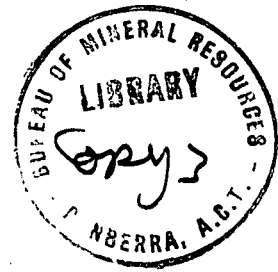


COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

1953/87.



OPEN-CUT COAL SCOUT DRILLING, WEST
WALLSEND, NEWCASTLE REGION, N.S.W.

by

G.M. Burton.

CANBERRA.

OPEN-CUT COAL SCOUT DRILLING,
WEST WALLSEND, NEWCASTLE REGION, N.S.W.

Records 1953/87

SUMMARY

Three widely separated scout holes totalling 566 feet of drilling were drilled to investigate the possibilities of open-cut mining sites on the Australasian Seam immediately to the west and south-west of West Wallsend, a western suburb of the city of Newcastle.

Only one hole intersected the Australasian Seam. This hole indicated that the seam was much banded and of inferior quality - below present open-cut coal standard. Analyses suggested that it may be possible to mine a section of coal 8 feet 7 inches thick excluding non-coal bands, and that this coal would have an ash content of about 29% and calorific value of 10,000 B.Th.U. per lb. after the exclusion of bands.

GENERAL

The Joint Coal Board early in 1952 requested the Bureau to investigate the possibilities of mining the Australasian Seam by open-cut methods in the vicinity of the suburb of West Wallsend which lies about 12 miles west of Newcastle.

The Australasian Seam is the middle seam of the Newcastle "Stage" of the "Upper" Coal Measures. It is generally overlain by a thickness of about 50 feet of sandstone termed the Seaham Sandstone. This unit separates it from the overlying Pilot Seams.

The Bureau had drilled extensively the Australasian Seam further to the east at Cocked Hat Creek (B.M.R. Records 1951/49) and Cardiff (B.M.R. Records 1951/32) but little was known of the quality of the seam at West Wallsend apart from minor recent prospecting nearby by J. & A. Brown and information obtained while sinking the shafts of the West Wallsend collieries to the Borehole Seam.

Three scout drill hole sites were selected to investigate the unmined land immediately south and west of West Wallsend which Bureau geologists considered on the basis of the little structural information available to offer the best possibilities for establishing an open cut.

Only one hole, BMR1 Holmesville, penetrated the Australasian Seam. The seam proper was penetrated from a depth of 233'10" to 271'5", a total thickness of 37 feet 7 inches including numerous non-coal bands up to 2 feet in thickness. The coal was sampled in plies and submitted for analysis; unfortunately the analyst decided that it was advisable to combine a number of samples and this has prevented the synthesis of the quality of certain seam sections.

The analyses supplied indicate that the seam has a high ash content and that there is little hope even of mining by selective underground methods an uncleaned product possessing a calorific value exceeding 10,000 B.Th.U's/lb. and containing less than 25% ash. Unfortunately, as can be seen from the logs, coal core recovery in the most important sections of the seam was bad. In view of the presence of clayshale in the seam this introduces a large margin of possible error in logging and this must be taken into account when assessing the possibilities

of the seam. It appears that the best section of the seam is the 9 feet 8 inches between 249'11" and 259'7", if the three bands of 4, 8, and 1 inch are excluded, the 8 feet 7 inches of coal remaining would have an ash content of about 29% and calorific value of 10,000 B.Th.U's/lb.

It is not possible to correlate the other two holes with one another or with BMR1: there is no definite marker horizon present and even the continuation of the structure contours from the Cardiff and Cocked Hat Creek areas give no reliable guide to the stratigraphical location of these bores in the absence of levels on the Australasian Seam west of West Wallsend. The seams in these holes may be the Pilot Seams in which case the Australasian Seam would be far too deep in the West Wallsend area for open-cut mining. Should, however, additional levels on the Australasian Seam show that these are the irregular seams below the Australasian then the Australasian will probably be at suitable depth for open cutting in the triangular area between Fairley, Killingworth and Holmesville. Hole BMR1 indicates that even if the seam were shallow its quality would be too poor. Under these circumstances additional drilling by the Bureau in this area was considered to be unjustified.

It is suggested that the time may now be opportune for the central coal prospecting authority - the Joint Coal Board - to use the results of the Bureau drilling of the Australasian Seam in the Cardiff, Cocked Hat, & Surveyor Creek areas in conjunction with additional information in their own files to prepare a structure contour plan of the Australasian Seam in the Cardiff and Sugarloaf Range area thus establishing a more reliable structural control for the upper beds in the Newcastle "Stage" than the lower Borehole plan now does. Such a plan would not only be a useful guide for bore correlation but would provide much useful information on the sedimentary history of this part of the Newcastle Basin.

The assistance rendered by Mr. D.J. McGarry, Prospecting Supervisor of the Joint Coal Board Newcastle Office, the officers of the Geological Survey of N.S.W. who performed the coal analyses, and the staff officers of Caledonian Collieries is gratefully acknowledged.

LIST OF ABBREVIATIONS USED IN BORE LOGS.

abundant - A.	ferruginous - ferr.	medium - m.
agglomerate - aggl.	fibrous - fib.	micaceous - mic.
aggregate - aggr.	fine - f.	mineral - min.
angular - ang.	fi ssile - fss.	mottled - mot.
arenaceous - aren.	flint - flt.	
argillaceous - argill.	formation - fm.	oolith - ool.
arkose (ic) - ark.	friable - fri.	
anhydrite - anhyd.	foraminifera - forams.	pebble (s) - pbl.
	fossil(iferous) - foss.	pyrite - pyr.
band (s) - bd (s)	fracture - fract.	pyritiferous - pyrf.
		purple - ppl.
bentonite - bent.	frosted - fstd.	
biotite - bio.		quartz - q.
bituminous - bit.	glauc onite(ic) - glauc.	quartzite - qite.
black - bk.	grain - gr.	
blue - bl.	granite - grt.	
bottom - bot.	granular - grnl.	rare - R.
boulder - bldr.	grey - gy.	regular - reg.
brown - br.	greyish - grish.	residue - res.
breccia - brcc.	green - gn.	round (ed) - rd.
brecciated - brectd.	greenish - gnish.	salt and pepper-s & p.
	greywacke - gw.	sandstone - sst.
calcareous - calc.	gypsum - gyp.	sand - sd.
carbonaceous - carb.		sandy - sdy.
cement - cmt.	hard - hd.	shale - sh.
chert - cht.	heavy - hvy.	shaly - shy.
clay - cl.	heterogeneous - hetg.	siltstone - slst.
clayey - cly.		siderite - sid.
claystone - clst.	igneous - ign.	slightly - sl.
clayshale - clsh.	indurated - ind.	siliceous - sil.
coarse - c.	inferior - inf.	soft - s.
cobble - cbl.	interbedded - intb.	streak - strk.
colour - col.	intraformational - ifml.	
common - C.		tabular - tab.
compact - cpt.	jointing - jtng.	thin-bedded - t.bdd.
composition - comp.		tuffaceous - tuff.
concretion - conc.	kaolin - kaol.	
conglomerate - cgl.		very - v.
contaminant (ated) - contm.	laminated)	variable - var.
crystal - xsl.	laminae) lam.	
crystalline - xln.	lamination)	weathered - wd.
contorted - conttd.	light - l.	white - wh.
dark - dk.	limestone - lst.	with - w.
dense - d.		yellow - y.
distributed - dist.	massive - mass.	yellowish - yish.
distribution - distn.	marl - ml.	
dolomite - dol.	material - mat.	
	matrix - mtx.	

The following interpretation is placed on the respective terms when applied to descriptions of cores recovered in coal:-

"broken" - fragments which can be put together to form cylinders, either approximate or actual, but which are not recognisably continuous with an unbroken portion of the same core.

APPENDIX

a. Analyses b. Logs.

COAL ANALYSES

HOLMESVILLE-WEST WALLSEND AREA

Bore	Bur.Min.Pes. Sample	Mines Dept. Analysis No. 1952/	Seam	Depth of Sample	Proximate Analysis					Calorific Value	
					H. Moisture %	Volatile Matter %	Fixed Carbon %	Ash %	Coke Nature ★	Ash Colour	B.Th.U's/lb.
S1 Holmesville	1 to 6/S1	1453	Australasian	233'10"-247'0"	2.5	21.5	31.0	45.3	Af	Pink	-
	7 to 9/S1	1454	"	247'5" -254'9"	2.8	25.8	40.5	30.9	Af	"	9,560
	10/S1	1455	"	255'1" -256'3"	2.6	27.1	41.0	29.3	Af	"	9,950
	11-12/S1	1456	"	256'11"-266'2"	2.8	29.1	44.3	23.8	Cw	"	10,850
	13/S1	1457	"	267'6" -268'10"	2.8	21.7	29.6	45.9	Nc	"	-
	14/S1	1458	"	269'6" -271'5"	2.6	26.7	43.1	27.6	Cw	"	10,270

The sulphur contents of these samples were not determined

★ Nc = Non-agglomerating, coherent

Af = Firmly Agglomerating

Cw = Weak coking

BUREAU OF MINERAL RESOURCES

Name and No. of Bore BMR 1 HOLMESVILLE

DISTRICT	Newcastle	COUNTY	Northumberland	PARISH	Teralba	PORTION	100	Approx. LOCATION	N.E. Cnr. Port. 100/2210/
Surveyed by	A. N. Rochfort	Survey Method	Theodolite	Elevation	120 ft. A.S.L.	Ref. Map	2710 ft.		
Logged by	M. Konecki & W. McKinnon	Cased	Not	Datum	H.W.D.B. Standard.	Ref. Report	BMR Plan N.66 - 12		
Sunk by	BMR	Type of Drill	Sullivan 22 HD	Depth	286.7"	Date Begun/Finished	BMR Recs. 1953/87.		26/5/52-4/6/52.

[illegible]

[illegible]

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Min. Bands Included		Min. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
142	7½		2½	Greywacke wh. c.gr. fri.		2½										
144	1½	1	6	Claystone, silty, off-wh.		1										
144	4		2½	COAL, dull		2½										
144	7		3	COAL, dull with bright bds.		3										
144	10½		3½	Splint carb.		3½										
147	1	2	2½	Siltstone carb. with plant detritus	1	1										
147	11½		10½	Siltstone carb. w. plant detritus & carb.		10½										
148	2½		3	Shale, carb. silty sh.		3										
148	9½		7	Siltstone, car. w. plant detritus. bds. carb. sh.		7										
148	11		1½	COAL dull with bright bds. & 1/8" clst. bd. in the middle, pyrf.		1½										
				(Continued on next page)												

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Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Min. Bands Included		Min. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B.T.H. U/LB
235	4½	1	6½	COAL, dull w. calcite along bedding	0	11	1/BMR1									
235	5	0	0½	Shale, bk. s.	0	0½				0	0½)					
235	8	0	3	Siltstone, gy.bk. cly. in parts	0	3				0	3)					
236	4	0	8	COAL, dull w some br. bds. calcite in cracks	0	8	2/BMR1				)					
236	6	0	2	Siltstone, br.-bk. hd.	0	2				0	2)					
237	0	0	6	Clayshale, gy.-br. w. plant remains	0	6				0	6)					
237	1	0	1	Siltstone, br.-bk. hd.	0	1				0	1)					
237	4	0	3	Shale, bk.	0	3				0	3)					
237	10	0	6	COAL, mainly dull, shy. in parts	0	6)					)					
238	0	0	2	Claystone, br. s. sy.	0	2)	3/BMR1			0	2)	2.5	21.5	31.0	45.0	
238	8½	0	8½	COAL, mainly dull w. some bright bds. showing calcite cleats	0	8½)					)					
239	4½	0	8	Siltstone, bk.-br. & y. interdigitating	0	8.)					)					
239	7½	0	3	Clayshale, y. s. at top and hardening progressively towards base	0	3					)					
240	1	0	5½	Shale, bk.-br. shattered	0	5½				1	4½)					
241	1	1	0	COAL, dull w. numerous bright bds.	1	0	4/BMR1				)					
241	6¼	0	5½	Clayshale, y.-br. s.	0	5½				0	.5½)					
242	6½	1	0	COAL, dull w. abundant, bright bds. & calcitic cleats	1	0)					)					
242	7½	0	1	Clayshale, y.-br. s. & some small coal part.	0	1)				0	1)					
243	1¾	0	6	COAL, mainly dull w.a. sh. parting	0	6)					)					
243	2¾	0	1	Clayshale, gy.br. s. lensing into coal	0	1)	5/BMR1			0	1)					
243	8	0	5½	COAL, mainly dull, w. numerous bright bds.	0	5½)					)					
243	9	0	1	Siltstone, gy. & bk. intb., current bedding	0	1)				0	1)					
243	10	0	1	Clayshale, y.-br. s.	0	1)				0	1)					
244	2	0	4	COAL, dull w. thin bright bds.	0	4)					)					
244	9	0	7	Clayshale, grades from br. at top to l. y. at bot.	0	7				0	7)					
246	4	1	7	COAL, dull w. some bright bds. & some sh. partings.	1	0)	6/BMR1				)					
247	0	0	8	COAL, shy.	0	3)					)					

BUREAU OF MINERAL RESOURCES

Name and No. of Bore BMR2 HOLMESVILLE

Approx. N.W. Cnr. Port. 65/313°/
1918 feet

DISTRICT	Newcastle	COUNTY	Northumberland	PARISH	Teralba	PORTION	97	LOCATION	1918 feet
Surveyed by	A.N. Rochfort	Survey Method	Theodolite	Elevation	132 ft. A.S.L.	Ref. Map	BMR Plan N66-12		
Logged by	W.A. McKinnon	Cased	Not	Datum	H.D.W.B. Standard	Ref. Report	BMR Recs. 1953/87		
Sunk by	BMR	Type of Drill	Failing 750	Depth	130' 2"	Date Begun/Finished	June, 1952.		

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Page

Name and No. of Bore

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Min. Bands Included		Min. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
58	11	1	4	Greywacke, gy.-wh. c.	1	0										
60	9	1	10	Greywacke, gy.-wh. m. to c.												
61	9	1	0	Shale, br. bk. hd.												
64	9	3	0	Shale br. bk.	2	5										
65	3 $\frac{1}{2}$	0	6 $\frac{1}{2}$	Shale bk. br. hd.	0	6 $\frac{1}{2}$										
67	9	2	5 $\frac{1}{2}$	Clayshale gy.-wh. varying hdness.	2	5 $\frac{1}{2}$										
68	2	0	5	Siltstone dk. gy. to bk.	0	5										
69	2	1	0	Clayshale gy.-wh. slightly wd.	0	3 $\frac{1}{2}$										
70	5	1	3	Clayshale dk.-gy. to bk.	1	3										
70	11	0	6	Clayshale gy.-wh. shattered	0	3										
72	5	1	6	Siltstone gy. vertically jointed	0	9										
73	2	0	9	Shale bk. carb.	0	4 $\frac{1}{2}$										
				Clayshale gy. wh. s.	3	10										
80	11			Shale, br.-bk. carb.	0	0 $\frac{1}{2}$										
				Shale bk.-br. carb.	0	7										
81	3	0	4	Siltstone gy.-bk. hd.	0	6										
84	1 $\frac{1}{2}$	2	10 $\frac{1}{2}$	Siltstone gy. to gy. bk. w. some c. s. bds.	3	1										
86	3	2	1 $\frac{1}{2}$	Sandstone s. & p. c. w. some larger pbl. included	1	11										
88	10 $\frac{1}{2}$	2	7 $\frac{1}{2}$	Sandstone, as above	2	10										
89	1	0	2 $\frac{1}{2}$	Shale bk. br.	0	11 $\frac{1}{2}$										
90	4	1	3	Shale bk-br. carb.	1	4										
92	3 $\frac{1}{2}$	1	11 $\frac{1}{2}$	Shale bk.-br. carb. w. a cly. & 2 coal partings	1	9 $\frac{1}{2}$										
93	3 $\frac{1}{2}$	1	0	Siltstone bk. to dk.gy.	0	11										
98	10	5	6 $\frac{1}{2}$	Sandstone, s & p. m. to c. gy. w. some minor darker bds.	5	5 $\frac{1}{2}$										
99	1	0	3	Conglomerate dk.gy. to bk. f.	0	2										
100	4	1	3	Sandstone s & p.	1	2										
102	6	2	2	Greywacke s & p. m. to c. bdd. some darker bds. present	1	9										
130	2	27	8	Greywacke s & p. f. to m. grd.												

Hole completed

typed 26.12.53

Name and No. of Bore BMR 3 HOLMESVILLE

DISTRICT	Newcastle	COUNTY	Northumberland	PARISH	Teralba	PORTION	98	Approx. LOCATION	N.E. Cnr. Port. 98/ 181°/1600 feet
Surveyed by	A.N. Rochfort	Survey Method	Theodolite	Elevation	184 ft. A.S.L.	Ref. Map	BMR Plan N66-12		
Logged by	W.A. McKinnon	Cased	Not	Datum	H.D.W.B. Standard	Ref. Report	BMR Recs. 1953/87		
Sunk by	BMR	Type of Drill	Sullivan 22HD	Depth	149' 5"	Date Begun/Finished	17.6.52/30.6.52		

[illegible]

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Min. Bands Included		Min. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
66	4	0	8	Greywacke, y. m. gr.	0	2										
67	10	1	6	Clayshale, dk.-gy. w. bk. carb. bds.	0	8										
69	10	2	0	Clayshale, dk.-gy. w. bk. carb. bds.	0	0										
70	6	0	8	Clayshale, dk.-gy. w. bk. carb. bds.	0	3										
71	10	1	4	Shale, br.-bk. carb.	0	5										
76	4	4	6	Siltstone, l. gy. w. dk. bds.	3	6										
76	7	0	3	Shale, bk. w. thin bright coal bds.	0	2										
79	10	3	3	Siltstone, l. gy. w. a few thin dk. bds.	2	10										
81	1	1	3	Siltstone, gy.-wh. w. thin dk. bds.	1	3										
81	10	0	9	Shale, bk. carb. w. thin bright coal bds.	0	6										
82	1	0	3	Clayshale, dk.-gy. s. w. plant remains	0	3										
83	6 $\frac{1}{2}$	1	5 $\frac{1}{2}$	Clayshale, gy. s. w. dk. bds.	1	5 $\frac{1}{2}$										
83	7	0	0 $\frac{1}{2}$	Shale, dk.-gy. bd.	0	0 $\frac{1}{2}$										
93	11	0	4	Clayshale, gy.-wh. s.	0	4										
85	7	1	8	Shale, gy. hd. shattered in places	0	9										
87	10	2	3	Shale, off wh. fairly s. (tuff.?)	1	10										
89	11	2	1	COAL shy. wd. w. thin lenses of clst.	1	3										
90	4	0	5	Clayshale, gy.-wh.	0	2										
91	0	0	8	Clayshale, gy.-wh. s.	0	1 $\frac{1}{2}$										
91	2	0	2	COAL, bright slightly wd.	0	1										
91	3	0	1	Shale, wh. hd.	0	1										
92	2	0	11	COAL, v. shy.	0	6										
92	11	0	9	Shale, gy. hd. w. plant remains	0	9										
93	11	1	0	Shale, gy. hd. w. plant remains	0	2										
94	10	0	11	COAL v. shy., shattered	0	8										
95	4	0	6	Shale, dk.-gy. hd.	0	6										
95	5	0	1	COAL, shy.	0	0 $\frac{1}{2}$										
96	2	0	9	Shale, dk.-gy. hd.	0	9										
96	8	0	6	Shale, bk. carb.	0	3										
97	2	0	6	Siltstone, gy. to wh. w. f. partings of bright coal	0	6										
97	3	0	1	COAL, shy.	0	1										
97	5 $\frac{1}{2}$	0	2 $\frac{1}{2}$	Siltstone, gy. w. thin coal partings	0	2 $\frac{1}{2}$										
98	8	1	2 $\frac{1}{2}$	COAL, shy. & dirty.	0	5 $\frac{1}{2}$										
99	8 $\frac{1}{2}$	1	0 $\frac{1}{2}$	Shale, coaly, w. some bright bds.	0	5 $\frac{1}{2}$										
99	9	0	0 $\frac{1}{2}$	Siltstone, wh. w. bk. strks.	0	0 $\frac{1}{2}$										

Estimated Depth		Estimated Thickness		GEOLOGICAL DESCRIPTION OF STRATA	Core Measured		Coal Sample No.	Min. Bands Included		Min. Bands Excluded		PROXIMATE ANALYSIS				
Ft.	Ins.	Ft.	Ins.		Ft.	Ins.		Ft.	Ins.	Ft.	Ins.	H.M.	V.	F.C.	ASH	B. TH. U/LB
129	5	0	5	Clayshale, wh. s.	0	1½										
130	0	0	7	Shale, coaly bk.-br. w. thin bright coal bds.	0	3½										
130	11	0	11	Shale, dk.-gy. s. w. plant remains	0	8										
131	9	0	10	Siltstone, dk.-gy. cpt.	0	10										
132	9½	1	0½	Siltstone, gy. hd.	1	0										
133	5½	0	8	Shale, br.-bk. wd. w. bright coal bds.	0	4										
135	1½	1	8	Siltstone & sandstone varves, about ½" thick, both l. gy. in col. & the sst. is f. gr.	1	6										
138	0	2	10½	Siltstone, gy. w. a 1" bd. of m. gr. gw. about 1' from the bottom	2	10½										
139	5	1	5	Conglomerate, gy. in col. f. gr. w. occasional ¼" bds. of gy. slst.	1	5										
142	7	3	2	Conglomerate, gy. f. to m. gr. grading down in places to a v. c. gw. & in one place to a ½" bd. of gy. slst.	3	2										
147	3	4	8	Conglomerate, gy. f. grading into a v. c. gw. & back again	4	6										
147	4	0	1		0	1										
149	5	2	1	Greywacke, gy. v. c. w. occasional larger grs. up to 10 m.m.	1	11										

Hole completed

typed 28/12/53

HOLMESVILLE

BMRI

BMR2

BMR3

Stratigraphic Log (1"=10')

Coal Detail (1"=2')

Stratigraphic Log (1"=10')

Stratigraphic Log (1"=10')

	M.M.	V.	F.C.	Ash
		B.Th.U./lb.		
233'10"				
238'8"				
241'1"				
247'				
249'6"				
254'9"				
256'3"				
259'7"				
263'6"				
266'2"				
271'5"				

2.5

21.5

31.0

45.0

2.8

25.8

40.5

30.9

2.6

27.1

41.0

29.3

2.8

29.1

44.3

23.8

2.8

21.7

29.6

45.9

2.6

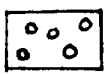
26.7

43.1

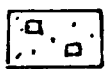
27.6

Note: * = Bands excluded from analysis

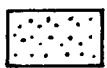
Legend



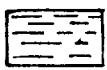
Conglomerate



Greywacke



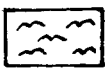
Sandstone



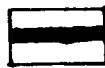
Shale & Siltstone



Clayshale or clay or Claystone



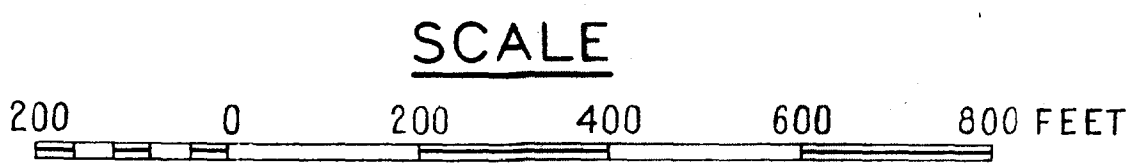
Alluvium or soil



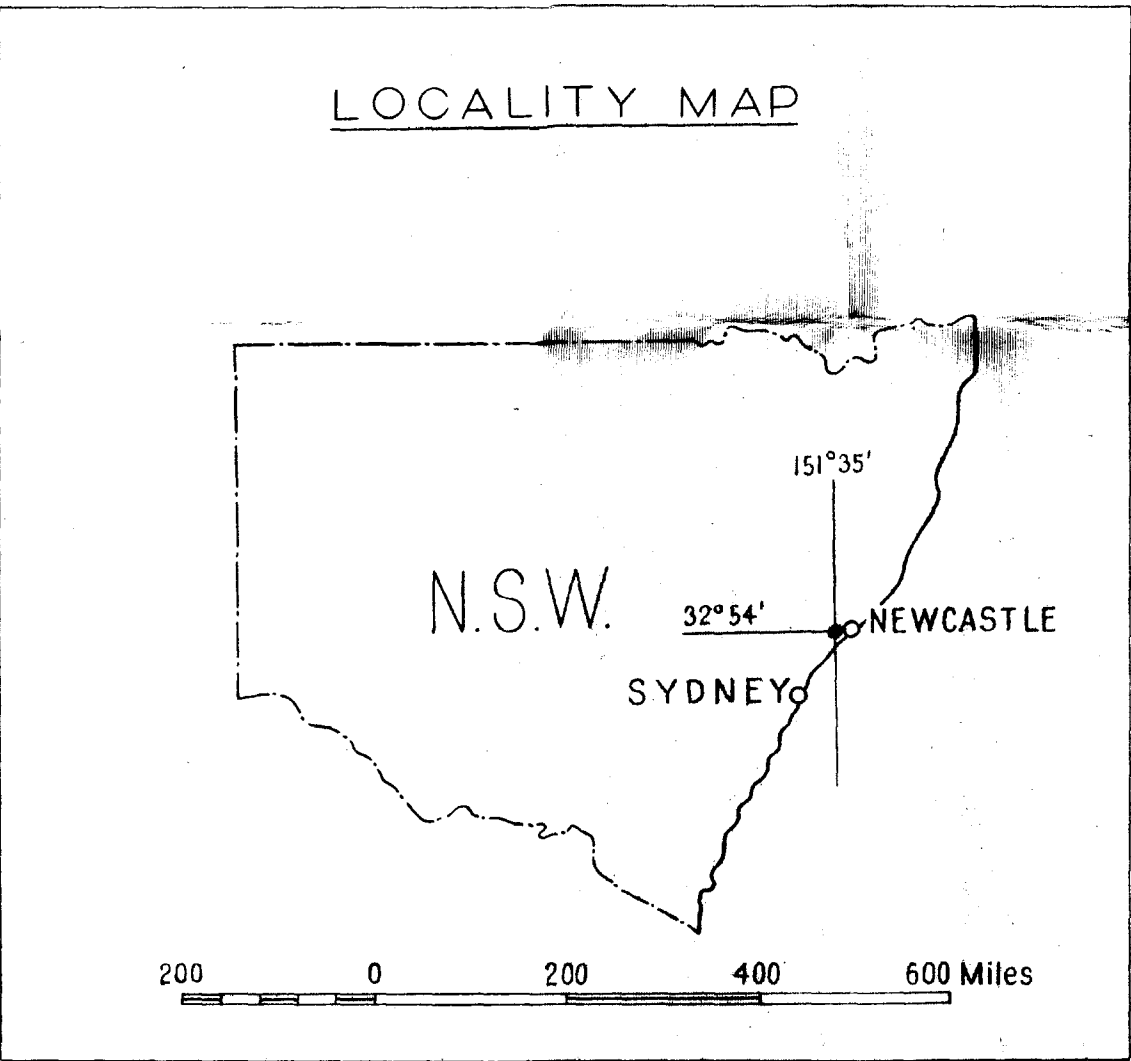
Coal

COAL DRILLING PLAN
WEST WALLSEND AREA
PH. TERALBA, CO. NORTHUMBERLAND

NEWCASTLE REGION
N.S.W.



BMR3
184' ● *Rotary drill hole-coal cored, showing number and elevation.*
Datum : H.D.W.B. Standard
This plan is based on Dept. of Interior Survey Negatives
Nº N.S.W. 5384 and 5385



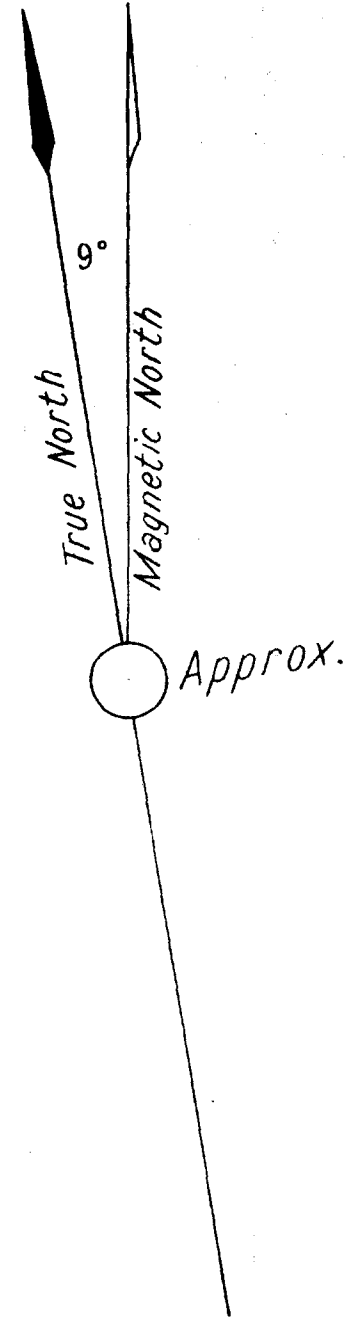
BMR3
184' ●

PORTION 98

PORTION 99

P A R I S H O F T E R A L B A

PORTION 97



BMR2
132' ●

PORTION 77

PORTION 100

PORTION 68

PORTION 78

BMR1
120' ●

