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1955/44

DRILLING RESULTS, RAVENSWORTH AND MUSWELLBROOK
AREAS, N.S.W.

by

M.C. Konecki

CANBERRA.

November, 1955.

DRILLING RESULTS

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INTRODUCTION

During the open-cut coal investigations carried out in New South Wales by the Bureau of Mineral Resources in conjunction with the Joint Coal Board and N.S.W. Department of Mines in the years 1951 to 1954 five bores were drilled, which had no direct bearing on the open-cut problem, but were designed to obtain subsurface information for underground mining or to acquire stratigraphic and structural data to be used in a wider geological analysis.

The bores thus drilled are tabulated below:

Table I.

Area	Bore No.	Final Depth	Commenced/Finished
State Mine Roserve Ravensworth	BMR 1 (S)	746'6"	10.2.53/16.4.53
	BMR 2 (S)	764'1"	16.4.53/ 5.6.53
	BMR 3 (S)	558'10"	17.4.53/ 1.5.53
Ravensworth Trig.	BMR 1 (S.C.)	1,216'10"	13.5.53/ 5.8.53
St. Helier's (Muswellbrook)	BMR 1 (S.C.)	1,758'6"	14.7.53/ 4.11.53

The factual results of drilling are given in the attached descriptive and graphic logs.

The bores are situated in the Singleton-Muswellbrook Coalfield. Booker (1953) suggests the following stratigraphical succession of the Permian in the area.

Newcastle Coal Measures

Tomago Coal Measures (Rix's Creek Formation
Bayswater Formation)

Upper Marine Group (Crinoidal or Mulbring Sub-group
Branxton Sub-group)

Greta Coal Measures (Muswellbrook Formation
Skeletal Formation)

Lower Marine Group (Gyarran Volcanics)

The above classification is the expression of "an attempt to apply the ... Australian Code of Stratigraphical Nomenclature ... to meet special conditions in the Singleton-Muswellbrook Coalfield", and it will be adhered to in this report.

STATE MINE RESERVE, RAVENSWORTH AREA.

BORES. 1(S). 2(S). 3(S).

Bore 1(S) was located in the north-western part of Portion 147, Bore 2(S) in the southern part of the same Portion, and Bore 3(S) in the western part of Portion 26, all in Parish of Liddell, County of Durham, N.S.W.

All three bores were put down in the lower part of Tomago Coal Measures, and each of them penetrated the lowermost (Hebden) coal seam, and bore BMR 1(S) drilled 35'6" in the rocks of Mulbring Sub-group from 711' to 746'6". The transitional Bayswater Formation was drilled by bores BMR 1(S) and BMR 2(S) between depths 653'10"-711' and 734'4"-764'1" respectively.

The Liddell seam splits in the southerly and south-easterly direction, i.e. between bores BMR 1(S) in the north and BMR 3(S) in the south, and between bore BMR 1(S) and BMR 2(S) to the south-east.

Table 2 shows the correlation of coal seams between the three bores.

Table 2.

Coal Seam	Bore No.	Depth limits	Remarks
"J" & "G"	BMR 1 (S)		
	BMR 2 (S)	47' 11" - 52' 6" and } 64' 3" - 66' 7"	For naming of these seams see
	BMR 3 (S)	29' 3" - 32' 9" }	
"E"	BMR 1 (S)	49' 8" - 53' 11" }	J. Veevers
	BMR 2 (S)		
	BMR 3 (S)	83' 7½" - 87' 2" }	BMR Records 1953/47;
"C"	BMR 1 (S)	73' 10" - 76' 6½" }	Folder 1, pp. 15-26.
	BMR 2 (S)	167' 8" - 170' 3"	
	BMR 3 (S)	103' 6" - 107' 9" }	
Pike's Gully	BMR 1 (S)	165' 7" - 173' 3½" }	
	BMR 2 (S)	259' 6" - 267' 7" }	
	BMR 3 (S)	192' 8" - 199' 4" }	
Artie's	BMR 1 (S)	229' 6" - 235' 7" }	
	BMR 2 (S)	323' 10" - 330' 10" }	
	BMR 3 (S)	248' 9" - 256' 7" }	
Upper Liddell	BMR 2 (S)	381' 1" - 392' 5" }	Includes inter- vening non-coal beds.
	BMR 3 (S)	330' 8" - 340' 11" }	
Middle Liddell	BMR 2 (S)	426' 3½" - 443' 8" and 450' 9½" - 451' 8½" }	
	BMR 3 (S)	354' 0" - 369' 1" and 377' 2" - 378' 3" }	
Lower Liddell	BMR 2 (S)	499' 6" - 504' 6" }	
	BMR 3 (S)	416' 9" - 426' 1" }	
Liddell	BMR 1 (S)	352' 11" - 375' 10" and 382' 8" - 385' 10" }	Parent seam for U.M.&L. Liddell
Barrett's	BMR 1 (S)	436' 5" - 446' 2" }	
	BMR 2 (S)	531' 2" - 543' 0" }	
	BMR 3 (S)	475' 8" - 484' 9" }	
Hebden	BMR 1 (S)	491' 5" - 493' 5" }	
	BMR 2 (S)	583' 6" - 587' 7" }	
	BMR 3 (S)	541' 3" - 545' 0" }	

Fossils: Miss I. Crespin (1953) determined the following

foraminifera from bore BMR 1(S):

Ammodiscus multincinctus from samples 713'-734' and
739'-746'

Nodosaria sp. from samples 739'-746'

RAVENSWORTH TRIG AREA.

BORE 1(S.C.).

Bore BMR 1(S.C.) Ravensworth Trig. was located 16 yards N.E. from the Ravensworth Trigonometric Station in Portion DP997, Lot 3c, Parish of Liddell, County of Durham, N.S.W.

The bore was drilled to the depth of 1,216 ft. in order to investigate at depth the geological conditions of the axial part of the Camberwell Anticline in this locality.

Normal Tomago Coal Measures rocks containing at least seven major coal seams occur from the surface to the depth of 604'3", which is the base of the lowermost band of coal in the bore.

The interval 604'3" to 1,081'7" is made up of alternate beds of fine to medium grained quartz greywacke, with few coarse grained beds, and siltstone. The siltstone represents about 23% of the section. Fine to very fine grained quartz greywacke interbedded with siltstone occurs between 1,081'7" and 1,143'7", the siltstone representing about 45% of the section. This interval is considered to be the stratigraphical equivalent of the Bayswater Formation.

The lowest interval, between 1,143'7" and the final depth of 1,216'0", consists of dark grey siltstone and (?) pyritic nodules. An unusual microfaunal assemblage was found in this interval. It contained "rare Ammodiscus, Hyperamminoides and other arenaceous Foraminifera, a few hyaline types (mainly Nodosaria and some Ostracoda. These microfossils are scattered sparsely throughout the siltstone and the calcareous forms are fragmentary, although one specimen of Nodosaria and some ostracods were found complete". (M. A. Reynolds, 1955).

The siltstone which occurs in the 1,143'7"-1,216'0" interval is thought to represent the uppermost marine succession in this locality.

ST. HELIER'S (MUSWELLBROOK) AREA

BORE BMR 1(S.C.)

Bore BMR 1(S.C.) St. Helier's was drilled to the final depth of 1,758'6" mainly in order to investigate the extent, quality and thickness of Greta Measures coal seams in the Lupton Park Syncline, which is separated from the Muswellbrook Anticline to the west by the Aberdeen, St. Helier's and Gyarran faults. These faults merge into one (Aberdeen) fault farther north.

The bore was located in portion II, Parish of Rowan, County of Durham, 1/4 mile east of No. 2 Muswellbrook Colliery.

The bore penetrated rocks referable to the Mulbring or Crinoidal and Branxton Sub-groups of Upper Marine Group, Greta

Coal Measures (including Muswellbrook and Skeletar Formations) and entered brecciated amygdaloidal basalt of the Lower Marine Group after crossing a fault (? St. Helier's) at about 1,730 ft. It is thought that the top of the Branxton Sub-group in the bore is at 47 ft. and the top of Greta Coal Measures at 1,135 ft. 10 ins. No obvious "Muree" type rocks were identified.

The rocks of the Upper Marine Group contain Foraminifera, Bryozoa, Brachiopoda, Mollusca, Ostracoda and crinoid ossicles and plates.

Miss I. Crespin (1953) studied Foraminifera from this bore between depths of 64'10" and 275'5" and considered them to belong to the "Branxton Stage".

M. A. Reynolds, in the paper now being prepared for publication and entitled "The Identification of Marine Beds Underlying the Upper Coal Measures in the Singleton-Muswellbrook District", refers to the relevant section in the bore as follows: "A complete section from the lower "Mulbring or Crinoidal Stage" down into "Branxton Stage" is obtainable from cores and cuttings from the St. Helier's bore, but there is some doubt whether the boundary between the two should be determined on lithological or microfaunal evidence. Calcareous microfossils similar to those which Miss Crespin describes as belonging to the "Branxton Stage" occur from 47 ft. downwards, and, although some of these species have been noted in the upper beds of the "Mulbring or Crinoidal Stage", their absence in intermediate and basal beds in other areas indicates that the next lower occurrence of these forms is in the "Branxton Stage". Mrs. J. Beattie identified Fenestella dispersa from a sample from 138 ft. (St Helier's bore) and she considers that "the presence of fenestellid Bryozoa is indicative of a pre-Mulbring age." In the discussion of lithology, it is noted that a gradual change occurred from 300 ft. where the rock was mostly coarse grained with an argillaceous to silty matrix to 158 ft. 6 ins. where the rock type is an argillaceous siltstone to very fine-grained greywacke with rare erratics. On lithological evidence, the section from 17 ft. down almost to 158 ft. 6 ins. could be regarded as representing the "Mulbring or Crinoidal Stage", but in view of the fossil evidence this interval is reduced to 17-47 ft., and 47 ft.-158 ft. 6 ins. is now considered as the upper bed of the "Branxton Stage".

J. M. Dickins (1955) examined a piece of core from the interval 1,106'11"-1,107'11" and found that the following fossils were present in it: Brachiopoda, crinoid plates and productid spines. He was able to develop one of the brachiopods as a productid, probably a Terakea, which indicates the presence of marine Permian sediments. It is not possible to assign the fossil to any horizon in the Permian.

The coal seams of Greta Coal Measures were penetrated in the interval 1,296'4" to 1,675'9", and they were not affected by igneous intrusion of any kind.

An interesting feature is the merging into practically one seam of the Muswellbrook (No. 1) and St. Helier's (No. 2) Seams, which occur in the 1,463'4" to 1,483'7" and 1,483'10" to 1,517'4" intervals respectively.

Thin coal seams which occur within the intervals 1,443'7" to 1,447'4" and 1,449'6" to 1,450'10" may represent splits of the upper part of Muswellbrook Seam.

In that case several coal seams which occur within two intervals above, i.e. 1296'4" to 1,345'6" and 1,378'0" to

1,402'8", may represent splits of the Flemming (No. 1A) and Hallett (No. 1B) Seams respectively.

Similarly, coal seams which occur in two intervals below (1,560'7" to 1,577'11" and 1,612'11" to 1,675'9") may be referred to the Lewis (No. 3) and Loder (No. 4) Seams respectively.

A deviation Survey of the bore was carried out using the "acid bottle" and "Tro-Pari" deviation instruments. The following results were obtained:-

Depth	Acid Bottle					Tro-Pari		
	600'	1008'	1198'6"	1450'	1750'	600'	900'	1200'
Amount of Deviation	0°	1½°	3°	3°	7°	2°	1°	3°
Azimuth of Deviation	-	-	-	-	-	278½°	1½°	293°

It appears that, except for the reading at 600 ft., both acid bottle and Tro-Pari surveys agree as to the amount of deviation. With regard to the direction of deviation - it oscillates within the N.W. quadrant of the compass, and to the depth of 1,200 ft. is generally "up-dip" in relation to the structure at this locality. This observation is consistent with the statistical results of deviation surveys in oil-field practice.

This general trend (up-dip) of deviation is assumed to continue below the depth of 1200 feet, and is 3½° between depths of 1,463'4" and 1,517'4" at which combined Muswellbrook and St. Hellier's Seams were penetrated by the bore. Taking into consideration the measured dip of 35° from the core in this interval, the true thickness of the combined coal-seams is calculated at close to 44 ft. 3 in. and the true dip near 38½°

Similar calculations may be carried out for the remaining coal seams which were penetrated by the bore in this locality.

The quality of coal seams of Greta Coal Measures in the bore is given by proximate analyses in the attached descriptive log. It is consistent with the values for Greta Coal Seams generally.

At 1,275 ft. a flow of water was noticed at an estimated rate of 1,000 to 1,200 gallons per hour at ground level. However, at this depth the formation drilled was shale - an unlikely water reservoir. It is reasonable to assume that the water flow came from the greywacke bed above the shale, between 1,261'8" and 1,263'8", and the failure to manifest itself earlier may be ascribed to the fact that drilling mud, having density greater than water, was used during the drilling.

The water was analysed in the Geological Survey Branch, Department of Mines, N.S.W. with the following results:-

pH	7.05
Conductivity at 20°C.	2,603.00 micro-ohms/cm

Analyses (parts per hundred thousand)

Bicarbonate	67.7
Chloride	49.7
Sulphate	31.9

Analyses (parts per hundred thousand) continued

Calcium	13.8
Magnesium	9.7
Alkalies, etc.	38.5
Total	<u>211.3</u>

Sulphuretted hydrogen 0.17

Dr. J. E. Glover (1953) of the Bureau of Mineral Resources and Mr. H. F. Whitworth (1953) of the N.S.W. Geological Survey carried out petrological examination of a number of core samples from the lowermost portion of the bore in the Skeletar Formation and Gyarran Volcanics.

J. E. Glover recorded his results as follows:

Sample from the depth of 1.671 ft. "...Almost complete alteration of the rock prevents precise discussion of its original nature, but its texture, particularly relict textures of many constituent fragments, confirms Mr. Konecki's diagnosis of its pyroclastic origin. The rock appears to have been a fine, andesitic or basaltic, volcanic breccia that has been almost completely made over to clay minerals".

Sample from the depth of 1.751 ft. "Overall colour of the rock is mottled brown, due to presence of iron oxide staining. An apparent shear zone, with concentration of iron oxide and numerous, intersecting, white calcite veins, transects the specimen. The matrix of the rest of the rock varies from mottled brown and very pale green through deeper shades of brown with increasing content of iron oxide. The matrix, which effervesces in cold 10% HCl., contains numerous irregular amygdales of soft, white to very pale green serpentine. Some amygdales are brown from iron staining.

In plane polarized light, the texture appears typical of an amygdaloidal basalt. The texture is however relict, for calcite and to a lesser degree antigorite, has replaced plagioclase, preserving its lath-like form. The laths average 0.15 mm. in length and are set in an opaque base of hematite. A number of amygdales are represented by colourless fibro-lamellar serpentine with first order grey interference tints and a mean refractive index 1.561 (antigorite), and some such amygdales have a very narrow outer rim of chrysotile. A few amygdales are calcite and others are composed of a mineral of aggregate texture and very low birefringence that is dark brown to opaque from iron staining. The mineral cannot be scratched with a knife and is probably crypto-crystalline silica. The apparent shear zone is also partly made up of the mineral.

Texture shows the rock to be an amygdaloidal basalt or andesite. It appears to have been sheared and has been highly altered, with replacement by calcite, serpentine and crypto-crystalline silica."

H. F. Whitworth's results are as follows:

Sample from 1.694' "Claystone with thin lenticles of oolitic carbonates. The clay gives some evidence of having been baked and the carbonates have probably been derived from the decomposition of felspar contained in the nearby basalt".

Sample from 1.728'8". An altered fine-grained basaltic rock with amygdaloidal structure. The cavities are filled with

opaline and chalcedonic silica. The basalt was originally a porphyritic feldspathic type but of the feldspars, the form only remains. They have been altered chiefly to opaline silica and aggregates of secondary carbonates. The carbonates show radial structure in places."

Sample from 1,732'4". "Altered basalt. Highly brecciated and slickensided and converted largely to opaline silica and secondary carbonates. The thin section shows only traces of the structure of the original rock. Some sooty carbon, possibly derived from coal or carbonaceous shale is present."

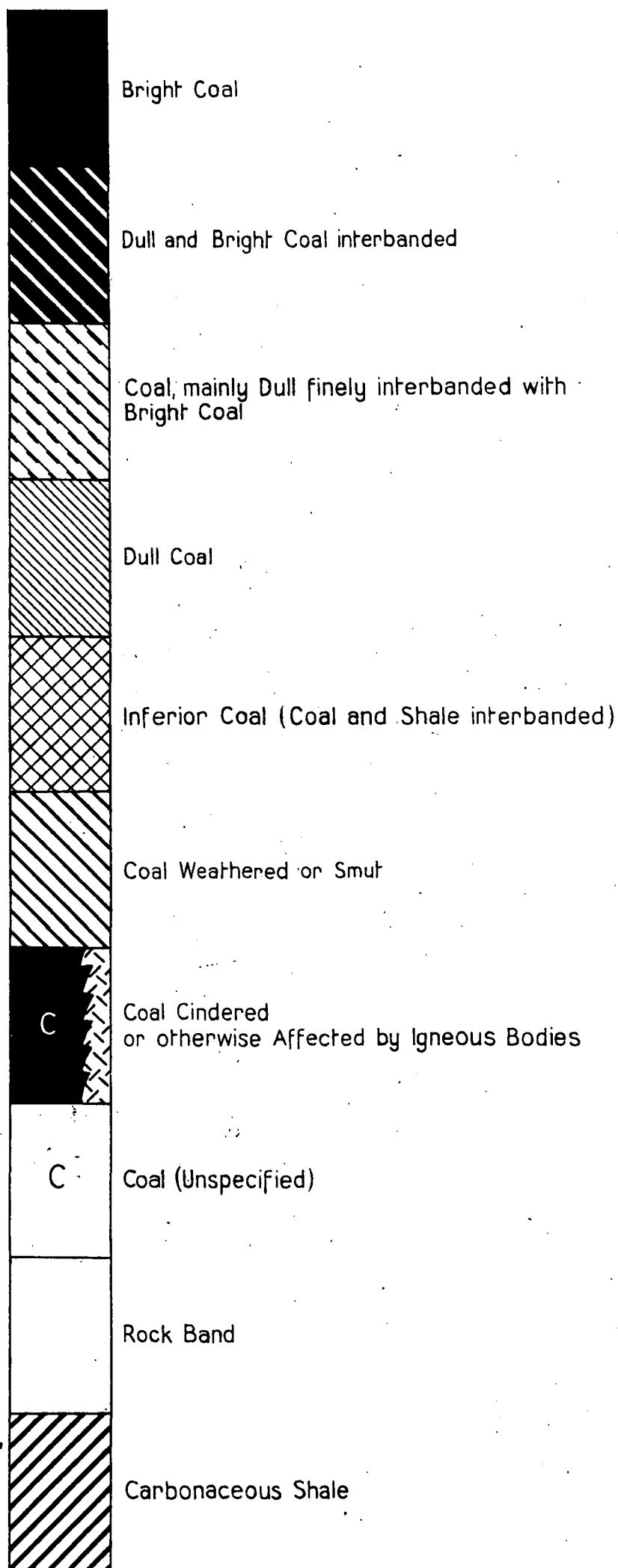
Sample from 1,737'8". "An altered breccia containing fragments of basalt, claystone and sandstone. A considerable amount of opaline and chalcedonic silica is present, and there are numerous small rounded masses of secondary carbonates."

Electric logging (self potential, single point resistance) was carried out between the depths of 850 and 1,600 ft. in November, 1953, by the well logging party of the Geophysical Section of the Bureau of Mineral Resources. Both curves, i.e. self potential and resistance are shown on the attached graphic log. It may be seen that the coal seams correlate very well with "kicks" of the resistance curve. The self potential "kicks" are not so well pronounced. Shale beds are characterized by minimum resistance values.

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- Booker, W.F., 1953 - The Geology and Coal Resources of Singleton Muswellbrook Coal-Field. (unpub. thesis for Ph.D., Sydney University).
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- Dickins, J.M., 1955 - Written communication for Chief Geologist Bur.Min.Resour.Aust. (unpub.)
- Glover, J.E., 1954 - Petrographic Description of 21 Rock Specimen from Muswellbrook, N.S.W. Bur.Min.Resour. Aust. Rec. 1954/8 (unpub.)
- Reynolds, M.A., 1955 - Identification of Marine Beds Underlying The Upper Coal Measures in the Singleton-Muswellbrook District. Bur.Min.Resour. Aust. Rep. No. 28 (in preparation for publication)
- Whitworth, H.F., 1953 - Petrological Description of Samples of Core from St. Helier's Bore, $\frac{1}{4}$ mile East of Muswellbrook No. 2 Colliery. (written communication for F. W. Booker, Geol. Survey, N.S.W. Dept. of Mines). (unpub.).

LEGEND



STATE MINE RESERVE

RAVENSWORTH

STATE MINE RESERVE,
RAVENSWORTH

Intervals of analysed coal samples

BMR Bore No.	Analysis No.	BMR Sample No.	Intervals				
2S	1777	1	47'	11 "	-	50'	7 "
	1778	2	51'	4 "	-	52'	6 "
	1779	3	167'	8 "	-	170'	3 "
	1780	4	269'	6 "	-	262'	2 "
	1781	5	262'	3 "	-	263'	6 "
	1782	6	263'	7 "	-	266'	6 "
	1783	7	266'	6 "	-	267'	7 "
	1784	8	325'	10 "	-	325'	0 "
	1785	9	325'	1 "	-	327'	3 "
	1786	10	327'	3 "	-	328'	7 "
	1787	11	328'	7 "	-	330'	10 "
	1788	12	426'	3½ "	-	428'	6 "
	1789	13	428'	6 "	-	430'	6 "
	1790	14	430'	6 "	-	431'	1 "
	1791	15	433'	7½ "	-	435'	4½ "
	1792	16	436'	8 "	-	439'	0 "
	1793	17	439'	0 "	-	441'	6 "
	1794	18	441'	6 "	-	443'	8 "
	1795	19	499'	6 "	-	502'	0 "
	1796	20	502'	0 "	-	504'	6 "
	1797	21	531'	2 "	-	533'	4½ "
	1798	22	533'	4½ "	-	535'	7 "
	1799	23	537'	3½ "	-	539'	5 "
	1800	24	539'	7 "	-	542'	6 "
3S	1442	1	84'	6 "	-	87'	2 "
	1443	2	103'	6 "	-	105'	6 "
	1444	3	105'	6 "	-	107'	9 "
	1445	4	192'	8 "	-	194'	10 "
	1446	5	195'	3 "	-	196'	7 "
	1447	6	196'	11 "	-	199'	4 "
	1448	7	250'	8 "	-	253'	8 "
	1449	8	253'	8 "	-	256'	7 "
	1450	9	336'	1 "	-	338'	3 "
	1451	10	338'	8 "	-	340'	11 "
	1452	11	354'	0 "	-	356'	6 "
	1453	12	356'	6 "	-	359'	3 "
	1454	13	359'	3 "	-	362'	1 "
	1455	14	362'	2 "	-	363'	2 "
	1456	15	364'	8 "	-	366'	4 "
	1457	16	366'	5½ "	-	369'	1 "
	1458	17	416'	9 "	-	418'	9 "
	1459	18	418'	9 "	-	420'	9 "
	1500	19	478'	3 "	-	481'	0 "
	1501	20	481'	0½ "	-	483'	0 "
	1502	21	483'	6 "	-	484'	9 "
	1503	22	541'	3 "	-	543'	8½ "
	1504	23	543'	10 "	-	545'	0 "

BUREAU OF MINERAL RESOURCES

Name and No. of Bore BMR 18 STATE MINE RESERVE, RAVENSWORTH

~~Cossack~~

Approx.

DISTRICT Muswellbrook COUNTY Durham PARISH Liddell PORTION 147 LOCATION SWCnr.Ptn.147/30°/9494'

Surveyed by R.W.Archer(SCMS) Survey Method Theodolite Traverse Elevation 441.1' Ref. Map Liddell Parish Map

Surveyed by M.A.Reynolds-W.McKinnon Survey Method Cased No Datum Railway Datum Ref. Report 1953/133

Logged by	BMR	Cased	Failing 1500/293	Barium	746.6"	Ref. Report	7
Sunk by		Type of Drill		Depth		Date Begun/Finished	10.2.53/16.4.53

[illegible]

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
73	10	0	2	Shale, dk.gy., carb.	0	2										
75	10 $\frac{1}{2}$	2	0 $\frac{1}{2}$	COAL, dull & brt.bdd: mostly brt.powdery	2	0 $\frac{1}{2}$										
76	3	0	4 $\frac{1}{2}$	Intermixed coal & dk.gy.sh.	0	4 $\frac{1}{2}$										
76	6 $\frac{1}{2}$	0	3 $\frac{1}{2}$	COAL as above	0	3 $\frac{1}{2}$										
77	4	0	9 $\frac{1}{2}$	Greywacke, gy.f.-v.f.grd.	0	9 $\frac{1}{2}$										
77	8	0	4	Clay-ironstone, br.gy., tough	0	4										
80	3	2	7	Greywacke, f.grd.w.t.slst.bds.	2	7										
81	5	1	2	Siltstone, gy.	0	8 $\frac{1}{2}$										
82	2 $\frac{1}{2}$	0	9 $\frac{1}{2}$	Siltstone, br.gy.tough sideritic w. calcite veins	0	9 $\frac{1}{2}$										
123	1	40	10 $\frac{1}{2}$	Intbd.f.-n.grd.gw.ind.in part & gy.slst. w.R.t.bd.clay-ironstone	40	7 $\frac{1}{2}$										
128	2	5	1	Greywacke, n.-c.grd.w.sone pbls.	5	1										
143	2	15	0	Conglomerate n.grd.fri.in part w.c.grd. gw.matrix	14	5										
144	3	1	1	Greywacke, gy., f.grd.	1	1										
152	5	8	2	Greywacke, l.gy.n.-c. & v.c.grd.w.occ. pbl.bds.	8	2										
156	1	3	8	Greywacke, gy.v.f.grd.w.t.bd.clay-ironstone	3	8										
165	7	9	6	Greywacke, l.gy., f.-n.grd.	6	7										
166	4	0	9	COAL, dull & bright bdd.	0	4										
166	6 $\frac{1}{2}$	0	2 $\frac{1}{2}$	Shale, br.sdy.w.t.coal bds. & t.marcasite bds.	0	2 $\frac{1}{2}$										
166	11 $\frac{1}{2}$	0	5	COAL, mostly bright	0	5										
167	0 $\frac{1}{2}$	0	1	Shale, bk.carb.	0	1										
167	1 $\frac{1}{2}$	0	1	COAL, as above	0	1										
168	2 $\frac{1}{2}$	1	1	Shale, silty bk.carb.	1	1										
169	1 $\frac{1}{2}$	0	11	COAL, bdd.but mostly bright	0	11										
169	4	0	2 $\frac{1}{2}$	Shale, bk.carb.	0	2 $\frac{1}{2}$	3/BMR			3		3.9	33.1	54.9	8.1	13,100
169	11 $\frac{1}{2}$	0	7 $\frac{1}{2}$	COAL, as above	0	7 $\frac{1}{2}$										

SEAM

Pike's
Gully
Seam.

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
322	0	7	11	Greywacke gy.-l.gy.f.grd.tough ind.w. occ.t.slst.bd.	7	11										
326	4	4	4	Greywacke, gy.v.f.grd.tough to gy.slst.	2	6										
334	9	8	5	Claystone, gy.	8	5										
336	6	1	9	Shale, w.clst.bds.gy.to bk.carb.	1	9										
337	3	0	9	Claystone, gy.v.sandy at bot.	0	9										
337	7	0	4	COAL, bright	0	4										
352	7	15	0	Shale, dk.gy.-gy.w.slst.bds. sideritic in parts & sdy.in places	15	0										
352	11	0	4	Shale, carb.cleated	0	3										
356	0	3	1	COAL, mainly bright, strongly cleated shattered, shaly in two small bds.	2	3	8/BMR			0 1/2		3.3	34.4	51.2	11.1	12,770
356	8	0	8	Siltstone to f.grd.gw.dk.gy.pyr.	0	8										
364	10 1/2	8	2 1/2	COAL, bright mostly broken into small cleat. fragments, unbroken at base	7	11	9/BMR 10/BMR 11/BMR					3.6	33.1	53.2	10.1	12,370
366	10 1/2	2	0	Siltstone, carb.pyr.w.coaly bds.	2	0						3.5	35.3	55.4	5.8	13,530
367	0	0	1 1/2	Shale, coaly, s.& fri.	0	1 1/2										
371	6	4	6	COAL, bright & dull bdd., cleated, fragmentary powdery at base	4	6	12/BMR 13/BMR					3.0	37.3	51.5	8.2	13,280
371	7	0	1	COAL, bright, cleated	0	1						3.0	38.6	52.4	6.0	13,650
372	1	0	6	Siltstone, dk.gy.to bk.pyr.in places	0	6										
373	11	1	10	COAL, bright, cleated fragmentary	1	9	14/BMR					3.1	34.2	48.0	14.7	12,330
374	2	0	3	Shale, carb. and coaly bds.	0	3 1/2										
374	11	0	9	COAL, mostly bright cleated	0	9										
375	2	0	3	Claystone, br.	0	3										
375	10	6	8	COAL, mostly bright, cleated	0	7										
382	8	6	10	Siltstone, l.gy.w.numerous plant remains & pyr.patches on cleavage planes	4	10										
384	3	1	7	COAL, bright & dull bdd.	0	6										
384	6	0	3	COAL, mainly bright, shattered	0	3										
385	7	1	1	Siltstone, w.f.gw.bds.	1	1										
385	10	0	3	COAL, mainly bright	0	3										
391	10	6	0	Siltstone, gy.s.grading into a clst.numerous plant remains												

LIDDELL SEAM

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
411	3	19	5	Greywacke, l.gy.-dk.gy.f.to c.gy. cross-bdd.	19	5										
435	0	23	9	Siltstone, l.gy.to dk.gy.grading up into a f.grd.gw.	23	7										
436	5	1	5	Shale, bk.carb.	1	5										
436	7	0	2	COAL, bright	0	2										
436	10	0	3	Shale, carb.	0	3										
441	9	4	11	COAL, mainly bright, cleated	4	11	15/BMR					3.1	35.1	45.4	16.4	11,930
							16/BMR					2.9	38.4	52.5	6.2	13,650
442	0	0	3	Shale, bk.,carb.	0	3										
444	10	2	10	COAL, mainly brt.w.minor dull bds.	2	10	17/BMR					3.3	34.6	54.6	7.5	13,340
445	3	0	5	Siltstone, l.br.-gy.w.minor bright coal bds.	0	5										
445	5	0	2	COAL, bright, cleated	0	2										
445	5 $\frac{1}{2}$	0	0 $\frac{1}{2}$	Shale, bk.carb.	0	0 $\frac{1}{2}$										
446	0	0	6 $\frac{1}{2}$	COAL, mainly bright bdd.	0	6 $\frac{1}{2}$										
446	1	0	1	Siltstone, bk.carb.	0	1										
446	2	0	1	COAL, mainly bright, broken	0	1										
447	0	0	10	Siltstone, l.br.-gy. numerous plant remains	0	10										
447	5	0	5	Shale, v.coaly, cleated	0	5										
448	2	0	9	Siltstone, l.br. gy.s.w.plant remains	0	9										
484	0	35	10	Greywacke, l.gy.f.to n.grd.	35	10										
487	10	3	10	Siltstone, l.& dk.gy.bdd.w.f. bds.of l.gy. f.grd.gw.	3	10										
491	5	3	7	Claystone, dk.gy.w.plant remains grading into carb.sh.at base	3	7										
493	5	2	0	COAL, shy.w.bright bds.,broken	2	0										
534	0	40	7	Greywacke, l.gy., n.grd.	40	2										
549	0	15	0	Greywacke, intb. f.to n.w.bds.of dk. gy.slst.	15	0										
568	0	19	0	Siltstone, dk.gy.w.f.bds.of f.grd.gw.	19	0										
568	9	0	9	Crystal tuff.c.grd.dk.gy. w.wh.grains	0	9										
577	0	8	3	Greywacke intb.n.grd.& slst.dk.gy.	8	3										

---BARRETT'S SEAM

Hebden SEAM

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
632	0	55	0	Greywacke, l.gy.n.grd.w.f.bds.dk.gy. slst.	54	9										
653	10	21	10	Greywacke, n.to f.grd.l.gy.w.bds.of slst.	21	10										
682	6	23	8	Siltstone, dk.gy. w.some bds.of gw. f.to n.grd.	23	8										
685	5	2	11	Limestone, l.gy.,hd.	2	11										
687	4	1	11	Siltstone, dk.gy.w.bds.of n.grd.gw.	1	11										
689	0	1	8	Limestone, l.gy. w.a bd.of gw.	1	8										
711	0	22	0	Siltstone, dk.gy. w.some bds.gw.at top	22	0										
746	6	35	6	Siltstone, dk.gy.	35	6										

typed 1.2.54

COMMONWEALTH OF AUSTRALIA
Bureau of Mineral Resources, Geology and Geophysics

Area: State Reserve Ravensworth. Hole No: BMR 1(S) Elevation: 441.1'
Reference: BMR Records 1953/133 Datum: Railway
Begun: 10.2.53 Finished: 16.4.53 Depth: 746' 6"

COAL DETAIL (1"-2')

IM V FC Ash BThU
3.9 31.5 56.8 7.8 13,080

No.1

4.4 33.5 55.3 6.8 13,190

No.2

49' 8"

51' 5"
51' 6 $\frac{1}{2}$ "

53' 11"

73' 10"

76' 6 $\frac{1}{2}$ "

165' 7"

166' 4"
166' 6 $\frac{1}{2}$ "

167' 1 $\frac{1}{2}$ "

168' 2 $\frac{1}{2}$ "

169' 1 $\frac{1}{2}$ "
169' 4"

169' 11 $\frac{1}{2}$ "
170' 4 $\frac{1}{2}$ "

3.9 33.1 54.9 8.1 13,100

No.3

4.3 35.5 55.7 4.5 13,540

No.4

173' 3 $\frac{1}{2}$ "

IM V FC Ash BThU
4.3 33.3 54.1 8.3 12,980

No.5

4.0 30.2 47.3 13.5 11,530

No.6

4.0 31.5 57.9 6.6 13,310

No.7

3.3 34.4 51.2 11.1 12,770

No.8

3.6 33.1 53.2 10.1 12,870

No.9

3.5 35.3 55.4 5.8 13,530

No.10

3.5 35.4 55.7 5.4 13,580

No.11

229' 6"

230' 6"

232' 7"

235' 7"

352' 11"

356' 0"

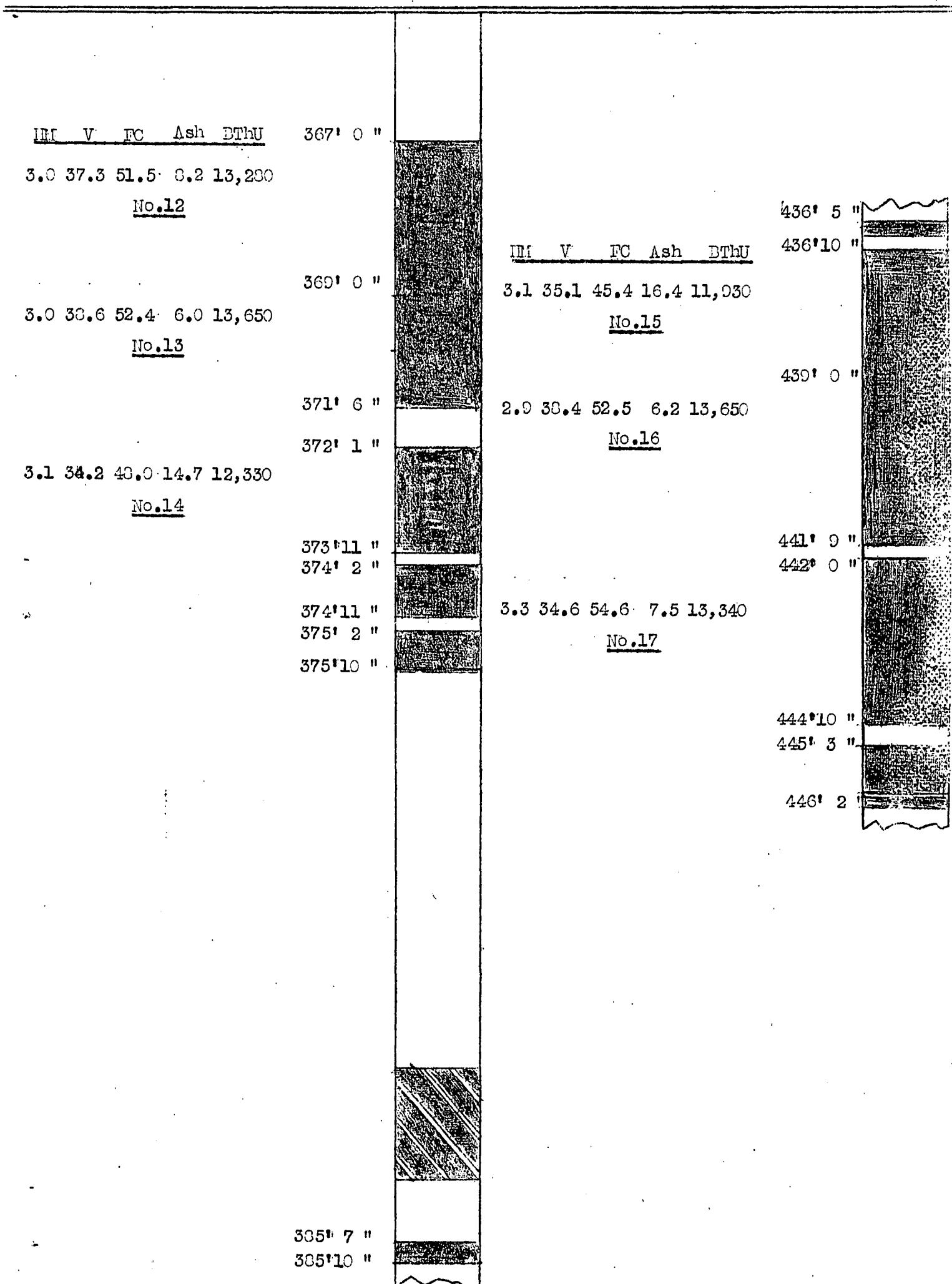
356' 8"

359' 4"

362' 0"

364' 10 $\frac{1}{2}$ "

COAL DETAIL (1"-2')



Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
382	6		1 1/2	Siltstone, gy. and clst. gy. soft.		1 1/2										
384	5	1	11	Shale black w. l. gy. br. inclusions and 1/2" light grey siltstone.												
385	7	1	2	Siltstone, light grey, soft.	1	11										
385	9		2	Siltstone, gy. w. small siderite nodules	1	0										
386	2		5	Siltstone, grey, hard.		5										
386	7		5	COAL, dull & bright bdd. w. 1/2" slst. bd.		4 1/2										
388	10	2	3	COAL, bright with calcite veining.	2	1										
388	11 1/2		1 1/2	Siltstone, gy. with bds. of v.f. grd. gw.		1										
389	3 1/2		4	Siltstone, grey.		3 1/2										
389	4		1 1/2	COAL, bright with calcite veining.		1 1/2										
391	1	1	9	Siltstone, gy. & dk. gy. with soft bds.	1	9										
391	5		4	Clay ironstone, grey br. silty streaks.		4										
391	11		6	Siltstone, grey.		5										
392	5		6	COAL, dull & bright banded.		2										
393	7	1	2	Siltstone with thin coal bands.		9										
394	3		8	Clay ironstone, grey brown.		6										
397	2	2	11	Greywacke, f. grd. gy. & slst. gy. bdd.	1	1										
399	2	2	0	Greywacke, f. grd. & slst. l. gy. bdd.	1	0										
407	5	8	3	Greywacke, f. to v.f. grd. w. thin siltstone bands, grey.	6	6										
415	2	7	9	Greywacke, gy. f. to v.f. grd. w. t. siltstone bands, grey.	7	4										
417	9	2	7	Greywacke, gy. f. to v.f. grd. w. thin siltstone bands, grey.	2	4										
424	8	6	11	Siltstone, gy. hard, with plants.	6	10										
426	3 1/2	1	7 1/2	Siltstone, black dark grey, hard.	1	3 1/2										
428	6	2	2 1/2	COAL, hard & dull w. thin bright bds.	1	9	12/BMR	1/2"	3.3	34.8	55.5	6.4	13,630			
430	6	2	0	COAL, bright brittle broken, soft bds.	1	6	13/BMR		3.3	36.8	52.8	7.1	13,530			
433	1	2	7	COAL, dull and bright banded.	2	1	14/BMR		3.4	36.9	53.1	6.6	13,590			
433	7 1/2		6 1/2	Siltstone, dk. gy. shaly pyritiferous.		5										
435	4 1/2	1	9	COAL, dull & bright bdd. broken.	1	4 1/2	15/BMR		3.5	36.9	54.4	5.2	13,780			
435	11		6 1/2	COALY shale		5										
436	8		9	Siltstone, carbonaceous.		7										
439	9	3	1	COAL, dull & bright bdd. broken parts.	2	4	16/BMR		3.1	38.3	50.9	7.7	13,510			
							17/BMR		3.2	38.2	53.5	5.1	13,880			
443	8	3	11	COAL, dull & bright bdd. broken parts.	3	0	18/BMR		3.6	35.7	55.1	5.6	13,710			
445	7	1	11	Siltstone, light grey, hard.	1	11										

[illegible]

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
596	5	7	8	Siltstone, dark grey, hard.	7	6										
596	8		3	Siltstone, dark grey, sideritic.		3										
598	9	2	1	Greywacke, grey, fine grained.	2	1										
601	7	2	10	Siltstone, grey, hard.	2	10										
604	3	2	8	Greywacke, grey, fine grained.	2	8										
605	3	1	0	Greywacke, grey, with silty bands.	1	0										
613	2	7	11	Greywacke, medium grd. l. gy. w. thin silty and planty bands.	7	11										
614	1		11	Siltstone, light grey, hard.		11										
620	1	6	0	Greywacke, m. to f. grd. l. gy. w. thin siltstone bands.	6	0										
621	10	1	9	Siltstone, light grey, hard.	1	9										
631	1	9	3	Siltstone, grey, hd. gw. fine grd. gy bdd.	9	3										
631	6		5	Greywacke, fine grained, grey.		5										
639	11	8	5	Siltstone, light grey, shaly.	8	5										
643	5	3	6	Siltstone, grey, shaly.	3	6										
649	5	6	0	Greywacke, medium grained, grey.	6	0										
658	10	9	5	Greywacke, medium grained, grey.	9	5										
668	1	9	3	Greywacke, medium grained, grey.	9	3										
677	8	9	7	Greywacke, medium grained, grey.	9	7										
685	8	8	0	Greywacke, medium grained, grey.	8	0										
691	11	6	3	Greywacke, medium grained, grey.	6	3										
694	7	2	8	Siltstone, grey with sandy bands.	2	8										
703	1	8	6	Greywacke, m.f. grd. gy. w. t. slst. bd.	8	6										
712	7	9	6	Siltstone, l. gy. w. bds. of fine grd. greywacke, grey.	8	6										
713	7	1	0	Siltstone, grey.	1	0										
722	4	8	9	Greywacke, fine grained, grey.	8	9										
726	2	3	10	Greywacke, fine grd. gy. with silty bds.	3	10										
728	7	2	5	Greywacke, f. grd. gy. shattered with sideritic bands.	2	3										
734	4	5	9	Greywacke, fine grained, grey.	5	9										
741	0	6	8	Siltstone, grey with sandy bands.	6	8										
745	3	4	3	Siltstone, grey with sandy bands.	3	10										
746	4	1	1	Greywacke, medium f. grained, whitish.	1	1										
746	10		6	Siltstone, grey.		6										
755	5	8	7	Greywacke, v. f. grd. w. silty bands.	8	7										
761	1	5	8	Siltstone, grey, sandy.	5	1										
764	1	3	0	Siltstone, grey.	2	8										

Hole completed

Typed 19.8.53

COMMONWEALTH OF AUSTRALIA
Bureau of Mineral Resources, Geology and Geophysics

Area: State Reserve Ravensworth. Hole No: BMR 2(S)

Elevation: 321.3'

Reference: BMR Records 1953/133

Datum: Standard

Begun: 10.4.53

Finished: 5.6.53

Depth: 764'1"

COAL DETAIL (1"-2")

III V FC Ash BThU
4.1 31.3 47.4 17.2 11,410

No.1

4.4 34.0 51.3 10.3 12,580

No.2

3.7 32.5 56.2 7.6 13,150

No.3

3.6 33.9 50.7 11.3 12,590

No.4

3.6 33.0 52.3 10.6 12,800

No.5

3.3 35.5 52.3 7.9 13,240

No.6

4.0 36.0 56.2 3.3 13,320

No.7

III V FC Ash BThU
3.5 30.7 54.7 11.1 12,730

No.8

3.9 33.4 56.8 5.9 13,460

No.9

3.6 33.1 56.8 6.5 13,480

No.10

3.3 30.6 53.1 5.0 13,700

No.11

47' 11 "

50' 7 "

51' 4 "

52' 6 "

52' 10 "

64' 3 "

66' 3 "

66' 7 "

167' 8 "

170' 3 "

259' 6 "

262' 2 "

262' 3 "

263' 6 "

263' 7 "

266' 6 "

267' 7 "

323' 10 "

325' 0 "

325' 1 "

327' 3 "

328' 9 "

330' 10 "

381' 1 "

382' 1 "

386' 2 "

386' 7 "

Siltstone
(no coal)

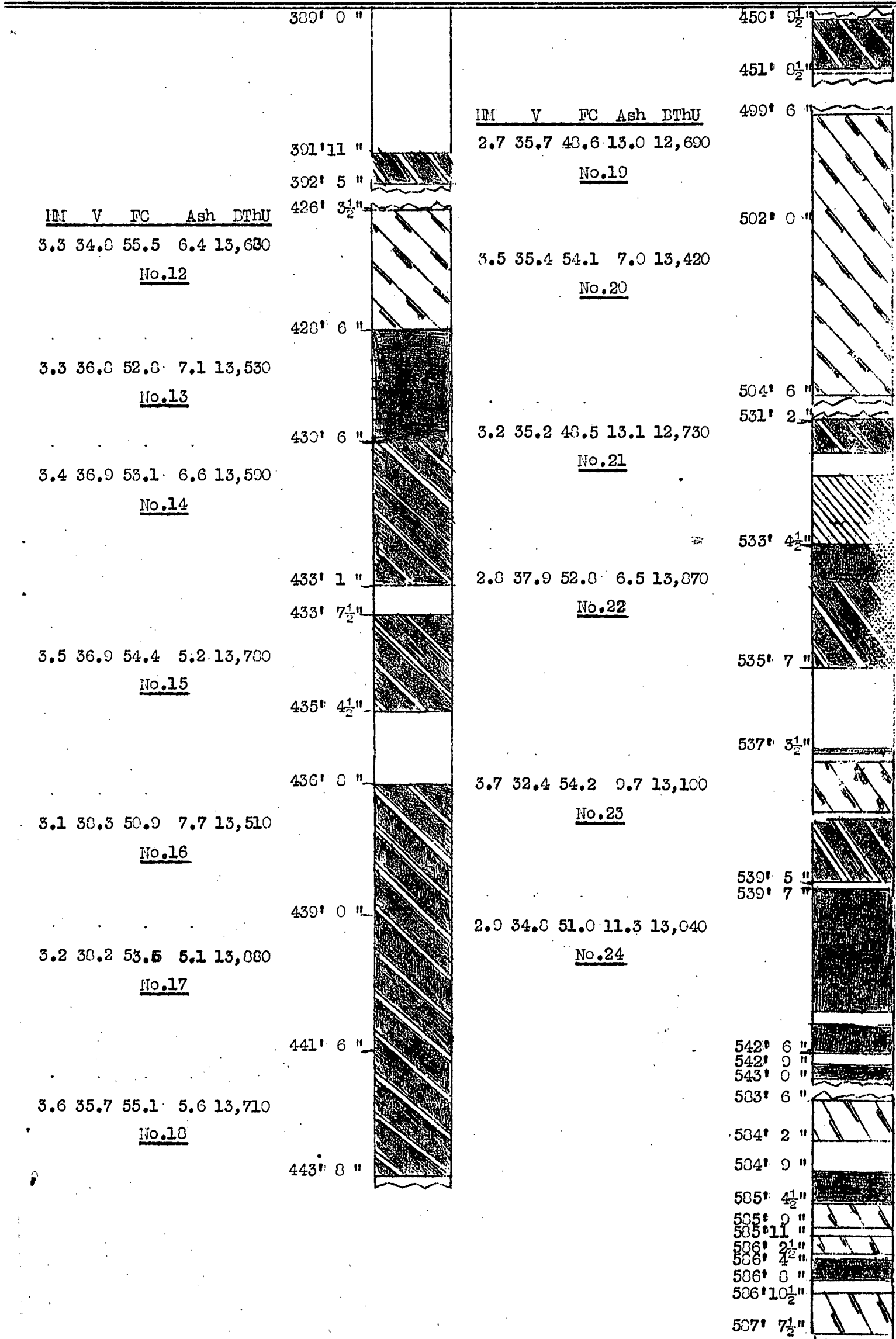
388' 10 "

388' 11 "

389' 31 "

389' 42 "

COAL DETAIL (1"=2')



BUREAU OF MINERAL RESOURCES

Name and No. of Bore BMR 3S STATE MINE RESERVE, RAVENSWORTH

Cessnock		Name and No. of Bore	
DISTRICT	Muswellbrook	COUNTY	Durham
PARISH	Liddell	PORTION	26
LOCATION	209 yds. NW Corner Per. 26	232 yds. SW Corner Per. 26	
Surveyed by	R.W. Archer	Survey Method	Theodolite Traverse
Elevation	182.8'	Ref. Map	Liddell Parish Map
Logged by	W. McKinnon & S. Henderson	Cased	No
Datum	Standard	Ref. Report	1953/133
Sunk by	BMR	Type of Drill	Failing 1500/1316
Depth	558' 10"	Date Begun/Finished	17.4.53 / 1.5.53

[illegible]

[illegible]

Name and No. of Bore

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included	Miner. Bands Excluded	PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.				H.M.	V.	F.C.	ASH	B. TH U/LB
369	1	2	7½	COAL, bright banded.	2	7½	)16/BMR			2.5	37.8	54.9	4.8	14,000
369	6		5	Shale, black carbonaceous, pyritic.		5								
370	3		9	Siltstone, dark grey.		9								
376	9	6	6	Greywacke, light gy. f. to m. grd. with bands of carbonaceous matters.	6	3								
377	0		3	Shale, black carbonaceous.		3								
377	2		2	Siltstone, dark brown sideritic.		2								
378	3	1	1	COAL, bright banded shaly in part.		11								
416	9	38	6	Greywacke l. gy. f. to m. grd. w. bds. of bk. gy. slst. carb. at bottom.	38	4								
417	0		3	COAL, mainly bright somewhat shaly.		3	}17/BMR			2.2	35.7	49.1	13.0	12,720
417	1		1	Shale, black carbonaceous.		1								
420	9	3	8	COAL, dull with bright bands, shaly at base.	3	7	)18/BMR			2.8	34.3	55.2	7.7	13,420
423	3	2	6	Claystone, dk. gy. w. coaly bands.	2	3								
423	6		3	Shaly black carbonaceous, cleated.		3								
423	8		2	Siltstone, br. gy. sideritic w. lens of coal.		2								
424	0		4	COAL, mainly bright.		2								
424	1		1	Siltstone, as above.		1								
426	2	2	1	COAL, bright bdd. w. a shale partings ¼	1	6								
427	5	1	3	Siltstone, dark grey, bedded.	1	3								
427	7		2	Shale, bk. carb. bedded dip 8°.		2								
428	2		7	Siltstone, dk. gy. sandy in places.		7								
475	8	47	6	Greywacke, light grey m. to coarse grd.	47	6								
475	10		2	COAL, mainly dull.		2								
475	10½		1½	Shale, dark grey.		1½								
476	10		11½	COAL, mainly bright banded, broken.		8½								
478	3	1	5	Greywacke, dark grey, medium grained.	1	5								
479	1	10		COAL, mainly bright banded.		10	}19/BMR							
479	2½		1½	Siltstone, dark brown sideritic.		1½								
479	11½		9	COAL, bright banded.		9				3.1	35.8	53.7	7.4	13,380
480	0		1½	Siltstone, dark brown sideritic.		1½								
481	0	1	0	COAL bright bdd. w. a ¼" shale band.	1	0								
481	1½		1½	Siltstone, as above.		1½								
483	0	1	10½	COAL, bright banded.	1	10½	)20/BMR			3.0	35.2	55.4	6.4	13,550
483	6		6	Siltstone, light brown sideritic with coaly bands.		6								

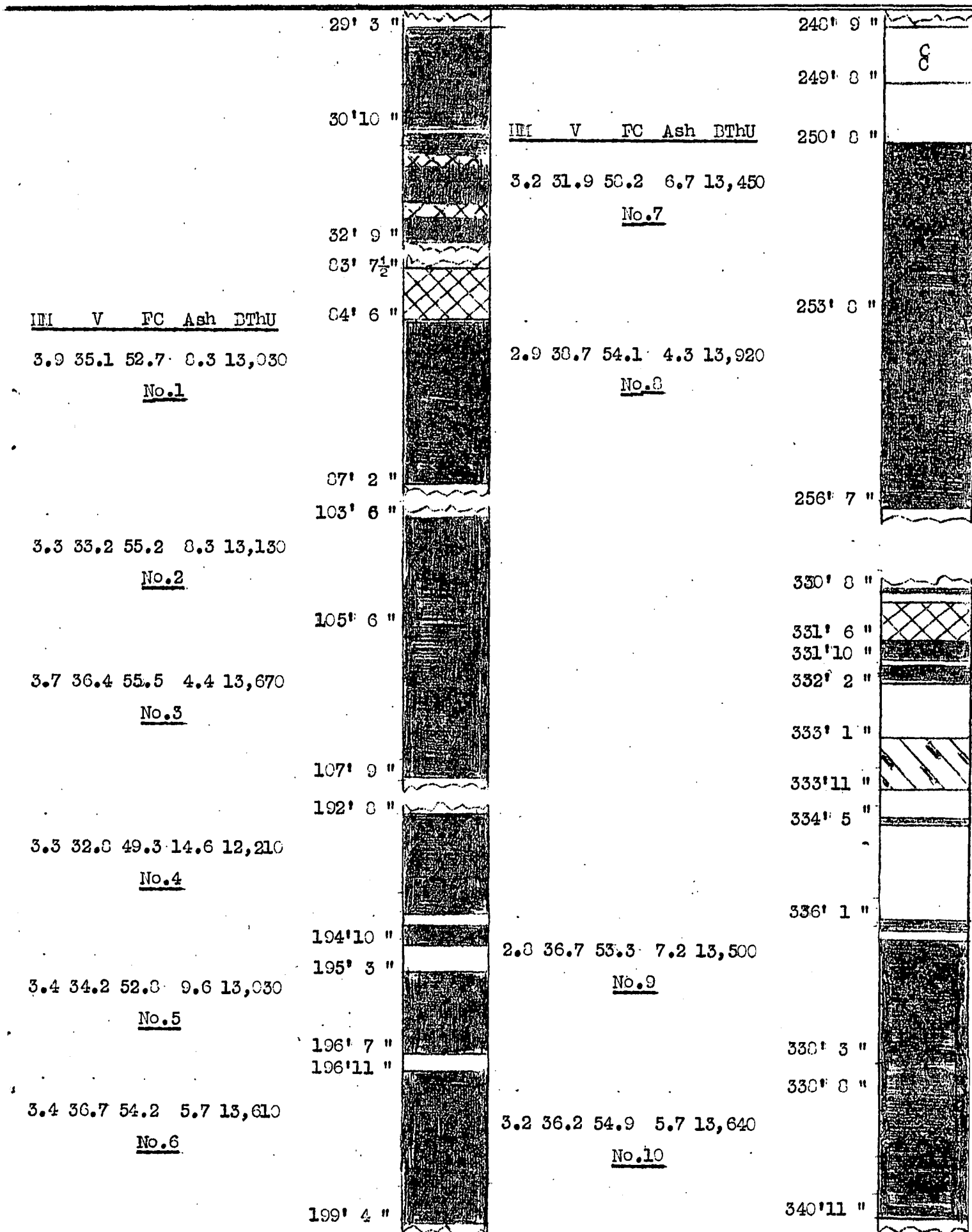
Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS					
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB	
484	9	1	3	COAL, dull and bright banded, broken.	1	3	21/BMR					2.8	35.5	53.6	8.1	13,360	
485	0		3	Greywacke, gy. m. grd. with coaly bands.		3											
499	2	14	2	Greywacke, l. gy. m.grd. stained by limonite in parts.	14	2											
507	10	8	8	Greywacke, m. grd. l. gy. bkn. parts.	5	7											
511	9	3	11	Greywacke, m. grd. w. c. grd. bds. l. gy. thin coal lenticles limonite staining.	3	10											
514	2	2	5	Greywacke, v. f. grd. silty grev.	2	4											
516	4	2	2	Greywacke, f. grd. l. gy. w. silty bds.	2	2											
524	10	8	6	Greywacke, m. grd. l. gy. some limonite staining.	8	6											
532	0	7	2	Greywacke, m. grd. l. gy. limonite staining.	8	5											
538	0	6	0	Greywacke, m. grd. gy. w. silty. streaks.	5	5											
540	9	2	9	Siltstone, grey, hard.	2	7	22/BMR					2.7	35.0	52.1	10.2	13,060	
541	3		6	Siltstone, carbonaceous.		4½											
541	4		1	COAL, bright, broken.		1											
542	3	11		COAL, bright with dull bands.		9											
542	7		4	COAL, dull w. bright bands, soft.		4											
543	1½		6½	COAL, dull & bright bdd. calcite veining.		5½											
543	2½		1	Siltstone, grey brown, hard.		1											
543	8½		6	COAL, dull & brt. bdd. calcite veining.		6											
543	10		1½	Siltstone, grey.		1½											
543	11		1	COAL, shale w. small granules.		1		23/BMR					2.7	34.1	52.0	11.2	12,910
545	0	1	1	COAL, bright w. dull bds. calcite veining.	1	0											
545	10		10	Greywacke, f. grd. gy. w. t. coaly streaks		10											
548	1	2	3	Siltstone, gy. with thin bds. of dull coal interbedded.	2	3											
548	10		9	Greywacke, fine grained, grey.		9											
550	4	1	6	Greywacke, medium grained, light grey.		6											
556	2	5	10	Greywacke, medium grained, grey.	5	10											
557	6	1	4	Greywacke, f. grd. & v.f. grd. bands sideritic.	1	4											
558	10	1	4	Greywacke, medium grained, light grey.	1	4											
Hole completed																	
												Typed 20.8.53.					

COMMONWEALTH OF AUSTRALIA

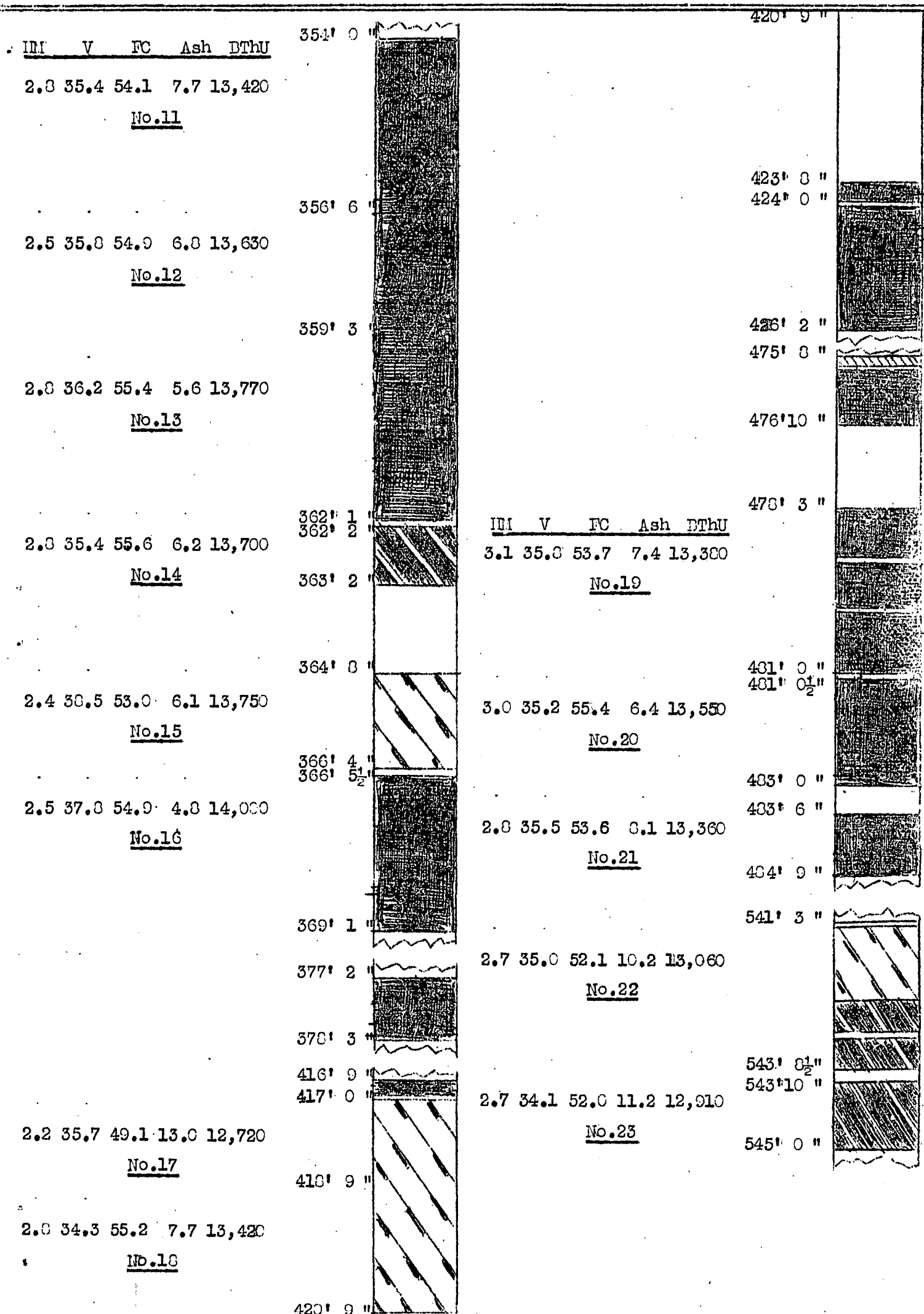
Bureau of Mineral Resources, Geology and Geophysics

Area: State Reserve, Ravensworth. Hole No: BMR 3(S) Elevation: 102.0'
 Reference: BMR Records 1953/135 Datum: Standard
 Begun: 17.4.53 Finished: 1.5.53 Depth: 550'10"

COAL DETAIL (1"=2')



COAL DETAIL (1"=2')





RAVENSWORTH TRIG.

RAVENSWORTH TRIE.

Intervals of analysed coal samples

BMR Bore No.	Analysis No.	BMR Sample No.	Intervals					
1SC	2317	1	134'	11 "	-	136'	6 "	
	2318	2	136'	6 "	-	138'	6 "	
	2319	3	139'	2 $\frac{1}{2}$ "	-	142'	2 $\frac{1}{2}$ "	
	2320	4	142'	2 $\frac{1}{2}$ "	-	145'	2 "	
	2321	5	198'	1 "	-	200'	7 $\frac{1}{2}$ "	
	2322	6	201'	2 $\frac{1}{2}$ "	-	203'	4 $\frac{1}{2}$ "	
	2323	7	282'	5 $\frac{1}{2}$ "	-	285'	2 $\frac{1}{2}$ "	
	2324	8	285'	2 $\frac{1}{2}$ "	-	287'	6 "	
	2325	9	379'	2 "	-	381'	5 "	
	2326	10	381'	5 "	-	382'	8 "	
	2327	11	382'	8 "	-	384'	8 "	
	2328	12	384'	8 "	-	387'	4 "	
	2329	13	456'	6 $\frac{1}{2}$ "	-	458'	6 $\frac{1}{2}$ "	
	2330	14	458'	6 $\frac{1}{2}$ "	-	460'	8 $\frac{1}{2}$ "	
	2331	15	460'	8 $\frac{1}{2}$ "	-	462'	2 "	
	2332	16	506'	0 $\frac{1}{2}$ "	-	509'	6 "	
	2333	17	509'	6 "	-	512'	6 "	
	2334	18	592'	1 "	-	594'	6 "	
	2335	19	594'	6 "	-	596'	7 "	
	2336	20	596'	7 "	-	598'	6 "	

BUREAU OF MINERAL RESOURCES

Name and No. of Bore BMR 1S.C.Ravenswerth Trig.

Cessnock-		DP6997		1015 yds. SW Corner Lot 3c	
DISTRICT Muswellbrook	COUNTY Durham	PARISH Liddell	PORTION Lot 3c	LOCATION	16 yds. NE from Rav. Trig.
Surveyed by N. Gorbunow	Survey Method	Theodolite Traverse	Elevation	441.9'	Ref. Map N 14-121
Logged by S.D. Henderson & M.A. Rey	Cased	No	Datum	Standard	Ref. Report Records 1953/133
Sunk by BMR	Type of Drill	Failing 1500	Depth	1216'	Date Begun/Finished 13.5.53/5.8.53

[illegible]

[illegible]

Name and No. of Bore

[illegible]

[illegible]

Name and No. of Bore

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
381	5	2	3	COAL, dull w. bright bds. shattered	2	3	9/BMR					2.3	33.7	51.1	7.9	13,450
382	8	1	3	COAL dull w. bright bds.	1	1	10/BMR					2.5	34.6	46.2	16.7	11,840
384	8	2	0	COAL powdered, dull	1	10	11/BMR					2.2	33.0	50.7	9.1	13,110
386	6	1	10	COAL dull & bright bdd., broken	1	7 1/2										
386	9	0	3	Siltstone sideritic w. carb. bds.	0	2	12/BMR		2			2.4	35.9	52.4	9.3	13,060
387	4	0	7	COAL dull w. bright bds.	0	6 1/2										
394	0	6	8	Siltstone l. gy.	5	10										
394	8	0	8	Greywacke v. f. grd. gy.	0	8										
394	11	0	3	Clay-ironstone gy. br.	0	2 1/2										
395	0	0	1	Siltstone gy.	0	1										
395	3	0	3	Clay-ironstone gy. br.	0	2 1/2										
399	5	4	2	Siltstone gy.	4	2										
400	1	0	8	Clay-ironstone dk. br.	0	8										
403	3	3	2	Siltstone gy.	3	2										
403	7	0	4	Clay-ironstone br. w. sd. streaks	0	3										
404	5	0	8	Claystone l. br. s. w. coal fragments	0	5										
406	0	1	7	COAL dull w. bright bds.	1	7										
406	4	0	4	Siltstone gy. w. coal streaks	0	4										
412	11	6	7	Greywacke l. gy. f. grd. w. t. silty bds.	6	7										
421	4	8	5	Greywacke f. grd., whitish	8	5										
430	7	9	3	Greywacke n. f. grd. whitish	9	3										
439	11	9	4	Greywacke n. f. grd. whitish	9	4										
448	6	8	9	Greywacke n. grd. whitish	7	7										
454	8	6	2	Greywacke n. grd. to v. f. grd. l. gy.	6	2										
456	6 1/2	1	10 1/2	Siltstone dk. gy.	1	9										
456	11 1/2	0	5	COAL dull	0	5										
457	6 3/4	0	7	COAL dull bright bdd.	0	6	13/BMR					2.1	37.2	48.5	12.2	12,850
458	6 1/4	1	0	COAL bright w. t. dull bds.	1	0										
460	8 1/2	2	2	COAL mainly bright	2	2	14/BMR					2.2	37.8	50.8	9.2	13,360
461	3 1/2	0	7	COAL bright w. t. dull bds.	0	7				0 3/4						
462	2	0	10 1/2	COAL mainly bright	0	10 1/2	15/BMR					2.3	35.1	52.0	10.6	13,150
462	8	0	6	Siltstone w. carb. & sd. bds.	0	6										
463	6	0	10	Shale dk. gy. w. plants	0	10										

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Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
513	10	0	8	COAL bright & dull bdd.	0	8										
513	11 $\frac{1}{2}$	0	11 $\frac{1}{2}$	Claystone dk.br.coaly tuff,?	0	11 $\frac{1}{2}$										
514	1	0	1 $\frac{1}{2}$	COAL dull & bright, shy.	0	1 $\frac{1}{2}$										
515	6	1	5	Siltstone l.gy.hd.	1	5										
523	3	7	9	Siltstone gy.w.sdy.bds.	7	9										
531	6	8	3	Siltstone gy.sdy.w.t.bds.of f.grd.gw.	8	3										
536	3	4	9	Siltstone gy.sdy.	4	7										
537	11	1	8	Siltstone gy.& gw.f.grd.intb.	1	8										
541	11	4	0	Greywacke m.grd.whitish	4	0										
542	3	0	4	Conglomerate f.	0	4										
545	5	3	2	Greywacke m.grd.l.gy.	3	2										
546	10	1	5	Conglomerate f.	1	5										
553	3	6	5	Greywacke m.grd.gy.	6	5										
562	9	9	6	Greywacke m.grd.whitish	9	1										
565	9	3	0	Greywacke m.grd.whitish	3	0										
574	3	8	6	Greywacke m.f.grd.l.gy.w.silty bds.	8	6										
580	6	6	3	Greywacke m.f.grd.l.gy.w.silty bds.	6	0										
581	6	1	0	Greywacke m.grd.l.br.	1	0										
587	11	6	5	Greywacke m.grd.whitish	6	5										
590	3	2	4	Greywacke f.grd.gy.& slst.gy.w. plants intb.	2	4										
591	2	0	11	Siltstone l.gy.hd.;sdy.	0	8										
592	1	0	11	Siltstone gy.w.v.t.coaly streaks	0	8										
592	9	0	8	COAL hd.dull	0	6										
592	11 $\frac{1}{2}$	0	2 $\frac{1}{2}$	Claystone br.tuff.?	0	2										
593	0	0	6 $\frac{1}{2}$	COAL dull	0	0 $\frac{1}{2}$										
593	11 $\frac{1}{2}$	0	11 $\frac{1}{2}$	Claystone, br.silty tuff.?	0	1	18/BMR					2.1	36.6	54.1	7.2	13,670
593	6 $\frac{1}{2}$	0	5	COAL dull & bright bdd.	0	4										
593	9 $\frac{1}{2}$	0	3	Claystone br.,silty tuff.?	0	2				2						
594	6	0	8 $\frac{1}{2}$	COAL dull to bright,bdd.	0	5										
596	7	2	1	COAL, dull to bright,broken & shattered bds.	1	7	19/BMR					2.0	37.3	55.6	4.6	14,100

[illegible]

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included	Miner. Bands Excluded	PROXIMATE ANALYSIS					
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.				Ft.	Ins.	Ft.	Ins.	H.M.	V.
674	0	7	1	Greywacke m.f.grd. w.t.v.f.grd.bds.	6	10									
683	0	9	0	Greywacke m.grd.& f.grd.,slst.gy. intb.	9	0									
692	0	9	0	Siltstone gy. hd.,w.bds.of gw.f.grd.	9	0									
696	1	4	1	Siltstone gy.hd.	4	1									
700	6	4	5	Claystone, whitish	4	5									
702	0	1	6	Siltstone gy.broken	1	0									
702	6	0	6	Claystone whitish	0	3									
704	0	1	6	Siltstone gy.broken	1	0									
705	8	1	8	Siltstone gy.shy.	1	7									
707	9	2	1	Siltstone dk.gy.	2	0									
709	4	1	7	Greywacke f.grd.l.gy.	1	6									
713	4	4	0	Greywacke m.f.grd.gy.,v.hd.l.gy.	4	0									
713	10	0	6	Greywacke m.grd.gy.	0	6									
718	4	4	6	Greywacke m.grd.gy.w.t.silty bds.	4	0									
720	8	2	4	Greywacke f.grd.gy.w.bds.of slst.gy,	2	4									
723	3	2	7	Greywacke m.grd.l.gy.w.bds.of gw.f.grd.	2	0									
725	8	2	5	Greywacke m.grd.gy.	1	10									
728	9	3	1	Greywacke m.& f.grd.gy.w.slst.bds.	2	2									
730	9	2	0	Siltstone gy.	0	3									
740	2	9	5	Siltstone dk.gy.sdy.	9	3									
740	10	0	8	Siltstone gy.	0	8									
743	6	2	8	Greywacke f.grd.gy.w.silty bds.	2	8									
750	0	6	6	Siltstone gy.w.sdy.bds.& shy.bds.	6	6									
753	5	3	5	Siltstone gy.	3	5									
753	10	0	5	Greywacke m.f.grd.sideritic l.gy.	0	5									
757	4	3	6	Greywacke m.f.grd. gy.	3	4									
766	4	9	0	Greywacke m.f.grd. gy.w.silty bds.	6	9									
768	4	2	0	Greywacke m.f.grd.gy.	0	8									
769	4	1	0	Siltstone gy.shy.	0	4									
773	0	3	8	Greywacke m.f.grd. gy.	1	3									
780	0	7	0	Greywacke m.f.grd.l.gy.& slst.gy.intb.	6	9									
782	1	2	1	Siltstone gy.w.bds.of f.grd.gw.	2	1									

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Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
905	10	9	3	Greywacke finely intb. l.gy.-gy.v.f.-f.grd. & gy.slst., ?hieroglyphic structures in bds.; c.grd.sdy.to pbly.over bot. 8"; t. bdd.carb. nat.	9	3										
913	8	7	10	Greywacke, l.gy., c.grd. at top to m.grd. w.irregular gy.slst.lenses towards bot.	7	10										
936	10	23	2	Greywacke l.gy.; m.grd., w.t.gy.slst.bds.	23	2										
954	6	17	8	Greywacke l.gy.-gy.f.grd.w.t.gy.slst.bds.	17	8										
1031	7	127	1	Greywacke l.gy.n.to c.grd.in t.bds., w.t. bds. & lenses of f.-v.f.grd.gw. & slst. w.t.bdd. carb. nat.	115	7										
1137	11	56	4	Siltstone intb.gy. & f.-v.f.grd.gw., w.t. bdd.carb. nat.& some ?hieroglyphics as above, fractd.in part w. v.small fault	53	2										
1143	7	5	8	Greywacke, gy.v.f.grd., w.t.slst.bds.	5	8										
1216	0	72	5	Siltstone, dk.gy., w.pyr.modules, fractd. in part; a few microfossils were found, slightly sdy.near bot.; 2 v.t.bds. l.br.	61	2										
				Hole completed.	typed 2.2.54.											

COMMONWEALTH OF AUSTRALIA
Bureau of Mineral Resources, Geology and Geophysics

Area: Ravensworth Trig. Hole No: BMR 1(SC) Elevation: 441.9'
Reference: BMR N14-121, January, 1954 Datum: Standard
Begun: 13.5.53 Finished: 5.3.53 Depth: 1216'0"

COAL DETAIL (1"-2')

IM V FC Ash BThU
2.9 34.4 53.7 9.0 13,070

No.1

2.5 37.2 50.4 9.9 12,990

No.2.

2.3 30.6 52.7 13.9 12,200

No.3

2.9 35.7 54.1 7.3 13,310

No.4.

3.0 30.0 49.2 17.8 11,500

No.5

IM V FC Ash BThU
2.6 34.4 43.9 13.9 12,110

No.6

2.3 32.7 58.0 6.5 12,990

No.7

2.6 34.2 55.4 7.6 12,760

No.8

2.3 38.7 51.1 7.9 13,450

No.9

2.5 34.6 46.2 16.7 11,840

No.10

201' 2 1/2"
201' 4 1/2"
201' 7 1/2"
202' 1 1/2"

203' 4 1/2"
203' 6 1/2"

204' 5 1/2"

208' 7 1/2"
208' 6 1/2"

209' 1"

209' 7"

211' 1"

202' 5 1/2"

205' 2 1/2"

206' 2 1/2"

206' 7 1/2"

207' 6"

379' 2"

381' 5"

382' 8"

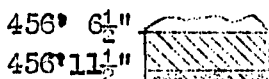
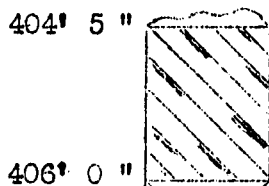
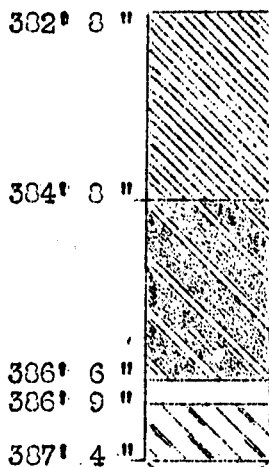
COAL DETAIL (1"-2')

HEI V FC Ash BThu
2.2 38.0 50.7 9.1 13,110

No.11

2.4 35.0 52.4 9.3 13,060

No.12

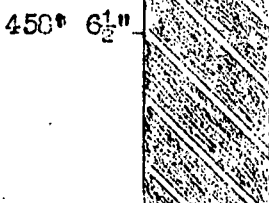


2.1 37.2 48.5 12.2 12,850

No.13

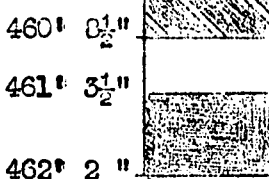
2.2 37.8 50.8 9.2 13,360

No.14



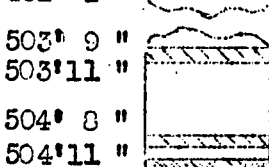
2.3 35.1 52.0 10.6 13,150

No.15



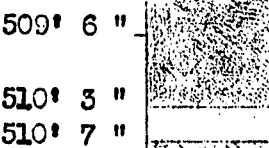
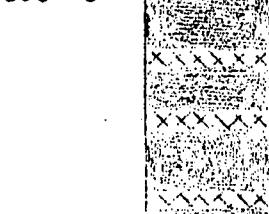
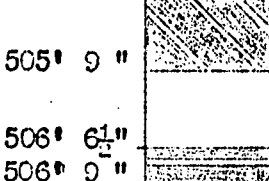
2.1 37.3 48.1 12.5 12,720

No.16



2.2 34.0 51.5 11.4 12,940

No.17



HEI V FC Ash BThu
2.1 36.6 54.1 7.2 13,670

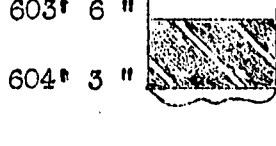
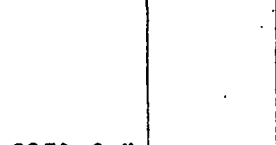
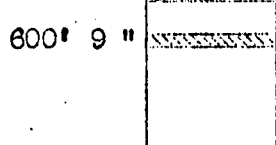
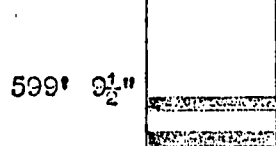
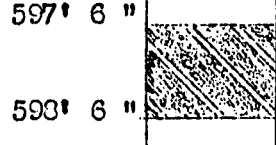
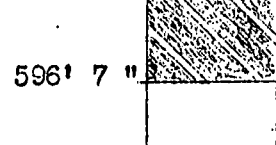
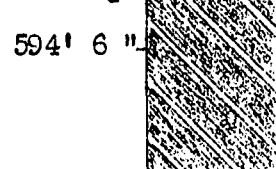
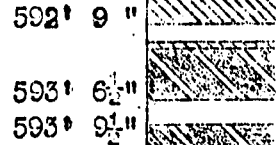
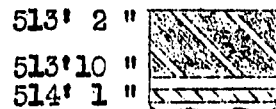
No.18

2.0 37.8 55.6 4.6 14,100

No.19

1.9 38.1 54.7 5.3 14,030

No.20



ST . H E L I E R S

S T. H E L I E R S

Intervals of analysed coal samples

BMR Bore No.	Analysis No.	BMR Sample No.	Intervals				
1SC	2922	1	1517'	8 "	-	1520'	3 "
	2923	2	1320'	3 "	-	1322'	9 "
	2924	3	1340'	7 "	-	1343'	6 "
	2925	4	1378'	0 "	-	1381'	0 "
	2926	5	1381'	0 "	-	1384'	0 "
	2927	6	1384'	0 "	-	1386'	3 "
	2928	7	1386'	3 "	-	1388'	6 "
	2929	8	1443'	7 "	-	1445'	5 "
	2930	9	1445'	5 "	-	1447'	4 "
	2931	10	1463'	4 "	-	1466'	4 "
	2932	11	1466'	4 "	-	1469'	4 "
	2933	12	1469'	4 "	-	1472'	4 "
	2934	13	1472'	4 "	-	1475'	4 "
	2935	14	1475'	4 "	-	1478'	4 "
	2936	15	1478'	4 "	-	1481'	0 "
	2937	16	1481'	0 "	-	1483'	0 "
	2938	17	1483'	0 "	-	1484'	7 "
	2939	18	1484'	10 "	-	1487'	10 "
	2940	19	1487'	10 "	-	1490'	10 "
	2941	20	1490'	10 "	-	1493'	10 "
	2942	21	1493'	10 "	-	1496'	10 "
	2943	22	1496'	10 "	-	1499'	10 "
	2944	23	1499'	10 "	-	1502'	10 "
	2945	24	1502'	10 "	-	1505'	10 "
	2946	25	1505'	10 "	-	1508'	10 "
	2947	26	1508'	10 "	-	1511'	10 "
	2948	27	1511'	10 "	-	1514'	0 "
	2949	28	1514'	0 "	-	1516'	0 "
	2950	29	1516'	0 "	-	1517'	4 "
	2951	30	1560'	7 "	-	1562'	7 "
	2952	31	1562'	7 "	-	1565'	0 "
	2953	32	1565'	0 "	-	1567'	3 "
	2954	33	1575'	5 "	-	1577'	11 "
	2955	34	1612'	10 "	-	1615'	10 "
	2956	35	1628'	8 "	-	1630'	8 "
	2957	36	1630'	8 "	-	1632'	8 "

BUREAU OF MINERAL RESOURCES

Name and No. of Bore BMR ISC ST. HELIERS

DISTRICT	Muswellbrook	COUNTY	Durham	PARISH	Rowan	PORTION	LOCATION	921156
Surveyed by	Not surveyed	Survey Method	Not surveyed	Elevation	595'	Ref. Map	Scone Military 1 Mile Map	
Logged by	M. A. Reynolds/ H. S. Taylor-Rogers	Cased	No	Datum	Standard	Ref. Report	1953/133	
Sunk by	BMR	Type of Drill	Failing 2500	Depth	1758' 6"	Date Begun/Finished	14/7/53-4/11/53	

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
12	0	12	0	Alluvium: br. cl. & some silt w. sd. & rock gravel; grs. & gravel generally l. col. (colourless wh. br. gy. red, bl. gn. etc.) ang. w. some Xal faces preserved. Comp. of cuttings samples: Approx. 75% cl. & silt, 25% sd. & gravel. R. small pieces of coal found. Foss.; <u>Ammodiscus multicaucus</u> & other forams found & regarded as remanie.												
17	0	5	0	Sand l. col. as above, v.f. to c. gr. w. some cl. pbls. & gravel recorded by driller. Foss. as above								0'	- 21' 9"			Drilled
20	0	3	0	Siltstone, l. br.-gy. wd. fo. s. (see below)								21' 9"	- 25' 6"			Cored
22	0	2	0	Sand, as above 5', mostly f. gr.								25' 6"	- 45' 6"			Drilled
78	3	56	3	Siltstone, gy. & br. wd. for approx. 10' to dk. gy. sdy. in part, some pbls. mic. irregular sh.-like cleavage in t. bds. Some fracturing; dip of fract. planes var. Slickensides not pronounced. After exposure core develops irregular f. cracks, the more continuous of which are generally dipping 45°-50° & approx. parallel. Another set of f. cracks is developed at right angles to the above & forms a discontinuous jointing pattern. Fossils: Forams, Bryozoa, brachiopoda, mollusca, ostracoda, crinoid stems.	25	6						45' 6"	- 78' 3"			Cored
Remarks: Pbls. generally are igneous rocks w. phenocrysts of qtz. & plagioclase in an aphanitic ground mass; flow structure is shown in thin section. An irregularly shaped piece of calcite & other rock types have been noted. (Calcite fragment resembles a small fragment of a Glendonite).																

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
138	9	60	6	Greywacke, dk. gy.-gy. v. f. gr. w. irregular lenticles of dk. gy slst. & gy. f.gr. gy. to dk. gy. sdy. slst. occasional pbls. v. mic. pyr. hieroglyphic structures formed in t. bds. bedding is irregular due to lensing as above but generally the dip conforms to that of the cracks developed on exposure as in the slst. above. Foss. as in slst. above to v. foss. from 134' to 138'9".	48	5					<u>Remarks.</u>	78'3"-81'9" Drilled.				
												81'9"-322'3" Cored.				
												Microscope examination of samples from 92'-98'6" & 99'8" revealed the presence of small amounts of carb. mat.				
139	9	1	0	Shale, gy. to off-wh. cly. tuff. w. t. impure lst. bd. at bot. (cone-in-cone structure	1	0										
158	6	18	9	Siltstone, dk. gy. w. sdy. lenticles as above over top 2'; sd. (f. to v.c. gr.) & pbls. w. occasional cobbles common	14	2										
258	0	99	6	Greywacke, gy. & dk. br. gy. mot. v.f. to f. gr. mostly, but m. to v. c. gr. sds. pbls. & cobbles are present & comprise about 15% of the sediments at the top. The percent of f. gr. mtx. decreases towards the bot. Argill. to silty; unstratified & unsorted; fri. in part; foss. notably from 223' downwards.	85	1										
284	6	26	6	Greywacke, gy. & dk. br. gy. mot. & as above except that predominantly c. gr. mtx.	19	7										
322	3	37	9	Greywacke, gy. & dk. br. gy. mot. v.c. gr. to f. gr. Cgl. w. argill. to f. gr. sdy. mtx.; unstratified & unsorted; foss.	24	0										
371	0	48	9	Greywacke, wh. to l. gy. mostly f. gr. occasional pbls. (often dk. gy. but gn. & other l. col. pbls. noted); some t. bds. &/or lenses dk.gy. argill to silty sometimes c.gr.sdy.to pbly. consolidated to 354'6"then fri.;core & cuttings react w. acid.	5	0					<u>Remarks:</u>	322'3"-332'4"			Cored	
												332'4"-417'2"				Drilled
												417'2"-420'10"				Cored
												420'10"-502'6"				Drilled
												502'6"-506'6"				Cored
												506'6"-550'11"				Drilled

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
375	6	4	6	Greywacke, gy. m.-c. gr. pbly. argill. to silty												
408	6	33	0	Greywacke, as above 48'9", generally consolidated but v. silty, s. fri. between 393' & 397'												
419	6	11	0	Greywacke, l. gy. v. c. gr. pbly. to f.-m. gr. Cgl. w. bds. & mtx. of gw. as above 48'9"	2	4										
500	6	81	0	Greywacke, wh. to l. gy. f. gr. as above	0	10										
506	6	6	0	Greywacke, gy. c. gr. w. t. pbl. bds. argill. to silty in part; coal fragment noted	2	6										
524	6	18	0	Greywacke, gy.-dk. gy. gr. size varies but mainly m. to f. gr. fri. c. gr. sdy. to pbly.; argill. to silty in part w. f. lam. dk. gy. sh. ^x (slickensided) most prominent at top												
537	6	13	0	Conglomerate mainly w. m.-c. gr. gw.mtx. gy. more consolidated than above												
550	11	13	5	Greywacke, as above 18' w. bd. of sh. ^x & cgl. between 547'6" & 549'6". S. fri. below 549'6"												
552	7	1	8	Conglomerate, gy.-dk. br. gy. mot. f. gr. w. argill. to sdy. mtx.; unstratified & unsorted	1	0										
563	4	10	9	Greywacke (gr. size variable) pbly. & cgl. as above, w. t. bd. sh. ^x at bot.												
565	4	2	0	Greywacke, gy.-dk. br. gy. mot., c. to v.c. gr. pbly.; argill. to sdy. mtx.;foss.	2	0										
623	6	58	2	Greywacke, gy.-dk. gy.; gr. size variable but mainly m.-f. gr. fri. c. gr. sdy. to pbly.; argill. to silty in part w. some sh. ^x lam.; & cgl. w. mtx. of gw. as described												
				x See p.4 (bottom)												
											Microscopic examination of a t. bd. of sh. from this core revealed that it was carb. & contained bright coal frags.					
											Remarks: 550' 11" - 552' 7" Cored 552' 7" - 563' 4" Drilled 563' 4" - 565' 4" Cored 565' 4" - 623' 6" Drilled 623' 6" - 628' 0" Cored					

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
628	0	4	6	Conglomerate as above, f. to m. gr.	3	4										
687	6	59	6	Greywacke as above, generally fri. but more consolidated from 673' to 677'												
761	6	74	0	Greywacke, gy.-dk. gy. mot. as above; mostly f. gr.; pbly. sometimes in t.bds. some t. bds. &/or lam. of sh. ^x ; occasional foss. fragments noted from 731'6" to 753'6"	3	6										
806	3	44	9	Greywacke, dk. gy. mostly f. to v. f. gr.; argill. to silty; c. gr. sd. & pbls. common to v. common at bot.; t. bd. sh. ^x 9" above bot.	8	7										
898	0	91	9	Siltstone, dk. gy. f. gr. sdy. in part; c. sd. grs. & pbls. not common, generally unsorted; fractd. or faulted in parts where s. shy. w. some slickensides	55	1										
913	10	15	10	Greywacke, gy. v. f. gr. w. irregular small dk. gy. argill. to silty lenticles common in parts; c. sd. grs. & pbls. as above; dip as estimated from lenticles is 45°-55°	15	4										
920	8	6	10	Greywacke, as above w. numerous argill. to silty lenticles to sdy. slst. gy.-dk. gy.; c. gr. sdy. to pbly. w. some R. bds. cgl.; dip as above	6	10										
947	8	27	0	Greywacke, gy.-dk. gy. (gr. size varying from f. to v.c.) w. pbls. & R. sdy. cgl., argill. to silty; pbls. & cbls. mainly l. coloured, v. hd.	27	0										
994	0	46	4	Greywacke, as above 27' w. intervening bds. of argill. to silty, v. f. gr. gw. w. occasional pbls. Cbls. & one boulder (an erratic measuring 1'6") noted. Strong evidence of faulting is given by steeply dipping cleavage planes (often shy.) w. slickensides & calcite veins (cf. gash veins). The latter noted at 952'8" & between 987'6" & 990'4". Est.hd.	39	4										
x Shale & shy. slst. occur in t. bds. & lam., often slickensided. Where drilled, estimation of exact position and thickness is not possible.																

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
1057	6	63	6	Greywacke, gy. pbly. & R. cgl. w. gw. mtx.; gr. size of gw. variable, but mainly m.-c.gr.; argill. to silty mat. present but less common as from 1034'6" to bot. calc. over this zone. ext. hd.	53	9				Acid		bottle reading @ 1012' - 1 $\frac{1}{2}$ °				
										1057'	6"	-	1061'	2"	Cored	
										1061'	2"	-	1070'	9"	Drilled	
										1070'	9"	-	1149'	4"	Cored	
1086	5	28	11	Conglomerate, gy.-l. gy. f. gr. mainly to m. gr. in parts; mtx. of c. gr. gw. (argill. to silty in some places); calc. fri. in part towards bot. ext. hd.	19	4										
1103	1	16	8	Conglomerate, gy. f. gr. w. c. gr. gw. mtx. to v. c. gr. pbly. gw. over bot. 5'; argill. to silty in part; slightly calc.; 10" boulders at 1090'11" & 1093'9", gn. cbl. at 1094'9"; foss. ext. hd.	16	1										
1135	10	32	9	Greywacke, gy. mostly f.-v.f. gr. pbly. w. dk. gy. argill. to silty lenticles; t. bds. c. gr.; slightly calc. in parts & some t. calcite veins; foss. & 2 foss. pbls. from 1106'11" to 1107'11". ext. hd.	29	4										
1145	8	9	10	Conglomerate, l. coloured (pbls. & cbls. off-wh. l. br. l. gy. & gn. common) f. to m. gr. w. a t. bd. of dk. gy. argill. c. gr. gw. at top; boulder of l. br. & gn. mot. amygdaloidal igneous rock at 1140' ext. hd.	9	10										
1149	4	3	8	Greywacke, wh. to l. gy. v. c. gr. w. bds. of f. gr. cgl. . t. bds. of steeply dipping m. gr. gw. dip as shown by bedding planes is approx. 65°. Ext. hd.	3	8										
1192	1	42	9	Greywacke, wh. f. gr. sub-angular fractd. extremely hd. occ. ptgs. carb. mat.; a few small pbls. pyrite at 1157' 7" about 12" s. loosely cemented all sorted pbl. bed w. pbls. up to $\frac{1}{2}$ ". At 1186'1" a thin (1/16") irreg. ptg. at 45° of f. bright coal; abdt. pyrite, slickens.	28	1				Acid		bottle reading at 1198'6" - 3°				
												Tropari reading at 1200' - 3° @ 3930 AZ				

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
1215	0	22	11	Greywacke, gy. m. gr. p.&s. appnce. qtz. grs. aver. w. A. well rdd. pellets bk. mat. fairly calc. occ. small pbls. strg. m. vert. jtg. occ. ptgs. carb. mat.	20	0						Drilled				
1224	6	9	6	Greywacke, gy. m. gr. gritty v. hd. w. occ. 2" bds. small pbl. cgl.	3	3										
1225	3	0	9													
1245	4	20	1	Greywacke, f. m. gr. bl.-gy. v. hd. mass. w. scattered ang. pbls. s. shwg. peripheral altn. s. cl. pbls.	12	5										
1261	8	16	4	Conglomerate, gy. v. hd. mass. well rdd. v. brkn.	2	4										
1263	8	2	0	Greywacke, bk. v. f. gr. completely shattered & heavily slickens, dip apparently vertical	2	0										
1274	2	10	6	Shale, bk. s. v. heavily shattered & slickens. Two frags. wh. conglie. gr.	0	6										
1285	7	11	5	Shale, bk. coaly, v. bkn. occ. ptgs. bright coal s. calc. veining s. irnst. strg. slickens	4	4						Dip - 25°				
1290	1	4	6	Greywacke, dk. gy.-bk. v. f. gr. shy. v. well bdd. strg. irreg. jtg. slickens	3	9						Good dip 25°				
1293	6	3	5	Greywacke, l. gy. m. gr. partly bdd. w. f. ptgs. bk. shy. & carb. mat. ang. chert frags. strg. jtg. s. slickens	3	5										
1294	2	0	8	Greywacke, dk. gy. v. f. gr. bdd. w. plant remains, carb.	0	8										
1296	4	2	2	Greywacke, gy.-br. m.-c. gr. v. hd. ptgs. carb. mat. strg. jtg. w. slickens, many irreg. sh. lenses & ptgs. in top 12"	2	2										
1296	10	0	6	COAL bk. bright w. bdd. irreg. calc. veining A. pyrite	0	6										
1303	10	7	0	Greywacke, f. gr. w. bdd. v. f. carb. s. jtg. & slickens, w. A. pyrite wh. talcy subs. on slickens faces	6	10						Good dip 40°				

[illegible]

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
1402	8	3	0	Shale, bk. v. carb. & coaly, w. c. xln. calc. plane in vert. axis	3	0										
1403	6	0	10	Greywacke, gy. bn. m.-c. gr. v. felspathic s. w. half core in calc. as above	0	10										
1407	6	4	0	Greywacke, bk. v. arg. f. gr. few t. ptgs. bright coal bdd. v. shattered & slickens, A. v. f. calc. veins	4	0										
1419	4	11	10	Greywacke, wh. m. gr. ptly. bdd. A. f. carb. & coaly ptgs. stg. jtg. s. slickens v. stg. vert. calc. veining ($\frac{1}{2}$ " wide) in bot. 2'6". Ex. sm. sc. faulting	11	10										
1428	6	9	2	Greywacke, bk. v. arg. ptly. bdd. w. occ. lenses m. gr. l. gy. gw. s. stg. slickens w. calc. on faces	9	2										
1443	7	15	1	Greywacke, m.-c. gr. rough text. ptly. bdd. w. ptgs. bright coal, vert. jtg. v. calc.	15	1										
1445	5	1	10	COAL, mainly dull bdd. occasionally bright bds.	1	10	8/BMR 9/BMR					1.7	33.7	55.9	8.7	13,330
1447	4	1	11		1	11						1.7	36.2	56.6	5.5	13,830
1449	6	2	2	Greywacke, bk. v. f. gr. well bdd. ang. w. coaly ptgs.	2	2						Dip	37°			
1450	10	1	4	COAL, mainly dull, bdd. s. bright bds.	1	4						Dip	37°			
1453	2	2	4	Shale, bk. bdd. carb. w. plant remains	2	4										
1457	1	3	11	Greywacke, gy. f. gr. bdd. w. carb. ptgs. & occ. thin sh. bds.	3	11										
1463	4	6	3	Greywacke, as above becoming gradually into c. gr. over last 15"	6	3						Dip	35°			
1466	4	3	0	COAL, mainly dull, few bright bds., broken Occ. thin $\frac{1}{2}$ " sh. bds. occ. A. pyrites	3	0	10/BMR					1.5	36.1	49.8	12.6	12,800
1469	4	3	0		3	0	11/BMR					1.6	36.3	52.6	9.5	13,240
1472	4	3	0		3	0	12/BMR					1.6	41.2	53.3	3.9	14,170
1475	4	3	0		3	0	13/BMR					1.7	36.8	56.0	5.5	13,920
1478	4	3	0		3	0	14/BMR					1.8	35.6	55.4	7.2	13,560
1481	0	2	8		2	8	15/BMR					1.7	39.9	53.8	4.6	14,050
1483	0	2	0		2	0	16/BMR					1.7	39.6	54.3	4.4	14,180
1484	7	1	7		1	7	17/BMR					1.8	37.2	53.3	7.7	13,570

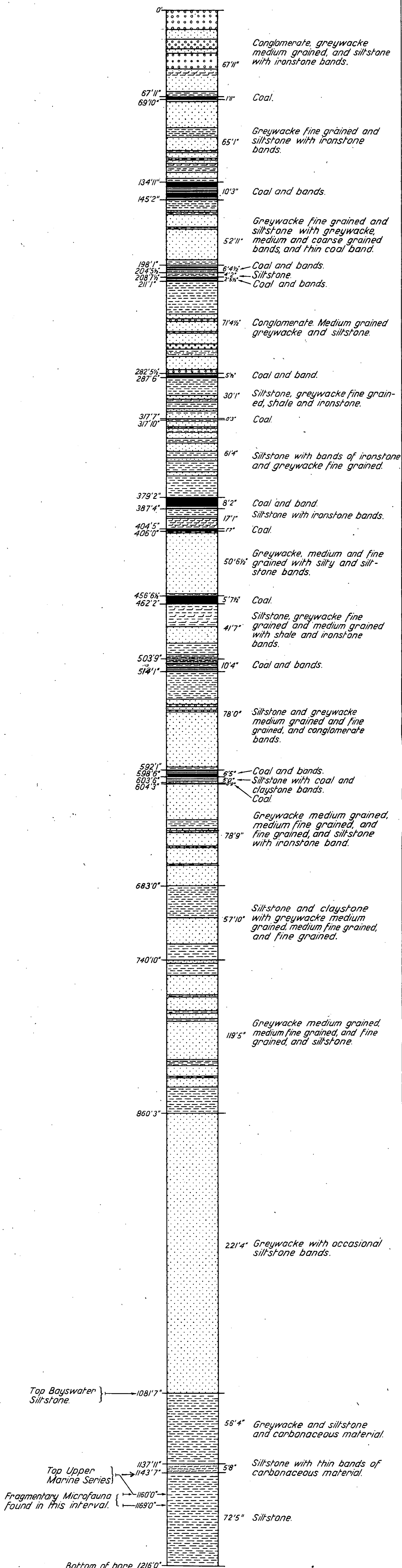
Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
1487	10	3	3	COAL, mainly dull loc. splint loc. A. pyrite becomes brighter & bdd. towards bot. R. calcite veins in bot.	3	0	18/BMR					1.7	36.2	48.3	13.8	12,440
1490	10	3	0		3	0	19/BMR					1.6	38.0	53.0	7.4	13,560
1493	10	3	0		3	0	20/BMR					1.6	38.0	56.0	4.4	14,200
1496	10	3	0		3	0	21/BMR					1.6	40.5	53.8	4.1	14,240
1499	10	3	0		3	0	22/BMR					1.6	41.4	52.6	4.4	14,200
1502	10	3	0		3	0	23/BMR					1.4	40.8	52.0	5.8	14,070
1505	10	3	0		3	0	24/BMR					1.5	36.5	54.2	7.8	13,450
1508	10	3	0		3	0	25/BMR					1.7	35.1	58.7	4.5	14,070
1511	10	3	0		3	0	26/BMR					1.7	32.6	60.8	4.9	13,900
1514	0	2	2		2	2	27/BMR					1.7	34.9	59.4	4.0	14,140
1516	0	2	0	Greywacke, bk. v. f. gr. v. arg. ptly. bdd. jtd. R. plant remains. s. slickens occ. ptgs. f. gr. gy. gw. Greywacke, f. gr. gy. bdd. w. ptgs. carb. carb. mat. & coal 6" w. abdt. sh. pbls. at 1530'	2	0	28/BMR					1.6	39.6	51.7	7.1	13,340
1517	4	1	4		1	4	29/BMR					1.8	37.6	53.2	7.4	13,340
1528	9	11	5		11	5										
1532	6	3	9		3	9										
1536	3	3	9		3	9						Dip 35°				
1560	7	24	4		24	4										
1562	7	2	0		2	0	30/BMR					1.6	31.9	50.4	16.1	12,100
1565	0	2	5		2	5	31/BMR					1.6	32.0	57.2	9.2	13,140
1567	3	2	3		2	3	32/BMR					1.6	31.1	53.6	11.7	12,690
1575	5	8	2		8	2						Dip 35°				
1577	11	2	6	COAL, dull w. bright bds. bdd. prom. calc. veining perp. to bedding.	2	6	33/BMR					1.5	25.3	42.6	30.6	9,800
1612	10	34	11	Greywacke as 8'2" above. Frequent 1/8" bds. of coal from 1592'6" to 1594'6". Prom. jtg. perp. to bedding	34	11						Dip 35°				
1615	10	3	0	COAL, dull bdd. w. occ. bright bds. which have A. f. calc. veining	3	0	34/BMR					1.5	27.8	45.6	25.1	10,590

[illegible]

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Miner. Bands Included		Miner. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
				Becomes lighter in colour downwards, w. fewer pellets. Frequent flecks bk. mat. in lower 10'												
1725	3	6	3	Tuff. l. gy.-bn. bdd. flaky fiss. w. occ. strks. dk. gy. cly. mat.	6	3										
1730	0	4	9	Rhyolite, l. gy. passing downwards to pink, calc. veining, fri. amygdolae w. zeolites	4	9										
1730	1 1/2	0	1 1/2	COAL, frags. bk. v. l. weight, heavily slickens	0	1 1/2						Fault				
1758	6	28	4 1/2	Amygdaloidal Basalt, brecc. bl. & purple v. f. gr. calc. mtx. w. considerable calc. veining	28	4 1/2										
				Hole completed								typed 7/2/54.				

COMMONWEALTH OF AUSTRALIA.
BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.

Area: Ravensworth Trig.
Bore N^o: I.S.C. commenced: 13.5.53
completed: 5.8.53
Depth: 1216 Feet
Scale: 1 Inch to 50 Feet.



WELL LOGGING MUSWELLBROOK N.S.W.

BMR.1(SC). ST. HELIERS

SELF POTENTIAL, SINGLE POINT RESISTANCE AND GEOLOGICAL LOGS

SCALE: 1" = 50'

REMARKS

BORE HOLE DIAMETER 0 - 908' - 5 1/8"
908 - 914' - 4 3/4"
914 - BOTTOM 3 1/2"
MUD RESISTIVITY : 300 - 50 OHM CM
DATE : 30.10.53

