57.3	
1.55 - 1.60	0.8	27.7	78.9	10.0	21.9	62.6	9.1
1.60 - 1.70	3.1	33.6	82.0	10.5	21.1	65.9	
1.70 - 1.80	2.1	44.0	84.1	11.7	18.0	69.1	
Sk. 1.80	15.9	72.4	100.0	21.3	15.9	72.4	

WASHABILITY OF -28M + 100M FRACTION:

20.2

SP. GR.	WT. %	ASH %	CUM. WT. % FLOAT	CUM ASH % FLOAT	CUM WT. % SINK	CUM ASH % SINK	DIFFERENTIAL CURVES
Fl. 1.30	10.9	1.4	10.9	1.4	100.0	13.1	
1.30 - 1.40	39.0	4.5	49.9	3.8	89.1	14.5	73.5
1.40 - 1.50	28.2	11.3	78.1	6.5	50.1	22.3	41.0
1.50 - 1.60	9.3	21.0	87.4	8.1	21.9	36.6	14.6
1.60 - 1.70	4.0	30.6	91.4	9.0	12.6	48.1	
Sk. 1.70	8.6	56.2	100.0	13.1	8.6	56.2	

WASHABILITY OF -100M + 0:

-Cleaned in Lab Cell

CONC.	WT.	WT. %	ASH %	CALCULATED ASH
		93.9	9.8	9.2
TAILS		6.1	52.2	3.2
				12.4

CLEAN COAL PROXIMATE:

MOIST. % V.M.% F.C.% ASH% F.S.I. DD.M.
2.9 20.6 67.1 9.4 3 1/2

YIELD	WT. %	COMPOSITE ASH %
2" + 28M	52.3	6.6
28M + 100M	17.6	1.7
100M + 0	12.7	1.3
TOTAL	82.6%	9.6% ASH

Identification

Laboratory Number 2726-71
Description Elk
Valley
Adit #1

Classification

Rank (ASTM) mvb
International System
Specific Volatile Index 193
Carbon (dmmfb) % 90.5

Proximate Analysis (db)

Ash % 9.4
Volatile Matter % 21.7
Fixed Carbon % 68.9

Gross Calorific Value (db)

Btu per pound 13,983 7768 cal

Ultimate Analysis (db)

Carbon % 81.0
Hydrogen % 4.3
Sulphur % 0.42
Nitrogen % 1.0
Ash % 9.4
Oxygen (by difference) % 3.9

Ash Analysis (db)

SiO₂ % 58.0
Al₂O₃ % 31.9
Fe₂O₃ % 2.0
TiO₂ % 1.1
P₂O₅ % 2.5
CaO % 3.9
MgO % 0.6
SO₃ % 0.2
Na₂O % 0.5
K₂O % 0.9

TABLE 2 Physical Tests and Fusibility of Ash of Component Coals

<u>Identification</u>									
Laboratory Number		2726-71							
Description		Elk Valley Adit #1							
<u>Coal Pulverization</u>									
<u>Sieve Analysis</u>									
Passing	Retained On								
1/4 in.	1/4 in. $\frac{3}{8}$	0.2							
1/8 in.	1/8 in. $\frac{1}{2}$	8.2							
1/16 in.	1/16 in. $\frac{3}{4}$	13.8							
1/32 in.	1/32 in. $\frac{7}{8}$	23.8							
 $\frac{100}{100}$	54.0							
Total Passing	1/8 in. $\frac{7}{8}$	91.6							
<u>Grindability</u>									
Hardgrove Index		118							
<u>Fusibility of Ash</u>									
Initial Deformation Temp. ...	$^{\circ}\text{F}$	2700+	1482 $^{\circ}\text{C}$						
Softening Temp. Spherical ...	$^{\circ}\text{F}$	+							
Softening Temp. Hemispherical	$^{\circ}\text{F}$	+							
Fluid Temp.	$^{\circ}\text{F}$	+							

Identification

Laboratory Number 2726-71
Description Elk
Valley
Adit #1

Linear Expansion

Bd. 52 lb/ft³ at 2% moisture...% 14.4

Gieseler Plasticity

Start °C 450
Fusion Temp. °C
Max. Fluid Temp. °C 463
Final Fluid Temp. °C 473
Solidification Temp. °C 492
Melting Range °C 23
Max. Fluidity dd/m 1.8
Torque g.in. 40

Dilatation

Ti - Softening Temp. °C 428
Tii - Max. Contraction Temp. °C 509
Tiii - Max. Dilatation Temp. °C 509
Contraction % 20
Dilatation % -20

Free Swelling Index

F.S.I. 3½

TABLE 4

Analyses of Coke Oven Charges and Resultant Cokes

<u>Identification</u>								
Test Number.....	826							
Date Charged.....	26/8/71							
Description.....	Elk Valley Adit #1							
<u>Coke Oven Charge</u>								
Laboratory Number.....	2726-71							
<u>Proximate Analysis (db)</u>								
Ash.....%	9.4	CASH						
Volatile Matter.....%	21.7	CVCM						
Fixed Carbon.....%	68.9	CFXC						
Sulphur (db).....%	0.42	CSUL						
<u>Resultant Coke</u>								
Laboratory Number.....	2800-71							
<u>Proximate Analysis (db)</u>								
Ash.....%	11.5							
Volatile Matter.....%	1.5							
Fixed Carbon.....%	87.0							
Sulphur (db).....%	0.50							

Test Identification Number..... 826
Date of Test..... 26/8/71
Laboratory Number
(refer for analysis of charge)..... 2726-71

COMPONENT COALS IN CHARGE

(% by wt. on db)

Elk Valley Adit #1 100

CARBONIZATION DATA

Net Weight of Charge (wet).....lb 524.5
Moisture in Charge.....% 3.3
ASTM Bulk Density (wet).....lb/ft³ 48.5
Oven Bulk Density (db).....lb/ft³ 51.1

CARBONIZATION RESULTS

Gross Coking Time.....hr:min₂ 9:52 9.9
Maximum Wall Pressure.....lb/in² 0.44
Coke Yield Actual.....% 81.9
Mean Coke size.....in 2.19
Apparent Specific Gravity..... 1.022

Screen Analysis of Coke

(cumulative percentage retained on)

3 inch sieve..... 15.7
2 inch sieve..... 59.7
1 1/2 inch sieve..... 81.4
1 inch sieve..... 91.7
3/4 inch sieve..... 93.1
1/2 inch sieve..... 93.6
Percentage -1/2 inch (breeze)..... 6.4

Tumbler Test (ASTM)

Stability Factor..... 47.2
Hardness Factor..... 63.1

Japanese Tumbler Test (JIS)

(cumulative percentage retained on)

50 mm sieve..... 14.5
25 mm sieve..... 83.5
15 mm sieve..... 90.3

TABLE 6.

PETROGRAPHIC DATA ON: KAISER ELK VALLEY ADIT No 1.

Project No. 03-3-1 / 16-19 Sample No. 2726-71 Pellet No. 220

I Petrographic Composition

Reactive Components

Distribution of Vitrinoid Types

Type	Percent
12	15.8
13	30.1
14	7.5
15	0.8
16	0.8

Total Vitrinoid	7	55.0
Reactive Semi-fusinoid (1/3)		8.9
Exinoid + Resinoid		0.0
Total Reactive Components		63.9

Inert Components

Inert Semi-fusinoids (2/3)	17.8
Micrinoids	3.0
Fusinoids	10.0
Mineral Matter	5.3
Total Inert Components	36.1

II Petrographic Indices

Mean Reflectance, %	1.34
Balance Index	2.95
Strength Index	5.55
Stability Index	50.5

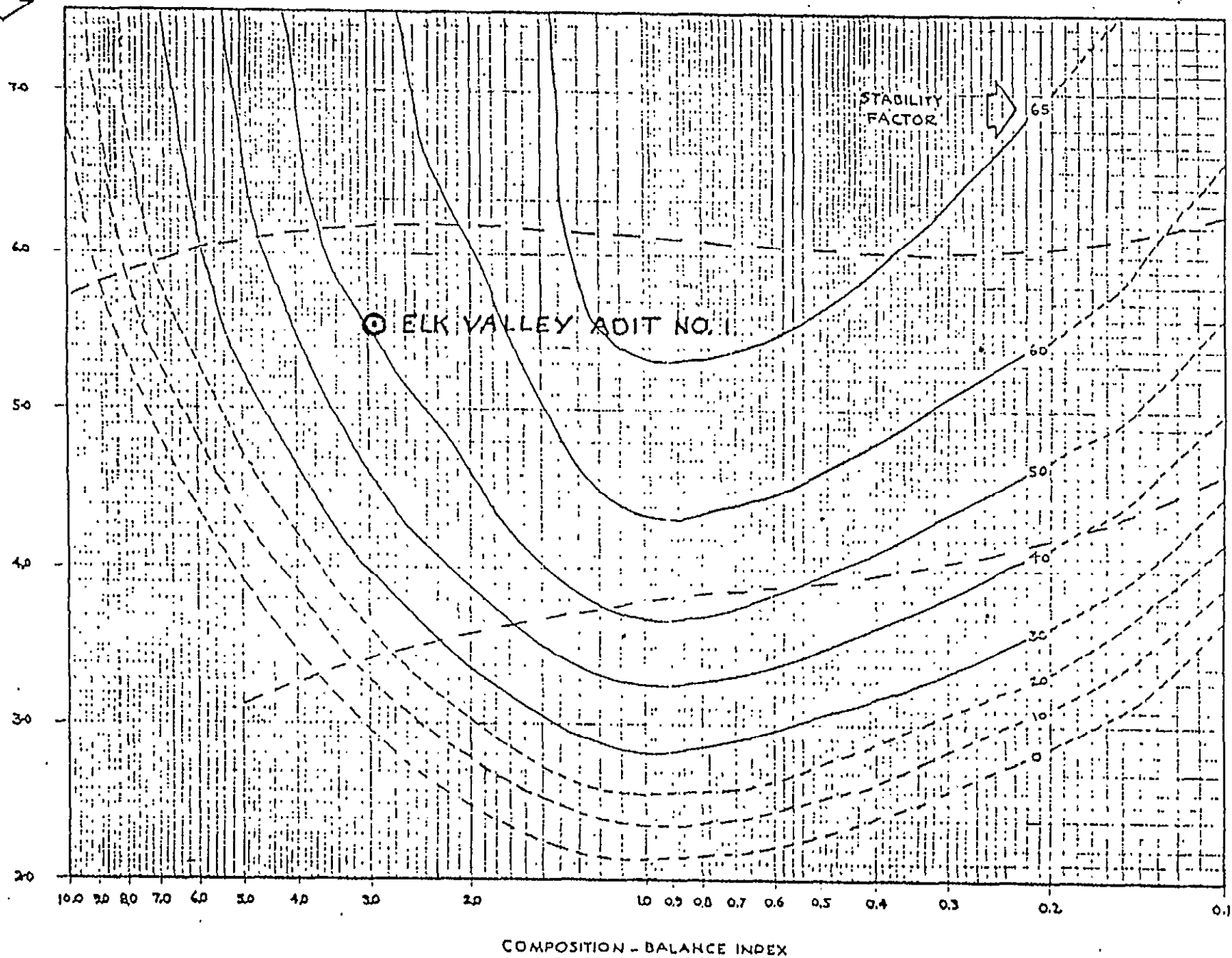


FIGURE 1. POTENTIAL STABILITY FACTOR OF 10 CORE SAMPLES TAKEN
 IN VALLEY ADIT NO. 1.

Adit 1
Elk Valley

<u>Proximate Analysis</u>	<u>As Rec'd</u>	<u>Dry</u>
Moisture.....%	3.0	-
Ash.....%	11.0	-
Volatile Matter....%	18.1	-
Fixed Carbon (By Difference)....%	67.9	-

<u>Ultimate Analysis</u>
Carbon.....%
Hydrogen.....%
Sulphur.....%
Nitrogen.....%
Ash.....%
Oxygen (By Difference)....%

Calorific Value.....
Btu/lb Gross

Grindability Index

EXPLORATION PROGRAM 1979

ADIT 26 BOTTOM PART OF SEAM

OIO SEAM

BURNT RIDGE EXTENSION

1L SEAM
x-cut @ 150 ft.

SEAM THICKNESS 19.6 ft.

5.9m THICK

8.5m V THICK

PROXIMATE ANALYSIS (DRY BASIS)

	<u>RAW</u>	<u>CLEAN</u>
% of 1/4" x 0		90.7
ASH %	11.4	8.1
V.M. %	17.4	18.8
F.C. %	71.2	73.1
F.S.I.	5	5½
% TOTAL SULF.	0.36	0.46
% P ₂ O ₅	--	--
GROSS CAL. VALUE BTUs/LB. (db)	13,676	14,184

Giesler Plasticity

Start.....	°C	408
Fusion Temp.....	°C	433
Max. Fluid Temp.....	°C	458
Final Fluid Temp.....	°C	478
Solidification Temp.....	°C	493
Melting Range.....	°C	45
Max. Fluidity.....	dd/m	10.5

		<u>Petrographic Data</u> ± 972
		<u>Petrographic Composition</u>
<u>Type</u>	<u>Percent</u>	<u>Reactive Components Volume %</u>
13	28.4	Total Vitrinoid 54.6
14	25.7	Reactive Semi-Fusinoid (1/2) 15.9
15	0.5	Exinoid & Resinoid 0.0
	54.6	Total Reactives 70.5
		<u>Inert Components</u>
		Inert Semi-Fusinoids (1/2) 15.8
		Micrinoids 5.8
		Fusinoids 5.3
		Mineral Matter 4.6
		Total Inerts 29.5
Max. Mean Reflectance of Vitrinoids Ro:		1.39
Balance Index 1.89		Strength Index 6.53
Predicted Coke Stability Index		61.5

Dilatation (Ruhr)

Ti - Soft. Temp.....	°C	408
Tii - Max. Cont. Temp.....	°C	469
Tiii - Max. Dil. Temp.....	°C	496
Contraction.....	%	17
Dilatation.....	%	-12

EXPLORATION PROGRAM 1979

ADIT 26 BOTTOM PART OF SEAM

010 SEAM

BURNT RIDGE EXTENSION

1L SEAM
x-cut @ 150 ft.

SEAM THICKNESS 19.6 ft.

5.9m THICK

8.5m V THICK

PROXIMATE ANALYSIS (DRY BASIS)

	RAW	CLEAN
% of 1/4" x 0		90.7
ASH %	11.4	8.1
V.M. %	17.4	18.8
F.C. %	71.2	73.1
F.S.I.	5	5 1/2
% TOTAL SULF.	0.36	0.46
% P ₂ O ₅	--	--
GROSS CAL. VALUE BTUS/LB. (db)	13,676	14,184

Giesler Plasticity

Start.....	°C	408
Fusion Temp.....	°C	433
Max. Fluid Temp.....	°C	458
Final Fluid Temp.....	°C	478
Solidification Temp.....	°C	493
Melting Range.....	°C	45
Max. Fluidity.....	dd/m	10.5

Dilatation (Ruhr)

Ti - Soft. Temp.....	°C	408
Tii - Max. Cont. Temp.....	°C	469
Tiii - Max. Dil. Temp.....	°C	496
Contraction.....	%	17
Dilatation.....	%	-12

Petrographic Data = 972

Vitrinoid Types		Petrographic Composition	
Type	Percent	Reactive Components	Volume %
13	28.4	Total Vitrinoid	54.6
14	25.7	Reactive Semi-Fusinoid (1/2)	15.1
15	0.5	Exinoid & Resinoid	0.1
	54.6	Total Reactives	70.1
		Inert Components	
		Inert Semi-Fusinoids (1/2)	15.1
		Micrinoids	5.0
		Fusinoids	3.0
		Mineral Matter	4.0
		Total Inerts	29.0
Max. Mean Reflectance of Vitrinoids Ro:		1.59	
Balance Index		1.89	Strength Index
Predicted Coke Stability Index		61.5	

EXPLORATION PROGRAM
ADIT CHANNEL SAMPLE

TABLE 11

SEAM NO. 12 ADIT NO. 26

RAW COAL BROKEN TO -4" AND REDUCED TO 1000 LBS. FOR SCREENING.

CUMULATIVE

SIZE	WT. %	ASH %	WT. %	ASH %
-4" + 1/4"	42.7	9.8	42.7	9.8
-3/8" + 28M	36.5	13.6	79.2	11.6
-28M + 60M	10.2	13.2	89.4	11.7
-60M + 0	10.6	12.2	100.0	11.8

ATTRITION TEST

One Thousand pounds of 4" x 0" coal tumbled in A.S.T.M. coke tumbler for 30 minutes in batches of 50 lbs. or 786 revolutions per batch. Total coal was mixed and screened. Results are shown below.

CUMULATIVE

SIZE	WT. %	ASH %	WT. %	ASH %
-4" + 1/4"	16.5	12.2	16.5	12.2
-3/8" + 28M	45.7	11.8	62.2	11.9
-28M + 60M	13.1	11.8	75.3	11.9
-60M + 0	24.7	11.1	100.0	11.7

Washability tests as shown in Table 111 were run on the coal from the Attrition Test.

ADIT 26 Burnt R. Ext.
1L SEAM

TABLE V

Flotation Data - 60 M x 0

Size & Size Wt. %	Time (Sec)	Wt. %	Ash %	Cumulative Float	
				Wt. %	Ash %
60Mx0	30	87.5	9.1	87.5	9.1
	60	9.8	15.3	97.3	9.7
	90	1.1	32.4	98.4	10.0
	TAILINGS	1.6	77.8	100.0	11.1

EXPLORATION OGRAM
ADIT CHANLL SAMPLE ADIT 26 1L SEAM

TABLE 111

WASHABILITY STUDY OF ADIT 26 BURNT RIDGE EXTENSION SEAM 1

SIZE & WT.	SP GR	WT %	ASH %	VM %	FSI	SUL %	CUM WT %	CUM ASH %	CUM VM %	CUM SUL %	±.10 SP GR	Z
.4 + 1/4												
16.5	FLT.	1.30	25.4	5.3	19.4	6½	.33	25.4	5.3	19.4	.33	
		1.35	21.5	5.8	19.0	3½	.32	46.9	5.5	19.2	.33	
		1.40	25.9	10.8	16.6	1½	.33	72.8	7.4	18.3	.33	67.2
		1.45	13.4	15.3	17.3	1	.30	86.2	8.6	18.1	.32	47.2
		1.50	4.0	19.8	17.0	1	.33	90.2	9.1	18.1	.32	21.5
		1.55	2.2	24.6	16.5	1	.29	92.4	9.5	18.0	.32	---
		1.60	1.1	27.2	17.0	1	.29	93.5	9.7	18.0	.32	5.3
		1.70	1.8	31.0	18.9	1	.28	95.3	10.1	18.0	.32	3.0
		1.80	1.1	36.9	19.6	1	.26	96.4	10.4	18.1	.32	
		1.80	3.6	60.8	18.2	NC	.19	100.0	12.2	18.1	.32	
.1/4 + 28M												
45.7		1.30	23.6	2.9	22.1	7½	.38	23.6	2.9	22.1	.38	
		1.35	30.1	6.4	19.9	4½	.32	53.7	4.9	20.9	.35	
		1.40	21.3	10.9	18.2	1½	.30	75.0	6.6	20.1	.33	59.4
		1.45	10.7	15.2	16.7	1	.28	85.7	7.7	19.7	.33	39.9
		1.50	4.5	19.2	17.8	1	.28	90.2	8.2	19.6	.32	19.2
		1.55	1.8	21.5	17.2	1	.27	92.0	8.5	19.5	.32	---
		1.60	1.4	27.7	17.2	1	.26	93.4	8.8	19.5	.32	5.1
		1.70	1.7	32.9	16.1	1	.27	85.1	9.2	18.4	.32	2.6
		1.80	.8	36.7	14.9	1	.32	95.9	9.4	19.4	.32	
		1.80	4.1	68.4	13.6	NC	.20	100.0	11.8	19.2	.32	
-28M + 60M												
13.1		1.30	35.3	1.6	22.8	8	.41	35.3	1.6	22.8	.41	
		1.35	13.5	5.5	19.0	5	.35	48.8	2.7	21.7	.39	
		1.40	18.4	8.0	18.7	1½	.35	67.2	4.1	20.9	.38	51.9
		1.45	10.8	11.7	17.8	1	.31	78.0	5.2	20.5	.37	41.1
		1.50	5.8	16.3	18.9	1	.30	83.8	6.0	20.4	.37	24.1
		1.55	3.4	19.6	17.8	1	.32	87.2	6.5	20.3	.36	---
		1.60	2.5	23.6	17.1	1	.30	89.7	7.0	20.2	.36	9.5
		1.70	2.8	30.9	16.9	1	.33	92.5	7.7	20.1	.36	4.1
		1.80	1.0	38.1	16.3	1	.37	93.5	8.0	20.0	.36	
		1.80	6.5	66.8	15.0	NC	.25	100.0	11.8	19.7	.35	

EXPLORATION PROGRAM
ADIT CHANNEL SAMPLE

ADIT 26 1L SEAM

TABLE 111 (cont'd)

WASHABILITY STUDY OF ADIT 26 BURNT RIDGE EXTENSION SEAM 1

SIZE & WT.	SP GR	WT %	ASH %	VM %	FSI	SUL %	CUM WT %	CUM ASH %	CUM VM %	CUM SUL %	±.10 SP GR	
-4 + 28M												
62.2	1.30	24.1	3.6	21.3		.37	24.1	3.6	21.3	.37		12.1
	1.35	27.8	6.3	19.7		.32	51.9	5.0	20.5	.34		38.0
	1.40	22.5	10.6	17.7		.31	74.4	6.8	19.6	.33	68.8	63.2
	1.45	11.4	15.2	16.9		.29	85.8	7.9	19.3	.33	41.9	80.2
	1.50	4.4	19.4	17.6		.29	90.2	8.5	19.2	.32	19.8	88.1
	1.55	1.9	22.4	17.0		.28	92.1	8.8	19.1	.32	----	91.2
	1.60	1.3	27.6	17.2		.28	93.4	9.0	19.1	.32	5.2	92.8
	1.70	1.7	31.7	16.9		.27	95.2	9.4	19.1	.32	2.7	94.3
	1.80	.9	36.8	16.5		.30	96.0	9.7	19.1	.32		95.6
	1.80	4.0	66.6	14.7		.20	100.0	11.9	18.9	.32		98.1
-4 + 60M												
	1.30	26.0	3.1	21.7		.38	26.0	3.1	21.7	.38		13.1
75.3	1.35	25.3	6.2	19.6		.32	51.4	4.6	20.7	.35		38.7
	1.40	21.8	10.4	17.9		.32	73.2	6.4	19.8	.34	66.0	62.3
	1.45	11.3	14.6	17.0		.29	84.5	7.5	19.5	.33	41.7	78.9
	1.50	4.6	18.7	17.9		.29	89.1	8.1	19.4	.33	20.5	86.8
	1.55	2.2	21.7	17.2		.29	91.3	8.4	19.3	.33	----	90.2
	1.60	1.5	26.5	17.1		.28	92.8	8.7	19.3	.33	5.9	92.1
	1.70	1.9	31.5	16.9		.29	94.7	9.1	19.2	.33	2.9	93.8
	1.80	.9	37.0	16.4		.31	95.6	9.4	19.2	.33		95.2
	1.80	4.4	66.6	14.8		.21	100.0	11.9	19.0	.32		97.8
-60M + 0												
24.7	FLT. 1.30	30.8	1.8	22.0	9+	.45	30.8	1.8	32.0	.45		15.4
	1.40	29.0	5.4	19.6	7	.38	59.8	3.5	20.8	.42	55.0	45.3
	1.50	22.3	10.9	18.8	2½	.35	82.1	5.5	20.3	.40	32.7	71.0
	1.60	8.2	19.7	16.9	1½	.34	90.3	6.8	20.0	.39	12.0	86.2
	1.70	3.0	31.2	16.0	1	.34	93.3	7.6	19.8	.39		91.8
	SK 1.70	6.7	60.8	13.4	NC	.42	100.0	11.2	19.4	.39		96.7

EXPLORATION PROGRAM 1979

ADIT CHANNEL SAMPLE
ADIT 26 1L SEAM

TABLE V

SEAM NO. 1 BOTTOM ADIT NO. 26

YIELD VS ASH

BASIS: GRAVITY SEPARATION OF -4" x 60M FRACTION AND FROTE FLotation
OF -60M x 0 FRACTION.

	-4" x 60M	75.3		60M x 0	24.7	COMPOSITE	
SPECIFIC GRAVITY	CUM. WT. %	YIELD WT. x 753	ASH %	YIELD 98.4 x 247	ASH %	YIELD	ASH
		a		b		a & b	
1.30	26.0	19.578	3.1	24.305	10.0	43.9	6.9
1.35	51.4	38.704	4.6	24.305	10.0	63.0	6.7
1.40	73.2	55.120	6.4	24.305	10.0	79.4	7.5
1.45	84.5	63.628	7.5	24.305	10.0	87.9	8.2
1.50	89.1	67.092	8.1	24.305	10.0	91.4	8.6
1.55	91.3	68.749	8.7	24.305	10.0	93.0	8.8
1.60	92.8	69.878	9.1	24.305	10.0	94.2	9.0
1.70	94.7	71.309	9.1	24.305	10.0	95.6	9.3
1.80	95.6	71.987	9.4	24.305	10.0	96.3	9.6
TOTAL	100.0	75.3	11.9	24.7	11.1	100.0	11.7

GREENHILLS PROGRAM NOVEMBER, 1979
BULK SAMPLE ANALYSES - BIRTLEY LABORATORY

Seam No.	7	10	Blend		
Adit No.	23	24	25% 1 seam	1	7
			25% 10 seam	26	22
			30% 7 seam		
			20% 16 seam		
					x-cut @ 175 ft.

Classification

Raw Moisture (ADB)		4.0	2.8	3.6	3.0	4.3
Raw Ash	%	29.0*	24.9	18.4	12.5	14.7
Raw FSI		5	5	5½	5	6
HGI Clean Coal		81	75	85	92	
Separating Gravity		1.40	1.42	1.50	1.42	1.45
Yield	%	44.6	65.3	75.8	76.0	79.5

* 4.4' rock parting included in sample.

Burnt Ridge
Extention x-cut @ 175 ft.

Clean Coal Proximate

Basis (ADB)

Residual Moisture		0.6	0.6	0.3	0.4	0.4
AD Moisture	%	7.4	7.9	8.1	5.5	5.7
Ash	%	7.8	8.0	8.1	8.5	8.0
Volatile Matter	%	25.8	25.8	25.9	20.1	24.6
Fixed Carbon	%	65.8	65.6	65.7	71.0	67.0
FSI		8	7½	7½	7½	7½
Sulphur	%	0.53	0.53	0.45	0.58	0.42
P	%	0.07	0.11	0.08	0.05	
Btu per pound		14,076	14,046	14,029	14,215	14,140

Giesler Plasticity

Start	°C	432	446	430	452	456
Maximum	°C	470	477	468	479	480
Final	°C	504	508	499	490	510
Range	°C	72	62	69	28	64
Fluidity	ddpm	600	83	170	4	65

Dilatation

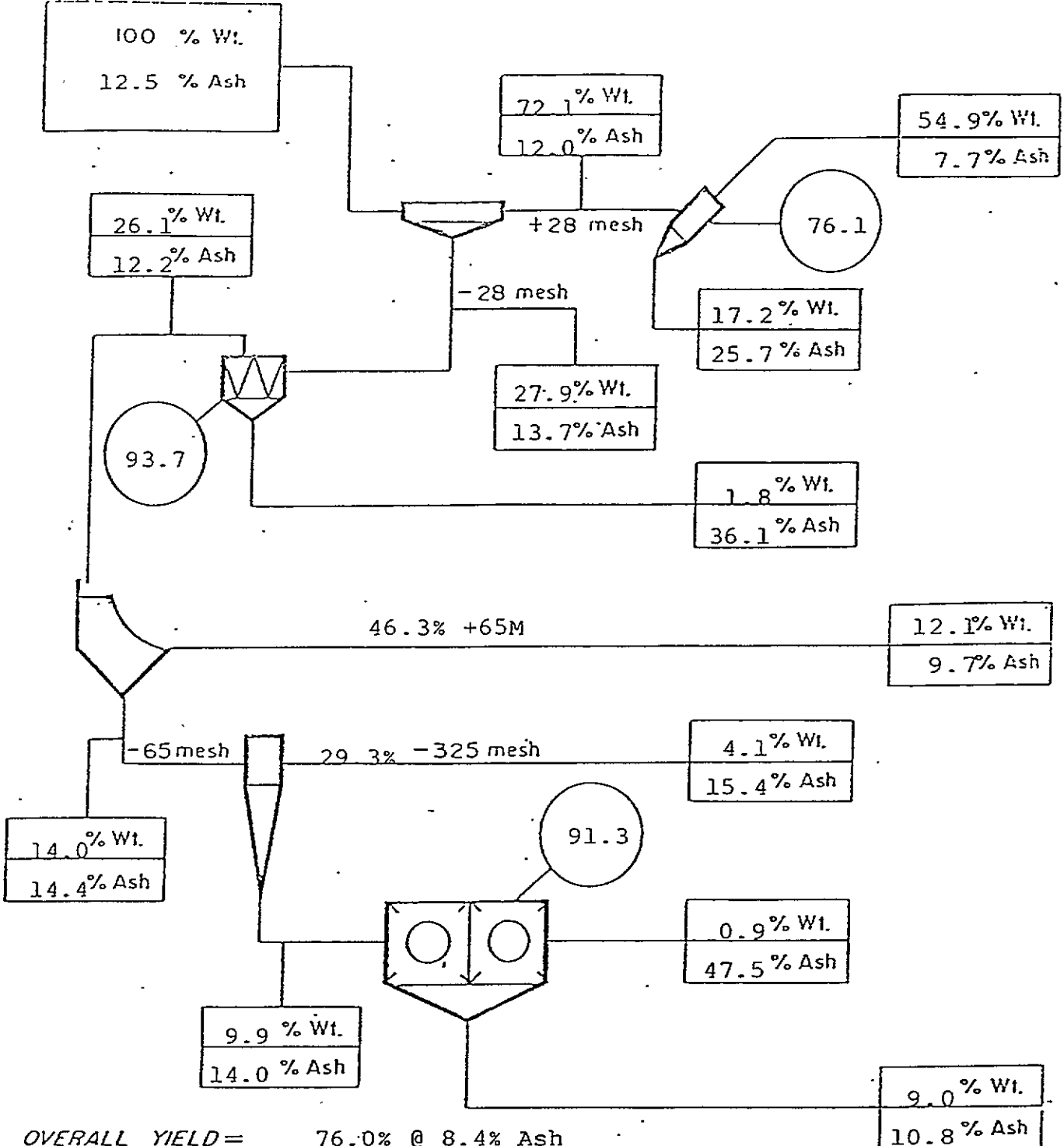
Softening Temp.	°C	383	395	389	413	383
Max Contraction Temp	°C	435	444	442	467	445
Max Dilatation Temp	°C	470	476	475	485	473
Contraction	%	25	24	27	26	24
Dilatation	%	67	25	38	-9	8
G Factor		1.049	1.002	1.017	0.858	0.950

GREENHILLS PROGRAM OCTOBER, 1979

TABLE - Carbonization Data

Test Identification Number	389-79	396-79	395-79	399-79						
Date of Test	79.08.13	79.10.25	79.10.18	79.11.08						
Laboratory Number						Test Pits	Test Pits			
Description Percent and Adit or Pit	100% 7 seam Adit 23	100% 10 seam Adit 24	Blend 25% 1 seam 25% 10 seam 30% 7 seam 20% 16 seam	1 Seam Adit 26 Burnt Ridge Ext.	100% 7 Seam Adit 22 x cut 175'	54% 1 seam 46% 16 seam raw blend	63% 7 seam 47% 10 seam raw blend			
<u>Carbonization Data</u>										
Net Weight of Charge (wet) lb	398.6	402.5	406.9	400.5	407.2					
Moisture in Charge %	2.5	3.5	3.8	3.1	3.0					
ASTM Bulk Density (wet) lb/ft ³	50.5	49.9	50.9	50.2	50.1					
Oven Bulk Density (db) lb/ft ³	51.5	51.5	51.9	51.5	52.4					
<u>Carbonization Results</u>										
	1980 °F	1971 °F	1972 °F	1979 °F	1969 °F					
Gross Coking Time hr:min	8:31	9:37	9:24	9:30	9:43					
Maximum Wall Pressure lb/in ²	0.60	1.05	0.82	1.01						
Coke Yield Actual %	74.6	75.6	74.9	79.7	76.6					
Mean Coke Size in	1.95	1.99	1.96	2.17	2.04					
Apparent Specific Gravity	0.95	0.94	0.96	1.01	0.98					
<u>Screen Analysis of Coke</u> (cumulative percentage retained on)										
3 inch sieve	4.8	5.9	7.3	15.6	9.5					
2 inch sieve	43.1	46.0	41.9	52.9	47.2					
1-1/2 inch sieve	74.8	77.0	74.1	79.1	76.5					
1 inch sieve	93.6	93.1	93.1	93.3	93.1					
3/4 inch sieve	96.6	95.9	95.7	96.4	95.9					
1/2 inch sieve	97.5	96.9	96.8	97.3	96.9					
Percentage 1/2 inch (breeze)	2.5	3.1	3.2	2.7	3.1					
<u>Tumbler Test (ASTM)</u>										
Stability Factor	52.4	52.1	51.8	55.6	54.0					
Hardness Factor	67.2	66.8	67.7	69.9	66.3					
<u>Japanese Drum Test (JIS)</u> (Cumulative percentage retained on)										
50 mm sieve	30R	150R	30R	150R	30R	150R	30R	150R		
25 mm sieve	25.6	8.4	20.6	7.4	12.8	1.0	20.2	10.4	19.1	4.8
15 mm sieve	86.7	70.0	87.9	71.6	85.5	67.3	85.7	69.8	85.1	68.7
	93.8	81.8	93.4	82.1	92.3	80.3	93.8	83.3	93.3	81.6

--3/4" x 0 Row Cool



OVERALL YIELD = 76.0% @ 8.4% Ash

LEGEND:

○ CIRCUIT YIELD %

Wt. WEIGHT %

Ash ASH CONTENT (AIR DRIED)



BIRTLEY COAL & MINERALS TESTING

Title KAISER RESOURCES LTD.
ADIT 26, BURNT RIDGE EXTENSION
LAB. NO. 3967

Date OCTOBER, 1979

BIRTLEY COAL & MINERALS TESTING.

KAISER RESOURCES LIMITED

BULK WASHING DATA*

#26

ADIT BURNT RIDGE EXTEN. SEAM LAB. NO. 3967

DELIVERY DATE OCTOBER 17, 1979 DATE OF WASH OCTOBER 19, 1979

Raw Coal Analysis: ADM 3.0 ASH% 12.5 F.S.I. 5

Delivered Bulk Weight 3.216 Metric Tons

Washed Weight 2.988 Metric Tons

* All weight and analyses are on Air Dried Basis unless otherwise indicated.

BULK WASHING DATA

HEAVY MEDIUM CIRCUIT

ADIT/SEAM NO. _____ LAB. NO. 3967

1. S.G. of Separation 1.42
2. Feed Ash Content 12.0 % F.S.I. 4 1/2
3. Clean Coal Estimated Weight 1.603 M.T.
4. Clean Coal Analysis - Ash 7.7 %F.S.I. 7
5. Reject Estimated Weight 0.552 M.T.
6. Reject Analysis - Ash 25.7 %F.S.I. 1
7. Estimated 3/4" x 28M in Circuit 2.155 M.T. 72.1 WT.%
8. Yield Clean Coal (Weighed) : _____
74.4 %
9. Yield Clean Coal
(Calculated Ash Balance) - _____
76.1 %

BULK WASHING DATA

WATER-ONLY CYCLONE CIRCUIT

ADIT/SEAM _____ LAB. NO. 3967

1. Vortex Finder Clearance (VCF) #2 = 5.08 2.00
 #1 = 3.81 CM 1.50 INCHES
2. Sample Analysis

	SCREEN SIZE	WT. %	ASH%	F.S.I.	CUM. WT. %	CUM. ASH%	HEAD ASH%	HEAD F.S.I.
FEED							13.7	7
O'FLOW	+65 Mesh	46.3	9.1	8 1/2	46.3	9.1	12.2	7 1/2
	65M x 0	53.7	14.6	6 1/2	100.0	12.1		
U'FLOW							36.1	1
S.B.O.							9.7	8 1/2
T.C.O.*							15.4	1 1/2

3. Yield - Total W.O. Cyclone Circuit = 93.7 %

4. Estimated Yield of 28 x 65 Mesh Coal* = 43.4 %
 (as % of 28 Mesh x 0 Feed).

5. Estimated 28M x 0 in circuit 0.833 M.T. 27.9 %
 (Plant Feed - H.M. Products)

* Thickener Cyclone Overflow

BULK WASHING DATA

FROTH FLOTATION CIRCUIT

ADIT/SEAM NO. _____ LAB. NO. 3967

1. Reagents: Kerosene:Methylisobutylcarbinol (MIBC)
2. Feed Pulp Density _____ g/l _____ % Solids W/V
3. Sample Analysis:-

	ASH	F.S.I.
FEED	14.0	7 1/2
CONC.	10.8	8
TAILS	47.5	1

4. Impeller Type - Birtley-Humboldt Multi-Wobble.
5. Yield Calculated (Ash Balance) 91.3 %
6. Filter Cake (Sieve Bend 0'Flow & Flotation Conc.)
Wt. Recovered 0.565 M.T.
7. Filter Cake - Ash% 10.3 F.S.I. 8 1/2

BULK WASHING DATA

SUMMARY

ADIT/SEAM NO: _____ LAB. NO. 3967 DATE OF WASH OCT 19, 1979

a) Raw Coal

Delivered Weight	=	<u>3.216</u>	M.T.
Ash%	=	<u>12.5</u>	
F.S.I.	=	<u>5</u>	
Estimated Washed Wt.	=	<u>2.988</u>	M.T.

b) Heavy Media Circuit

Estimated Proportion of +28 Mesh in Feed	<u>72.1</u>	
Effective S.G. =	<u>1.42</u>	
Raw Feed	<u>12.0</u> % Ash	<u>4 1/2</u> F.S.I.
Clean Coal	<u>7.7</u> % Ash	<u>7</u> F.S.I.
Reject	<u>25.7</u> % Ash	<u>.1</u> F.S.I.
Calculated Yield	<u>76.1</u> %	
Weighed Yield	<u>74.4</u> %	

c) Water-Only Cyclone Circuit

Raw Feed	<u>13.7</u> % Ash	<u>7</u> F.S.I.
Overflow	<u>12.2</u> % Ash	<u>7 1/2</u> F.S.I.
Underflow	<u>36.1</u> % Ash	<u>1</u> F.S.I.
Calculated Yield	<u>93.7</u> %	
% of +65M in O/F	<u>46.3</u> %	
Sieve Bend Overflow	<u>9.7</u> % Ash	<u>8 1/2</u> F.S.I.

d) Froth Flotation Circuit

Raw Feed	<u>14.0</u> % Ash	<u>7 1/2</u> F.S.I.
Concentrates	<u>10.8</u> % Ash	<u>8</u> F.S.I.
Tails	<u>47.5</u> % Ash	<u>1</u> F.S.I.
Calculated Yield	<u>91.3</u> %	

BULK WASHING DATA

BULK WASHING SUMMARY (cont.)

ADIT NO. 26 BURNT RIDGE EXTENSION LAB. NO. 3967

e) Clean Coal Mix Analyses, a.d.b.

i) Proximate Analysis:

ADM% 5.5 RM.% 0.4 ASH% 8.5 VM.% 20.1 FC.% 71.0

ii) S% 0.58 P% 0.05 BTU/LB 14215 F.S.I. 7 1/2 H.G.I. 92

iii) Dilatation Test:

S.T.(°C) 413 M.D.%(°C) 485 M.C.% 26% @ 467° M.D.% -9 G. NO. 0.858

iv) Gieseler Plasticity Test:

	DDPM	TEMP(°C)
START	1	462
MAXIMUM	4	479
FINAL	0	490
	RANGE = 28	

f) Clean Coal Mix Make Up

H.M. CLEAN COAL	FINES FILTER CAKE	CLEAN COAL MIX		SHIPPED		IN STOCK	
M.T.	M.T.	BBLS.	M.T.	BBLS.	M.T.	BBLS.	M.T.
1.603	0.565	13	2.168				



Energy, Mines and
Resources Canada

Energie, Mines et
Ressources Canada

CANMET

Canada Centre
for Mineral
and Energy
Technology

Centre canadien
de la technologie
des minéraux
et de l'énergie

ADIT 26
IS BREX
1 SEAM COAL

AN INVESTIGATION OF THE CAKING AND COKING CHARACTERISTICS
OF COALS FROM SEAMS 1, 7, 10 AND 16 FROM THE GREENHILLS
PROJECT SUBMITTED BY KAISER RESOURCES LIMITED,
SPARWOOD, BRITISH COLUMBIA.

Project No. 03-5-1/16-41A
(Job No. 3252R)

J.G. JORGENSEN, T.A. LLOYD AND A.B. FUNG
COAL RESOURCE AND PROCESSING LABORATORY

JULY 1980

An Investigation of the Caking and Coking Characteristics
of Coals from Seams 1, 7, 10 and 16 from the Greenhills
Project Submitted by Kaiser Resources Limited,
Sparwood, British Columbia

Project No. 03-5-1/16-41A
(Job No. 3252R)

by

J.G. Jorgensen*, T.A. Lloyd* and A.B. Fung**

INTRODUCTION

The evaluation of coals for Kaiser Resources Limited is a continuing divisional project in which periodic investigations are undertaken as requested by the company.

This report is Investigation 41A in the series and includes evaluation data on coals specified in a letter dated October 23, 1979 from D.P. Sharma, Manager, Quality Control, Kaiser Resources Limited. A copy of this letter appears in Appendix 1. This letter was later amended to delete samples from Adit 27, Seam 3 and Adit 20, Seam 27.

The coals which were carbonized are described in Table 1. The cleaned coal samples received from Birtley Engineering, Calgary, were crushed, blended, and carbonized in the 12-inch width Koppers Movable-wall Coke Oven located at the Western Research Laboratory at Edmonton. Representative samples were taken for chemical, physical, thermal rheological, and petrographical analyses which were carried out at the Energy Research Laboratories located at the CANMET Bells Corners Complex near Ottawa. The results of the testing program are tabulated in Tables 2 to 7.

*Heads, Coal Petrography Section, Coal Treatment Section respectively, Coal Resource and Processing Laboratory, **Carbonization Engineer; Western Research Laboratory (Edmonton), Energy Research Laboratories, Canada Centre for Mineral and Energy Technology (CANMET), Energy, Mines and Resources, Ottawa, Canada.

TABLE 1
Description of Coals Tested from the Greenhills Area

Lab No.	Test No.	Description
2364-80	389-79	Seam 7, Adit 23
2365-80	395-79	Blend of 25% Seam 1 30% Seam 7 25% Seam 10 20% Seam 16
2366-80	396-79	Seam 10, Adit 24
2367-80	399-79	Seam 1, Adit 26
2368-80	405-79	Seam 7, Adit 22

TABLE 2 Chemical Analyses of Component Coals

Identification

Laboratory Number	2364-80	2365-80	2366-80	2367-80	2368-80
Description	Adit 23 Seam 7	25% Seam 1 30% Seam 7 25% Seam 10 20% Seam 16	Adit 24 Seam 10	Adit 26 Seam 1	Adit 22 Seam 7

Classification

Rank (ASTM)	mvb	mvb	mvb	lvb	mvb
International System	432	532	531	431	432
Specific Volatile Index	187	188	185	202	184
Carbon (dmmfb)	88.7	88.9	89.1	91.0	89.8

Proximate Analysis (db)

Ash	7.6	7.9	7.9	8.2	8.1
Volatile Matter	24.4	26.4	26.1	19.9	24.5
Fixed Carbon	68.0	65.7	66.0	71.9	67.4

Gross Calorific Value (db)

Btu per pound	14270	14280	14240	14270	14120
---------------------	-------	-------	-------	-------	-------

Ultimate Analysis (db)

Carbon	81.3	80.9	81.3	82.7	81.8
Hydrogen	5.0	4.9	4.9	4.6	4.8
Sulphur	0.47	0.46	0.54	0.40	0.36
Nitrogen	1.3	1.3	1.4	1.5	1.4
Ash	7.6	7.9	7.9	8.2	8.1
Oxygen (by difference)	4.3	4.5	4.0	2.6	3.5

Ash Analysis (db)

SiO ₂	53.7	53.2	54.8	55.0	50.0
Al ₂ O ₃	29.5	29.8	27.8	30.5	34.9
Fe ₂ O ₃	5.4	6.9	5.4	5.4	3.6
TiO ₂	2.0	1.7	1.6	1.7	2.0
P ₂ O ₅	2.1	2.3	2.5	1.1	2.5
CaO	2.8	3.2	3.4	1.9	3.4
MgO	0.4	0.3	0.3	0.3	0.4
SO ₃	0.6	0.6	0.6	0.4	0.5
Na ₂ O	0.0	0.0	0.1	0.0	0.0
K ₂ O	0.7	0.6	1.1	0.5	0.3

TABLE 3 Physical Tests and Fusibility of Ash of Component Coals

<u>Identification</u>		2364-80	2365-80	2366-80	2367-80	2368-80
Laboratory Number		2364-80	2365-80	2366-80	2367-80	2368-80
Description		Adit 23 Seam 7	25% Seam 1 30% Seam 7 25% Seam 10 20% Seam 16	Adit 24 Seam 10	Adit 26 Seam 1	Adit 22 Seam 7
<u>Coal Pulverization</u>						
<u>Sieve Analysis</u>						
<u>Passing</u>	<u>Retained On</u>					
	1/4 in. %	5.1	7.3	5.6	0.5	1.1
1/4 in.	1/8 in. %	9.9	11.4	13.8	16.9	14.5
1/8 in.	1/16 in. %	17.0	15.4	18.4	27.1	26.3
1/16 in.	1/32 in. %	17.4	14.2	15.8	17.2	19.9
1/32 in.%	50.6	51.7	46.4	38.3	38.2
Total Passing	1/8 in. %	85.0	81.3	80.6	82.6	84.4
<u>Grindability</u>						
Hardgrove Index		81	89	80	103	76
<u>Fusibility of Ash</u>						
Initial Deformation Temp. ...	°F	2480	2490	2480	2630	2700+
Softening Temp. Spherical ...	°F	2700+	2700+	2700+	2700+	2700+
Softening Temp. Hemispherical	°F	2700+	2700+	2700+	2700+	2700+
Fluid Temp.	°F	2700+	2700+	2700+	2700+	2700+

TABLE 4 Thermal Rheological Properties of Component Coals

<u>Identification</u>						
Laboratory Number	2364-80	2365-80	2366-80	2367-80	2368-80	
Description	Adit 23 Seam 7	25% Seam 1 30% Seam 7 25% Seam 10 20% Seam 16	Adit 24 Seam 10	Adit 26 Seam 1	Adit 22 Seam 7	
 <u>Linear Expansion</u>						
Bd. 52 lb/ft ³ at 2% moisture...%						
 <u>Gieseler Plasticity</u>						
Start	429	430	434	453	432	
Fusion Temp.°C	445	443	457	-	447	
Max. Fluid Temp.°C	464	461	457	476	464	
Final Fluid Temp.°C	477	478	469	487	482	
Solidification Temp.°C	484	484	474	494	485	
Melting Range	48	48	35	34	50	
Max. Fluidity	27.5	24.3	5.3	2.4	18.5	
Torque	40	40	40	40	40	
 <u>Dilatation</u>						
Ti - Softening Temp.°C	401	406	410	426	397	
Tii - Max. Contraction Temp.°C	449	447	453	477	453	
Tiii - Max. Dilatation Temp.°C	471	469	-	-	473	
Contraction	24	26	26	21	25	
Dilatation	-11	-13	N11	N11	-23	
 <u>Free Swelling Index</u>						
F.S.I.	7½	7½	6	5	5½	

Identification

Laboratory Number.....	2364-80	2365-80	2366-80	2367-80	2368-80
Description.....	Adit 23 Seam 7	25% Seam 1 30% Seam 7 25% Seam 10 20% Seam 16	Adit 24 Seam 10	Adit 26 Seam 1	Adit 22 Seam 7

Distribution of Vitrinite Types

V-6.....%					
V-7.....%					
V-8.....%					
V-9.....%		0.6	3.8		
V-10.....%	13.4	18.4	24.9		7.2
V-11.....%	37.2	25.1	22.2		25.3
V-12.....%	7.6	8.4	1.1	2.0	15.3
V-13.....%		3.3	2.2	23.3	
V-14.....%				23.3	
V-15.....%				2.0	
V-16.....%					
V-17.....%					
V-18.....%					

Reactive Components

Total Vitrinite.....%	58.1	55.8	54.2	50.6	47.8
Reactive Semi-fusinite (1/3).....%	11.7	13.4	13.2	17.6	16.2
Exinite.....%	0.6	0.6	1.5	0.0	0.3
Total.....%	70.4	69.8	68.9	68.2	64.3

Inert Components

Inert Semi-fusinite (2/3).....%	11.8	13.5	13.2	17.6	16.2
Micrinite.....%	4.5	2.1	4.5	4.2	3.7
Fusinite.....%	9.0	10.2	8.9	5.4	11.3
Mineral Matter.....%	4.3	4.4	4.5	4.6	4.5
Total.....%	29.6	30.2	31.1	31.8	35.7

Petrographic Indices

Mean Reflectance.....%	1.14	1.14	1.10	1.40	1.17
Balance Index.....	1.33	1.37	1.32	2.88	1.86
Strength Index.....	4.35	4.36	4.17	6.26	4.33
Stability Index.....	56.0	55.5	54.0	54.5	48.8

TABLE 6 - Coking Data

Test Identification Number.....	389-79	395-79	396-79	399-79	405-79					
Date of Test.....	Aug 30/79	Oct 18/79	Oct 25/79	Nov 8/79	Dec 19/79					
Laboratory Number.....	2364-80	2365-80	2366-80	2367-80	2368-80					
Description.....	Adit 23 Seam 7	25% Seam 1 30% Seam 7 25% Seam 10 20% Seam 16	Adit 24 Seam 10	Adit 26 Seam 1	Adit 22 Seam 7					
<u>ARBONIZATION DATA</u>										
Net Weight of Charge (wet).....lb	398.6	406.9	402.5	400.5	407.2					
Moisture in Charge.....%	2.5	3.8	3.5	3.1	3.0					
ASTM Bulk Density (wet).....lb/ft ³	50.5	50.9	49.9	50.2	50.1					
Oven Bulk Density (db).....lb/ft ³	51.5	51.9	51.5	51.5	52.4					
Average Flue Temperature.....°F	1980	1972	1971	1979	1969					
<u>ARBONIZATION RESULTS</u>										
Gross Coking Time.....hr:min	8:31	9:24	9:37	9:30	9:43					
Maximum Wall Pressure.....lb/in ²	0.60	0.82	1.05	1.01	0.80					
Coke Yield Actual.....%	74.6	74.9	75.6	79.7	76.6					
Mean Coke size.....in	1.95	1.96	1.99	2.17	2.04					
Apparent Specific Gravity.....	0.95	0.96	0.94	1.01	0.98					
<u>Screen Analysis of Coke</u> (cumulative percentage retained on)										
3 inch sieve.....	4.8	7.3	5.9	15.6	9.5					
2 inch sieve.....	43.1	41.9	46.0	52.9	47.2					
1 1/2 inch sieve.....	74.8	74.1	77.0	79.1	76.5					
1 inch sieve.....	93.6	93.1	93.1	93.3	93.1					
3/4 inch sieve.....	96.6	95.7	95.9	96.4	95.9					
1/2 inch sieve.....	97.5	96.8	96.9	97.3	96.9					
Percentage -1/2 inch (breeze).....	2.5	3.2	3.1	2.7	3.1					
<u>Umbler Test (ASTM)</u>										
Stability Factor.....	52.4	51.8	52.1	55.6	54.0					
Hardness Factor.....	67.2	67.7	66.8	69.9	66.3					
<u>Japanese Drum Test (JIS)</u> (cumulative percentage retained on)										
50 mm sieve.....	* 25.6	** 8.4	* 12.8	** 1.0	* 20.6	** 7.4	* 20.2	** 10.4	* 19.1	** 4.8
25 mm sieve.....	* 86.7	** 70.0	* 85.5	** 67.3	* 87.9	** 71.6	* 85.7	** 69.8	* 85.1	** 68.7
15 mm sieve.....	* 93.8	** 81.8	* 92.3	** 80.3	* 93.4	** 82.1	* 93.8	** 83.3	* 93.3	** 81.6
			*30 revs		**150 revs					

TABLE 7

Analyses of Coke Oven Charges and Resultant Cokes

<u>Identification</u>					
Test Number.....	389-79	295-79	396-79	399-79	405-79
Date Charged.....	Adit 23	25% Seam 1	Adit 24	Adit 26	Adit 22
Description.....	Seam 7	30% Seam 7 25% Seam 10 20% Seam 16	Seam 10	Seam 1	Seam 7
<u>Coke Oven Charge</u>					
Laboratory Number.....	2364-80	2365-80	2366-80	2367-80	2368-80
Proximate Analysis (db)					
Ash.....%	7.6	7.9	7.9	8.2	8.1
Volatile Matter.....%	24.4	26.4	26.1	19.9	24.5
Fixed Carbon.....%	68.0	65.7	66.0	71.9	67.4
Sulphur (db).....%	0.47	0.46	0.54	0.40	0.36
<u>Resultant Coke</u>					
Laboratory Number.....	2373-80	2374-80	2375-80	2376-80	2377-80
Proximate Analysis (db)					
Ash.....%	10.4	10.5	10.6	10.4	10.2
Volatile Matter.....%	1.9	2.5	2.4	1.7	2.5
Fixed Carbon.....%	87.7	87.0	87.0	87.9	87.3
Sulphur (db).....%	0.39	0.38	0.44	0.31	0.30

STRENGTH INDEX

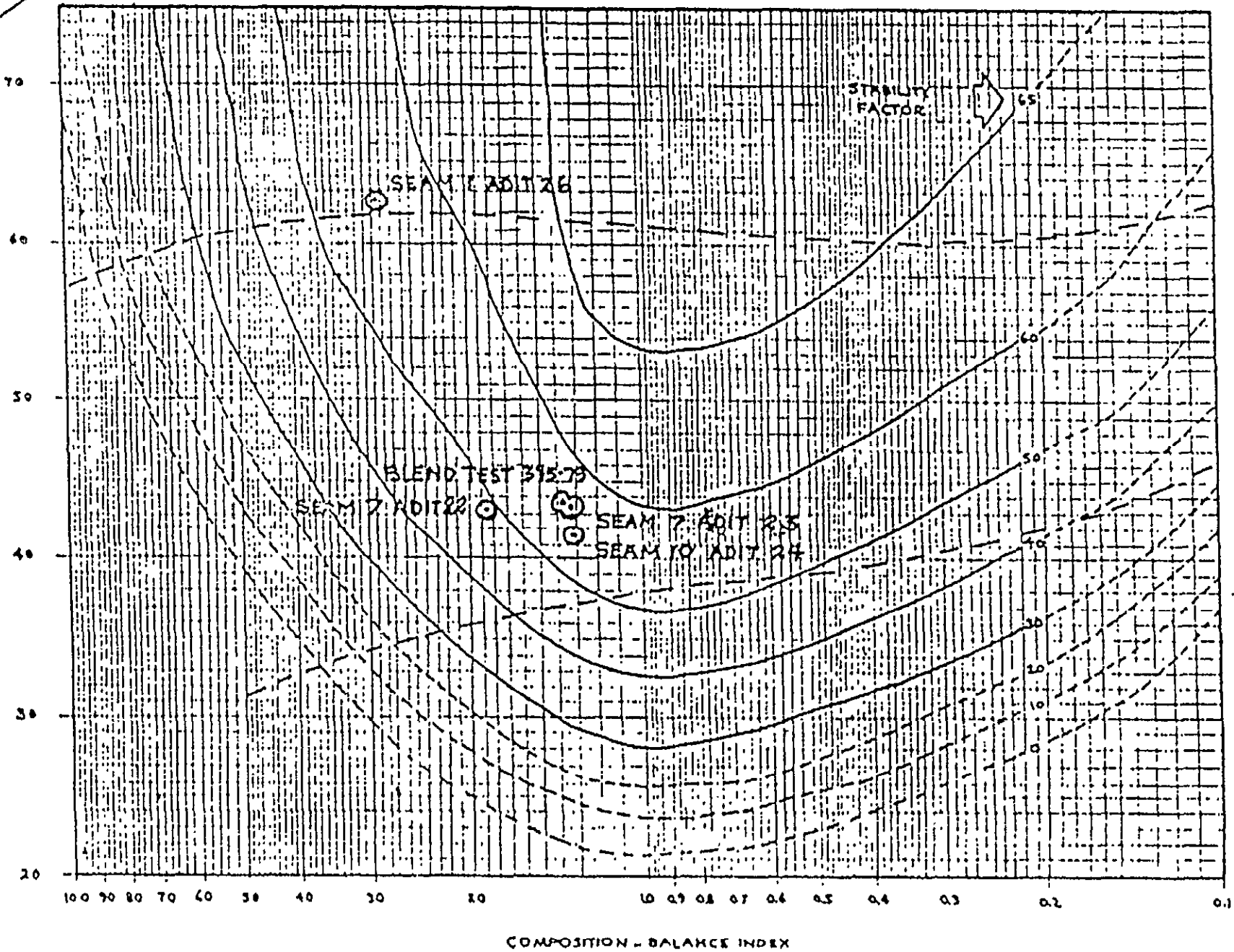
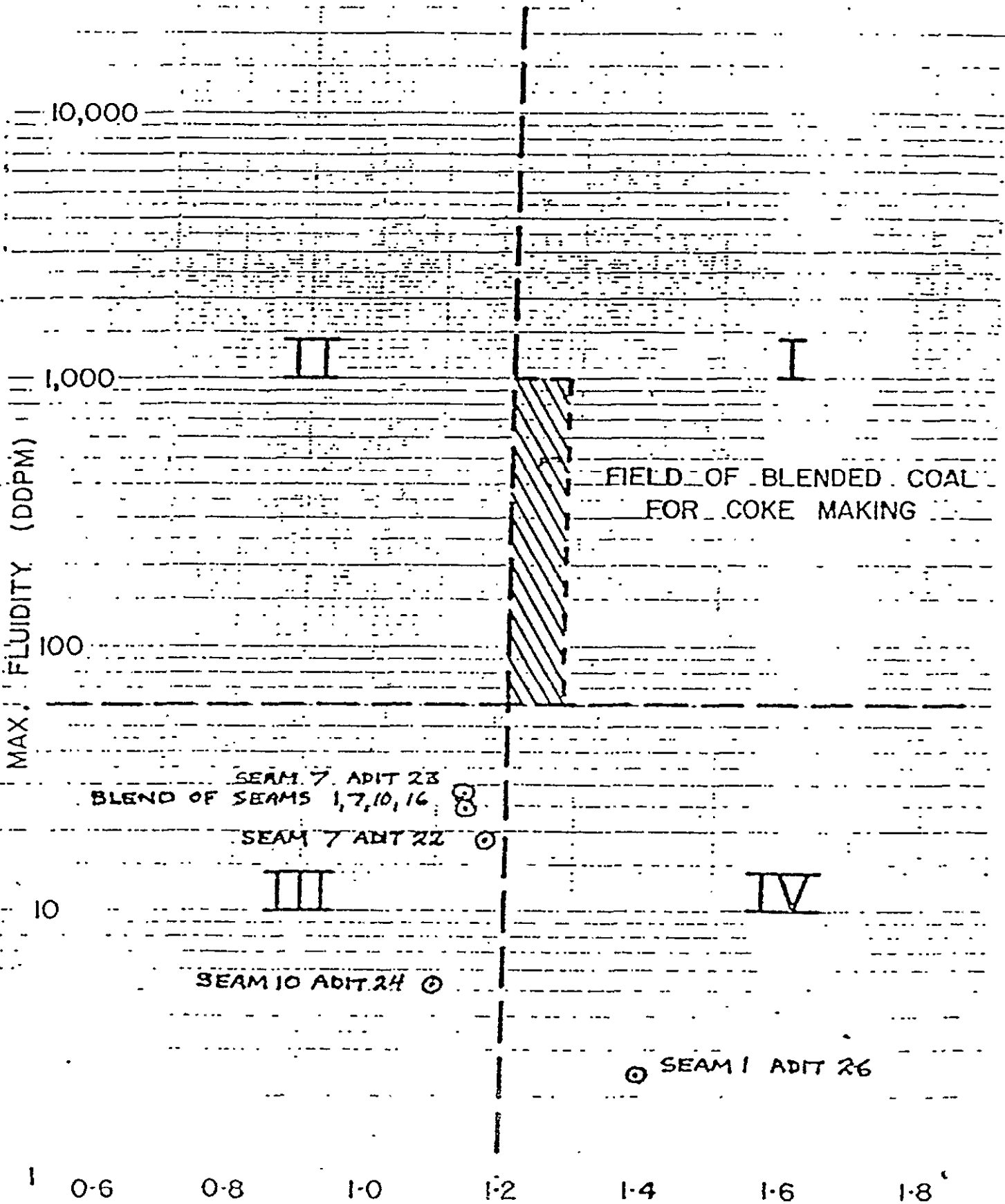


Figure 1. Plot of predicted stability index of component coals from petrographic data.

Figure 2. RELATIONSHIP BETWEEN MAX. FLUIDITY AND MEAN REFLECTANCE



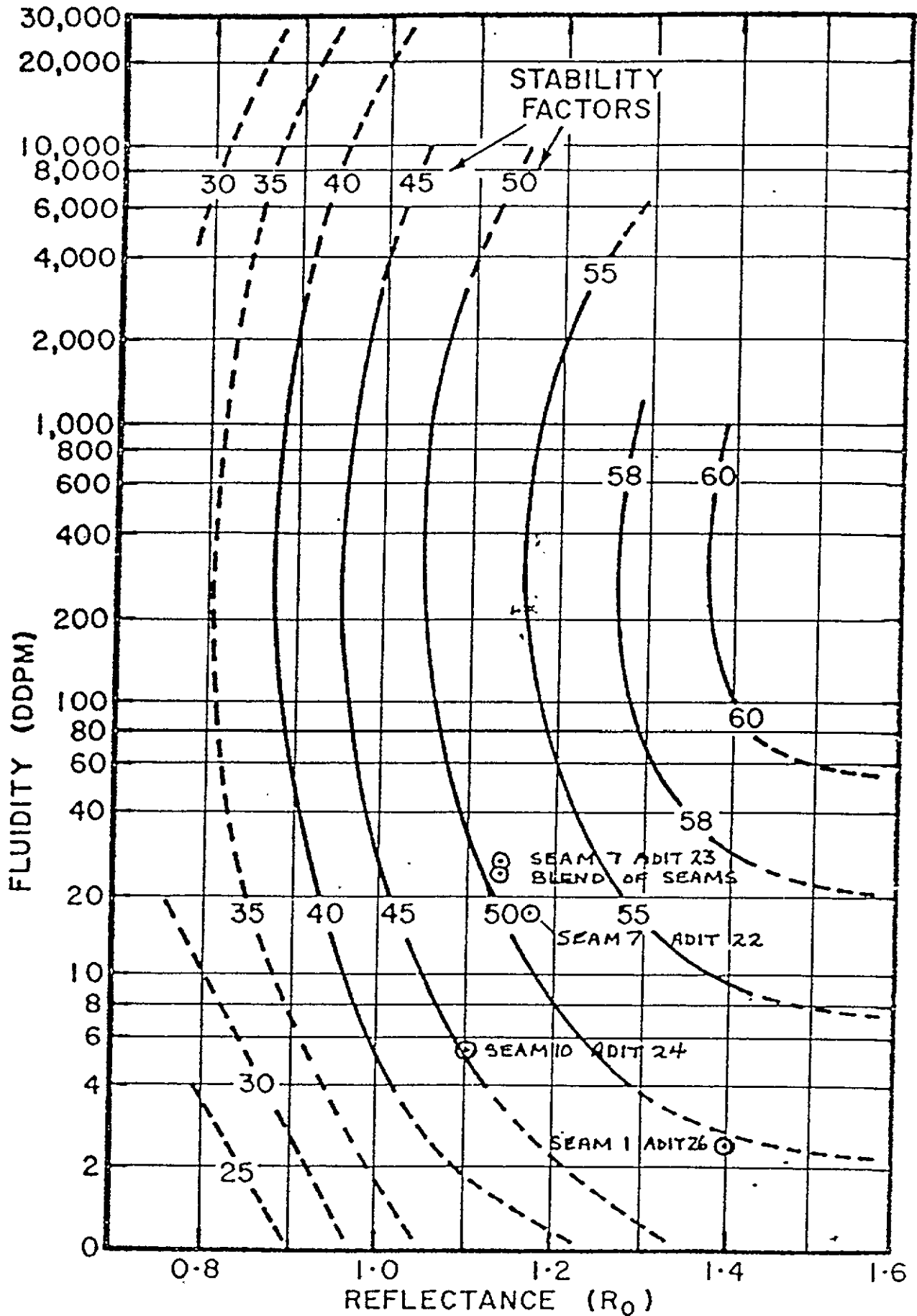


Figure 3. PREDICTION OF COKE STABILITY FACTORS.

- REGRESSION RESULTS FROM GARMET DATA

APPENDIX 1

Letter dated October 23, 1979 from D.P. Sharma, Manager, Quality Control, Kaiser Resources Limited, Sparwood, British Columbia.

KAISER
RESOURCES
COAL DIVISION

KAISER
RESOURCES
COAL DIVISION
1979 10 23

1979 10 23

Mr. J.C. Botham
Manager, Coal Resources and
Processing Laboratory
Energy Research Laboratories
555 Booth Street
Ottawa, Ontario
K1A 0G1

Dear Jack:

RE: GREENHILLS PROJECT

In continuation of our feasibility study on Greenhills Project, additional carbonization tests are required on the following samples:

- (1) Adit #23 No. 7 Seam
- (2) Adit #24 No. 10 Seam
- (3) Greenhills Blend Seam Nos. 1, 7, 10 & 16
- (4) Adit #26 No. 1 Seam
- (5) Adit #27 No. 3 Seam
- (6) Adit #20 No. 27 Seam
- (7) Adit #22 No. 7 Seam, Recheck

Two drum lots of clean coal from the above listed seams will be shipped to Cloverbar Lab, Edmonton from Birtley Engineering, Calgary. To-date, first four samples are already at Cloverbar Lab, and remaining three will be available during the next two months.

Along with 7 carbonization tests, the following bench scale tests are required:

Proximate Analysis,
% Sulphur,
F.S.I.,
Dilatation,
Giesler Plasticity,
Petrographic Analysis,

Mr. J.C. Botham
Energy Research Laboratories

1979 10 23
GREENHILLS PROJECT

Ultimate Analysis
Ash Fusion Temp.,
Chemical Analysis of Ash and
Hardgrove Grindability Index

Please bill us for the test work as per CCRA member rates.

Yours sincerely,
KAISER RESOURCES LTD.

D. P. Sharma
L.B.S.

D.P. Sharma,
Manager
Quality Control

DPS/cl

cc: Dr. Ross Leader, E.M.R. - Edmonton
Mr. Alfred Fung, E.M.R. - Edmonton
N. Stonestreet - K.R.L.
J.B. Murphy - K.R.L.
L.B. Samuelson - K.R.L.

APPENDIX 3

SEAM EQUIVALENCY CHART

Fording Coal Greenhills

Crows Nest Resources

160	15
164	14
140	13U
144	13L
131	12U
130	12L
110	11
112	9
114	8U
116	8L
100	7
102	6U
104	6L
090	5U
092	5
070	4U
072	4L
030	2
010	1

ENCLOSURE 13

BURNT RIDGE EXT file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calc	S%	R/yld
101	5	7.0	9.71	R	.85	19.9	00	00	00	00	0	79
101	5	7.0	9.71	W	.91	6.0	22.8	70.7	6	8013	.63	70
102	5U	71.8	74.6	R	.64	40.13	0	0	0	0	0	66.2
102	5U	71.8	74.6	W	.57	12.24	20.6	66.8	5.5	7490	.62	47
102	5	82.6	84.4	R	.55	10.3	0	0	0	0	0	41.7
102	5	82.6	84.4	W	1.34	5.7	23.7	70.0	7.5	8020	.59	89
103	5	121.75	122.32	R	.53	21.34	0	0	0	0	0	43
103	5	121.75	122.32	W	.49	9.37	19.93	70.21	2.5	7744	.76	71
103	5	150.5	151.9	R	.66	19.98	0	0	0	0	0	82.7
103	5	150.5	151.9	W	2.5	5.2	22.54	69.76	8	7906	.63	79
501	5U	281.8	284.7	R	.71	28.91	0	0	4.0	0	0	85.7
501	5U	281.8	284.7	W	1.8	8.48	23.57	66.15	7.5	7750	.57	70.82
501	5L	286.2	289.6	R	.65	20.89	0	0	6.5	0	0	70
501	5I	286.2	289.6	W	1.29	6.37	24.44	67.90	7.5	7869	.51	79.45
601	5	266.05	267.48	R	.53	42.77	0	0	0	0	0	60
601	5	266.05	267.48	W	.86	12.19	21.64	65.31	7.0	7392	.82	41.79
601	5	242.4	242.6	R	.88	22.05	0	0	0	0	0	85
601	5	242.4	242.6	W	.55	17.26	23.05	59.14	7.0	7002	1.03	84.68

BURNT RIDGE EXT file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
102	6L	12.23	13.51	R	.71	25.7	0	0	0	0	0	45.3
102	6L	12.23	13.51	W	.79	10.35	21.25	68	2	7470	.66	66
103	6	52.0	55.3	R	.75	11.98	0	0	0	0	0	95.6
103	6	52.0	55.3	W	1.3	6.53	23.99	68.38	8.5	7832	.74	86
103	6	57.0	58.0	R	.59	20.67	0	0	0	0	0	83.3
103	6	57.0	58.0	W	.65	9.4	21.81	68.14	6	7666	.63	77
103	6	68.5	70.1	R	.59	29.25	0	0	0	0	0	97.1
103	6	68.5	70.1	W	.54	10.98	22.86	65.62	7.5	7582	.96	65
104	6	53.9	55.2	R	.57	9.3	0	0	0	0	0	00
104	6	53.9	55.2	W	.68	6.5	25.6	67.6	8.5	7953	0	00
501	6U	204.8	222.1	R	.78	19.13	0	0	8.0	0	0	77.5
501	6U	204.8	222.1	W	1.29	7.99	26.45	64.27	8.5	7679	.87	81.36
501	6U	212.03	214.45	R	.81	18.04	0	0	6.0	0	0	77.5
501	6U	212.03	214.45	W	1.48	9.85	23.22	65.45	7.0	7515	.64	81.65
501	6L	217.7	219.35	R	.9	37.68	0	0	7.0	0	0	94.4
501	6L	217.7	219.35	W	1.4	9.71	25.42	63.47	7.5	7610	.82	53.83
601	6U	218.43	220.96	R	.66	14.73	0	0	0	0	0	35
601	6U	218.43	220.96	W	.85	6.32	25.41	67.42	8.0	7786	.82	85.92
601	6L	226	228.15	R	.67	30.52	0	0	0	0	0	28
601	6L	226	228.15	W	.73	9.45	23.1	66.72	7.5	7658	.78	65.59
601	6L	228.35	229.3	R	1.04	66.7	0	0	0	0	0	63
601	6L	228.35	229.3	W	.65	11.25	25.55	62.55	8.0	7534	1.15	17.25

hole	sm	from	to	Rw/Wsh	moist	ash	vol%	FC	FSI calcs			Sx R/yld
601	6L	239.25	241.15	R	.71	46.93	0	0	0	0	0	95
601	6L	239.25	241.15	W	.56	14.32	23.49	61.63	7.0	7191		.94 95
602	6	200.53	207.2	R	.73	30.29	0	0	0	0	0	63
602	6	200.53	207.2	W	.56	8.67	24.64	66.13	7.5	7643		.62 62.18

burnt ridge ext file is c:\hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
501	7	194.8	197.3	R	.96	42.74	0	0	5.5	0	0	91.1
501	7	194.8	197.3	W	1.46	8.74	27.61	62.19	8.5	7631	1.12	51.44
601	7	205.47	211.73	R	.67	37.37	0	0	0	0	0	35
601	7	205.47	211.73	W	1.01	6.51	26.48	66	8.5	7907	.86	53.17

burnt ridge ext file is c:\hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
103	8	35.0	35.73	R	1.0	21.1	0	0	0	0	0.	44.8
103	8	35.0	35.73	W	1.42	4.6	25.21	68.77	9	8047	.94	75
104	8	35.7	36.24	R	.82	4.8	0	0	0	0	0	0
104	8	35.7	36.24	W	.88	4.1	25.5	69.8	9	8173	1.0	00
104	8	38.64	39.6	R	.72	6.9	0	0	0	0	0	00
104	8	38.64	39.6	W	1.37	4.1	25.9	69.3	9	8098	1.3	00
501	8	182.3	184.4	R	1.09	7.16	0	0	8.5	0	0	86.8
501	8	182.3	184.4	W	1.42	5.1	30.06	63.42	8.5	7967	.87	96.61

burnt ridge ext file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
103	9	20.0	21.9	R	1.0	6.2	0	0	0	0	0	64.1
103	9	20.0	21.9	W	.9	3.85	25.26	70.03	8.5	8170	.97	93
104	9	19.32	22.4	R	.8	13.6	0	0	0	0	0	00
104	9	19.32	22.4	W	.76	4.9	25.3	69.4	8.5	8088	.77	00
501	9	171.05	175.6	R	.9	16.66	0	0	7.5	0	0	92.5
501	9	171.05	175.6	W	1.22	8.15	28.2	62.43	8.0	7685	.79	82.46
601	9	186.07	190.45	R	.72	6.37	0	0	0	0	0	17
601	9	186.07	190.45	W	.73	4.46	28.19	66.62	8.0	7937	.77	96.57
602	9	158.40	161.1	R	.94	32.59	0	0	0	0	0	69
602	9	158.40	161.1	W	1.26	5.45	27.34	65.95	8.5	7937	.81	66.82

burnt ridge ext file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
501	10U	132.5	134.1	R	.97	35.38	0	0	6	0	0	70.3
501	10U	132.5	134.1	W	1.3	11.1	26.08	61.52	8.0	7235	.77	53.87
501	10L	136.15	139.0	R	.9	9.35	0	0	7.5	0	0	100
501	10L	136.15	139.0	W	1.04	5.05	29.16	64.75	8.0	7993	.71	91.94
601	10	165.06	165.66	R	.66	79.68	0	0	0	0	0	0
601	10	165.06	165.66	W	.96	8.28	26.85	63.91	9.0	7757	1.07	5.37
602	10	132.8	137.6	R	.88	40.48	0	0	0	0	0	63
602	10	132.8	137.6	W	.54	6.51	28.24	64.71	7.5	7717	.6	65.65

burnt ridge ext file is c:hold 2/12/86.

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
501	11U	109.05	111.80	R	1.0	13.73	0	0	8	0	0	100
501	11U	109.05	111.80	W	1.27	6.09	28.85	63.79	8.0	7853	.66	84.61
501	11U	113.05	114.4	R	.83	32.4	0	0	7	0	0	100
501	11U	113.05	114.4	W	1.86	8.43	29.29	60.42	8.0	7505	.92	66.51
501	11L	117.05	118.3	R	.94	34.39	0	0	5	0	0	81.5
501	11L	117.05	118.3	W	1.36	12.79	26.66	59.19	8.0	7232	.98	64.49
601	11	124.03	125.8	R	.89	21.97	0	0	0	0	0	90
601	11	124.03	125.8	W	.89	7.22	26.64	65.25	8.0	7629	.84	75.39
602	11	94.1	95.3	R	.8	12.19	0	0	0	0	0	75
602	11	94.1	95.3	W	.83	6.61	27.93	64.63	8.0	7846	.69	92.35
602	11	97.15	99.52	R	.82	46.45	0	0	0	0	0	0
602	11	97.15	99.52	W	.7	11.04	26.46	61.8	7.5	7479	.97	47.93
602	11	103.5	105.16	R	1.1	45.45	0	0	0	0	0	84
602	11	103.5	105.16	W	.71	11.48	27.4	60.41	7.5	7458	1.11	40.69
602	11	105.86	107.62	R	.95	25.56	0	0	0	0	0	62
602	11	105.86	107.62	W	1.14	6.77	29.15	62.94	8.5	7773	1.10	70.69

burnt ridge ext file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calc	S%	R/yld
501	12	90.07	91.02	R	.77	17.65	0	0	8	0	0	95.4
501	12	90.07	91.02	W	.95	9.72	30.02	59.31	8.5	7518	.83	88.03
501	12	91.42	93.3	R	.91	23.7	0	0	6	0	0	95.4
501	12	91.42	93.3	W	1.1	13.62	29.24	56.04	7.5	7280	.78	78.82
601	12	113.95	116.78	R	.73	17.23	0	0	0	0	0	53
601	12	113.95	116.78	W	1.04	4.48	28.11	66.37	8.5	8012	.82	82.23
602	12	83.95	86.05	R	.96	36.66	0	0	0	0	0	0
602	12	83.95	86.05	W	.77	9.12	28.87	61.24	8.5	7478	.80	60.96

burnt ridge ext file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calc	S%	R/yld
501	13	79.7	82.65	R	.91	11.32	0	0	8	0	0	100
501	13	79.7	82.65	W	1.53	6.44	31.58	60.45	8.0	7765	.76	91.95
601	13	102.87	103.15	R	1.09	10.31	0	0	0	0	0	100
601	13	102.87	103.15	W	.93	6.49	28.38	64.2	8.0	7800	.69	90.45
601	13	105.64	106.3	R	.73	13.89	0	0	0	0	0	85
601	13	105.64	106.3	W	1.08	5.21	28.62	65.09	8.5	7911	.93	85.63
602	13	69.96	74.53	R	.96	25.85	0	0	0	0	0	71
602	13	69.96	74.53	W	.91	4.48	30.02	64.59	8.5	8041	.68	72.08

burnt ridge ext file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calc	S%	R/yld
601	14	85.3	85.95	R	.94	30.9	0	0	0	0	0	0
601	14	85.3	85.95	W	.9	10.3	28.51	60.29	8.0	7541	.91	64.04
601	14	86.65	88.1	R	.97	53.78	0	0	0	0	0	0
601	14	86.65	88.1	W	.82	12.15	28.12	58.91	8.5	7394	.89	25.74

burnt ridge ext file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calc	S%	R/yld
601	15	72.8	73.7	R	1.03	14.42	0	0	0	0	0	100
601	15	72.8	73.7	W	.81	6.69	28	64.5	7.0	7864	1.41	89.63
601	15	76.95	79.35	R	.94	12.96	0	0	0	0	0	71
601	15	76.95	79.35	W	.79	5.53	30.33	63.35	8.5	7837	.71	92.83
602	15	27	27.6	R	.72	34.07	0	0	0	0	0	90
602	15	27	27.6	W	.83	15.94	27.93	55.3	7.5	6989	.72	59.87

BURNT RIDGE EXT file is c:hold 2/12/86

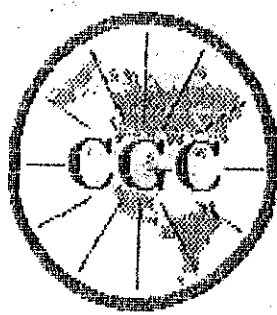
hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
601	16	62.43	62.75	R	1.04	31.55	0	0	0	0	0	0
601	16	62.43	62.75	W	.79	11.35	30.01	57.85	8.5	7419	.79	64.96

burnt ridge ext file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
601	17	23.9	26.15	R	1.71	8.7	0	0	0	0		
601	17	23.9	26.15	W	1.54	3.95	28.45	66.06	1.0	7726	.61	71.13
602	17	6.75	8.6	R	2.0	42.86	0	0	0	0	0	79
602	17	6.75	8.6	W	1.54	9.47	29.9	59.09	.1	6782	.48	47.44
602	17	10.57	12.35	R	1.54	27.12	0	0	0	0	0	78
602	17	10.57	12.35	W	1.89	6.75	29.28	62.08	.1	7239	.62	62.8

BURNT RIDGE EXT file is c:hold 2/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
601	18	7.1	9.5	R	4.81	6.54	0	0	0	0	0	53
601	18	7.1	9.5	W	2.81	3.41	30.12	65.5	0.5	7112	.64	94.13



Century
GEOPHYSICAL CORP.

GAMMA-NEUTRON

COMPANY : FORDING COOL GREENHILLS
WELL : HOLE #R 2438
LOCATION/FIELD : SITE #15 Clow
COUNTY : ELKFORD
STATE : BRITISH COLUMBIA
SECTION : TOWNSHIP :

OTHER SERVICES:
9067
9030
9055

DATE : 06/05/96
DEPTH DRILLER : 168
LOG BOTTOM : 166.30
LOG TOP : -1.70

PERMANENT DATUM : G.L.
ELEV. PERM. DATUM:
LOG MEASURED FROM: G.L.
DRL MEASURED FROM: G.L.

ELEVATIONS
KB :
DF :
GL :

CASING DRILLER : 3
CASING TYPE : STEEL
CASING THICKNESS: .65

LOGGING UNIT : 9603
FIELD OFFICE : CALGARY
RECORDED BY : S MC NEIL

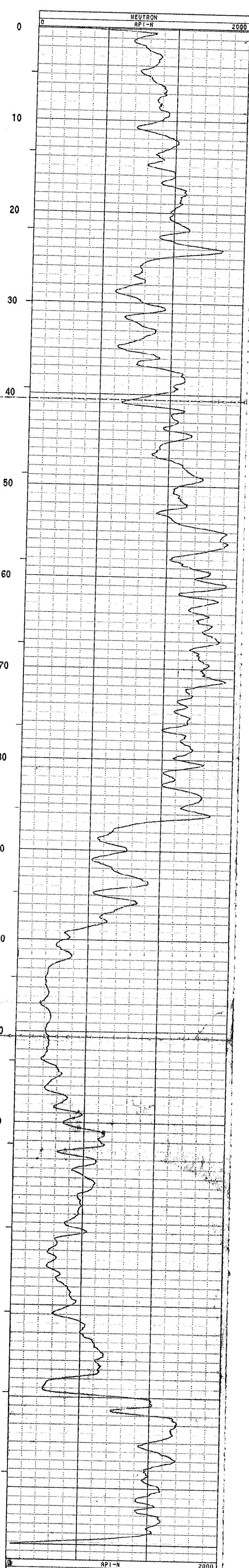
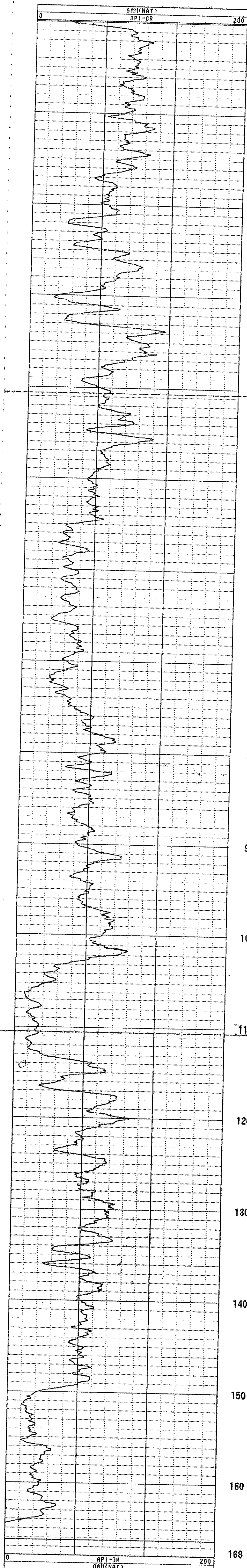
BIT SIZE : 13.3
MAGNETIC DECL. : 19
MATRIX DENSITY : 2.65
FLUID DENSITY : 1.10
NEUTRON MATRIX : SANDSTONE
REMARKS :

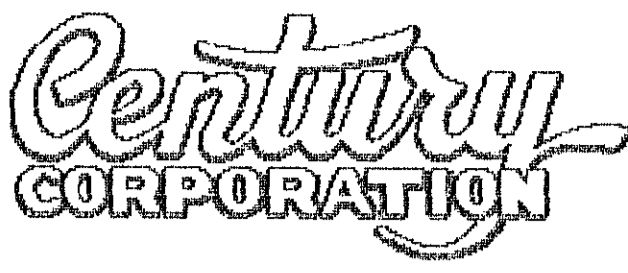
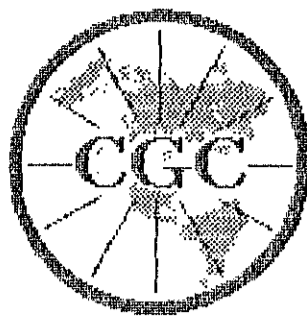
BORFHOLE FLUID : AIR
RM
RM TEMPERATURE :
MATRIX DELTA T :
FLUID DELTA T :

FILE : ORIGINAL
TYPE : 9067A
LOG : 2
PLOT : GREEN 1
THRESH:

9067 CASED, 9033 & 9055 OPEN HOLE

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

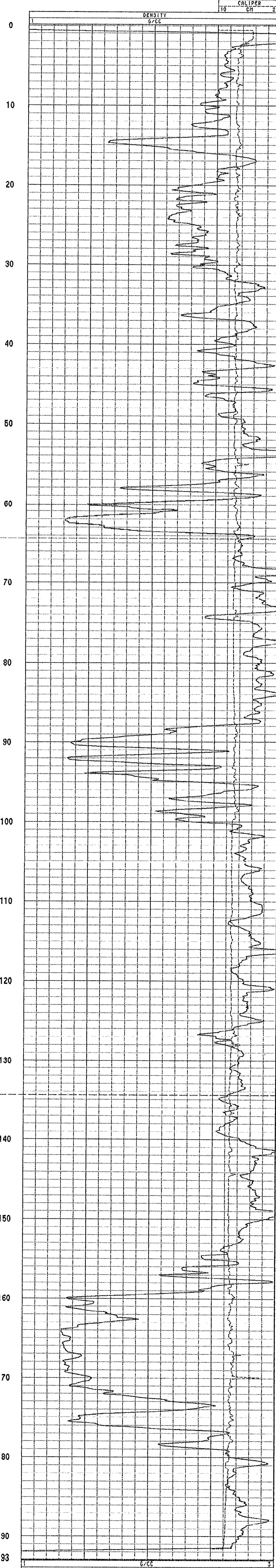
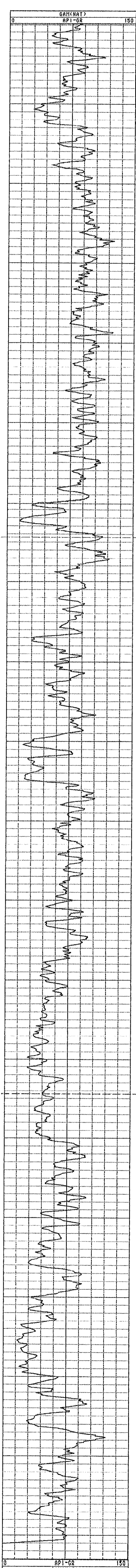


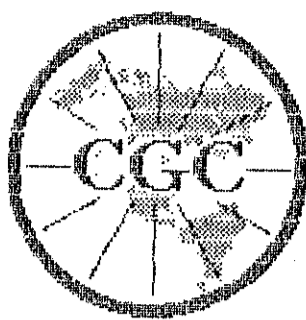


GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2439	9067	
LOCATION/FIELD	: SITE # 16	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/06/96	PERMANENT DATUM	: G.L.
DEPTH DRILLER	: 193	ELEV. PERM. DATUM:	KB :
LOG BOTTOM	: 193.00	LOG MEASURED FROM:	G.L. DF :
LOG TOP	: -1.50	DRL MEASURED FROM:	G.L. GL :
CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR
MAGNETIC DECL.	: 19	RM	:
MATRIX DENSITY	: 2.65	RM TEMPERATURE	:
FLUID DENSITY	: 1.10	MATRIX DELTA T	:
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T		:
REMARKS	:		:
	9067 CASED, 9033 & 9055 OPEN HOLE		

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



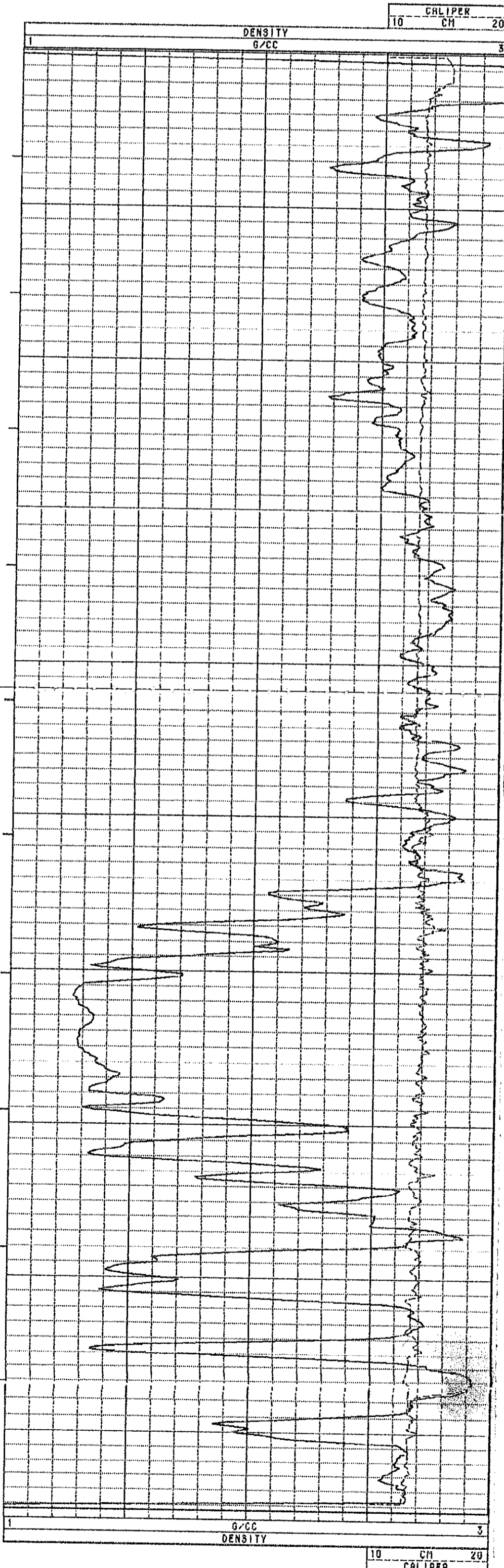
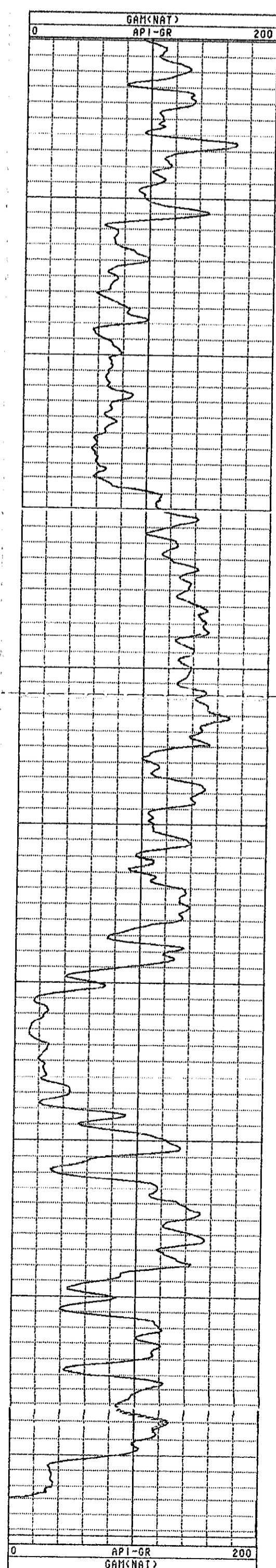


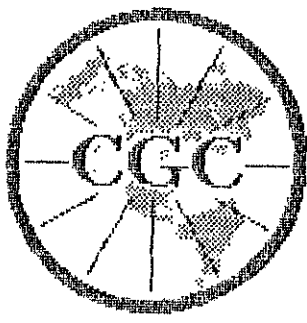
GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2440	9067	
LOCATION/FIELD	: SITE # 13	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/07/96	PERMANENT DATUM	: G.L. ELEVATIONS
DEPTH DRILLER	: 96	ELEV. PERM. DATUM:	KB :
LOG BOTTOM	: 95.40	LOG MEASURED FROM:	G.L. BF :
LOG TOP	: -1.90	DRL MEASURED FROM:	G.L. GL :
CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR
MAGNETIC DECL.	: 19	RM	:
MATRIX DENSITY	: 2.65	RM TEMPERATURE	:
FLUID DENSITY	: 1.10	MATRIX DELTA T	:
NEUTRON MATRIX	: SANDSTONE FLUID	DELTA T	:
REMARKS	:	FILE	: ORIGINAL
		TYPE	: 9030AA
		LOG	: 6
		PLOT	: GREEN 3
		THRESH:	

9067 CASED, 9033 & 9055 OPEN HOLE

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



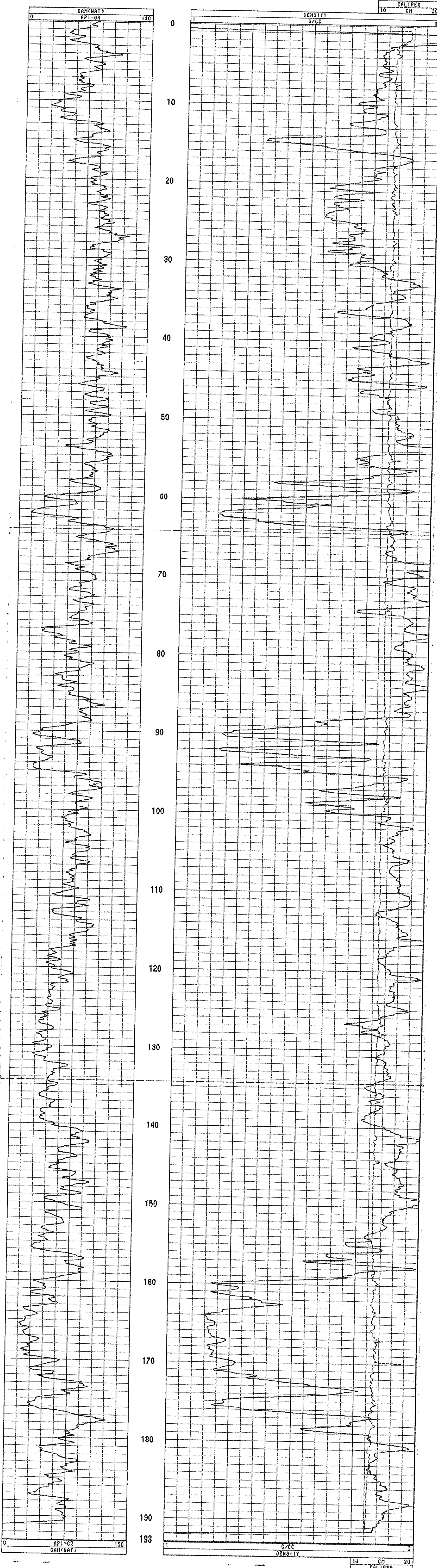


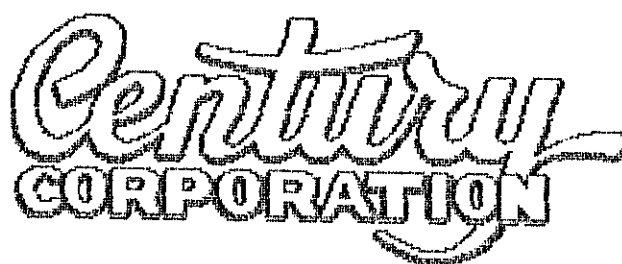
Century CORPORATION

GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2439	9067	
LOCATION/FIELD	: SITE # 16	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/06/96	PERMANENT DATUM	: G.L. ELEVATIONS
DEPTH DRILLER	: 193	ELEV. PERM. DATUM:	KB :
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LOG TOP	: -1.50	DRL MEASURED FROM:	G.L. GL :
CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR FILE : PROCESSED
MAGNETIC DECL.	: 19	RM	: TYPE : 9067A
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: LOG : 4
FLUID DENSITY	: 1.10	MATRIX DELTA T	: PLOT : GREEN 3
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T :		THRESH:
REMARKS	9067 CASED, 9030 & 9055 OPEN HOLE		

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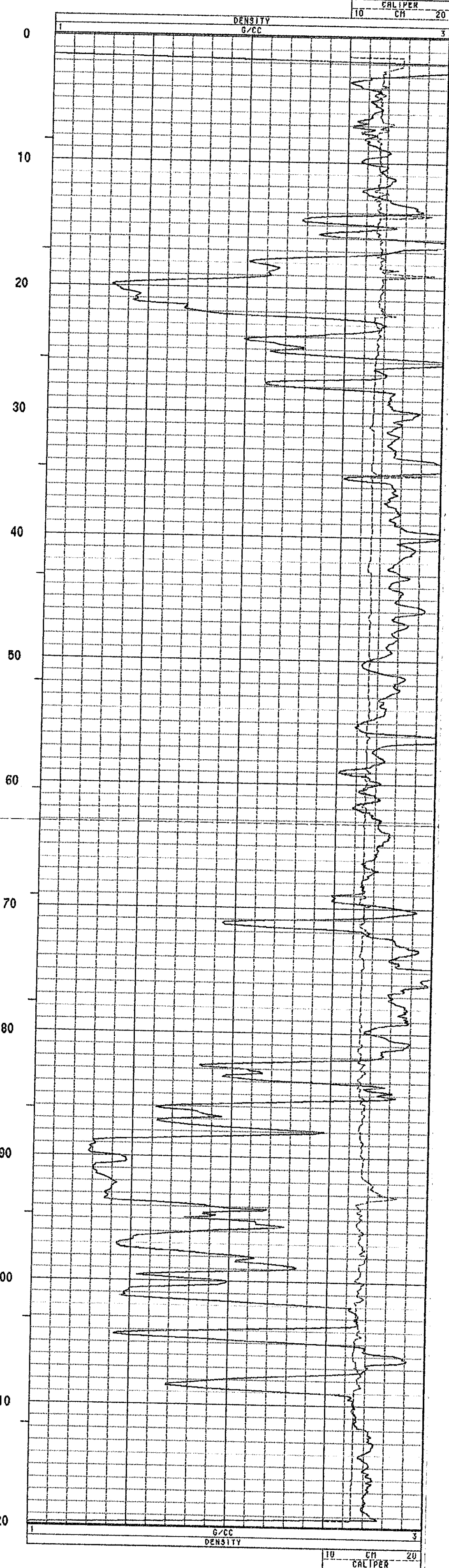
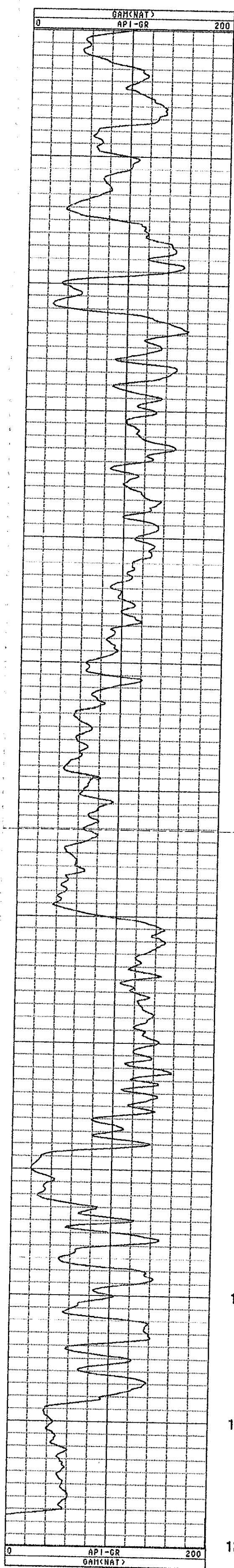


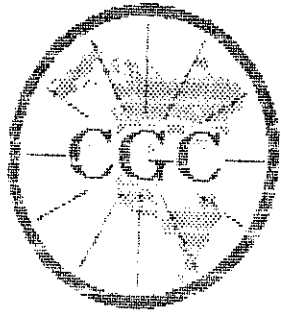
GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2441	9067	
LOCATION/FIELD	: SITE # 11	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/07/96	PERMANENT DATUM	: G.L.
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CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR
MAGNETIC DECL.	: 19	RM	:
MATRIX DENSITY	: 2.65	RM TEMPERATURE	:
FLUID DENSITY	: 1.10	MATRIX DELTA T	:
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T	:	:
REMARKS	:	FILE	: ORIGINAL
		TYPE	: 9030AA
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		THRESH:	

9067 CASED, 9033 & 9055 OPEN HOLE

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



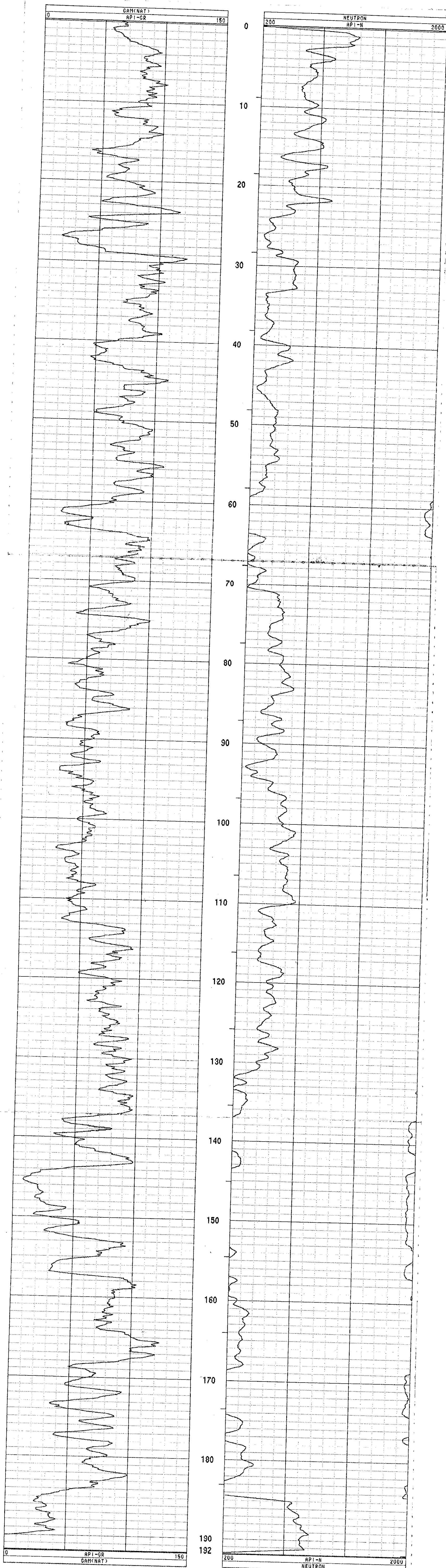


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GEOPHYSICAL CORP.

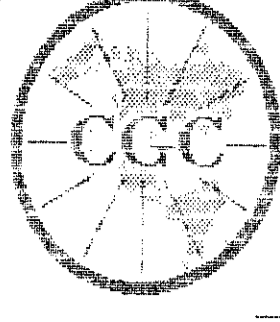
GAMMA-NEUTRON

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #PC 2442	9867	
LOCATION/FIELD	: SITE # 14 Crow	9838	
COUNTY	: ELKFORD	9855	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE :	
DATE	: 06/08/96	PERMANENT DATUM : G.L.	ELEVATIONS
DEPTH DRILLER	: 192	ELEV. PERM. DATUM:	KB :
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LOG TOP	: -1.68	DRL MEASURED FROM: G.L.	GL :
CASING DRILLER	: 3	LOGGING UNIT : 9603	
CASING TYPE	: STEEL	FIELD OFFICE : CALGARY	
CASING THICKNESS	: .65	RECORDED BY : S MC NEIL	
BIT SIZE	: 13.3	BOREHOLE FLUID : AIR	FILE : ORIGINAL
MAGNETIC DECL.	: 19	RM	TYPE : 9867a
MATRIX DENSITY	: 2.65	RM TEMPERATURE	LOG : 4
FLUID DENSITY	: 1.18	MATRIX DELTA T	PLOT : GREEN 1
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T		THRESH:
REMARKS			
9867 CASED, 9833 & 9855 OPEN HOLE			

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HOLE PC 2442 06/08/96 512



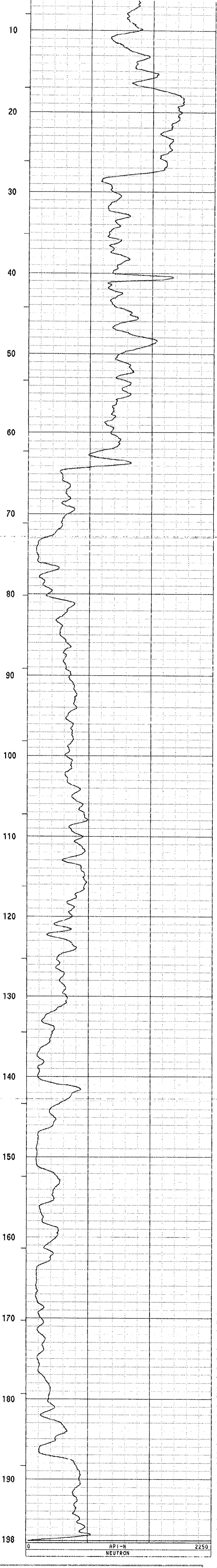
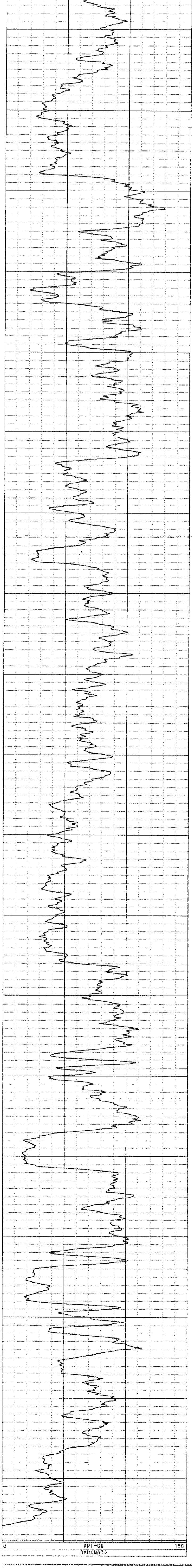
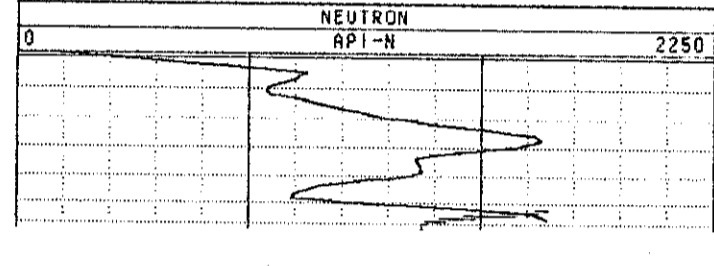
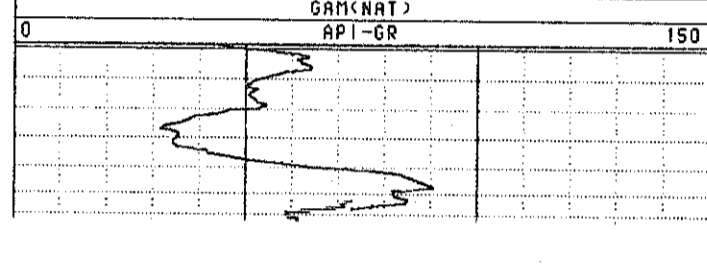
Century
GEOPHYSICAL CORP.

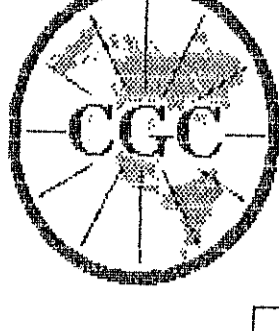
GAMMA-NEUTRON

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2443	9067	
LOCATION/FIELD	: SITE # 10 Crow	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/10/96	PERMANENT DATUM	: G.L.
DEPTH DRILLER	: 198	ELEV. FERM. DATUM:	ELEVATIONS
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LOG TOP	: -1.60	DRL MEASURED FROM:	G.L.
CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR
MAGNETIC DECL.	: 19	RM	:
MATRIX DENSITY	: 2.65	RM TEMPERATURE	:
FLUID DENSITY	: 1.10	MATRIX DELTA T	:
NEUTRON MATRIX	: SANDSTONE	FLUID DELTA T	:
REMARKS			

9067 CASED, 9033 & 9055 OPEN HOLE

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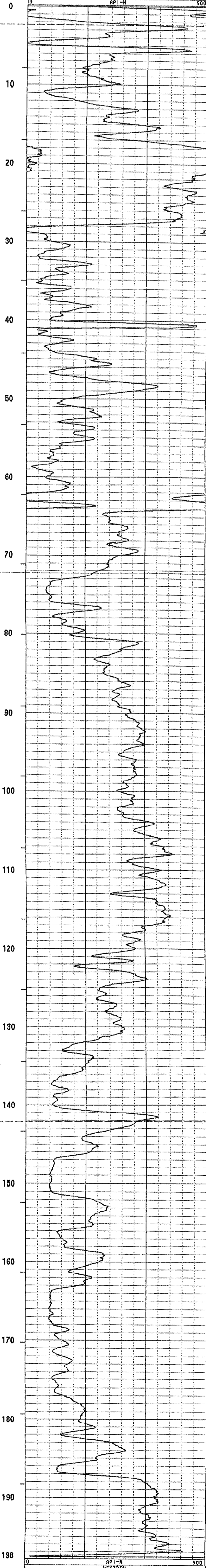
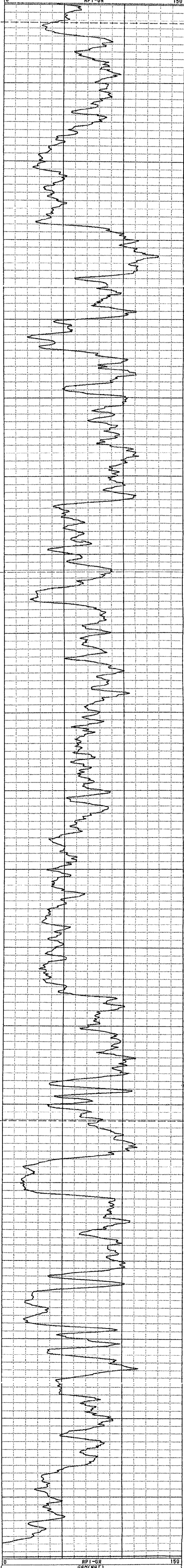


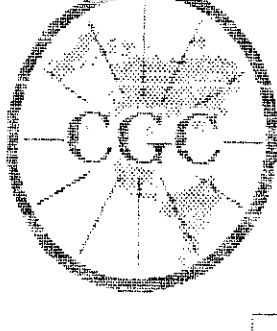
Century
GEOPHYSICAL CORP.

GAMMA-NEUTRON

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2443	9067	
LOCATION/FIELD	: SITE # 10	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/10/96	PERMANENT DATUM	: G.L. ELEVATIONS
DEPTH DRILLER	: 198	ELEV. PERM. DATUM:	KB :
LOG BOTTOM	: 197.70	LOG MEASURED FROM:	G.L. DF :
LOG TOP	: -1.60	DRL MEASURED FROM:	G.L. CL :
CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR FILE : ORIGINAL
MAGNETIC DECL.	: 19	RM	: TYPE : 9067A
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: LOG : 6
FLUID DENSITY	: 1.10	MATRIX DELTA T	: PLOT : GREEN 1
NEUTRON MATRIX	: SANDSTONE	FLUID DELTA T	: THRESH:
REMARKS	:		
9067 CASED, 9033 & 9055 OPEN HOLE			

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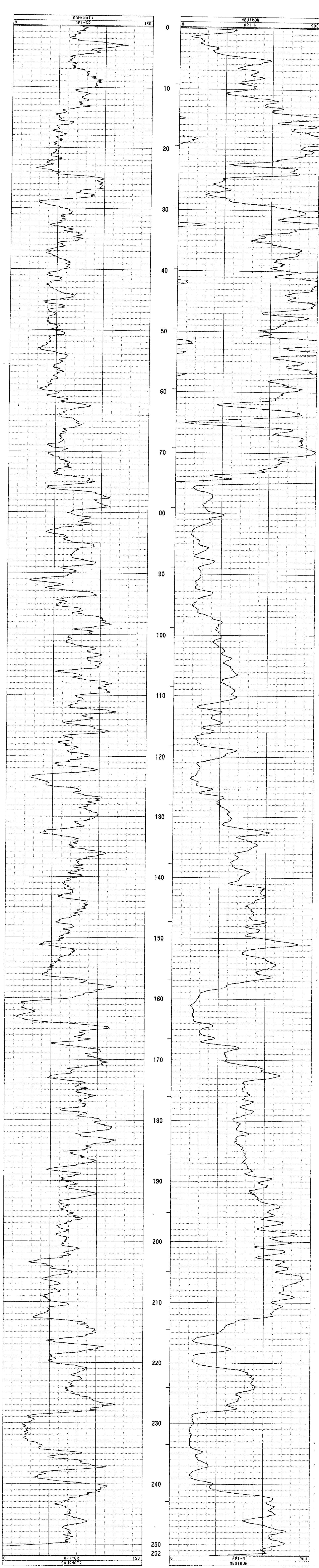


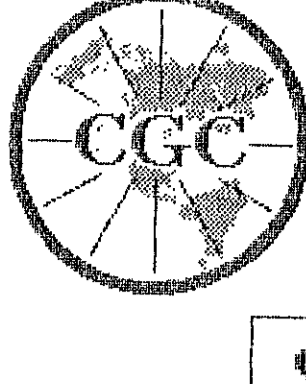
Century
GEOPHYSICAL CORP.

GAMMA-NEUTRON

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #PC 244F	9067	
LOCATION/FIELD	: SITE # 9	9038	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/12/96	PERMANENT DATUM	: G.L. ELEVATIONS
DEPTH DRILLER	: 252	ELEV. PERM. DATUM:	KB :
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CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS	: .65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR FILE : ORIGINAL
MAGNETIC DECL.	: 19	RM	: TYPE : 9067A
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: LOG : 6
FLUID DENSITY	: 1.10	MATRIX DELTA T	: PLOT : GREEN 1
NEUTRON MATRIX	: SANDSTONE	FLUID DELTA T	: THRESH:
REMARKS	:		
9067 CASED, 9033 & 9055 OPEN HOLE			

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GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2446	9067	
LOCATION/FIELD	: SITE # 7	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:

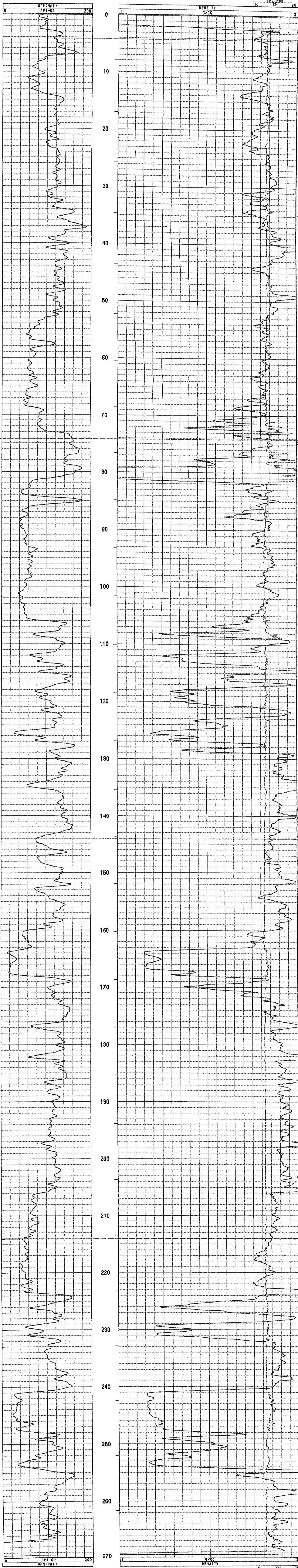
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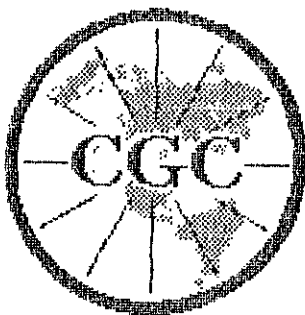
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CASING THICKNESS	: .65	RECORDED BY	: S HC NEIL

BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR	FILE	: ORIGINAL
MAGNETIC DECL.	: 19	RM	:	TYPE	: 9030AA
MATRIX DENSITY	: 2.65	RM TEMPERATURE	:	LOG	: 3
FLUID DENSITY	: 1.10	MATRIX DELTA T	:	PLOT	: GREEN 3
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T			THRESH	:

REMARKS :
9067 CASED, 9033 & 9055 OPEN HOLE

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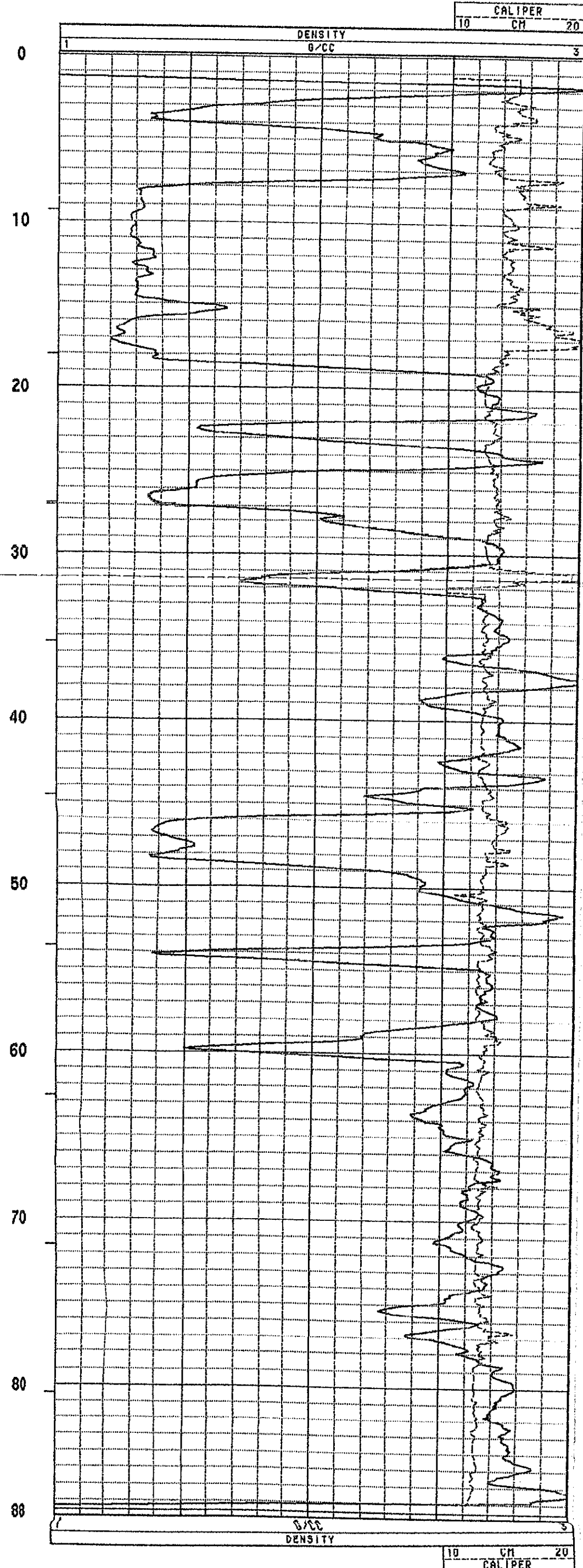
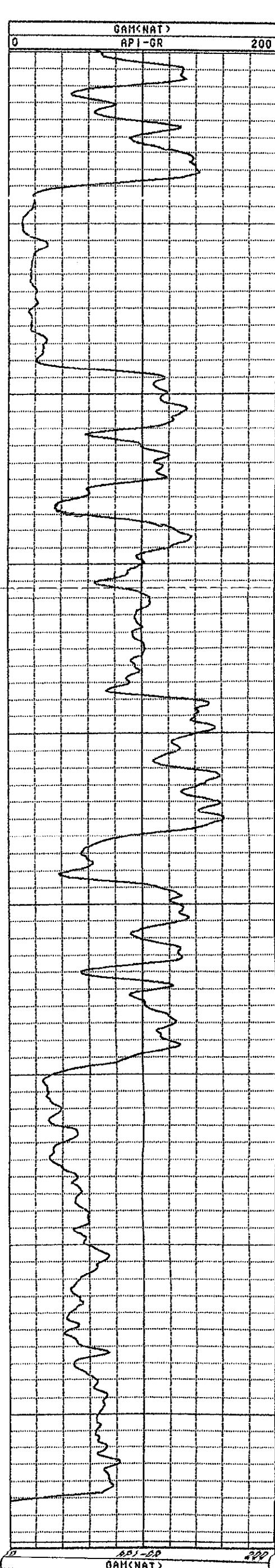




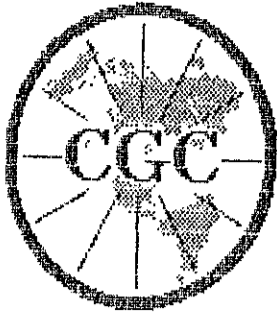
GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2447	9067	
LOCATION/FIELD	: SITE # 4	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/15/96	PERMANENT DATUM	: G.L. ELEVATIONS
DEPTH DRILLER	: 88.5	ELEV. PERM. DATUM:	KB :
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CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR FILE : ORIGINAL
MAGNETIC DECL.	: 19	RM	: TYPE : 9030AA
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: LOG : 5
FLUID DENSITY	: 1.10	MATRIX DELTA T	: PLOT : GREEN 3
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T	:	: THRESH:
REMARKS	:		
9067 CASED, 9033 & 9055 OPEN HOLE			

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HOLE RC 2447 06/15/96 418

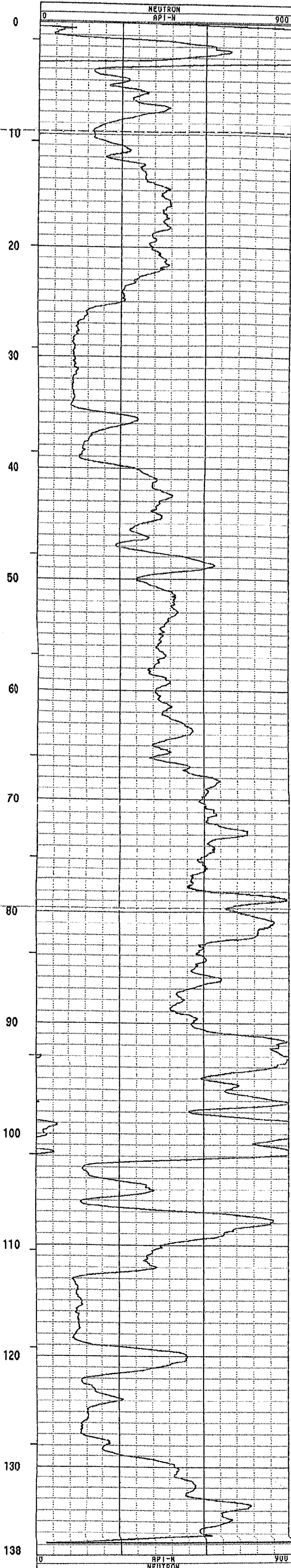
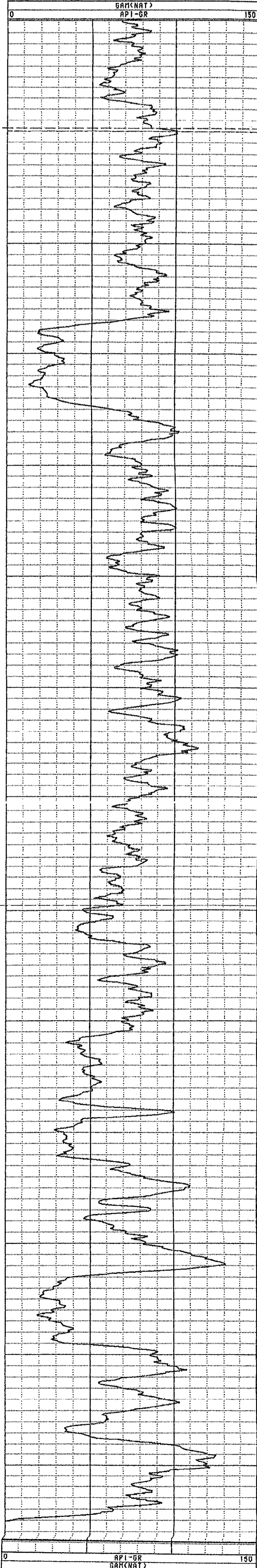


Century
GEOPHYSICAL CORP.

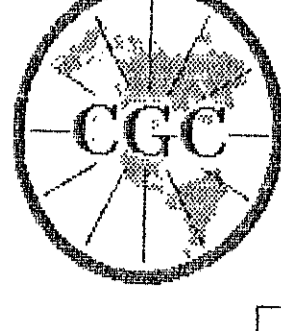
GAMMA-NEUTRON

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:		
WELL	: HOLE #RC 2448	9067		
LOCATION/FIELD	: SITE # 6	9030		
COUNTY	: ELKFORD	9055		
STATE	: BRITISH COLUMBIA			
SECTION	: TOWNSHIP	RANGE :		
DATE	: 06/16/96	PERMANENT DATUM : G.L.	ELEVATIONS	
DEPTH DRILLER	: 138	ELEV. PERM. DATUM:	KB :	
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LOG TOP	: -1.60	DRL MEASURED FROM: G.L.	GL :	
CASING DRILLER	: 3	LOGGING UNIT	: 9603	
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY	
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL	
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR	FILE : ORIGINAL
MAGNETIC DECL.	: 19	RM	:	TYPE : 9067A
MATRIX DENSITY	: 2.65	RM TEMPERATURE	:	LOG : 6
FLUID DENSITY	: 1.10	MATRIX DELTA T	:	PLOT : GREEN 1
NEUTRON MATRIX	: SANDSTONE	FLUID DELTA T	:	THRESH:
REMARKS	:			
	9067 CASED, 9033 & 9055 OPEN HOLE			

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HOLE RC 2448 06/16/96 512



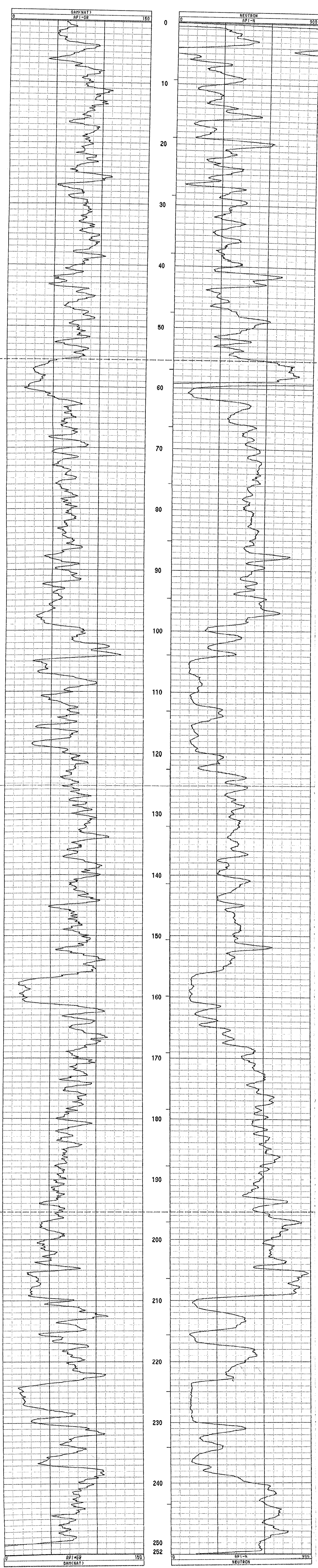
Century
GEOPHYSICAL CORP.

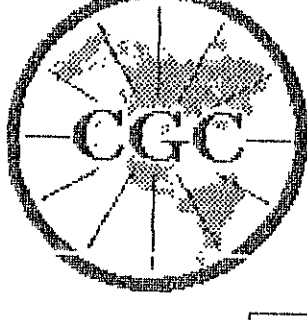
GAMMA-NEUTRON

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2449	9867	
LOCATION/FIELD	: SITE # 5	9830	
COUNTY	: ELKFORD	9855	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
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CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR
MAGNETIC DECL.	: 19	RM	:
MATRIX DENSITY	: 2.65	RM TEMPERATURE	:
FLUID DENSITY	: 1.10	MATRIX DELTA T	:
NEUTRON MATRIX	: SANDSTONE	FLUID DELTA T	:
REMARKS	:	FILE	: ORIGINAL
		TYPE	: 9867A
		LOG	: 7
		PLOT	: GREEN 1
		THRESH:	

9867 CASED, 9833 & 9855 OPEN HOLE
PIPE T.D. 252M

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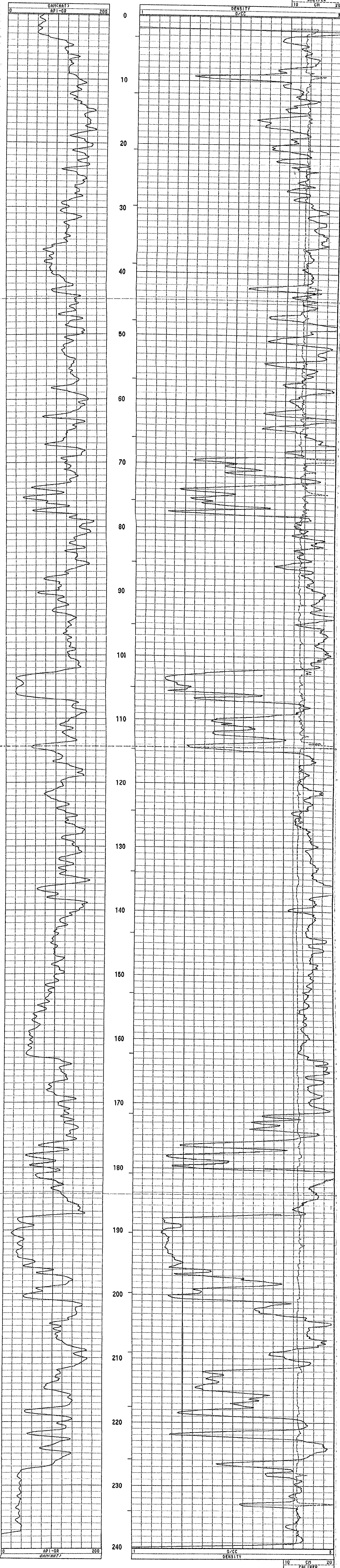


Century CORPORATION

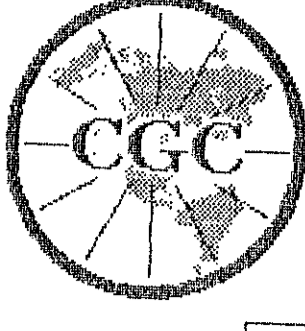
GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2450		9067
LOCATION/FIELD	: SITE # 12		9030
COUNTY	: ELKFORD		9055
STATE	: BRITISH COLUMBIA		
SECTION	: TOMNSHIP	RANGE	:
DATE	: 06/20/96	PERMANENT DATUM	: G.L. ELEVATIONS
DEPTH DRILLER	: 240	ELEV. PERM. DATUM	: XB :
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CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS	: .65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR FILE : ORIGINAL
MAGNETIC DECL.	: 19	RM	: RM TYPE : 9030AA
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: RM LOG : 7
FLUID DENSITY	: 1.10	MATRIX DELTA T	: MTR PLOT : GREEN 3
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T		: THRESH:
REMARKS	:		
9067 CASED, 9033 & 9055 OPEN HOLE			

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HOLE RC 2450 06/20/96 418

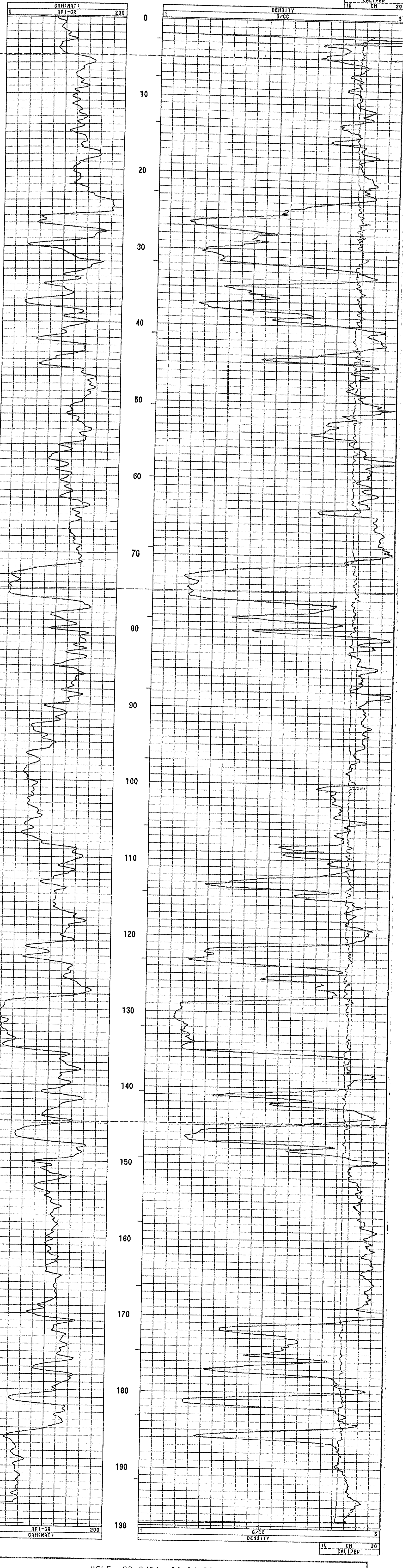


Century CORPORATION

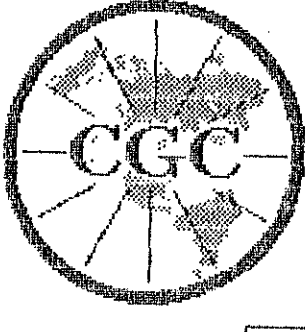
GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2451	9067	
LOCATION/FIELD	: SITE # 2	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/21/96	PERMANENT DATUM	: G.L.
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CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR
MAGNETIC DECL.	: 19	RH	:
MATRIX DENSITY	: 2.65	RH TEMPERATURE	:
FLUID DENSITY	: 1.10	MATRIX DELTA T	:
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T	:	:
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		LOG	: 4
		PLOT	: GREEN 3
		THRESH:	

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



HOLE RC 2451 06/21/96 418

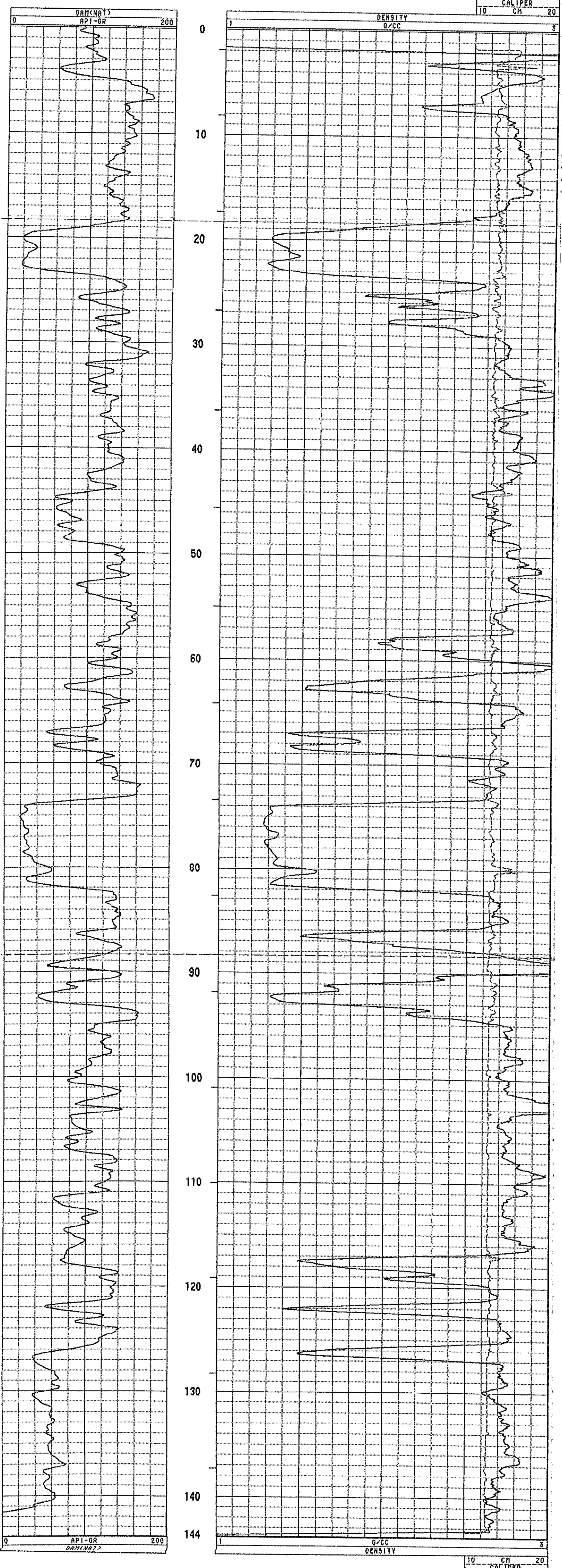


Century
CORPORATION

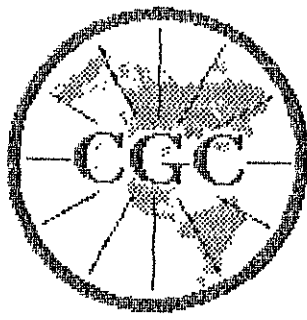
GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2452	9067	
LOCATION/FIELD	: SITE # 3	9030	
COUNTY	: ELKFORD	9055	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 06/21/96	PERMANENT DATUM	: G.L. ELEVATIONS
DEPTH DRILLER	: 144	ELEV. PERM. DATUM:	KB :
LOG BOTTOM	: 144.00	LOG MEASURED FROM:	G.L. DF :
LOG TOP	: -0.40	DRL MEASURED FROM:	G.L. GL :
CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR FILE : ORIGINAL
MAGNETIC DECL.	: 19	RM	: TYPE : 9030AA
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: LOG : 2
FLUID DENSITY	: 1.10	MATRIX DELTA T	: PLOT : GREEN 3
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T		: THRESH:
REMARKS	:		
9067 CASING, 9033 & 9055 OPEN HOLE			

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



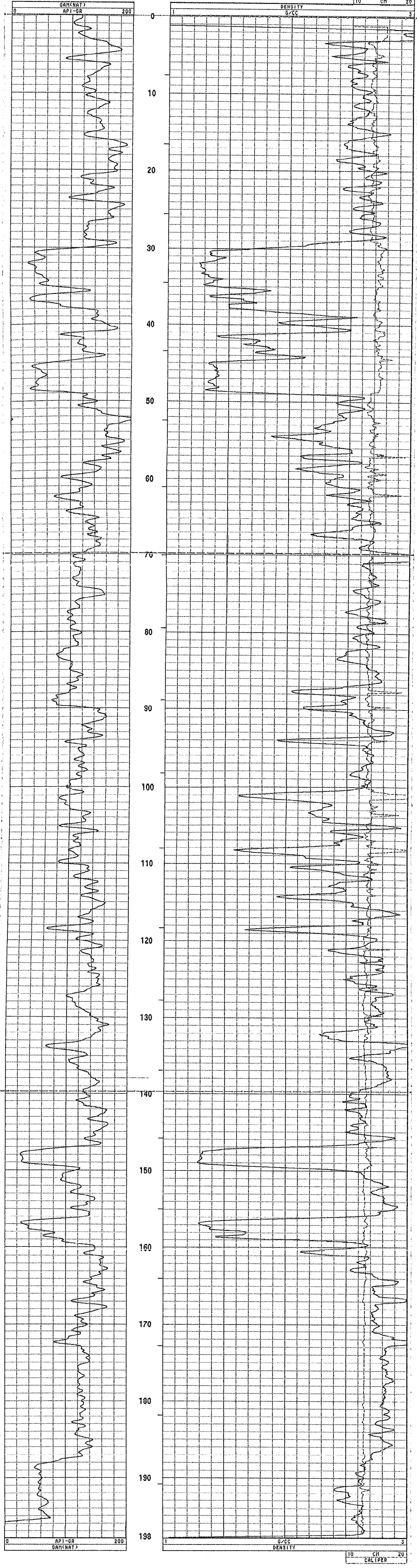
HOLE RC 2452 06/21/96 418



GAMMA DENSITY

COMPANY	: FORDING COAL GREENHILLS	OTHER SERVICES:	
WELL	: HOLE #RC 2482	9067	
LOCATION/FIELD	: SITE # 18	9012	
COUNTY	: ELKFORD	9030	
STATE	: BRITISH COLUMBIA		
SECTION	: TOWNSHIP	RANGE	:
DATE	: 08/09/96	PERMANENT DATUM	: G.L. ELEVATIONS
DEPTH DRILLER	: 198	ELEV. PERM. DATUM:	KB :
LOG BOTTOM	: 198.20	LOG MEASURED FROM:	G.L. DF :
LOG TOP	: -0.90	DEL MEASURED FROM:	G.L. GL :
CASING DRILLER	: 3	LOGGING UNIT	: 9603
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	.65	RECORDED BY	: S MC NEIL
BIT SIZE	: 13.3	BOREHOLE FLUID	: AIR FILE : ORIGINAL
MAGNETIC DECL.	: 19	RM	: TYPE : 9030AA
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: LOG : 1
FLUID DENSITY	: 1.10	MATRIX DELTA T	: PLOT : GREEN 3
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T		: THRESH:
REMARKS	:		

HOLE ANGLE 55 DEGREES
 9067, 9012 RUN THRU THE RODS, 9055 AND 9030 RUN OPEN HOLE
 ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



ENCLOSURE 14

BURNT RIDGE EXT file is c:hold 3/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
9129	12	0	2.21	R	3.41	20.79	0	0	0	0	0	100
9129	12	0	2.21	W	3.20	6.54	30.15	60.11	0	6414	0	67
9605	12L	0	1.01	R	11.54	21.73	0	0	0	0	0	100
9605	12L	0	1.01	W	0	0	0	0	0	0	0	0
9605	12U	0	1.7	R	11.55	14.08	0	0	0	0	0	100
9605	12U	0	1.7	W	0	0	0	0	0	0	0	0
9616	12	0	1.8	R	3.6	25.44	0	0	0	0	0	100
9616	12	0	1.8	W	0	0	0	0	0	0	0	0

BURNT RIDGE EXT file is c:hold 3/12/86

hole	sm	from	to	Rw/Wsh	moist	ash	vols	FC	FSI	calcs	S%	R/yld
9130	13	0	4.96	R	3.84	14.15	0	0	0	0	0	100
9130	13	0	4.96	W	3.11	5.71	31.85	59.33	0	6319	0	74
9607	13	0	2.64	R	4.19	17.58	0	0	0	0	0	100
9607	13	0	2.64	W	0	0	0	0	0	0	0	0
9614	13U	0	.65	R	6.05	22.08	0	0	0	0	0	100
9614	13U	0	.65	W	0	0	0	0	0	0	0	0
9614	13L	0	1.5	R	4.32	40.44	0	0	0	0	0	100
9614	13L	0	1.5	W	0	0	0	0	0	0	0	0

MASTER FILE SORT PROGRAM 3/12/86

