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ENGINEERING REPORT

ON

THE MERRITT COALFIELD

by

M. K. Lorimer, P. Eng.

for

Imperial Metals and Power Ltd.

July 1962.

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ENGINEERING REPORT ON THE
MERRITT COALFIELD

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OBJECT

This report is submitted with the object of setting forth the known and reported facts concerning the Merritt Coalfield under option to Imperial Metals and Power Limited on the information gained to date from drilling, geologic examinations and the perusal of old maps and reports.

LOCATION

The property consists of Lot 166 and the northern half of Section 4, Township 91, Kamloops Land District.

It is situated about one mile south of the Village of Merritt, B.C.

OWNERSHIP

The property is owned by S. Gerrard and partners of Merritt and is under option to Imperial Metals and Power Limited.

TRANSPORTATION

The Coalfield is traversed by a gravel road which gives access to Merritt. There are also several minor roads and trails. Merritt has highway connections with Kamloops, Spences Bridge and Princeton.

Merritt is located on the Canadian Pacific Railway line from Spences Bridge to Princeton. The line passes within a few hundred feet

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SUMMARY

The coalfield south of Merritt, B.C. contains an unknown quantity of a High Volatile Bituminous Coal with high BTU values and poor to good coking qualities.

It is conveniently located as regards road and rail transport. It is 240 miles from Vancouver.

The coal occurs in two outcrop areas. The continuity of the seams across the whole field is questionable, unless at considerable depth, as there appears to be an ancient river channel which cuts deeply into the measures. To date, no correlation of strata on either side of this channel has been possible.

A drilling programme carried out in 1960 indicated that there was little possibility of developing a strip mine in the field. Two thick seams were intersected in the Coal Gully Hill area, but insufficient drilling was done to make tonnage calculations.

The work done to date indicates that some of the old reports and maps of this field are unreliable.

An appraisal of this property must be deferred until more exploration is done since it must be regarded in the light of an underground operation.

If it is decided to proceed with exploratory drilling, the drilling should be concentrated in the Coal Gully Hill area. Drilling patterns should be laid out so that the exploration proceeds outwards from the known seams in this area.

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Transportation (cont'd)

of the northern boundary of the property and passes through the southeastern corner of Lot 166 and through the middle of Section 4. A spur to the Nicola Valley Sawmill runs along the northern boundary of Lot 166. The grades of the spurs to the old Middlesboro Colliery are still in existence.

Merritt is 240 miles from Vancouver by road and rail.

TOPOGRAPHY

The area is hilly and is covered with grass and sage-brush. There are few trees. Sandstone and coal outcrops are common.

The most prominent topographic feature is the Coldwater River which flows down the eastern boundary of Lot 166 and through the middle of Section 4.

The north-western corner of Lot 166 is split by a narrow, deep ravine known as Coal Gully. Coal Gully Hill lies to the east and south of the gully. In the north-eastern corner of Lot 166 there is a prominence known as Coldwater Hill.

CLIMATE

The climate is generally dry with hot summers and fairly cold winters. The snowfall is light.

GEOLOGY

Structural: According to a stratigraphic section prepared by the

Geology (cont'd)

Middlesboro Collieries, the coal is contained in at least seven seams as follows:

<u>Seam No.</u>	<u>Thickness</u>	<u>Mine No.</u>	<u>Interval</u>
2	6.0	2 North	70
3	2.5	3	50
6	6.0	4 Sec. 6 3 North	210
8	8.0	4, Sec. 8 & 9	160
4	25.0	4 East 4 Sec. 4 7	120
5	5.0	4 Sec. 5 5 East	160
1	26.0	1 5 West	

Note: Nos. 4 and 1 seams are double seams. No. 4 has two seams 18 and 7 feet thick with a 3 foot parting; No. 1 has two seams 18 and 8 feet thick with a 2 1/2 foot parting.

These seams outcrop in two distinct areas, the Coal Gully Area and the Coldwater Hill Area. (See Map 1). The Coal Gully seams are bounded on the west by Triassic volcanic rocks. They form a series of anticlines and synclines with their axes running north-west and south-east, and plunging at about 20 degrees to the south-east. The seams generally outcrop to the north-west. Their other limits are unknown.

The Coldwater Hill seams outcrop on the north-western side of

the hill. They form a broad anticline with the axis striking north 60 degrees east and plunging at about 20 degrees in the same direction. (Minister of Mines Report, 1946, Page 253). Three seams, No. 2, 3 and 6 outcrop in this area.

Very little is known of the ground between the two outcrop areas. For this reason the above stratigraphic section must be accepted as no more than a guide since it assumes a continuous structure across the whole field. It must also be borne in mind that the seam thicknesses given are those pertaining to the worked out portions of the mines. They do not necessarily apply to the unworked areas.

Mineralogical:

The coal is believed to be Tertiary, and is, therefore, younger than the Triassic greenstones to the west and below. The folding of the coal beds, and the lava flows and volcanic bombs in the Merritt area suggest a period of volcanic activity since the beds were laid down.

The coal, which varies from seam to seam, is a high volatile bituminous coal with recorded BTU values from 10190 to 12710. The coking quality is from "non-coking" to "good". (Minister of Mines Report, 1946, Page 261).

RESERVES

Although others have made estimates of the coal reserves in this field, the writer feels that too little is known of the extent of the various seams to make estimates which would be of any value.

HISTORY

The property was mined for coal from 1906 to 1944 by the Middlesboro Collieries Limited. In this period over 2,000,000 tons were produced.

Since 1945 S. Gerrard and partners, operating as the Cold-water Coal Mines, have produced a small annual tonnage for local consumption.

The coal was mined by working the outcrop seams. No shafts were sunk and no stripping was done.

DEVELOPMENT

Although the property was developed to produce a few hundred tons daily, practically nothing remains in the way of openings, plant or equipment. From the point of view of an operator who intends to mine coal today, the property must be considered as undeveloped, with the possible exception of Nos. 2 and 3 Mines. In these two mines the main slopes are in good condition.

RECENT EXPLORATION

In the spring of 1960 Imperial Metals and Power Limited began an exploration programme. Maps, plans and reports were collected from various sources which gave a partial picture of the coalfield layout. Persons who worked in or were associated with the old operations were interviewed. Much useful information was obtained, but many gaps were left.

A stadia survey of Lot 166 was made in June and a preliminary map prepared to show the main features such as roads, river, portals, caved workings, etc.

Based partly on this map and partly on old maps of the workings, a mine model was constructed. This model gave a picture of the relationships of the old workings but gave no information concerning the unworked seams.

In an attempt to gain access to the old workings, a bull-dozer and a front-end loader were obtained and put to work on opening up the portals of Nos. 1, 4 and 4 East Mines. These efforts were fruitless as the workings were found to be badly caved at various distances inside the portals. Some stripping and trenching was also done to expose outcrop seams.

Later, Mr. T. Robertson of the Mine Rescue Station at Princeton visited the coalfield with the necessary safety equipment for entering abandoned mines. Attempts were made to enter the workings through all available openings. The attempts in the Coal Gully area were unsuccessful with the exception of No. 3 South. In this case Mr. Robertson was lowered on a rope to a slope distance of 235 feet. He had to retreat at this point due to oxygen deficiency of the mine air. He reported that the mine was in a fair state of preservation as far as he could see. In the Cold-water Hill area Nos. 2 and 3 Mines were entered and examined. Both are in good condition. Except for No. 3 South, all workings had good air and were free of gas. The following table summarizes the results of the examination: (next page)

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Mine	Distance Penetrated	Obstruction	Air	General Condition
2	420 Ft.	Water	Good	Good
3	200 Ft.	Water	Good	Good
3 South	235	None	Oxygen Defic.	Fair
4	125	Cave	Good	Poor
5 West	60	Cave	Good	Poor
6	40	Cave	Good	Poor

A drilling programme was started in July using a six-inch rotary drill. The first two holes were planned to give a correlation between the Coal Gully and the Coldwater Hill seams and to determine whether the seams were continuous over the unknown area between.

The first hole was drilled with indifferent results. It was found that the rotary drill did not perform well in loose or muddy ground without the use of mud, and if mud were used and recirculated, the identification of the cuttings was very difficult. However, the drill appeared to intersect a 13-foot coal seam. The location of this hole is shown on Map 2.

Under the impetus of an impending order for coal it was decided to drill in an area where it was felt that strippable coal might be found. The drill was therefore moved to the Coldwater Hill area, and Holes Nos. 2, 3, 4, 5, 6 and 7 were drilled to intersect Seams 2, 3 and 6. The locations of these drill holes are shown on Map 3. The seams were found at approximately the expected depths but were too thin to support a stripping operation. (Dwgs. 1, 2 & 3). In this part of the field, where

the overburden was light and the holes were dry, the rotary drill worked well and identification of the cuttings was easy.

With the completion of this part of the drilling programme, the drill was moved back to the central area and Holes Nos. 8 to 13 inclusive were drilled. (Map 2). Holes 9 and 11 both intersected a thick seam of coal, presumably the No. 4 Seam. (Dwgs. 4 and 5). Holes 8, 10, 12 and 13 were abandoned because of water or mud conditions.

Hole No. 14 was drilled as a wild-cat hole to check the existence of strippable seams in the southern part of the field. It failed to reach bedrock at 140 feet; so it was abandoned.

Hole No. 15 was started to check the existence of seams below the No. 6 Seam on the western flank of the Coldwater Hill. The drill entered a zone of silt and sand which could not be kept clear without casing. It was decided to abandon this hole and terminate the contract.

In October a diamond drill was obtained for the purpose of deepening some of the rotary drill holes and recovering core, particularly of the coal. The first hole to be deepened was No. 2 which was drilled to 842 feet. Although several seams were intersected, none were of commercial interest and no correlation was possible with the Coal Gully area seams.

An attempt was made to deepen Hole No. 15 but persistent caving of boulders made the driving of casing impossible.

The drill was then moved to Hole No. 8. This one was deepened without trouble and a 28-foot coal intersection was made, apparently of No. 1 Seam.

The logs of all these holes are given in Appendix A.

The drilling was done using AX bits and rods and a standard type of core barrel. Excellent core recovery was obtained in the shale and sandstone, but the coal tended to grind unless the rods were pulled every foot or two.

CONCLUSIONS

Although the work done to date is far from conclusive, certain facts and indications have emerged which must be considered in any appraisal of the property or any future exploration programme.

One of these is the probable existence of a major break through the central portion of the field between the two hills. Drill Hole No. 10 went to an elevation of 1325 feet without reaching bedrock although Hole No. 1, 400 feet to the east, reached bedrock at 1967 and Hole No. 9, 421 feet to the west, reached it at 2056. (See Dwg. 4). Similarly, Hole No. 12 was drilled to an elevation of 1785 feet without entering bedrock. The overburden in both Hole No. 10 and Hole No. 12 contained stream-worn gravels and alluvial mud, and, frequently, pieces of float coal. These facts strongly suggest the existence of an ancient river bed through this area. (See Map 2). If this river bed were merely a water-cut valley or gorge, it could be expected that the coal seams at depth would persist from one part of the field to the other. But, if the river followed a fault zone, as frequently happens, it would be reasonable to expect that there was some movement of the blocks on either side of the fault. In this case the coal seams would not be continuous across the whole field but one set would be uplifted or offset with respect to the other. The answer to this

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question can only come from the correlation of strata on either side of the old river bed.

A strange fact about Hole No. 10 is that it is surrounded on three sides by the workings of No. 4 East Mine, yet the hole was drilled to about 100 feet below the elevation of the workings 50 feet to the north without entering bedrock. (See Map 2). The only suggestion that can be offered here is that the hole is in a bay or curve of the old river channel and that the existence of this channel accounts for the way in which No. 4 East was mined. It will be noted on Map 2 that there are three headings south of Hole No. 10 and two headings north which could conceivably have been probes. There is no concrete evidence for this supposition, but Mr. S. Gerrard of Merritt vaguely remembers hearing of the miners encountering "wash" in this mine.

The evidence obtained to date makes it unlikely that a strip mine could be operated in this field. The seams dip into the hillsides resulting in a rapid increase of overburden with advance down the dip. In the Coldwater Hill area no seams were found which could be economically stripped; in the Coal Gully area the major outcrop seams have been mostly mined. The only possible places for stripping would be in the southern portions of the property, an area which, except for Hole No. 14, has not been explored. However, the log of this hole is not encouraging: it indicates that, in at least part of the area, there is a heavy mantle of overburden. The property must therefore be regarded as a potential underground mine only.

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Much of the information available on the coalfield and the old workings must be accepted with reservations. Calculations of reserves based on the assumption that the seams are continuous across the field are certain to be high. There is no evidence of such continuity; if the thick Coal Gully seams run under the Coldwater Hill they must be at a great depth since the 842-foot No. 2 Hole failed to find them.

The stratigraphic section given on Page 3 of this report appears to be a somewhat fanciful document. It also assumes a continuity of seams across the whole field. If this were correct the log of Hole No. 2 would have agreed with the stratigraphic section since it went deep enough to intersect all seams but No. 1. Except for Seams 3 and 6, there was no recognizable agreement. For example, the section gives the distance between Seams 2 and 3 as 70 feet, the Minister of Mines Report for 1946, Page 254, gives it as 150 feet, and Hole No. 6 (Dwg. 3), shows it to be 110 feet. Similarly, there seems to be little justification for saying that No. 2 and No. 2 North Mines are in the same seam; or that the No. 4 Section of No. 4 Mine is in the seam which is called No. 6 under Coldwater Hill.

The results from Holes 8, 9 and 11 are the most encouraging. Hole No. 8 shows that the No. 1 Seam extends well towards the northern boundary of the property. If Hole No. 9 were deepened to intersect this seam, a body of coal of well over a million tons would be blocked out between Holes 8 and 9 and the former workings of No. 1 Mine. By drilling a pattern of holes north and east from Nos. 8 and 9, the continuity of the seam could be established or disproved.

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RECOMMENDATIONS

In accordance with the foregoing discussion the following recommendations are made:

1. Regard the field as a potential underground mine only and direct all thought to the economics of underground production.
2. Consider the field as largely unexplored and accept old reports, statements and maps with reservations.
3. If more drilling is proposed, concentrate on the area surrounding the old Coal Gully area workings, particularly to the north and the north-east. Drill on the principle of exploring outward from Known seams and workings in order to prove up coal as the drilling progresses.

Respectfully submitted,

M. K. Lorimer, P. Eng.

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1473
Merritt

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173
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SEC. 16



SECS 10

COAL IN AND UNDER THAT PART OF

1. DIST LOT 166 KDYD BEING NORTH AND WEST OF R/W PLAN A 215 SAVE AND EXCEPT PLAN 10584
 2. DIST LOT 166 LYING SOUTH AND EAST OF R/W PLAN A 215
 3. LOT 1 DIST LOT 166 KDYD PLAN 10584
 4. PART NORTH 1/2 OF SECTION 4 TSHP. 91 KDYD LYING NORTH AND WEST OF R/W PLAN A 215
 5. PART NORTH 1/2 LYING SOUTH AND EAST OF R/W PLAN A 215 SECTION 4 TSHP 91 KDYD
- KDYD - CARROORS DIV. OF YALE DIST.

IMPERIAL METALS
POWER LTD.
MERRITT COAL

TOTAL AREA APROX.
1200 ACRES

North: Overlap, Ed. 111

OLD WORKINGS

NO'S 1, 4, 5, 6, 7, 8 & 9 MINES

COAL
25' 0"
200'
NO 1 SEAM

COLD WATER
AREA MAP

OLD
WORKINGS

NO. 4 EAST
MINE

WORKINGS
200'
NO 4 MINE

Prospect
Shaft
16' coal
of 1860

IMPERIAL METALS AND POWER LTD.
LOCATION OF DRILL HOLES
COAL GULLY AREA

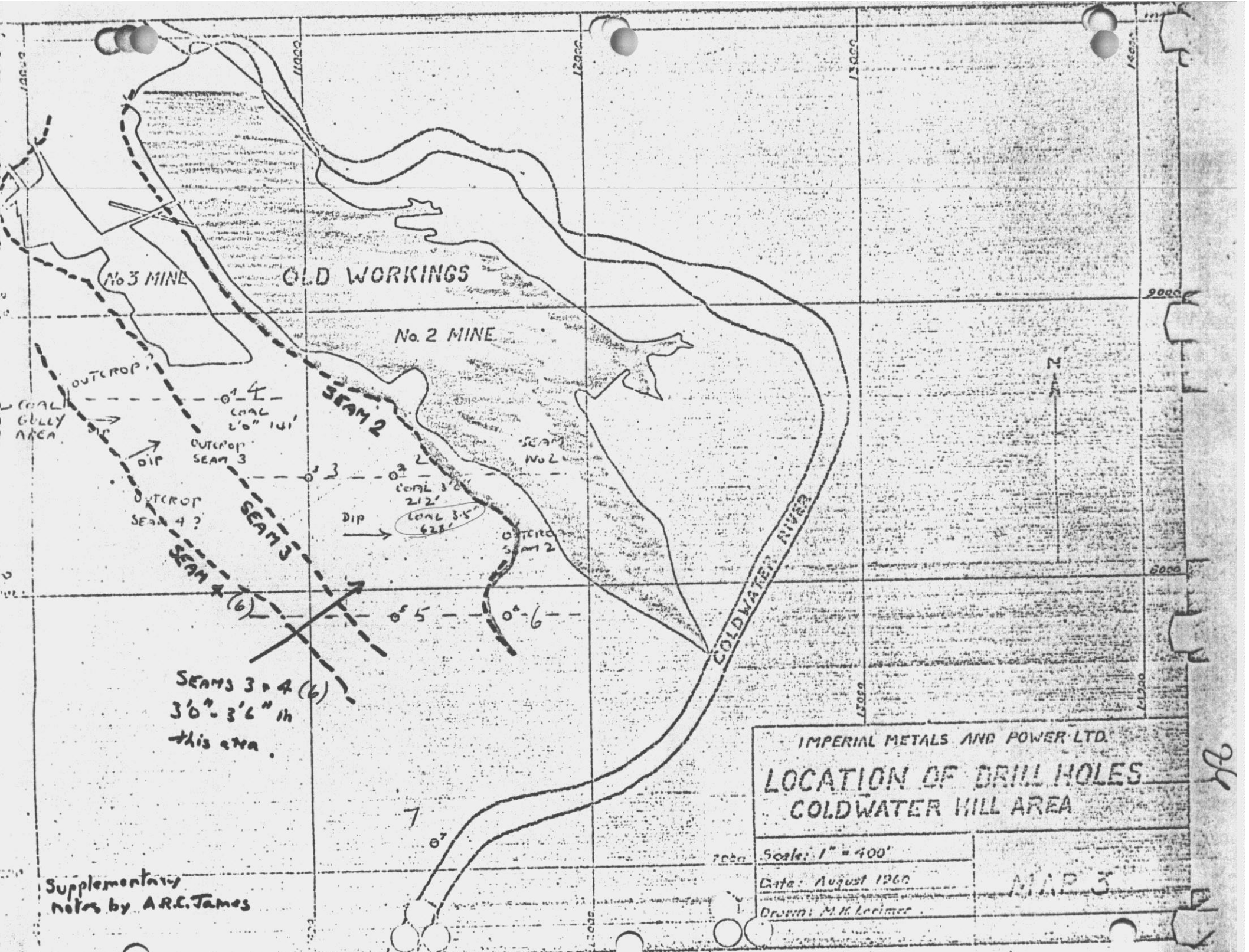
Scale: 1" = 400'

Date: August, 1960

MAP 2

Author: M. H. ...

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No 3 MINE

OLD WORKINGS

No. 2 MINE

COLDWATER RIVER

SEAM 2

SEAM No 2

OUTCROP

COAL GULLY AREA

OUTCROP SEAM 3

OUTCROP SEAM 4?

14
COAL 2'0" 101'

2
COAL 3'0" 212'

3
COAL 3'5" 628'

SEAMS 3 & 4 (6)
3'6" - 3'6" in
this area.

IMPERIAL METALS AND POWER LTD.
LOCATION OF DRILL HOLES
COLDWATER HILL AREA

Scale: 1" = 400'

Date: August 1960

Drawn: M.K. Leimer

MAP 3

Supplementary
notes by A.R.C. James

HL

10200.6

COLDWATER MILL

11200.7

D.H. 2

D.H. 2

2100

2200

SEAM #2 (partially)
NS 2

IMPERIAL METALS AND POWER LTD.
SECTION THROUGH D.H. 2 & 3
(SEE 10400 N)

Scale: 1" = 200'
Date: August, 1960
Drawn: M. K. Kermer

D.W.G. 1

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IMPERIAL METALS AND POWER LTD.

SECTION THROUGH D.H. 4
(SEE OTHER)

Scale: 1" = 200'

Date: August, 1960

By: M.H. Carter

DWG. 2

24

COLOWATER HILL

10000 E

D.H. 5

D.H. 6

2400

2200

SEAM No. 2

SEAM No. 3

SEAM No. 4

1800

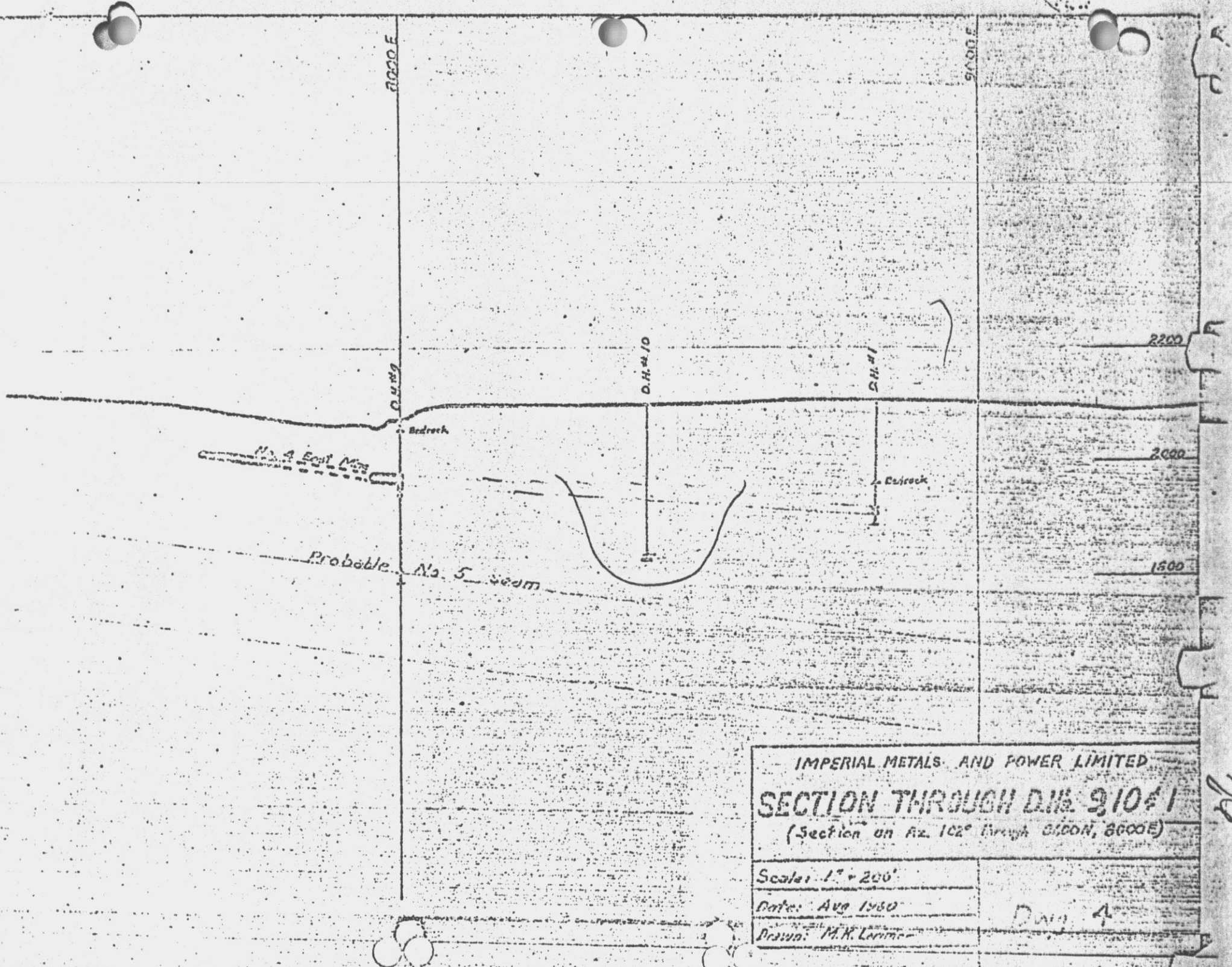
IMPERIAL METALS AND POWER LTD.
 SECTION THROUGH D.H. 5-6
 (SEC. 7200 N.)

Scale: 1" = 200'
 Date: August, 1960.

Drawn: M.K. Larimer

P.W.G.

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IMPERIAL METALS AND POWER LIMITED
SECTION THROUGH D.H.# 910#1
 (Section on Az. 102° through 0100N, 8000E)

Scale: 1" = 200'
 Date: Aug 1960
 Drawn: M. K. Lerner

Drawn: 4

AL

7620 E

8200 E

D.H. #11

No. 2 Mine
Worked out

probable seam

No. 2 East
Worked out

No. 2 East
Probable dip

2400

2500

2600

2700

IMPERIAL METALS AND POWER LIMITED
SECTION THROUGH D.H. # 11
 (SEE 7870 N.)

Scale: 1" = 200'

Date: Aug 1960

Drawn: M.K. Lorimer

July 5

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APPENDIX A
Drill Hole No. 2 (ctd.)

Depth	Formation
246 - 250	Light coloured sandstone
250 - 251	Grey shale
251 - 255	Light coloured sandstone
255 - 268	Grey shale
268 - 313	Sandstone
313 - 331	Shale
331 - 338	Dark shale
338 - 339	COAL
339 - 342	Bony COAL
342 - 343	Shale
343 - 353	Sandstone
353 - 373	Shale
373 - 403	Sandstone
403 - 412	Dark shale
412 - 447	Shale
447 - 458	Sandstone
458 - 464	Shale
464 - 494	Sandstone
494 - 508	Dark shale
508 - 512	Shale
512 - 517	Dark shale
517 - 518	Sandstone
518 - 520	Dark shale
520 - 527	Sandstone
527 - 538	Dark shale
538 - 541	Shale and COAL
541 - 622	Sandstone
622 - 625	Shale
625 - 628.5	COAL
628.5 - 641	Shale with bands of sandstone
641 - 653	Sandstone
653 - 655	Shale
655 - 658	Sandstone
658 - 665	Shale
665 - 677	Sandstone
677 - 689	Shale
689 - 689.5	COAL
689.5 - 690.5	Sandstone
690.5 - 691	Shale
691 - 696	Sandstone
696 - 698	Shale
698 - 715	Sandstone
715 - 724	Conglomerate and coarse sandstone
724 - 731	Core missing - probably conglomerate and coarse sandstone

APPENDIX A

Drill Hole No. 2 (ctd.)

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Depth	Formation
731 - 743	Conglomerate and coarse sandstone
743 - 745	Sandstone
745 - 751	Black shale
751 - 752	COAL
752 - 757	Black shale
757 - 758	COAL
758 - 760	Black shale
760 - 765	Sandstone
765 - 772	Core missing - probably conglomerate
772 - 773	Conglomerate
773 - 787	Sandstone
787 - 787.5	Sandstone with minor bands of COAL
787.5 - 799	Sandstone
799 - 806	Sandstone with bands of shale
806 - 819	Sandstone
819 - 823	Sandstone with bands of shale
823 - 826.5	Black shale
826.5 - 828	COAL and shale
828 - 837	Black shale
837 - 842	Coarse sandstone

END OF HOLE

APPENDIX A

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Drill Hole No. 3

Latitude: 8400
 Departure: 11000
 Elevation: 2213

Dip: 90°

Depth	Formation
0 - 10	Sandstone
10 - 17	Brown shale
17 - 28	Sandstone
28 - 36	Grey shale
36 - 39	Sandstone
39 - 45.5	Brown shale
45.5 - 48	Light coloured sandstone
48 - 100	Tan sandstone
100 - 102.5	COAL SEAM 3 2'6"
102.5 - 108.5	Sandstone
108.5 - 109	Shale
109 - 110	COAL SEAM 4 1'0"
110 - 113	Sandstone
113 - 113.5	COAL
113.5 - 114	Brown shale
114 - 116	Grey shale
116 - 119	Sandstone
119 - 123	Sandstone
123 - 124	Grey shale
124 - 132	Sandstone
132 - 132.5	Black shale
132.5 - 135	Grey shale
135 - 137	Sandstone
137 - 138	Shale
138 - 139	Sandstone

END OF HOLE

APPENDIX A

Drill Hole No. 5

26

Latitude: 7900
 Departure: 11300
 Elevation: 2210
 Dip: 90°

Depth	Formation
0 - 2	Overburden
2 - 7	Sandstone
7 - 8	Grey shale
8 - 36	Sandstone
36 - 40	Grey shale
40 - 41	Sandstone
41 - 43.5	Dark shale
43.5 - 47	COAL
47 - 52	Grey shale
52 - 56	Sandstone
56 - 58	COAL
58 - 80	Shale with several inches of sandstone at 66'
80 - 81	Dark brown shale
81 - 90	Grey shale
90 - 108	Sandstone
108 - 116	Grey shale
116 - 119	Brown shale
119 - 122	COAL
122 - 135	Grey shale
135 - 140	Tan sandstone

3'6" COAL SEAM 3.

3'0" COAL SEAM 4.

END OF HOLE

APPENDIX A

Drill Hole No. 6

26

Latitude: 7900

Departure: 11700

Elevation: 2158

Dip: 90°

Depth	Formation
0 - 3	Overburden
3 - 14	Grey shale
14 - 35	Brown shale
35 - 37	Grey shale
37 - 40	Brown shale
40 - 41	COAL
41 - 50	Grey shale
50 - 54	Boulder?
54 - 57	Sandstone
57 - 59	Dark shale
59 - 65	Sandstone
65 - 67	Grey shale
67 - 74	Sandstone
74 - 90	Grey shale with traces of COAL at 80 and 81
90 - 110	Grey sandstone with boulder from 98 to 100
110 - 120	Grey shale
120 - 144.5	Sandstone
144.5 - 147	COAL
147 - 147.5	Brown shale
147.5 - 148.5	COAL
148.5 - 155	Brown shale
155 - 157	COAL
157 - 166	Brown shale
166 - 169	Sandstone
169 - 175	Grey shale
175 - 182	Grey coarse sandstone
182 - 183	Grey shale
183 - 184	COAL and shale
184 - 194	Grey shale
194 - 197	Sandstone
197 - 200	Grey shale
200 - 211	Sandstone
211 - 226.5	Dark grey shale with 6 inches COAL at 220
226.5 - 229.5	COAL
229.5 - 236	Grey shale
236 - 237	Grey sandstone
237 - 260	Grey shale

END OF HOLE

4 - 10	Grey shale
10 - 12	Sandstone
12 - 18	Shale
18 - 19	Volcanics (Boulder?)
19 - 37	Grey shale
32	4 inches COAL ✓
37 - 41	Sandstone
41 - 43	Grey shale
43 - 45	Brown shale
45 - 59	Sandstone
59 - 66	Dark brown shale
66 - 70	Grey shale
70 - 75	Sandstone
75 - 79	Grey shale
79 - 81	Very dark shale
81 - 87	Grey shale
87 - 141	Sandstone
141 - 143	COAL ✓
143 - 144	Dark shale
144 - 147	COAL with shale 3' 0"
147 - 149	Dark shale
149 - 158	Grey shale
158 - 162	Brown shale
162 - 163	COAL with shale 1' 0"
163 - 164	Grey shale
164 - 180	Sandstone

26

2' 0"

3' 0"

1' 0"

END OF HOLE

APPENDIX A

Drill Hole No. 7 26

Latitude: 7100
Departure: 11430
Elevation: 2155
Dip: 90°

Depth	Formation
0 - 20	Sand and alluvial material.

Note: The hole was abandoned at 20 feet because of caving. The probable information to be obtained from this hole did not warrant the expense and trouble of casing.

APPENDIX A

Drill Hole No. 8

26

Latitude: 9500

Departure: 7700

Elevation: 2020

Dip: 90°

Depth	Formation
0 - 107	Mud with a few boulders
107 - 178	Sandstone
178 - 185	Alternate bands of shale and sandstone
185 - 201	Shale
201 - 229	COAL with 4 in. shale at 215 and 3 in. sandstone at 219
229 - 236	Dark shale
236 - 250	Sandstone

END OF HOLE

APPENDIX A

Drill Hole No. 9

Latitude: 8600
 Departure: 8000
 Elevation: 2076
 Dip: 90°

Depth	Formation
0 - 15	Alluvial wash
15 - 20	Large boulder
20 - 47	Sandstone
47 - 54	Grey shale
54 - 60	Dark brown shale grading to dark grey
60 - 80	Grey shale
80 - 96	Grey shale grading to dark brown
96 - 124	COAL 28' 0"
124 - 129	Grey shale
129 - 133	COAL 4' 0"
133 - 170	Grey shale
170 - 186	Grey sandstone
186 - 199	Grey shale
199 - 200	Dark brown shale
200 - 205	Dark sandy shale
205 - 210	Brown shale
210 - 280	Grey sandstone with streaks of grey shale
264	Trace of COAL

END OF HOLE

APPENDIX A

Drill Hole No. 10

26

Latitude: 8500

Departure: 8421

Elevation: 2095

Dip: 90°

Depth	Location
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0 - 120	Alluvial gravel
120 - 270	Heavy mud. Float coal from 225 feet. No sign of ledge.

END OF HOLE

APPENDIX A
Drill Hole No. 11

36

Latitude: 7950
Departure: 7921
Elevation: 2125
Dip: 90°

Depth	Formation
0 - 30	Alluvial material
30 - 31	Sandstone
31 - 60	Gravel with mud seams
60 - 65	Sandstone
65 - 85	Grey shale
85 - 125	Sandstone
125 - 168.5	Grey shale
168.5 - 181.5	COAL. Oxidized coal indicating old workings. Old timbers from 177 - 179.
181.5 - 187	Grey shale
187 - 193.5	COAL
193.5 - 200	Grey shale

END OF HOLE

APPENDIX A

B

Drill Hole No. 12

Latitude: 9058

Departure: 8821

Elevation: 2045

Dip: 90°

Depth	Formation
0 - 82.5	Gravel alluvial
82.5 - 83.5	COAL - probably float
83.5 - 260	Gravel alluvial material difficult to identify due to copious water.

END OF HOLE

APPENDIX A

Drill Hole No. 13

26

Latitude: 9000

Departure: 8300

Elevation: 2035

Dip: 90°

Depth	Formation
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0 - 90 Alluvial gravels with mud seams. No ledge.

END OF HOLE

APPENDIX A

24

Drill Hole No. 14

Latitude: 4390

Departure: 6580

Elevation: 2227

Dip: 90°

Depth	Formation
0 - 25	Fine sandy alluvial
25 - 40	Gravel with a few boulders
40 - 60	Fine dark sandy alluvial
60 - 70	Light tan sand with some clay
70 - 149	Dark grey clay
149 - 149.5	Shale?
149.5 - 170	Sand

END OF HOLE

APPENDIX A

26

Drill Hole No. 15

Latitude: 8400

Departure: 9170

Elevation: 2116

Dip: 90°

Depth	Formation
0 - 70	Overburden - clay and many boulders
70 - 95	Silt - very dry and powdery
95 - 105	Fine sand with occasional boulders

END OF HOLE

26

DRILL HOLE NO. 16

Latitudes:
Departures:

Elevations:

Dips:

Depth	Formation
0 - 41	Sand Rock - Pitch 50°
41 - 46	Sand Rock " "
46 - 51	Sand Rock " "
51 - 56	Sand Rock " "
56 - 64	Hard dark shale
64 - 71.25	Hard dark shale
71.25 - 74.75	Hard dark shale
74.75 - 91	Sand Rock - Pitch 40°
91 - 102	Sand Rock " "
102 - 106	Sand Rock " "
106 - 107	Light shale - Seam Flat
107 - 113	Light shale " "
113 - 118	Light shale " "
118 - 128.58	Sand Rock - Seam Flat
128.58 - 138	Sand Rock " "
138 - 140	Sand Rock " "
140 - 146	Sand Rock " "
146 - 151	Sand Rock " "
151 - 161	Sand Rock " "
161 - 165	Sand Rock " "
165 - 172	Sand Rock " "
172 - 183	Sand Rock " "
183 - 194	Sand Rock " "
194 - 204	Sand Rock " "
204 - 210	Sand Rock " "
210 - 216	Sand Rock " "
216 - 222	Sand Rock " "
222 - 227	Sand Rock " "
227 - 233	Sand Rock " "

.....cont'd

DRILL HOLE NO. 16 (cont'd)

Depth	Formation
233 - 238	Sand Rock - Seam Flat
238 - 240	Sand Rock - Seam Flat
240 - 242.5	Sand Rock - Pitch 30°
242.5 - 246.5	Light shale - Seam Flat
246.5 - 250.5	COAL
250.5 - 255	COAL
255 - 257.5	COAL
257.5 - 260	Sand Rock
260 - 261	Sand Rock
261 - 262	Sand Rock
262 - 271	Dark shale
271 - 274	COAL
274 - 280	COAL
280 - 283	COAL
283 - 286	COAL
286 - 288	COAL
288 - 291	COAL
291 - 293	COAL
293 - 295	COAL
295 - 297	COAL
297 - 301	COAL
301 - 302	COAL
302 - 304	COAL
304 - 305	COAL
305 - 306	COAL
306 - 309.5	Shale
309.5 - 315	Bone Coal
315 - 323	Bone Coal
323 - 327	Sand Rock - Shale
327 - 332	Sand Rock "
332 - 335	Sand Rock "
335 - 340.5	Sand Rock "
340.5 - 345	Sand Rock "
345 - 348	Sand Rock "
348 - 351	Sand Rock "
351 - 356	Hard glacier clay

Feb. 15, 1962.

APPENDIX A

Drill Hole No. 1

Latitude: 8400

Departure: 8821

Elevation: 2112

Dip: 90°

Depth	Formation
0 - 6	Soil
6 - 145	Clay and boulders. Some float coal between 98 and 100. Sand at 118.
145 - 192	Alluvial or sandstone.
192 - 205	COAL
205 - 235	Alluvial or sandstone.

END OF HOLE

111

APPENDIX A
Drill Hole No. 2

Latitude: 8400
 Departure: 11300
 Elevation: 2149
 Dip: 90°

26

Depth	Formation
0 - 10	Overburden
10 - 15	Light brown shale
15 - 37	Grey shale
37 - 40	Dark shale
40 - 45	Grey shale
45 - 55	Grey sandstone
55 - 57	Dark shale
57 - 59	Dark shale with COAL partings
59 - 60	Grey shale
80 - 85	Light coloured sandstone
85 - 86	Shale
86 - 91	Light sandstone
91 - 105	Grey shale
105 - 106	Sandstone
106 - 108	Grey shale
108 - 109	Dark shale
109 - 122	Sandstone
122 - 124	COAL ✓
124 - 130	Shale
130 - 131	Shale and COAL
131 - 132	Shale
132 - 139	Sandstone
139 - 140	Black Shale
140 - 140½	COAL
140½ - 149	Black shale
149 - 159	Grey shale
159 - 160	Brown shale
160 - 161	Shale and COAL
161 - 170	Grey shale
170 - 179	Sandstone with six inches shale at 173
179 - 185	Shale
185 - 190	No sample
190 - 198	Sandstone
198 - 209	Dark shale
209 - 212	COAL 3' 0" SEAM 3
212 - 213	Grey shale
213	Several inches COAL
213 - 220	Grey shale
220 - 226	Light coloured sandstone
226 - 227	Shale
227 - 241	Light coloured sandstone
241 - 246	Grey shale

COAL 2' 0" SEAM 2 ?

COAL 3' 0" SEAM 3