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EL 5/61 GRAY

TASMANIA

MOUNT NICHOLAS - REPORT ON TESTING OF 100mm CORE SAMPLES

VOLUME 1

TEXT, FIGURES, APPENDICES (Fiched)

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APPENDIX 1

(Microfiche)

Pretreatment, Washability and Analytical Results

Geotechnical Results
- Cargo Superintendents Co. (A/sia) Pty. Ltd.

Geotechnical Results
- University of Melbourne, Department of Mining & Metallurgy

N.B. Hard Copy Constitutes Volume 2.

APPENDIX 2

(Microfiche)

Borehole logs of GY 174 to GY 178

N.B. Hard Copy Constitutes Volume 3.

1. SUMMARY

The report briefly describes the objectives and implementation of the recent 100mm cored drilling program at Mt Nicholas in Tasmania, and presents the results in tabulated summary and graphical form. Complete results are contained within appendices.

No attempt is made to make recommendations concerning preparation plant equipment or design, however a number of relevant conclusions can be drawn from the results. Briefly, these are as follows:

- The results reinforce previous assumptions concerning the likely sizing of the coal at various stages of mining, handling and preparation.

- Ash is concentrated in the finest fractions due to slaking of bands and dilution material. Desliming near 0.125mm is essential, and some form of fines beneficiation may be desirable to attain an acceptable and consistent product specification. No specific fines cut point is indicated other than on equipment criteria.

- Coarse coal from the L2, M2 and M1 seams is washable by jigging, however separation may be problematic at clean coal ash levels below 18-20% for the L2 and M1 seams. The M2 can be washed to a quite low ash level with good yields. The L1 seam is not readily washable by jigging due to a very high proportion of near gravity material at all separation densities consistent with an acceptable product ash.

- There are indications that a top sizing of plant feed near 50mm may optimise yield and washed coal ash. This cannot be verified without recourse to larger sized samples.

- Slim core float/sink data can be used to accurately represent the cumulative floats characteristic of larger sized material, however, the separation RD's for equivalent fractions cannot be reliably predicted.

- Tests on dilution material indicate that dry size distributions will generally contain fewer fines than the coal, however a few samples showed high slaking propensity which could result in high slimes content within a preparation plant. These products are not considered likely to swell or be excessively sticky within the plant.

Some variability of raw coal thicknesses and quality was indicated by the completion of three boreholes at each drilling site. This has not been accurately quantified as a result of poor drilling conditions and consequently variable core recoveries.

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2. INTRODUCTION

2.1 Scope

This report presents the reasons for, methods used and results of a drilling program which obtained 100mm diameter core from a number of selected sites in the Mt Nicholas area of north eastern Tasmania (Figure 1). Its primary objective is to assemble, graphically display and condense where necessary, the available data into a format which can easily be used as the basis of a washery design study. To this end it is not designed, nor is it intended to pre-empt the possible results of such a study, however where the data indicates a particular area of relevant interest or concern, the implications of this are indicated in general fashion.

A prior understanding of the historical background and established geology is assumed; readers having insufficient knowledge of either are counselled to consult Wollff et.al. (1981) and Patterson et.al. (1982).

2.2 Previous Exploration

Evaluation of the deposit to date as summarised by Patterson et.al. (1982) has been confined to the testing of small diameter cores (up to HQ size, 61.1mm) and two subcrop samples which were, however, unrepresentative of the reserve. This work, whilst sufficient to adequately define the reserve in terms of its extent, structure and insitu quality, did not provide other than indicative washability data in the form of simple float/sink testing of small, finely sized samples. There was thus a demonstrated need for the acquisition of larger samples from which meaningful data satisfying basic coal preparation plant design criteria could be established.

2.3 Objectives

The objectives of the 100mm cored drilling program can be summarised as follows:

(a) To provide sufficiently large coal samples to determine the likely behaviour of the coal in respect of its:

- probable size consist at various stages of mining, handling and preparation.
- ash distribution and washability in different size fractions.
- ash and coal liberation characteristics as a result of comminution.

(b) To provide sufficiently large samples of band and confining strata to determine the likely behaviour of band and dilution material in respect of its breakage, slaking, plasticity and flocculant precipitability.

(c) To determine the relationships between float/sink tests on slim core and more comprehensive testing on the 100mm core and use this to determine the relevance or otherwise of the slim core analyses to preparation plant design studies.

(d) To determine the variability within restricted areas of:

- physical parameters used to define the reserve e.g. seam thickness and relative density.

- analytical parameters used to evaluate the reserve, e.g. raw ash and specific energy.

- mining parameters, e.g. roof/floor consistency and band lenticularity.

(e) To obtain additional information on the characteristics of the coal with particular emphasis on areas of inadequate existing information. These included raw coal Hardgrove Grindability Indices, washed coal abrasion indices and petrographic analyses.

2.4 Field Program

Five sites were chosen for large diameter drillhole locations, corresponding to the sites of the previously drilled slim holes GY123, 33, 36, 34 and 44 (Figure 2). These sites were selected for a number of reasons:

(a) Locations chosen optimise the number and distribution of intersections of each mineable seam in the area of its mineable reserve;

(b) Existing control would ensure that drilling of problematic colluvial material was minimised;

(c) A direct comparison would be provided between large sample washability testing and the slim core float/sink data which would serve to indicate the reliability and overall usefullness of the latter;

(d) Seam intersections could be accurately predicted to obviate the need for unnecessary coring runs and thus expedite the total program.

Desirably, seam samples would be of at least 50 kg to enable adequate sample pretreatment according to AS 2519 (1982). This requirement indicated a probable minimum core size of 170mm as being appropriate to the thinner seams to be intersected (1.4m). Enquiries indicated that coring at this diameter could only be accomplished in Tasmania at exhorbitant cost, and consequently a decision was made to drill two 100mm cores at each site which would provide sample equivalent to one 140mm core and only represent a minor compromise in the case of the thinnest seams. This approach would also advance objectives of the program as under 2.3 (d).

Tenders were called and a contract for the drilling subsequently let to Associated Diamond Drillers (contract drilling division of Boart Australia Pty. Limited) in August, 1982. Drilling proceeded very slowly largely due to hole collapse and circulation problems until the contract was terminated by mutual agreement in December. The remaining work was completed by H.J. Stacpoole of Launceston.

Altogether the program involved 1229m of drilling, of which 900m was by hammer, 191m by blade and 138m cored. These figures exclude precollaring attempts which were abandoned without result. Drilling data is summarised on a hole by hole basis in Table 1.

Seam cores were laid out on covered plastic splits at each drill site and sampling was not commenced until both cores of each seam intersection had been recovered, individually logged, and checked against one another and the equivalent slim core records for core losses and significant differences in thickness and/or visible structure. Each sample represented the full mineable seam at the location but did not exclude or include material representing wasteage or dilution respectively. Samples were individually massed as an additional check before combination.

Generally, core recoveries significantly less than the 95% (linear) contract specification were accepted, because the drilling difficulties were assumed to be largely geological and because of the compensating effect of the parallel samples in combination. Volumetric recoveries were significantly less than linear recoveries and are detailed in Table 2. Mean volumetric recovery for all samples was 74%.

Samples of confining strata and major bands were taken where appropriate for the purpose of geotechnical testing (see Section 2.5).

Holes were not geophysically logged because of the availability of logs from the slim holes at each site.

On completion of the drilling program, all holes were capped and sites rehabilitated in accordance with accepted practice.

TABLE 1 - SUMMARY OF DRILLING DATA

Bore	Shell Record No.	Collar RL (m AHD)	Easting (m AMG)	Northing (m AMG)	Open Hole Hammer (m)	Open Hole Chip (m)	Core (m)	Total Depth (m)
GY 174A	890	462.70	591864	5398612	71.50	41.20	20.42	133.12
174B	895	463.20	591864	5398605	119.11	-	12.88	131.99
175A	900	467.00	590400	5398693	113.20	-	10.10	123.30
175B	905	467.00	590414	5398686	113.60	-	9.06	122.66
176A	910	486.20	590313	5401344	96.00	-	12.00	108.00
176B	915	486.50	590319	5401334	96.60	-	12.35	108.95
177A	920	480.80	591220	5402290	20.00	75.00	9.84	104.84
177B	925	480.60	591226	5402283	20.00	75.05	9.69	104.74
178A	930	506.40	592751	5401656	119.60	-	26.30	145.90
178B	935	506.30	592768	5401650	130.54	-	15.01	145.55
					900.15	191.25	137.65	1229.05

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TABLE 2 - COAL SAMPLE DETAILS

		Sample	Logged Thickness m	RD (1)	Calculated Mass kg	Recovered Mass kg	Calculated Recovery (2) %
(3)	L2	GY174 A	1.97		25.22	19.77	78.4
		GY174 B	1.77		22.66	14.82	65.4
		GY174 Total	-	1.63	47.88	34.60	72.3
	L2	GY175 A	1.81		22.75	15.07	66.2
		GY175 B	1.71		21.49	16.11	75.0
		GY175 Total	-	1.60	44.24	31.18	70.5
	L2	GY176 A	1.21		15.49	10.59	68.4
		GY176 B	1.41		18.05	13.57	75.2
		GY176 Total	-	1.63	33.54	24.16	72.0
	L2	GY177 A	2.16		26.8	18.81	70.2
		GY177 B	1.71		21.22	19.25	90.7
		GY177 Total	-	1.58	48.02	38.06	79.3
	L2	GY178 A	3.11		37.86	27.43	72.5
		GY178 B	2.90		35.30	26.76	75.8
		GY178 Total	-	1.55	73.16	54.19	74.1
(3)	L1	GY174 A	2.15		27.52	10.87	39.5
		GY174 B	2.14		27.40	22.84	83.4
		GY174 Total	-	1.63	54.92	33.71	61.4
	L1	GY175 A	2.28		30.62	21.98	71.8
		GY175 B	2.10		28.20	14.33	50.8
		GY175 Total	-	1.71	58.82	36.31	61.7
	M2	GY176 A	1.19		13.55	10.40	76.8
		GY176 B	1.41		16.06	13.96	86.9
		GY176 Total	-	1.45	29.61	24.36	82.3
(4)	M2	GY177 A	2.10		24.90	26.33	105.7
		GY177 B	2.49		29.53	23.35	79.1
		GY177 Total	-	1.51	54.43	49.68	91.3
	M2	GY178 A	2.55		31.24	21.08	67.5
		GY178 B	2.79		34.18	26.95	78.8
		GY178 Total	-	1.56	65.42	48.03	73.4
	M1	GY174 A	1.77		21.69	17.14	79.0
		GY174 B	2.11		25.85	20.81	78.1
		GY174 Total	-	1.56	47.54	37.95	79.8
	M1	GY178 A	2.32		30.98	19.36	62.5
		GY178 B	2.64		35.25	28.63	81.2
		GY178 Total	-	1.70	66.23	47.99	72.5

(1) Apparent RD taken as True RD - 0.04.
(2) Volumetric. Maximum 91% probably equivalent to full linear recovery.
(3) These samples were combined for analysis.
(4) A & B samples assumed interchanged.
Average mass of samples tested : 41.84 kg.

2.5 Laboratory Program

Analytical requirements for samples of the size envisaged had been included in the Specification for the full analytical program which had included all of the 1982 slim core analyses also. This contract had been awarded to Cargo Superintendents Co. (A/sia) Pty. Limited (Casco) in April, 1982. Further discussion with Casco resulted in some refinement of the original Specification to the following laboratory program which was designated for all 100mm core coal samples:

RAW COAL ANALYSIS

Determine Mass.
Size to -45mm.
Determine RD, Proximate Analysis, HGI.

PRETREATMENT

Screen @ 1.4, 2.8, 5.6, 11.2 and 22.5mm.
Dry tumble each size fraction to synthesize plant feed sizing determined from nominated top size and HGI.
Wet tumble according to AS1661 Appendix C2.
Screen @ 0.063, 0.125, 0.25, 0.5 WW, 1.4, 2.8, 5.6, 11.2 and 22.5mm.
Determine ash and total sulphur of all size fractions under 0.5mmWW.

WASHABILITY

Combine to 45 x 11.2mm, 11.2 x 0.5mmWW, and 0.5mmWW x 0.125mm and independently float/sink at RD 1.4 to 2.0 in 0.1 increments. Calculate float/sink of combined 45 x 0.5mmWW sample.

LIBERATION TESTS

Reconstitute cumulative F1.70 and S1.70 fractions at sizing of 45 x 0.5mmWW.

On F1.70:
- Crush to -22.5mm
- Refloat @ RD 1.70, Ash sinks
- Crush floats to -11.2mm
- Refloat @ RD 1.70, Ash sinks
- Crush floats to -5.6mm
- Refloat @ RD 1.70, Ash sinks and floats

On S1.70:
- Crush to -22.5mm
- Refloat @ RD 1.70, Ash floats
- Crush sinks to -11.2mm
- Refloat @ RD 1.70 Ash floats
- Crush sinks to -5.6mm
- Refloat @ RD 1.70, Ash floats and sinks

WASHED COAL ANALYSIS

If indicated cumulative yield of floats fractions nearest 20% ash on combined 45 x 0.5mmWW sample ⩾ 60%, prepare equivalent sample and determine:

Relative Density	Ash Analysis
Proximate Analysis	Chlorine
Forms of Sulphur	Phosphorus
Specific Energy	Arsenic
HGI	Maceral Analysis
Ultimate Analysis	Vitrinite Reflectance & Reflectogram
CO_2	
Ash Fusion (Reducing)	Abrasion Index

The selection of a top sizing of 45mm represented to some extent a compromise between the need to generate data meaningful for its intended purpose from the limited available sample, and the optimum sizing specified by AS1661 (1979) for a sample of the expected mass. For a 50 kg sample having 30% of its mass in the top particle size range, the maximum sizing recommended by the standard would be 27mm. By the same criteria a top sizing of 45mm would require a total sample of approximately 150 kg. The compromise was considered acceptable in view of the weight of existing data for the coal and the impracticability of obtaining a significantly larger sample at acceptable cost. Coal sample details have been summarised in Table 2.

Casco's ash/coal liberation testing actually exceeded the Specification by providing additional data on slimes and fines liberation at each reduction stage. The comminution stages of 22.4, 11.2 and 5.6mm were chosen to facilitate the tying in of previous data which involved samples variously sized at or near these ranges.

The yield criteria for washed coal analysis was not applied because the current mining plan necessitates driveage of the L1 seam for access purposes in the area where it would have taken effect.

Major band and dilution characteristics were assessed by Casco (drop shatter testing and flocculation precipitability) and by the Department of Mining and Metallurgy at the University of Melbourne (slake durability and plasticity).

Analytical reports and summarised in Section 6, and reproduced in full in Appendix 1.

N.B. The L1 and L2 seam samples for GY174 were inadvertently combined for testing due to a laboratory misunderstanding. The raw coal ashes for the equivalently sampled sections in the adjacent slim core (GY123) were 39.6% and 33.9%.

3. SIZING

3.1 Method

Samples were sized to -45mm by hand knapping and dry seived to determine the As Received sizing. Raw ash, relative density and Hardgrove Grindability Indices were then determined from a sub sample, and the sample sized by dry drum tumbling to a consist determined from the HGI according to the method of AS 2519 para. 5.4.4, to obtain the Synthesized Plant Feed sizing. The samples were then wet tumbled according to AS 1661 Appendix C2 (essentially the same as AS 2519 para. 5.4.5) to determine the Process sizing. Although this method is intended to simulate pumped circuit preparation (e.g. Cyclones) the tumbling times are very short for hard coal and the results should have equal relevance to jig and bath type circuits. The sample was wet seived at sizes appropriate to further intended testing.

The ash and total sulphur content of fine fractions was determined, as these were not to be subjected to further work other than float/sink testing of the +0.125mm fraction.

For the purpose of this report and to facilitate comparison with earlier work "fines" are assumed to represent -1.0mm square mesh material. For practical purposes the laboratory cut point was 0.5mm (wedge wire), which represents a similar sizing for this type of coal. Where laboratory results are directly referred to, this description is retained.

3.2 Size Distribution

Size distributions as determined for the various samples by the method outlined are presented in Rosin-Rammler graph form in Figures 3 to 13, and summarised in Table 4.

The L2 seam size distributions (Figures 3 - 6) are very consistent, all having near 11% fines material in the synthesized plant feed and from 4-7% added by the wet pretreatment. There is an apparent tendency towards increased slimes liberation during the wet pretreatment stage in samples from the north west and north of the reserve area (GY176 and GY177).

The L1 seam distributions (Figures 7 and 8) both show approximately 9% fines in the synthesized plant feed, with minimal generation of fines in the wet pretreatment stage for the pure sample. The larger fines liberation (8.4%) from the combined L1/L2 seam sample (GY174 - south east) cannot be attributed with confidence to the sole influence of either seam.

The M2 seam distributions (Figures 9 - 11) are very similar in the three holes where this seam was sampled; GY176 (north west), GY177 (north) and GY178 (north east). There is some 9-11% of fines material in the synthesized plant feed and 7% increase after wet pretreatment, increasing to 11.5% on the western side of the reserve area.

The M1 seam distributions (Figures 12 and 13) show a similar distribution for the as received and dry sized coal, with fines material comprising some 10-11% of the synthesized plant feed. Wet pretreatment liberates a further 9% of fines material from the GY174 (south east) sample and over 20% from the GY178 (north east) sample.

3.3 Ash Distribution

Figures 14 to 17 indicate the distribution of ash within the various size fractions following wet pretreatment of each seam sample.

The L2 seam samples (Figure 14) have virtually uniform ash distribution over most of their size range, only showing significant ash increase in the -0.125mm (slimes) fraction.

The L1 seam samples (Figure 15) have a high inherent ash and few slaking bands, as evidenced by the reasonably uniform distribution of ash between the size fractions.

The M2 seam samples (Figure 16) have both maximum ash and the largest proportion of fines material in the finest fractions, i.e. below 0.063mm. This indicates a significant content in the ash of highly slaking material, suggesting that this is largely derived from bands.

The M1 seam samples (Figure 17) exhibit a similar although more pronounced effect, which is probably a function of their relatively high band content (see note under Section 7.5).

3.4 Sulphur Distribution

Total sulphur determinations were made on all size fractions below 0.5mmWW and the results are presented on an air dried and ash free basis in Table 3.

The ash free results show a generally constant sulphur content irrespective of the sizing of the coal, reflecting a high proportion of organic sulphur as indicated in Section 6 and by Table 27. A slight drop in sulphur content in the -0.063mm fraction may be the result of a higher moisture content, which however was not determined.

Conversely, the increasing sulphur contents with decreasing size in the air dried results generally result from increasing ash in the finer sized fractions.

An exception to the general relationship is the M1 seam from GY178 which has abnormally high pyritic sulphur (see Table 34) which appears to concentrate in the finest high ash fractions. This effect was not however, observable in other samples having a high proportion of pyritic sulphur (L1 seam GY175 and M2 seam GY177).

TABLE 3 : SULPHUR DISTRIBUTION IN SIZE FRACTIONS
(mass percent)

Sample	0.5mmWWx0.250mm		0.250x0.125mm		0.125x0.063mm		-0.063mm	
	a.d.	a.f.	a.d.	a.f.	a.d.	a.f.	a.d.	a.f.
L2 GY175	0.32	0.48	0.32	0.49	0.32	0.49	0.24	0.43
GY176	0.41	0.67	0.36	0.65	0.30	0.61	0.20	0.47
GY177	0.36	0.51	0.34	0.49	0.27	0.45	0.23	0.43
GY178	0.55	0.73	0.47	0.63	0.35	0.54	0.24	0.38
L1+2 GY174	0.37	0.62	0.35	0.60	0.26	0.51	0.24	0.52
L1 GY175	0.30	0.49	0.32	0.50	0.34	0.53	0.26	0.47
M2 GY176	0.75	0.96	0.82	1.07	0.51	0.69	0.22	0.49
GY177	0.63	0.88	0.79	0.99	0.51	0.77	0.32	0.55
GY178	0.36	0.50	0.39	0.55	0.36	0.55	0.22	0.42
M1 GY174	0.37	0.57	0.44	0.78	0.30	0.65	0.15	0.46
GY178	0.32	0.67	0.26	0.57	1.45	4.50	0.64	3.11

3.5 Comment

There is a high propensity for the highest ash material to accumulate in the finest fractions of the sample as a direct result of the inclusion of slaking bands or dilution. This indicates a requirement for a desliming facility in the eventual preparation plant so that the total product is not inordinately affected by changes in the level of dilution if the raw fines are bypassed. The desliming cut point should be near 0.125mm.

There is minimal advantage in selecting any particular cut point above 0.125mm for separation of fines from coarse coal or sub-division of the coarse coal other than to maximise efficiency or utilisation of particular items of beneficiation plant.

The results substantially confirm predictions concerning process sizing made in the previous geological report (Patterson et. al., 1982).

TABLE 4 - RAW COAL SIZING (UNDILUTED)

SAMPLE	RAW ASH	RAW HGI	AS RECEIVED SIZING (approx)			SYNTHESIZED FEED SIZING (approx.)			PROCESS SIZING		
			-0.125mm	0.125mm x 1.0mm	+1.0mm	-0.125mm	0.125mm x 1.0mm	+1.0mm	-0.125mm	0.125mm x 1.0mm	+1.0mm
L2 GY175	33.7	57	1.0	2.8	96.2	3.2	6.9	89.9	7.0	8.0	85.0
L2 GY176	35.4	60	-	2.0	98.0	3.2	7.8	89.0	10.8	7.2	82.0
L2 GY177	29.7	57	-	2.2	97.8	3.2	7.8	89.0	8.0	9.0	83.0
L2 GY178	26.5	57	1.2	5.0	93.8	3.0	8.0	89.0	7.9	7.2	84.9
Mean L2	31.3	58	0.6	3.0	96.4	3.2	7.6	89.2	8.4	7.9	83.7
L1+L2 GY174	39.9	57	1.0	3.5	95.5	2.0	6.6	91.4	8.4	8.6	83.0
L1 GY175	43.6	57	-	2.3	97.7	2.0	6.6	91.4	4.7	8.1	87.2
M2 GY176	20.2	60	1.2	3.5	95.3	2.4	7.1	90.5	9.6	11.4	79.0
M2 GY177	22.5	59	-	3.1	96.9	3.2	7.5	89.3	8.0	9.0	83.0
M2 GY178	26.6	55	-	3.2	96.8	2.3	6.9	90.8	7.5	9.0	83.5
Mean M2	23.1	58	0.4	3.3	96.3	2.6	7.2	90.2	8.4	9.8	81.8
M1 GY174	30.8	54	1.7	2.9	95.4	4.1	6.9	89.0	11.9	8.1	80.0
M1 GY178	43.1	57	1.5	3.5	94.0	3.1	7.1	89.8	22.7	8.8	68.5
Mean M1	37.0	55	1.6	3.2	95.2	3.6	7.0	89.4	17.3	8.4	74.3
OVERALL MEAN	-	57	0.7	3.1	96.2	2.9	7.2	89.9	9.7	8.6	81.7
1982 ESTIMATES											
(1) Patterson et.al. (1982)			-	-	-	2.0	7.0	91.0	9.5	10.5	80.0
(2) Fluor (1982)			-	-	-	1.0	22.5	76.5	1.0	25.0	74.0

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4. WASHABILITY

4.1 Method

The size fractions from the wet pretreatment were reconstituted into 45 x 11.2mm, 11.2 x 0.5mmWW and 0.5mmWW x 0.125mm fractions for float/sink testing. 11.2mm was chosen as a cut point for the coarse coal because it could approximate to a plant cut point for small coal equipment including water washing cyclones or spirals. The fine coal cut point of 0.5mmWW corresponds to a standard sieve bend aperture. The cut point of 0.125mm was correctly assumed to represent the point below which coal recovery would decrease rapidly.

All testing was carried out in organic liquids, it being assumed that plant preparation of all fractions would involve density reliant separation. Froth flotation was not considered because of the low rank of the coal.

A composite washability of the 45 x 0.5mmWW fraction was calculated, to facilitate comparison between samples and with the slim core results.

4.2 Washability of Seams

Assessment of the washability characteristics of the Mt Nicholas coals to date has been based almost entirely on very small samples derived from slim cores. Consequently there was seldom enough material to subdivide into size fractions or into more than a few relative density fractions. The assessments by necessity reflected the somewhat uncertain reliability of the data, and tended to dwell on theoretical yields for assumed product ash levels without regard to the practicality of performing such separations under operating preparation plant conditions.

As one of the objects of the present study is to commence bridging this information gap, the results are here presented with alternate emphasis - the results quoted having some relevance to the practical limits of washability of the coals in question. The limit used is assumed to be the yield point where the percentage of near density material (± 0.1 RD) begins to exceed 10%. This corresponds to the accepted limit of moderately difficult washability for a jig-type plant (Le Page, 1982). Consequently Tables 5, 7 and 8 in the following section represent to some extent the practical limit of jig washability of the L2, M2 and M1 seams. Coarse washed products with lower ash than the levels indicated would therefore be difficult to achieve. The L1 seam (Table 6) is not sufficiently washable to enable inclusion on a comparable basis.

4.2.1 L2 Seam:

Washability Curves for each L2 seam sample are included as Figures 18-21. They generally indicate a coal of moderately difficult washability as indicated by only gently curved relative density curves and near density curves which with the exception of the GY176 sample, show no tendency to plateau at relative densities corresponding to acceptable yields. The amount of near gravity material is however reduced to acceptable limits at RD's above 1.75, corresponding to theoretical yields in the order of 75-80% with approximately 20% ash. Separation RD's, yields and ashes corresponding to 10% near gravity material are as shown by Table 5.

TABLE 5 - L2 SEAM WASHABILITY AT 10% ± 0.1 RD
(45 x 0.5mmWW)

	Separation RD	Yield %	Cumulative Floats Ash %	Cumulative Sinks Ash %	Instantaneous Ash %
GY175	1.81	78.7	23.4	71.0	49.9
GY176	1.64	68.2	18.3	56.0	38.1
GY177	1.76	82.5	19.4	70.0	45.9
GY178	1.71	79.3	16.6	64.0	40.5
Mean	1.73	77.2	19.4	65.3	43.6

4.2.2 L1 Seam:

Washability curves for the L1 and L2 seams from GY174 and the L1 seam sample from GY175 are included as Figures 22 and 23 respectively. The combined L1 + L2 sample is included in this section because its washability resembles that of the L1 seam and there are no present plans to mine the L2 seam in the vicinity of the sample.

Both figures indicate a coal of very difficult washability. There is virtually no levelling of the RD curves and ash curves are almost straight, indicating a coal containing plies with widely varying but well distributed inherent ash. This is reinforced by the almost uniform distribution of near gravity material over a wide range of separation densities, being generally over 15%.

Jig separation of this coal to a consistent specification with predictable yield may not be possible. This may have to be taken into account in mine planning, so as to avoid if practicable the mining of this seam when product ash control cannot otherwise be maintained by blending.

Table 6 indicates the washability parameters of the samples washed at RD 1.85.

TABLE 6 - L1 SEAM WASHABILITY AT RD 1.85
(45 x 0.5mmWW)

	Yield %	± 0.1 RD %	Cumulative Floats Ash %	Cumulative Sinks Ash %	Instantaneous Ash %
GY174 *	68.2	22.5	24.5	69.0	50.0
GY175	57.3	15.2	26.8	70.0	52.7
Mean	62.8	18.9	25.7	69.5	51.4

* Includes L2

4.2.3 M2 Seam:

Figures 24, 25 and 26 represent washability curves derived for the M2 seam in GY176, GY177 and GY178 respectively.

The relatively good washability characteristic represents a seam of inherently low ash coal containing few bands. The rapid flattening of the instantaneous ash curve indicates the effect of these bands at RD's over 1.60. There is comparatively little near gravity material at separation RD's corresponding to very low product ash levels, but surprisingly high yields.

This coal would be ideally suited as a blend coal in conjunction with the L1 seam, however its geographic isolation from the latter reserve restricts its usefulness for this purpose. It is thus more likely that yield will be maximised.

Table 7 indicates the washability parameters of the samples corresponding to 10% of near gravity material.

TABLE 7 - M2 SEAM WASHABILITY AT 10% ± 0.1 RD
(45 x 0.5mmWW)

	Separation RD	Yield %	Cumulative Floats Ash %	Cumulative Sinks Ash %	Instantaneous Ash %
GY176	1.54	83.1	10.2	51.0	25.1
GY177	1.59	77.8	12.1	53.2	28.2
GY178	1.68	80.8	15.0	62.0	39.1
Mean	1.60	80.6	12.4	55.4	30.8

4.2.4 M1 Seam:

Figures 27 and 28 represent washability curves derived for the M1 seam in GY174 and GY178 respectively and indicate some deterioration in washability from south to north. This reflects increasing band content of the seam in the same direction. Unfortunately the M1 reserve area does not extend sufficiently far westward to enable intermediate locations to be covered by the 100mm core program.

In the south the seam is apparently readily washable down to RD's of approximately 1.65 corresponding to a coarse washed ash level of under 20%. The northerly sample could not be readily washed below RD 1.80 at which point the coarse washed ash level was over 23%, although yields were similar.

TABLE 8 - M1 SEAM WASHABILITY AT 10% ± 0.1 RD
(45 x 0.5mmWW)

	Separation RD	Yield %	Cumulative Floats Ash %	Cumulative Sinks Ash %	Instantaneous Ash %
GY174	1.63	83.7	18.4	68.3	38.8
GY178	1.78	83.4	23.0	75.1	53.6
Mean	1.71	83.6	20.7	71.7	46.2

4.3 Washability of Size Fractions

Figures 29A to 39A show cumulative ash and relative density curves for the 45 x 11.2mm, 11.2 x 0.5mmWW and 0.5mmWW x 0.125mm size fractions as well as the calculated 45 x 0.5mmWW composite, for each seam sample.

As the fractions of each sample in many cases have quite different raw ash levels, a direct comparison of the fractional washabilities is not simple, however the following comments apply in general to all seams.

- Where fractional raw ash levels are similar, the 0.5mmWW x 0.125mm fraction exhibits the highest yield for a given ash, and this effect is accentuated at low washed ash levels.

- The 0.5mmWW x 0.125mm fraction usually has the lowest ash and lowest yield at given RD; conversely similar ash levels are obtained by separation of this fraction at higher RD.

- There are not usually substantial differences in washability between the 45 x 11.2mm fraction and the 11.2 x 0.5mmWW fraction, however the 45 x 11.2mm density curve generally shows better plateauing, suggesting slightly improved washability.

- Fractional washability curves are generally of similar shape to the composite washability curves, implying that the comments made on a seam basis in Section 4.2 apply also to the fractional washabilities of the seams.

4.4 Comment

The washability of the coals as defined by the criteria assumed reinforce the impression gained from the slim core assessment (Patterson et.al, 1982) that, for preparation plant based on jigs:

(a) The L1 seam will be exceedingly difficult to wash to a consistent or acceptable specification and that yields may be unpredictable.

(b) The L2 and M1 seams may be difficult to wash below a coarse coal ash level of 18-20%.

(c) The M2 seam will be easy to wash to quite low ash levels.

The fact that most of the reserve is located within the L2 seam again raises the problem of maintaining an acceptable product ash level in the face of varying dilution levels and without some form of fines treatment.

The feasibility study (Fluor, 1982) concluded that the coal reserves at Mt Nicholas could be beneficiated adequately in a jig-based preparation plant, and this section has thus been based on the premise that such a plant would be favoured. It does however draw attention to the problematic jig-washability of some of the coal, leading to the conclusion that a heavy media plant may be required to provide adequate separation efficiency and controls on product quality. The significance of this problem depends to a large extent on the required ash level of the coarse coal, which will largely be determined by the ash of the fines material to be blended with it. This in turn is heavily dependent on dilution levels and/or fines beneficiation (if any).

The relationship between washabilities as determined from the slim core and from the 100mm core are summarised by Table 9. The comparison is at a constant yield for each seam, which represents the approximate threshold of difficult washability for the L2 and M1 seams, and an equivalent separation RD for the L1 and M2 seams. Note that slim and 100mm core samples are not strictly equivalent, as shown by disparities in raw ash content of the sample. In one instance (M1 seam GY178) this was caused by the exclusion of high ash fines material from the 100mm core sample. In most other cases (notably M1 seam GY174) the exclusion of this material has lessened or removed existing ash disparities (Cf. Table 39).

TABLE 9 - COMPARISON OF SLIM CORE AND 100mm CORE WASHABILITY

SEAM	BORE NO. SLIM GY	BORE NO. 100mm GY	SAMPLE SIZING SLIM mm	SAMPLE SIZING 100mm mm	YIELD %	RAW ASH IN SAMPLE SIZE RANGE SLIM %	RAW ASH IN SAMPLE SIZE RANGE 100mm %	SEPARATION RD SLIM	SEPARATION RD 100mm	CUM. FLOATS ASH SLIM %	CUM. FLOATS ASH 100mm %
L2	33	175	25 x 0	45 x 0.5	80	31.9	32.9	1.76	1.84	23.7	23.8
L2	36	176	25 x 0	45 x 0.5	80	28.3	33.3	1.70	1.99	18.9	22.8
L2	34	177	25 x 0	45 x 0.5	80	27.3	27.9	1.67	1.71	19.1	19.5
L2	44	178	25 x 0	45 x 0.5	80	26.3	26.5	1.73	1.72	17.6	16.8
Mean L2	-	-	25 x 0	45 x 0.5	80	28.5	30.2	1.72	1.82	19.8	20.7
L1	33	175	25 x 0	45 x 0.5	60	38.1	45.1	1.75	1.88	21.6	27.9
L1+L2	123	174	5.6 x 0	45 x 0.5	60	37.5	38.7	1.71	1.75	19.7	21.5
Mean L1	-	-	-	45 x 0.5	60	37.8	41.9	*	1.82	*	24.7
M2	36	176	25 x 0	45 x 0.5	85	19.7	17.0	1.66	1.59	11.5	10.6
M2	34	177	25 x 0	45 x 0.5	85	19.3	21.1	1.50	1.83	13.3	14.2
M2	44	178	25 x 0	45 x 0.5	85	21.8	24.1	1.66	1.80	15.4	16.4
Mean M2	-	-	25 x 0	45 x 0.5	85	20.3	20.7	1.61	1.74	13.4	13.7
M1	123	174	5.6 x 0	45 x 0.5	85	26.1	26.2	1.92	1.66	17.6	18.8
M1	44	178	25 x 0	45 x 0.5	85	41.0	31.1	1.80	1.64	32.0	23.6
Mean M1	-	-	-	45 x 0.5	85	33.6	28.7	*	1.65	*	21.2

* Non comparative results due to different sample sizing.

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5. ASH/COAL LIBERATION

5.1 Method

The intention of the liberation testing was to establish relationships between the indicated washability of the coal at different top sizes and to use these to make projections about the washability of the coal at sizes which could only be obtained from bulk sampling and/or trial mining.

Samples at a sizing of 45 x 0.5mmWW were reconstituted for both the F 1.70 and S 1.70 fractions of each sample. These were successively crushed to 22.4mm, 11.2mm and 5.6mm, being resized and refloated at each stage to determine the amounts of ash liberated from the floats and coal liberated from the sinks by the crushing. A materials flow chart representing one stage of this reduction comprises Figure 40.

There are two effects to be considered when assessing results of liberation testing:

(a) The effect on yield and ash of the more effective separation between coal and non coal material when finely sized.

(b) The increase in the overall proportion of fines which takes place as a result of the reduction.

The combined effect of the two may be that an apparent increase in the proportion of coarse coal floating at a particular RD may be offset by a reduction in the proportion of material remaining within the size fraction, so that the actual mass of material floating may not be significantly different.

Figures 29B to 39B show the net effects of coal liberation on the proportion and ash of material remaining within the +0.5mmWW fraction; these curves are thus uncorrected for the effects of fines generation and are useful for evaluating the effects of crushing on the likely performance of preparation equipment having a +0.5mmWW feed. Tables 10-20 and Figure 41 illustrate the overall liberation effects on mass yield and ash of a range of products including different combinations of sized washed and raw coal.

All mass and ash values are on an air dried basis; no allowance has been made for moisture increases in product coal which would occur as a practical result of feed size reduction.

5.2 Liberation of Coarse Coal

All samples show a net decrease in both ash and yield as a result of successive reduction to -5.6mm, implying that the liberation of high ash reject from the floats fraction is of greater significance than the migration of coal from the sinks. This effect is however more pronounced below 22.4mm.

From 45 to 22.4mm top size there is in all cases a reduction in ash of up to 1.0%, however the yield is less predictable, usually staying within 1.0% but occasionally increasing, as in the M2 and L2 samples from GY176. This indicates that some liberation of lower ash coal from the sinks fraction is taking place within this range of size reduction, and implies that this may be the dominant factor in the reduction of larger sized fractions to about 45 or 50mm.

Below a top size of 22.4mm the slope of most of the liberation curves is sub parallel with the original 45 x 0.5mm cumulative floats curve. The changes from -22.4mm to -11.2mm and from -11.2mm to -5.6mm are usually of a similar magnitude and amount in each case to a drop of the order of 0.5 - 1.0% in ash and 1.0-4.0% in yield at each stage.

5.3 Liberation Effects on Total Sample

The results under Section 5.2 need to be assessed within the context of the total product to determine their actual significance. This depends to a great extent on what actually comprises product and how much of it is cleaned coal. A number of alternatives are examined by Figure 41 and Tables 10-20.

5.3.1 Coarse Floats Product:

This is the base case assuming that product will be derived from coarse floats only and that all -0.5mmWW material will be added to reject. It is represented by Product One on Figure 41 and Tables 10-20. The effects shown are basically those of Section 5.2, however they are accentuated by the accounting for all of the -0.5mmWW material liberated by the crushing which under this case becomes reject. Although the product ashes remain the same as under Section 5.2, the yields decrease rapidly.

5.3.2 Coarse Floats, Fine Floats Product:

Inclusion of washed fines material (-0.5mmWW x 0.125mm) lessens the yield effects of the preceding case, as only the liberated slimes constitute a significant proportion of material lost to reject. This is reflected in yields increased by up to 5% absolute, with marginally reduced ash. This is because the ash of the fines F 1.70 is very low, as indicated under Section 4.3.

5.3.3 Coarse Floats, Total Fines Product:

The overall effect of ash liberation in the coarse fraction is nearly supressed in some cases by a large reduction in yield and increase in ash as a result of the addition of a significant component of fine coal reject over the preceding case. Negative liberation effects (i.e. increased yield and ash) are evident in some low yielding and high product ash coals as a result of the liberation of high ash material from what would have become coarse coal reject, into the fines.

5.3.4 Coarse Floats, Total Fines and Slimes Product:

This case does not differ substantially from the preceding one except in samples having a high proportion of slimes, causing an overall shift in yield and mass. Negative liberation effects as described for the previous sample are enhanced as a result of slimes liberation from both coarse and fine fractions during the comminution.

5.4 Comment

5.4.1 Implications for Slim Core Interpretation:

All of the slim cores have been reduced to their float/sink sizing by minimum fines techniques, i.e. by hand knapping of oversize material. The float/sink performance of this material should therefore most closely approximate to Product 2 of Figure 41 and Tables 10-20 (coarse floats plus fine floats). From Figure 41 it is apparent that the slim core data should understate both the yield and the ash of an equivalent more coarsely sized coal at the same RD of separation. As the liberation curve parallels the cumulative floats curve, it can be conversely stated that the same yield/ash relationship will be demonstrated by the slim core data, but that the RD's of separation of equivalent yield points will be higher than for the coarser sample. A washability diagram would therefore show very similar yield/ash curves, but the RD curve would be displaced to the left.

Whilst the bore data for the slim and 100mm cores shows identical yield/ash relationships, the yield/RD relationship is frequently reverse to that expected (Table 9). It must therefore be concluded that slim cores do not provide a reliable indication of separation RD.

5.4.2 Implications for Plant Feed Sizing:

Some of the liberation curves for washed coal (Products 1 and 2 in Figure 41) show a tendency to level out at the coarse coal end, indicating that optimum yield of the washed fraction may be obtained near a maximum plant feed sizing of 45-50mm. Below this size there appears to be yield reduction caused by ash liberation from the floats, whilst above this point the liberation of clean coal attached to sinks particles may be incomplete. This could only be ascertained by similar testing of a bulk sample at substantially larger sizing.

5.4.3 Implications for Product Coal Qualtiy:

The substantial difference in product ash levels between the various product alternatives of Figure 41 and Tables 10-20 emphasises the significance of the fines and slimes fractions in determining the overall ash of the product. The ash levels indicated are laboratory yields based on a separation RD of 1.70 for all fractions, and with no allowance for dilution. Section 4.2 has already shown that for most of the coal in the reserve, a separation RD of 1.70 is close to or beyond the practical limit of jig washability. It may not therefore be possible to optimise plant yield within market constraints without either or a combination of the following alternatives:

(a) Desliming the raw coal below approx. 0.125mm.
(b) Washing the fine coal.
(c) Use of dense medium plant for the coarse coal; the recommended sizing and problematic washability of some of the coal suggest the use of dense medium cyclones.

TABLE 10 - EFFECT OF SIZING ON PRODUCT YIELD
L2 SEAM GY175
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	62.50	20.8	60.89	19.9	57.99	19.3	52.60	18.6
Sinks	24.30	64.1	24.75	63.9	24.35	65.4	23.20	65.7
Fines (0.125-0.5mmWW) Floats	4.17	17.5	4.82	17.5	6.72	17.4	10.17	17.0
Sinks	2.03	63.4	2.46	62.6	3.39	62.1	5.30	61.9
Slimes (-0.125mm)	7.00	41.3	7.08	41.2	7.55	40.9	8.73	40.9
TOTAL *	100.00	33.5	100.00	33.2	100.00	33.5	100.00	33.6
PRODUCT 1	62.50	20.8	60.89	19.9	57.99	19.3	52.60	18.6
PRODUCT 2	66.67	20.6	65.71	19.7	64.71	19.1	62.77	18.3
PRODUCT 3	68.70	21.9	68.17	21.3	68.10	21.2	68.07	21.7
PRODUCT 4	75.70	23.7	75.25	23.1	75.65	23.2	76.80	23.9

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 11 - EFFECT OF SIZING ON PRODUCT YIELD
L2 SEAM GY176
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	58.73	18.9	58.10	18.7	56.13	18.2	46.51	17.4
Sinks	24.17	68.3	22.56	68.7	22.08	69.0	21.21	67.7
Fines (0.125-0.5mmWW) Floats	3.47	14.7	4.63	16.2	6.14	16.8	12.46	15.7
Sinks	2.83	71.8	3.83	72.7	4.44	72.1	6.79	69.2
Slimes (-0.125mm)	10.8	54.9	10.88	54.8	11.21	54.5	13.03	51.9
TOTAL *	100.00	36.1	100.00	35.9	100.00	35.8	100.00	35.9
PRODUCT 1	58.73	18.9	58.10	18.7	56.13	18.2	46.51	17.4
PRODUCT 2	62.20	18.7	62.73	18.5	62.27	18.1	58.97	17.0
PRODUCT 3	65.03	21.0	66.56	21.6	66.71	21.7	65.76	22.4
PRODUCT 4	75.83	25.8	77.44	26.3	77.92	26.4	78.79	27.3

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 12 - EFFECT OF SIZING ON PRODUCT YIELD
L2 SEAM GY177
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	69.42	18.2	65.96	17.2	60.92	16.0	51.62	14.7
Sinks	17.48	66.6	19.10	64.2	21.21	64.0	21.64	63.6
Fines (0.125-0.5mmWW) Floats	3.26	12.0	4.52	12.2	6.40	12.3	11.42	12.4
Sinks	1.84	59.8	2.32	59.6	2.87	57.8	5.00	58.7
Slimes (-0.125mm)	8.00	44.4	8.10	44.3	8.60	44.0	10.32	42.8
TOTAL *	100.00	29.3	100.00	29.1	100.00	29.6	100.00	30.1
PRODUCT 1	69.42	18.2	65.96	17.2	60.92	16.0	51.62	14.7
PRODUCT 2	72.68	17.9	70.48	16.9	67.32	15.7	63.04	14.3
PRODUCT 3	74.52	19.0	72.80	18.2	70.19	17.4	68.04	17.6
PRODUCT 4	82.52	21.4	80.90	20.8	78.79	20.3	78.36	20.9

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 13 - EFFECT OF SIZING ON PRODUCT YIELD
L2 SEAM GY178
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	68.68	16.5	66.13	16.0	59.31	14.8	50.03	13.2
Sinks	18.02	64.5	18.29	64.3	19.80	63.3	21.07	61.9
Fines (0.125-0.5mmWW) Floats	3.82	10.4	5.44	10.6	8.82	11.0	13.42	11.2
Sinks	1.58	58.9	2.15	58.9	3.07	57.9	4.95	59.3
Slimes (-0.125mm)	7.90	36.3	7.99	36.3	9.00	34.7	10.53	34.2
TOTAL *	100.00	27.2	100.00	27.1	100.00	27.2	100.00	27.7
PRODUCT 1	68.68	16.5	66.13	16.0	59.31	14.8	50.08	13.2
PRODUCT 2	72.50	16.2	71.57	15.6	68.13	14.3	63.45	12.8
PRODUCT 3	74.08	17.1	73.72	16.9	71.20	16.2	68.40	16.1
PRODUCT 4	81.98	19.0	81.71	18.8	80.20	18.3	78.93	18.6

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 14 - EFFECT OF SIZING ON PRODUCT YIELD
L1 & L2 SEAMS GY174
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	47.37	19.9	46.08	19.4	44.01	18.9	40.25	18.5
Sinks	38.53	61.8	38.17	60.7	37.04	61.5	34.53	61.7
Fines (0.125-0.5mmWW) Floats	2.92	18.7	3.61	18.5	5.20	17.9	8.13	17.1
Sinks	2.78	61.4	3.65	60.4	4.75	61.0	7.05	60.9
Slimes (-0.125mm)	8.4	52.0	8.49	51.9	9.00	51.3	10.04	50.6
TOTAL *	100.00	39.9	100.00	39.4	100.00	39.5	100.00	39.5
PRODUCT 1	47.37	19.9	46.08	19.4	44.01	18.9	40.25	18.5
PRODUCT 2	50.29	19.8	49.69	19.3	49.21	18.8	48.38	18.3
PRODUCT 3	53.07	22.0	53.34	22.1	53.96	22.5	55.43	23.7
PRODUCT 4	61.47	26.1	61.83	26.2	62.96	26.6	65.47	27.8

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 15 - EFFECT OF SIZING ON PRODUCT YIELD
L1 SEAM GY175
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	39.93	20.8	38.95	20.4	36.35	19.0	33.00	18.4
Sinks	49.37	64.7	48.16	65.1	46.98	65.7	42.67	66.1
Fines (0.125-0.5mmWW) Floats	3.22	17.4	4.31	17.2	5.96	16.9	8.42	15.6
Sinks	2.78	60.3	3.79	60.2	5.45	61.0	9.47	62.6
Slimes (-0.125mm)	4.70	41.5	4.79	41.6	5.26	41.7	6.44	43.6
TOTAL *	100.00	44.4	100.00	44.3	100.00	44.3	100.00	44.3
PRODUCT 1	39.93	20.8	38.95	20.4	36.35	19.0	33.00	18.4
PRODUCT 2	43.15	20.6	43.26	20.1	42.31	18.7	41.42	17.8
PRODUCT 3	45.93	23.0	47.05	23.3	47.76	23.5	50.89	26.2
PRODUCT 4	50.63	24.7	51.84	25.0	53.02	25.3	57.33	28.1

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 16 - EFFECT OF SIZING ON PRODUCT YIELD
M2 SEAM GY176
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	74.30	11.4	73.82	11.2	68.01	11.0	58.01	10.4
Sinks	10.10	58.2	9.57	59.1	9.15	59.6	9.17	58.5
Fines (0.125-0.5mmWW) Floats	4.73	12.7	5.55	12.7	10.05	11.2	17.35	10.4
Sinks	1.27	60.8	1.46	60.8	1.89	59.3	2.92	56.5
Slimes (-0.125mm)	9.60	49.4	9.60	49.4	10.90	45.3	12.55	41.3
TOTAL *	100.00	20.5	100.00	20.3	100.00	20.1	100.00	20.0
PRODUCT 1	74.30	11.4	73.82	11.2	68.01	11.0	58.01	10.4
PRODUCT 2	79.03	11.5	79.37	11.3	78.06	11.0	75.36	10.4
PRODUCT 3	80.30	12.3	80.83	12.2	79.95	12.2	78.28	12.1
PRODUCT 4	89.90	16.3	90.43	16.2	90.85	16.1	90.83	16.1

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 17 - EFFECT OF SIZING ON PRODUCT YIELD
M2 SEAM GY177
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	69.97	13.1	67.80	12.4	64.10	11.8	55.75	11.2
Sinks	15.73	56.6	15.28	57.4	15.68	56.9	15.34	56.4
Fines (0.125-0.5mmWW) Floats	3.92	10.6	5.59	10.6	7.76	10.6	13.46	10.5
Sinks	2.38	56.9	3.17	57.3	3.80	57.1	5.29	56.6
Slimes (-0.125mm)	8.0	40.5	8.16	40.2	8.66	39.1	10.16	36.4
TOTAL *	100.00	23.1	100.00	22.9	100.00	22.9	100.00	23.0
PRODUCT 1	69.97	13.1	67.80	12.4	64.10	11.8	55.75	11.2
PRODUCT 2	73.89	13.0	73.39	12.3	71.86	11.7	69.21	11.1
PRODUCT 3	76.27	14.3	76.56	14.1	75.66	14.0	74.50	14.3
PRODUCT 4	84.27	16.9	84.72	16.7	84.32	16.6	84.66	17.0

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 18 - EFFECT OF SIZING ON PRODUCT YIELD
M2 SEAM GY178
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	71.68	15.5	68.57	14.9	63.63	14.0	51.77	12.6
Sinks	15.52	63.9	15.47	63.3	16.53	62.4	17.65	60.3
Fines (0.125-0.5mmWW) Floats	3.43	10.3	5.31	10.5	7.90	10.7	14.25	11.0
Sinks	1.87	61.9	2.70	62.4	3.38	61.6	5.38	60.6
Slimes (-0.125mm)	7.50	45.3	7.95	43.8	8.56	42.1	10.95	37.3
TOTAL *	100.00	25.9	100.00	25.7	100.00	25.8	100.00	26.1
PRODUCT 1	71.68	15.5	68.57	14.9	63.63	14.0	51.77	12.6
PRODUCT 2	75.11	15.3	73.88	14.6	71.53	13.6	66.02	12.3
PRODUCT 3	76.98	16.4	76.58	16.3	74.91	15.8	71.40	15.9
PRODUCT 4	84.48	18.9	84.53	18.8	83.47	18.6	82.35	18.8

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 19 - EFFECT OF SIZING ON PRODUCT YIELD
M1 SEAM GY174
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	70.57	18.8	68.67	17.8	60.17	17.5	54.76	17.0
Sinks	11.23	72.7	11.21	72.1	11.25	72.9	10.42	74.5
Fines (0.125-0.5mmWW) Floats	3.64	15.6	4.75	15.5	10.70	15.3	14.95	15.7
Sinks	2.66	67.9	3.33	67.2	4.20	66.0	5.25	67.0
Slimes (-0.125mm)	11.9	64.2	12.04	63.7	13.68	58.6	14.62	56.4
TOTAL *	100.00	31.5	100.00	31.0	100.00	31.2	100.00	31.2
PRODUCT 1	70.57	18.8	68.67	17.8	60.17	17.5	54.76	17.0
PRODUCT 2	74.21	18.6	73.42	17.7	70.87	17.2	69.71	16.7
PRODUCT 3	76.87	20.4	76.75	19.8	75.07	19.9	74.96	20.2
PRODUCT 4	88.77	26.2	88.79	25.8	88.75	25.9	89.58	26.1

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

TABLE 20 - EFFECT OF SIZING ON PRODUCT YIELD
M1 SEAM GY178
(Laboratory yields at RD 1.70)

	-45mm		-22.4mm		-11.2mm		-5.6mm	
	Mass	Ash	Mass	Ash	Mass	Ash	Mass	Ash
Coarse + (+ 0.5mmWW) Floats	55.50	21.5	52.55	20.8	47.50	19.8	39.76	18.6
Sinks	14.1	68.8	13.69	66.4	14.78	66.6	15.12	67.3
Fines (0.125-0.5mmWW) Floats	2.34	14.6	3.61	15.1	6.30	15.5	10.66	15.5
Sinks	5.36	69.6	7.09	70.7	7.82	69.6	9.45	67.6
Slimes (-0.125mm)	22.7	77.3	23.06	76.6	23.60	75.4	25.01	72.5
TOTAL *	100.00	43.2	100.00	43.2	100.00	43.5	100.00	43.7
PRODUCT 1	55.50	21.5	52.55	20.8	47.50	19.8	39.76	18.6
PRODUCT 2	57.84	21.2	56.16	20.4	53.80	19.3	50.42	17.9
PRODUCT 3	63.20	25.3	63.25	26.1	61.62	25.7	59.87	25.8
PRODUCT 4	85.90	39.0	86.31	39.5	85.22	39.5	84.88	39.5

PRODUCT 1 : Coarse Floats only.

PRODUCT 2 : Coarse Floats + Fine Floats

PRODUCT 3 : Coarse Floats + Total Fines

PRODUCT 4 : Coarse Floats + Total Fines + Slimes

* Ash variation in total is due to rounding errors and difficulty of accurate determination with some smaller samples.

6. COAL QUALITY

6.1 Raw Coal

As indicated in Section 2.3, the main area where additional raw coal quality data was needed concerned Hardgrove grindability indices. This was the only raw coal analytical work carried out as part of the 100mm core program which significantly advanced the 1982 results.

The raw coal Hardgrove grindability indices have been presented in Table 4, as they relate principally to the synthesis of the feed size distribution.

There is generally little variation of the index in the raw coal from around 55 to 60, and consequently no observable dependence on ash levels. The indicies are however generally the same or slightly less for the washed coal than for the raw coal, indicating that band materials are in general terms slightly softer than the coal. The exception was the M1 Seam, where washed coal indices were significantly lower than raw coal indices.

6.2 Clean Coal

Samples representing cumulative floats of the 45 x 0.5mmWW fraction nearest 20% ash were prepared and subjected to the analyses as listed under Section 2.5. Not all samples yielded enough material to determine Hardgrove grindability indices and abrasion indices on the washed coal.

6.2.1 Result Summary:

Results are presented in summary form in Tables 21-30, which compare the 100mm core results with those of equivalent slim cores, and with averaged results of all of the slim cores as previously promulgated (Patterson et.al., 1982). Format is similar for ease of comparison, Tables 21-26 and 30 being directly equivalent to Tables 7.3-7.9 in the previous report. Significant departures from the previously determined value or established norm are underlined in the tables, however there are no consistent differences which would alter the previous findings.

The following additional determinations are worthy of comment:

Forms of Sulphur:
Approximately 15% of the total sulphur present in the washed coal is pyritic sulphur, in the L2 seam the proportion falls to 10%. Total sulphur levels remain low at around 0.3 - 0.4%.

Abrasion Indices:
Nine abrasion indices have been determined, all indicating coals of low abrasiveness, however, the M seams appear slightly more abrasive than the L2 seam. L1 seam abrasiveness could not be determined because of insufficient washed coal sample yield.

Petrology:
Table 30 summarises the extent of known petrological data for Mt Nicholas coals, with examples of Duncan coal included for the purposes of comparison. Some differences of opinion between various petrographers who have looked at the coals are evident. These relate to the balance of the major constituent macerals vitrinite, semifusinite, and inertodetrinite. Checking and revision of the Casco results had the effect of reallocating some of the original vitrinite count to semifusinite, which lessened the disparity without removing it. The revised results form the basis of Table 30 and have been used in Tables 31, 33 and 34; full results are included in Appendix 1.

6.2.2 Data:

All washed coal analyses are included in full in Appendix 1, however Tables 31-34 present the raw data in a more accessable format. These tables comprise extensions to Tables 7.14 to 7.17 in Patterson et.al. (1982).

SAMPLE SUITE IDENTIFICATION

A 100mm diameter core result.
B Slim diameter core result from same drillsite as 100mm diameter core.
C Slim diameter core result from all Mt Nicholas intersections.

TABLE 21 - MEAN PROXIMATE ANALYSES OF WASHED COAL
(Corrected to 20% ash)

	MIDDLE 1 SEAM			MIDDLE 2 SEAM			LOWER 1 SEAM			LOWER 2 SEAM		
	A	B	C	A	B	C	A	B	C	A	B	C
MOISTURE % ad	5.3	6.6	6.9	4.8	6.3	6.3	4.0	5.2	5.8	4.3	6.4	5.9
ASH % ad	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
VOLATILE MATTER % ad	28.2	27.8	27.7	26.4	24.7	25.3	26.5	23.9	25.3	25.5	24.1	23.5
FIXED CARBON % ad	46.5	45.6	45.4	48.8	49.0	48.9	49.5	50.9	48.9	50.2	49.5	50.6
VOLATILE MATTER % daf	37.8	37.9	37.9	35.1	33.5	34.1	34.9	31.9	34.1	33.7	32.7	31.7
VOLATILE MATTER % dmmf	34.9	35.0	35.3	32.7	31.6	31.1	31.4	29.3	31.1	31.0	30.0	29.9
NUMBER OF SAMPLES	(2)	(2)	(11)	(3)	(3)	(6)	(1)	(1)	(10)	(4)	(4)	(20)

TABLE 22 - MEAN ULTIMATE ANALYSES OF WASHED COAL

CARBON % daf	80.03	79.7	80.25	79.64	81.30	81.31	79.30	83.20	81.57	80.36	81.75	81.57
HYDROGEN % daf	4.93	4.88	4.91	4.55	4.94	4.94	4.72	5.42	4.88	4.44	5.09	4.88
NITROGEN % daf	1.54	1.45	1.45	1.46	1.42	1.42	1.56	1.48	1.43	1.44	1.42	1.43
SULPHUR % daf	0.48	0.69	0.54	0.44	0.41	0.41	0.42	0.45	0.47	0.48	0.44	0.47
OXYGEN % daf	13.02	13.28	12.85	13.92	11.94	11.94	14.00	9.45	11.66	13.29	11.31	11.66
CARBON DIOXIDE % AA	0.38	0.17	0.55	0.38	0.51	0.51	0.19	0.28	0.19	0.22	0.19	0.55
NUMBER OF SAMPLES	(2)	(1)	(4)	(3)	(3)	(4)	(1)	(1)	(3)	(4)	(4)	(9)

533041

SAMPLE SUITE IDENTIFICATION

A 100mm diameter core result.
B Slim diameter core result from same drillsite as 100mm diameter core.
C Slim diameter core result from all Mt Nicholas intersections.

TABLE 23 - MEAN MINOR CONSTITUENT ANALYSES OF WASHED COAL

	MIDDLE 1 SEAM			MIDDLE 2 SEAM			LOWER 1 SEAM			LOWER 2 SEAM		
	A	B	C	A	B	C	A	B	C	A	B	C
SULPHUR %	0.39	0.50	0.42	0.34	0.33	0.34	0.37	0.34	0.34	0.36	0.33	0.35
PHOSPHORUS %	0.05	0.04	0.001	0.02	0.07	0.001	0.03	N.A.	0.002	0.015	0.05	0.01
CHLORINE %	0.008	0.001	0.04	0.05	0.001	0.06	0.004	0.002	0.07	0.009	0.003	0.05
ARSENIC ppm As_2O_3	1.0	0.70	1.30	1.0	0.70	1.00	0.60	N.A.	1.00	1.0	N.A.	0.80
NUMBER OF SAMPLES	(3)	(1)	*	(4)	(4)	*	(1)	(1)	*	(4)	(4)	*

N.A. : Not analysed.

* Number of Samples

	M1	M2	L1	L2
Sulphur	11	5	10	21
Chlorine	2	3	2	7
Phosphorus	3	4	3	7
Arsenic	3	3	2	5

533042

SAMPLE SUITE IDENTIFICATION

A 100mm diameter core result.
B Slim diameter core result from same drillsite as 100mm diameter core.
C Slim diameter core result from all Mt Nicholas intersections.

TABLE 24 - MEAN ASH ANALYSES OF WASHED COAL

	MIDDLE 1 SEAM			MIDDLE 2 SEAM			LOWER 1 SEAM			LOWER 2 SEAM		
	A	B	C	A	B	C	A	B	C	A	B	C
SiO_2	65.0	61.00	51.00	63.47	61.23	61.60	61.30	61.80	64.03	61.03	61.68	60.96
Al_2O_3	23.4	26.00	23.27	27.77	27.70	27.70	32.40	32.00	29.30	30.85	30.60	30.68
Fe_2O_3	6.83	7.10	5.58	2.79	4.57	4.57	2.30	2.60	2.68	4.10	3.61	3.89
CaO	1.45	1.16	2.66	2.22	0.96	0.96	1.42	0.13	0.35	1.10	0.81	0.69
MgO	1.71	2.10	1.06	0.81	0.95	0.95	0.37	0.35	0.37	0.73	0.58	0.69
TiO_2	0.72	1.58	1.13	1.03	1.13	1.10	1.23	1.34	1.64	1.06	0.98	1.22
Na_2O	0.22	0.26	0.30	0.20	0.15	0.15	0.31	0.11	0.20	0.22	0.16	0.23
K_2O	0.45	0.75	0.65	0.86	0.57	0.57	0.50	0.26	0.33	0.54	0.36	0.42
P_2O_5	0.04	0.01	0.01	0.26	0.02	0.02	0.04	0.03	0.02	0.05	0.04	0.09
Mn_3O_4	0.03	0.05	0.09	0.06	0.05	0.05	0.04	0.04	0.03	0.04	0.03	0.03
SO_3	0.19	0.35	1.31	0.60	0.38	0.38	0.28	0.23	0.27	0.40	0.20	0.15
NUMBER OF SAMPLES	(2)	(1)	(3)	(3)	(3)	(4)	(1)	(1)	(3)	(4)	(4)	(11)

CCC047C

SAMPLE SUITE IDENTIFICATION

A 100mm diameter core result.
B Slim diameter core result from same drillsite as 100mm diameter core.
C Slim diameter core result from all Mt Nicholas intersections.

TABLE 25 - SLAGGING AND FOULING FACTORS

	MIDDLE 1 SEAM			MIDDLE 2 SEAM			LOWER 1 SEAM			LOWER 2 SEAM		
	A	B	C	A	B	C	A	B	C	A	B	C
SLAGGING FACTOR Rs	0.04-0.05	0.07	0.03-0.09	0.02-0.04	0.02-0.03	0.01-0.04	0.02	0.01	0.01-0.02	0.01-0.04	0.01-0.03	0.01-0.04
FOULING FACTOR Rf	0.02-0.04	0.03	0.01-0.07	<0.01-0.02	0.01-0.02	0.01-0.02	0.02	<0.01	0.01	0.01-0.02	0.01-0.02	0.01-0.05
NUMBER OF SAMPLES	(2)	(1)	(3)	(3)	(3)	(4)	(1)	(1)	(3)	(4)	(4)	(11)

TABLE 26 - ASH FUSION TEMPERATURES
(Degree celsius - Reducing Atmosphere)

			*									
DEFORMATION	1310-1320	1360	1360-1410	1490-1570	1380->1600	1340->1600	>1600	>1600	1560->1600	1460->1600	1540->1600	1330->1600
SPHERICAL	1420-1460	1470	1470-1500	1575->1600	1490->1600	1410->1600	>1600	>1600	>1600	1570->1600	>1600	1480->1600
HEMISPHERE	1450-1490	1490	1490-1560	1590->1600	1510->1600	1420->1600	>1600	>1600	>1600	1580->1600	>1600	1500->1600
FLOW	1500-1530	1500	1500-1560	>1600	1520->1600	1440->1600	>1600	>1600	>1600	>1600	>1600	1520->1600

* Excludes GY43

330141

TABLE 27 - MEAN FORMS OF SULPHUR ANALYSES OF WASHED COAL

(100mm DIAMETER HOLES ONLY)

	MIDDLE 1	MIDDLE 2	LOWER 1	LOWER 2
PYRITIC SULPHUR %	0.06	0.05	0.06	0.03
SULPHATE SULPHUR %	< 0.01 - 0.03	< 0.01	0.01	< 0.01
ORGANIC SULPHUR %	0.31	0.29	0.30	0.26
NUMBER OF SAMPLES	(2)	(3)	(1)	(4)

SAMPLE SUITE IDENTIFICATION

A 100mm diameter core result.
B Slim diameter core result from same drillsite as 100mm diameter core.
C Slim diameter core result from all Mt Nicholas intersections.

TABLE 28 - HARDGROVE GRINDABILITY INDICES OF WASHED COAL

	MIDDLE 1 SEAM			MIDDLE 2 SEAM			LOWER 1 SEAM			LOWER 2 SEAM		
	A	B	C	A	B	C	A	B	C	A	B	C
MEAN	48	46	55	57	56	58	N.D.	57	58	56	57	56
RANGE	46-49	46	46-71	54-61	52-59	57-58			57-58	54-57	55-58	51-61
NUMBER OF SAMPLES	(2)	(1)	(5)	(3)	(3)	(4)	(0)	(1)	(3)	(4)	(4)	(10)

N.D. : Not Determined

533043

TABLE 29 - ABRASION INDICES OF WASHED COAL

	(100mm DIAMETER HOLES ONLY)			
	MIDDLE 1	MIDDLE 2	LOWER 1	LOWER 2
MEAN ABRASION INDEX mg/kg	21	24	N.D.	16
RANGE	17.5 - 25	19-28	-	14-21
NUMBER OF SAMPLES	(2)	(3)	(0)	(4)

N.D. : Not Determined

533046

TABLE 30 - PETROLOGY OF WASHED COAL

SEAM	M1			M2			L2			M1	M2	L2	E.Fingal Duncan (Raw Coal)	
LOCATION	GY174	GY178	GY176	GY177 (1)	GY178	GY175	GY176	GY177 (1)	GY178	GY43	GY34 (1)	GY34 (1)	Duncan (2)	Colliery (2)
PETROGRAPHER	Fay	Fay	Fay	Fay	Fay	Fay	Fay	Fay	Fay	Norris	Lacey	Lacey	Smyth (3)	Smyth (3)
RESULTS (m.m.f.)														
Vitrinite	23.0	34.9	27.7	30.5	34.2	18.3	30.0	35.5	27.8	32.9	14.0	18.3	13.0	15.3
Exinite	8.7	10.6	13.7	3.8	9.1	8.2	3.4	4.9	4.3	3.9	4.4	3.3	5.0	5.7
Resinite	0.9	1.8	3.4	0.7	1.3	1.6	0.5	1.1	0.7	2.6	2.2	1.1	0.3(4)	0.5(4)
Sporinite	7.3	7.9	10.1	3.1	6.9	6.2	2.7	3.6	3.6	1.3	2.2	2.2	1.9	1.2
Cutinite	0.5	0.9	0.2	-	0.9	0.4	0.2	0.2	-	-	Tr	Tr	2.8	4.0
Intertinite	68.3	54.5	58.6	65.7	56.7	73.5	66.6	59.6	67.9	63.2	81.6	78.4	82.0	79.0
Fusinite	9.5	7.2	4.6	7.4	7.6	9.4	12.5	5.8	11.5	1.3	2.2	3.2	0.8	0.6
Semifusinite	36.9	31.6	38.4	42.6	36.5	43.1	31.0	35.1	40.2	35.6	69.7	65.5	53.8	53.8
Macrinite	11.8	7.9	7.6	8.3	7.6	11.9	8.0	10.8	10.2	6.6	-	1.1	1.2	1.5
Inertodetrinite	8.0	5.8	6.9	4.0	3.4	6.8	12.2	5.4	3.6	18.4	8.6	7.5	25.8	22.8
Micrinite	2.1	2.0	1.1	3.4	1.6	2.3	2.9	2.5	2.4	1.3	1.1	1.1	0.4	0.3
Ro max all Vitrinite	0.64	0.68	0.68	0.69	0.70	0.60	0.71	0.68	0.67	0.67	0.55	0.55	0.58	0.58
	Casco 1982-83									ACIRL 1981			Independent	

(1) GY34 and GY177 were drilled at the same location 12m apart.
(2) Same measures as Mt. Nicholas seams, correlation uncertain.
(3) Smyth M., (1979) and Smyth M. et.al., (1980) Mean of 5 maceral analyses between the two seams.
(4) Liptodetrinite.

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TABLE 31 - WASHED COAL QUALITY - L2 SEAM

BORE NO.		100mm CORE HOLES 175	176	177	178	$\bar{X}$	CORRESPONDING SLIM HOLES 33	36	34	44	$\bar{X}$
Seam Thickness (m)		-	-	-	-		1.71	1.57	2.05	2.96	
Sample (Cum. Fl.RD)		1.7	1.8	1.8	2.0		1.7	1.7	1.7	1.7	
Yield %		72.0	73.69	84.37	87.98		74.4	79.8	82.7	78.1	
Relative Density		1.51	1.50	1.50	1.52		-	-	-	-	
Proximate Analysis											
Moisture	% a.d.	3.0	3.5	5.7	5.1	4.3	5.2	6.9	6.5	7.1	6.4
Ash	% a.d.	20.7	19.7	19.5	19.6	19.9	21.9	19.8	19.7	16.9	19.6
Volatile Matter	% a.d.	24.6	27.1	24.9	25.5	25.5	22.9	25.9	23.6	24.5	24.2
Fixed Carbon	% a.d.	51.7	49.7	49.9	49.8	50.3	50.0	47.4	50.2	51.5	49.8
Ultimate Analysis											
Carbon	% d.a.f.	80.52	80.87	80.03	80.01	80.35	82.40	79.90	82.10	82.60	81.75
Hydrogen	% d.a.f.	4.31	4.81	4.34	4.30	4.44	5.52	4.95	5.32	4.56	5.09
Nitrogen	% d.a.f.	1.38	1.52	1.43	1.41	1.44	1.55	1.33	1.38	1.42	1.42
Sulphur	% d.a.f.	0.55	0.44	0.47	0.44	0.48	0.41	0.58	0.31	0.44	0.44
Oxygen	% d.a.f.	13.24	12.36	13.73	13.84	13.29	10.12	13.24	10.89	10.98	11.31
(Carbonates)	% A.A.	0.39	0.12	0.22	0.16	0.22	0.43	0.09	0.20	0.04	0.19
Sulphur	% a.d.	0.41	0.34	0.35	0.33	0.36	0.30	0.44	0.23	0.34	0.33
Chlorine	% a.d.	0.01	0.01	0.02	0.02	0.015		0.03		0.07	0.05
Phosphorus	% a.d.	0.017	0.002	0.008	0.007	0.009	0.003	0.001	0.005		0.003
Arsenic P.P.M. As_2O_3		<1	<1	<1	<1	<1		0.1			0.1
Specific Energy MJ/kg		24.70	24.54	24.24	24.22	24.43	23.65	24.12	24.17	25.27	24.30
Hardgrove Grindability		54	56	57	56	56	58	58	57	55	57
Abrasion Index mg/kg		14.0	14.2	16.2	21.0	16.4					
Ash Analysis											
SiO_2		56.6	62.2	60.7	64.6	61.03	61.4	60.0	60.0	65.3	61.68
Al_2O_3		34.7	26.8	31.7	30.2	30.85	31.0	31.2	31.6	28.60	30.60
Fe_2O_3		4.61	7.08	2.42	2.30	4.10	3.81	4.20	3.65	2.80	3.61
CaO		0.80	1.35	1.67	0.57	1.10	0.23	1.30	1.20	0.49	0.81
MgO		0.77	0.47	0.65	0.54	0.73	0.42	0.91	0.30	0.70	0.58
TiO_2		1.17	0.94	1.23	0.91	1.06	1.08	0.94	0.90	1.00	0.98
Na_2O		0.21	0.17	0.29	0.19	0.22	0.10	0.21	0.15	0.17	0.16
K_2O		0.45	0.51	0.69	0.52	0.54	0.30	0.55	0.31	0.27	0.36
P_2O_5		0.08	0.02	0.04	0.04	0.05	0.03	0.01	0.06	0.04	0.04
Mn_3O_4		0.08	0.03	0.03	0.01	0.04	0.06	0.02	0.01	0.01	0.03
SO_3		0.77	0.13	0.58	0.12	0.40	0.56	0.06	0.15	0.02	0.20

TABLE 31 Cont'd - WASHED COAL QUALITY - L2 SEAM

BORE NO.		100mm CORE HOLES 175	176	177	178	$\bar{X}$	CORRESPONDING SLIM HOLES 33	36	34	44	$\bar{X}$
Ash Fusion											
Deformation	°C	>1600	1460	>1600	>1600		>1600	1580	>1600	1540	
Spherical	°C	>1600	1570	>1600	>1600		>1600	>1600	>1600	>1600	
Hemisphere	°C	>1600	1580	>1600	>1600		>1600	>1600	>1600	>1600	
Flow	°C	>1600	>1600	>1600	>1600		>1600	>1600	>1600	>1600	
Volatile Matter	d.a.f.	32.2	36.7	33.3	33.9	33.6	31.4	35.3	32.0	32.2	32.7
Volatile Matter	d.m.m.f.	29.3	32.7	30.6	31.2	31.0	28.1	32.7	29.2	30.0	30.0
Base/Acid Ratio		0.07	0.11	0.06	0.04	0.07	0.05	0.08	0.06	0.05	0.06
Slagging Factor Rs		0.03	0.04	0.02	0.01	0.03	0.02	0.03	0.01	0.02	0.02
Fouling Factor Rf		0.01	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.01	0.01
Forms of Sulphur											
Pyritic Sulphur	%	0.03	0.04	0.03	0.03						
Sulphate Sulphur	%	<0.01	<0.01	<0.01	<0.01						
Organic Sulphur	%	0.38	0.30	0.32	0.30						
Petrographic Analysis											
Vitrinite	% m.m.f.	18.3	30.0	35.5	27.8						
Exinite	% m.m.f.	8.2	3.4	4.9	4.3						
Inertinite	% m.m.f.	73.5	66.6	59.6	67.9						
Ro max. all Vitrinite		0.60	0.71	0.68	0.67						

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TABLE 32 - WASHED COAL QUALITY - L1 SEAM AND COMBINED L1, L2 SEAMS

BORE NO.	100mm CORE HOLES GY175 L1	100mm CORE HOLES GY174 L1, L2	CORRESPONDING SLIM HOLE GY33 L1
Seam Thickness (m)	-	-	2.49
Sample (Cum. Fl.RD)	1.8	1.8	1.7
Yield %	53.97	64.55	54.0
Relative Density	1.56	1.53	-
Proximate Analysis			
Moisture % a.d.	3.8	4.1	5.3
Ash % a.d.	24.8	23.0	18.9
Volatile Matter % a.d.	24.9	24.2	24.2
Fixed Carbon % a.d.	46.5	48.7	51.6
Ultimate Analysis			
Carbon % d.a.f.	79.30	80.05	83.20
Hydrogen % d.a.f.	4.72	4.45	5.42
Nitrogen % d.a.f.	1.56	1.57	1.48
Sulphur % d.a.f.	0.42	0.41	0.45
Oxygen % d.a.f.	14.00	13.52	9.45
(Carbonates) % A.A.	0.19	0.21	0.28
Sulphur % a.d.	0.37	0.34	0.34
Chlorine % a.d.	0.03	0.02	0.02
Phosphorus % a.d.	0.004	0.004	0.002
Arsenic P.P.M. As_2O_3	0.6	0.3	
Specific Energy MJ/kg	23.08	23.18	24.73
Hardgrove Grindability	-	-	57
Ash Analysis			
SiO_2	61.3	61.3	61.8
Al_2O_3	32.4	31.5	32.0
Fe_2O_3	2.3	3.34	2.60
CaO	1.42	0.82	0.13
MgO	0.37	0.61	0.35
TiO_2	1.23	1.25	1.34
Na_2O	0.31	0.68	0.11
K_2O	0.50	0.56	0.26
P_2O_5	0.04	0.04	0.03
Mn_3O_4	0.04	0.04	0.04
SO_3	0.28	0.08	0.23

533051

TABLE 32 Cont'd - WASHED COAL QUALITY - L1 SEAM AND COMBINED L1, L2 SEAMS

BORE NO.		100mm CORE HOLES GY175 L1	100mm CORE HOLES GY174 L1, L2	CORRESPONDING SLIM HOLE GY33 L1
Ash Fusion				
Deformation	°C	>1600	>1600	>1600
Spherical	°C	>1600	>1600	>1600
Hemisphere	°C	>1600	>1600	>1600
Flow	°C	>1600	>1600	>1600
Volatile Matter	d.a.f.	34.9	33.2	31.9
Volatile Matter	d.m.m.f.	31.4	34.2	29.3
Base/Acid Ratio		0.05	0.06	0.04
Slagging Factor Rs		0.02	0.02	0.01
Fouling Factor Rf		0.02	0.04	< 0.01
Forms of Sulphur				
Pyritic Sulphur	%	0.06	0.03	
Sulphate Sulphur	%	0.01	0.01	
Organic Sulphur	%	0.30	0.30	

TABLE 33 - WASHED COAL QUALITY - M2 SEAM

BORE NO.		100mm CORE HOLES 176	177	178	$\bar{X}$	CORRESPONDING SLIM HOLES 36	34	44	$\bar{X}$
Seam Thickness (m)		-	-	-		1.53	2.14	2.74	
Sample (Cum. Fl.RD)		1.9	2.0	1.7		1.7	1.7	1.7	
Yield %		97.71	91.92	90.24		86.4	90.3	86.2	
Relative Density		1.46	1.49	1.51		-	-	-	
Proximate Analysis									
Moisture	% a.d.	4.0	6.0	4.9	5.0	7.9	6.8	5.7	6.8
Ash	% a.d.	15.6	17.4	18.6	17.2	12.4	14.5	15.7	14.2
Volatile Matter	% a.d.	29.9	25.6	26.5	27.3	28.1	25.2	26.1	26.5
Fixed Carbon	% a.d.	50.5	51.0	50.0	50.5	51.6	53.5	52.5	52.5
Ultimate Analysis									
Carbon	% d.a.f.	79.54	79.52	79.87	79.63	80.00	82.80	81.10	81.29
Hydrogen	% d.a.f.	4.56	4.52	4.56	4.55	4.89	5.31	4.61	4.94
Nitrogen	% d.a.f.	1.48	1.45	1.44	1.46	1.40	1.39	1.46	1.42
Sulphur	% d.a.f.	0.41	0.43	0.47	0.44	0.46	0.27	0.50	0.41
Oxygen	% d.a.f.	14.01	14.08	13.66	13.92	13.25	10.23	12.33	11.94
(Carbonates)	% A.A.	0.07	0.52	0.54	0.38	0.70	0.70	0.14	0.51
Sulphur	% a.d.	0.33	0.33	0.36	0.34	0.38	0.21	0.40	0.33
Chlorine	% a.d.	0.02	0.02	0.02	0.02	0.09		0.04	0.065
Phosphorus	% a.d.	0.001	0.130	0.007	0.05	0.001	0.002	0.001	0.001
Arsenic P.P.M. As_2O_3		<1	<1	<1	<1	0.3		1.1	0.7
Specific Energy MJ/kg		25.56	24.38	24.78	24.91	26.36	25.65	25.74	25.92
Hardgrove Grindability		61	57	54	57	59	56	52	56
Abrasion Index mg/kg		28.0	23.7	19.0	23.6				
Ash Analysis									
SiO_2		68.8	60.4	61.2	63.47	64.0	60.7	59.0	61.23
Al_2O_3		25.0	26.8	31.5	27.77	28.3	22.8	32.0	27.7
Fe_2O_3		2.41	3.24	2.71	2.79	3.30	7.00	3.40	4.57
CaO		1.13	4.18	1.36	2.22	1.26	0.81	0.80	0.96
MgO		0.78	0.95	0.70	0.81	0.96	1.00	0.90	0.95
TiO_2		0.96	1.10	1.04	1.03	0.83	1.10	1.46	1.13
Na_2O		0.15	0.14	0.31	0.20	0.07	0.08	0.30	0.15
K_2O		0.89	1.03	0.65	0.86	1.01	0.23	0.46	0.57
P_2O_5		0.02	0.73	0.04	0.26	0.01	0.03	0.02	0.02
Mn_3O_4		0.01	0.09	0.07	0.06	0.01	0.08	0.06	0.05
SO_3		0.04	1.34	0.42	0.60	0.07	0.70	0.38	0.38

TABLE 33 Cont'd - WASHED COAL QUALITY - M2 SEAM

BORE NO.		100mm CORE HOLES 176	177	178	$\bar{X}$	CORRESPONDING SLIM HOLES 36	34	44	$\bar{X}$
Ash Fusion									
Deformation	°C	1520	1490	1570	1526	1540	1380	>1600	-
Spherical	°C	>1600	1575	>1600	-	>1600	1490	>1600	-
Hemisphere	°C	>1600	1590	>1600	-	>1600	1510	>1600	-
Flow	°C	>1600	>1600	>1600	-	>1600	1520	>1600	-
Volatile Matter	d.a.f.	37.2	33.4	34.6	35.1	35.3	32.0	33.2	33.5
Volatile Matter	d.m.m.f.	35.3	30.9	32.0	32.7	33.7	29.8	31.2	31.6
Base/Acid Ratio		0.06	0.11	0.06	0.08	0.07	0.11	0.06	0.08
Slagging Factor Rs		0.02	0.04	0.02	0.03	0.03	0.02	0.03	0.03
Fouling Factor Rf		0.01	0.02	0.02	0.02	<0.01	0.01	0.02	-
Forms of Sulphur									
Pyritic Sulphur	%	0.03	0.09	0.02	0.05				
Sulphate Sulphur	%	<0.01	<0.01	<0.01	<0.01				
Organic Sulphur	%	0.30	0.24	0.34	0.29				
Petrographic Analysis									
Vitrinite	% m.m.f.	27.7	30.5	34.2					
Exinite	% m.m.f.	13.7	3.8	9.1					
Inertinite	% m.m.f.	58.6	65.7	56.7					
Ro max. all Vitrinite		0.68	0.69	0.70					

533054

TABLE 34 - WASHED COAL QUALITY - M1 SEAM

BORE NO.		100mm CORE HOLES 174	178	$\bar{X}$	CORRESPONDING SLIM HOLES 123	44	$\bar{X}$
Seam Thickness (m)					1.78	2.55	
Sample (Cum. Fl.RD)		1.9	1.7		2.0	1.7	
Yield %		89.69	79.74		86.0	67.0	
Relative Density		1.52	1.50		1.49	-	
Proximate Analysis							
Moisture	% a.d.	5.0	5.6	5.3	7.3	5.8	6.5
Ash	% a.d.	20.1	21.3	20.7	18.3	24.2	21.3
Volatile Matter	% a.d.	28.1	27.8	27.9	28.9	25.9	27.4
Fixed Carbon	% a.d.	46.8	45.3	46.1	45.5	44.1	44.8
Ultimate Analysis							
Carbon	% d.a.f.	79.57	80.48	80.03		79.7	
Hydrogen	% d.a.f.	4.75	5.11	4.93		4.88	
Nitrogen	% d.a.f.	1.54	1.53	1.54		1.45	
Sulphur	% d.a.f.	0.36	0.59	0.48		0.69	
Oxygen	% d.a.f.	13.75	12.29	13.02		13.28	
(Carbonates)	% A.A.	0.12	0.63	0.38		0.17	
Sulphur	% a.d.	0.34	0.43	0.39	0.44	0.50	0.47
Chlorine	% a.d.	0.07	0.02	0.05		0.04	
Phosphorus	% a.d.	0.006	0.009	0.008		0.001	
Arsenic P.P.M. As_2O_3		< 1	< 1	< 1		0.7	
Specific Energy MJ/kg		24.38	23.98	24.18	23.26	22.91	23.09
Hardgrove Grindability		49	46	48		46	
Abrasion Index mg/kg		17.5	25.0	21.3			
Ash Analysis							
SiO_2		66.6	63.4	65.0		61.0	
Al_2O_3		22.3	24.5	23.4		26.0	
Fe_2O_3		6.95	6.7	6.83		7.10	
CaO		1.59	1.30	1.45		1.16	
MgO		1.53	1.88	1.71		2.10	
TiO_2		0.67	0.77	0.72		1.58	
Na_2O		0.13	0.30	0.22		0.26	
K_2O		0.19	0.70	0.45		0.75	
P_2O_5		0.03	0.04	0.035		0.01	
Mn_3O_4		0.01	0.04	0.025		0.05	
SO_3		0.01	0.37	0.19		0.35	

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TABLE 34 Cont'd - WASHED COAL QUALITY - M1 SEAM

BORE NO.		100mm CORE HOLES 174	178	$\bar{X}$	CORRESPONDING SLIM HOLES 123	44	$\bar{X}$
Ash Fusion							
Deformation	°C	1320	1310	1315		1360	
Spherical	°C	1420	1460	1440		1470	
Hemisphere	°C	1450	1490	1470		1490	
Flow	°C	1500	1530	1515		1500	
Volatile Matter	d.a.f.	37.5	38.0	37.7	38.8	37.0	38.0
Volatile Matter	d.m.m.f.	34.9	34.9	34.9		33.6	
Base/Acid Ratio		0.12	0.12	0.12		0.13	
Slagging Factor Rs		0.04	0.05	0.05		0.07	
Fouling Factor Rf		0.02	0.04	0.03		0.03	
Forms of Sulphur							
Pyritic Sulphur	%	0.04	0.08	0.06			
Sulphate Sulphur	%	0.03	<0.01	-			
Organic Sulphur	%	0.27	0.35	0.31			
Petrographic Analysis							
Vitrinite	% m.m.f.	23.0	34.9				
Exinite	% m.m.f.	8.7	10.6				
Inertinite	% m.m.f.	68.3	54.5				
Ro max. all Vitrinite		0.64	0.68				

7. DILUTION AND BAND CHARACTERISTICS

7.1 Method

Samples of seam roof, floor and in one instance, a major band were taken for testing to indicate the likely behaviour of dilution material in a preparation plant. The main area of concern was in the breakdown of the samples due to breakage and wetting, consequently only finer grained siltstones, mudstones and claystones were sampled. Details of the samples taken are in Table 35.

Mechanical degradation was simulated by drop shatter testing, which was carried out by Casco. Samples are first massed and screened at 45mm. The oversize is removed and dropped on to a steel plate from a height of three metres, rescreened at 45mm and the process repeated for 10-12 drops or until no oversize material remains. A size analysis is then undertaken. The sample remains dry for the entire test.

The whole sample is then drum tumbled with water (3 litres per kg of sample) to simulate conditions during preparation. The drum tumbled product is wet screened at 0.2mm and flocculation tests carried out if sufficient breakdown product is generated. Flocculation tests are carried out on suspensions with solids concentrations of 3%, 10% and 30% (w/w) and with flocculant added at the rate of 0, 10, 20, 30 and 40 ppm. The depression of the clear liquid interface is measured periodically for each of the 15 suspensions mixed, and plotted against time.

A similar range of samples were submitted for geotechnical testing at the Department of Mining and Metallurgy of the University of Melbourne. Slake durability tests were carried out on each sample. In this test, the material is broken into lumps about 20mm in size, oven dried at 105°C to a constant weight, and placed in a rotating mesh drum half immersed in fresh water for a period of 10 minutes. The drum and its contents are then removed from the water trough, dried and the test repeated. The drum has a 2.0mm mesh. The slake durability index is the percentage dry weight of material retained in the drum after two slaking cycles. For those samples exhibiting low to medium durability, the particle size distribution of the material passing through the 2.0mm mesh drum was determined by sieve and hydrometer methods. Atterberg limit tests were also determined for these samples.

7.2 Drop Shatter Tests

Twelve samples were submitted for drop shatter testing. Of these, five had little or no +45mm material remaining after the first three drops. These were:

- The L2 roof from GY174. The seam here is thin and is not included within the mineable reserve.

- The L1 and L2 floors from GY175. This area could be within the mineable reserve of either seam, however they are too close together to be mined independently (1.7m).

- The roof and floor of the M1 seam from GY178.

The L2 roof sample from GY174 fragmented into particularly small particles, 41.8% of the sample being reduced to less than 1.4mm top size in only four drops. This is particularly significant considering that the sample is still dry, and could indicate very poor roof conditions with commensurate dilution and washability problems if mining were to be attempted in this area.

All other samples show considerably less fines in the dry size distributions than is expected from the coal itself.

The drop shatter test results are summarised in Table 36 and presented in full in Appendix I Parts 12 to 14.

7.3 Flocculation Tests

The flocculant precipitability of suspensions mixed from the wet tumbled -0.2mm fraction of the drop shattered material is summarised by Table 37. Appendix 1 contains detailed tabulated results and settling curves.

Of the 12 samples drop shattered, only four generated sufficient slimes at the wet tumbling stage to allow flocculation testing. These were the M1 band and the particularly poor L2 roof sample from GY174, and the roof and floor samples from the M1 seam in GY178. The fact that the latter three were the worst performers in the drop shatter test and that the M seam roof and floor samples generated only 50 grams of -1.4mm material each at the dry screening stage indicates a strong relationship between the drop shatter test and slaking propensity.

Flocculant concentration did not appear to significantly alter the degree of depression of the clear water interface and in some instances (e.g. L2 roof, GY174 again) the flocculant had little effect on the degree of flocculation at all. There was however a marked reduction in the time it took, with increasing concentrations to 20 ppm. Above this level the addition of more flocculant did not produce a marked effect.

Better flocculation appears to be achieved with pulp densities of up to 10% w/w or slightly more, however there was a significant improvement in flocculation time below this concentration. The L2 roof sample from GY174 did not settle appreciably at concentrations above 3% w/w without excessive doses of flocculant, which did not however greatly accellerate the process.

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7.4 Geotechnical Tests

Results of geotechnical tests are summarised in Table 38. Grading curves are contained within Appendix 1, Part 15.

The fine grained arenaceous rocks from the roof and floor of the L1 seam show high to very high durability. These are unlikely to suffer significant degradation when passed through a wash plant. The argillaceous rocks from roof and floor of the M2 seam, on the other hand, are likely to suffer up to 60% breakdown to a fine fraction less than 2.0mm in size. The result from the floor of the L2 seam shows an intermediate condition with mudstone of medium durability.

The grading curves indicate the slake susceptible argillaceous rocks will break down as fines with a variable proportion of slimes. The gradings can be summarised as follows :-

Sample	Location	Passing 2.0mm	Passing 0.1mm
GY 176B T1	M2 roof	65	6.5
GY 176A T2	M2 floor	58	19.1
GY 176B T4	L2 floor	35	4.7

The liquid limits match the percentage slimes in order of magnitude. In general terms the fine products from breakdown of mudstone are of low to medium plasticity and thus should not exhibit stickiness or swelling when passing through the wash plant.

7.5 Comment

A drilling program of only five holes cannot purport to adequately represent the strengths and durabilities of confining strata over the entire Mt. Nicholas reserve area. The observations made in this section relating to a small number of samples should be taken as an indication of the range of materials likely to be encountered and not necessarily representative of roof or floor strata over extensive areas. The geotechnical assessment of the slim core remains the best indication of the variation of probable roof and floor conditions on an areal basis.

It is noteworthy that both roof and floor of the M1 seam in GY178 have poor strength and durability coincident with an anomalously high fines and extremely high slimes ash content of the coal itself (see Figures 13 and 17). Whilst only minor breakage of the core is noted on the field log with some slickensiding in the seam roof of GY178B, it is possible that the area has been considerably stressed, and that this may reflect proximity to a major north/south fault to the east. Lower seams at the site appear normal however, suggesting a more localised effect.

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TABLE 35 - NON-COAL SAMPLE DETAILS

SAMPLE		LOCATION	DEPTH	LITHOLOGY	TESTING BY *
GY174	A 8902	M1 band	34.20 - 34.37	Claystone, mudstone	Casco
	A T11	L1 floor	127.95 - 128.50 (?)	Siltstone	U. of M.
	B T11	L1 roof	124.64 - 124.91	Siltstone & mudstone	Casco
	B T12	L1 floor (nr)	127.33 - 127.52	Silty mudstone	Casco
	B T13	L2 roof	129.75 - 130.16	Mudstone	Casco
	B T14	L2 floor	131.93 - 132.32	Fine Sandstone	Casco
GY175	B T1	L1 roof	117.17 - 117.34	Fine Sandstone	U. of M.
	B T2	L1 floor	119.44 - 119.74	Silty mudstone	U. of M.
	A T2	L1 floor	119.30 - 119.75	Mudstone	Casco
	A T3	L2 roof	120.33 - 120.76	Silty mudstone	Casco
	A T4	L2 floor	122.57 - 122.95	Silty mudstone	Casco
GY176	B T1	M2 roof	27.29 - 27.63	Mudstone	U. of M.
	A T2	M2 floor	28.05 - 28.38	Silty mudstone	U. of M.
	B T4	L2 floor	108.25 - 108.60	Mudstone	U. of M.
GY178	A T1	M1 roof	62.05 - 62.38	Carb. mudstone	Casco
	B T1	M1 floor	63.30 - 63.49	Siltstone, mudstone	Casco
	B T2	M2 roof	72.10 - 72.34	Mudstone	Casco
	B T3	M2 floor	75.13 - 75.46	Mudstone	Casco
	B T6	L2 floor	144.45 - 144.76	Mudstone	Casco

* Casco : Cargo Superintendents Co. (A/sia) Pty. Limited
(Drop shatter and flocculation tests)

U. of M.: University of Melbourne Department of Mining and Metallurgy
(Slake durability and Atterberg limit tests)

TABLE 36 - DROP SHATTER TEST RESULT SUMMARY

SAMPLE		LOCATION	MASS (kg)	INITIAL +45mm (%)	REMAINING +45mm (% OF INITIAL +45mm) 3m drop	9m drop	30m drop	TOTAL DROP (m)	FINAL SIZING (%) -1.4mm	-5.6mm	-45mm
GY174	T11	L1 roof	4.32	84.2	40.3	22.1	1.9	36	3.6	7.1	99.6
	T12	L1 floor (nr)	3.63	89.2	45.0	29.4	19.7	36	1.1	3.8	80.1
	T13	L2 roof	6.21	78.2	23.5	1.1	-	12	41.8	46.4	100.0
	T14	L2 floor	7.24	95.3	50.9	31.3	16.7	36	1.8	5.3	82.8
GY175	T2	L1 floor	7.60	76.1	15.8	1.4	-	12	2.2	6.3	100.0
	T3	L2 roof	8.10	97.5	51.0	11.4	-	15	1.6	4.0	100.0
	T4	L2 floor	7.23	80.4	21.2	Nil	-	9	1.4	3.2	100.0
GY178A	T1	M1 roof	4.94	39.0	5.1	2.9	-	27	0.8	2.4	100.0
GY178B	T1	M1 roof	3.22	60.5	11.7	Nil	-	9	1.4	4.0	100.0
	T2	M2 roof	4.55	80.4	51.9	22.9	2.8	30	2.2	6.3	96.5
	T3	M2 floor	5.47	96.3	68.9	47.4	Nil	30	4.5	11.4	100.0
	T6	L2 floor	5.93	97.3	83.5	70.8	18.5	30	2.4	5.4	81.0

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TABLE 37 - FLOCCULATION TEST RESULT SUMMARY

SAMPLE	LOCATION	SOLIDS CONC. (% w/w)	MAXIMUM DEPRESSION * (cm) FLOCCULANT CONC. (ppm) 0	10	20	30	40	TIME FOR 90% DEPRESSION (min) FLOCCULANT CONC. (ppm) 0	10	20	30	40
GY174 8902	M1 Band	3	1.0	10.5	10.4	10.3	10.4	85	0.62	0.17	0.10	0.09
		10	1.1	9.6	9.4	9.2	9.3	85	2.2	1.2	1.2	0.92
		30	5.2	5.9	5.6	5.8	-	50	36	65	38	-
GY174 T13	L2 Roof	3	10.8	10.3	10.4	10.6	10.5	28	10	11	11	11
		10	1.2	1.0	1.3	1.4	1.3	10	14	13	12	13
		30	3.1	3.2	3.8	4.7	4.5	10	8.7	7.7	7.5	7.8
GY178B T1	M1 Floor	3	-	10.3	10.1	10.2	10.0	-	0.23	0.19	0.18	0.19
		10	7.5	8.5	8.2	8.1	8.0	57	11	8.6	5.0	2.6
		30	2.9	2.6	3.0	4.1	4.0	95	80	80	64	42
GY178B T3	M2 Floor	3	9.8	10.0	9.8	9.9	9.6	-	3.0	2.2	2.8	2.2
		10	7.0	7.3	7.5	7.6	7.3	38	42	30	17	12
		30	-	-	0.3	0.5	0.8	-	-	90	96	85

* Depression of clear water interface, stable level or depression reached in 100 minutes if not stabilised.

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TABLE 38 - GEOTECHNICAL TEST RESULT SUMMARY

BOREHOLE	SAMPLE NO.	LOCATION	SLAKE DURABILITY INDEX %	COMMENT	LIQUID LIMIT %	PLASTIC LIMIT %	CASAGRANDE CLASSIFICATION	COMMENT
174A	T11	L1 Floor	97	High durability				
175B	T1	L1 Roof	99	Very high durability				
715B	T2	L1 Floor	91	High durability				
176A	T2	M2 Floor	42	Low durability	48	30	M1	silty clay - medium plasticity
176B	T1	M2 Roof	35	Low durability	43	18	C1	clay - medium plasticity
176B	T4	L2 Floor	65	Medium durability	33	18	CL	clayey silt - low plasticity

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8. SEAM VARIABILITY

Throughout this report, oblique reference has been made to the apparent variability of the seams between different bores drilled at the same site. This problem has been made difficult to assess because of the generally low core recoveries obtained during the latest program and the unavailability of comparative wireline logs.

Graphic sections of equivalent seams at each site are shown on Figures 43 to 54. A cursory examination of these establishes that few of the observed anomalies can be explained entirely in terms of core losses, even if these were to be reapportioned.

Table 39 tabulates raw coal physical and analytical parameters indicating the variability of these between samples obtained from the same site. The salient features of Table 39 are as follows:

Core Recovery : All but one of the equivalent slim holes recorded 100% core recovery, however the average recorded seam thickness of all of the slim cored seams is only 1% greater than that of the 100mm cored seams, suggesting that slim core recoveries are not significantly better. Discrepancies between the slim core and 100mm core data do not therefore necessarily represent inadequacies of the admittedly low 100mm core recovery.

Seam Thickness : Quite large fluctuations in seam thickness must occur over short distances in order to generate variations such as those observed at all locations. This phenomenon was not envisaged by the latest program which for reasons outlined has been unable to accurately quantify these changes. The variations have a non-cumulative effect and do not alter the reserve base, however, they have obvious relevance to mining particularly in low seam areas. The variation is almost certainly due to seam roof erosion in the M1 seam at GY174 and possibly the L1 at GY175 and L2 at GY178; in other areas it appears to be a depositional effect.

Band Development : As the distinction in the field between a stony coal and a coaly shale can be somewhat subjective, the variations in cumulative band thickness as shown in Table 39 must be taken as indicative. There are however, instances of quite large shaly bands having been recorded in slim holes which have not been found in the corresponding 100mm cored holes, e.g, L2 seam GY178, L1 seam GY174.

Relative Density : This appears to be more consistent than either seam thickness or ash. Large differences such as those at GY176 (L2 seam), GY178 (M2 seam) and GY178 (M1 seam) are readily explainable in terms of changes in relative band content or observable coal quality.

Ash : The same comments apply to ash as to relative density. The reason for the large difference in the ash of the L1 seam at GY175 in the absence of a corresponding change in relative density is however, not readily identifiable.

Moisture Content : Air dried moisture levels in Table 39 have been calculated to a constant ash level of 20% in order to check an apparent shift in reported values between the slim and 100 mm core results. This has revealed that 100mm cores show consistently lower moisture levels than slim cores, by up to 3.4% absolute. The mean shift is 2% for the L2 seam. No consistent laboratory error is indicated, as the slim cores analysed by ACIRL have the same mean moisture levels as those analysed by Casco one year later. As the slim cores were all analysed in winter and the 100mm cores were all analysed in summer (all at Sydney), it is possible that the differences reflect different moisture equilibrium levels attained by the samples in the air drying stage of sample preparation. The lower suite of moisture values for the 100mm cores would more closely approximate to the inherent moisture.

The variability, is, unfortunately, something which will have to be taken account of in mine planning in the absence of firm information. Accurate quantification of these variations at the present scale of investigation would not alter this perspective.

TABLE 39 - VARIABILITY OF RAW COAL PARAMETERS

	LOGGED LINEAR RECOVERY			SEAM THICKNESS			CUMULATIVE BAND THICKNESS			RELATIVE DENSITY		RAW ASH a.d.		MOISTURE (1) a.d.@20% Ash	
SAMPLE (2)	SLIM	A	B	SLIM	A	B	SLIM	A	B	SLIM	A&B	SLIM	A&B	SLIM	A&B
L2 GY174	90.5	100.0	81.4	1.37	1.97	1.77	0.16	0.12	0.11	1.64	-	33.9	-	5.8	4.3
GY175	100.0	86.2	100.0	1.71	1.81	1.45	0.09	0.07	0.17	1.63	1.60	31.9	33.5	5.3	3.0
GY176	100.0	75.2	100.0	1.57	1.21	1.41	0.16	0.18	0.15	1.54	1.63	28.3	36.1	6.9	3.5
GY177	100.0	98.4	91.6	2.05	2.16	2.02	0.16	0.21	0.25	1.59	1.58	27.3	29.3	6.5	5.7
GY178	100.0	89.1	100.0	2.96	3.11	2.90	0.49	0.14	0.04	1.52	1.55	26.3	27.1	6.9	5.1
Mean				1.93	2.05	1.91	0.21	0.14	0.14	1.58	-	29.5	-	6.3	4.3
L1 GY174	100.0	53.5	100.0	2.30	2.15	2.14	0.17	0.02	0.17	1.70	-	39.6	-	5.7	4.3
GY175	100.0	95.6	62.4	2.49	2.28	2.10	0.34	0.22	0.17	1.70	1.71	38.1	44.5	5.2	3.6
Mean				2.40	2.22	2.12	0.26	0.12	0.17	1.70	-	38.8	-	5.4	4.0
M2 GY176	100.0	96.6	100.0	1.53	1.19	1.41	0.20	0.04	0.12	1.43	1.45	19.7	20.4	7.2	4.2
GY177	100.0	100.0	100.0	2.14	2.10	2.49	0.06	0.19	0.11	1.51	1.51	19.3	23.1	6.4	6.3
GY178	100.0	100.0	100.0	2.74	2.55	2.79	0.07	0.11	0.17	1.39	1.56	21.8	25.9	5.4	4.8
Mean				2.14	1.95	2.23	0.11	0.12	0.13	1.44	1.51	20.3	23.1	6.3	5.1
M1 GY174	100.0	100.0	100.0	1.78	1.77	2.11	0.23	0.24	0.29	1.55	1.56	26.1	31.4	7.1	5.0
GY178	100.0	90.1	100.0	2.55	2.32	2.64	0.51	0.54	0.50	1.54	1.70	41.0	43.3	6.1	5.7
Mean				2.17	2.05	2.38	0.37	0.39	0.40	1.55	1.63	33.6	37.4	6.6	5.4
L1 + L2 BY174											1.63	37.5	39.9		

(1) Washed Coal. No raw coal moisture determinations made on equivalent slim cores.

(2) SLIM : Equivalent slim core at same site (See Table 9 for bore numbers).
A, B : Duplicate 100mm cores at site (combined for analysis).

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9. CONCLUSIONS AND RECOMMENDATIONS

The 100mm core drilling program has satisfactorily fulfilled all of the stated objectives, providing additional detailed information on seam washability, dilution behaviour and coal quality where required, as well as substantial reinforcement of the interpreted slim core float/sink test results. This is one of the main successes of the project, enabling the areal variation of detailed seam washability to be confidently predicted on the basis of the slim core analyses.

The variability in small areas of the raw seam thickness and quality is a matter of some concern and had not previously been anticipated. Present indications of the degree of this variability are such that the inability of the program to accurately quantify it within the restricted areas of the 100 mm corehole sites does not present a serious shortcoming of the total interpretation or warrant revision of any reserve figures. With hindsight, the site availability of a small hand operated logging tool would have been of some advantage, but the cost of a standard petrophysical service would still not have been justified.

The recommendations which follow from this work are for some reappraisal of the data prior to commitment to a specific mining plan or coal preparation plant design. This should address identified problem areas such as:

(a) The variability of washability between seams, with particular reference to the poor performance of the L1 seam in the area where the current mine plan shows development headings.

(b) The probability that a jig-based preparation plant may not be able to adequately treat all run of mine material.

(c) The possibility of excessive slimes generation from dilution and coal material entering the plant.

(d) The desirability or necessity to include fine coal preparation facilities in a washplant in order to maintain acceptable or consistent product ash levels.

It is anticipated that the results of the 100mm core drilling program as presented and summarised in this report, provide sufficient information on which to base this reappraisal and subsequent coal preparation plant design studies.

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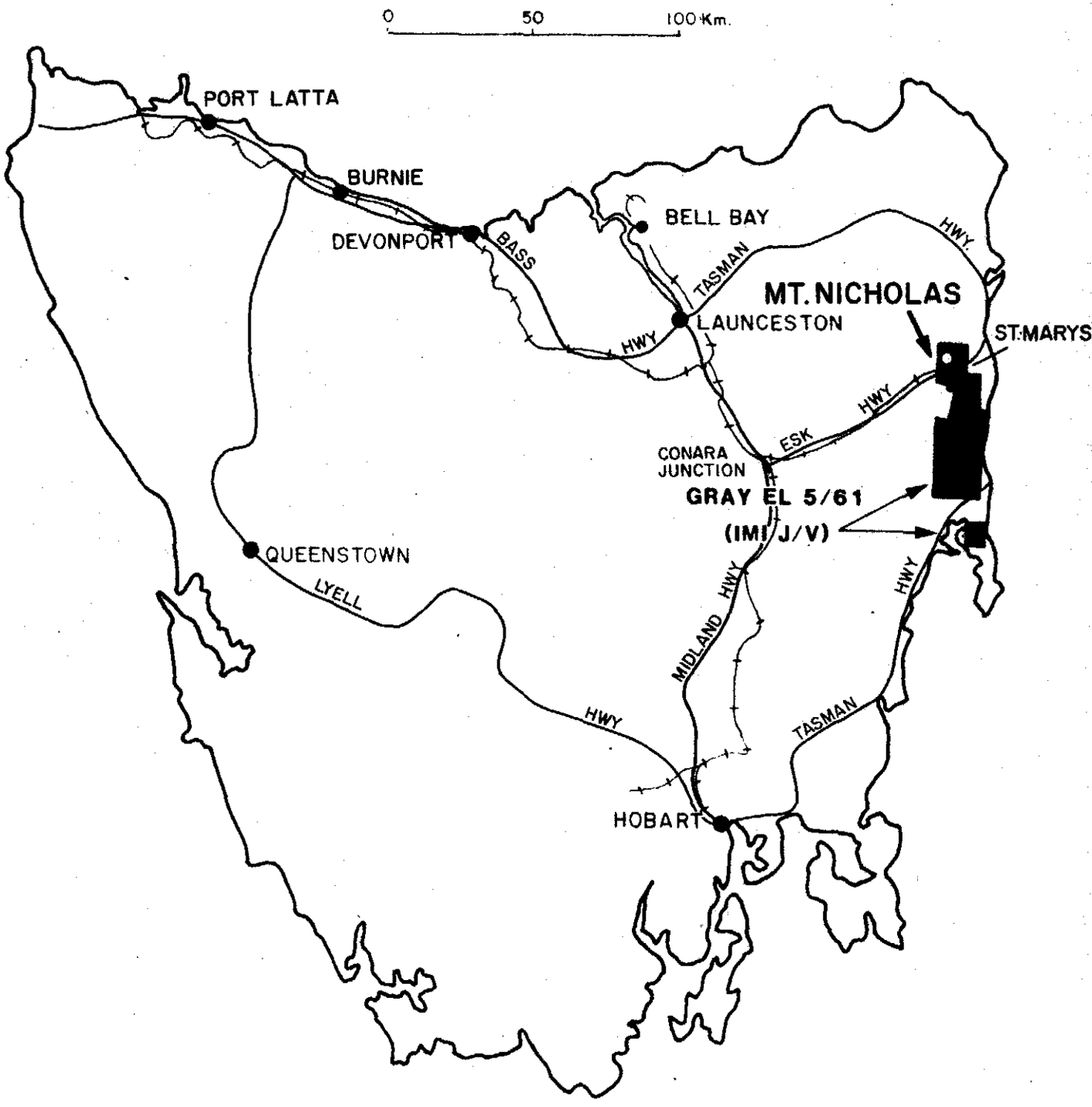
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11. ACKNOWLEDGEMENTS

P.W. Sansom was responsible for all of the field work related to this program and assisted in the compilation of tables and drawing of figures. B. Ward contributed Section 7.4.

533068

Mt Nicholas Location Map – Tasmania



5 cm

Author : Coal Division	Date : May 1983	Fig. 1
Report No: CEPR 12/83	Drawing No: 3104	

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589000mE 590000mE 591000mE 592000mE 593000mE 594000mE 595000mE

5403000mN 5402000mN 5401000mN 5400000mN 5399000mN 5398000mN

E.L. 22/80

E.L. 5/61

Haslemere Road

Avenue Road

Huntsmans Road

Huntsmans Avenue No.1

Avenue No.2

Avenue No.1

Mt Nicholas Rd.

Road

Lohreys Road

APPM

HUNTSMANS CAP

MT. NICHOLAS

MT NICHOLAS COLLIERY

GY177 GY34 GY31 GY108 DOM13 GY106 GY178 GY44 GY46 & GY37 GY42 GY176 GY36 GY45 GY119 GY24 GY26 GY39 GY32 DOM8 GY40 GY28 GY46 GY43 GY151 GY168 GY135 GY124 GY130 GY128 GY127 GY167 GY33 GY122 GY136 GY175 GY123 GY174 GY41 GY141 GY138 GY120 GY137 GY157 GY143 GY173 GY117 GY121 GY109 GY38 GY164 GY142 GY116 GY166 GY146 GY35

PART OF UNDERGROUND WORKINGS

THE CONSOLIDATED LEASE 34M/79

THE CORNWALL COAL CO. N.L.

DOM33 DOM36

TASMANIA

FALMOUTH

St. Marys

HIGHWAY

BICHENO

EL5/61

LEGEND

- Cored Slim Borehole Existing
- Non Cored Slim Borehole Existing
- Large Diameter Borehole
- Shaft

5 cm

SCALE

0 500 1000 1500m

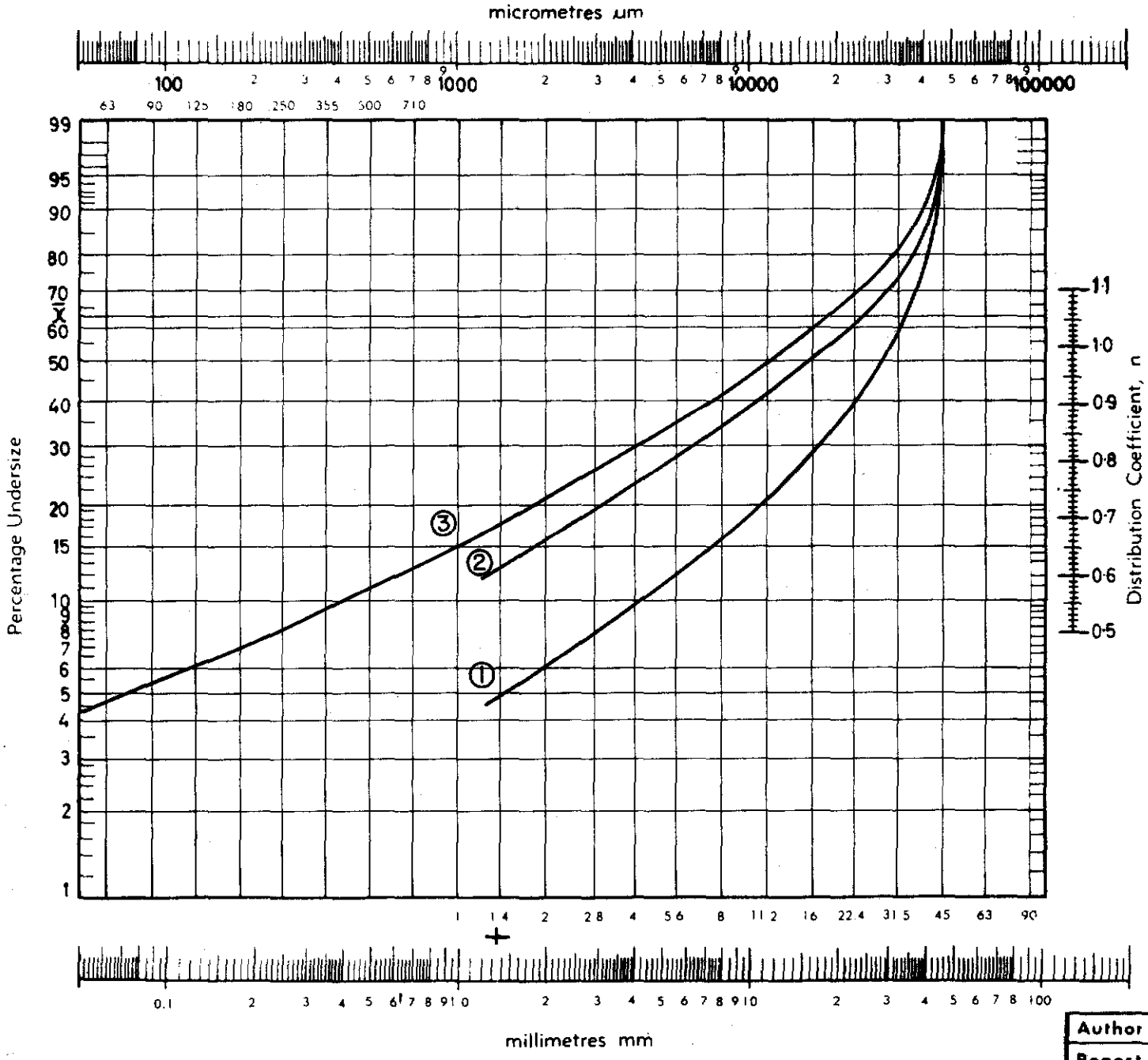
THE SHELL COMPANY OF AUSTRALIA LTD.

TASMANIA – GRAY EL 5/61
MT NICHOLAS AREA

TOPOGRAPHIC MAP WITH SLIM AND LARGE DIAMETER BOREHOLE LOCATIONS

Scale 1:20 000

Author: COAL DIVISION	Date: May 1983	Fig. 2
Report No: CEPR 12/83	Drawing No: 3105	



ROSIN-RAMMLER SIZING

L2 SEAM GY 175

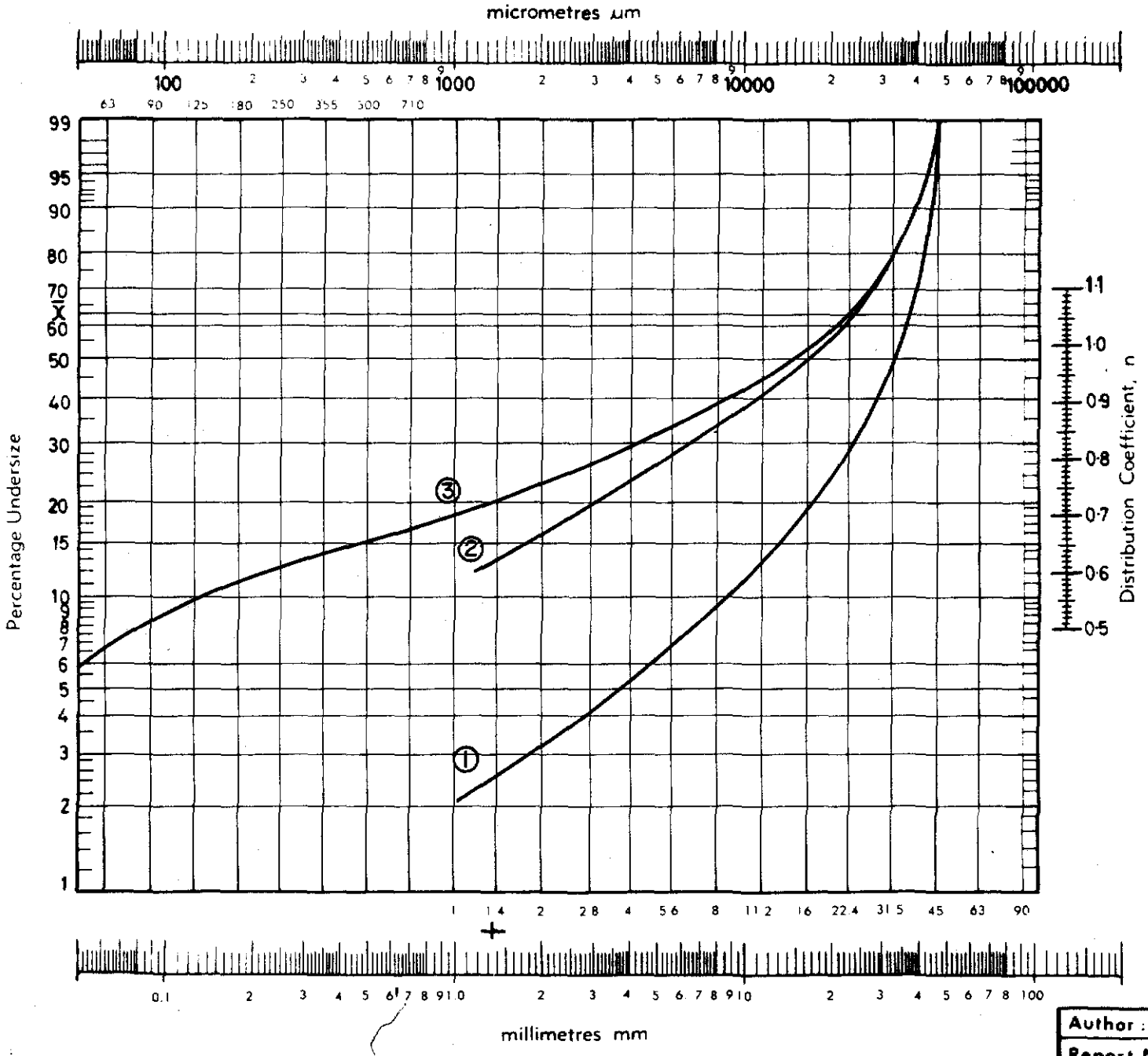
① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

③ Process Sizing (Wet Tumbled)

533070

Author : Coal Division	Date : May 1983	Fig. 3
Report No: CEPR 12/83	Drawing No: 3106	



ROSIN–RAMMLER SIZING

L2 SEAM GY 176

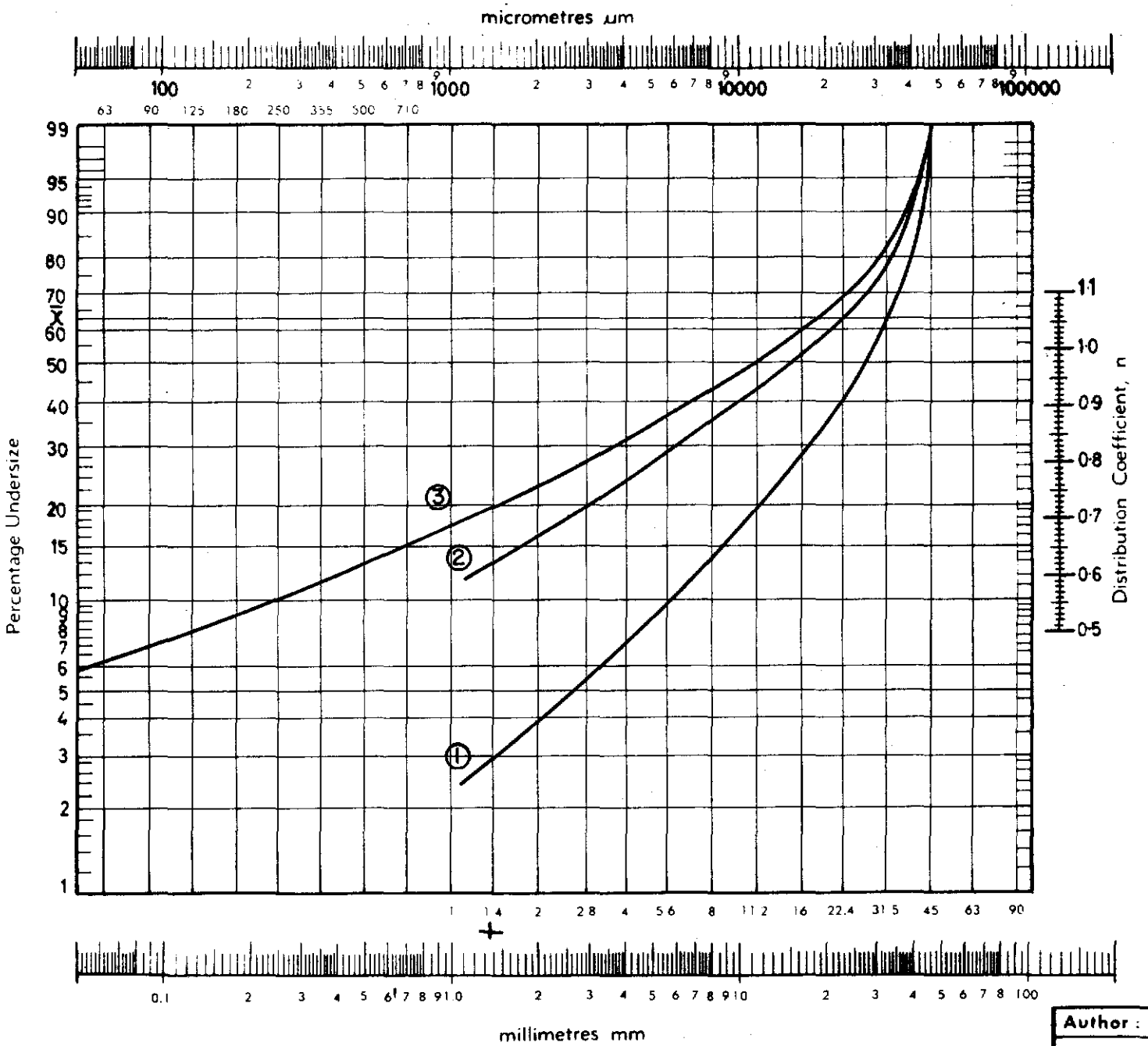
① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

③ Process Sizing (Wet Tumbled)

53301

Author : Coal Division	Date : May 1983	Fig. 4
Report No: CEPR 12/83	Drawing No: 3107	



ROSIN–RAMMLER SIZING

L2 SEAM GY 177

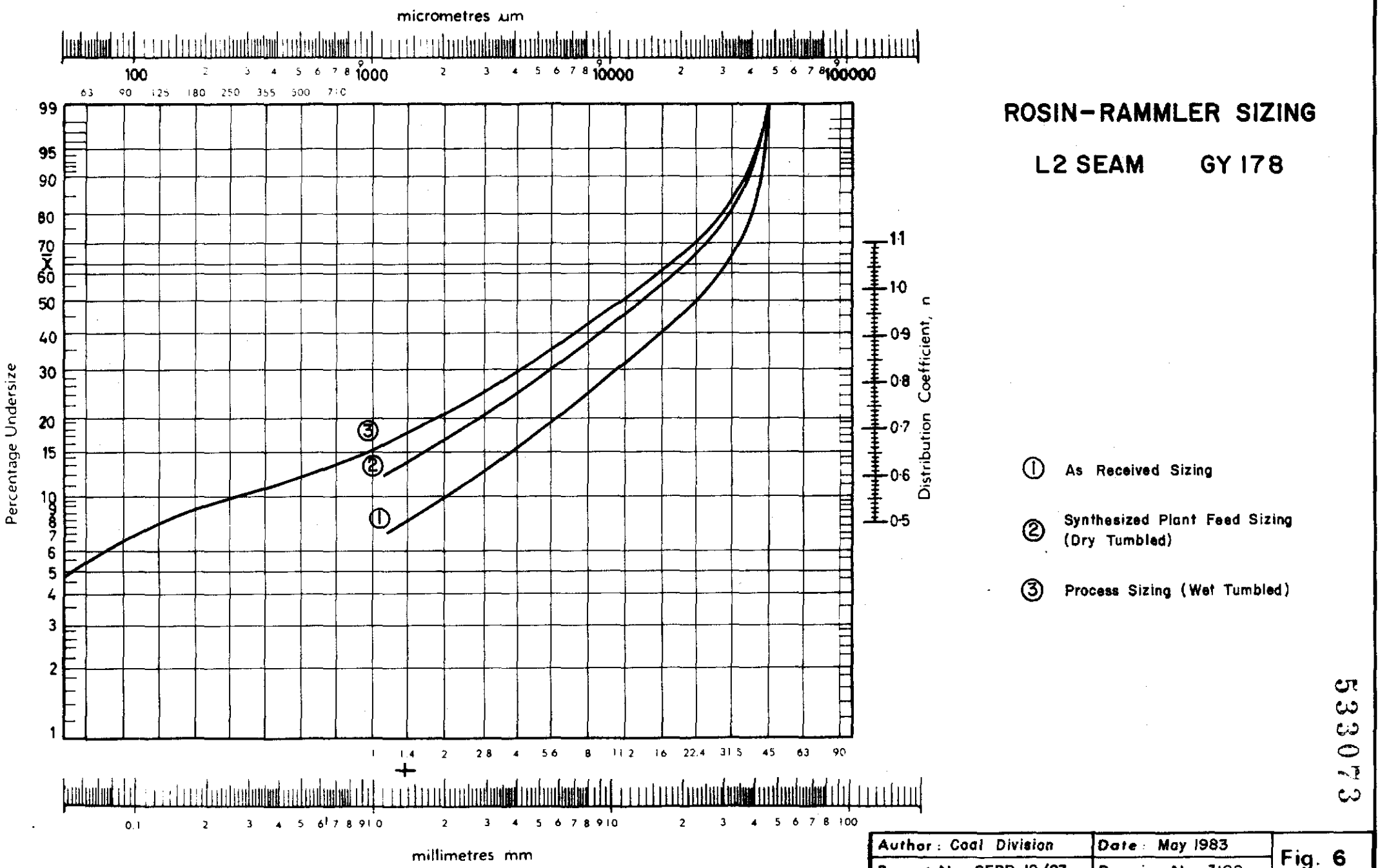
① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

③ Process Sizing (Wet Tumbled)

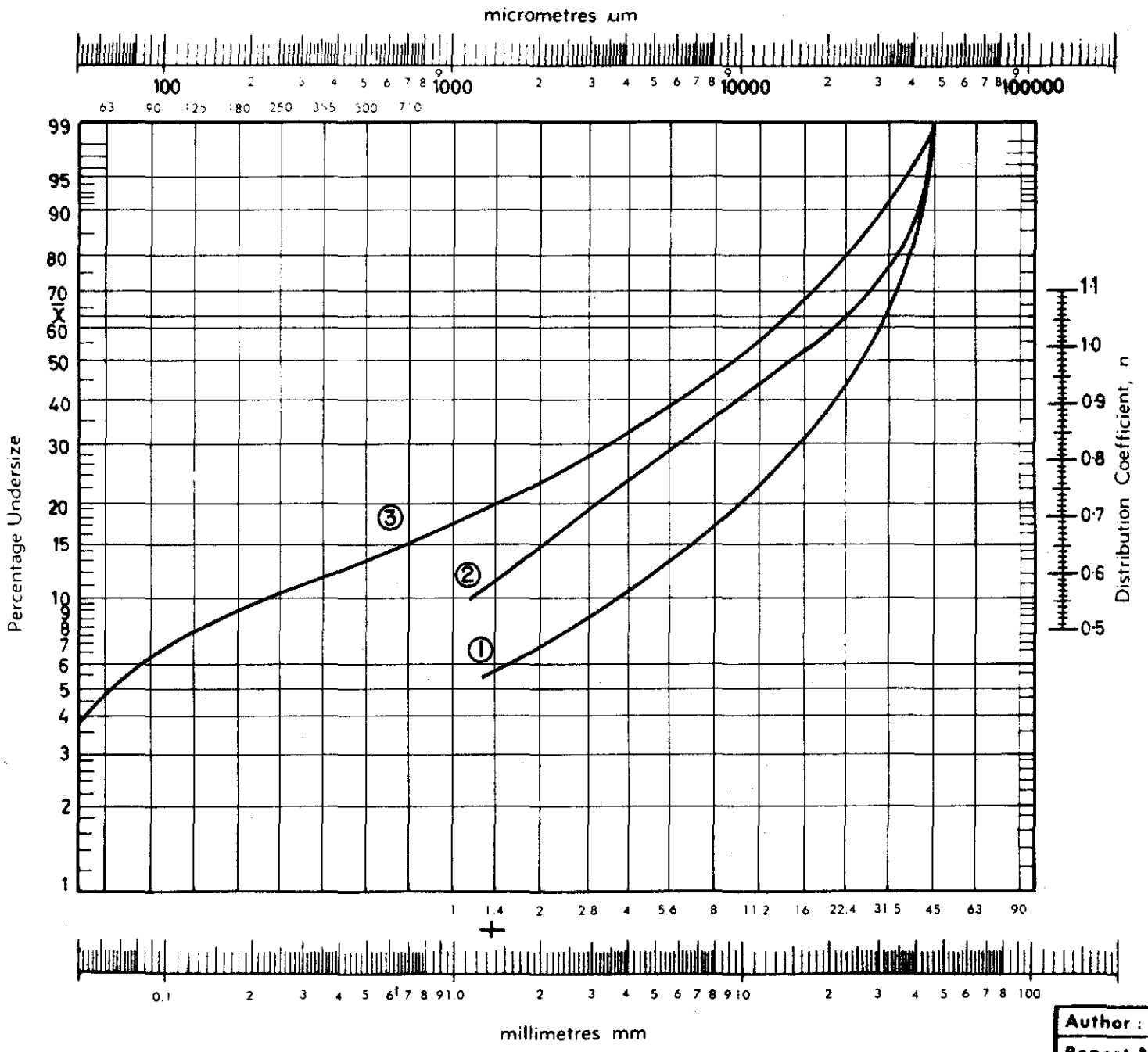
5330772

Author : Coal Division	Date : May 1983	Fig. 5
Report No: CEPR 12/83	Drawing No: 3108	



5330713

Author : Coal Division	Date : May 1983	Fig. 6
Report No: CEPR 12/83	Drawing No: 3109	



ROSIN-RAMMLER SIZING

L1 & L2 SEAMS GY 174

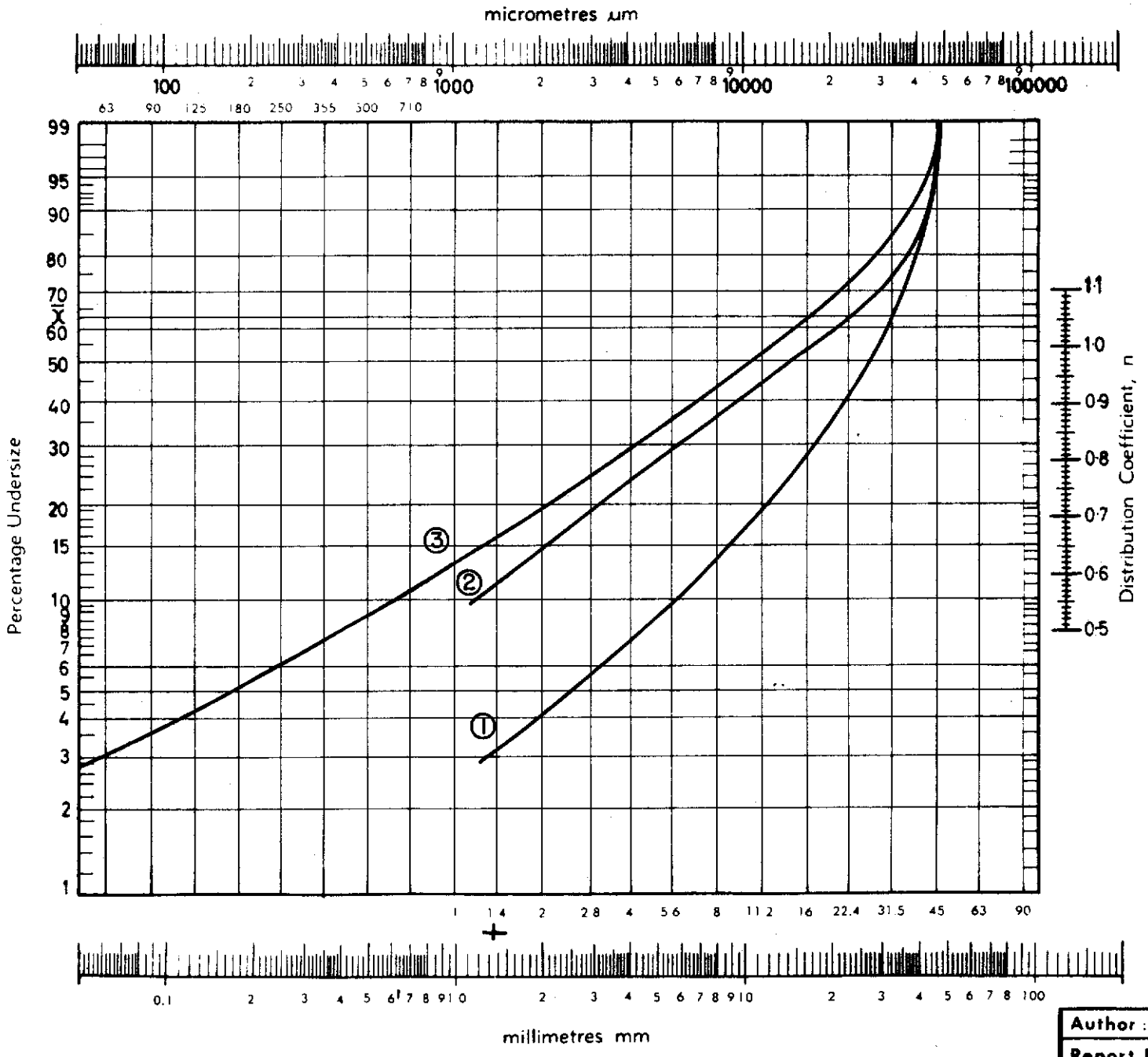
① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

③ Process Sizing (Wet Tumbled)

533041

Author : Coal Division	Date : May 1983	Fig. 7
Report No: CEPR 12/83	Drawing No: 3110	



ROSIN-RAMMLER SIZING

LI SEAM GY 175

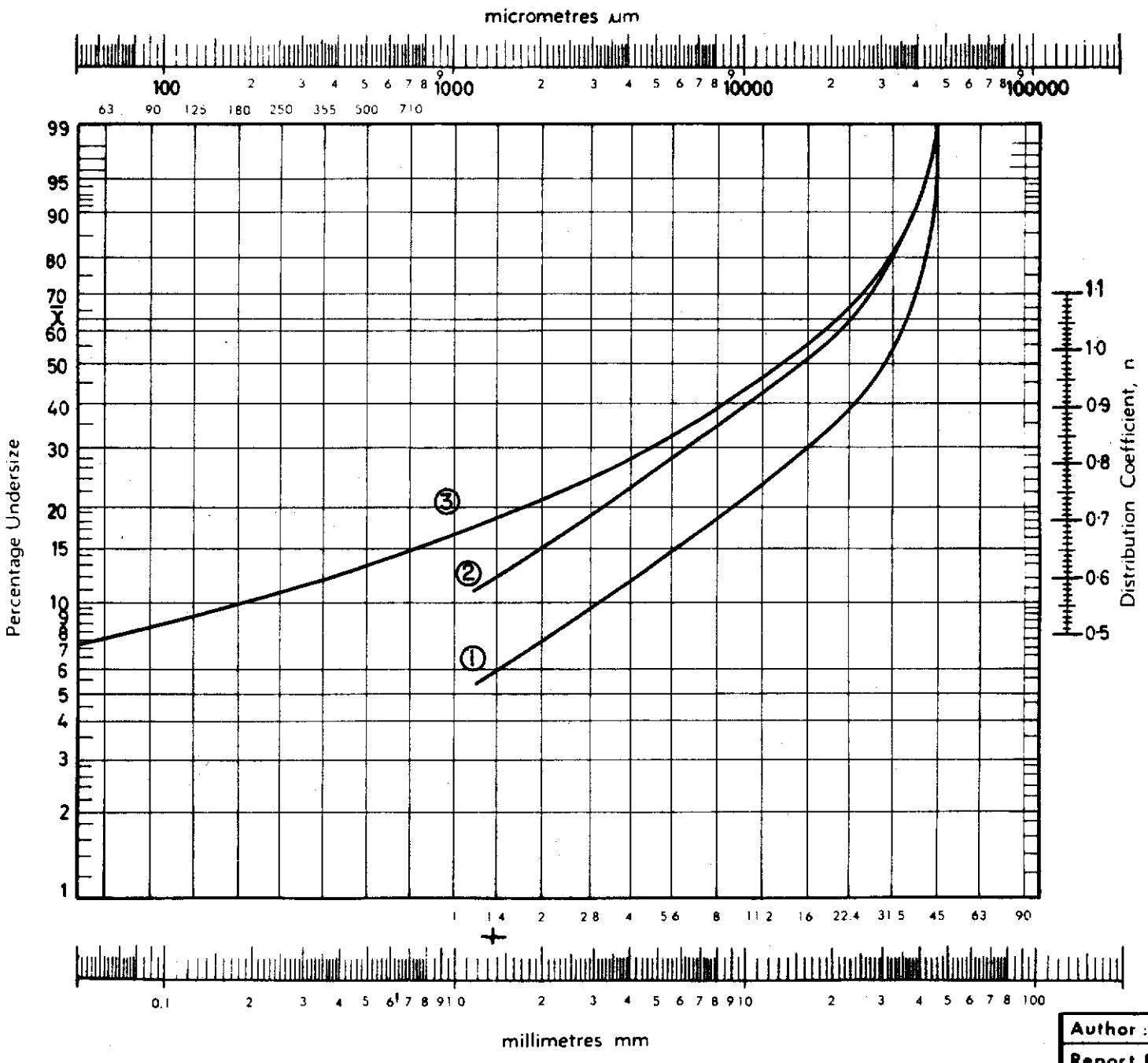
① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

③ Process Sizing (Wet Tumbled)

5330775

Author : Coal Division	Date : May 1983	Fig. 8
Report No: CEPR 12/83	Drawing No: 3111	



ROSIN-RAMMLER SIZING

M2 SEAM GY 176

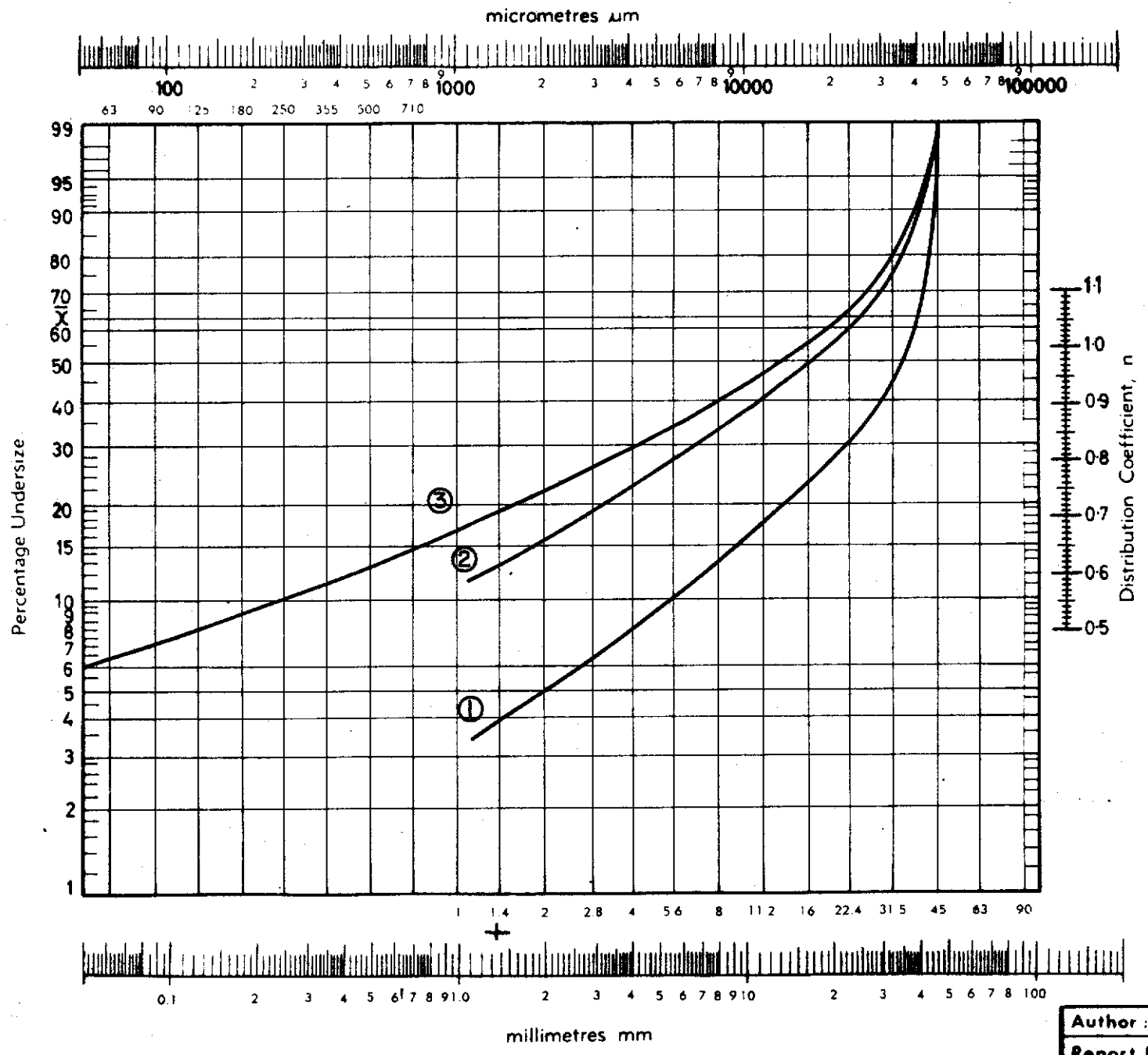
① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

③ Process Sizing (Wet Tumbled)

9760

Author : Coal Division	Date : May 1983	Fig. 9
Report No: CEPR 12/83	Drawing No: 3112	



ROSIN-RAMMLER SIZING

M2 SEAM GY 177

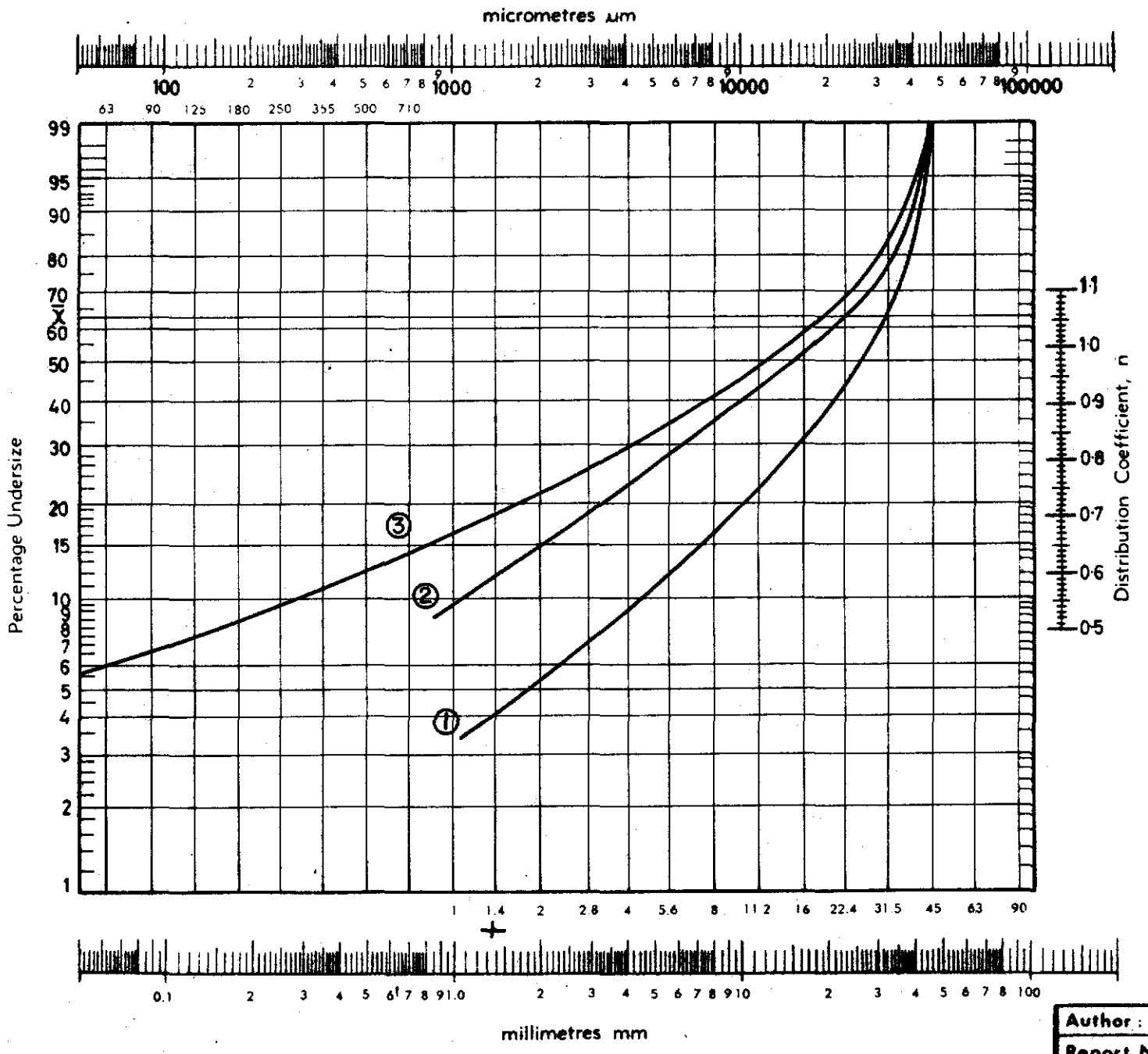
① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

③ Process Sizing (Wet Tumbled)

533017

Author : Coal Division	Date : May 1983	Fig. 10
Report No: CEPR 12/83	Drawing No: 3113	



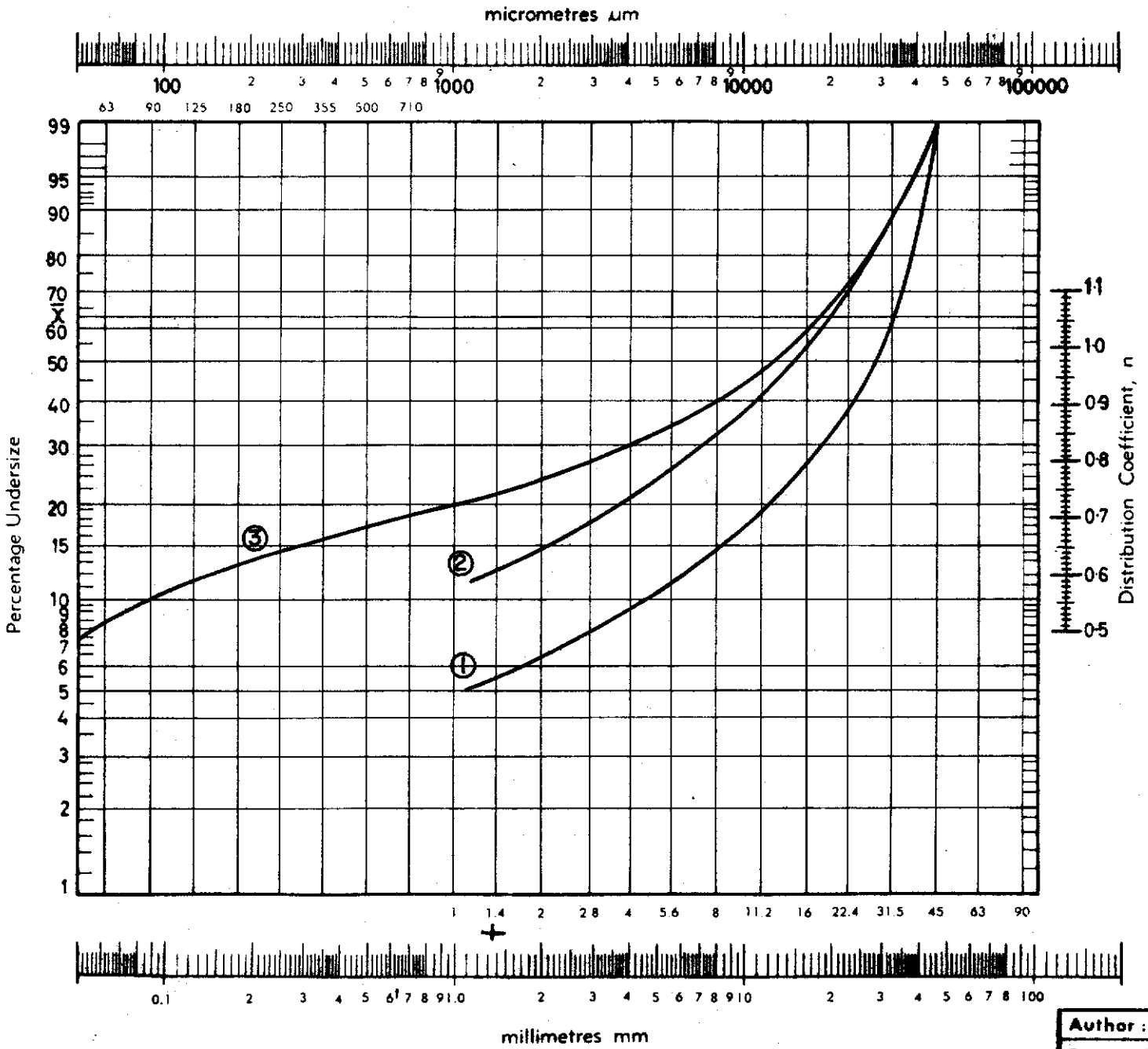
ROSIN–RAMMLER SIZING

M2 SEAM GY 178

Author: Coal Division	Date: May 1983
Report No: CEPR 12/83	Drawing No: 3114

Fig. 11

5330/18



ROSIN–RAMMLER SIZING

MI SEAM GY 174

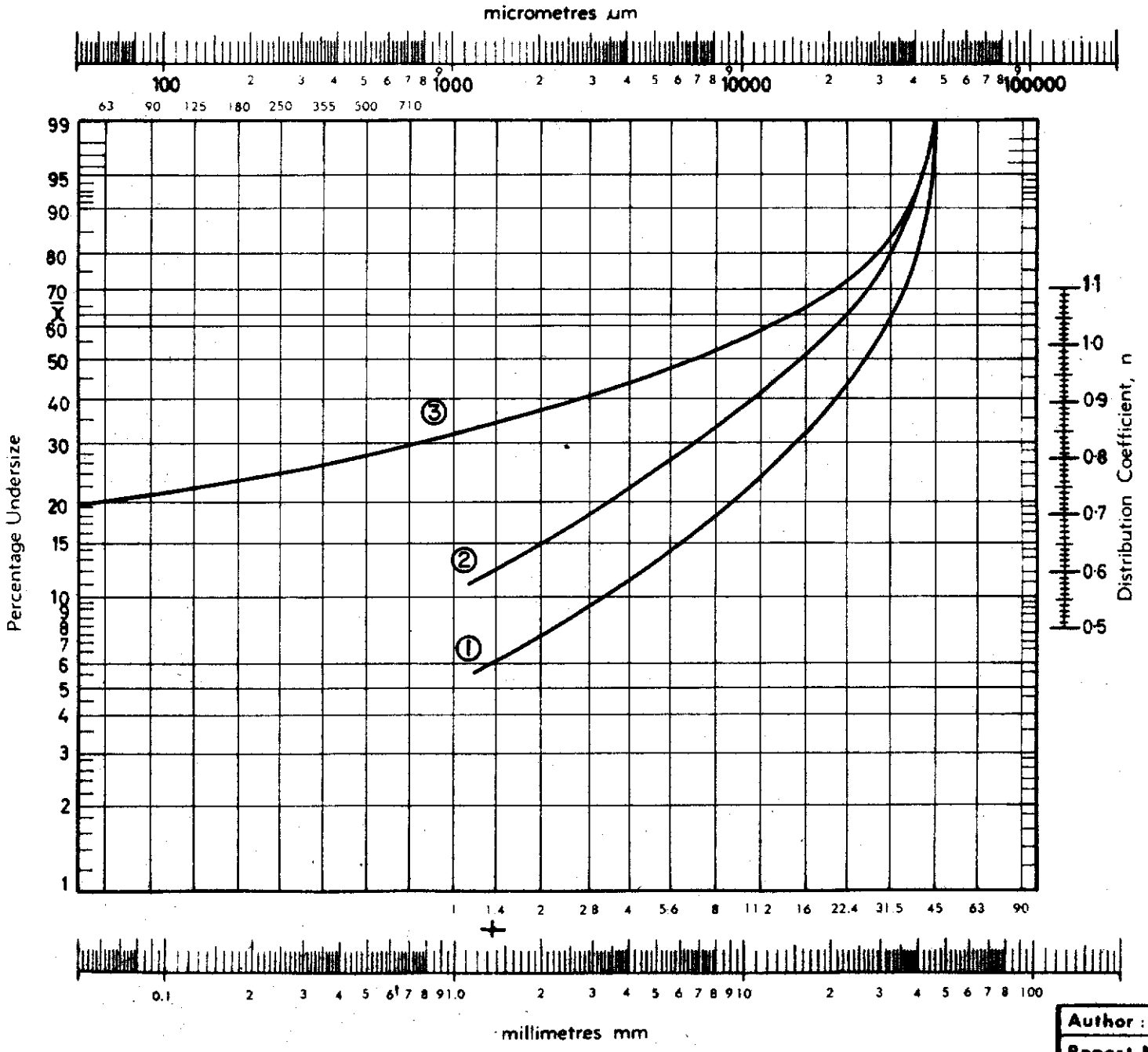
① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

③ Process Sizing (Wet Tumbled)

5330/79

Author : Coal Division	Date : May 1983	Fig. 12
Report No: CEPR 12/83	Drawing No: 3115	



ROSIN-RAMMLER SIZING

M I SEAM GY 178

① As Received Sizing

② Synthesized Plant Feed Sizing (Dry Tumbled)

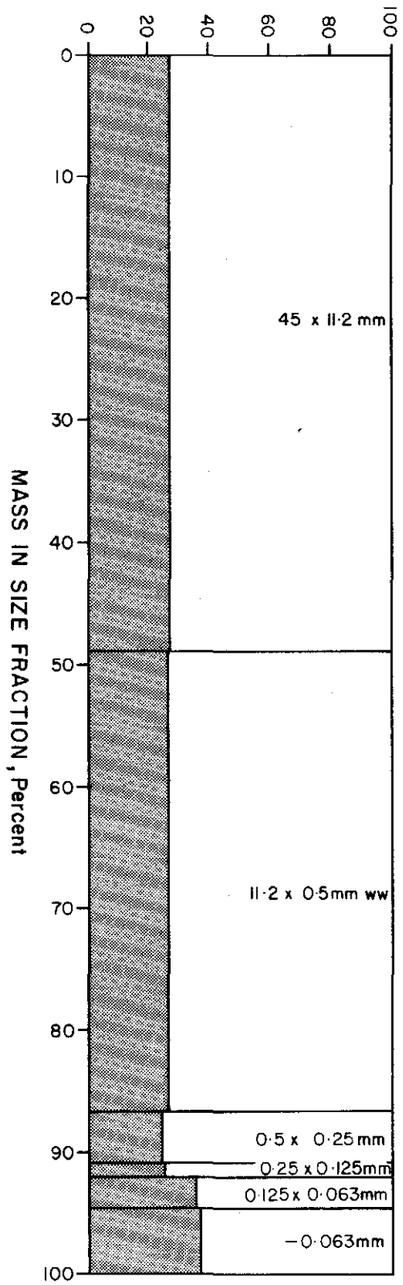
③ Process Sizing (Wet Tumbled)

533080

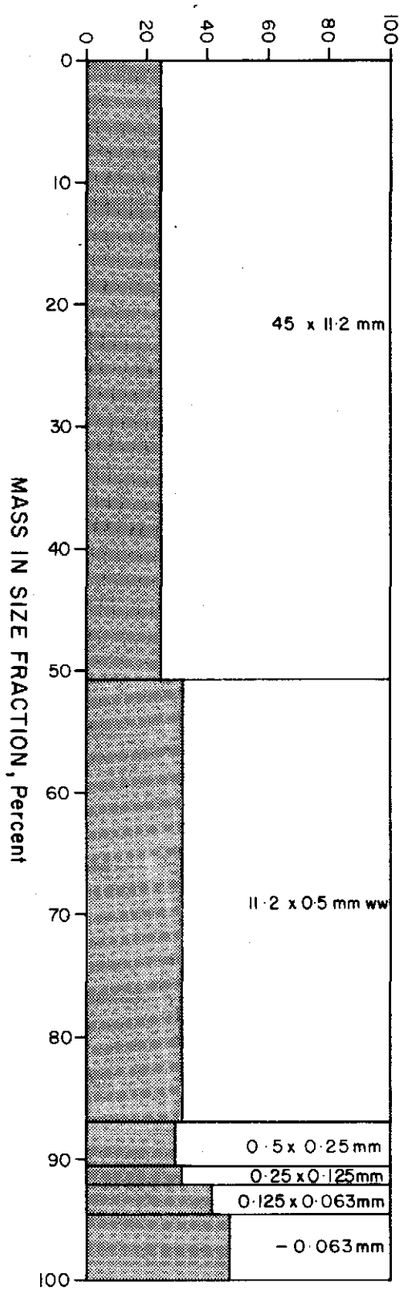
Author : Coal Division	Date : May 1983	Fig. 13
Report No: CEPR 12/83	Drawing No: 3116	

533081

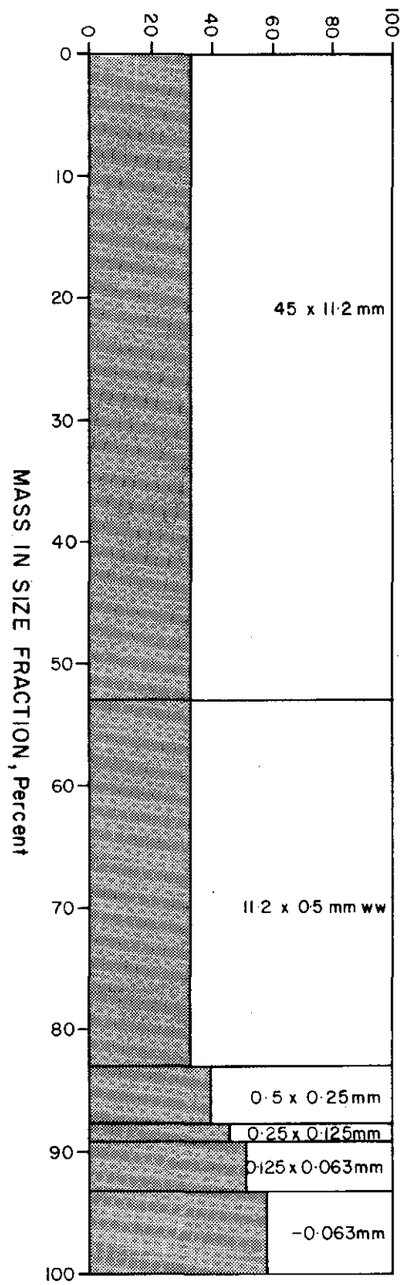
GY 178



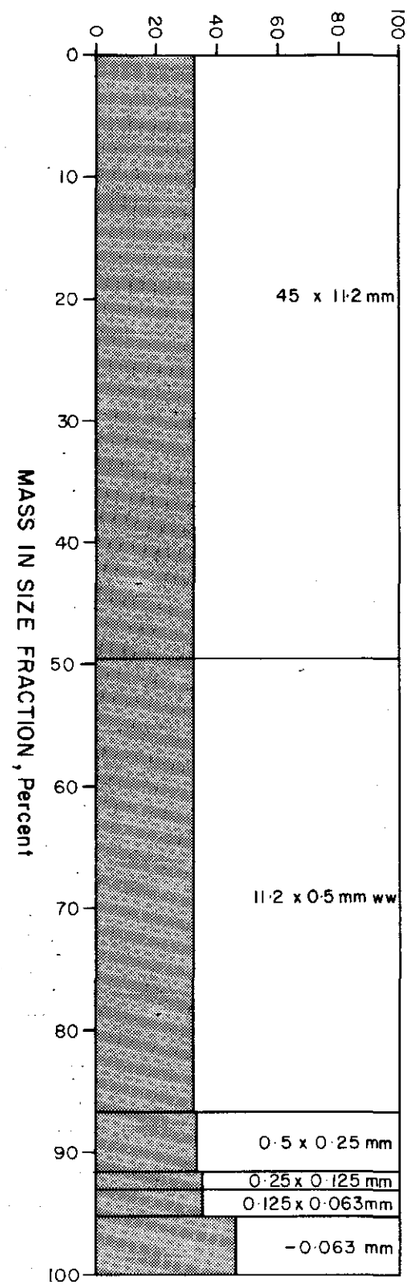
GY 177



GY 176



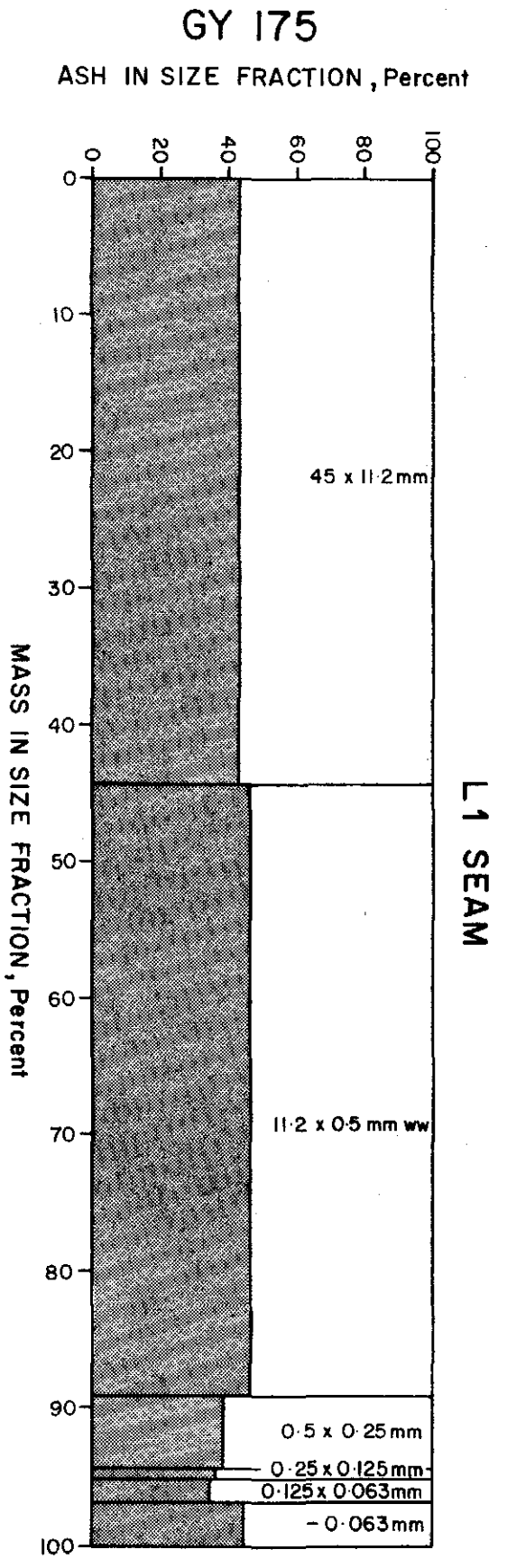
GY 175

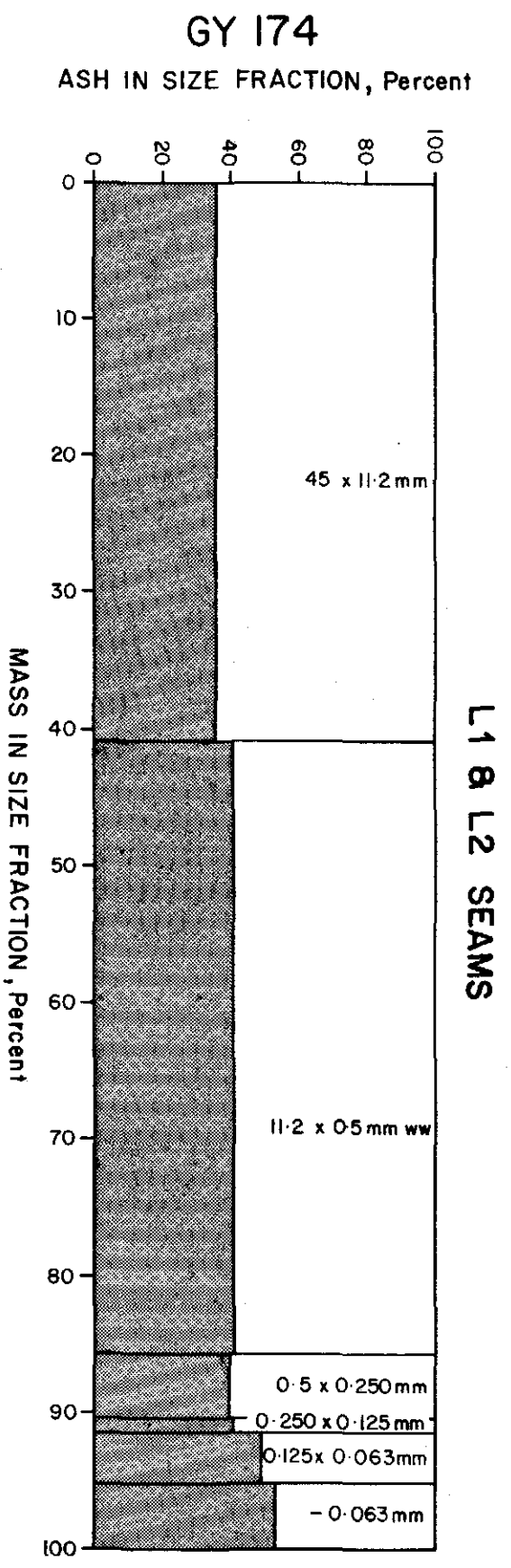


SIZING AND ASH CONTENT
L2 SEAM

Author: Coal Division	Date: May 1983	Fig. 14
Report No: CEPR 12/83	Drawing No: 3117	

533082



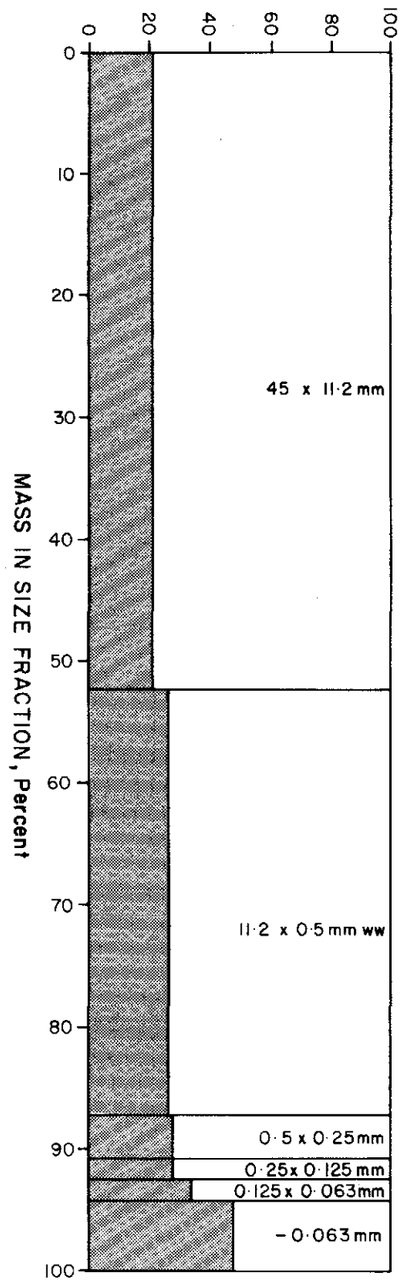


SIZING AND ASH CONTENT
L1 SEAM

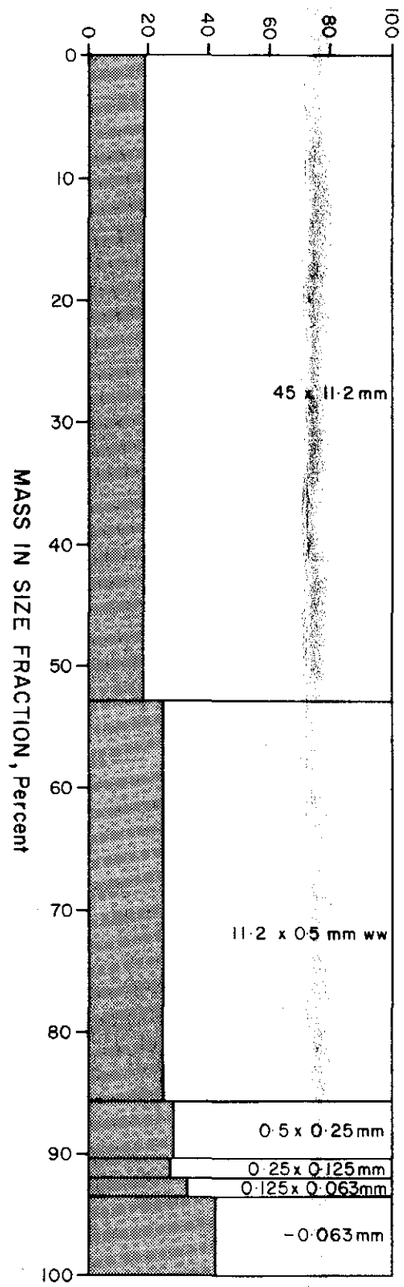
Author: Coal Division		Date: May 1983	Fig. 15
Report No: CEPR 12/83		Drawing No: 3118	

533083

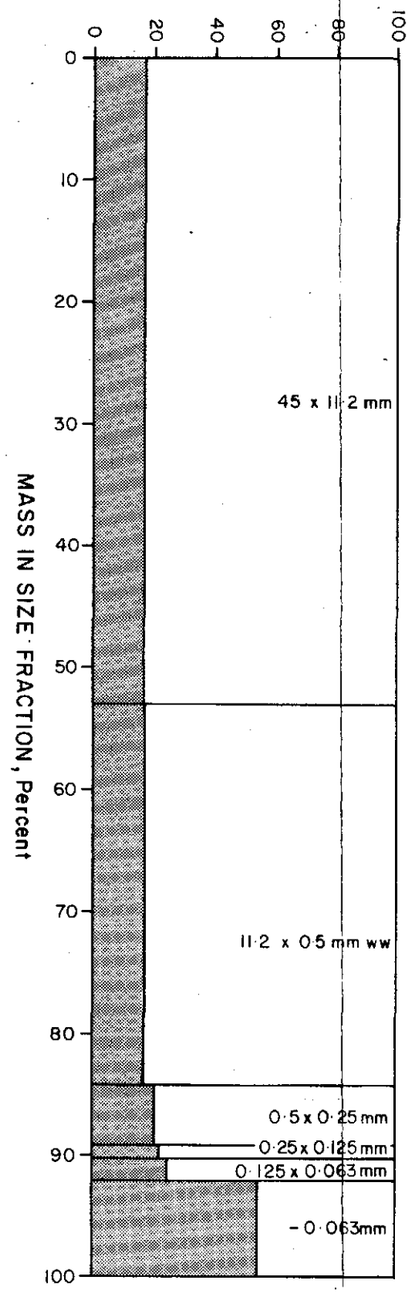
GY 178



GY 177



GY 176



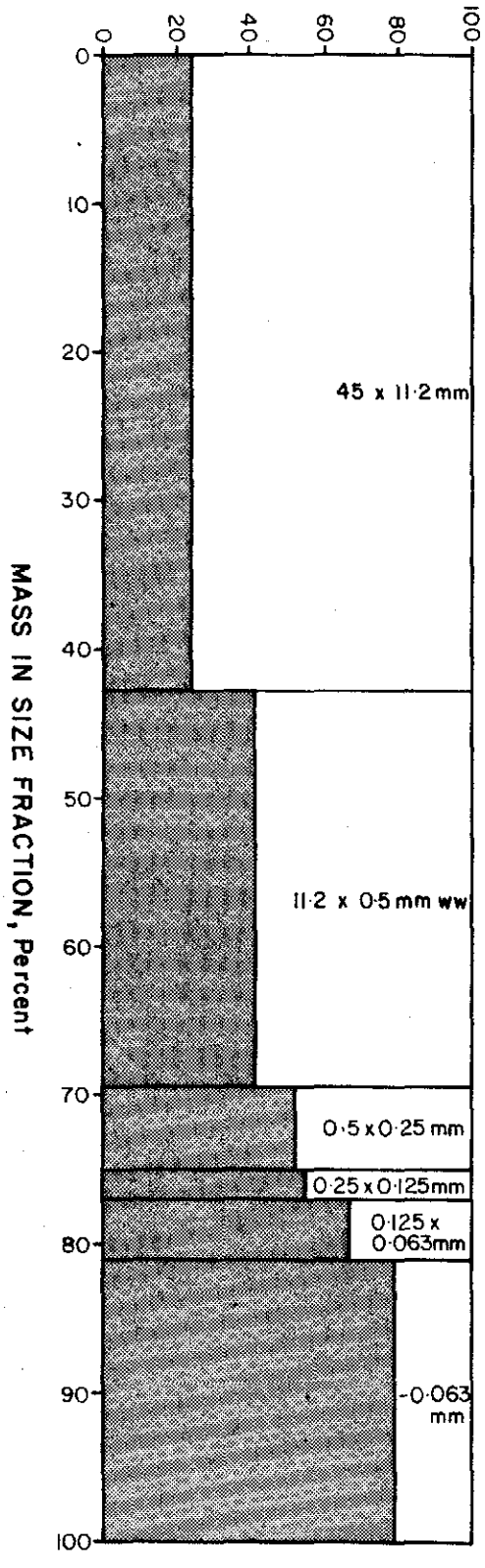
SIZING AND ASH CONTENT
M2 SEAM

Author: Coal Division	Date: May 1983	Fig. 16
Report No: CEPR 12 /83	Drawing No: 3119	

533084

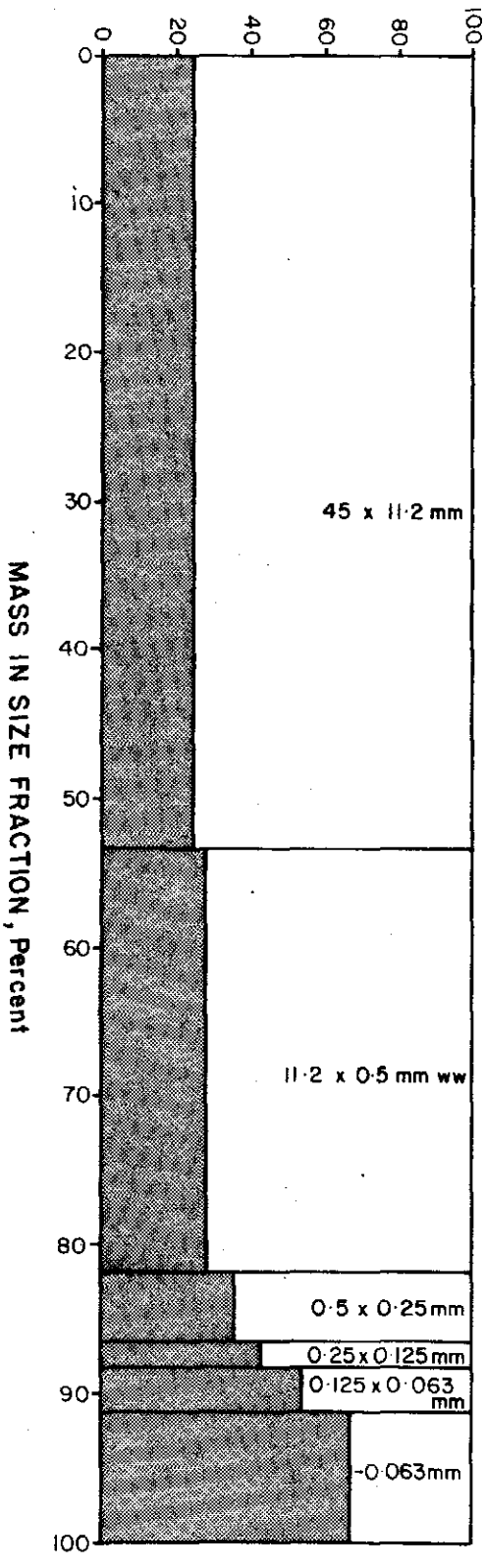
GY 178

ASH IN SIZE FRACTION, Percent



GY 174

ASH IN SIZE FRACTION, Percent



SIZING AND ASH CONTENT
M1 SEAM

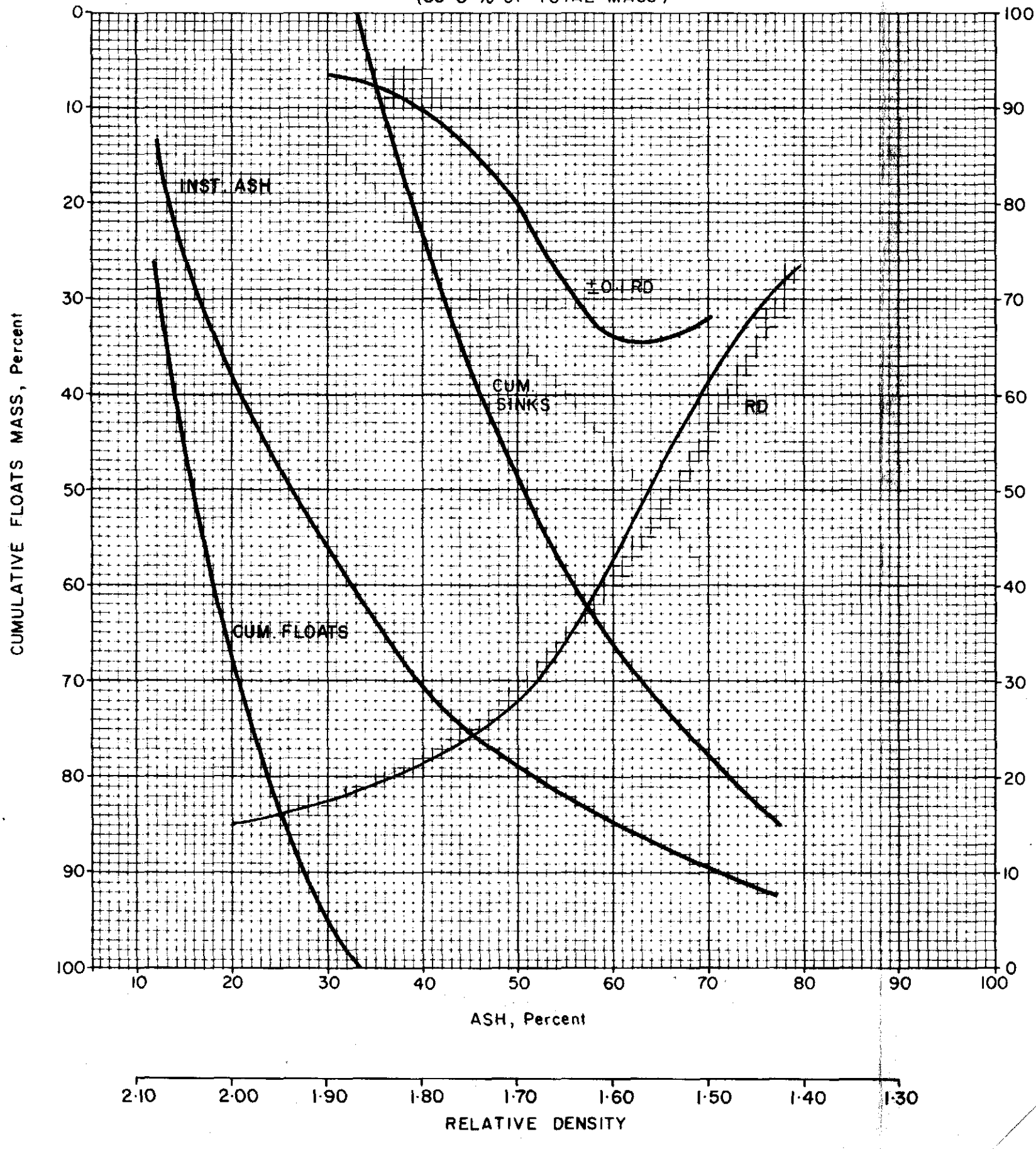
Author : Coal Division	Date : May 1983	Fig. 17
Report No: CEPR 12/83	Drawing No: 3120	

533083

WASHABILITY L2 SEAM – GY175

45 x 0.5mm w/w MATERIAL

(86·8 % OF TOTAL MASS)



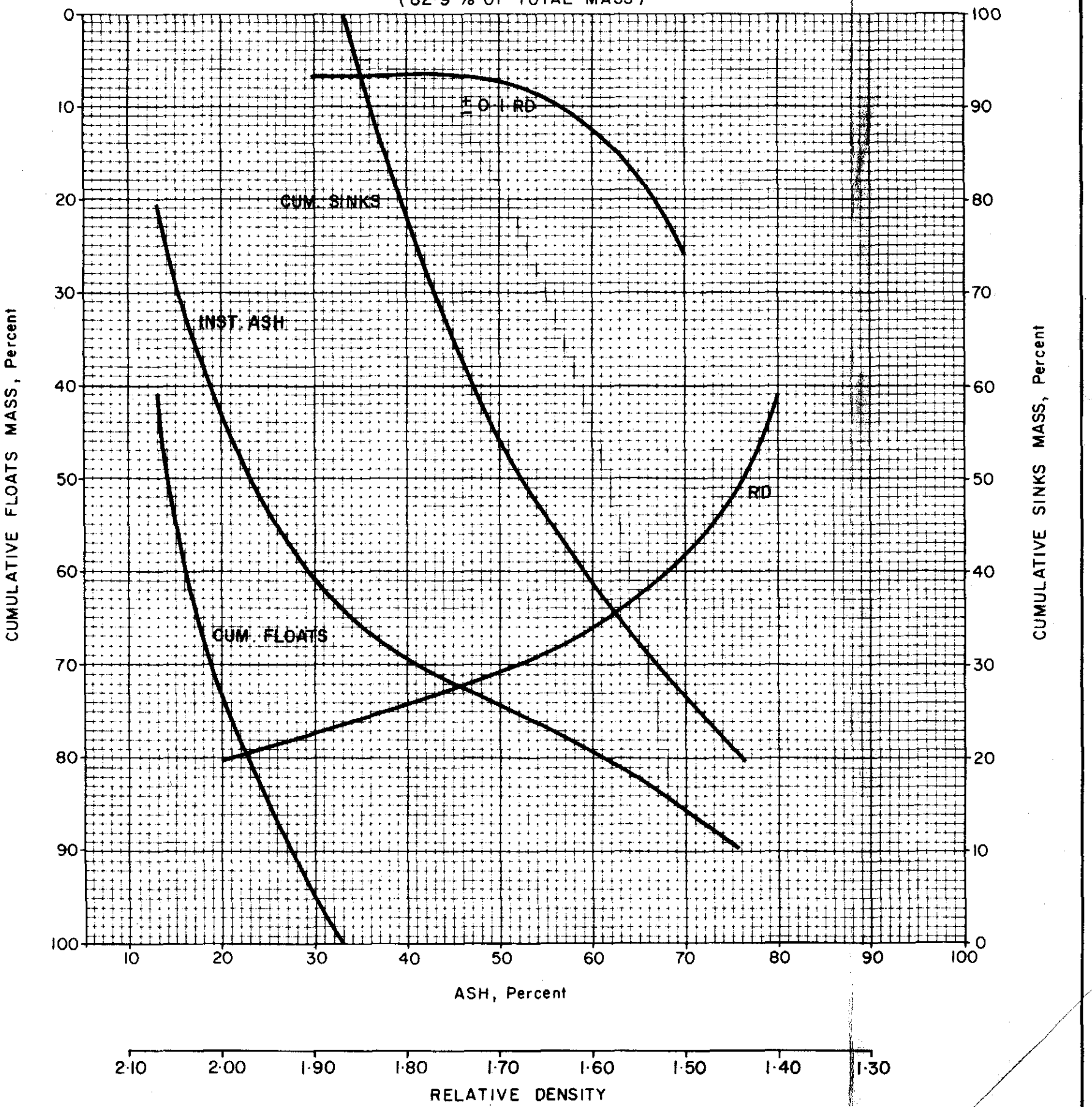
Author Coal Division		**Date** May 1983	Fig. 18
Report No CEPR 12/83		**Drawing No** 3121	

533086

WASHABILITY L2 SEAM - GY176

45 x 0.5mm w/w MATERIAL

(82·9 % OF TOTAL MASS)



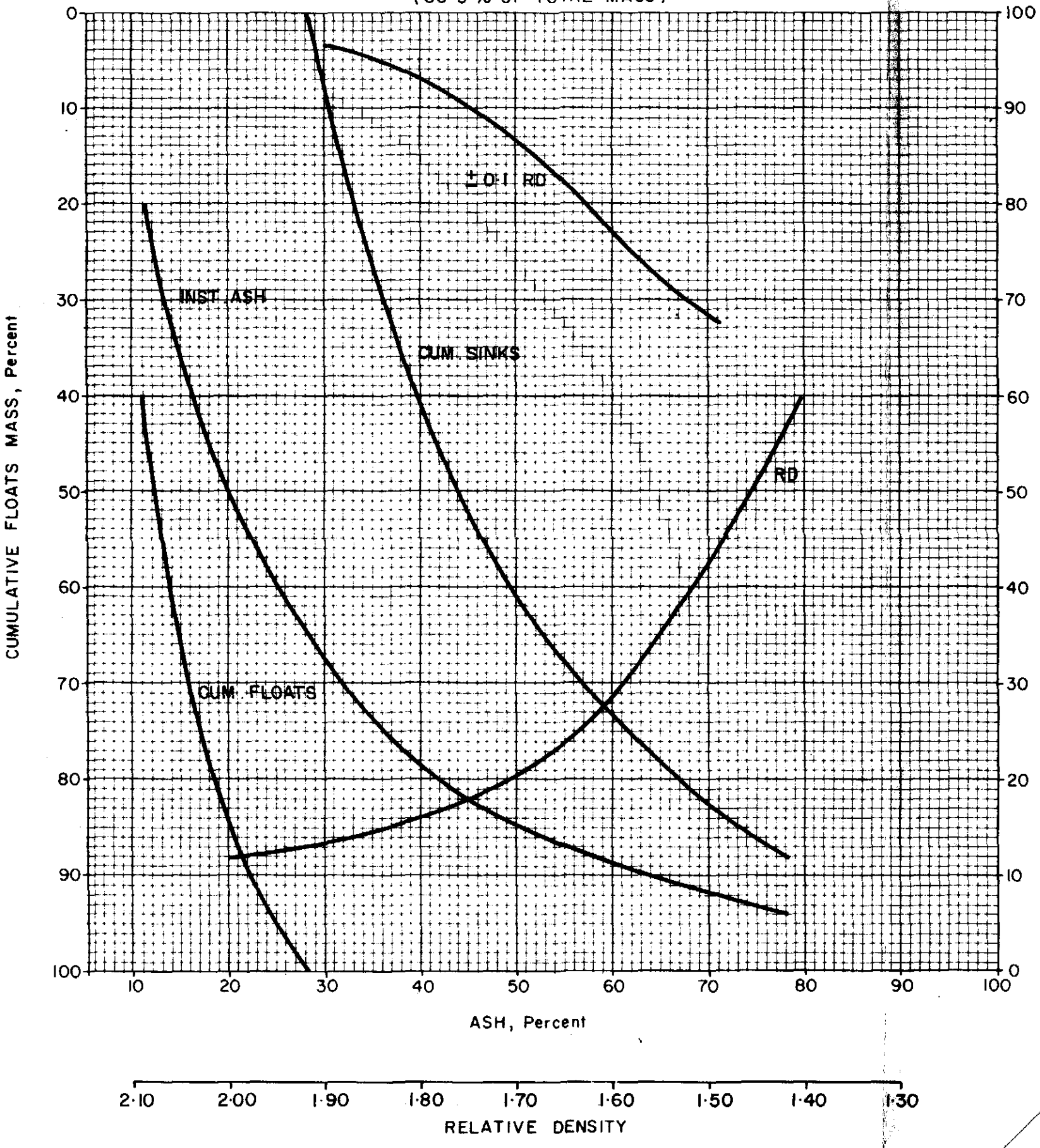
Author Coal Division		Date May 1983	Fig. 19
Report No CEPR 12/83		Drawing No 3122	

533087

WASHABILITY L2 SEAM - GY177

45 x 0.5mm w/w MATERIAL

(86·9% OF TOTAL MASS)



Author Coal Division	Date May 1983
Report No CEPR 12/83	Drawing No 3123

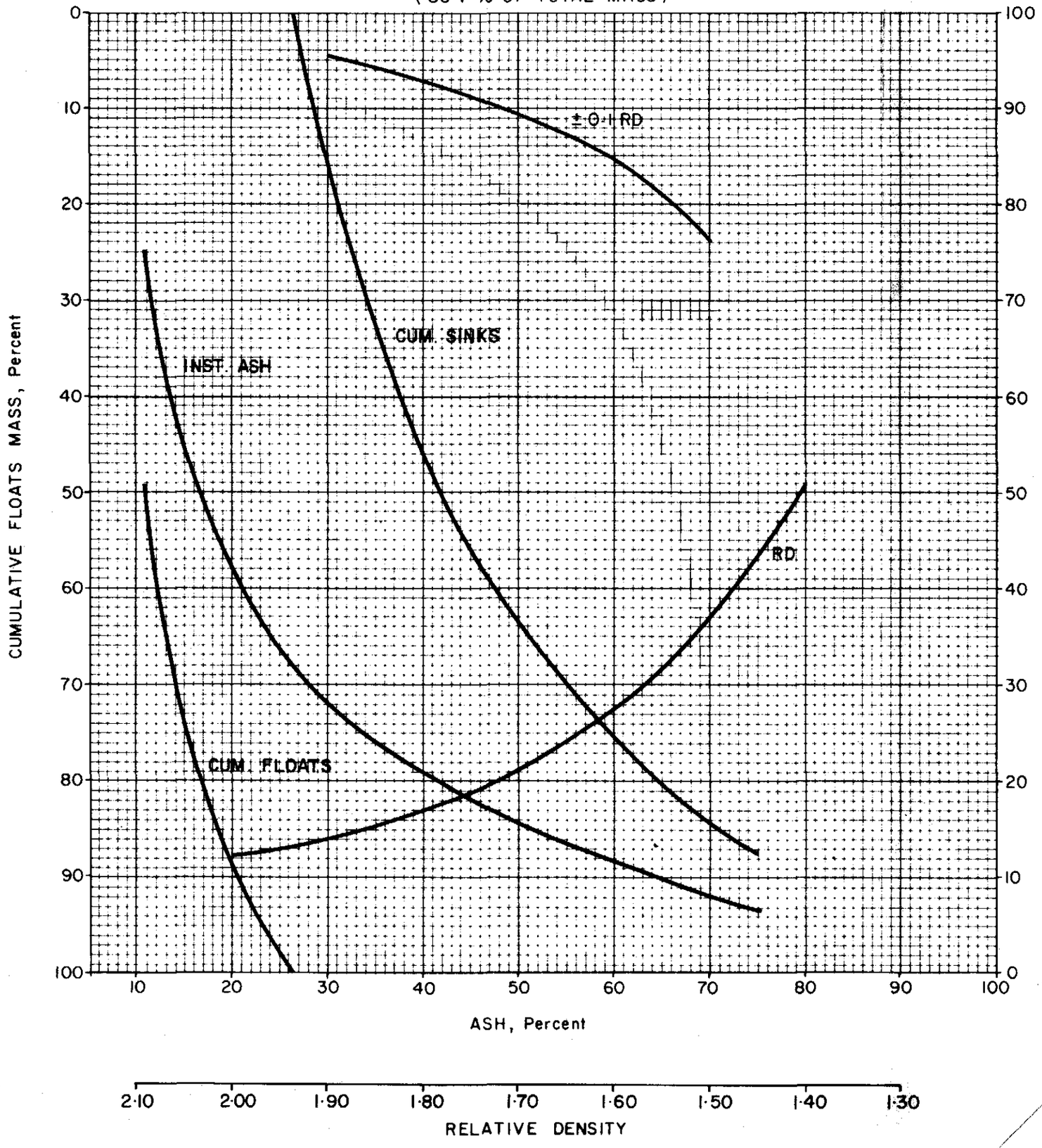
Fig. 20

533088

WASHABILITY L2 SEAM - GY178

45 x 0.5mm w/w MATERIAL

(86·7 % OF TOTAL MASS)



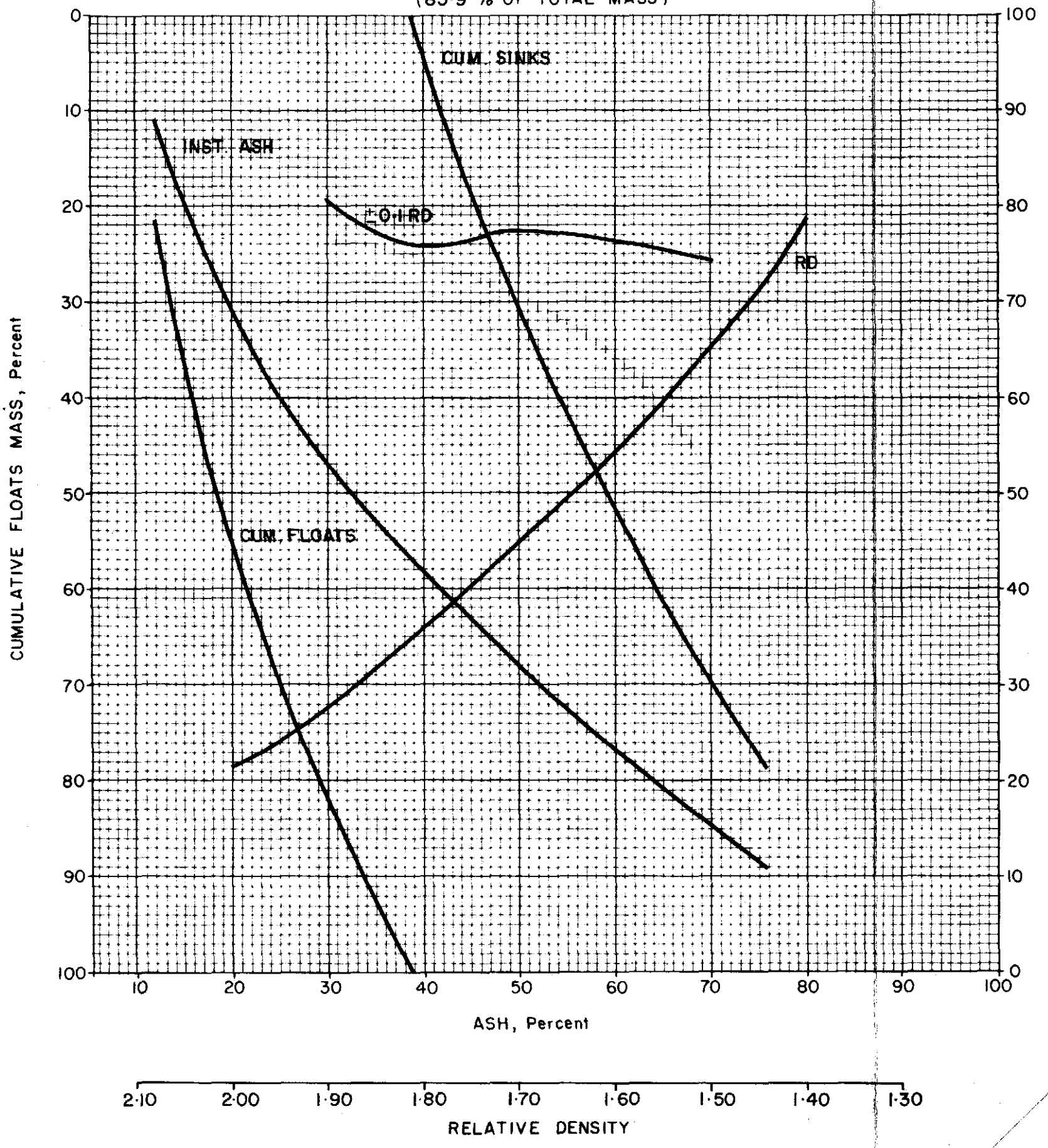
Author Coal Division		Date May 1983	Fig. 21
Report No CEPR 12/83		Drawing No 3124	

533089

WASHABILITY L1 AND L2 SEAMS COMBINED – GY174

45 x 0.5mm w/w MATERIAL

(85.9 % OF TOTAL MASS)



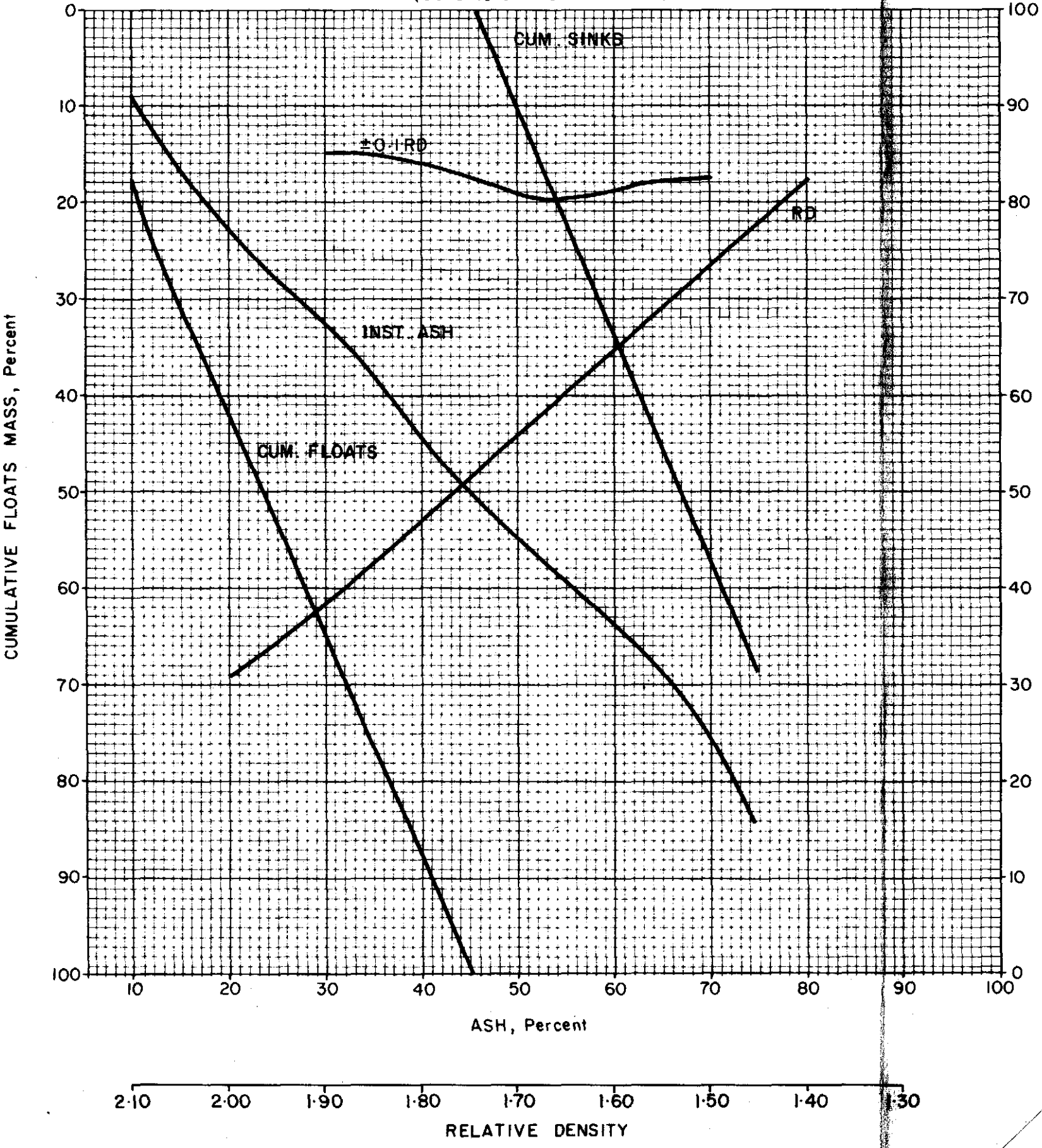
Author Coal Division		**Date** May 1983	Fig. 22
Report No CEPR 12/83		**Drawing No** 3125	

533090

WASHABILITY L1 SEAM – GY175

45 x 0.5mm w/w MATERIAL

(89·3 % OF TOTAL MASS)



Author Coal Division	Date May 1983
Report No CEPR 12/83	Drawing No 3126

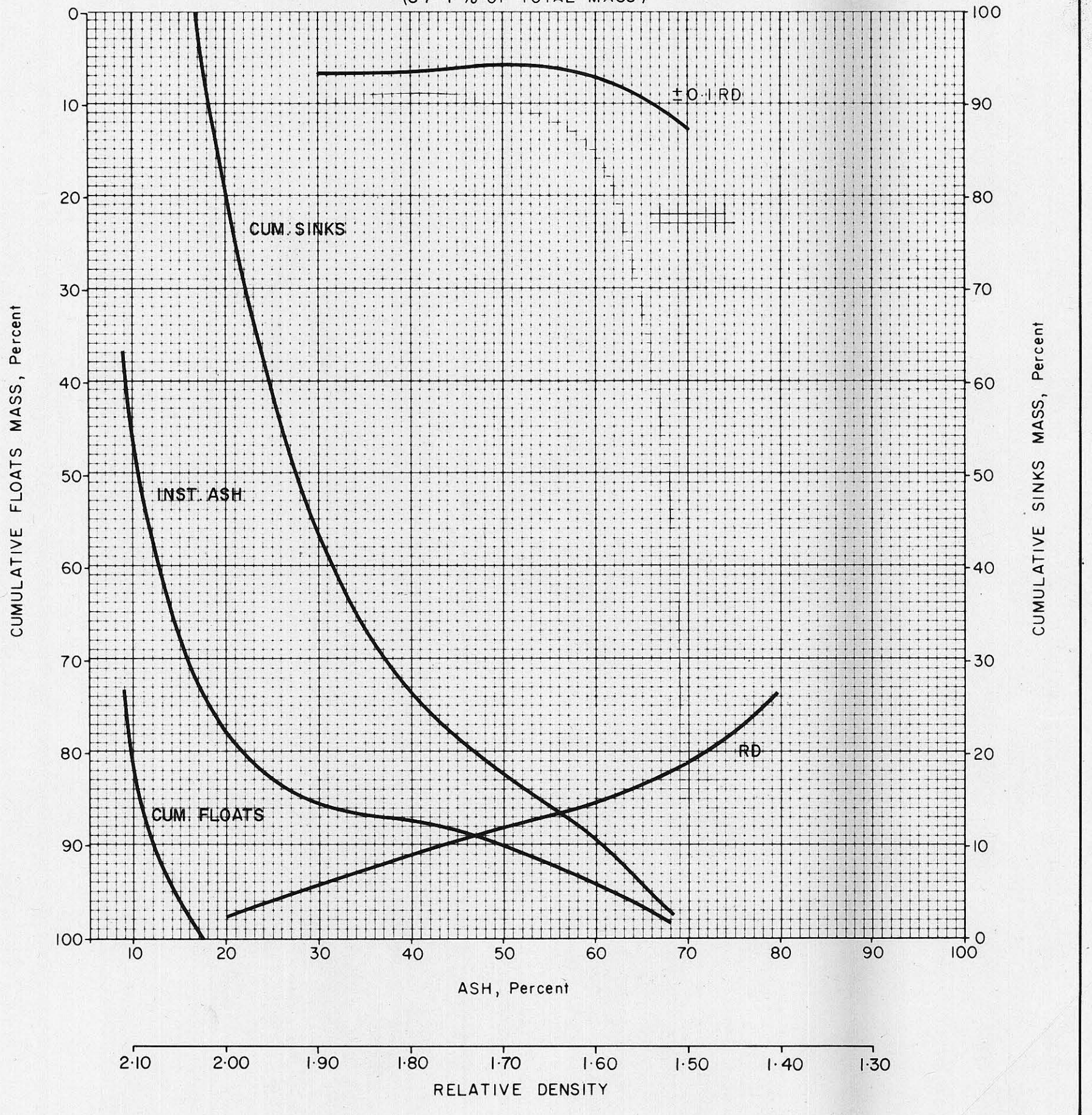
Fig. 23

533091

WASHABILITY M2 SEAM – GY176

45 x 0.5mm w/w MATERIAL

(84·4 % OF TOTAL MASS)

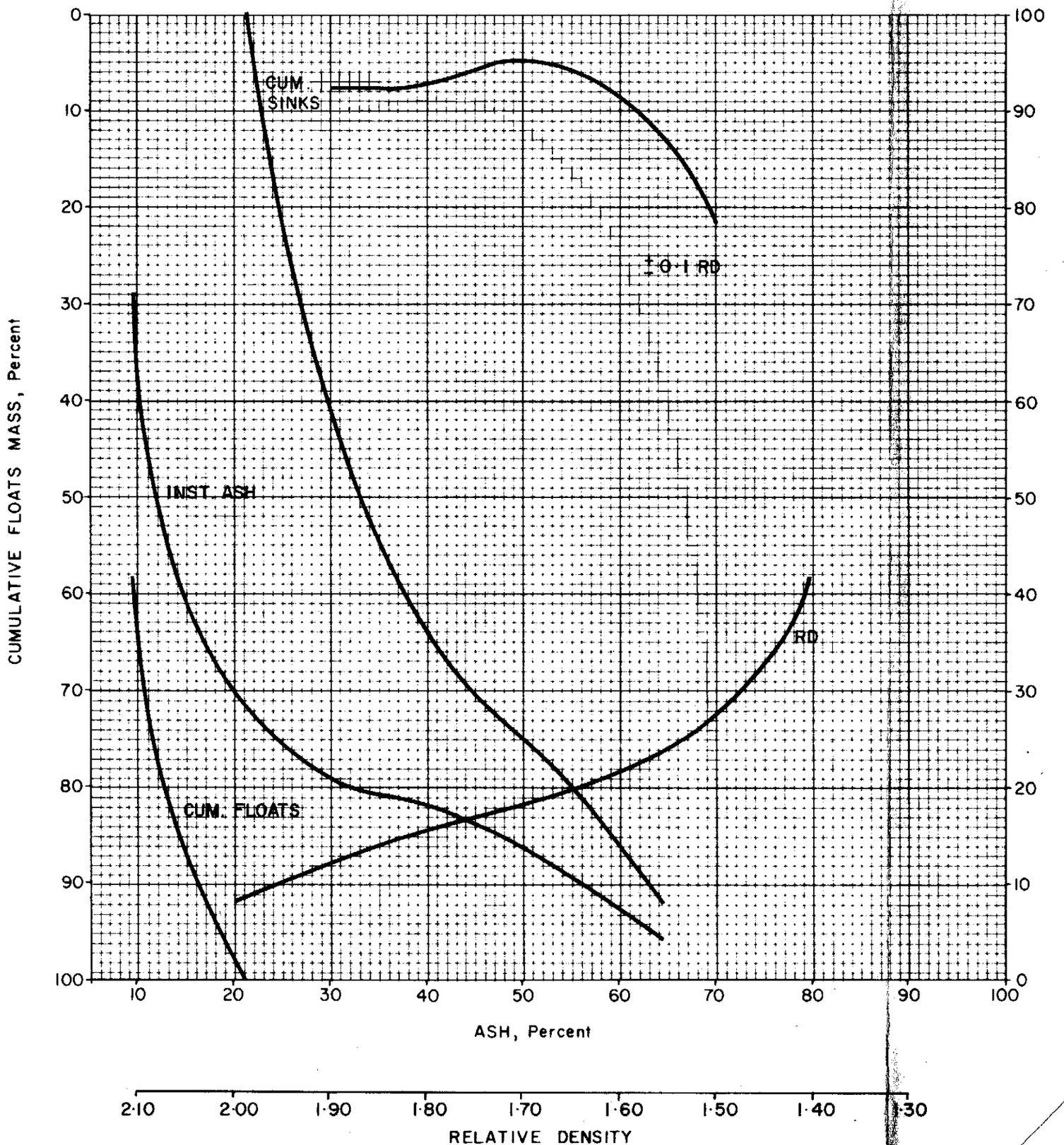


Author Coal Division		**Date** May 1983	Fig. 24
Report No CEPR 12/83		**Drawing No** 3127	

533092

WASHABILITY M2 SEAM - GY177

45 x 0.5mm w/w MATERIAL



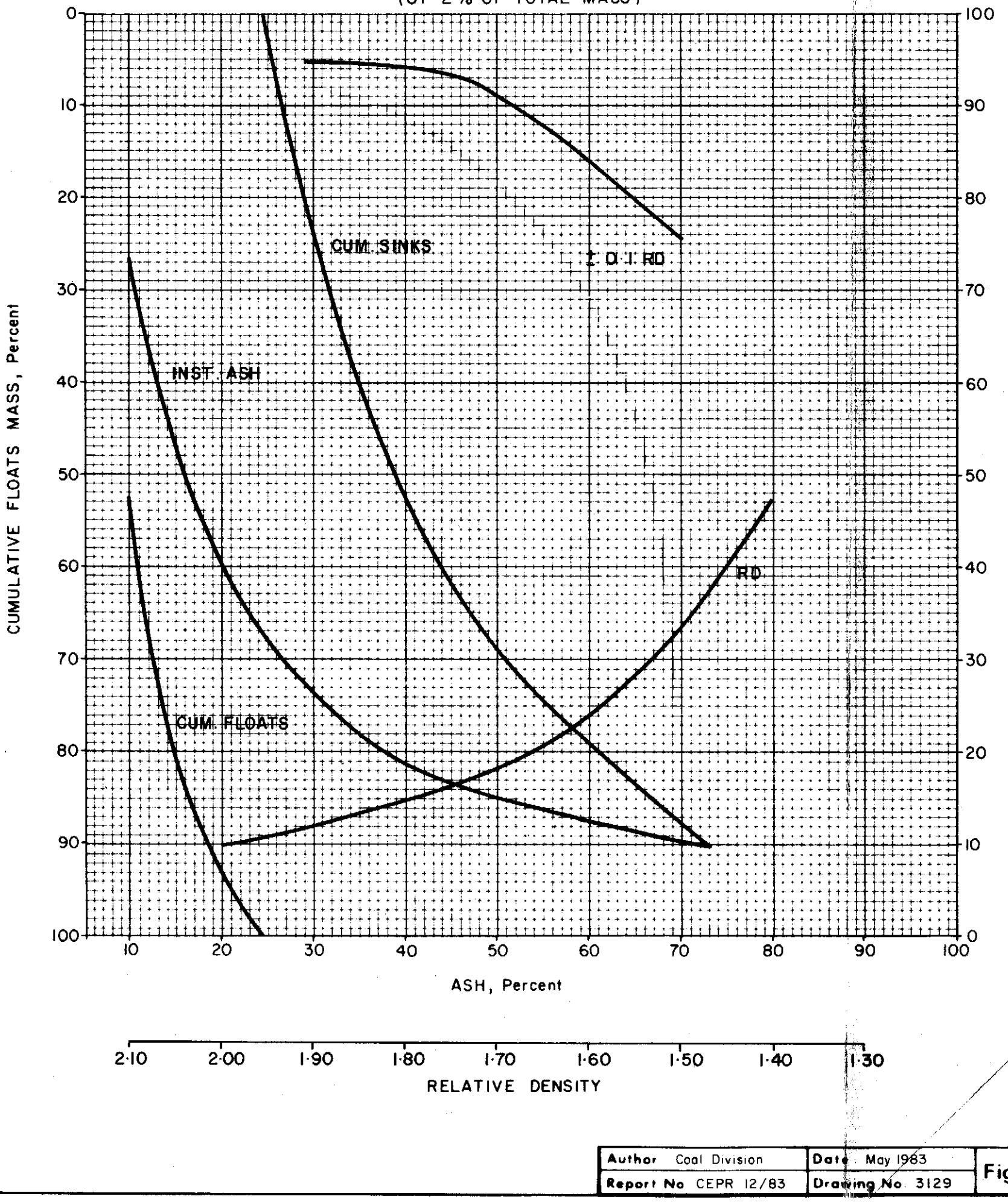
Author Coal Division		Date May 1983	Fig. 25
Report No CEPR 12/83		Drawing No 3128	

533093

WASHABILITY M2 SEAM - GY178

45 x 0.5mm w/w MATERIAL

(87·2% OF TOTAL MASS)



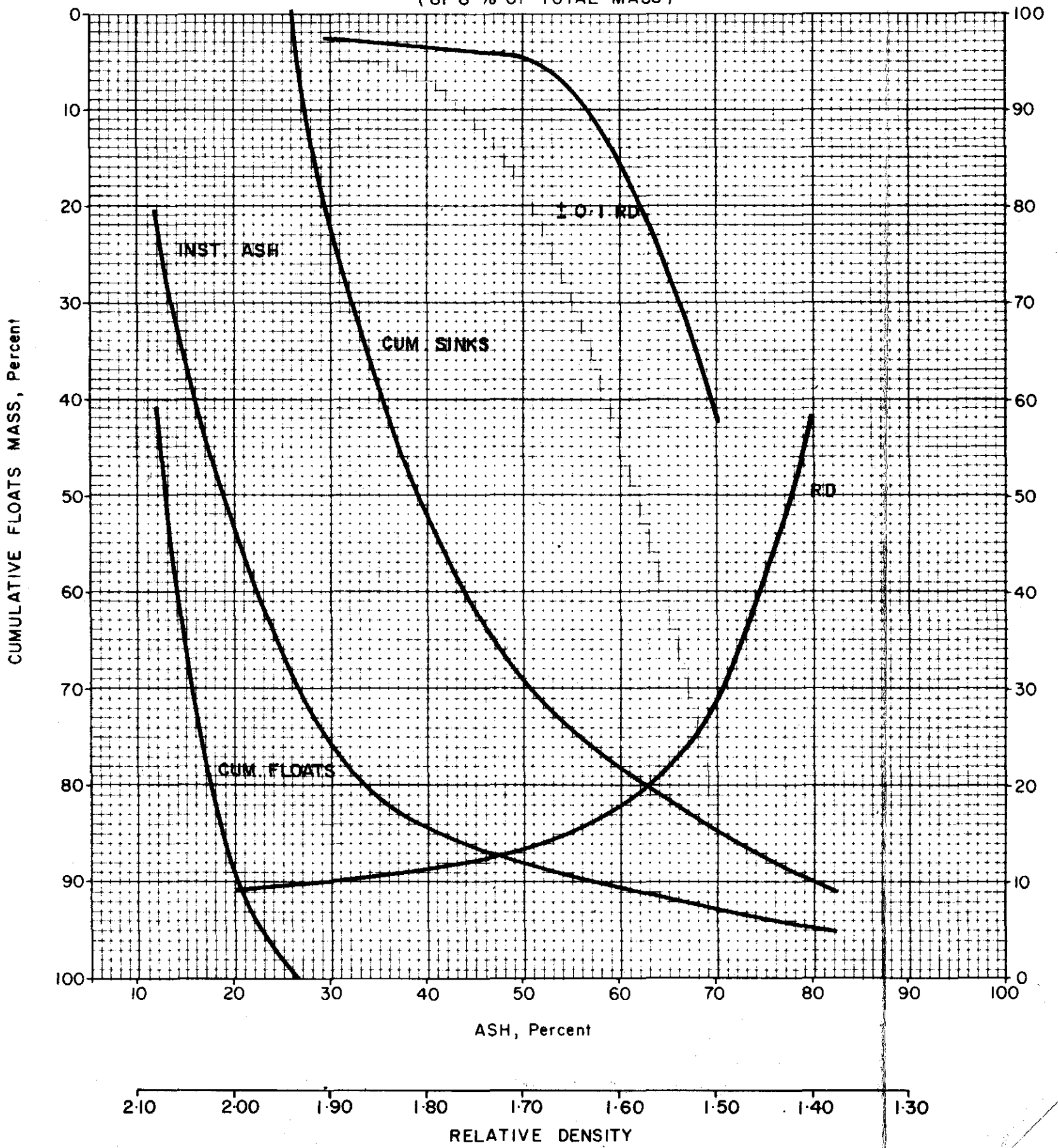
Author Coal Division	Date May 1983	Fig. 26
Report No CEPR 12/83	Drawing No 3129	

533094

WASHABILITY M1 SEAM – GY174

45 x 0.5mm w/w MATERIAL

(81·8 % OF TOTAL MASS)



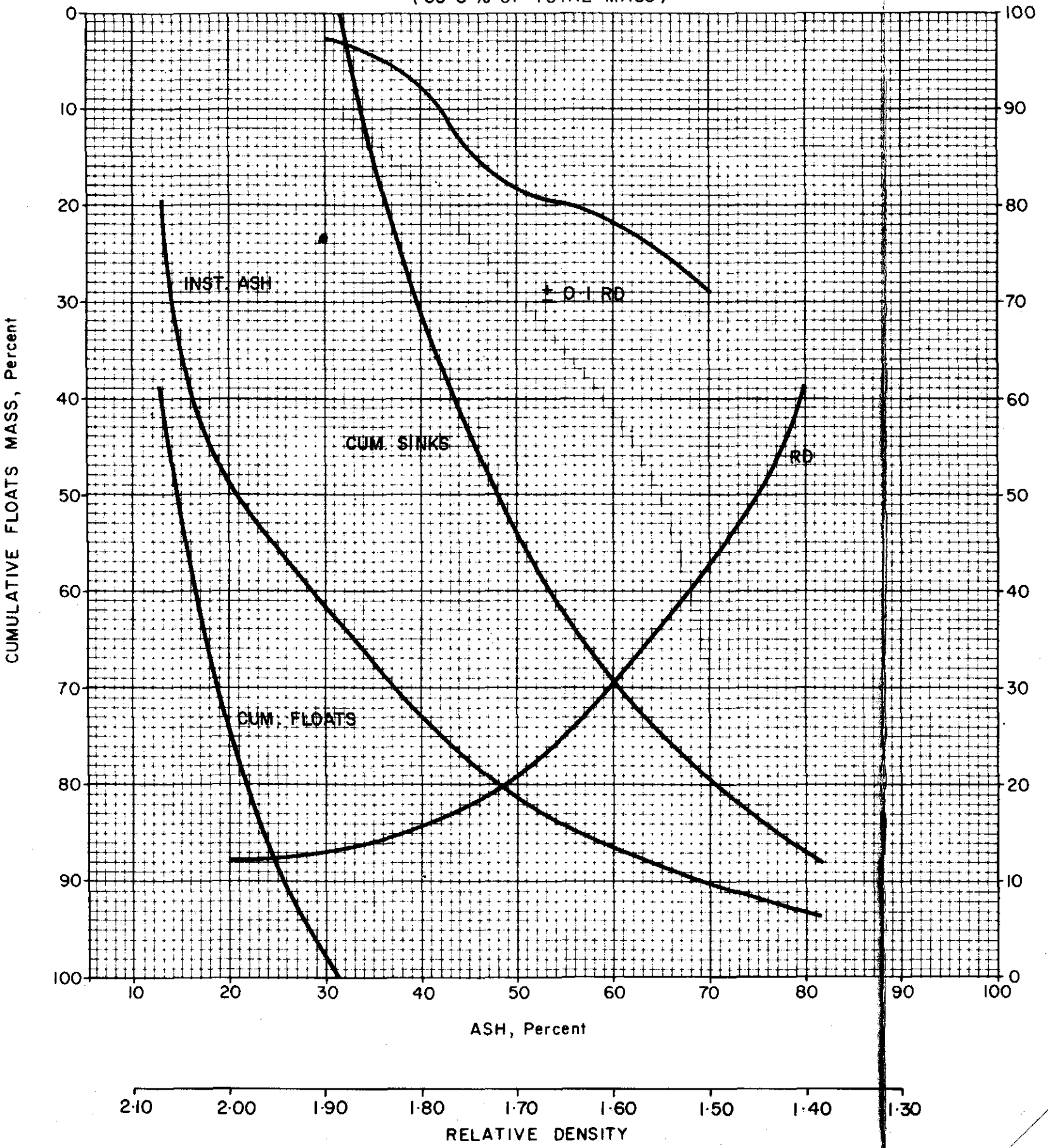
Author Coal Division		**Date** May 1983	Fig. 27
Report No CEPR 12/83		**Drawing No** 3130	

533095

WASHABILITY M1 SEAM - GYI78

45 x 0.5mm w/w MATERIAL

(69·6 % OF TOTAL MASS)

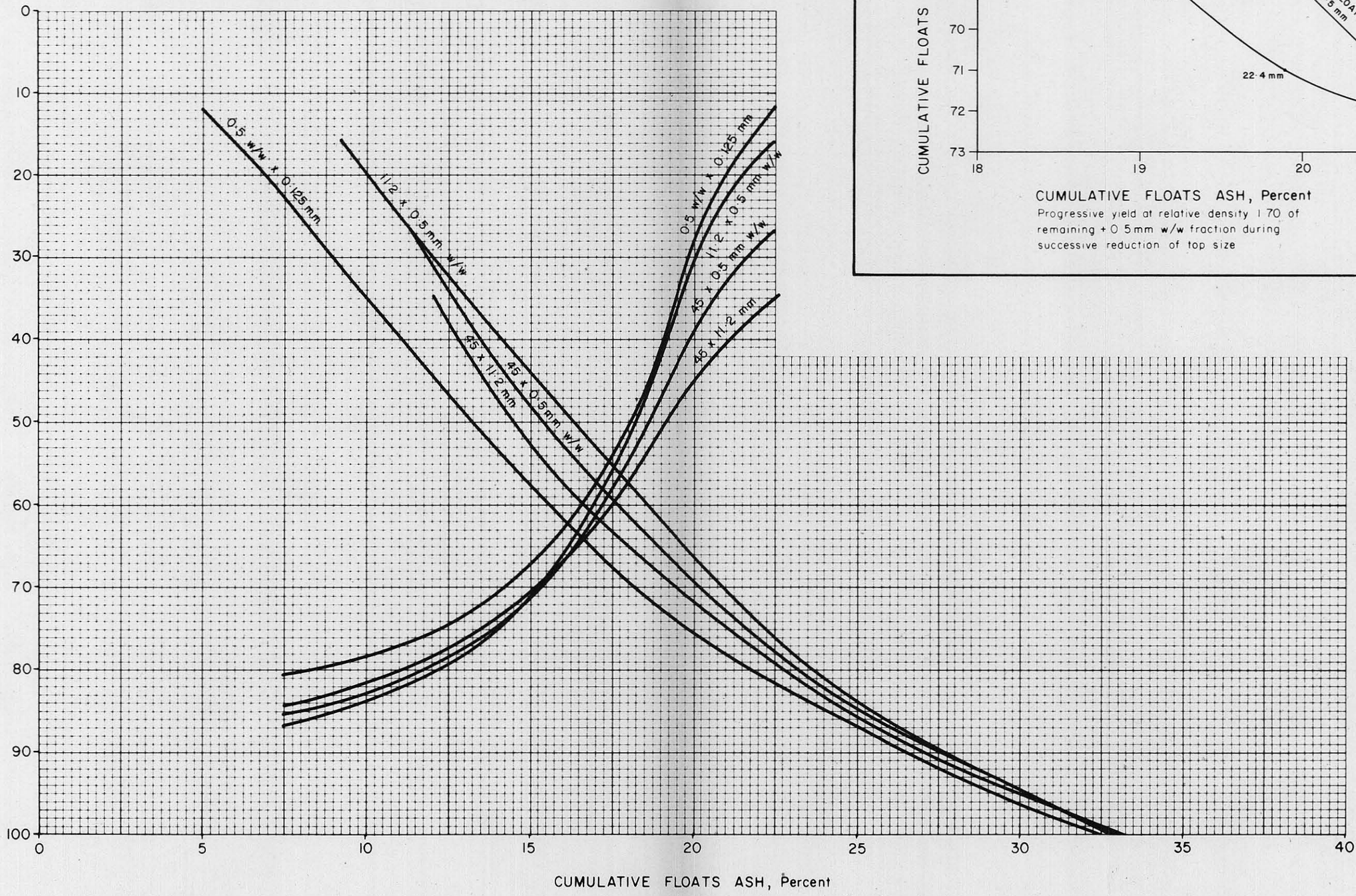


Author Coal Division	Date May 1983
Report No CEPR 12/83	Drawing No 3131

Fig. 28

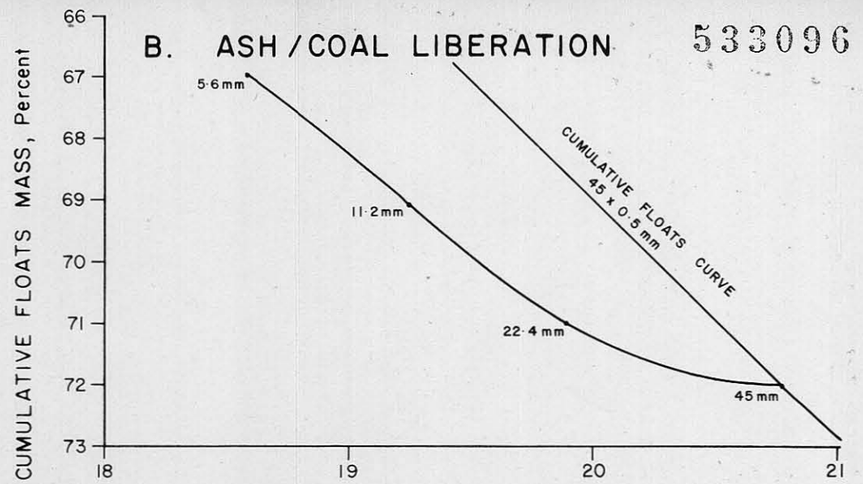
EFFECT OF SIZING ON WASHABILITY
L2 SEAM – GY 175

A. WASHABILITY OF SIZE FRACTIONS



B. ASH / COAL LIBERATION

533096

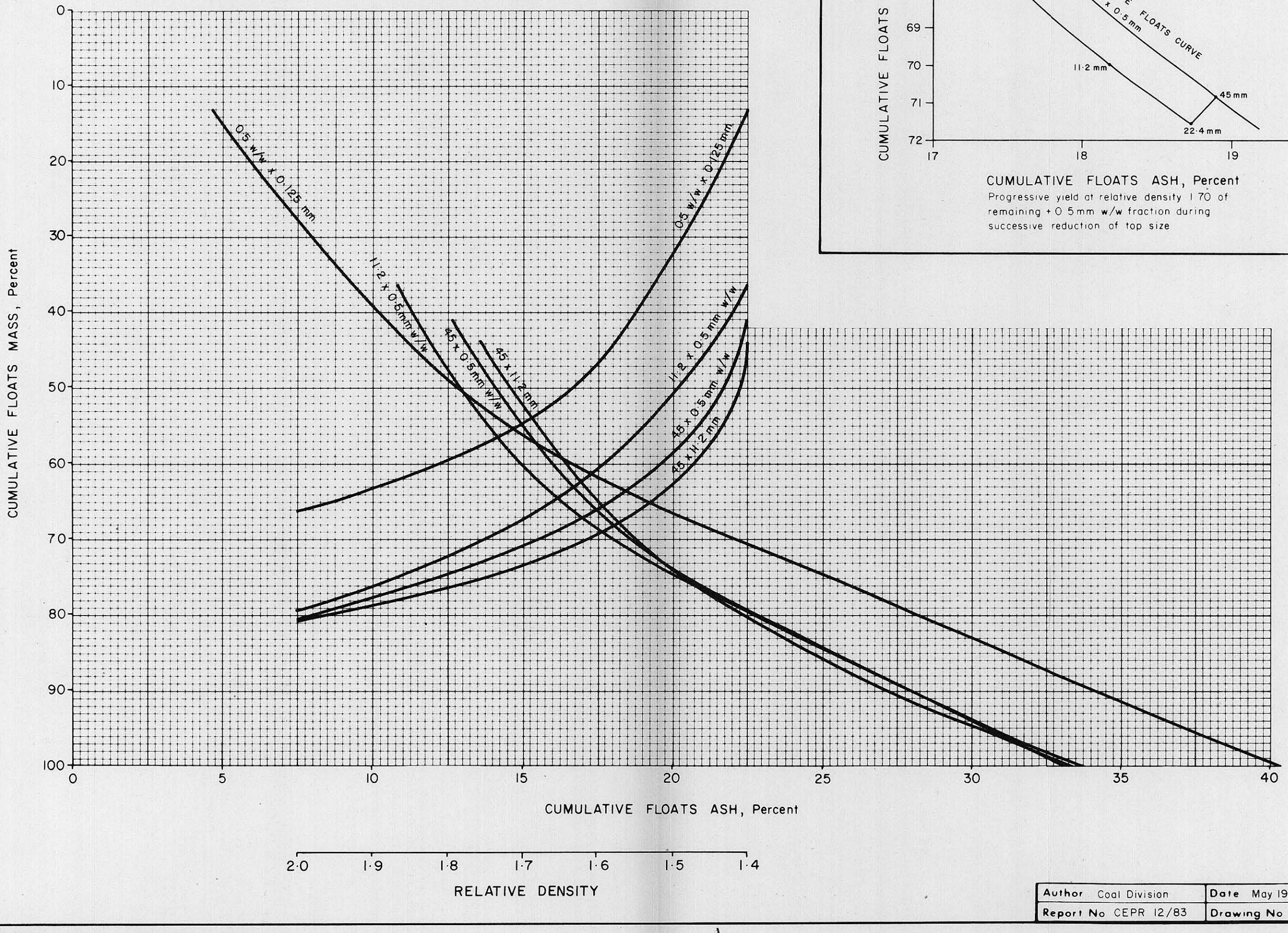


Progressive yield at relative density 1·70 of remaining + 0·5mm w/w fraction during successive reduction of top size

Author Coal Division	Date May 1983	Fig. 29
Report No CEPR 12/83	Drawing No 3132	

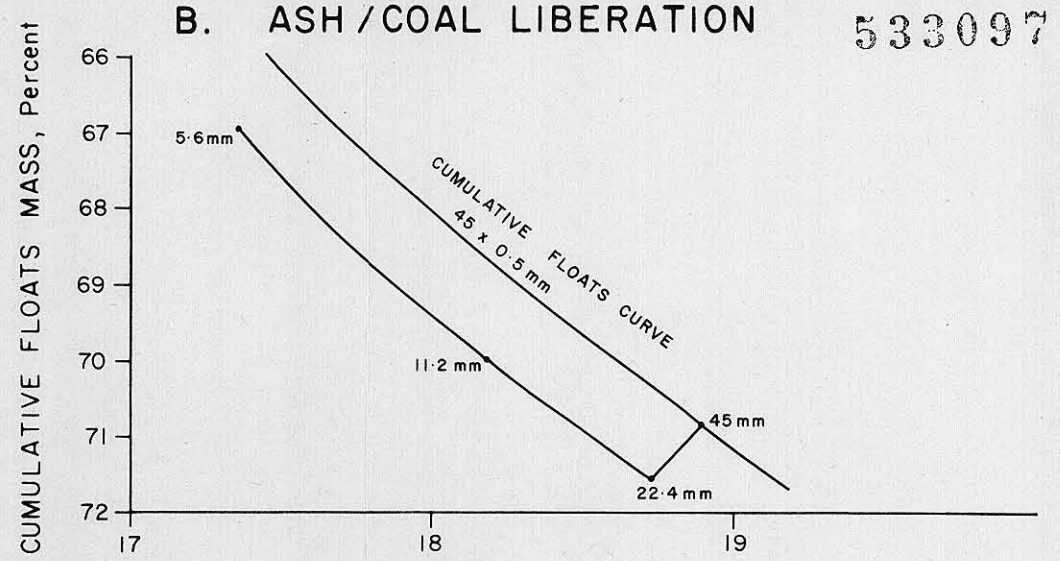
EFFECT OF SIZING ON WASHABILITY
L2 SEAM — GY 176

A. WASHABILITY OF SIZE FRACTIONS



B. ASH / COAL LIBERATION

533097

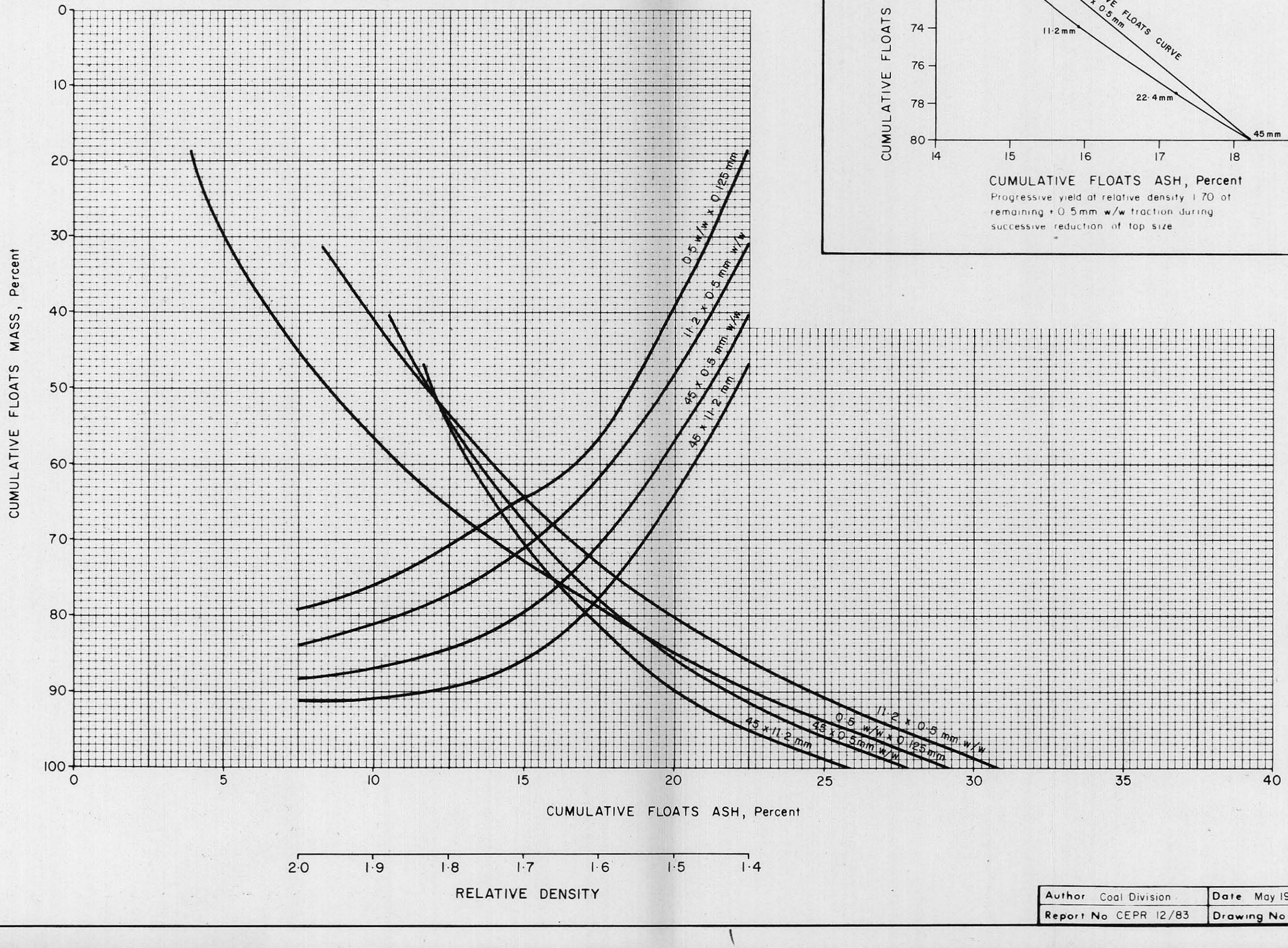


Progressive yield at relative density 1·70 of remaining + 0·5 mm w/w fraction during successive reduction of top size

Author Coal Division		Date May 1983	Fig. 30
Report No CEPR 12/83		Drawing No 3133	

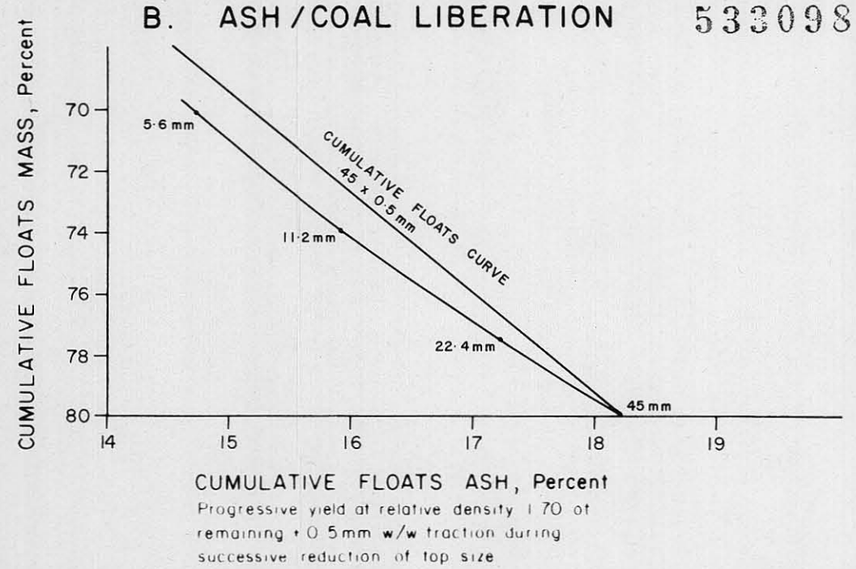
EFFECT OF SIZING ON WASHABILITY
L2 SEAM — GY 177

A. WASHABILITY OF SIZE FRACTIONS



B. ASH/COAL LIBERATION

533098



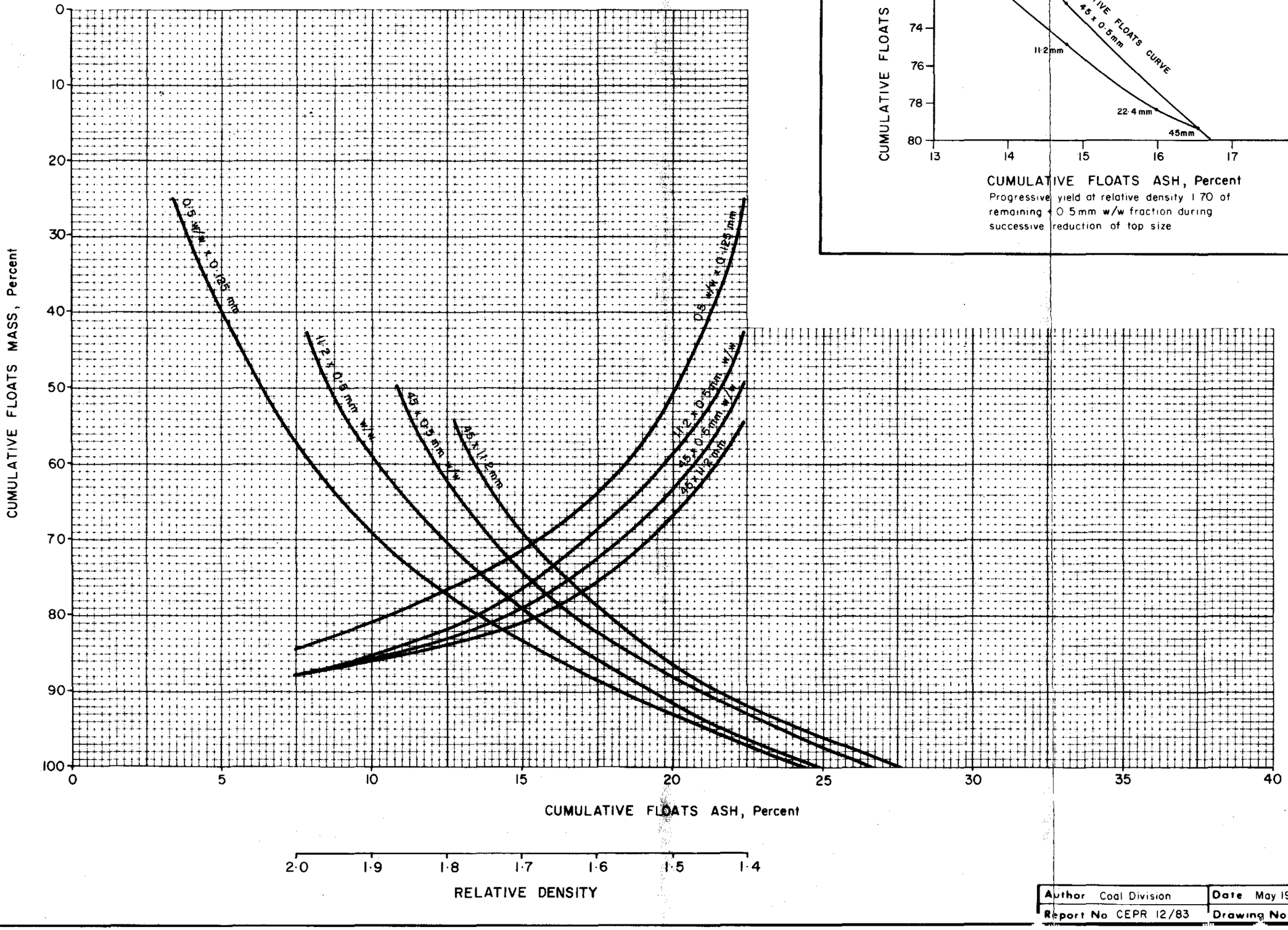
Progressive yield at relative density 1·70 of remaining + 0·5 mm w/w fraction during successive reduction of top size

Author Coal Division	Date May 1983
Report No CEPR 12/83	Drawing No 3134

Fig 31

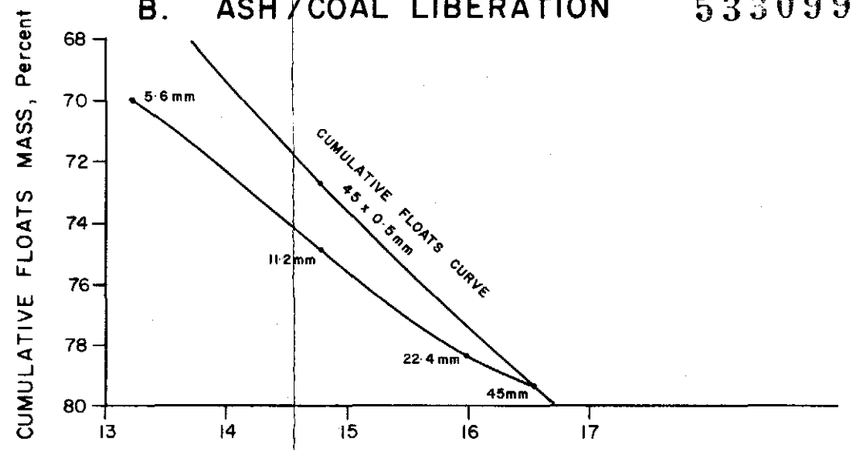
EFFECT OF SIZING ON WASHABILITY
L2 SEAM — GY 178

A. WASHABILITY OF SIZE FRACTIONS



B. ASH / COAL LIBERATION

533099

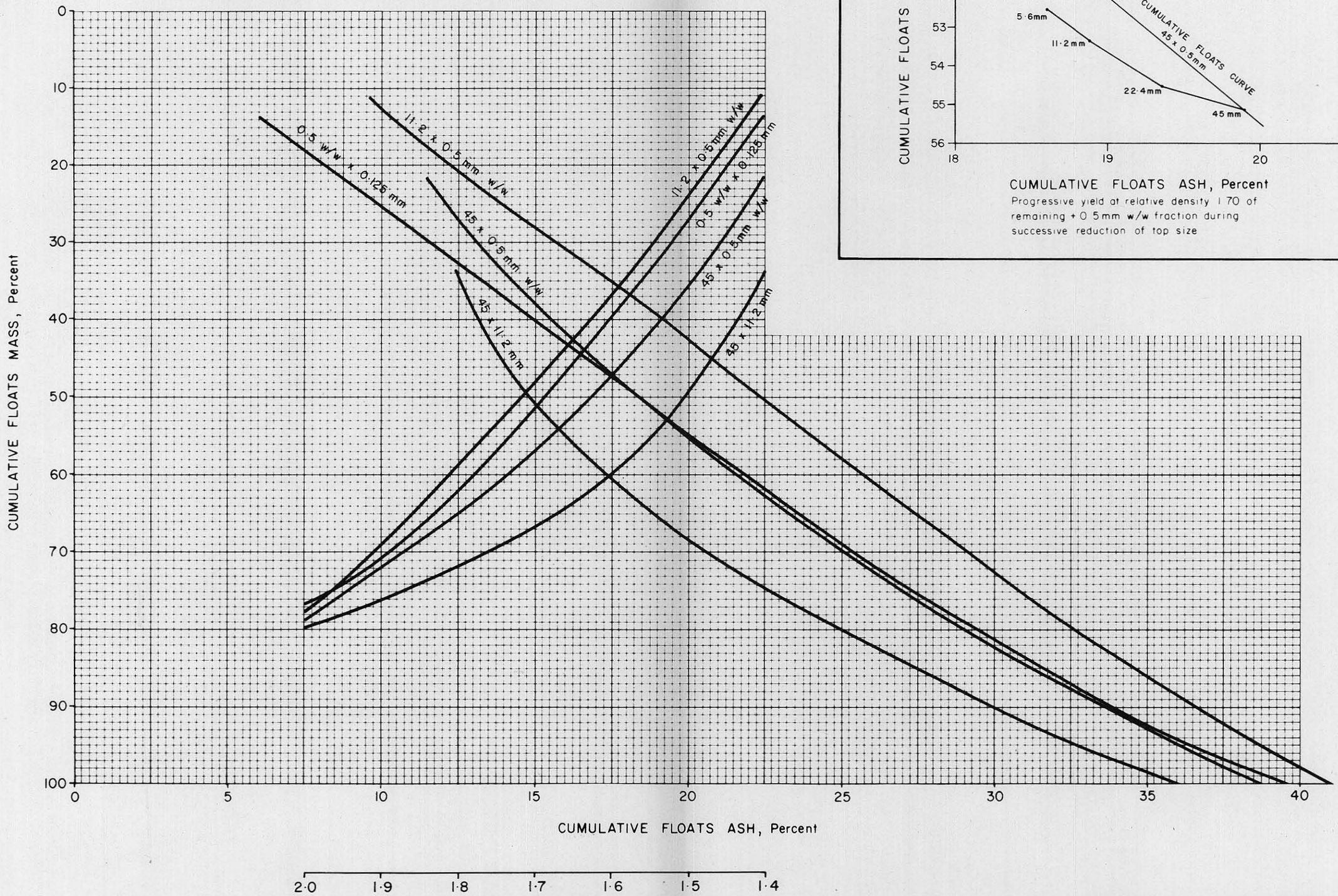


Progressive yield at relative density 1·70 of remaining +0·5mm w/w fraction during successive reduction of top size

Author Coal Division	Date May 1983	Fig. 32
Report No CEPR 12/83	Drawing No 3135	

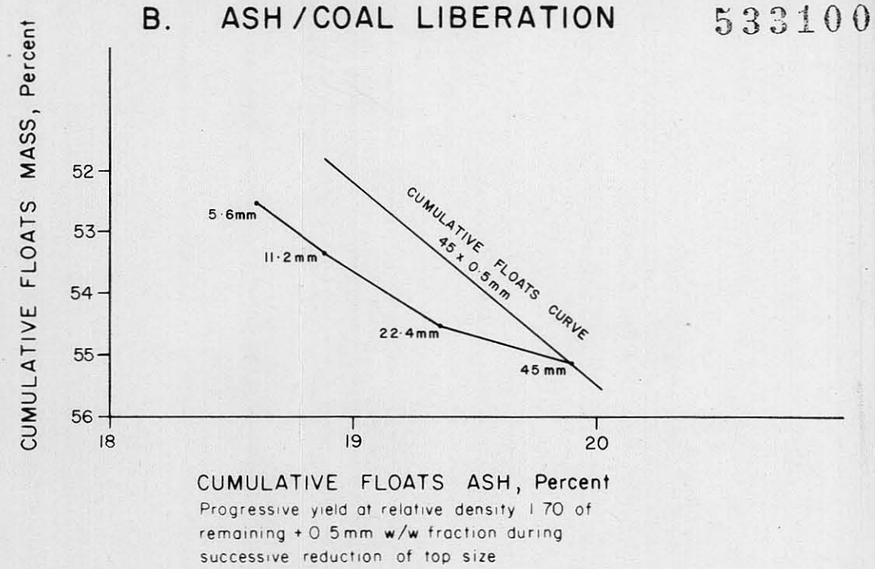
EFFECT OF SIZING ON WASHABILITY
L1 AND L2 SEAMS – GY 174

A. WASHABILITY OF SIZE FRACTIONS



B. ASH / COAL LIBERATION

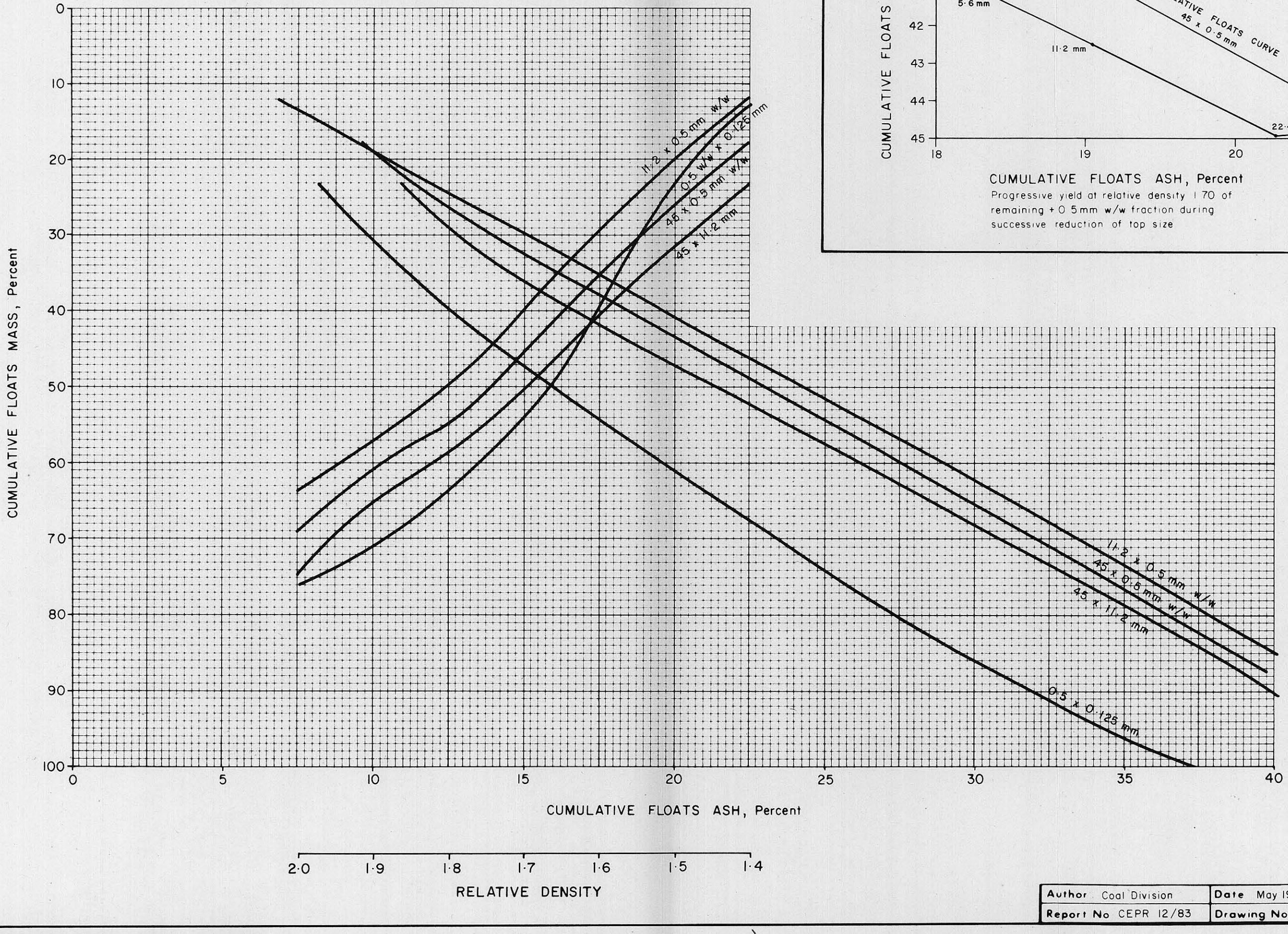
533100



Author Coal Division	Date May 1983	Fig. 33
Report No CEPR 12/83	Drawing No 3136	

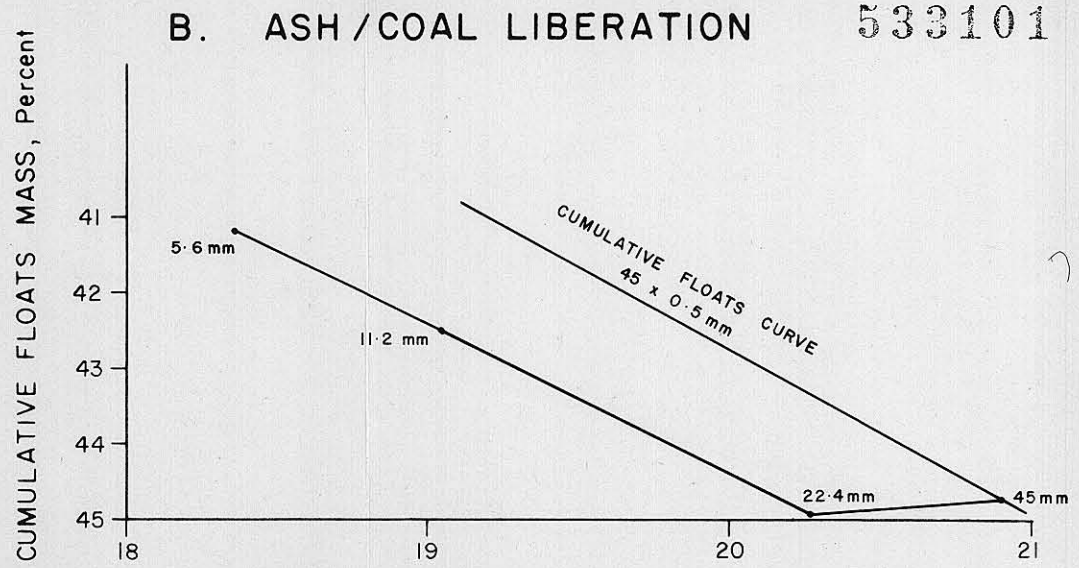
EFFECT OF SIZING ON WASHABILITY
L1 SEAM – GY 175

A. WASHABILITY OF SIZE FRACTIONS



B. ASH/COAL LIBERATION

533101

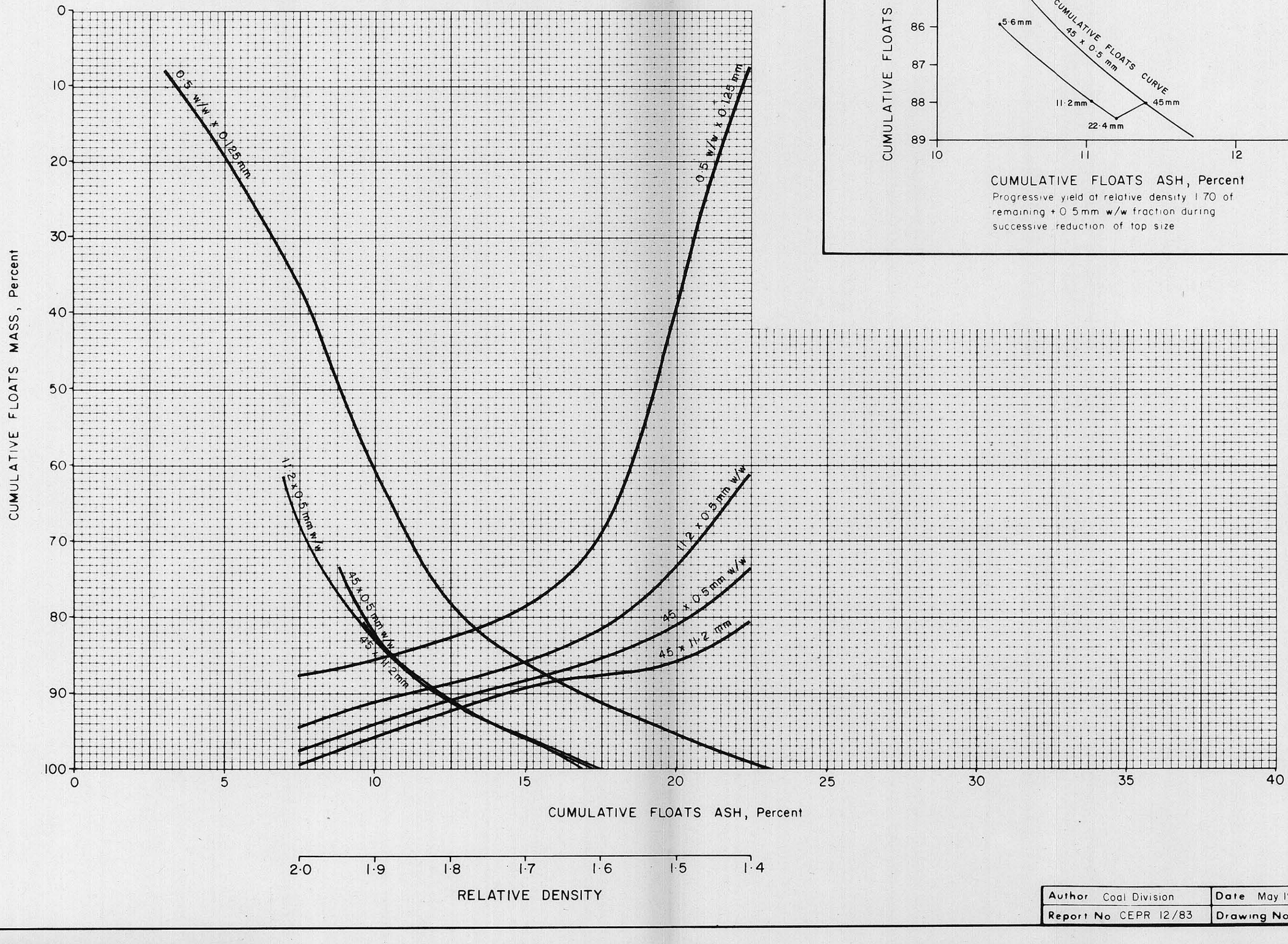


Progressive yield at relative density 1·70 of remaining +0·5 mm w/w fraction during successive reduction of top size

Author Coal Division	Date May 1983	Fig. 34
Report No CEPR 12/83	Drawing No 3137	

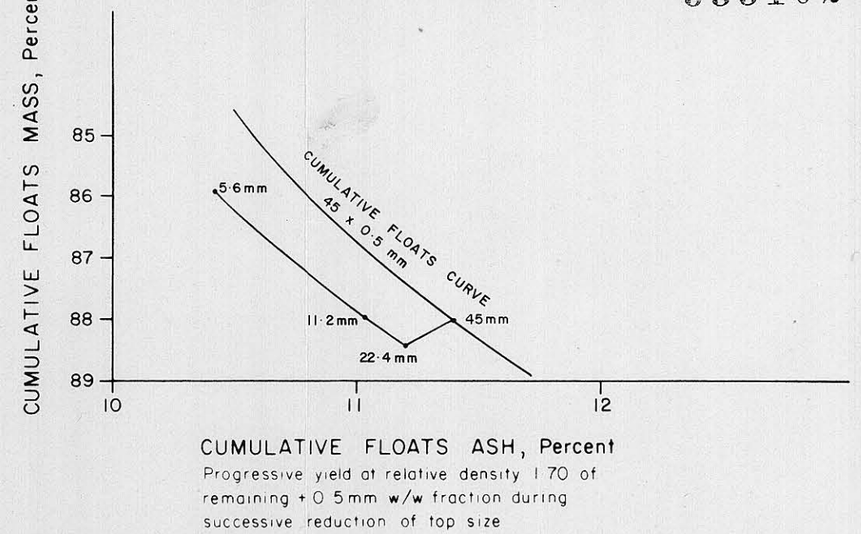
EFFECT OF SIZING ON WASHABILITY
M2 SEAM — GY 176

A. WASHABILITY OF SIZE FRACTIONS



B. ASH/COAL LIBERATION

533102

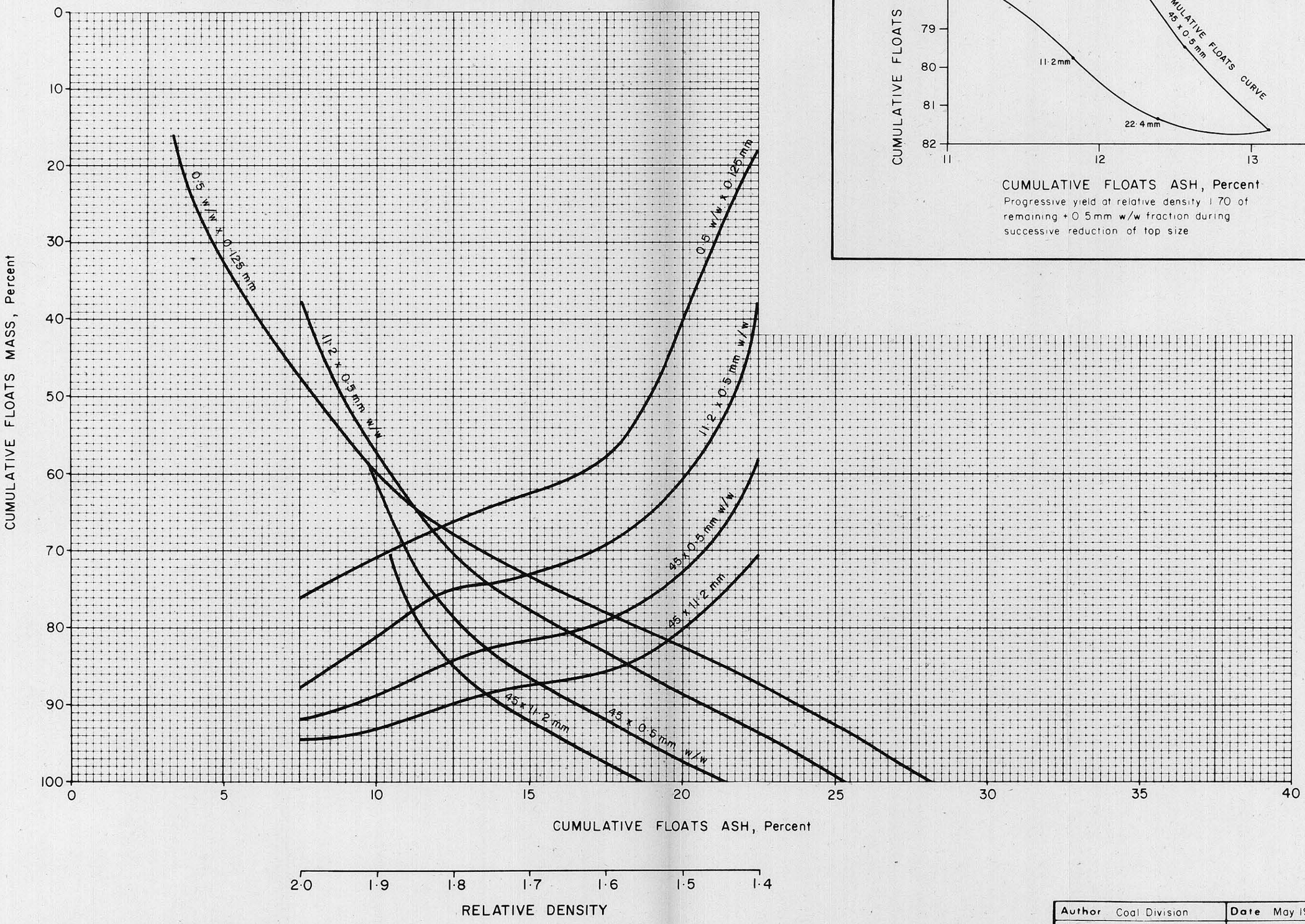


Progressive yield at relative density 1·70 of remaining +0·5mm w/w fraction during successive reduction of top size

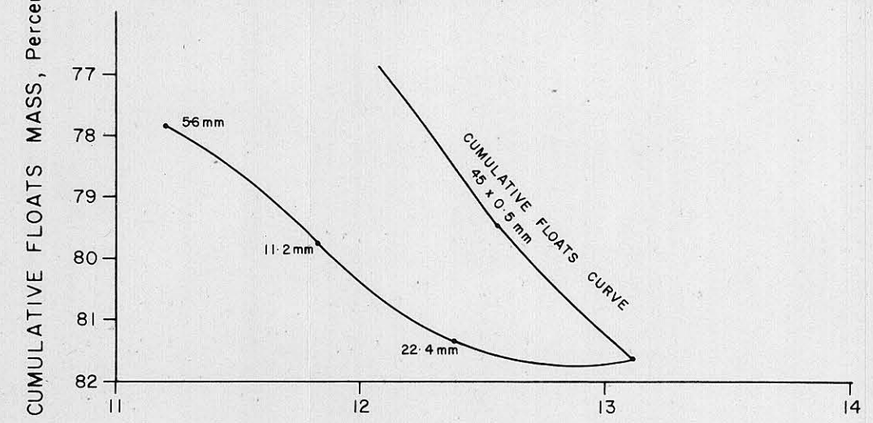
Author Coal Division	Date May 1983	Fig. 35
Report No CEPR 12/83	Drawing No 3138	

EFFECT OF SIZING ON WASHABILITY
M2 SEAM — GY 177

A. WASHABILITY OF SIZE FRACTIONS



B. ASH/COAL LIBERATION



Progressive yield at relative density 1·70 of remaining +0·5 mm w/w fraction during successive reduction of top size

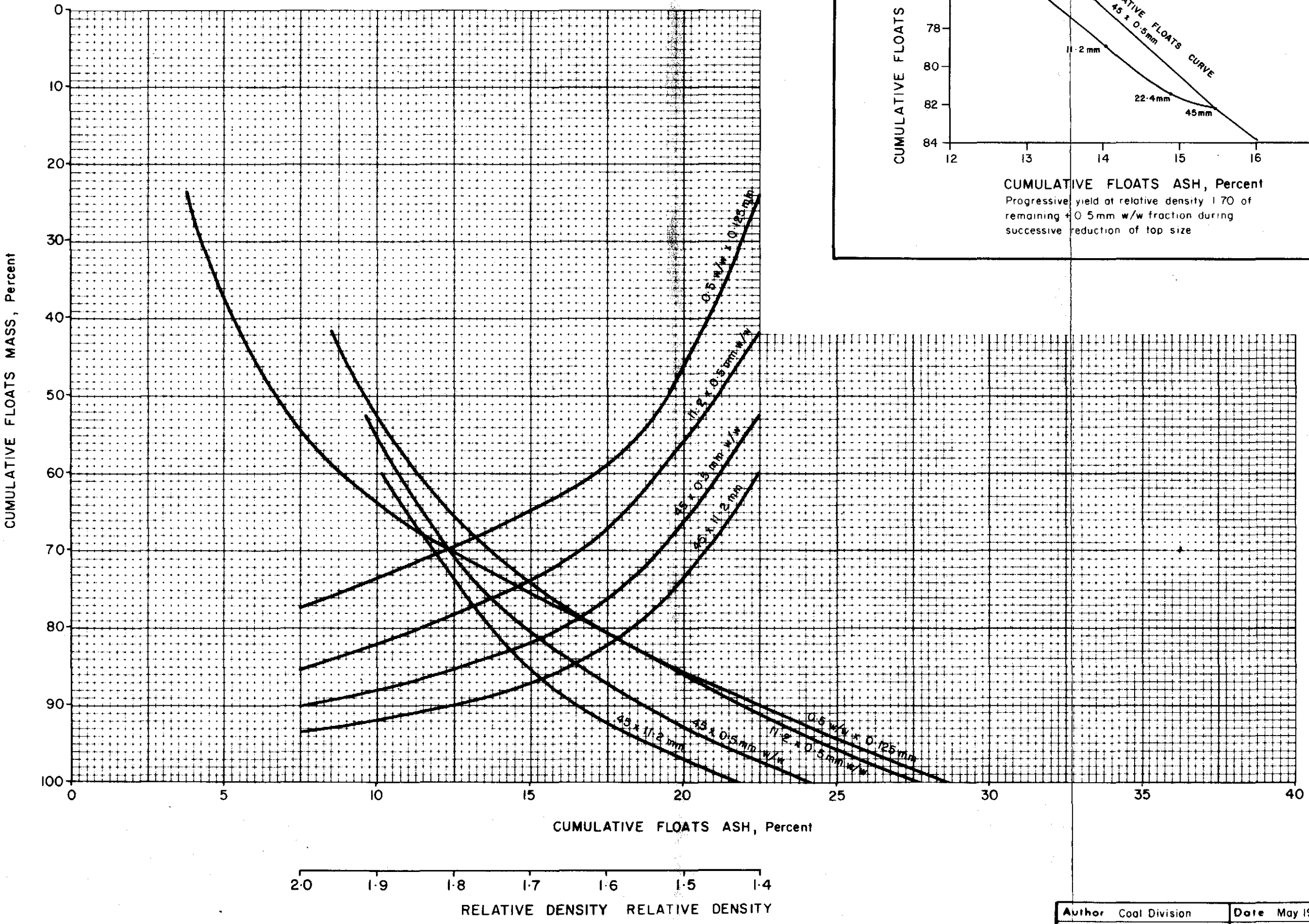
533103

Author Coal Division	Date May 1983
Report No CEPR 12/83	Drawing No 3139

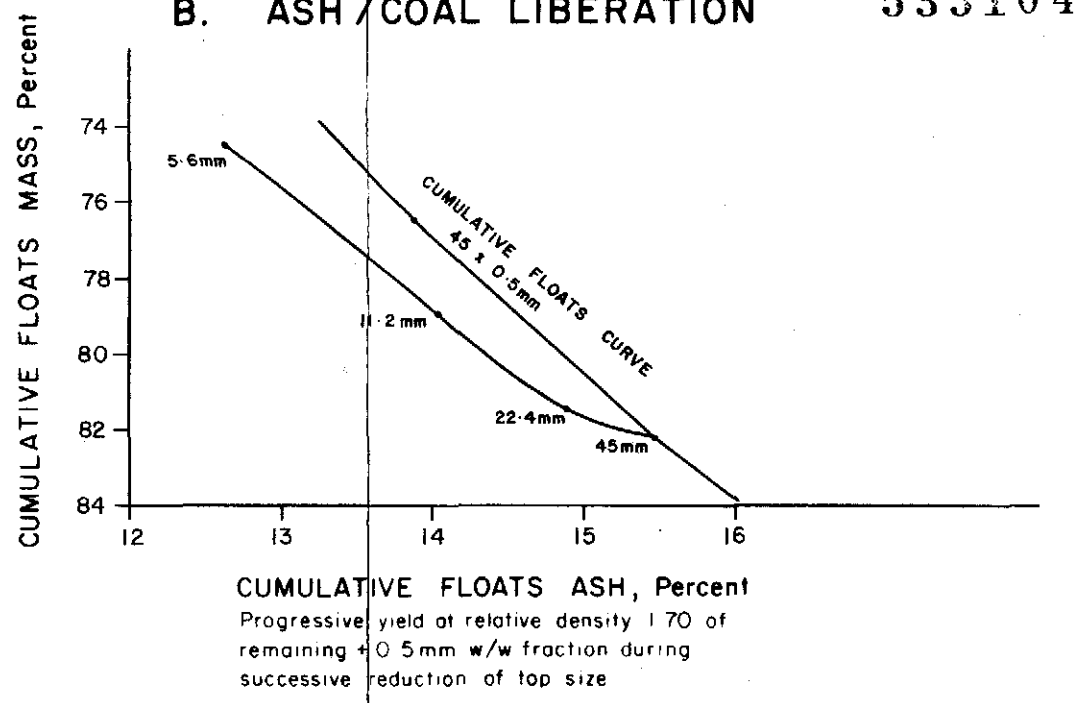
Fig. 36

EFFECT OF SIZING ON WASHABILITY
M2 SEAM — GY 178

A. WASHABILITY OF SIZE FRACTIONS



B. ASH / COAL LIBERATION



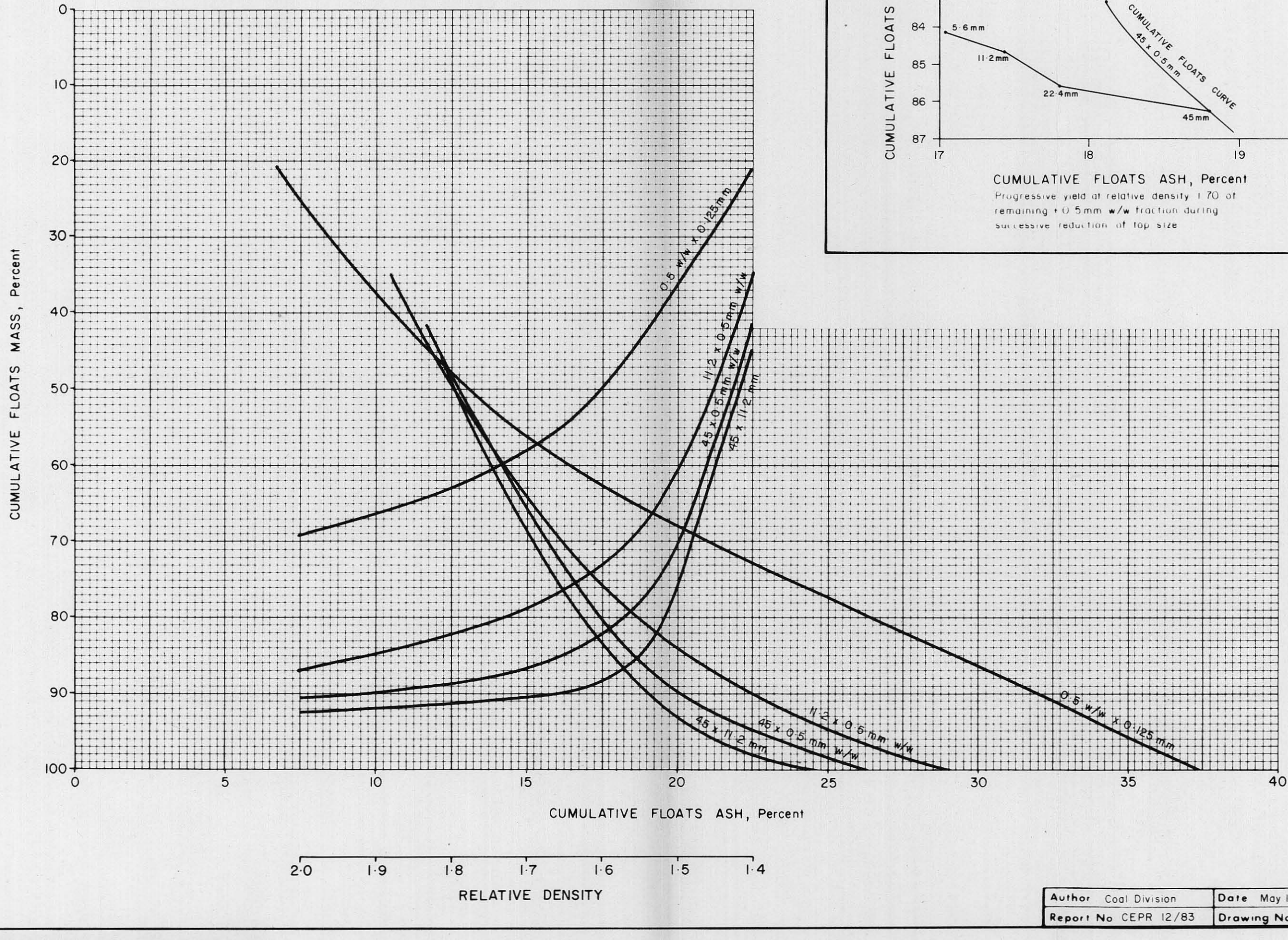
Progressive yield at relative density 1·70 of remaining +0·5mm w/w fraction during successive reduction of top size

533104

Author Coal Division	Date May 1983	Fig. 37
Report No CEPR 12/83	Drawing No 3140	

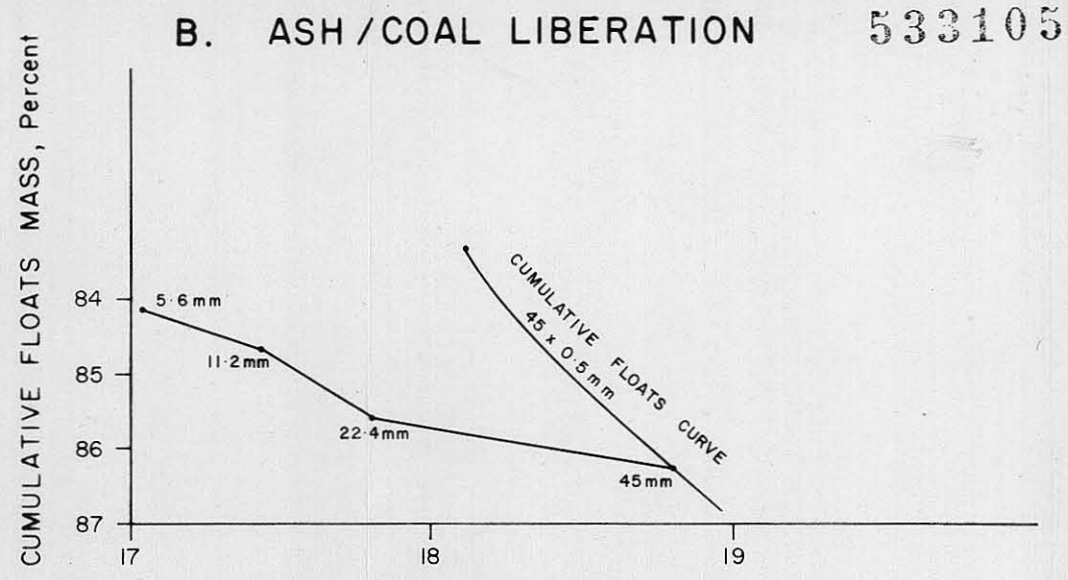
EFFECT OF SIZING ON WASHABILITY
M1 SEAM — GY 174

A. WASHABILITY OF SIZE FRACTIONS



B. ASH/COAL LIBERATION

533105



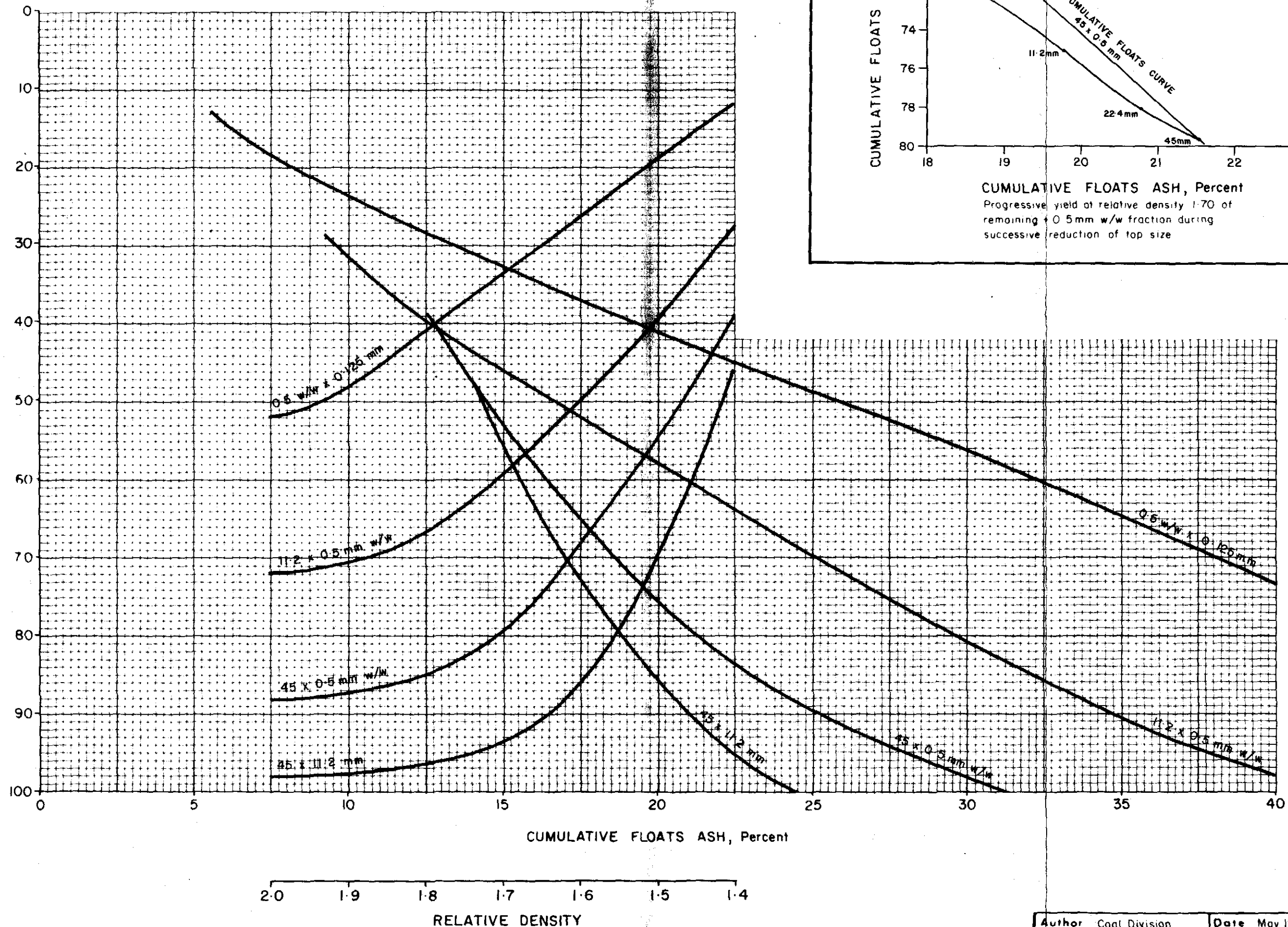
Progressive yield at relative density 1·70 of remaining +0·5mm w/w fraction during successive reduction of top size

Author Coal Division	Date May 1983
Report No CEPR 12/83	Drawing No 3141

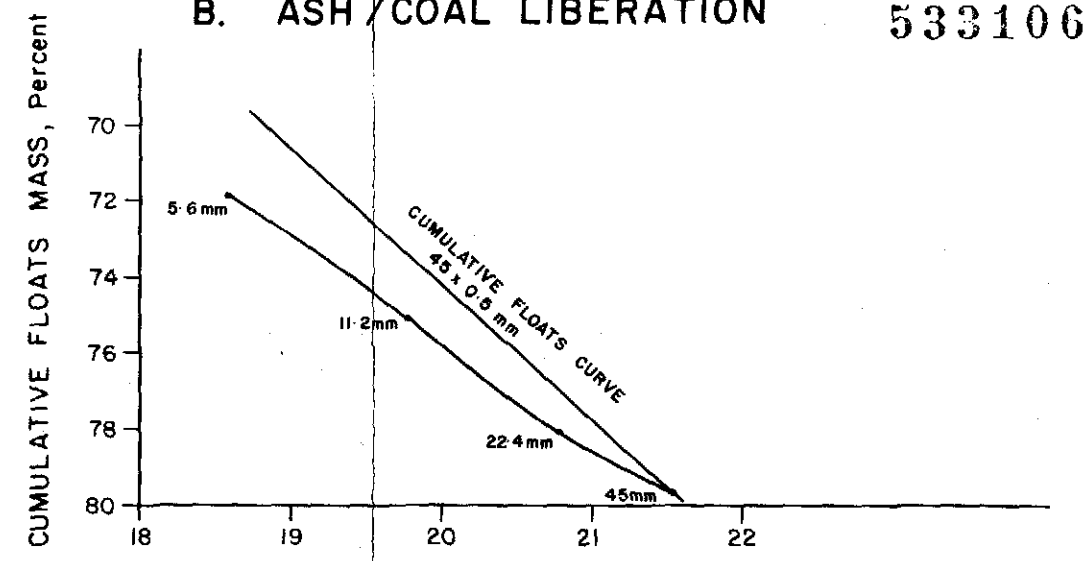
Fig. 38

EFFECT OF SIZING ON WASHABILITY
M1 SEAM — GY 178

A. WASHABILITY OF SIZE FRACTIONS



B. ASH / COAL LIBERATION



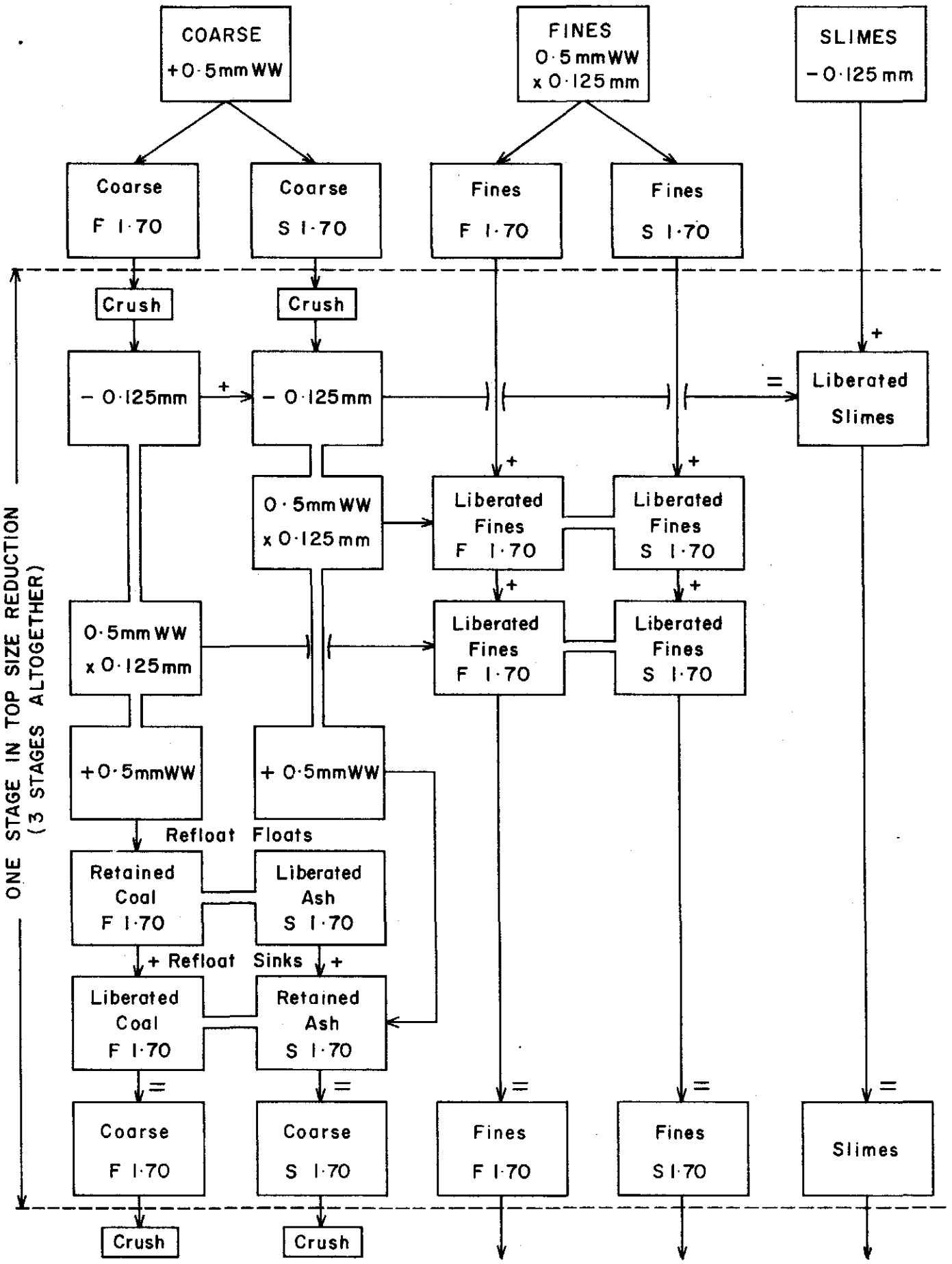
Progressive yield at relative density 1·70 of remaining +0·5mm w/w fraction during successive reduction of top size

533106

Author Coal Division		Date May 1983	Fig. 39
Report No CEPR 12/83		Drawing No 3142	

533107

ASH / COAL LIBERATION TEST FLOWSHEET



KEY TO SYMBOLS :

- Actual Mass Transfer
- Calculated Mass Transfer
- Subsamples of Previous Sample

Author : Coal Division	Date : May 1983	Fig. 40
Report No: CEPR 12/83	Drawing No: 3143	

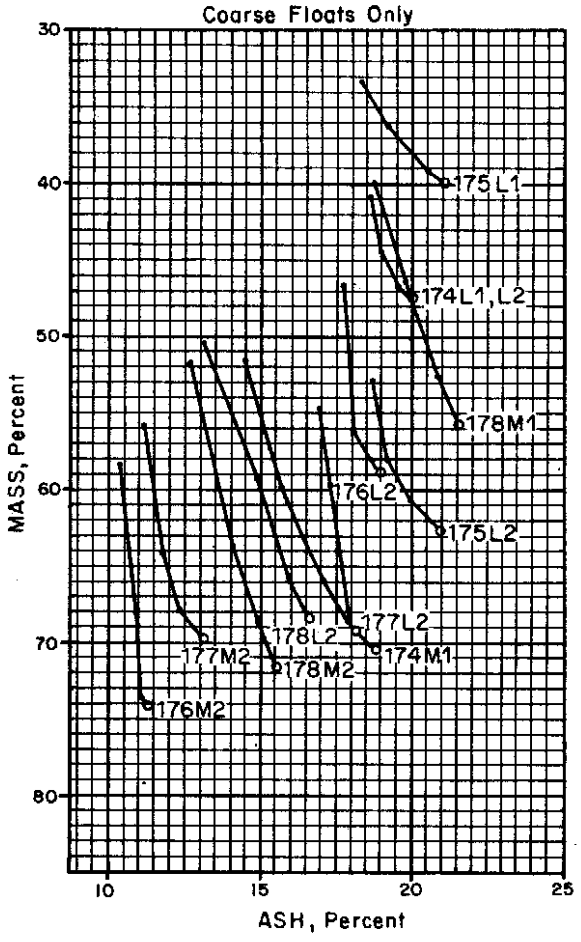
53108

EFFECT OF SIZING ON ALTERNATIVE PRODUCT YIELDS

AT RELATIVE DENSITY 1·70

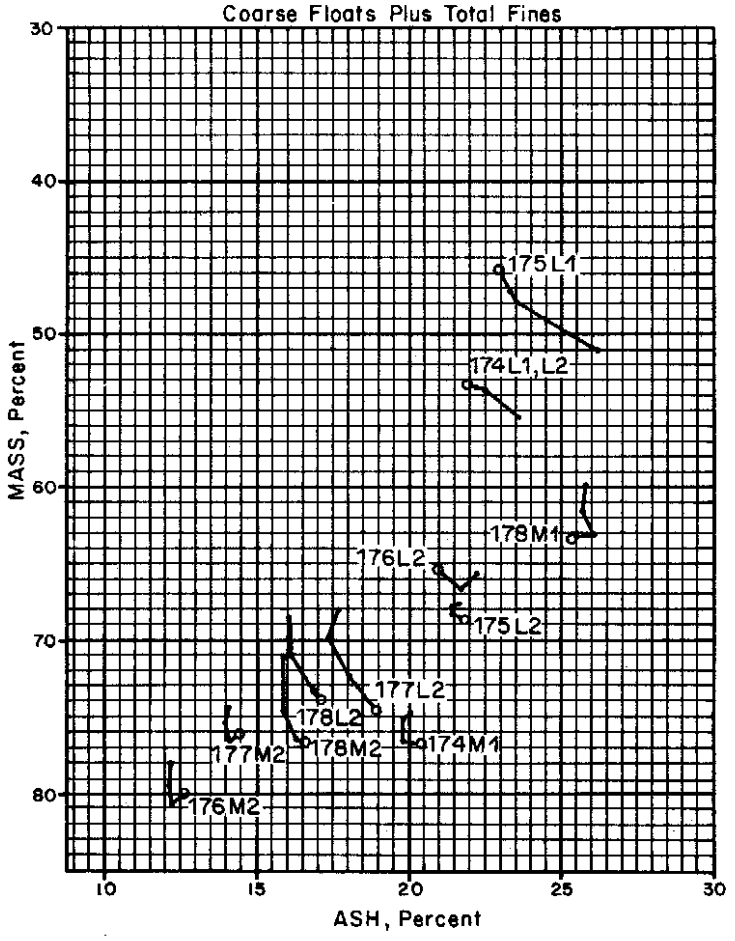
PRODUCT ONE

Coarse Floats Only



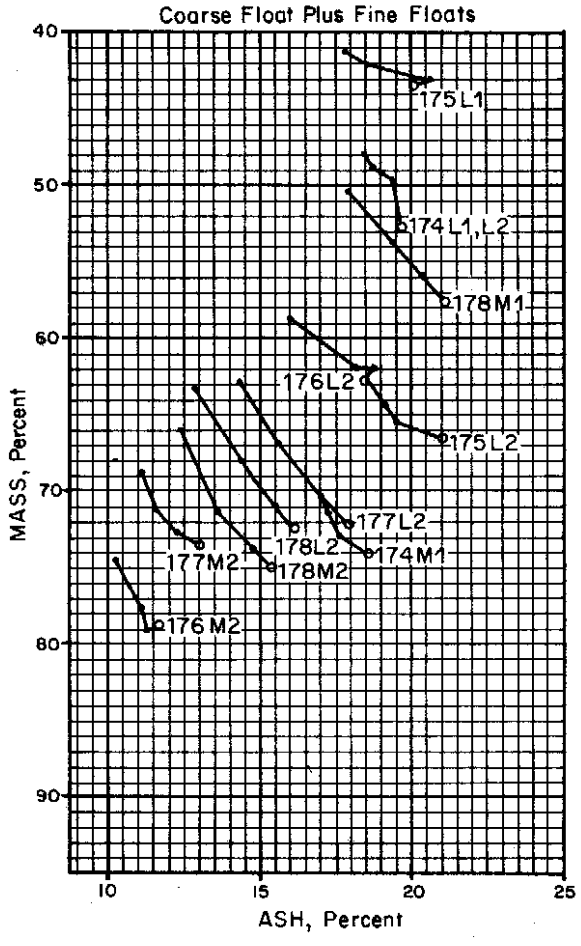
PRODUCT THREE

Coarse Floats Plus Total Fines



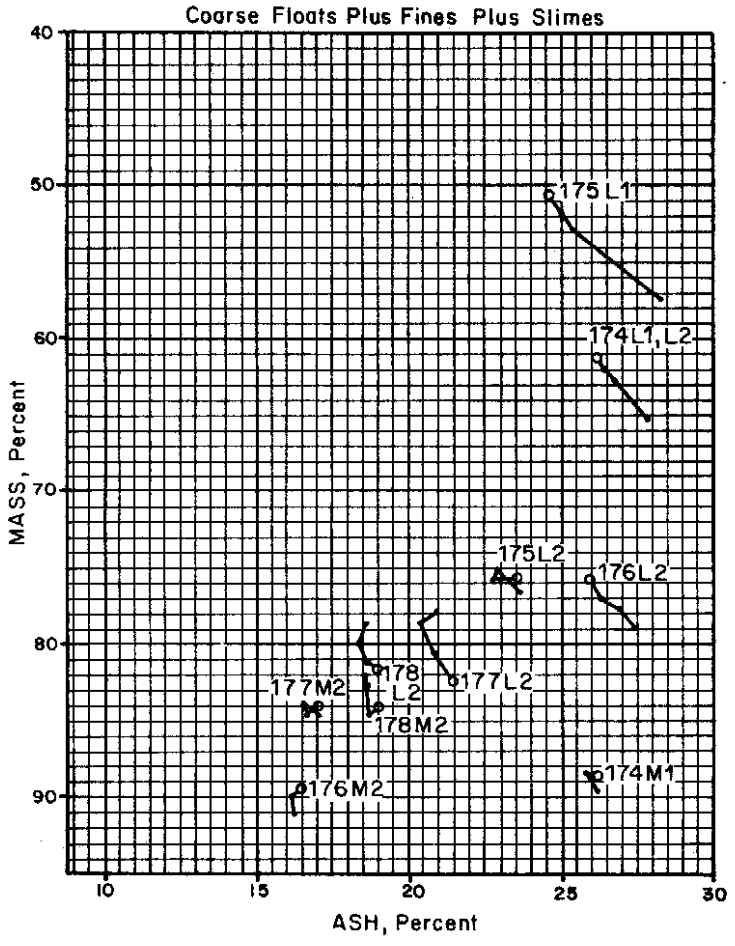
PRODUCT TWO

Coarse Float Plus Fine Floats



PRODUCT FOUR

Coarse Floats Plus Fines Plus Slimes



KEY TO SAMPLE TOP SIZING

- 5·6mm
- 11·4mm
- 22·4mm
- 45mm

Author: Coal Division	Date: May 1983
Report No: CEPR 12/83	Drawing No: 3144

Fig. 41

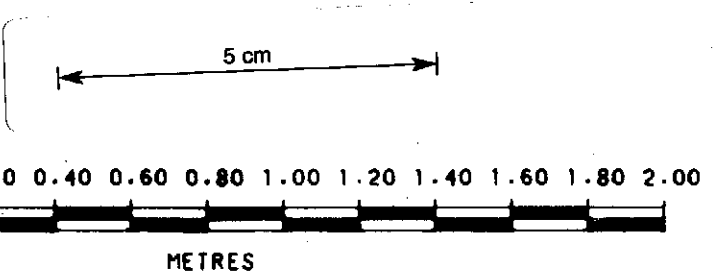
533109

BRIGHTNESS PROFILE REFERENCE

- COAL - BRIGHT
- COAL - BRIGHT WITH DULL BANDS
- COAL - INTERBANDED DULL AND BRIGHT
- COAL - MAINLY DULL . FREQ. BRIGHT BANDS
- COAL - DULL WITH MINOR BRIGHT BANDS
- COAL - DULL
- COAL STONY
- COAL - UNDIFFERENTIATED
- COAL - WEATHERED
- COAL - CINDERED
- TONSTEIN
- NOT CORED / CORE LOST

LITHOLOGY REFERENCE

- SOIL
- DOLERITE SCREE
- COAL
- COAL STONY
- NOT CORED / CORE LOST
- BRECCIA
- SANDSTONE
- MUDSTONE
- CARBONACEOUS MUDSTONE
- CLAYSTONE
- INTERBEDDED SEDIMENTS (SANDST / MUDST 50:50)



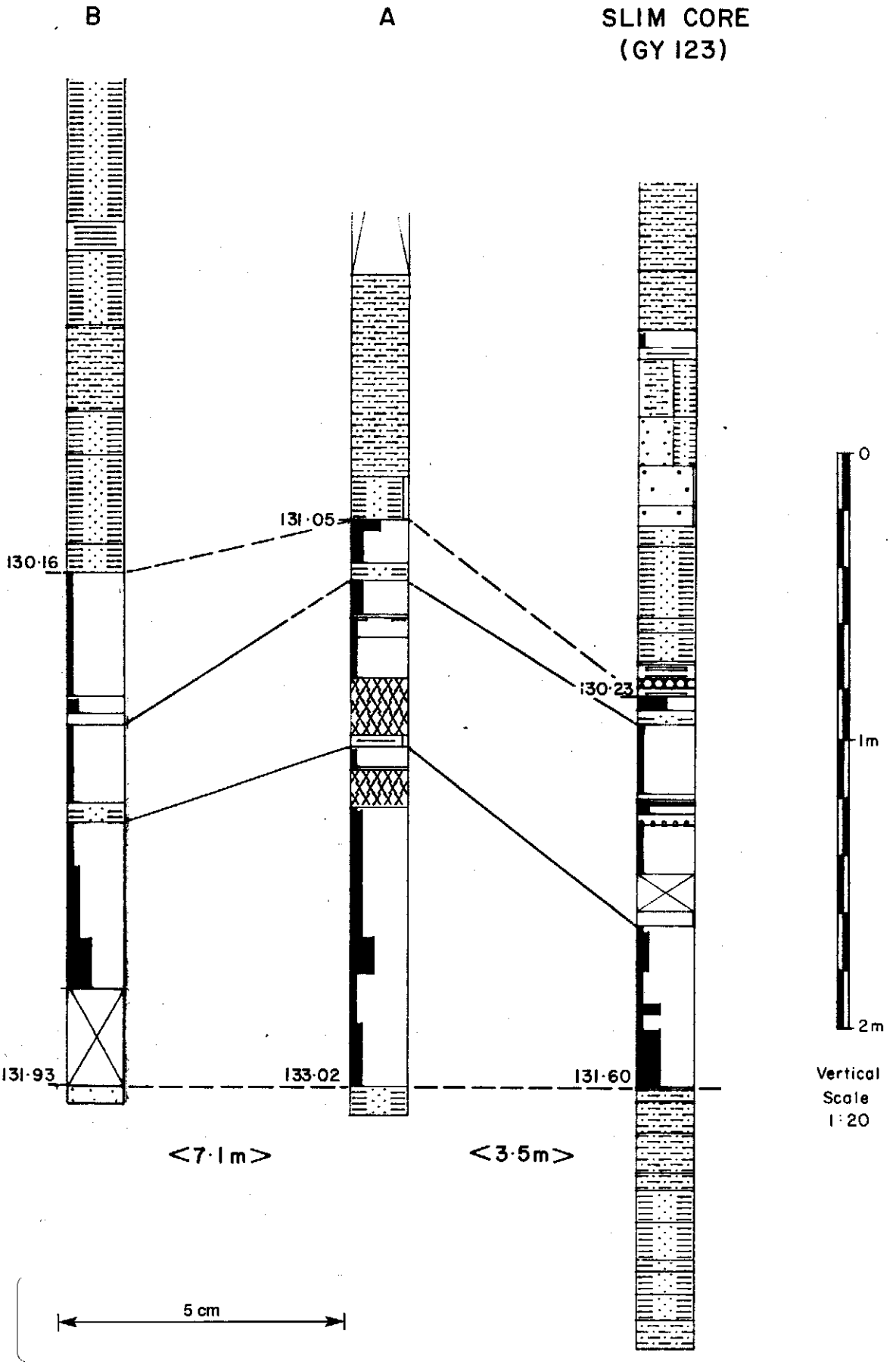
SEAM SECTION
1 : 20

THE SHELL COMPANY OF AUSTRALIA LTD.
COAL DIVISION

REFERENCE LEGEND
FIGURES 43-54

AUTHOR: Coal Division	DATE: May 1983	Fig. 42
REPORT NO: CEPR 12/83	DRAWING NO: 3145	

533110

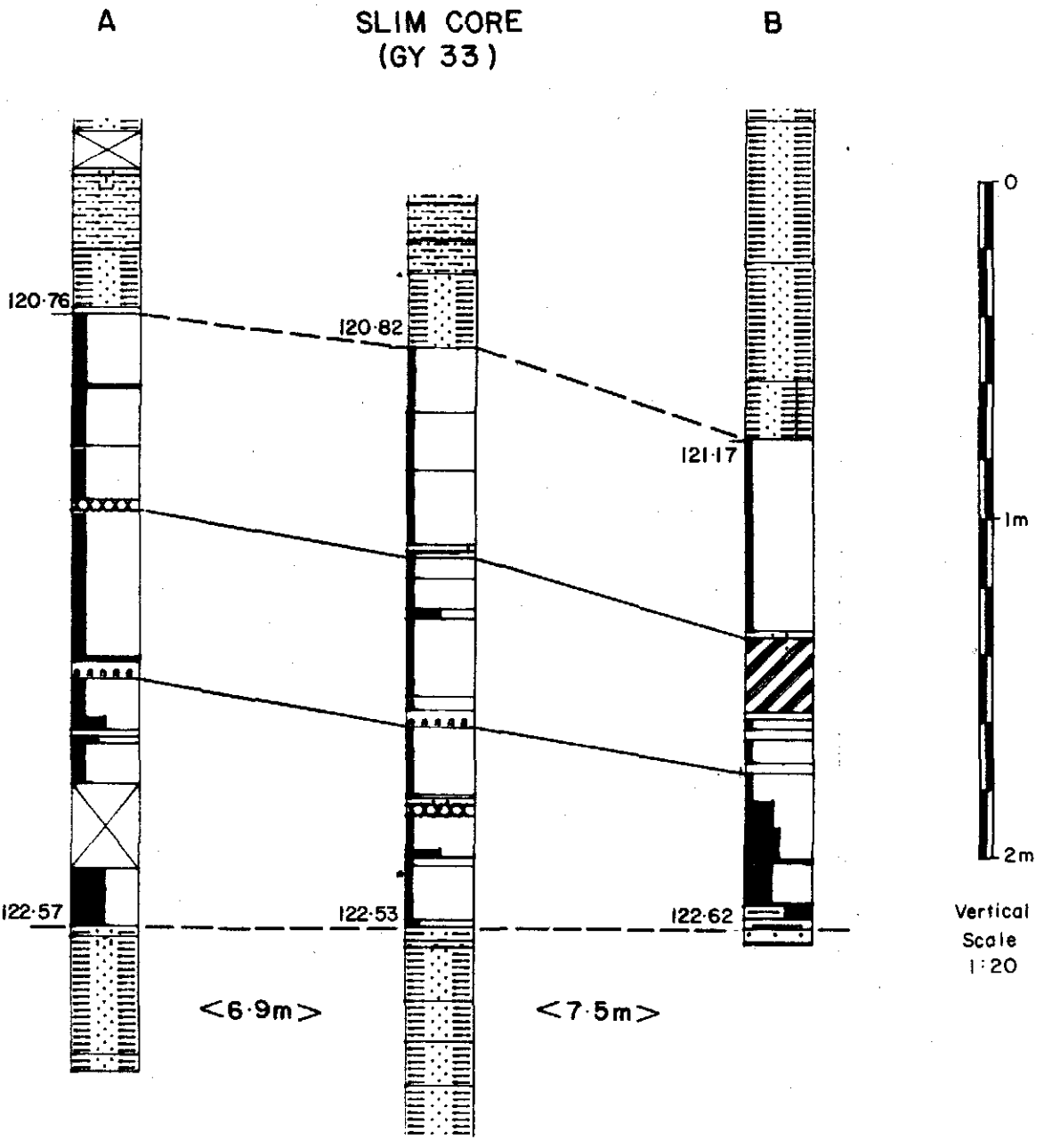


—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
L2 SEAM GY 174

Author: Coal Division	Date: May 1983	Fig. 43
Report No: CEPR 12/83	Drawing No: 3146	



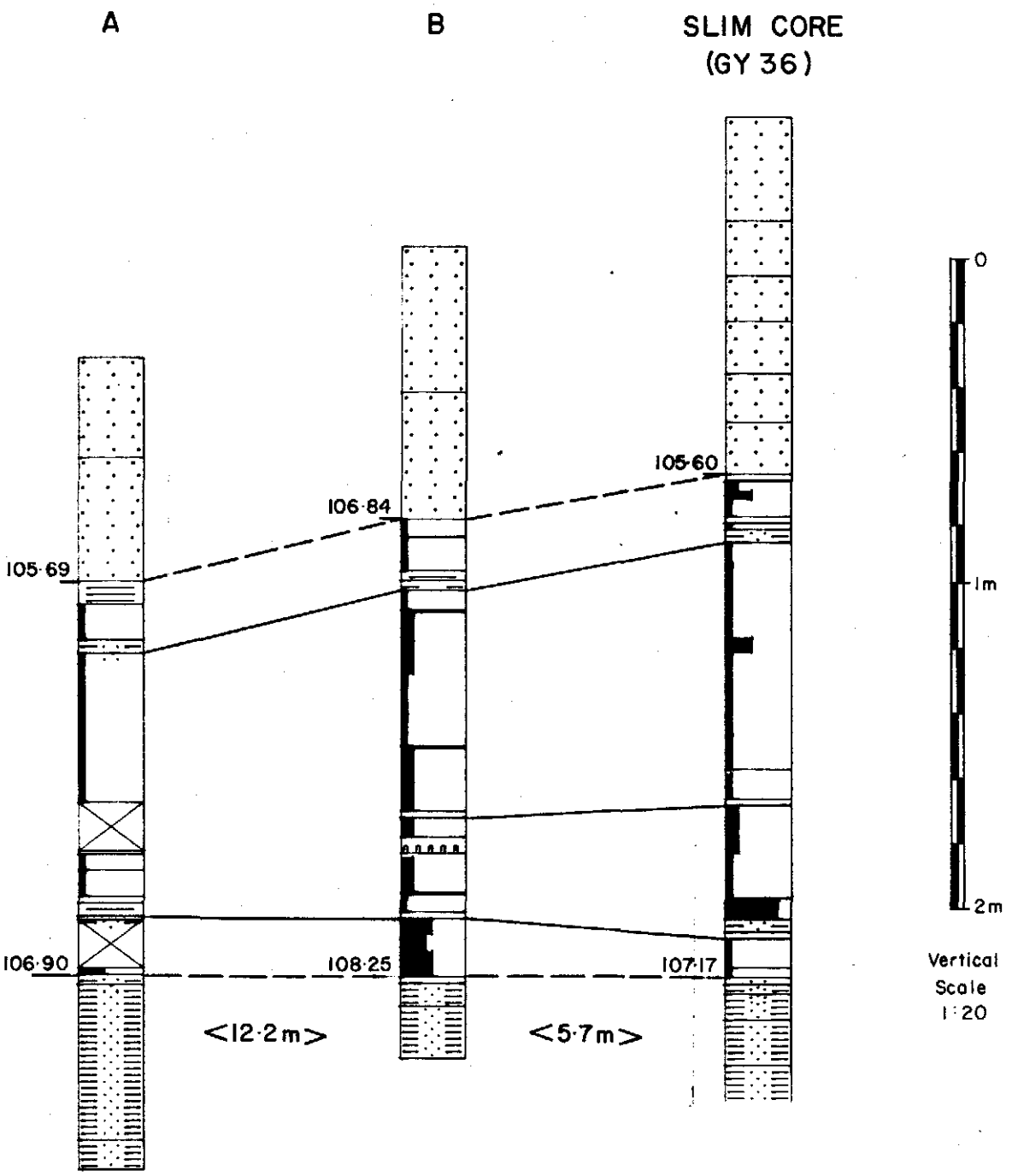
—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
L2 SEAM GY 175

Author : Coal Division	Date : May 1983	Fig. 44
Report No: CEPR 12/83	Drawing No: 3147	

533112



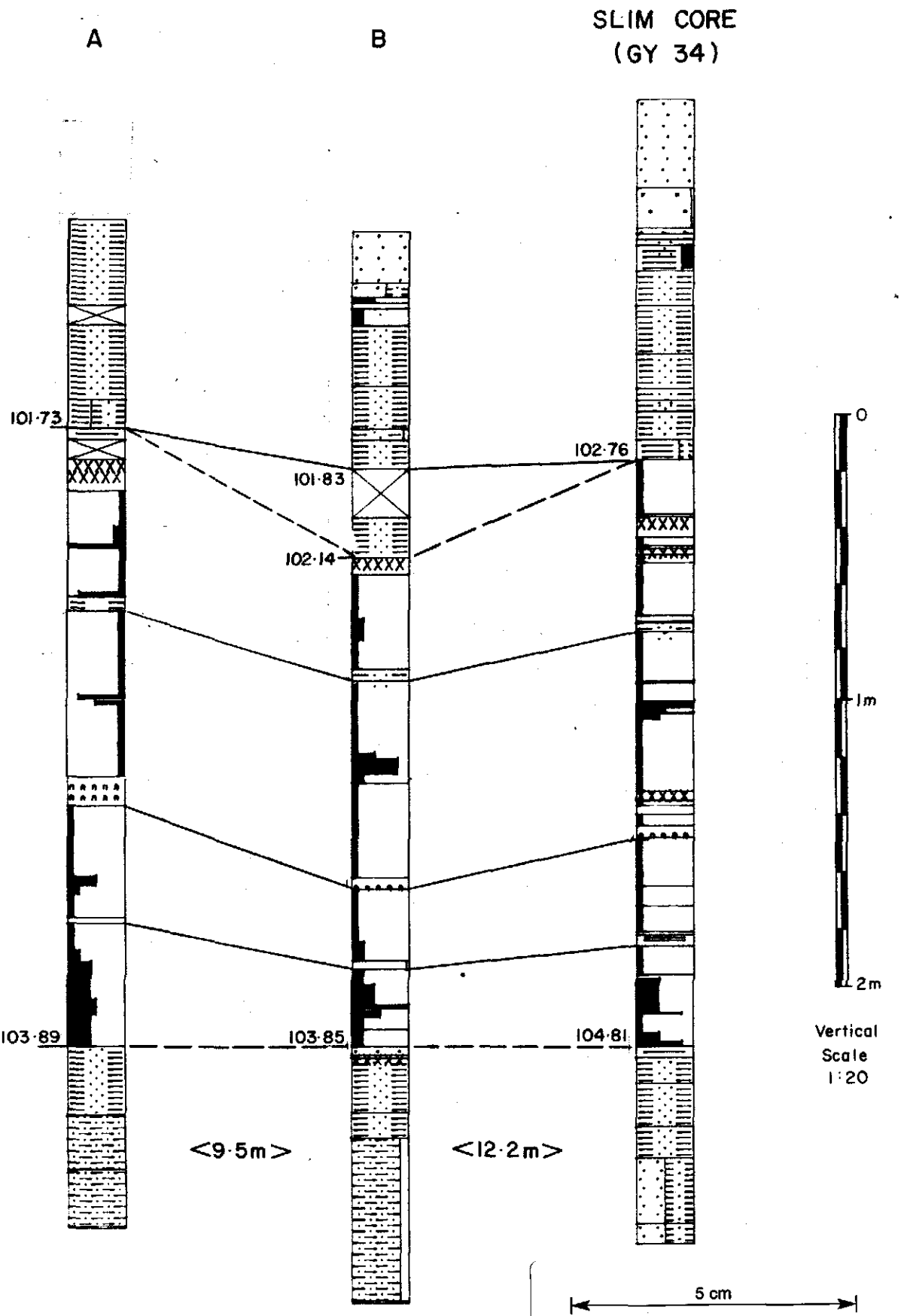
—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
L2 SEAM GY 176

Author: Coal Division	Date: May 1983	Fig. 45
Report No. CEPR 12/83	Drawing No: 3148	

533113



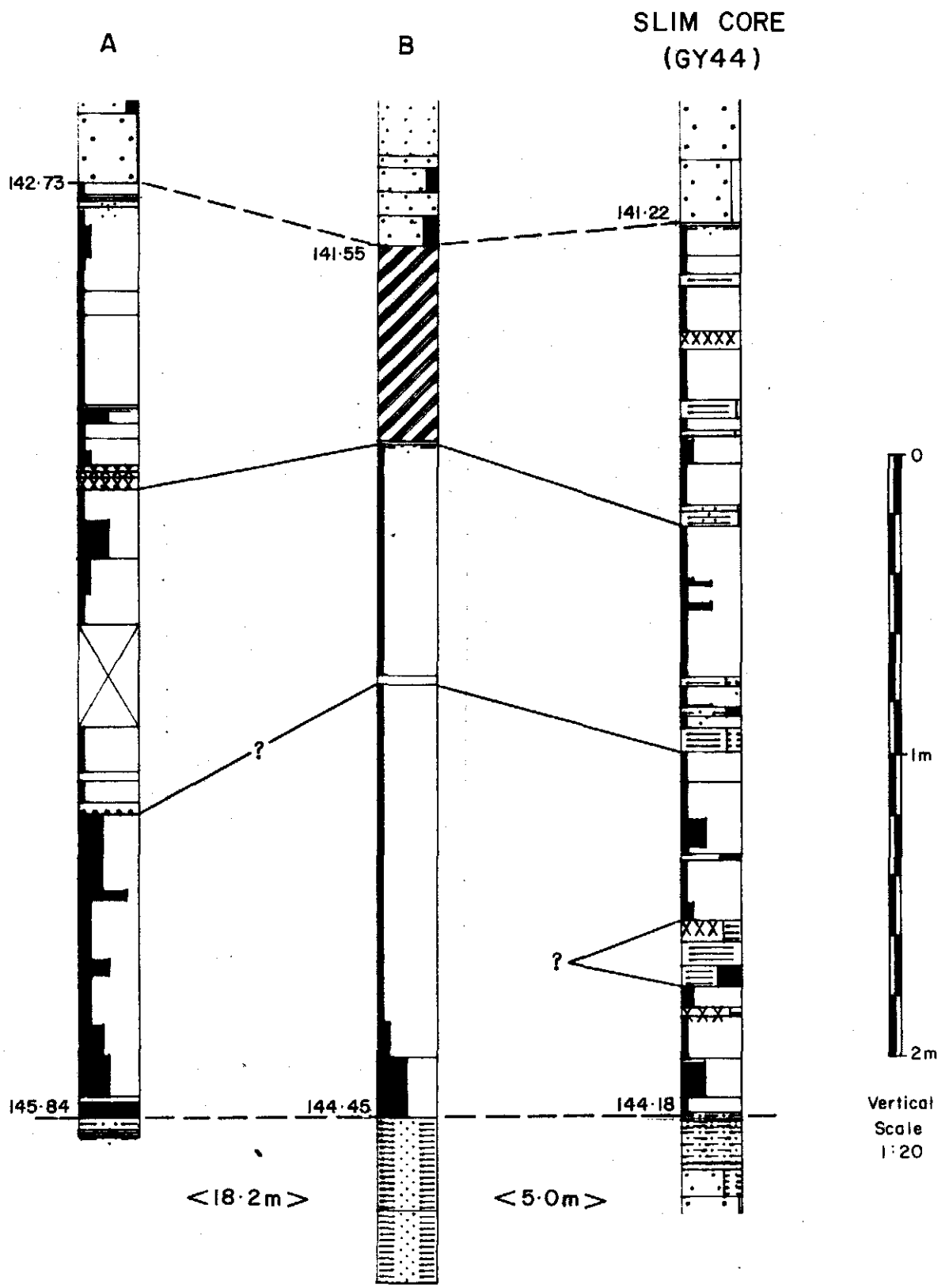
—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
L2 SEAM GY177

Author: Coal Division	Date: May 1983	Fig. 46
Report No: CEPR 12/83	Drawing No: 3149	

533114

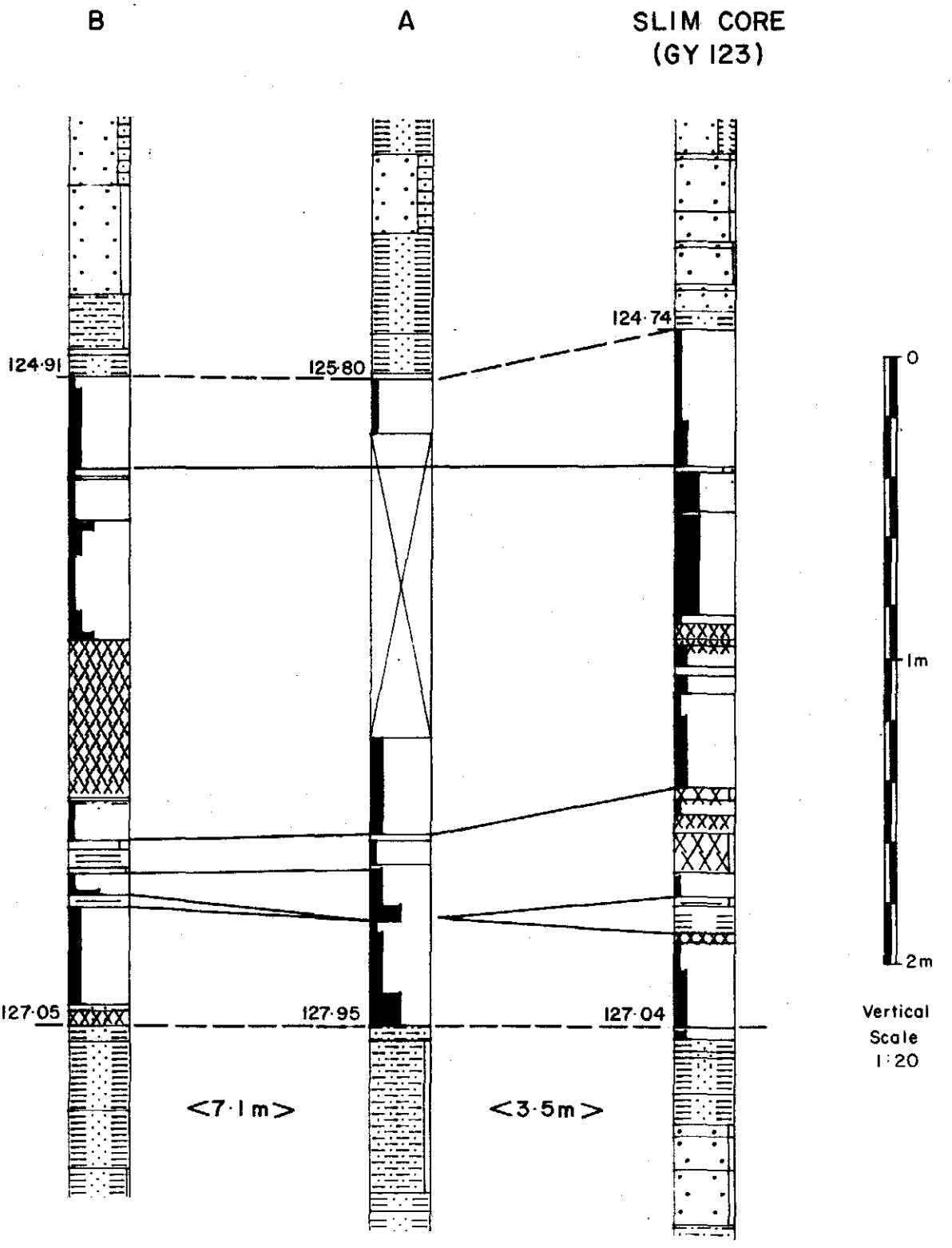


—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
L2 SEAM GY178

Author: Coal Division	Date: May 1983	Fig. 47
Report No: CEPR 12/83	Drawing No: 3150	



—— —— Limit of Sampled Section

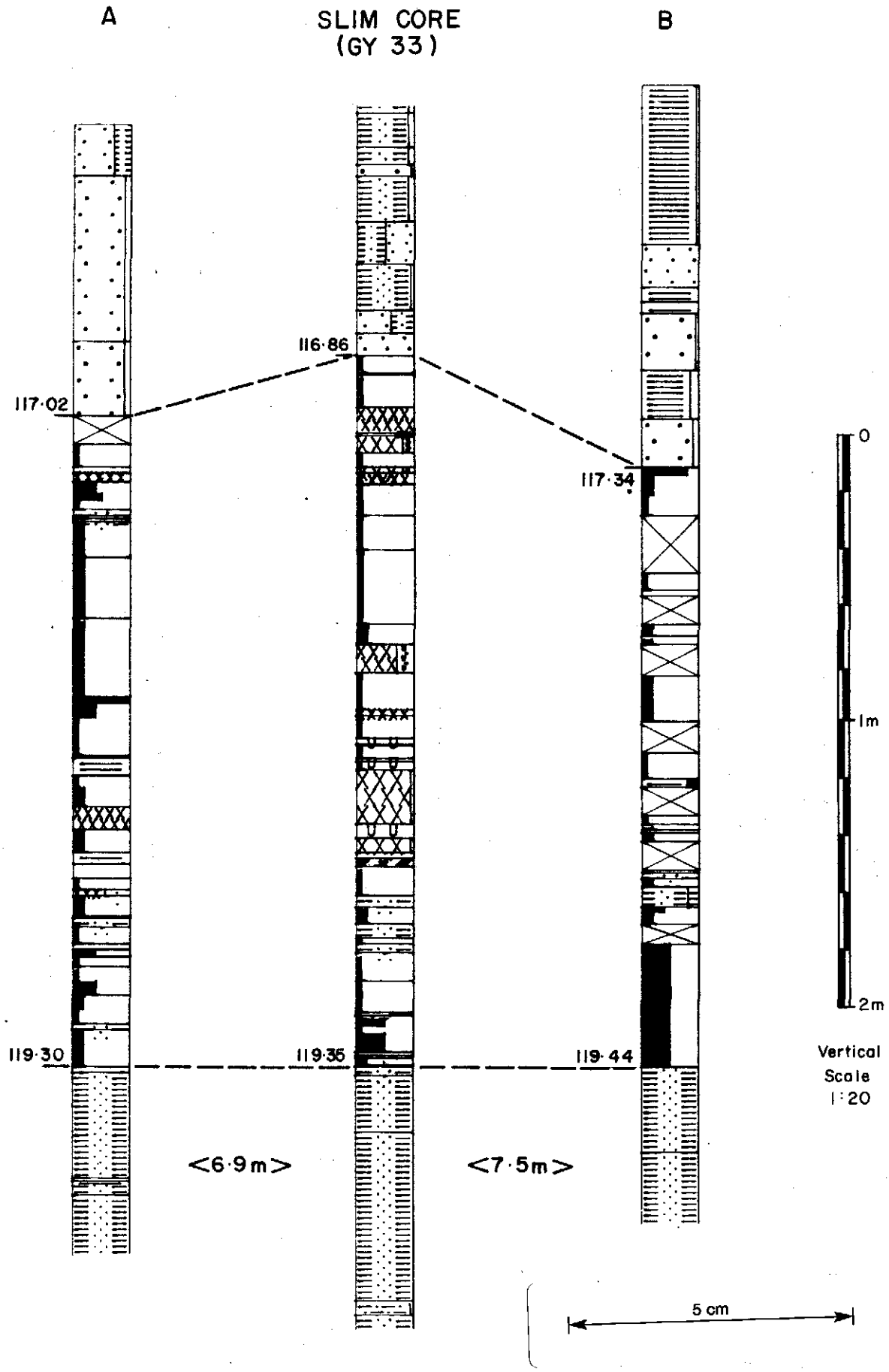
See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
L1 SEAM GY174

Author: Coal Division	Date: May 1983
Report No. CEPR 12/83	Drawing No: 3151

Fig. 48

533116



—— —— Limit of Sampled Section

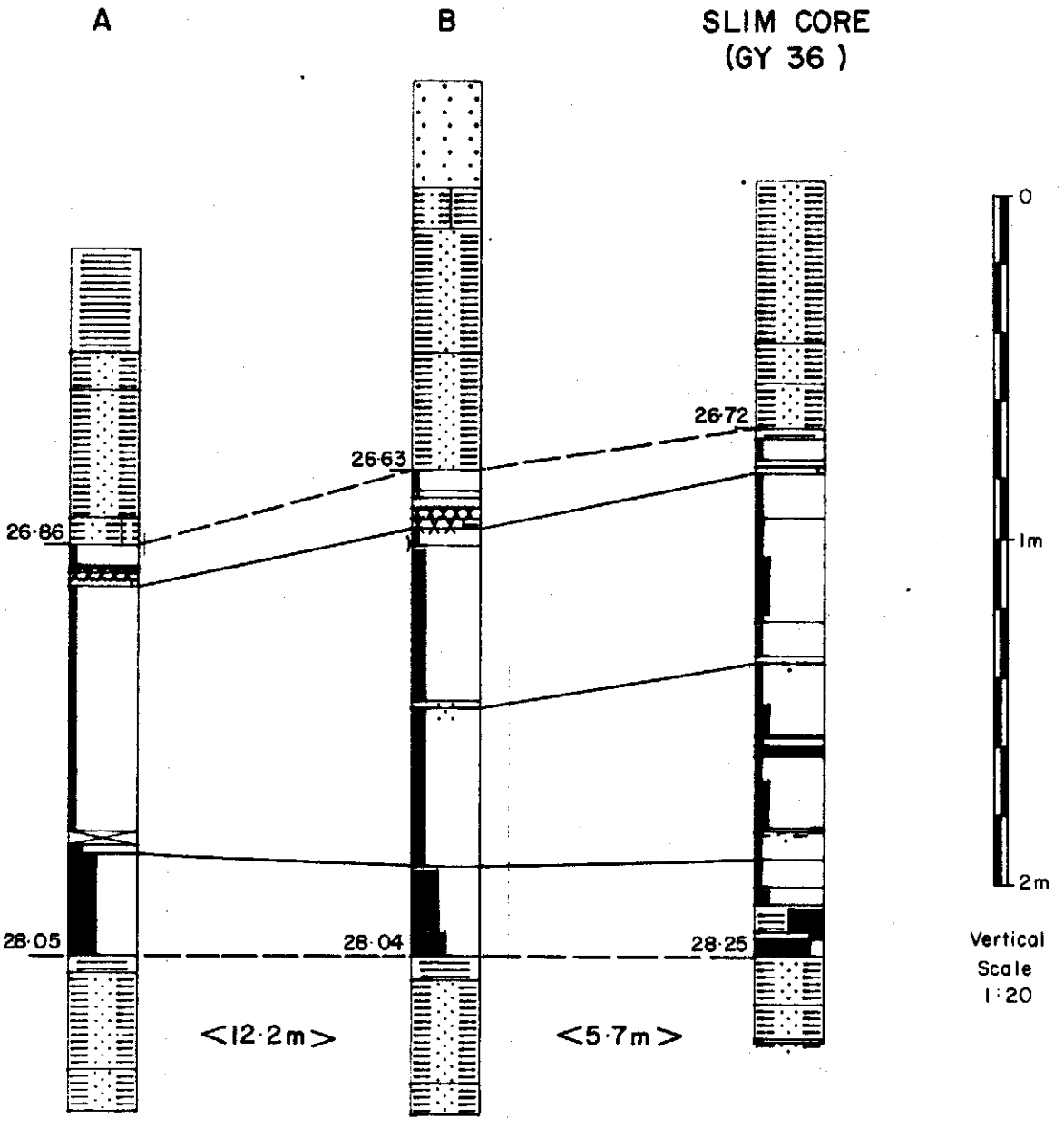
See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
L1 SEAM GY 175

Author . Coal Division	Date : May 1983
Report No: CEPR 12/83	Drawing No: 3152

Fig. 49

F32117



5 cm

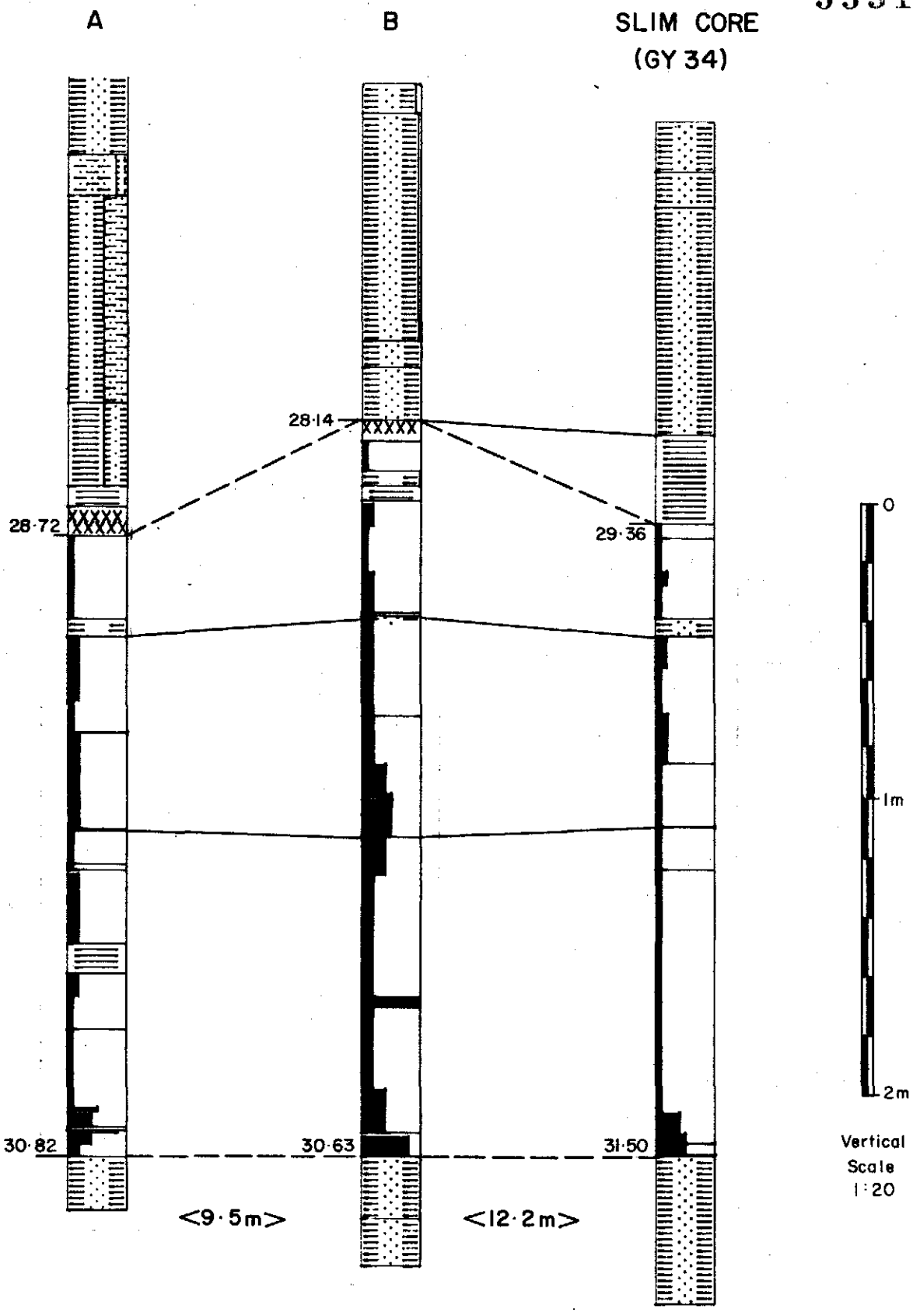
—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
M2 SEAM GY176

Author . Coal Division	Date : May 1983	Fig. 50
Report No. CEPR 12/83	Drawing No: 3153	

533118



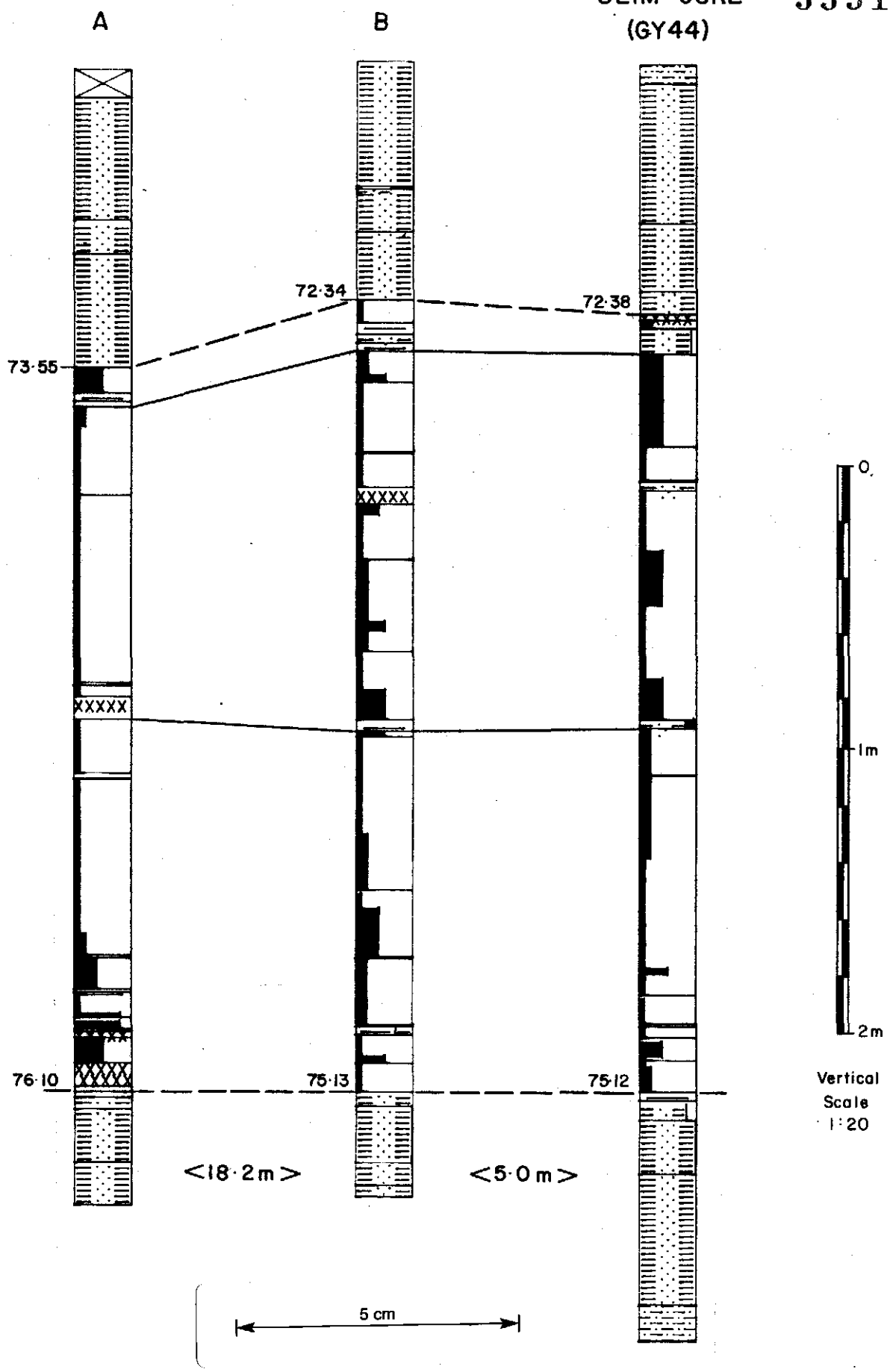
—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
M2 SEAM GY177

Author. Coal Division	Date: May 1983	Fig. 51
Report No. CEPR 12/83	Drawing No: 3154	

SLIM CORE (GY44) 533119



— — Limit of Sampled Section

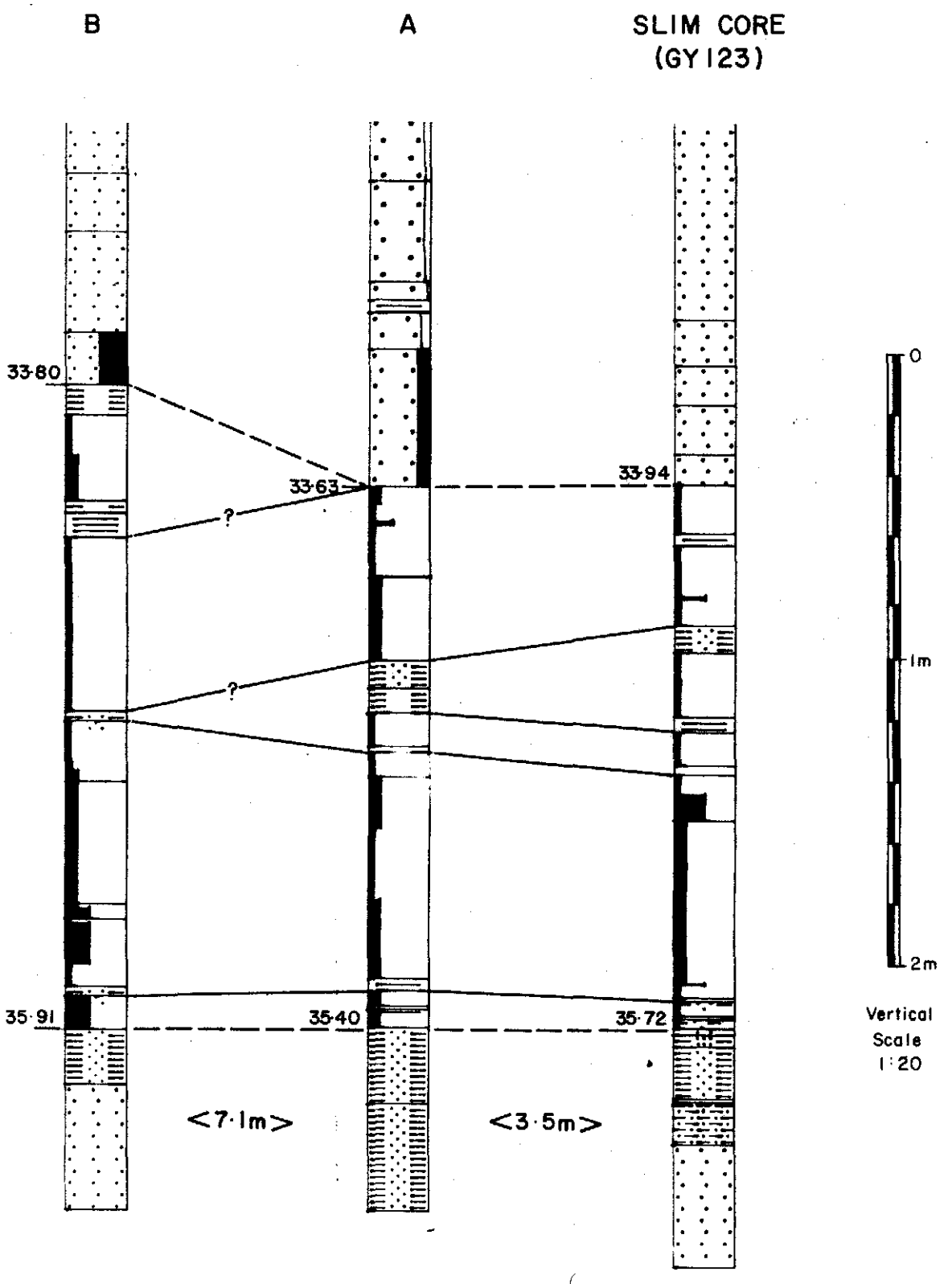
See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
M2 SEAM GY178

Author: Coal Division	Date: May 1983
Report No: CEPR 12/83	Drawing No: 3155

Fig. 52

533120



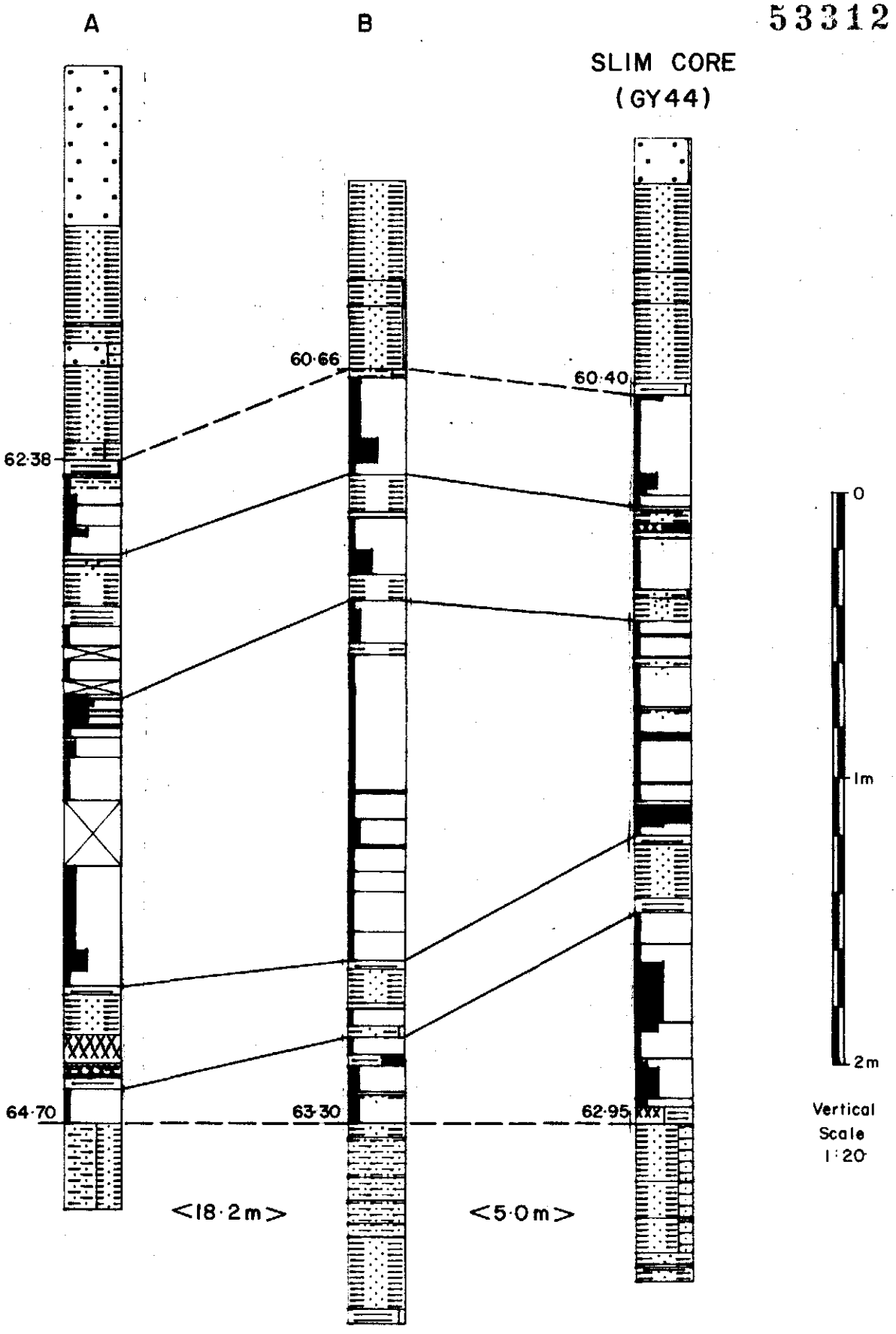
—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
MI SEAM GY174

Author : Coal Division	Date : May 1983	Fig. 53
Report No: CEPR 12/83	Drawing No: 3156	

533121



—— —— Limit of Sampled Section

See Figure 42 for Legend

GRAPHIC SEAM SECTIONS
MI SEAM GY 178

Author : Coal Division	Date : May 1983
Report No: CEPR 12/83	Drawing No: 3157

Fig. 54

EL 5/61

MOUNT NICHOLAS - REPORT ON TESTING OF 100mm CORE SAMPLES

CEPR 12/83

APPENDIX 1

RAW ANALYTICAL DATA

1. GRAY 174

M1 SEAM

CASCO REPORT CS 42458 A

Washability Tests

174A M1 8901)

174A M1 8903) Seam Sample

174B M1 8951)

Flocculation Tests

174A M1 8902 Band Sample

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

1.1

CS.42458.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE SAMPLES 8901, 8902, 8903,8951.
EX GY174, HOLES 890 AND 895.

CONTRACT C14-82

DATE RECEIVED: 18 October,1982.

DATE PRELIMINARY REPORT: 3 November,1982 (Our Telex S/6103/82).

DATE FINAL REPORT: 12 November,1982.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia

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CS.41458.A

INTRODUCTION

Four (4) only samples of large diameter core designated:

Sample No.	Thickness (m)
8901	0.57
8902	0.17
8903	1.03
8951	2.11

ex GY 174 (Holes 890 and 895) were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 dated 12.10.82 and Telex KTE/2 dated 18.10.82).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF1.90)

Section 6: Flocculation Test Data.

APPENDIX: Petrographic Summary and Graphical Representation of Flocculation Data.

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

Page 2 attached

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
8901	8.619
8903	8.519
8951	20.815
TOTAL:	37.953

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	4.5
Ash	%	30.8
Volatile Matter	%	24.8
Fixed Carbon	%	39.9
Relative Density		1.60
Hardgrove Grindability Index		54

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	63.1	63.1
22.4 x 11.2mm	16.8	79.9
11.2 x 5.6mm	8.4	88.3
5.6 x 2.8mm	3.8	92.1
2.8 x 1.4mm	2.5	94.6
Minus 1.4mm	5.4	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	26.6	26.6
22.4 x 11.2mm	32.8	59.4
11.2 x 5.6mm	14.5	73.9
5.6 x 2.8mm	8.4	82.3
2.8 x 1.4mm	5.1	87.4
Minus 1.4mm	12.6	100.0

Page 3 attached

CS.42458.A

TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	24.9			24.9	
22.4 x 11.2mm	28.5	24.7	-	53.4	24.7
11.2 x 5.6mm	13.6			67.0	
5.6 x 2.8mm	6.3			73.3	
2.8 x 1.4mm	6.1			79.4	
1.4 x 0.5mm w/w	2.4	29.0	-	81.8	26.2
0.5 w/w x 0.250mm	4.7	35.6	0.37	86.5	26.7
0.250 x 0.125mm	1.6	43.8	0.44	88.1	27.0
0.125 x 0.063mm	3.1	54.1	0.30	91.2	27.9
Minus 0.063mm	8.8	67.7	0.15	100.0	31.4

Page 4 attached

1.6

CS.42458.A

SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=53.4% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=28.4% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=6.3% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=81.8% of Total)

Page 5 attached

CS.42458.A

TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=53.4% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	44.6	12.1	44.6	12.1
F1.50	31.1	22.5	75.7	16.4
F1.60	12.8	32.2	88.5	18.7
F1.70	1.7	40.4	90.2	19.1
F1.80	1.1	49.6	91.3	19.4
F1.90	1.0	57.0	92.3	19.8
F2.00	0.5	62.9	92.8	20.1
S2.00	7.2	84.9	100.0	24.7

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=28.4% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	34.7	10.6	34.7	10.6
F1.50	26.1	19.4	60.8	14.4
F1.60	13.0	28.7	73.8	16.9
F1.70	5.1	37.4	78.9	18.2
F1.80	3.4	45.0	82.3	19.3
F1.90	2.5	52.2	84.8	20.3
F2.00	1.8	59.1	86.6	21.1
S2.00	13.4	80.0	100.0	29.0

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=6.3% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	20.3	6.8	20.3	6.8
F1.50	16.7	13.9	37.0	10.0
F1.60	13.0	22.1	50.0	13.1
F1.70	7.7	31.7	57.7	15.6
F1.80	3.5	38.9	61.2	17.0
F1.90	4.8	45.0	66.0	19.0
F2.00	3.2	53.2	69.2	20.6
S2.00	30.8	76.2	100.0	37.7

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=81.8% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	41.16	11.66	41.16	11.66
F1.50	29.36	21.54	70.52	15.77
F1.60	12.87	30.97	83.39	18.12
F1.70	2.88	38.56	86.27	18.80
F1.80	1.90	46.74	88.17	19.40
F1.90	1.52	54.26	89.69	19.99
F2.00	0.95	60.40	90.64	20.41
S2.00	9.36	82.46	100.00	26.22

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SECTION 3:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.
Table 3.1:	45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm
Table 3.2:	22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm
Table 3.3:	11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	98.1	18.0	98.1	18.0
0.5 w/w x 0.125mm	1.7	17.5	99.8	18.0
Minus 0.125mm	0.2	23.9	10.0	18.0

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	99.1	17.8	99.1	17.8
S1.70	0.9	43.8	100.0	18.0

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	91.8	15.2	91.8	15.2
S1.70	8.2	43.2	100.0	17.5

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	88.5	17.8	88.5	17.8
0.5 w/w x 0.125mm	9.2	17.3	97.7	17.8
Minus 0.125mm	2.3	19.5	100.0	17.8

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	98.8	17.4	98.8	17.4
S1.70	1.2	49.4	100.0	17.8

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	93.7	15.1	93.7	15.1
S1.70	6.3	49.7	100.0	17.3

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TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	91.3	17.3	91.3	17.3
0.5 w/w x 0.125mm	7.3	18.0	98.6	17.4
Minus 0.125mm	1.4	19.0	100.0	17.4

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	99.5	17.0	99.5	17.0
S1.70	0.5	50.0	100.0	17.3

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	95.6	16.5	95.6	16.5
S1.70	4.4	49.7	100.0	18.0

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SECTION 4:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.
Table 4.1:	45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm
Table 4.2:	22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm
Table 4.3:	11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction		Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w		94.8	73.6	94.8	73.6
0.5 w/w x 0.125mm		5.2	67.5	100.0	73.3
Minus 0.125mm	l.t.	0.1	65.9		

l.t. denotes less than.

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	0.6	42.3	0.6	42.3
S1.70	99.4	73.8	100.0	73.6

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.9	20.9	1.9	20.9
S1.70	98.1	68.4	100.0	67.5

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	95.0	74.1	95.0	74.1
0.5 w/w x 0.125	4.5	68.2	99.5	73.8
Minus 0.125mm	0.5	66.2	100.0	73.8

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.2	38.3	1.2	38.3
S1.70	98.8	74.5	100.0	74.1

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	6.8	25.7	6.8	25.7
S1.70	93.2	71.3	100.0	68.2

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
5.6 x 0.5mm w/w	91.0	74.7	91.0	74.7
0.5 w/w x 0.125mm	8.1	72.7	100.0	74.5
	0.9	70.5		

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	0.9	34.1	0.9	34.1
S1.70	99.1	75.1	100.0	74.7

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	5.3	25.1	5.3	25.1
S1.70	94.7	75.4	94.7	72.7

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.90)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

Table 5.6: Petrographic Analysis Summary

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE
(45 x 0.5mm w/w CF1.90)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%	89.69
Yield of Total	%	73.37
Relative Density		1.52
Air-Dried Moisture	%	5.0
Ash	%	20.1
Volatile Matter	%	28.1
Fixed Carbon	%	46.8
Specific Energy	%	24.38
Total Sulphur	%	0.34
Chlorine	%	0.07
Phosphorus	%	0.006
Carbon Dioxide		0.12
Arsenic		l.t. 1 ppm
Hardgrove Grindability Index		49
Abrasion Index		17.5 mg/kg

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	79.57
Hydrogen	%	4.75
Nitrogen	%	1.54
Sulphur	%	0.36
Oxygen (by difference)	%	13.75

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%	0.04
Sulphate Sulphur	%	0.03
Organic Sulphur (by difference)	%	0.27

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	66.6
Aluminium	as	Al_2O_3	22.3
Titanium	as	TiO_2	0.67
Iron	as	Fe_2O_3	6.95
Calcium	as	CaO	1.59
Magnesium	as	MgO	1.53
Sodium	as	Na_2O	0.13
Potassium	as	K_2O	0.19
Manganese	as	Mn_3O_4	0.01
Phosphorus	as	P_2O_5	0.03
Sulphur	as	SO_3	0.01

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	1320
Spherical	°C	1420
Hemisphere	°C	1450
Flow	°C	1500

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	28.4 %
Exinite	7.0 %
Inertinite	53.8 %
Minerals	10.8 %
Mean Maximum Reflectance	0.61%

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SECTION 6: FLOCCULATION TEST DATA.

Table 6.1: Sample Identification & Air-Dried Mass

Table 6.2: Raw Coal Analysis

Table 6.3: Flocculation Tests:
Minus 0.2mm Material (3% Solids w/w)

Table 6.4: Flocculation Tests:
Minus 0.2mm Material (10% Solids w/w)

Table 6.5: Flocculation Tests:
Minus 0.2mm Material (30% Solids w/w)

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TABLE 6.1: SAMPLE IDENTIFICATION AND AIR-DRIED MASS

Sample No.	Mass (kg)
8902	2.620

TABLE 6.2: RAW COAL ANALYSIS

Air-Dried Moisture	%	2.1
Ash	%	86.2
Relative Density		2.40

TABLE 6.3: FLOCCULATION TESTS:MINUS 0.2mm MATERIAL(3% Solids w/w)

	DEPRESSION OF CLEAR WATER INTERFACE (cm)				
Time (Mins.)	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.05	0.5	0.7	5.1	6.9	7.4
0.13	0.5	1.0	8.0	9.8	10.0
0.20	0.5	1.4	9.9	10.0	10.1
0.95	0.5	10.2	10.1	10.2	10.2
2.0	0.5	10.3	10.2	10.2	10.2
5.0	0.6	10.5	10.3	10.2	10.3
10.0	0.6	10.5	10.4	10.3	10.4
20.0	0.7	10.5	10.4	10.3	10.4
30.0	0.7	10.5	10.4	10.3	10.4
130	1.4	10.5	10.4	10.3	10.4
180	2.3	10.5	10.4	10.3	10.4
300	2.9	10.5	10.4	10.3	10.4
1300	10.8	10.5	10.4	10.3	10.4

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TABLE 6.4: FLOCCULATION TESTS: MINUS 0.2mm MATERIAL (10% Solids w/w)

Time (Mins.)	DEPRESSION OF CLEAR WATER INTERFACE (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.03	–	–	0.5	0.6	0.8
0.08	–	–	0.6	0.9	1.2
0.14	–	–	0.9	1.8	2.2
0.20	–	–	2.0	2.9	3.2
0.28	–	–	3.2	4.1	4.4
0.41	–	–	5.3	6.0	6.5
0.66	–	0.2	7.5	7.5	7.9
1.0	–	1.2	8.2	8.2	8.3
2.0	–	8.2	8.9	8.8	8.9
5.0	–	9.4	9.1	9.1	9.1
13	–	9.6	9.2	9.2	9.1
33	0.6	9.6	9.3	9.2	9.2
71	0.9	9.6	9.3	9.2	9.2
120	1.8	9.6	9.4	9.2	9.3
180	2.9	9.6	9.4	9.2	9.3
240	9.4	9.6	9.4	9.2	9.3
310	9.6	9.6	9.4	9.2	9.3
420	9.9	9.6	9.4	9.2	9.3
1400	9.9	9.6	9.4	9.2	9.3

TABLE 6.5: FLOCCULATION TESTS: MINUS 0.2mm MATERIAL(30% Solids w/w)

Time (Mins.)	DEPRESSION OF CLEAR WATER INTERFACE (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.03					
0.34		0.2			
0.84	0.2	0.5	0.2	0.4	0.4
1.2	0.2	0.7	0.4	0.5	0.6
2.0	0.2	1.2	0.5	0.7	0.9
2.5	0.2	1.2	0.5	0.8	0.9
3.0	0.4	1.2	0.5	0.9	1.2
4.2	0.4	1.6	0.6	1.2	1.6
5.3	0.4	2.0	0.8	1.7	2.0
6.4	0.7	2.5	0.9	2.2	2.5
8.0	1.1	3.0	1.1	2.7	2.8
10.0	1.2	3.6	1.3	3.2	3.3
15	1.9	4.4	2.0	4.0	4.1
24	3.3	5.0	3.1	4.7	4.8
33	4.0	5.2	3.9	5.2	
66	4.9	5.7	4.9	5.7	
120	5.3	6.0	5.7	5.8	
180	5.6	6.1	5.9	6.0	
300	5.6	6.1	6.0	6.0	
1300					

1.23

CS.42458

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

MACERAL ANALYSIS OF COAL

MACERALS						
SAMPLE No...CS.42458	VITRINITE A	10.0	11.4	20.2	23.0	VITRINITE
OPERATOR: Gail Fay	VITRINITE B	10.2	11.6			
R max~~imax~~ 0.64	SPORINITE	6.4	7.3	7.6	8.7	EXINITE
n (MACERALS): 500	CUTINITE	0.4	0.5			
n (REFLECTANCE): 100	RESINITE	0.8	0.9			
	MICRINITE	1.8	2.1	60.0	68.3	INERTINITE
	MACRINITE	10.4	11.8			
	SEMI-FUSINITE	32.4	36.9			
	FUSINITE	8.4	9.5			
	INERTODETRINITE	7.0	8.0			
	MINERALS *	12.2	mmf	12.2	MINERAL MATTER FREE BASIS	
MINERALS: *clay, quartz, carbonate, pyrite.						

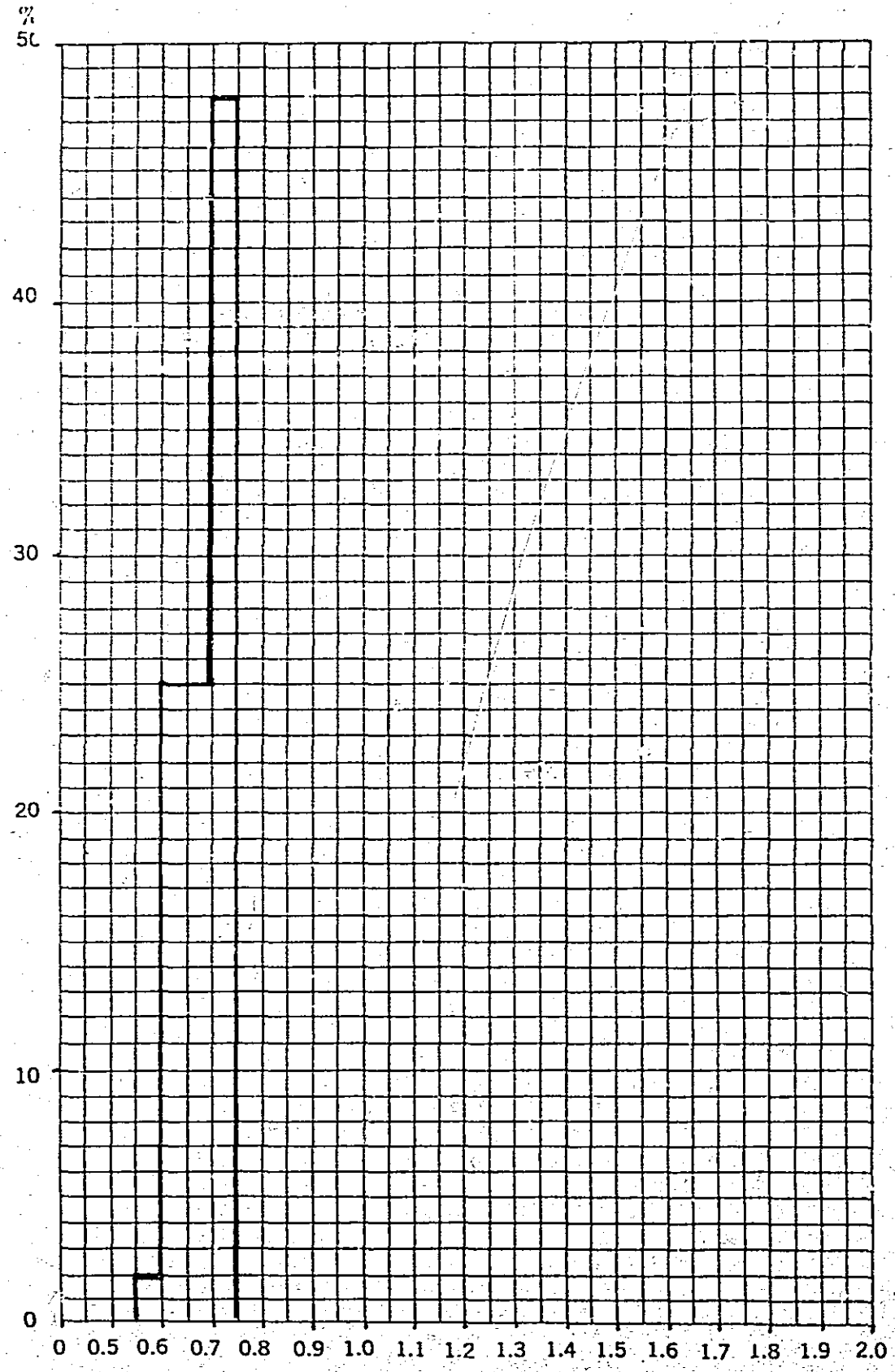
REFLECTANCE (546nm / oil refractive index 1.518)

MEAN ~~XXXXXXXX~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.64	PERCENTAGE OF NON-REACTIVES =

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

REFLECTOGRAM

SAMPLE REFERENCE: CS.42458



0.64% Ro mean max., Vitrinite A only.

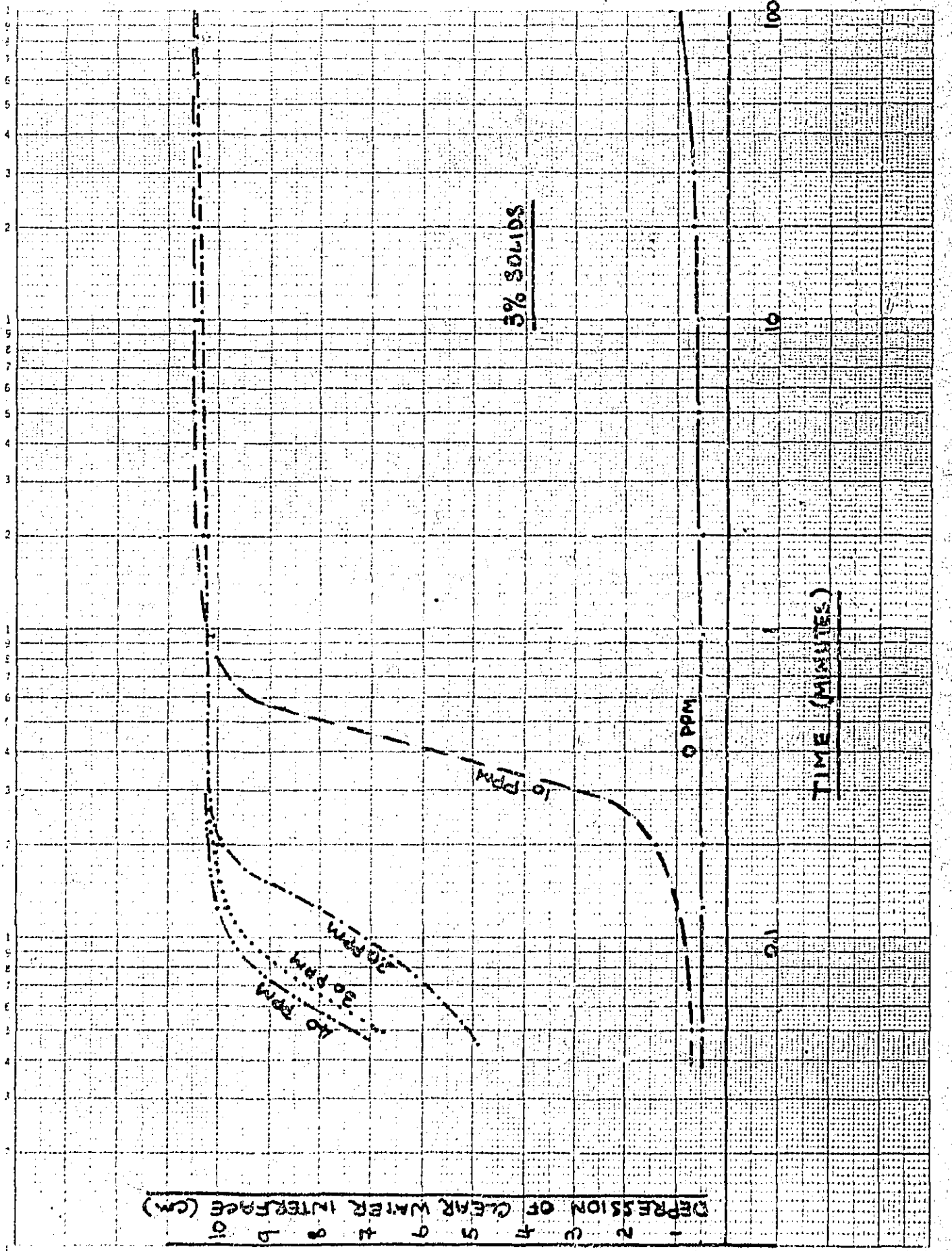
CARGO SUPERINTENDENTS CO. (ASIA) P. L. LIMITED

PETROGRAPHIC ANALYSIS

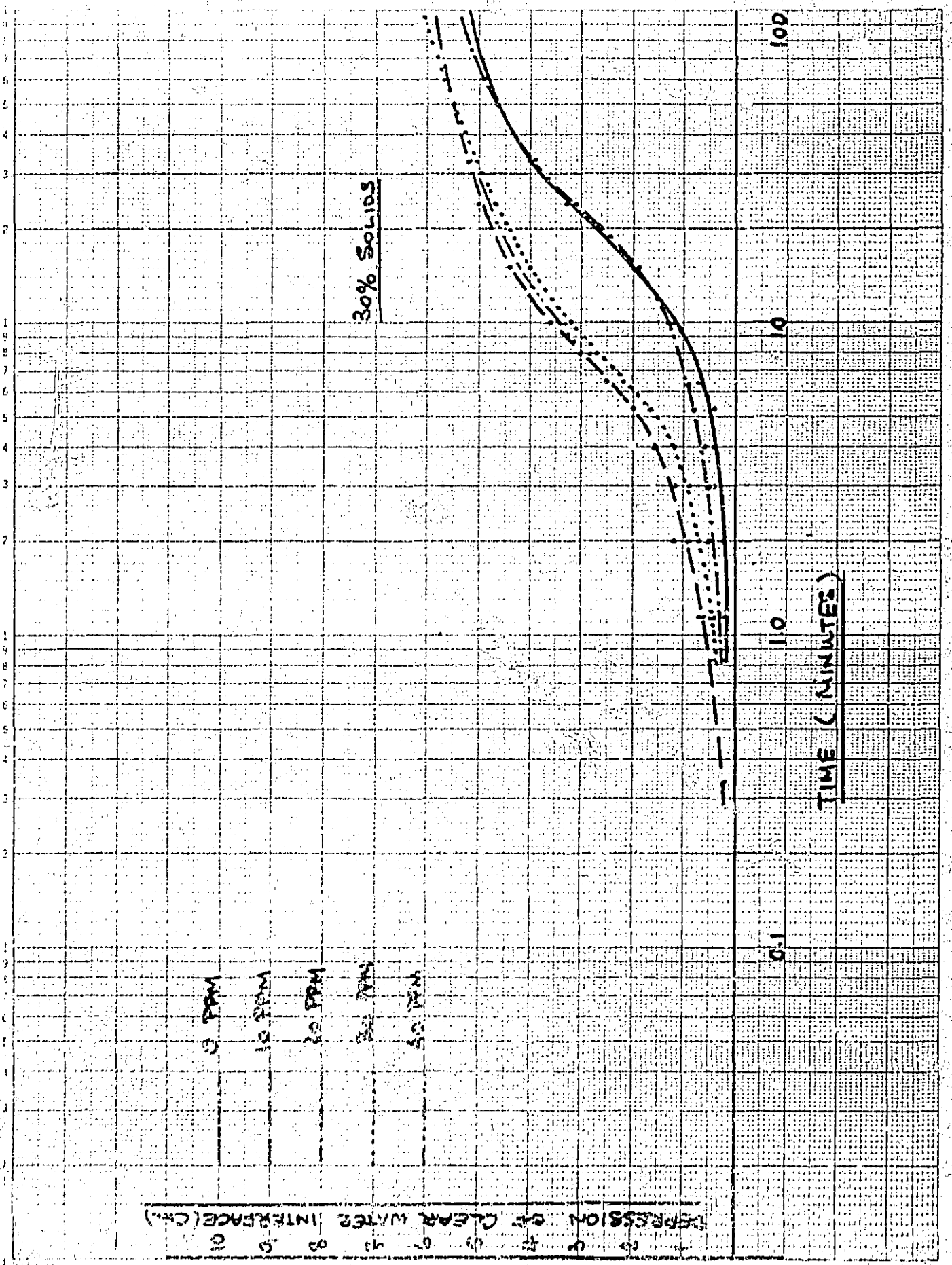
REFLECTANCE MEASUREMENT

CS.42458

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE			EXINITE	SEMI-INERT	REACTIVES	
			A	B	A + B				
5	0.50–0.55	0.525		4	4				
	0.55–0.60	0.575	1	19	20				
6	0.60–0.65	0.625	10	27	37				
	0.65–0.70	0.675	10	10	20				
7	0.70–0.75	0.725	19		19				
	0.75–0.80	0.775							
8	0.80–0.85	0.825							
	0.85–0.90	0.875							
9	0.90–0.95	0.925							
	0.95–1.00	0.975							
10	1.00–1.05	1.025							
	1.05–1.10	1.075							
11	1.10–1.15	1.125							
	1.15–1.20	1.175							
12	1.20–1.25	1.225							
	1.25–1.30	1.275							
13	1.30–1.35	1.325							
	1.35–1.40	1.375							
14	1.40–1.45	1.425							
	1.45–1.50	1.475							
15	1.50–1.55	1.525							
	1.55–1.60	1.575							
16	1.60–1.65	1.625							
	1.65–1.70	1.675							
17	1.70–1.75	1.725							
	1.75–1.80	1.775							
18	1.80–1.85	1.825							
	1.85–1.90	1.875							
19	1.90–1.95	1.925							
	1.95–2.00	1.975							
20	2.00–2.05	2.025							
	2.05–2.10	2.075							
21	2.10–2.15	2.125							
	2.15–2.20	2.175							
22	2.20–2.25	2.225							
	2.25–2.30	2.275							
TOTAL NUMBER OF READINGS			40	60	100				
MEAN RANDOM REFLECTANCE									
MEAN MAXIMUM REFLECTANCE					0.64				


3% SOLIDS
0 ppm
TIME (MINUTES)
DEPRESSION OF CLEAR WATER INTERFACE (cm.)

DEPRESSION OF CLEAR WATER INTERFACE (cm)
TIME (MINUTES)
10% SOLIDS
40 PPM
30 PPM
20 PPM
10 PPM
5 PPM
0.1
1
10
100


30% SOLIDS
TIME (MINUTES)
0.1
1.0
10
100
DEPRESSION OF CLEAR WATER INTERFACE (cm.)
0 PPM
10 PPM
20 PPM
40 PPM

2. GRAY 174

L1 and L2 Seams Combined

CASCO REPORT CS 42516 A & B

Washability Tests

174A	L1	890/51	)
174A	L2	890/52	) Seam Sample
174B	L1	895/51	)
174B	L2	895/52	)

2.1

CS.42516.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE GY 890-95 SAMPLE NOS.
GY 174 AL1 890/51 GY 174 BL1 895/51
GY 174 AL2 890/52 GY 174 BL2 895/52

CONTRACT C14-82

DATE RECEIVED: 2 November,1982.

DATE PRELIMINARY REPORT: 17 November,1982.

DATE FINAL REPORT: 8 December,1982.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia

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CS.42516.A

INTRODUCTION

Two (2)only samples of large diameter core designated:

Sample No.	Thickness (m)
89051	2.15
89052	1.97
89551	2.14
89552	1.44

ex GY 174 (Holes 890 and 895) were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 dated 12.10.82 and Telex KTE/2 dated 18.10.82).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

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Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF1.80)

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Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

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Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
GY 174 AL1 890/51	10.87
GY 174 AL2 890/52	19.77
GY 174 BL1 895/51	22.84
GY 174 BL2 895/52	14.82
TOTAL	68.30

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	3.0
Ash	%	39.9
Volatile Matter	%	20.9
Fixed Carbon	%	36.2
Relative Density		1.67
Hardgrove Grindability Index		57

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	57.8	57.8
22.4 x 11.2mm	19.9	67.7
11.2 x 5.6mm	8.3	86.0
5.6 x 2.8mm	5.3	91.3
2.8 x 1.4mm	2.9	94.2
Minus 1.4mm	5.8	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	38.5	38.5
22.4 x 11.2mm	18.0	56.5
11.2 x 5.6mm	15.0	71.5
5.6 x 2.8mm	10.0	81.5
2.8 x 1.4mm	6.8	88.3
Minus 1.4mm	11.7	100.0

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	24.3			24.3	
22.4 x 11.2mm	16.3	35.9	-	40.6	35.9
11.2 x 5.6mm	18.2			58.8	
5.6 x 2.8mm	13.8			72.6	
2.8 x 1.4mm	11.4			84.0	
1.4 x 0.5mm w/w	1.9	41.2	-	85.9	38.7
0.5 w/w x 0.250mm	4.6	40.3	0.37	90.5	38.8
0.250 x 0.125mm	1.1	41.2	0.35	91.6	38.8
0.125 x 0.063mm	3.6	49.5	0.26	95.2	39.2
Minus 0.063mm	4.8	53.8	0.24	100.0	39.9

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=40.6% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=45.3% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=5.7% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=85.9% of Total)

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TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=40.6% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	33.4	12.4	33.4	12.4
F1.50	16.0	19.8	49.4	14.8
F1.60	10.7	28.6	60.1	17.3
F1.70	5.6	37.0	65.7	18.9
F1.80	5.5	45.8	71.2	21.0
F1.90	4.6	53.4	75.8	23.0
F2.00	4.2	62.4	80.0	25.0
S2.00	20.0	79.1	100.0	35.9

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=45.3% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	10.8	9.7	10.8	9.7
F1.50	11.3	16.2	22.1	13.0
F1.60	14.1	25.7	36.2	18.0
F1.70	9.5	33.1	45.7	21.1
F1.80	12.9	40.7	58.6	25.4
F1.90	11.2	48.9	69.8	29.2
F2.00	7.9	56.9	77.7	32.0
S2.00	22.3	73.2	100.0	41.2

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=5.7% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	13.4	6.0	13.4	6.0
F1.50	9.9	14.0	23.3	9.4
F1.60	15.4	22.6	38.7	14.7
F1.70	12.6	31.1	51.3	18.7
F1.80	10.8	40.1	62.1	22.4
F1.90	8.9	48.6	71.0	25.7
F2.00	6.2	56.2	77.2	28.1
S2.00	22.8	78.1	100.0	39.5

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=85.9% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	21.48	11.68	21.48	11.68
F1.50	13.52	18.21	35.00	14.20
F1.60	12.49	26.87	47.49	17.53
F1.70	7.66	34.45	55.15	19.88
F1.80	9.40	42.11	64.55	23.12
F1.90	8.08	50.11	72.63	26.12
F2.00	6.15	58.67	78.78	28.66
S2.00	21.22	75.83	100.00	38.67

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

Table 3.1: 45 x 0.5mm w,w CF1.70 Product Crushed to Minus 22.4mm

Table 3.2: 22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm

Table 3.3: 11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	98.4	19.6	98.4	19.6
0.5 w/w x 0.125mm	1.5	19.1	99.9	19.6
Minus 0.125mm	0.1	23.7	100.0	19.6

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	97.0	19.0	97.0	19.0
S1.70	3.0	38.4	100.0	19.6

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	93.6	17.4	93.6	17.4
S1.70	6.4	43.7	100.0	19.1

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	95.8	19.0	95.8	19.0
0.5 w/w x 0.125mm	3.6	18.9	99.4	19.0
Minus 0.125mm	0.6	21.6	100.0	19.0

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	98.7	18.7	98.7	18.7
S1.70	1.3	44.9	100.0	19.0

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	91.6	15.9	91.6	15.9
S1.70	8.4	51.8	100.0	18.9

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TABLE 3.3 11.2 x 0.5 w/w F1.7C PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	91.9	18.7	91.9	18.7
0.5 w/w x 0.125mm	7.0	18.1	98.9	18.7
Minus 0.125mm	1.1	19.5	100.0	18.7

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	98.4	18.3	98.4	18.3
S1.70	1.6	43.0	100.0	18.7

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	91.1	15.4	91.1	15.4
S1.70	8.9	45.9	100.0	18.1

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.

Table 4.1: 45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm

Table 4.2: 22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm

Table 4.3: 11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	97.7	61.0	97.7	61.0
0.5 w/w x 0.125mm	2.2	56.6	99.9	60.9
Minus 0.125mm	0.1	61.6	100.0	60.9

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	2.3	38.9	2.3	38.9
S1.70	97.7	61.5	100.0	61.0

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	3.5	22.8	3.5	22.8
S1.70	96.5	57.8	100.0	56.6

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CF [illegible].B

TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO [illegible]NUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	96.7	61.5	96.7	61.5
0.5 w/w x 0.125	2.7	62.1	99.4	61.5
Minus 0.125mm	0.6	67.1	100.0	61.5

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.2	37.2	1.2	37.2
S1.70	98.8	61.8	100.0	61.5

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	6.5	26.5	6.5	26.5
S1.70	93.5	64.6	100.0	62.1

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	92.7	61.8	92.7	61.8
0.5 w/w x 0.125mm	5.8	60.8	98.5	61.7
Minus 0.125mm	1.5	65.3	100.0	61.8

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	1.3	37.8	1.2	37.8
S1.70	98.7	62.1	100.0	61.8

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	5.6	25.3	5.6	25.3
S1.70	94.4	62.9	100.0	60.8

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

2.17

CS.42516.B

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE GY 890-95 SAMPLE NOS.

GY 174 AL1 890/51 GY 174 BL1 895/51
GY 174 AL2 890/52 GY 174 BL2 895/52

CONTRACT C14-82

DATE RECEIVED: 2 November,1982.

DATE PRELIMINARY REPORT: 17 November,1982.

DATE FINAL REPORT: 8 December,1982.
(Pretreatment,Float/Sink Testing).

DATE FINAL REPORT: 14 January,1983 (Washed Coal Analysis)

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia
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CS.41516.B

INTRODUCTION

Two (2) only samples of large diameter core designated:

GY 174 AL1 890/51 GY 174 BL1 895/51
GY 174 AL2 890/52 GY 174 BL2 895/52

ex GY 174 (Holes 890 and 895) were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 dated 12.10.82 and Telex KTE/2 dated 18.10.82).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

cf.CS.42516.A Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF1.80)

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SECTION 5:	ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.80)
Table 5.1:	Laboratory Analysis
Table 5.2:	Ultimate Analysis
Table 5.3:	Forms of Sulphur
Table 5.4:	Ash Analysis (% of Ash)
Table 5.5:	Ash Fusion Characteristics (Reducing Atmosphere)

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.80)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%	64.55
Yield of Total	%	55.45
Relative Density		1.53
Air-Dried Moisture	%	4.1
Ash	%	23.0
Volatile Matter	%	24.2
Fixed Carbon	%	48.7
Specific Energy	%	23.18
Total Sulphur	%	0.34
Chlorine	%	0.02
Phosphorus	%	0.004
Carbon Dioxide	%	0.21
Arsenic	ppm	0.3

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	80.05
Hydrogen	%	4.45
Nitrogen	%	1.57
Sulphur	%	0.41
Oxygen (by difference)	%	13.52

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%	0.03
Sulphate Sulphur	%	0.01
Organic Sulphur (by difference)	%	0.30

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	61.3
Aluminium	as	Al_2O_3	31.5
Titanium	as	TiO_2	1.25
Iron	as	Fe_2O_3	3.34
Calcium	as	CaO	0.82
Magnesium	as	MgO	0.61
Sodium	as	Na_2O	0.68
Potassium	as	K_2O	0.56
Manganese	as	Mn_3O_4	0.04
Phosphorus	as	P_2O_5	0.04
Sulphur	as	SO_3	0.08

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	g.t.	1600
Spherical	°C	g.t.	1600
Hemisphere	°C	g.t.	1600
Flow	°C	g.t.	1600

g.t. denotes greater than

3. GRAY 175

L1 SEAM

CASCO REPORT CS 42528 A & C

Washability Tests

175A L1 9001)
175B L1 9051) Seam Sample

3.1

CS.42528.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS. 900 AND 905 SAMPLES 9001 AND 9051.

CONTRACT C14-82

DATE RECEIVED: 5 November,1982.

DATE PRELIMINARY REPORT: 22 November,1982.

DATE FINAL REPORT: 7 December,1982.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

for H.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia

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3.2

CS.42528.A

INTRODUCTION

Two (2) only samples of large diameter core designated:

Sample No.	Thickness (m)
9001	2.28
9051	2.10

ex Holes 900 and 905 were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large dimater core were treated as instructed (Letter KTE/23 dated 3.11.1982).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9001	21.982
9051	14.329
TOTAL:	36.311

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	2.7
Ash	%	43.6
Volatile Matter	%	19.7
Fixed Carbon	%	34.0
Relative Density		1.75
Hardgrove Grindability Index		57

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	60.8	60.8
22.4 x 11.2mm	19.9	80.7
11.2 x 5.6mm	9.6	90.3
5.6 x 2.8mm	4.1	94.4
2.8 x 1.4mm	2.4	96.8
Minus 1.4mm	3.2	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	38.3	38.3
22.4 x 11.2mm	18.3	56.6
11.2 x 5.6mm	14.6	71.2
5.6 x 2.8mm	10.5	81.7
2.8 x 1.4mm	6.9	88.6
Minus 1.4mm	11.4	100.0

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	28.7			28.7	
22.4 x 11.2mm	15.7	43.7	-	44.4	43.7
11.2 x 5.6mm	17.4			61.8	
5.6 x 2.8mm	13.4			75.2	
2.8 x 1.4mm	9.2			84.4	
1.4 x 0.5mm w/w	4.9	46.5	-	89.3	45.1
0.5 w/w x 0.250mm	4.8	38.3	0.30	94.1	44.8
0.250 x 0.125mm	1.2	36.2	0.32	95.3	44.7
0.125 x 0.063mm	1.7	35.3	0.34	97.0	44.5
Minus 0.063mm	3.0	45.0	0.26	100.0	44.5

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=44.4% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=44.9% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=6.0% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=89.3% of Total)

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TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=44.4% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	22.8	11.0	22.8	11.0
F1.50	9.1	20.8	31.9	13.7
F1.60	8.3	31.3	40.2	17.4
F1.70	10.2	39.7	50.4	21.9
F1.80	8.5	46.9	58.9	25.5
F1.90	6.1	55.2	65.0	28.3
F2.00	9.7	63.6	74.7	32.9
S2.00	25.3	75.7	100.0	43.7

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=44.9% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	11.3	6.9	11.3	6.9
F1.50	8.5	15.5	19.8	10.6
F1.60	9.3	24.0	29.1	14.9
F1.70	10.0	33.0	39.1	19.5
F1.80	10.0	41.6	49.1	24.0
F1.90	7.7	49.7	56.8	27.5
F2.00	6.4	57.2	63.2	30.5
S2.00	36.8	74.0	100.0	46.5

Page 6 attached

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=6.0% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	12.2	4.4	12.2	4.4
F1.50	10.7	10.3	22.9	7.2
F1.60	16.1	19.9	39.0	12.4
F1.70	14.6	30.7	53.6	17.4
F1.80	10.0	40.2	63.6	21.0
F1.90	7.2	47.7	70.8	23.7
F2.00	4.9	54.7	75.7	25.7
S2.00	24.3	73.5	100.0	37.3

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=89.3% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	17.02	9.63	17.02	9.63
F1.50	8.80	18.12	25.82	12.52
F1.60	8.80	27.42	34.62	16.31
F1.70	10.10	36.36	44.72	20.84
F1.80	9.25	44.02	53.97	24.81
F1.90	6.90	52.12	60.87	27.91
F2.00	8.04	61.04	68.91	31.77
S2.00	31.09	74.69	100.00	45.12

Page 7 attached

SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

Table 3.1: 45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm

Table 3.2: 22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm

Table 3.3: 11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	97.0	20.6	97.0	20.6
0.5 w/w x 0.125mm	2.9	19.9	99.9	20.6
Minus 0.125mm	0.1	25.0	100.0	20.6

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	96.7	19.7	96.7	19.7
S1.70	3.3	46.6	100.0	20.6

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	88.6	16.2	88.6	16.2
S1.70	11.4	48.9	100.0	19.9

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	95.0	19.7	95.0	19.7
0.5 w/w x 0.125mm	4.4	19.2	99.4	19.7
Minus 0.125mm	0.6	21.0	100.0	19.7

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	96.5	18.7	96.5	18.7
S1.70	3.5	46.6	100.0	19.7

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	87.8	15.1	87.8	15.1
S1.70	12.2	48.4	100.0	19.2

Page 10 attached

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TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
5.6 x 0.5mm w/w	92.1	18.8	92.1	18.8
0.5 w/w x 0.125mm	7.0	17.9	99.1	18.7
Minus 0.125mm	0.9	18.3	100.0	18.7

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	95.8	17.8	95.8	17.8
S1.70	4.2	41.1	100.0	18.8

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	88.7	14.4	88.7	14.4
S1.70	11.3	45.4	100.0	17.9

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SECTION 4:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.
Table 4.1:	45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm
Table 4.2:	22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm
Table 4.3:	11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	98.0	64.7	98.0	64.7
0.5 w/w x 0.125mm	1.9	59.3	99.9	64.6
Minus 0.125mm	0.1	63.5	100.0	64.6

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	3.1	37.3	3.1	37.3
S1.70	96.9	65.6	100.0	64.7

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	6.3	23.1	6.3	23.1
S1.70	93.7	61.7	100.0	59.3

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	96.2	65.8	96.2	65.8
0.5 w/w x 0.125	3.3	61.5	99.5	65.7
Minus 0.125mm	0.5	64.1	100.0	65.6

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.4	37.5	1.4	37.5
S1.70	98.6	66.2	100.0	65.8

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	8.9	26.5	8.9	26.5
S1.70	91.1	64.9	100.0	61.5

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	89.8	66.4	89.8	66.4
0.5 w/w x 0.125mm	8.4	64.1	98.2	66.2
Minus 0.125mm	1.8	64.7	100.0	66.2

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	2.2	37.7	2.2	37.7
S1.70	97.8	67.0	100.0	66.4

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	5.3	26.3	5.3	26.3
S1.70	94.7	66.2	100.0	64.1

CARGO SUPERINTENDENTS CO. (A/SIA, PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

3.17

CS.42528.C

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS. 900 AND 905 SAMPLES 9001 AND 9051.

CONTRACT C14-82

DATE RECEIVED: 5 November,1982.

DATE PRELIMINARY REPORT: 22 November,1982.

DATE FINAL REPORT: 7 December,1982.
(Pretreatment,Float/Sink Testing).

DATE FINAL REPORT: 14 January,1983 (Washed Coal Analysis)

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

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3.18

CS.42528.C

INTRODUCTION

Two (2) only samples of large diameter core designated:

Sample No.	Thickness (m)
9001	2.28
9051	2.10

ex Holes 900 and 905 were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 dated 3.11.82).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

cf.CS.42528.A

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF1.80)

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.80)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.80)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%	53.97
Yield of Total	%	48.20
Relative Density		1.56
Air-Dried Moisture	%	3.8
Ash	%	24.8
Volatile Matter	%	24.9
Fixed Carbon	%	46.5
Specific Energy	%	23.08
Total Sulphur	%	0.37
Chlorine	%	0.03
Phosphorus	%	0.004
Carbon Dioxide	%	0.19
Arsenic	ppm	0.6

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	79.30
Hydrogen	%	4.72
Nitrogen	%	1.56
Sulphur	%	0.42
Oxygen (by difference)	%	14.00

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%	0.06
Sulphate Sulphur	%	0.01
Organic Sulphur (by difference)	%	0.30

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	61.3
Aluminium	as	Al_2O_3	32.4
Titanium	as	TiO_2	1.23
Iron	as	Fe_2O_3	2.30
Calcium	as	CaO	1.42
Magnesium	as	MgO	0.37
Sodium	as	Na_2O	0.31
Potassium	as	K_2O	0.50
Manganese	as	Mn_3O_4	0.04
Phosphorus	as	P_2O_5	0.04
Sulphur	as	SO_3	0.28

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	g.t.	1600
Spherical	°C	g.t.	1600
Hemisphere	°C	g.t.	1600
Flow	°C	g.t.	1600

g.t. denotes greater than

4. GRAY 175

L2 SEAM

CASCO REPORT CS 42528 B

Washability Tests

175A L2 9002)
175B L2 9052) Seam Sample

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(INCORPORATED IN NEW SOUTH WALES)

4.1

CS.42528.B

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS. 900 AND 905 SAMPLES 9002 AND 9052.

CONTRACT C14-82

DATE RECEIVED: 5 November,1982.

DATE PRELIMINARY REPORT: 22 November,1982.

DATE FINAL REPORT: 7 December,1982

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

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RECEIVED
15 DEC 1982
SHELL
COAL DIV.

CS. 42528B

INTRODUCTION

Two (2) only samples of large diameter core designated:

9002
9052

ex GY 175 (Holes 900 and 905) were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction SI.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm ww CF 1.70)

Appendix: Petrographic Summary

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9002	15.071
9052	16.107
TOTAL:	31.178

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	2.7
Ash	%	33.7
Volatile Matter	%	22.3
Fixed Carbon	%	41.3
Relative Density		1.64
Hardgrove Grindability Index		57

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	62.2	62.2
22.4 x 11.2mm	16.7	78.9
11.2 x 5.6mm	9.1	88.0
5.6 x 2.8mm	4.3	92.3
2.8 x 1.4mm	2.8	95.1
Minus 1.4mm	4.9	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	40.2	40.2
22.4 x 11.2mm	17.7	57.9
11.2 x 5.6mm	14.1	72.0
5.6 x 2.8mm	9.6	81.6
2.8 x 1.4mm	6.3	87.9
Minus 1.4mm	12.1	100.0

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	31.3			31.3	
22.4 x 11.2mm	18.4	33.0	–	49.7	33.0
11.2 x 5.6mm	15.8			65.5	
5.6 x 2.8mm	10.4			75.9	
2.8 x 1.4mm	8.3			84.2	
1.4 x 0.5mm w/w	2.6	32.8	–	86.8	32.9
0.5 w/w x 0.250mm	4.8	33.0	0.32	91.6	32.9
0.250 x 0.125mm	1.4	34.2	0.32	93.0	32.9
0.125 x 0.063mm	2.4	34.5	0.32	95.4	33.0
Minus 0.063mm	4.6	44.8	0.24	100.0	33.5

Page 4 attached

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=49.7% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=37.1% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=6.2% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=86.8% of Total)

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TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=49.7% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	34.5	12.1	34.5	12.1
F1.50	10.2	19.1	44.7	13.7
F1.60	14.9	25.7	59.6	16.7
F1.70	12.4	36.9	72.0	20.2
F1.80	5.3	44.2	77.3	21.8
F1.90	4.2	51.9	81.5	23.4
F2.00	2.6	60.3	84.1	24.5
S2.00	15.9	77.6	100.0	33.0

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=37.1% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	15.3	9.2	15.3	9.2
F1.50	14.3	15.4	29.6	12.2
F1.60	26.5	24.4	56.1	18.0
F1.70	15.9	34.1	72.0	21.5
F1.80	7.7	43.1	79.7	23.6
F1.90	3.8	51.0	83.5	24.9
F2.00	3.1	58.5	86.6	26.1
S2.00	13.4	76.5	100.0	32.8

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=6.2% OF TOTAL)

R.D. Fraction	Fractional Yield%	Fractional Ash%	Cumulative Yield%	Cumulative Ash%
F1.40	11.0	5.0	11.0	5.0
F1.50	15.7	10.9	26.7	8.5
F1.60	27.8	20.0	54.5	14.4
F1.70	12.8	31.1	67.3	17.5
F1.80	6.9	39.7	74.2	19.6
F1.90	3.5	48.2	77.7	20.9
F2.00	2.7	54.8	80.4	22.0
S2.00	19.6	75.3	100.0	32.5

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=86.8% OF TOTAL)

R.D.Fraction	Fractional Yield%	Fractional Ash%	Cumulative Yield%	Cumulative Ash%
F1.40	26.29	11.38	26.29	11.38
F1.50	11.95	17.21	38.24	13.20
F1.60	19.86	24.96	58.10	17.22
F1.70	13.90	35.53	72.00	20.76
F1.80	6.33	45.63	78.33	22.60
F1.90	4.03	51.54	82.36	24.02
F2.00	2.81	59.45	85.17	25.19
S2.00	14.83	77.18	100.00	32.90

Page 7 attached

SECTION 3:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.
Table 3.1:	45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm
Table 3.2:	22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm
Table 3.3:	11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	98.8	20.5	98.8	20.5
0.5 w/w x 0.125mm	1.1	20.2	99.9	20.5
Minus 0.125mm	0.1	20.6	100.0	20.5

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	96.9	19.7	96.9	19.7
S1.70	3.1	46.5	100.0	20.5

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	90.1	17.5	90.1	17.5
S1.70	9.9	45.2	100.0	20.2

Page 9 attached

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	96.2	19.7	96.2	19.7
0.5 w/w x 0.125mm	3.3	19.9	99.5	19.7
Minus 0.125mm	0.5	20.6	100.0	19.7

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	97.9	19.1	97.9	19.1
S1.70	2.1	45.8	100.0	19.7

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	90.6	17.0	90.6	17.0
S1.70	9.4	47.7	100.0	19.9

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TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	92.5	19.1	92.5	19.1
0.5 w/w x 0.125mm	6.4	19.0	98.9	19.1
Minus 0.125mm	1.1	19.6	100.0	19.1

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	96.9	18.4	96.9	18.4
S1.70	3.1	41.0	100.0	19.1

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	89.3	15.8	89.3	15.8
S1.70	10.7	45.9	100.0	19.0

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SECTION 4:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.
Table 4.1:	45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm
Table 4.2:	22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm
Table 4.3:	11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	98.3	63.8	98.3	63.8
0.5 w/w x 0.125mm	1.6	58.3	99.9	63.7
Minus 0.125mm	0.1	62.4	100.0	63.7

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	4.4	31.6	4.4	31.6
S1.70	95.6	65.3	100.0	63.8

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	7.8	20.8	7.8	20.8
S1.70	92.2	61.5	100.0	58.3

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	96.0	65.5	96.0	65.5
0.5 w/w x 0.125	3.3	60.2	99.3	65.3
Minus 0.125mm	0.7	63.9	100.0	65.3

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	2.7	33.4	2.7	33.4
S1.70	97.3	66.4	100.0	65.5

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	9.3	22.5	9.3	22.5
S1.70	90.7	64.1	100.0	60.2

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	91.0	66.7	91.0	66.7
0.5 w/w x 0.125mm	6.8	62.1	97.8	66.4
Minus 0.125mm	2.2	66.5	100.0	66.4

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	2.8	36.1	2.8	36.1
S1.70	97.2	67.6	100.0	66.7

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	8.7	23.2	8.7	23.2
S1.70	91.3	65.8	100.0	62.1

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CFI.70)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

Table 5.6: Petrographic Analysis Summary

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CFI.70)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%	72.00
Yield of Total	%	62.50
Relative Density		1.51
Air-Dried Moisture	%	3.0
Ash	%	20.7
Volatile Matter	%	24.6
Fixed Carbon	%	51.7
Specific Energy	MJ/kg	24.70
Total Sulphur	%	0.41
Chlorine	%	0.01
Phosphorus	%	0.017
Carbon Dioxide	%	0.39
Arsenic	ppm	l.t.1
Hardgrove Grindability Index		54
Abrasion Index	mg/kg	14.0

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	80.52
Hydrogen	%	4.31
Nitrogen	%	1.38
Sulphur	%	0.55
Oxygen (by difference)	%	13.24

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%		0.03
Sulphate Sulphur	%	l.t.	0.01
Organic Sulphur (by difference)	%		0.38

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	56.6
Aluminium	as	Al_2O_3	34.7
Titanium	as	TiO_2	1.17
Iron	as	Fe_2O_3	4.61
Calcium	as	CaO	0.80
Magnesium	as	MgO	0.77
Sodium	as	Na_2O	0.21
Potassium	as	K_2O	0.45
Manganese	as	Mn_3O_4	0.08
Phosphorus	as	P_2O_5	0.08
Sulphur	as	SO_3	0.77

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	Greater than 1600
Spherical	°C	Greater than 1600
Hemisphere	°C	Greater than 1600
Flow	°C	Greater than 1600

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	13.0%
Exinite	7.6%
Inertinite	69.2%
Minerals	10.2%
Mean Maximum Reflectance	0.60%

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CS.42528.B

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

MACERAL ANALYSIS OF COAL

MACERALS						
SAMPLE No... CS.42528	VITRINITE A	6.8	7.8	16.0	18.3	VITRINITE
OPERATOR: Gail Fay	VITRINITE B	9.2	10.5			
R max ~~max~~ 0.60	SPORINITE	5.4	6.2	7.2	8.2	EXINITE
n (MACERALS): 500	CUTINITE	0.4	0.4			
n (REFLECTANCE): 100	RESINITE	1.4	1.6			
	MICRINITE	2.0	2.3	64.4	73.5	INERTINITE
	MACRINITE	10.4	11.9			
	SEMI-FUSINITE	37.8	43.1			
	FUSINITE	8.2	9.4			
	INERTODETRINITE	6.0	6.8			
	MINERALS *	12.4	mmf	12.4	MINERAL MATTER FREE BASIS	
MINERALS: *clay, quartz, carbonate, pyrite.						

REFLECTANCE (546nm / oil refractive index 1.518)

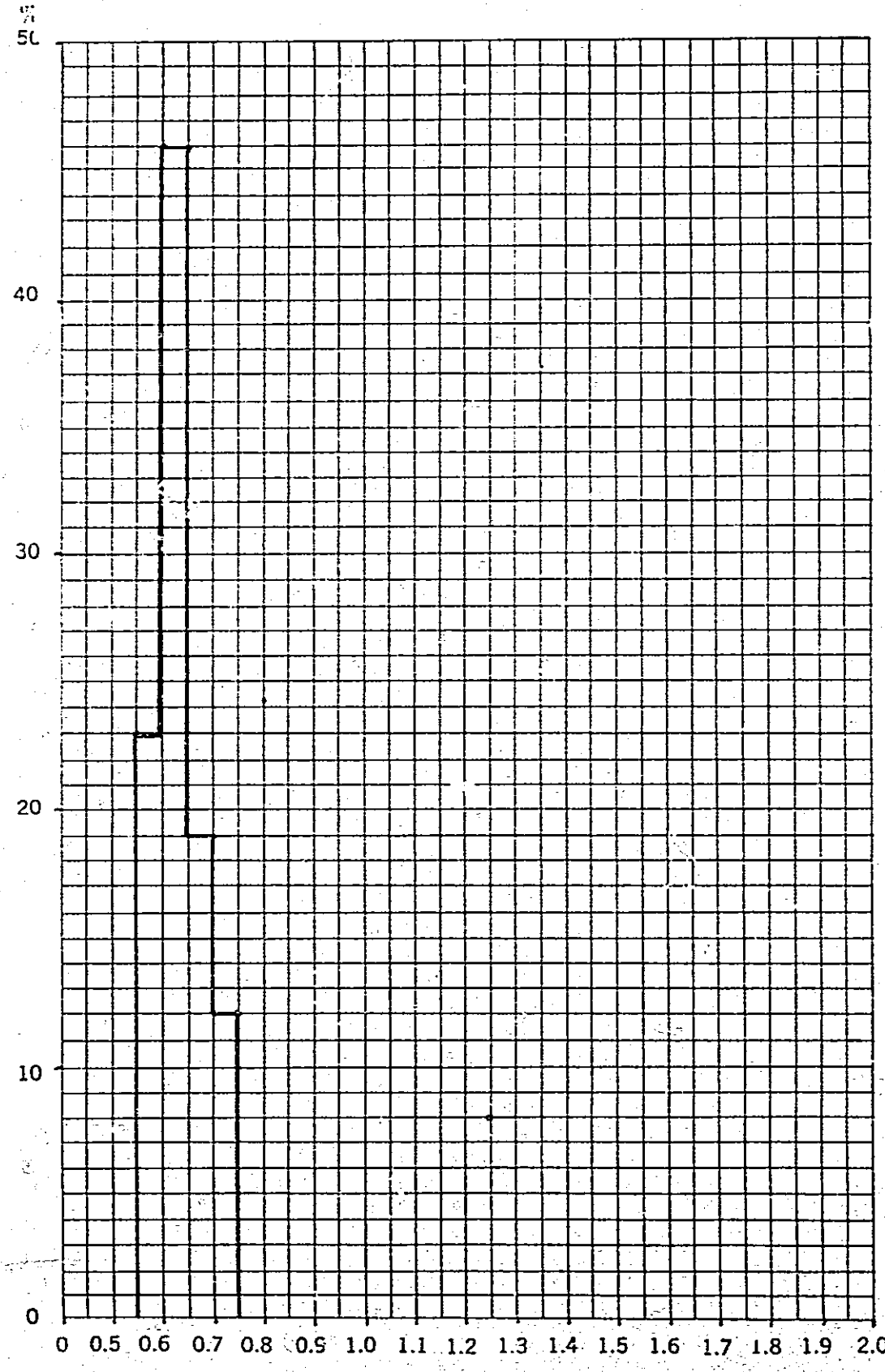
MEAN ~~MAXIMUM~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.60	PERCENTAGE OF NON-REACTIVES =

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

LABORATORIES CASCO ENGINEERING

REFLECTOGRAM

SAMPLE REFERENCE: CS.42528



0.60 % Ro mean max., Vitrinite A only.

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

PETROGRAPHIC ANALYSIS

REFLECTANCE MEASUREMENT

CS.42528

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE			EXINITE	SEMI-INERT	REACTIVES
			A	B	A + B			
0	0.00 - 0.25 0.05 - 0.10	0.025 0.075						
1	0.10 - 0.15 0.15 - 0.20	0.125 0.175						
2	0.20 - 0.25 0.25 - 0.30	0.225 0.275						
3	0.30 - 0.35 0.35 - 0.40	0.325 0.375						
4	0.40 - 0.45 0.45 - 0.50	0.425 0.475		5	5			
5	0.50 - 0.55 0.55 - 0.60	0.525 0.575	10	15 23	15 33			
6	0.60 - 0.65 0.65 - 0.70	0.625 0.675	20 8	13 1	33 9			
7	0.70 - 0.75 0.75 - 0.80	0.725 0.775	5		5			
8	0.80 - 0.85 0.85 - 0.90	0.825 0.875						
9	0.90 - 0.95 0.95 - 1.00	0.925 0.975						
10	1.00 - 1.05 1.05 - 1.10	1.025 1.075						
11	1.10 - 1.15 1.15 - 1.20	1.125 1.175						
12	1.20 - 1.25 1.25 - 1.30	1.225 1.275						
13	1.30 - 1.35 1.35 - 1.40	1.325 1.375						
14	1.40 - 1.45 1.45 - 1.50	1.425 1.475						
15	1.50 - 1.55 1.55 - 1.60	1.525 1.575						
16	1.60 - 1.65 1.65 - 1.70	1.625 1.675						
17	1.70 - 1.75 1.75 - 1.80	1.725 1.775						
TOTAL NUMBER OF READINGS			43	57	100			
MEAN RANDOM REFLECTANCE								
MEAN MAXIMUM REFLECTANCE								

5. GRAY 176

M2 SEAM

CASCO REPORT CS 42545 A

Washability Tests

176A M2 9101)
176B M2 9151) Seam Sample

5.1

CS.42545.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE 910 SAMPLE 9101, HOLE 915 SAMPLE 9151.

CONTRACT C14-82

DATE RECEIVED: 11 November,1982.

DATE PRELIMINARY REPORT: 29 November,1982.

DATE FINAL REPORT: 17 December,1982.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities Australia

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5.2

CS.42545.A

INTRODUCTION

Two (2) only samples of large diameter core designated:

Sample No.	Thickness (m)
9101	1.19
9151	1.41

ex Hole 910 sample 9101, Hole 915 sample 9151 which were received at our NATA registered Sydney Laboratory for pretreatment float/sink testing and analysis according TO CONTRACT C14-82 VARIATION 1 (Amended Type 3 analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 dated 9.11.82).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction SI.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF1.90)

APPENDIX: Petrographic Summary

5.3

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9101	10.396
9151	13.962
TOTAL:	24.358

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	4.0
Ash	%	20.2
Volatile Matter	%	26.6
Fixed Carbon	%	49.2
Relative Density		1.49
Hardgrove Grindability Index		60

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	61.6	61.6
22.4 x 11.2mm	15.7	77.3
11.2 x 5.6mm	8.8	86.1
5.6 x 2.8mm	4.6	90.7
2.8 x 1.4mm	3.3	94.0
Minus 1.4mm	6.0	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	39.9	39.9
22.4 x 11.2mm	17.8	57.7
11.2 x 5.6mm	14.7	72.4
5.6 x 2.8mm	9.6	82.0
2.8 x 1.4mm	5.9	87.9
Minus 1.4mm	12.1	100.0

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	35.5			35.5	
22.4 x 11.2mm	17.4	16.9	–	52.9	16.9
11.2 x 5.6mm	13.6			66.5	
5.6 x 2.8mm	8.3			74.8	
2.8 x 1.4mm	8.6			83.4	
1.4 x 0.5mm w/w	1.0	17.3	–	84.4	17.0
0.5 w/w x 0.250mm	4.7	21.5	0.75	89.1	17.3
0.250 x 0.125mm	1.3	23.6	0.82	90.4	17.4
0.125 x 0.063mm	1.8	25.8	0.51	92.2	17.5
Minus 0.063mm	7.8	54.8	0.22	100.0	20.4

Page 4 attached

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=52.9% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=31.5% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=6.0% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=84.4% of Total)

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TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=52.9% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	80.5	9.7	80.5	9.7
F1.50	5.3	24.7	85.8	10.6
F1.60	1.7	34.0	87.5	11.1
F1.70	1.8	43.4	89.3	11.7
F1.80	3.2	53.1	92.5	13.2
F1.90	3.3	60.4	95.8	14.8
F2.00	3.7	65.2	99.5	16.7
S2.00	0.5	70.2	100.0	16.9

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=31.5% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	61.2	7.0	61.2	7.0
F1.50	12.0	15.2	73.2	8.3
F1.60	8.9	22.7	82.1	9.9
F1.70	3.8	30.5	85.9	10.8
F1.80	2.8	39.5	88.7	11.7
F1.90	2.6	48.7	91.3	12.8
F2.00	3.4	58.3	94.7	14.4
S2.00	5.3	68.1	100.0	17.3

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=6.0% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	7.1	3.1	7.1	3.1
F1.50	32.3	8.9	39.4	7.9
F1.60	30.2	15.5	69.6	11.2
F1.70	9.2	24.0	78.8	12.7
F1.80	3.7	33.4	82.5	13.6
F1.90	2.8	43.6	85.3	14.6
F2.00	2.6	55.5	87.9	15.8
S2.00	12.1	74.6	100.0	22.9

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=84.4% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	73.29	8.86	73.29	8.86
F1.50	7.80	19.25	81.09	9.86
F1.60	4.39	25.44	85.48	10.66
F1.70	2.55	36.22	88.03	11.40
F1.80	3.05	48.44	91.08	12.64
F1.90	3.04	56.66	94.12	14.06
F2.00	3.59	62.76	97.71	15.85
S2.00	2.29	68.39	100.00	17.05

Page 7 attached

SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

Table 3.1: 45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm

Table 3.2: 22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm

Table 3.3: 11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction		Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w		98.9	11.1	98.9	11.1
0.5 w/w x 0.125mm		1.1	13.0	100.0	11.1
Minus 0.125mm	l.t.	0.1			

l.t. denotes less than

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	99.8	11.0	99.8	11.0
S1.70	0.2	46.0	100.0	11.0

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70)				
S1.70)	Insufficient sample for Float/Sink Tests.			

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	92.0	11.0	92.0	11.0
0.5 w/w x 0.125mm	6.3	10.5	98.3	11.0
Minus 0.125mm	1.7	14.2	100.0	11.0

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	99.4	10.8	99.4	10.8
S1.70	0.6	45.1	100.0	11.0

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	96.8	9.2	96.8	9.2
S1.70	3.2	50.7	100.0	10.5

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TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	86.6	10.8	86.6	10.8
0.5 w/w x 0.125mm	11.2	10.5	97.8	10.8
Minus 0.125mm	2.2	10.3	100.0	10.8

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	98.4	10.4	98.4	10.4
S1.70	1.6	37.6	100.0	10.8

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	95.1	9.2	95.1	9.2
S1.70	4.9	36.7	100.0	10.5

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CS.42545.A

SECTION 4:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.
Table 4.1:	45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm
Table 4.2:	22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm
Table 4.3:	11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction		Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w		98.1	58.3	98.1	58.3
0.5 w/w x 0.125mm		1.9	60.4	100.0	58.3
Minus 0.125mm	l.t.	0.1			

l.t. denotes less than.

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
Fl.70	4.9	41.8	4.9	41.8
Sl.70	95.1	59.3	95.1	58.3

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
Fl.70)				
Sl.70) Insufficient sample for Float/Sink Tests.				

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	96.7	59.3	96.7	59.3
0.5 w/w x 0.125	2.9	56.2	99.6	59.2
Minus 0.125mm	0.4	53.0	100.0	59.2

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	5.5	41.8	5.5	41.8
S1.70	94.5	60.3	100.0	59.3

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70)				
S1.70) Insufficient sample for Float/Sink Tests.				

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	90.5	60.7	90.5	60.7
0.5 w/w x 0.125mm	7.8	56.6	98.3	60.4
Minus 0.125mm	1.7	58.2	100.0	60.3

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	0.6	31.5	0.6	31.5
S1.70	99.4	60.9	100.0	60.7

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	6.8	16.2	6.8	16.2
S1.70	93.2	59.6	100.0	56.6

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF2.00)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

Table 5.6: Petrographic Analysis Summary

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE
(45 x 0.5mm w/w CF1.90)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%		97.71
Yield of Total	%		82.47
Relative Density			1.46
Air-Dried Moisture	%		4.0
Ash	%		15.6
Volatile Matter	%		29.9
Fixed Carbon	%		50.5
Specific Energy	MJ/kg		25.56
Total Sulphur	%		0.33
Chlorine	%		0.02
Phosphorus	%		0.001
Carbon Dioxide	%		0.07
Arsenic	ppm	l.t.	1
Hardgrove Grindability Index			61
Abrasion Index	Mg/kg		28.0

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	79.54
Hydrogen	%	4.56
Nitrogen	%	1.48
Sulphur	%	0.41
Oxygen (by difference)	%	14.01

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%		0.03
Sulphate Sulphur	%	l.t.	0.01
Organic Sulphur (by difference)	%		0.30

l.t. denotes less than

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	68.8
Aluminium	as	Al_2O_3	25.0
Titanium	as	TiO_2	0.96
Iron	as	Fe_2O_3	2.41
Calcium	as	CaO	1.13
Magnesium	as	MgO	0.78
Sodium	as	Na_2O	0.15
Potassium	as	K_2O	0.89
Manganese	as	Mn_3O_4	0.01
Phosphorus	as	P_2O_5	0.02
Sulphur	as	SO_3	0.04

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	1520
Spherical	°C	g.t. 1600
Hemisphere	°C	g.t. 1600
Flow	°C	g.t. 1600

g.t. denotes greater than

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	29.0%
Exinite	13.8%
Inertinite	43.8%
Minerals	13.4%
Mean Maximum Reflectance	0.73%

5.20

CS.42545.A

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.
INCORPORATED IN NEW SOUTH WALES

MACERAL ANALYSIS OF COAL

MACERALS						
	VITRINITE A	12.4	14.2	24.2	27.7	VITRINITE
	VITRINITE B	11.8	13.5			
	SPORINITE	8.8	10.1	12.0	13.7	EXINITE
	CUTINITE	0.2	0.2			
	RESINITE	3.0	3.4			
	MICRINITE	1.0	1.0	51.2	58.6	INERTINITE
	MACRINITE	6.6	7.6			
	SEMI-FUSINITE	33.6	38.4			
	FUSINITE	4.0	4.6			
	INERTODETRINITE	6.0	6.9			
	MINERALS *	12.6	mmf	12.6	MINERAL MATTER FREE BASIS	

SAMPLE No.... CS.42545

OPERATOR: Gail Fay

R max ~~or RX~~ 0.68

n (MACERALS): 500

n (REFLECTANCE): 100

MINERALS: *clay, quartz, carbonate, pyrite.

REFLECTANCE (546nm / oil refractive index 1.518)

MEAN ~~RANDOM~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.68	PERCENTAGE OF NON-REACTIVES =

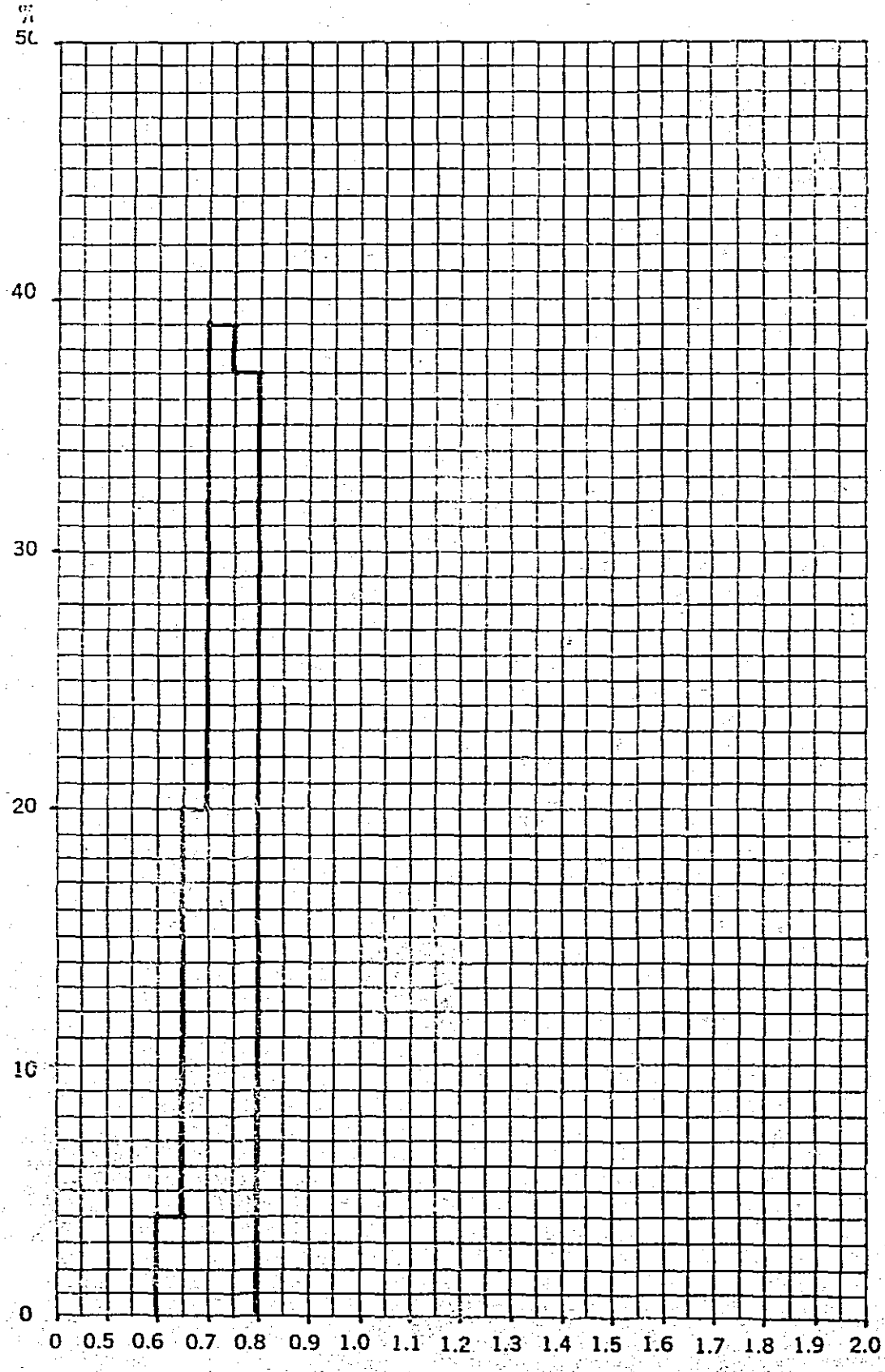
COKE STABILITY Calculations based on the SCHAPIRO-GRAY SYSTEM.

COMPOSITION BALANCE INDEX:	STRENGTH INDEX:
ESTIMATED (ASTM) COKE STABILITY INDEX:	

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

REFLECTOGRAM

SAMPLE REFERENCE: CS.42545



0.68 % Ro mean max., Vitrinite A only.

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED

PETROGRAPHIC ANALYSIS

REFLECTANCE MEASUREMENT

CS.42545

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE			EXINITE	SEMI-INERT	REACTIVES	
			A	B	A + B				
5	0.50–0.55 0.55–0.60	0.525 0.575		4 6	4 6				
6	0.60–0.65 0.65–0.70	0.625 0.675	2 10	24 15	26 25				
7	0.70–0.75 0.75–0.80	0.725 0.775	20 19		20 19				
8	0.80–0.85 0.85–0.90	0.825 0.875							
9	0.90–0.95 0.95–1.00	0.925 0.975							
10	1.00–1.05 1.05–1.10	1.025 1.075							
11	1.10–1.15 1.15–1.20	1.125 1.175							
12	1.20–1.25 1.25–1.30	1.225 1.275							
13	1.30–1.35 1.35–1.40	1.325 1.375							
14	1.40–1.45 1.45–1.50	1.425 1.475							
15	1.50–1.55 1.55–1.60	1.525 1.575							
16	1.60–1.65 1.65–1.70	1.625 1.675							
17	1.70–1.75 1.75–1.80	1.725 1.775							
18	1.80–1.85 1.85–1.90	1.825 1.875							
19	1.90–1.95 1.95–2.00	1.925 1.975							
20	2.00–2.05 2.05–2.10	2.025 2.075							
21	2.10–2.15 2.15–2.20	2.125 2.175							
22	2.20–2.25 2.25–2.30	2.225 2.275							
TOTAL NUMBER OF READINGS			51	49	100				
MEAN RANDOM REFLECTANCE									
MEAN MAXIMUM REFLECTANCE					0.68				

6. GRAY 176

L2 SEAM

CASCO REPORT CS 42553 A

Washability Tests

176A L2 9102)
176B L2 9152) Seam Sample

6.1

CS.42553.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS. 910 AND 915 SAMPLE NOS. 9102 AND 9152.

CONTRACT C14-82

DATE RECEIVED: 15 November,1982.

DATE PRELIMINARY REPORT: 29 November,1982.

DATE FINAL REPORT: 17 December,1982.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration. This report may not be reproduced except in full.

SY.LOI

CS.42553.A

INTRODUCTION

Two (2) only samples of large diameter core designated:

Sample No.	Thickness (m)
9102	1.21
9152	1.41

ex Hole Nos. 910 and 915 sample Nos. 9101 and 9152 which were received at our NATA registered laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 of 11 November, 1982).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF1.90)

APPENDIX: Petrographic Summary

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9102	10.593
9152	13.569
TOTAL:	24.162

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	4.3
Ash	%	35.4
Volatile Matter	%	22.9
Fixed Carbon	%	37.4
Relative Density		1.67
Hardgrove Grindability Index		60

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	72.2	72.2
22.4 x 11.2mm	14.5	86.7
11.2 x 5.6mm	6.9	93.6
5.6 x 2.8mm	2.4	96.0
2.8 x 1.4mm	1.3	97.3
Minus 1.4mm	2.7	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	40.9	40.9
22.4 x 11.2mm	17.8	58.7
11.2 x 5.6mm	13.3	72.0
5.6 x 2.8mm	9.7	81.7
2.8 x 1.4mm	5.4	87.1
Minus 1.4mm	12.9	100.0

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	37.6			37.6	
22.4 x 11.2mm	15.5	33.2	–	53.1	33.2
11.2 x 5.6mm	12.0			65.1	
5.6 x 2.8mm	8.2			73.3	
2.8 x 1.4mm	7.4			80.7	
1.4 x 0.5mm w/w	2.2	33.5	–	82.9	33.3
0.5 w/w x 0.250mm	4.7	38.9	0.41	87.6	33.6
0.250 x 0.125mm	1.6	44.9	0.36	89.2	33.8
0.125 x 0.063mm	4.1	50.7	0.30	93.3	34.6
Minus 0.063mm	6.7	57.4	0.20	100.0	36.1

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SECTION 2:	WASHABILITY DATA.
Table 2.1:	Washability Data of 45 x 11.2mm Material (=53.1% of Total)
Table 2.2:	Washability Data on 11.2 x 0.5mm w/w Material (=29.8% of Total)
Table 2.3:	Washability Data on 0.5 w/w x 0.125mm Material (=6.3% of Total)
Table 2.4:	Calculated Washability Data on 45 x 0.5mm Material (=82.9% of Total)

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TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=53.1% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	43.6	13.6	43.6	13.6
F1.50	19.2	24.7	62.8	17.0
F1.60	7.0	33.9	69.8	18.7
F1.70	2.7	42.5	72.5	19.6
F1.80	2.2	49.3	74.7	20.5
F1.90	3.9	56.1	78.6	22.2
F2.00	2.6	62.5	81.2	23.5
S2.00	18.8	75.1	100.0	33.2

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=29.8% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	36.1	10.9	36.1	10.9
F1.50	14.9	18.6	51.0	13.1
F1.60	10.0	27.2	61.0	15.5
F1.70	6.9	36.4	67.9	17.6
F1.80	4.0	44.2	71.9	19.1
F1.90	4.1	50.9	76.0	20.8
F2.00	3.4	57.1	79.4	22.3
S2.00	20.6	76.4	100.0	33.5

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=6.3% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	12.7	4.7	12.7	4.7
F1.50	19.4	10.8	32.1	8.4
F1.60	14.8	20.0	46.9	12.1
F1.70	8.1	30.3	55.0	14.7
F1.80	4.5	39.2	59.5	16.6
F1.90	3.7	46.7	63.2	18.4
F2.00	2.8	54.3	66.0	19.9
S2.00	34.0	80.2	100.0	40.4

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=82.9% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	40.90	12.74	40.90	12.74
F1.50	17.65	22.85	58.55	15.79
F1.60	8.08	30.92	66.63	17.62
F1.70	4.21	38.91	70.84	18.89
F1.80	2.85	46.72	73.69	19.96
F1.90	3.97	54.17	77.66	21.71
F2.00	2.89	60.21	80.55	23.09
S2.00	19.45	75.60	100.00	33.31

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

Table 3.1: 45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm

Table 3.2: 22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm

Table 3.3: 11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	98.0	18.6	98.0	18.6
0.5 w/w x 0.125mm	1.9	20.9	99.9	18.6
Minus 0.125mm	0.1	24.1	100.0	18.6

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	99.3	18.4	99.3	18.4
S1.70	0.7	44.8	100.0	18.6

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	(			
S1.70	(Insufficient sample for Float/Sink Test.			

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	97.1	18.4	97.1	18.4
0.5 w/w x 0.125mm	2.6	18.7	99.7	18.4
Minus 0.125mm	0.3	19.7	100.0	18.4

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	98.6	18.0	98.6	18.0
S1.70	1.4	47.6	100.0	18.4

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	(			
S1.70	(Insufficient sample for Float/Sink Test.			

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TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	85.8	18.2	85.8	18.2
0.5 w/w x 0.125mm	12.1	16.7	97.9	18.0
Minus 0.125mm	2.1	17.6	100.0	18.0

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	96.2	17.3	96.2	17.3
S1.70	3.8	41.6	100.0	18.2

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	92.2	14.5	92.2	14.5
S1.70	7.8	43.0	100.0	16.7

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SECTION 4:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.
Table 4.1:	45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm
Table 4.2:	22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm
Table 4.3:	11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	95.6	67.9	95.6	67.9
0.5 w/w x 0.125mm	4.3	72.9	99.9	68.1
Minus 0.125mm	0.1	68.0	100.0	68.1

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	4.1	38.7	4.1	38.7
S1.70	95.9	69.1	100.0	67.9

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	3.9	17.2	3.9	17.2
S1.70	96.1	75.2	100.0	72.9

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	96.6	69.1	96.6	69.1
0.5 w/w x 0.125	2.7	68.3	99.3	69.1
Minus 0.125mm	0.7	71.1	100.0	69.1

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	2.3	38.3	2.3	38.3
S1.70	97.7	69.8	100.0	69.1

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	(			
S1.70	(Insufficient sample for Float/Sink Test.			

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	88.6	69.9	88.6	69.9
0.5 w/w x 0.125mm	8.5	68.1	97.1	69.7
Minus 0.125mm	2.9	71.3	100.0	69.8

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	0.9	31.8	0.9	31.8
S1.70	99.1	70.2	100.0	69.9

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	3.3	20.0	3.3	20.0
S1.70	96.7	69.7	100.0	68.1

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.80)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

Table 5.6: Petrographic Analysis Summary

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.80)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%		73.69
Yield of Total	%		61.09
Relative Density			1.50
Air-Dried Moisture	%		3.5
Ash	%		19.7
Volatile Matter	%		27.1
Fixed Carbon	%		49.7
Specific Energy	MJ/kg		24.54
Total Sulphur	%		0.34
Chlorine	%		0.01
Phosphorus	%		0.002
Carbon Dioxide	%		0.12
Arsenic	ppm	l.t.	1
Hardgrove Grindability Index			56
Abrasion Index	MJ/kg		14.2

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	80.87
Hydrogen	%	4.81
Nitrogen	%	1.52
Sulphur	%	0.44
Oxygen (by difference)	%	12.36

TABLE 5.3. FORMS OF SULPHUR.

Pyritic Sulphur	%		0.04
Sulphate Sulphur	%	l.t.	0.01
Organic Sulphur (by difference)	%		0.30

l.t. denotes less than

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	62.2
Aluminium	as	Al_2O_3	26.8
Titanium	as	TiO_2	0.94
Iron	as	Fe_2O_3	7.08
Calcium	as	CaO	1.35
Magnesium	as	MgO	0.97
Sodium	as	Na_2O	0.17
Potassium	as	K_2O	0.51
Manganese	as	Mn_3O_4	0.03
Phosphorus	as	P_2O_5	0.02
Sulphur	as	SO_3	0.13

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	1460
Spherical	°C	1570
Hemisphere	°C	1580
Flow	°C	1600

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	31.2%
Exinite	7.8%
Inertinite	50.2%
Minerals	10.8%
Mean Maximum Reflectance	0.74%

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

MACERAL ANALYSIS OF COAL

MACERALS						
	VITRINITE A	13.4	14.9	27.0	30.0	VITRINITE
	VITRINITE B	13.6	15.1			
	SPORINITE	2.4	2.7	3.0	3.4	EXINITE
	CUTINITE	0.2	0.2			
	RESINITE	0.4	0.5			
	MICRINITE	2.6	2.9	59.8	66.6	INERTINITE
	MACRINITE	7.2	8.0			
	SEMI-FUSINITE	27.8	31.0			
	FUSINITE	11.2	12.5			
	INERTODETRINITE	11.0	12.2			
	MINERALS *	10.2	mmf	10.2	MINERAL MATTER FREE BASIS	

SAMPLE No.... CS.42553

OPERATOR: Gail Fay

R max ~~oil~~ 0.71

n (MACERALS): 500

n (REFLECTANCE): 100

MINERALS: clay, quartz, carbonate, pyrite.

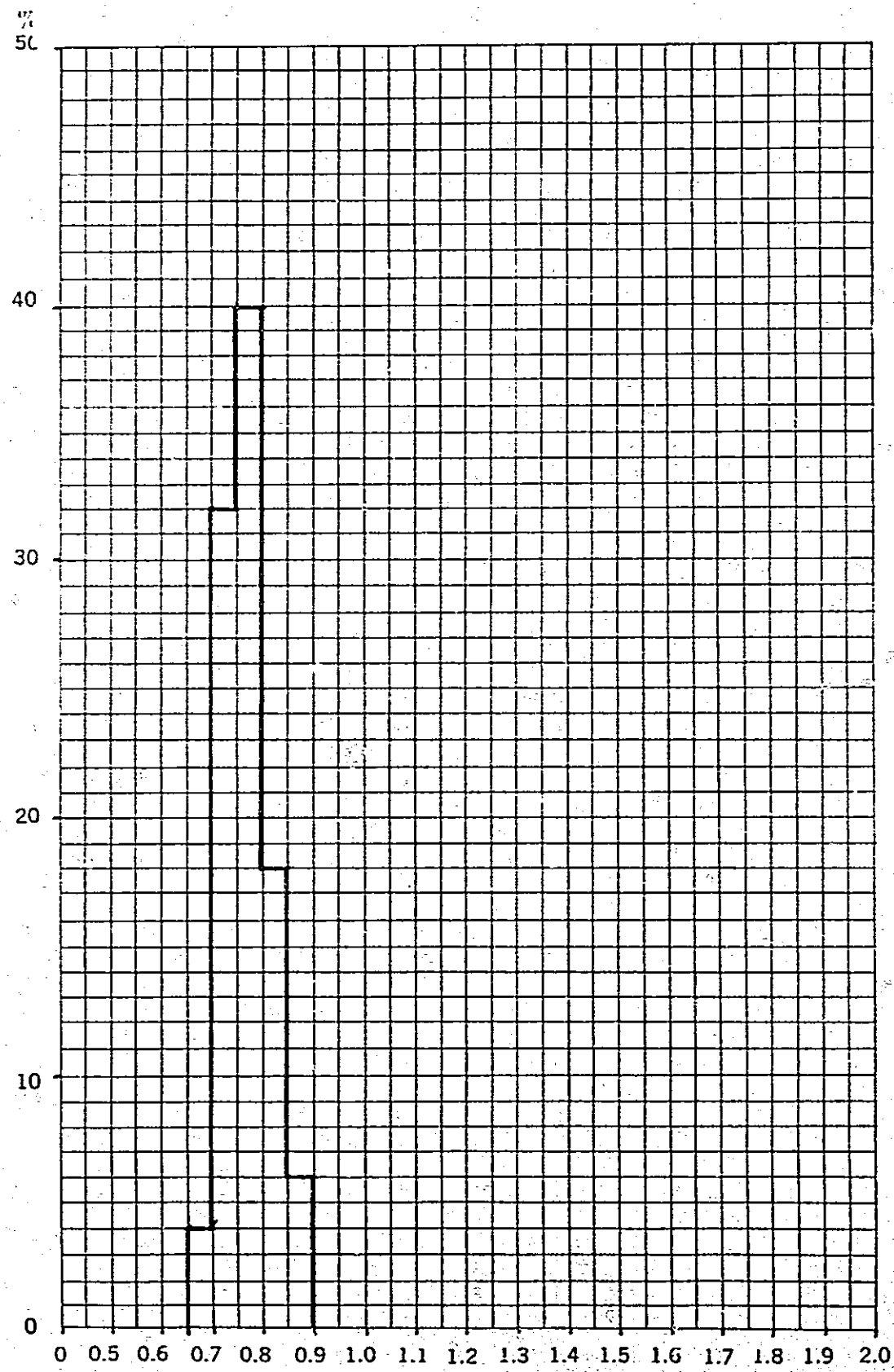
REFLECTANCE (546nm / oil refractive index 1.518)

MEAN ~~RANDOM~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.71	PERCENTAGE OF NON-REACTIVES =

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

REFLECTOGRAM

SAMPLE REFERENCE: CS.42553



0.71% Ro mean max., Vitrinite A only.

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED

PETROGRAPHIC ANALYSIS

REFLECTANCE MEASUREMENT CS.42553

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE			EXINITE	SEMI-INERT	REACTIVES	
			A	B	A + B				
5	0.50–0.55 0.55–0.60	0.525 0.575		1 8	1 8				
6	0.60–0.65 0.65–0.70	0.625 0.675	2	19 18	19 20				
7	0.70–0.75 0.75–0.80	0.725 0.775	16 20	4	20 20				
8	0.80–0.85 0.85–0.90	0.825 0.875	9 3		9 3				
9	0.90–0.95 0.95–1.00	0.925 0.975							
10	1.00–1.05 1.05–1.10	1.025 1.075							
11	1.10–1.15 1.15–1.20	1.125 1.175							
12	1.20–1.25 1.25–1.30	1.225 1.275							
13	1.30–1.35 1.35–1.40	1.325 1.375							
14	1.40–1.45 1.45–1.50	1.425 1.475							
15	1.50–1.55 1.55–1.60	1.525 1.575							
16	1.60–1.65 1.65–1.70	1.625 1.675							
17	1.70–1.75 1.75–1.80	1.725 1.775							
18	1.80–1.85 1.85–1.90	1.825 1.875							
19	1.90–1.95 1.95–2.00	1.925 1.975							
20	2.00–2.05 2.05–2.10	2.025 2.075							
21	2.10–2.15 2.15–2.20	2.125 2.175							
22	2.20–2.25 2.25–2.30	2.225 2.275							
TOTAL NUMBER OF READINGS			50	50	100				
MEAN RANDOM REFLECTANCE									
MEAN MAXIMUM REFLECTANCE					0.71				

7. GRAY 177

M2 SEAM

CASCO REPORT CS 42784 D

Washability Tests

177A M2 9201)

177A M2 9202) Seam Sample

177B M2 9251)

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

7.1

CS.42784.D

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS.920 AND 925 SAMPLE NOS. 9201, 9202 AND 9251.

CONTRACT C14-82

DATE RECEIVED: 25 January,1983.

DATE PRELIMINARY REPORT: 17 March,1983.

DATE FINAL REPORT: 30 March,1983

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

J.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia

This laboratory is registered by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration. This report may not be reproduced except in full.

CS.42784.D

INTRODUCTION

Two (2) only samples of large diameter core designated:

Sample No.	Thickness (m)
9201	0.45
9202	2.10
9251	2.49

ex Hole Nos. 930 and 935, which were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 of 25.1.1983).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF2.00)

APPENDIX: Petrographic Summary

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9201	4.69
9202	21.64
9251	23.35
TOTAL:	49.68

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

		TOTAL	9201
Air-Dried Moisture	%	6.0	4.5
Ash	%	22.5	60.9
Volatile Matter	%	24.8	-
Fixed Carbon	%	46.7	-
Relative Density		1.55	2.02
Hardgrove Grindability Index		59	-

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	70.2	70.2
22.4 x 11.2mm	13.4	83.6
11.2 x 5.6mm	6.9	90.5
5.6 x 2.8mm	3.2	93.7
2.8 x 1.4mm	2.4	96.1
Minus 1.4mm	3.9	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	41.1	41.1
22.4 x 11.2mm	17.4	58.5
11.2 x 5.6mm	15.4	73.9
5.6 x 2.8mm	8.3	82.2
2.8 x 1.4mm	5.3	87.5
Minus 1.4mm	12.5	100.0

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	35.9			35.9	
22.4 x 11.2mm	17.0	18.5	-	52.9	
11.2 x 5.6mm	14.2			67.1	18.5
5.6 x 2.8mm	8.3			75.4	
2.8 x 1.4mm	7.8			83.2	
1.4 x 0.5mm w/w	2.5	25.3	-	85.7	21.1
0.5 w/w x 0.250mm	4.7	28.8	0.63	90.4	21.5
0.250 x 0.125mm	1.6	27.4	0.72	92.0	21.6
0.125 x 0.063mm	1.5	33.4	0.51	93.5	21.8
Minus 0.063mm	6.5	42.1	0.32	100.0	23.1

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=52.9% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=32.8% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=6.3% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=85.7% of Total)

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TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=52.9% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	70.6	10.5	70.6	10.5
F1.50	9.7	20.0	80.3	11.6
F1.60	5.4	28.4	85.7	12.7
F1.70	1.5	36.3	87.2	13.1
F1.80	2.7	44.0	89.9	14.0
F1.90	3.5	51.7	93.4	15.4
F2.00	1.2	59.3	94.6	16.0
S2.00	5.4	62.7	100.0	18.5

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=32.8% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	37.8	7.6	37.8	7.6
F1.50	23.3	15.8	61.1	10.7
F1.60	8.2	23.4	69.3	12.2
F1.70	3.4	31.3	72.7	13.1
F1.80	2.3	40.6	75.0	14.0
F1.90	6.2	49.4	81.2	16.7
F2.00	6.4	55.9	87.6	19.5
S2.00	12.4	65.9	100.0	25.3

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=6.3% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	18.1	3.6	18.1	3.6
F1.50	22.5	8.4	40.6	6.3
F1.60	17.7	17.2	58.3	9.6
F1.70	3.9	25.5	62.2	10.6
F1.80	4.0	34.0	66.2	12.0
F1.90	4.7	42.6	70.9	14.0
F2.00	5.1	51.3	76.0	16.5
S2.00	24.0	64.7	100.0	28.1

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=85.7% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	58.04	9.78	58.04	9.78
F1.50	14.91	17.49	72.95	11.36
F1.60	6.47	25.98	79.42	12.56
F1.70	2.23	33.38	81.65	13.12
F1.80	2.55	42.89	84.20	14.02
F1.90	4.53	50.50	88.73	15.88
F2.00	3.19	56.69	91.92	17.30
S2.00	8.08	64.58	100.00	21.12

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SECTION 3:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.
Table 3.1:	45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm
Table 3.2:	22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm
Table 3.3:	11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
22.4 x 0.5mm w/w	97.3	12.6	97.3	12.6
0.5 w/w x 0.125mm	2.5	12.9	99.8	12.6
Minus 0.125mm	0.2	17.3	100.0	12.6

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	99.2	12.3	99.2	12.3
S1.70	0.8	49.5	100.0	12.6

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	94.8	10.7	94.8	10.7
S1.70	5.2	53.4	100.0	12.9

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	96.0	12.3	96.0	12.3
0.5 w/w x 0.125mm	3.4	13.2	99.4	12.3
Minus 0.125mm	0.6	15.3	100.0	12.3

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	98.2	11.8	98.2	11.8
S1.70	1.8	41.0	100.0	12.3

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	92.9	10.4	92.9	10.4
S1.70	7.1	49.8	100.0	13.2

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TABLE 3.3 11.2 x 0.5 w/w F'.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	88.9	11.8	88.9	11.8
0.5 w/w x 0.125mm	9.2	11.8	98.1	11.8
Minus 0.125mm	1.9	12.7	100.0	11.8

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	97.7	11.2	97.7	11.2
S1.70	2.3	35.5	2.3	11.8

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	95.7	10.3	95.7	10.3
S1.70	4.3	45.5	100.0	11.8

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.

Tabe 4.1: 45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm

Table 4.2: 22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm

Table 4.3: 11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	95.4	57.3	95.4	57.3
0.5 w/w x 0.125mm	4.5	58.7	99.9	57.4
Minus 0.125mm	0.1	59.8	100.0	57.4

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.7	34.8	1.7	34.8
S1.70	98.3	57.7	100.0	57.3

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.5	17.2	1.5	17.2
S1.70	98.5	59.3	100.0	58.7

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	96.1	57.8	96.1	57.8
0.5 w/w x 0.125	3.3	55.6	99.4	57.7
Minus 0.125mm	0.6	54.4	100.0	57.7

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	1.2	22.4	1.2	22.4
S1.70	98.8	58.2	99.2	57.8

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	5.7	16.6	5.7	16.6
S1.70	94.3	58.0	100.0	55.6

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	90.0	58.3	90.0	58.3
0.5 w/w x 0.125mm	8.2	57.1	98.2	58.2
Minus 0.125mm	1.8	55.6	100.0	58.2

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	0.6	18.7	0.6	18.7
S1.70	99.4	58.3	100.0	58.1

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	3.8	17.9	3.8	17.9
S1.70	96.2	57.1	100.0	55.6

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SECTION 5:	ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF2.00)
Table 5.1:	Laboratory Analysis
Table 5.2:	Ultimate Analysis
Table 5.3:	Forms of Sulphur
Table 5.4:	Ash Analysis (% of Ash)
Table 5.5:	Ash Fusion Characteristics (Reducing Atmosphere)
Table 5.6:	Petrographic Analysis Summary

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF2.00)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%		91.92
Yield of Total	%		78.78
Relative Density			1.49
Air-Dried Moisture	%		6.0
Ash	%		17.4
Volatile Matter	%		25.6
Fixed Carbon	%		51.0
Specific Energy	MJ/kg		24.38
Total Sulphur	%		0.33
Chlorine	%		0.02
Phosphorus	%		0.130
Carbon Dioxide	%		0.52
Arsenic	ppm	l.t.	1
Hardgrove Grindability Index			57
Abrasion Index	mg/kg		23.7

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	79.52
Hydrogen	%	4.52
Nitrogen	%	1.45
Sulphur	%	0.43
Oxygen (by difference)	%	14.08

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%		0.09
Sulphate Sulphur	%	l.t.	0.01
Organic Sulphur (by difference)	%		0.24

l.t. denotes less than

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	60.4
Aluminium	as	Al_2O_3	26.8
Titanium	as	TiO_2	1.10
Iron	as	Fe_2O_3	3.24
Calcium	as	CaO	4.18
Magnesium	as	MgO	0.95
Sodium	as	Na_2O	0.14
Potassium	as	K_2O	1.03
Manganese	as	Mn_3O_4	0.09
Phosphorus	as	P_2O_5	0.73
Sulphur	as	SO_3	1.34

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	1490
Spherical	°C	1575
Hemisphere	°C	1590
Flow	°C	1600

g.t. denotes greater than

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	31.8 %
Exinite	3.4 %
Inertinite	54.2 %
Minerals	10.6 %
Mean Maximum Reflectance	0.71%

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CS.42784.D

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

MACERAL ANALYSIS OF COAL

MACERALS						
SAMPLE No. CS.42784.D	VITRINITE A	16.4	18.4	27.2	30.5	VITRINITE
	VITRINITE B	10.8	12.1			
	SPORINITE	2.8	3.1	3.4	3.8	EXINITE
	CUTINITE	-	-			
	RESINITE	0.6	0.7			
OPERATOR: Fay	MICRINITE	3.0	3.4	58.6	65.7	INERTINITE
R max ~~max~~ 0.69	MACRINITE	7.4	8.3			
	SEMI-FUSINITE	38.0	42.6			
n (MACERALS): 500	FUSINITE	6.6	7.4			
n (REFLECTANCE): 100	INERTODETRINITE	3.6	4.0			
	MINERALS *	10.8	mmi	10.8	MINERAL MATTER FREE BASIS	
MINERALS: * Clay,quartz,carbonate,pyrite						

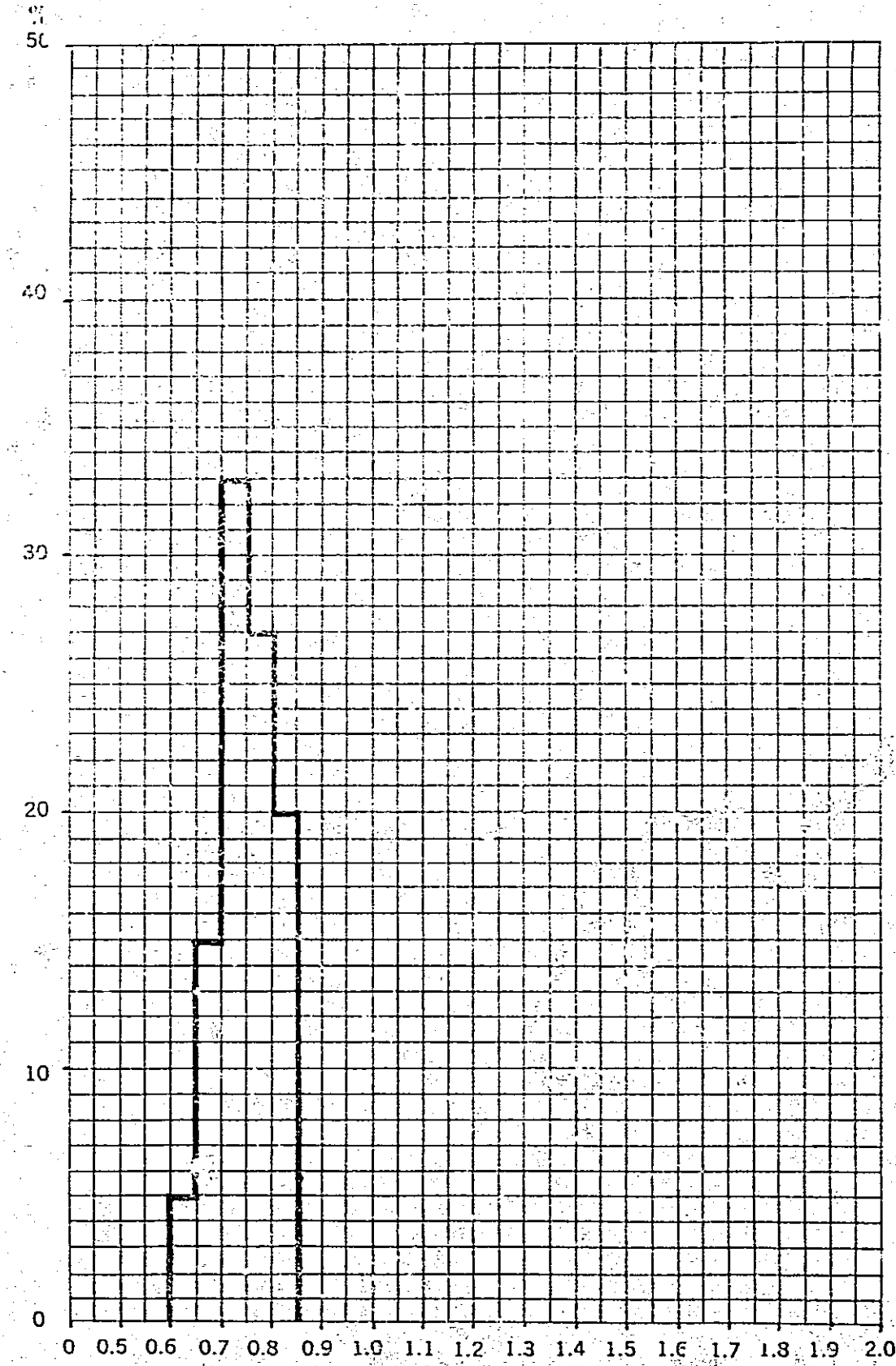
REFLECTANCE (546nm / oil refractive index 1.518)

MEAN ~~RANDOM~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.69	PERCENTAGE OF NON-REACTIVES =

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LTD.

REFLECTOGRAM

SAMPLE REFERENCE: CS.42784.D



0.69 % Ro mean max., Vitrinite A only.

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED

PETROGRAPHIC ANALYSIS

REFLECTANCE MEASUREMENT

CS.42784.D

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE A	VITRINITE B	VITRINITE A + B	EXINITE	SEMI-INERT	REACTIVES	
5	0.50–0.55	0.525		8	8				
	0.55–0.60	0.575		10	10				
6	0.60–0.65	0.625	3	12	15				
	0.65–0.70	0.675	9	10	19				
7	0.70–0.75	0.725	20		20				
	0.75–0.80	0.775	16		16				
8	0.80–0.85	0.825	12		12				
	0.85–0.90	0.875							
9	0.90–0.95	0.925							
	0.95–1.00	0.975							
10	1.00–1.05	1.025							
	1.05–1.10	1.075							
11	1.10–1.15	1.125							
	1.15–1.20	1.175							
12	1.20–1.25	1.225							
	1.25–1.30	1.275							
13	1.30–1.35	1.325							
	1.35–1.40	1.375							
14	1.40–1.45	1.425							
	1.45–1.50	1.475							
15	1.50–1.55	1.525							
	1.55–1.60	1.575							
16	1.60–1.65	1.625							
	1.65–1.70	1.675							
17	1.70–1.75	1.725							
	1.75–1.80	1.775							
18	1.80–1.85	1.825							
	1.85–1.90	1.875							
19	1.90–1.95	1.925							
	1.95–2.00	1.975							
20	2.00–2.05	2.025							
	2.05–2.10	2.075							
21	2.10–2.15	2.125							
	2.15–2.20	2.175							
22	2.20–2.25	2.225							
	2.25–2.30	2.275							
TOTAL NUMBER OF READINGS			60	40	100				
MEAN RANDOM REFLECTANCE									
MEAN MAXIMUM REFLECTANCE					0.69				

B. GRAY 177

L2 SEAM

CASCO REPORT CS 42784 E

Washability Tests

177A L2 9203)
177B L2 9252) Seam Sample

8.1

CS.42784.E

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS.920 AND 925 SAMPLE NOS. 9203 AND 9252.

CONTRACT C14-82

DATE RECEIVED: 25 January,1983.

DATE PRELIMINARY REPORT: 17 March,1983.

DATE FINAL REPORT: 30 March,1983.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia

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8.2

CS.42784.E

INTRODUCTION

Two (2) only samples of large diameter core designated:

Sample No.	Thickness (m)
9203	2.48
9252	1.71

ex Hole Nos. 930 and 935, which were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 of 25.1.1983).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF2.00)

APPENDIX: Petrographic Summary

8.3

CS.42784.E

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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CS.42784.E

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9203	18.81
9252	19.25
TOTAL:	38.06

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	4.7
Ash	%	29.7
Volatile Matter	%	22.9
Fixed Carbon	%	42.7
Relative Density		1.62
Hardgrove Grindability Index		57

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	61.3	61.3
22.4 x 11.2mm	18.4	79.7
11.2 x 5.6mm	10.7	90.4
5.6 x 2.8mm	4.5	94.9
2.8 x 1.4mm	2.2	97.1
Minus 1.4mm	2.9	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	38.9	38.9
22.4 x 11.2mm	17.2	56.1
11.2 x 5.6mm	13.6	69.7
5.6 x 2.8mm	10.6	80.3
2.8 x 1.4mm	7.3	87.6
Minus 1.4mm	12.4	100.0

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	33.2			33.2	
22.4 x 11.2mm	17.7	25.8	-	50.9	25.8
11.2 x 5.6mm	14.4			65.3	
5.6 x 2.8mm	11.1			76.4	
2.8 x 1.4mm	8.2			84.6	
1.4 x 0.5mm w/w	2.3	30.8	-	86.9	27.9
0.5 w/w x 0.250mm	3.6	29.5	0.36	90.5	27.9
0.250 x 0.125mm	1.5	31.2	0.34	92.0	28.0
0.125 x 0.063mm	2.5	40.6	0.27	94.5	28.3
Minus 0.063mm	5.5	46.1	0.23	100.0	29.3

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=50.9% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=36.0% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=5.1% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=86.9% of Total)

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TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=50.9% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	46.5	11.7	46.5	11.7
F1.50	18.0	20.0	64.5	14.0
F1.60	13.3	29.4	77.8	16.6
F1.70	8.3	39.5	86.1	18.8
F1.80	3.4	47.2	89.5	19.9
F1.90	1.3	55.4	90.8	20.4
F2.00	0.4	61.8	91.2	20.6
S2.00	8.8	79.9	100.0	25.8

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=36.0% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	30.8	8.3	30.8	8.3
F1.50	16.0	16.6	46.8	11.1
F1.60	15.4	24.7	62.2	14.5
F1.70	8.9	34.4	71.1	17.0
F1.80	6.0	42.9	77.1	19.0
F1.90	3.7	50.7	80.8	20.5
F2.00	2.8	27.1	83.6	21.7
S2.00	16.4	77.0	100.0	30.8

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CS.42784.E

TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=5.1% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	18.3	3.9	18.3	3.9
F1.50	21.0	8.7	39.3	6.5
F1.60	17.8	18.2	57.1	10.1
F1.70	6.9	27.6	64.0	12.0
F1.80	6.1	34.8	70.1	14.0
F1.90	5.5	42.5	75.6	16.1
F2.00	3.3	50.6	78.9	17.5
S2.00	21.1	72.7	100.0	29.2

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=86.9% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	40.00	10.62	40.00	10.62
F1.50	17.17	18.69	57.17	13.04
F1.60	14.17	27.28	71.34	15.87
F1.70	8.55	37.30	79.89	18.16
F1.80	4.48	44.81	84.37	19.58
F1.90	2.29	52.26	86.66	20.44
F2.00	1.39	57.89	88.05	21.03
S2.00	11.95	78.25	100.00	27.87

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

Table 3.1: 45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm

Table 3.2: 22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm

Table 3.3: 11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
22.4 x 0.5mm w/w	97.9	18.0	97.9	18.0
0.5 w/w x 0.125mm	2.0	16.3	99.9	18.0
Minus 0.125mm	0.1	20.7	100.0	18.0

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	96.6	17.1	96.6	17.1
S1.70	3.4	44.9	100.0	18.0

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	89.9	12.5	89.9	12.5
S1.70	10.1	49.7	100.0	16.3

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	96.3	17.1	96.3	17.1
0.5 w/w x 0.125mm	3.2	16.7	99.5	17.1
Minus 0.125mm	0.5	18.2	100.0	17.1

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	95.6	15.9	95.6	15.9
S1.70	4.4	42.5	100.0	17.1

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	88.4	12.6	88.4	12.6
S1.70	11.6	47.8	100.0	16.7

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TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	89.0	15.9	89.0	15.9
0.5 w/w x 0.125mm	9.2	15.9	98.2	15.9
Minus 0.125mm	1.8	16.1	100.0	15.9

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	95.0	14.7	95.0	14.7
S1.70	5.0	37.8	100.0	15.9

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	89.0	12.5	89.0	12.5
S1.70	11.0	43.2	100.0	15.9

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CS.42784.E

SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.

Tabe 4.1: 45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm

Table 4.2: 22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm

Table 4.3: 11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	97.8	66.4	97.8	66.4
0.5 w/w x 0.125mm	2.0	61.7	99.8	66.3
Minus 0.125mm	0.2	75.9	100.0	66.3

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.8	36.4	1.8	36.4
S1.70	98.2	66.9	100.0	66.4

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	2.7	17.9	2.7	17.9
S1.70	97.3	62.9	100.0	61.7

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	97.4	66.8	97.4	66.8
0.5 w/w x 0.125	1.7	67.8	99.1	66.8
Minus 0.125mm	0.9	77.0	100.0	66.9

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.0	30.7	1.0	30.7
S1.70	99.0	67.2	100.0	66.8

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	4.6	18.6	4.6	18.6
S1.70	95.4	70.2	95.4	67.8

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSES.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	89.8	67.1	89.8	67.1
0.5 w/w x 0.125mm	7.3	65.3	97.1	67.0
Minus 0.125mm	2.9	73.9	100.0	67.2

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	0.6	27.9	0.6	27.9
S1.70	99.4	67.3	100.0	67.1

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	2.9	18.4	2.9	18.4
S1.70	97.1	66.7	100.0	65.3

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CS.42784.E

SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.80)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

Table 5.6: Petrographic Analysis Summary

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CS.42784.E

SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.80)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%		84.37
Yield of Total	%		73.32
Relative Density			1.50
Air-Dried Moisture	%		5.7
Ash	%		19.5
Volatile Matter	%		24.9
Fixed Carbon	%		49.9
Specific Energy	MJ/kg		24.24
Total Sulphur	%		0.35
Chlorine	%		0.02
Phosphorus	%		0.008
Carbon Dioxide	%		0.22
Arsenic	ppm	l.t.	1
Hardgrove Grindability Index			57
Abrasion Index	mg/kg		16.2

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	80.03
Hydrogen	%	4.34
Nitrogen	%	1.43
Sulphur	%	0.47
Oxygen (by difference)	%	13.73

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%		0.03
Sulphate Sulphur	%	l.t.	0.01
Organic Sulphur (by difference)	%		0.32

l.t. denotes less than

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	60.7
Aluminium	as	Al_2O_3	31.7
Titanium	as	TiO_2	1.23
Iron	as	Fe_2O_3	2.42
Calcium	as	CaO	1.67
Magnesium	as	MgO	0.65
Sodium	as	Na_2O	0.29
Potassium	as	K_2O	0.69
Manganese	as	Mn_3O_4	0.03
Phosphorus	as	P_2O_5	0.04
Sulphur	as	SO_3	0.58

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	g.t.	1600
Spherical	°C	g.t.	1600
Hemisphere	°C	g.t.	1600
Flow	°C	g.t.	1600

g.t. denotes greater than

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	34.4 %
Exinite	4.4 %
Inertinite	50.0 %
Minerals	11.2 %
Mean Maximum Reflectance	0.71%

8.20

CS.42784.E

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

MACERAL ANALYSIS OF COAL

CASCO LABORATORIES ENGINEERING

MACERALS						
	VITRINITE A	16.8	18.9	31.6	35.5	VITRINITE
	VITRINITE B	14.8	16.6			
	SPORINITE	3.2	3.6	4.4	4.9	EXINITE
SAMPLE No. CS.42784.E	CUTINITE	0.2	0.2			
	RESINITE	1.0	1.1			
OPERATOR: Fay	MICRINITE	2.2	2.5	53.0	59.6	INERTINITE
R max ~~oxRx~~ 0.68	MACRINITE	9.6	10.8			
	SEMI-FUSINITE	31.2	35.1			
n (MACERALS): 500	FUSINITE	5.2	5.8			
n (REFLECTANCE): 100	INERTODETRINITE	4.8	5.4			
	MINERALS *	11.0	mmf	11.0	MINERAL MATTER FREE BASIS	

MINERALS: * Clay, quartz, carbonate, pyrite

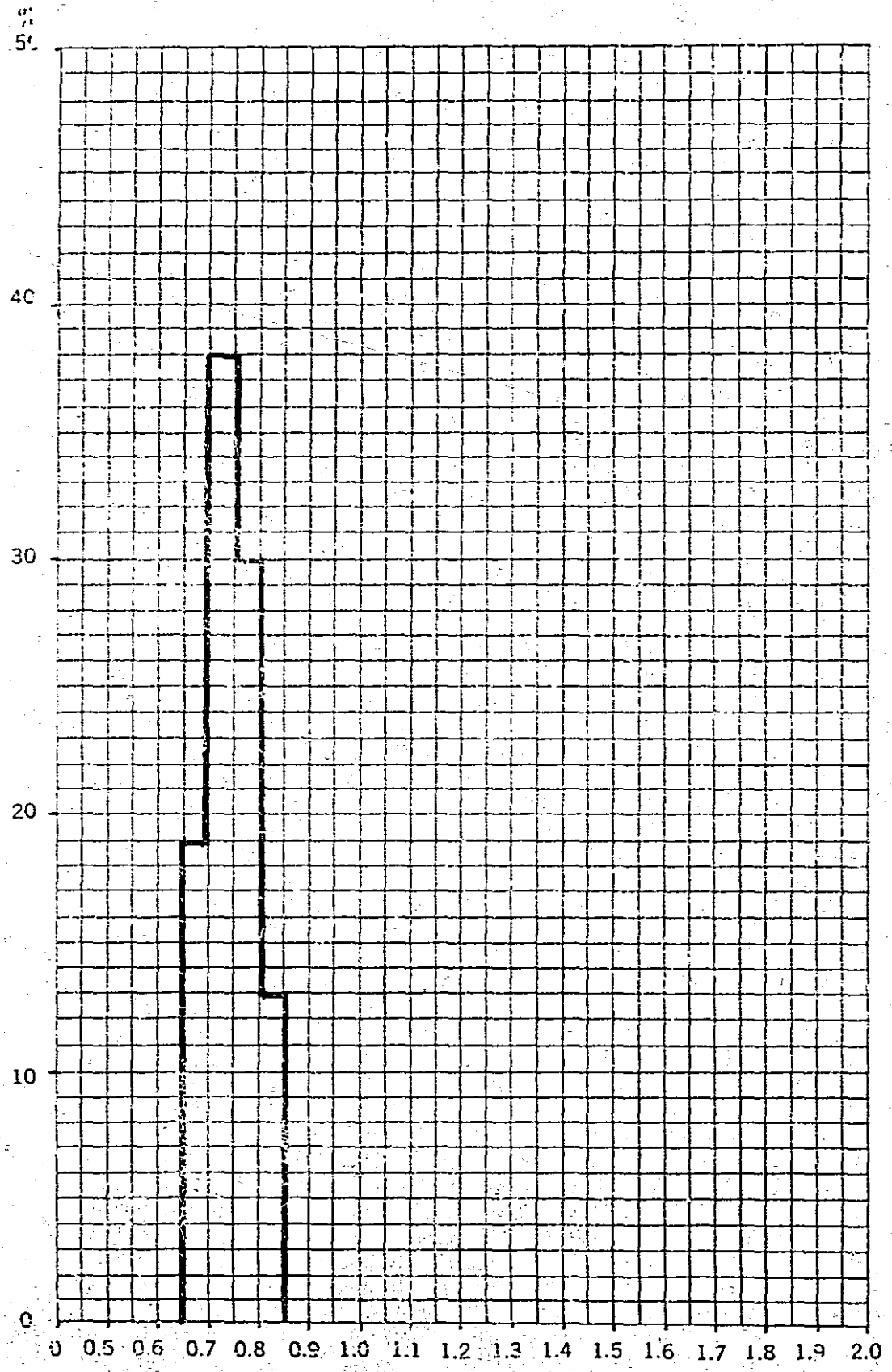
REFLECTANCE (546nm / oil refractive index 1.518)

MEAN ~~RANDOM~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.68	PERCENTAGE OF NON-REACTIVES =

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

REFLECTOGRAM

SAMPLE REFERENCE: CS.42784.E



0.66 % Rn mean max., Vitrinite A only.

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED

PETROGRAPHIC ANALYSIS

REFLECTANCE MEASUREMENT

CS.42784.E

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE A	VITRINITE B	VITRINITE A + B	EXINITE	SEMI-INERT	REACTIVES	
5	0.50–0.55 0.55–0.60	0.525 0.575		9 10	9 10				
6	0.60–0.65 0.65–0.70	0.625 0.675	10	18 10	18 20				
7	0.70–0.75 0.75–0.80	0.725 0.775	20 16		20 16				
8	0.80–0.85 0.85–0.90	0.825 0.875	7		7				
9	0.90–0.95 0.95–1.00	0.925 0.975							
10	1.00–1.05 1.05–1.10	1.025 1.075							
11	1.10–1.15 1.15–1.20	1.125 1.175							
12	1.20–1.25 1.25–1.30	1.225 1.275							
13	1.30–1.35 1.35–1.40	1.325 1.375							
14	1.40–1.45 1.45–1.50	1.425 1.475							
15	1.50–1.55 1.55–1.60	1.525 1.575							
16	1.60–1.65 1.65–1.70	1.625 1.675							
17	1.70–1.75 1.75–1.80	1.725 1.775							
18	1.80–1.85 1.85–1.90	1.825 1.875							
19	1.90–1.95 1.95–2.00	1.925 1.975							
20	2.00–2.05 2.05–2.10	2.025 2.075							
21	2.10–2.15 2.15–2.20	2.125 2.175							
22	2.20–2.25 2.25–2.30	2.225 2.275							
TOTAL NUMBER OF READINGS			53	47	100				
MEAN RANDOM REFLECTANCE									
MEAN MAXIMUM REFLECTANCE					0.68				

9. GRAY 178

M1 SEAM

CASCO REPORT CS 42784 A

Washability Tests

178A M1 9301)
178A M1 9302) Seam Sample
178A M1 9303)
178B M1 9351)

9.1

CS.42784.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS. 930 AND 935 SAMPLE NOS. 9301, 9302, 9303 AND 9351.

CONTRACT C14-82

DATE RECEIVED: 25 January, 1983.

DATE PRELIMINARY REPORT: 4 March, 1983.

DATE FINAL REPORT: 17 March, 1983.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J. Heinrich
Projects Manager

National Association of Testing Authorities, Australia

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CS.42784.A

INTRODUCTION

Four (4) only samples of large diameter core designated:

Sample No.	Thickness (m)
9301	0.33
9302	0.18
9303	1.81
9351	2.64

ex Hole Nos. 930 and 935 which were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C[illegible]-32 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 of 25.1.1983).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF1.70)

APPENDIX: Petrographic Summary

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9301	2.742
9302	2.377
9303	14.240
9351	28.632
TOTAL:	47.991

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

		COMPOSITE	9302
Air-Dried Moisture	%	5.5	15.8
Ash	%	43.1	78.5
Volatile Matter	%	20.5	-
Fixed Carbon	%	30.9	-
Relative Density		1.74	2.34
Hardgrove Grindability Index		57	-

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	60.3	60.3
22.4 x 11.2mm	14.9	75.2
11.2 x 5.6mm	10.4	85.6
5.6 x 2.8mm	4.8	90.4
2.8 x 1.4mm	3.7	94.1
Minus 1.4mm	5.9	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	38.7	38.7
22.4 x 11.2mm	18.4	57.1
11.2 x 5.6mm	14.8	71.9
5.6 x 2.8mm	10.2	82.1
2.8 x 1.4mm	6.2	88.3
Minus 1.4mm	11.7	100.0

Page 3 attached

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	31.5			31.5	
22.4 x 11.2mm	11.3	24.4	-	42.8	24.4
11.2 x 5.6mm	9.0			51.8	
5.6 x 2.8mm	6.8			58.6	
2.8 x 1.4mm	8.2			66.8	
1.4 x 0.5mm w/w	2.8	41.9	-	69.6	31.1
0.5 w/w x 0.250mm	5.7	52.2	0.32	75.3	32.7
0.250 x 0.125mm	2.0	54.7	0.26	77.3	33.3
0.125 x 0.063mm	4.1	67.3	1.45	81.4	35.0
Minus 0.063mm	18.6	79.4	0.64	100.0	43.3

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=42.8% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=26.8% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=7.7% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=69.6% of Total)

Page 5 attached

TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=42.8% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	45.7	13.9	45.7	13.9
F1.50	24.1	22.8	69.8	17.0
F1.60	10.6	32.8	80.4	19.1
F1.70	14.2	41.0	94.6	22.4
F1.80	2.4	48.4	97.0	23.0
F1.90	0.8	58.6	97.8	23.3
F2.00	0.3	68.0	98.1	23.4
S2.00	1.9	74.4	100.0	24.4

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=26.8% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	27.1	9.3	27.1	9.3
F1.50	12.1	20.3	39.2	12.7
F1.60	7.2	29.6	46.4	15.3
F1.70	9.6	38.3	56.0	19.3
F1.80	10.9	46.0	66.9	23.6
F1.90	3.3	56.8	70.2	25.2
F2.00	1.7	62.5	71.9	26.1
S2.00	28.1	82.6	100.0	41.9

Page 6 attached

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=7.7% OF TOTAL)

R.D. Fraction	Fractional Yield%	Fractional Ash%	Cumulative Yield%	Cumulative Ash%
F1.40	12.4	5.6	12.4	5.6
F1.50	6.0	13.2	18.4	8.1
F1.60	7.3	20.7	25.7	11.7
F1.70	4.7	30.8	30.4	14.6
F1.80	10.6	40.4	41.0	21.3
F1.90	6.9	48.3	47.9	25.2
F2.00	3.6	56.0	51.5	27.3
S2.00	48.5	80.0	100.0	52.9

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=69.6% OF TOTAL)

R.D.Fraction	Fractional Yield%	Fractional Ash%	Cumulative Yield%	Cumulative Ash%
F1.40	38.54	12.65	38.54	12.65
F1.50	19.48	22.20	58.02	15.86
F1.60	9.29	31.85	67.31	18.07
F1.70	12.43	40.20	79.74	21.52
F1.80	5.67	46.63	85.41	23.18
F1.90	1.76	57.30	87.17	23.87
F2.00	0.84	63.72	88.01	24.25
S2.00	11.99	81.80	100.00	31.15

Page 7 attached

SECTION 3:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.
Table 3.1:	45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm
Table 3.2:	22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm
Table 3.3:	11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	96.8	21.5	96.8	21.5
0.5 w/w x 0.125mm	2.7	21.4	99.5	21.5
Minus 0.125mm	0.5	25.7	100.0	21.5

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	97.2	20.7	97.2	20.7
S1.70	2.8	49.6	100.0	21.5

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	84.5	16.1	84.5	16.1
S1.70	15.5	50.6	100.0	21.4

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	93.2	20.7	93.2	20.7
0.5 w/w x 0.125mm	5.8	20.0	99.0	20.7
Minus 0.125mm	1.0	22.7	100.0	20.7

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	96.6	19.7	96.6	19.7
S1.70	3.4	47.9	100.0	20.7

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	87.7	15.9	87.7	15.9
S1.70	12.3	49.6	100.0	20.0

Page 10 attached

CS.42784.A

TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
5.6 x 0.5mm w/w	86.9	19.7	86.9	19.7
0.5 w/w x 0.125mm	10.4	19.3	97.3	19.7
Minus 0.125mm	2.7	20.0	100.0	19.7

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	94.8	18.4	94.8	18.4
S1.70	5.2	43.7	100.0	19.7

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	87.5	15.4	87.5	15.4
S1.70	12.5	46.7	100.0	19.3

Page 11 attached

SECTION 4:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.
Table 4.1:	45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm
Table 4.2:	22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm
Table 4.3:	11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	88.8	67.7	88.8	67.7
0.5 w/w x 0.125mm	10.6	77.5	99.4	68.7
Minus 0.125mm	0.6	61.7	100.0	68.7

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	2.6	39.3	2.6	39.3
S1.70	97.4	68.5	100.0	67.7

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	0.2	24.1	0.2	24.1
S1.70	99.8	77.6	100.0	77.5

Page 13 attached

CS.42784.A

TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	97.2	68.6	97.2	68.6
0.5 w/w x 0.125	2.7	66.4	99.9	68.5
Minus 0.125mm	0.1	59.9	100.0	68.5

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.4	38.3	1.4	38.3
S1.70	98.6	69.0	100.0	68.6

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	5.7	22.7	5.7	22.7
S1.70	94.3	69.0	100.0	66.4

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CS.42784.A

TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	92.0	69.5	92.0	69.5
0.5 w/w x 0.125mm	7.1	63.6	99.1	69.1
Minus 0.125mm	0.9	59.3	100.0	69.0

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	4.6	33.3	4.6	33.3
S1.70	95.4	71.2	100.0	69.5

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	4.1	21.1	4.1	21.1
S1.70	95.9	65.4	100.0	63.6

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CS.42784.A

SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.90)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

Table 5.6: Petrographic Analysis Summary

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE
(45 x 0.5mm w/w CF1.70)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%	79.74
Yield of Total	%	55.50
Relative Density		1.50
Air-Dried Moisture	%	5.6
Ash	%	21.3
Volatile Matter	%	27.8
Fixed Carbon	%	45.3
Specific Energy	MJ/kg	23.98
Total Sulphur	%	0.43
Chlorine	%	0.02
Phosphorus	%	0.009
Carbon Dioxide	%	0.63
Arsenic	ppm	l.t. 1
Hardgrove Grindability Index		46
Abrasion Index	mg/kg	25.0

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	80.48
Hydrogen	%	5.11
Nitrogen	%	1.53
Sulphur	%	0.59
Oxygen (by difference)	%	12.29

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%		0.08
Sulphate Sulphur	%	l.t.	0.01
Organic Sulphur (by difference)	%		0.35

l.t. denotes less than

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	63.4
Aluminium	as	Al_2O_3	24.5
Titanium	as	TiO_2	0.77
Iron	as	Fe_2O_3	6.7
Calcium	as	CaO	1.30
Magnesium	as	MgO	1.88
Sodium	as	Na_2O	0.30
Potassium	as	K_2O	0.70
Manganese	as	Mn_3O_4	0.04
Phosphorus	as	P_2O_5	0.04
Sulphur	as	SO_3	0.37

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	1310
Spherical	°C	1460
Hemisphere	°C	1490
Flow	°C	1530

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	35.8 %
Exinite	10.0 %
Inertinite	42.4 %
Minerals	11.8 %
Mean Maximum Reflectance	0.70%

9.20

CS.42784.A

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

MACERAL ANALYSIS OF COAL

MACERALS						
SAMPLE No... CS.42784.A	VITRINITE A	16.0	17.9	31.2	34.9	VITRINITE
	VITRINITE B	15.2	17.0			
	SPORINITE	7.0	7.9	9.4	10.6	EXINITE
	CUTINITE	0.8	0.9			
	RESINITE	1.6	1.8			
OPERATOR: Fay	MICRINITE	1.8	2.0	48.6	54.5	INERTINITE
R max ~~on Ox~~ 0.68	MACRINITE	7.0	7.9			
	SEMI-FUSINITE	28.2	31.6			
n (MACERALS): 500	FUSINITE	6.4	7.2			
n (REFLECTANCE): 100	INERTODETRINITE	5.2	5.8			
	MINERALS *	10.8	mmf	10.8	MINERAL MATTER FREE BASIS	
MINERALS: * Clay,quartz,carbonate,pyrite						

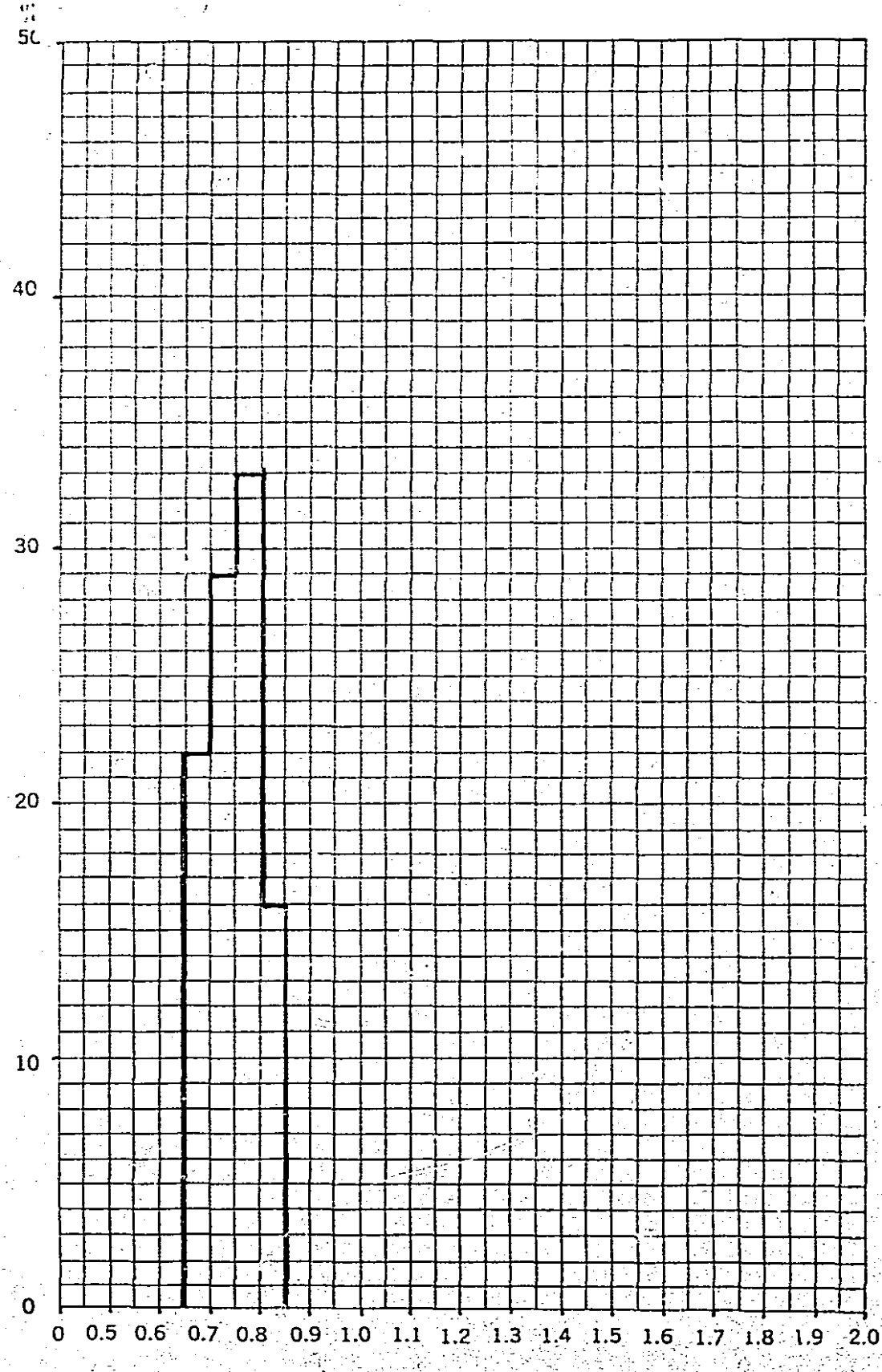
REFLECTANCE (546nm / oil refractive index 1.518)

MEAN ~~RANDOM~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.68	PERCENTAGE OF NON-REACTIVES =

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

REFLECTOGRAM

SAMPLE REFERENCE: CS.42784.A



0.68 % Ro mean max. vitrinite A only.

9.23

PETROGRAPHIC ANALYSIS

REFLECTANCE MEASUREMENT

CS.42784.A

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE			EXINITE	SEMI-INERT	REACTIVES	
			A	B	A + B				
5	0.50–0.55 0.55–0.60	0.525 0.575		6 16	6 16				
6	0.60–0.65 0.65–0.70	0.625 0.675	11	18 9	18 20				
7	0.70–0.75 0.75–0.80	0.725 0.775	15 17		15 17				
8	0.80–0.85 0.85–0.90	0.825 0.875	8		8				
9	0.90–0.95 0.95–1.00	0.925 0.975							
10	1.00–1.05 1.05–1.10	1.025 1.075							
11	1.10–1.15 1.15–1.20	1.125 1.175							
12	1.20–1.25 1.25–1.30	1.225 1.275							
13	1.30–1.35 1.35–1.40	1.325 1.375							
14	1.40–1.45 1.45–1.50	1.425 1.475							
15	1.50–1.55 1.55–1.60	1.525 1.575							
16	1.60–1.65 1.65–1.70	1.625 1.675							
17	1.70–1.75 1.75–1.80	1.725 1.775							
18	1.80–1.85 1.85–1.90	1.825 1.875							
19	1.90–1.95 1.95–2.00	1.925 1.975							
20	2.00–2.05 2.05–2.10	2.025 2.075							
21	2.10–2.15 2.15–2.20	2.125 2.175							
22	2.20–2.25 2.25–2.30	2.225 2.275							
TOTAL NUMBER OF READINGS			51	49	100				
MEAN RANDOM REFLECTANCE									
MEAN MAXIMUM REFLECTANCE					0.68				

10. GRAY 178

M2 SEAM

CASCO REPORT CS 42784 B

Washability Tests

178A M2 9304)
178B M2 9352) Seam Sample

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

10.1

CS.42784.B

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS.930 AND 935 SAMPLE NOS. 9304 AND 9352.

CONTRACT C14-82

DATE RECEIVED: 25 January,1983.

DATE PRELIMINARY REPORT: 4 March,1983.

DATE FINAL REPORT: 17 March,1983.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia

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10.2

CS.42784.B

INTRODUCTION

Two (2) only samples of large diameter core designated:

Sample No.	Thickness (m)
9304	2.55
9352	2.79

ex Hole Nos. 930 and 935, which were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 of 25.1.1983).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF2.00)

APPENDIX: Petrographic Summary

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9304	21.083
9352	26.946
TOTAL	48.029

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	5.8
Ash	%	26.6
Volatile Matter	%	25.3
Fixed Carbon	%	42.3
Relative Density		1.60
Hardgrove Grindability Index		55

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	57.0	57.0
22.4 x 11.2mm	21.8	78.8
11.2 x 5.6mm	9.0	87.8
5.6 x 2.8mm	5.3	93.1
2.8 x 1.4mm	2.8	95.9
Minus 1.4mm	4.1	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	38.2	38.2
22.4 x 11.2mm	18.1	56.3
11.2 x 5.6mm	14.7	71.0
5.6 x 2.8mm	10.6	81.6
2.8 x 1.4mm	6.9	88.5
Minus 1.4mm	11.5	100.0

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	32.9	21.7	-	32.9	
22.4 x 11.2mm	19.2			52.1	21.7
11.2 x 5.6mm	14.1			66.2	
5.6 x 2.8mm	9.8			76.0	
2.8 x 1.4mm	8.1			84.1	
1.4 x 0.5mm w/w	3.1	27.6	-	87.2	24.1
0.5 w/w x 0.250mm	3.7	28.5	0.36	90.9	24.2
0.250 x 0.125mm	1.6	28.6	0.39	92.5	24.3
0.125 x 0.063mm	1.6	34.4	0.36	94.1	24.5
Minus 0.063mm	5.9	48.2	0.22	100.0	25.9

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=52.1% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=35.1% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=5.3% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=87.2% of Total)

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TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=52.1% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	59.9	10.2	59.9	10.2
F1.50	13.7	21.9	73.6	12.4
F1.60	8.7	30.1	82.3	14.3
F1.70	5.3	38.3	87.6	15.7
F1.80	2.2	46.4	89.8	16.5
F1.90	2.0	54.5	91.8	17.3
F2.00	1.7	62.3	93.5	18.1
S2.00	6.5	73.0	100.0	21.7

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=35.1% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	41.3	8.6	41.3	8.6
F1.50	14.2	16.5	55.5	10.6
F1.60	12.4	25.0	67.9	13.2
F1.70	6.3	35.0	74.2	15.1
F1.80	3.8	44.6	78.0	16.5
F1.90	3.9	51.6	81.9	18.2
F2.00	3.5	58.2	85.4	19.8
S2.00	14.6	73.2	100.0	27.6

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=5.3% OF TOTAL)

R.D. Fraction	Fractional Yield%	Fractional Ash%	Cumulative Yield%	Cumulative Ash%
F1.40	23.4	3.8	23.4	3.8
F1.50	22.6	8.6	46.0	6.2
F1.60	13.1	17.6	59.1	8.7
F1.70	5.6	27.0	64.7	10.3
F1.80	4.4	35.2	69.1	11.9
F1.90	3.9	44.7	73.0	13.6
F2.00	4.2	53.0	77.2	15.8
S2.00	22.8	71.7	100.0	28.5

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=87.2% OF TOTAL)

R.D.Fraction	Fractional Yield%	Fractional Ash%	Cumulative Yield%	Cumulative Ash%
F1.40	52.41	9.69	52.41	9.69
F1.50	13.90	19.68	66.31	11.79
F1.60	10.19	27.60	76.50	13.89
F1.70	5.70	36.83	82.20	15.48
F1.80	2.85	45.43	85.05	16.49
F1.90	2.76	52.86	87.81	17.63
F2.00	2.43	59.92	90.24	18.77
S2.00	9.76	73.12	100.00	24.07

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

Table 3.1: 45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm

Table 3.2: 22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm

Table 3.3: 11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	96.6	15.4	96.6	15.4
0.5 w/w x 0.125mm	2.8	14.3	99.4	15.4
Minus 0.125mm	0.6	17.1	100.0	15.4

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	98.5	14.8	98.5	14.8
S1.70	1.5	52.1	100.0	15.4

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	92.1	10.7	92.1	10.7
S1.70	7.9	55.7	100.0	14.3

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	95.1	14.8	95.1	14.8
0.5 w/w x 0.125mm	4.1	14.3	99.2	14.8
Minus 0.125mm	0.8	15.1	100.0	14.8

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	97.4	14.0	97.4	14.0
S1.70	2.6	43.8	100.0	14.8

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	90.7	10.9	90.7	10.9
S1.70	9.3	47.1	100.0	14.3

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TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	86.1	14.0	86.1	14.0
0.5 w/w x 0.125mm	10.7	14.1	96.8	14.0
Minus 0.125mm	3.2	13.5	100.0	14.0

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	94.4	12.6	94.4	12.6
S1.70	5.6	38.0	100.0	14.0

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	92.2	11.4	92.2	11.4
S1.70	7.8	45.7	100.0	14.1

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CS.42784.B

SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.

Tabe 4.1: 45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm

Table 4.2: 22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm

Table 4.3: 11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	95.4	63.3	95.4	63.3
0.5 w/w x 0.125mm	4.5	63.5	99.9	63.3
Minus 0.125mm	0.1	63.8	100.0	63.3

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	2.5	32.4	2.5	32.4
S1.70	97.5	64.1	100.0	63.3

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	3.8	20.6	3.8	20.6
S1.70	96.2	65.2	100.0	63.5

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	96.6	64.2	96.6	64.2
0.5 w/w x 0.125	3.0	61.9	99.6	64.1
Minus 0.125mm	0.4	61.7	100.0	64.1

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	0.8	29.8	0.8	29.8
S1.70	99.2	64.5	99.2	64.2

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	8.1	19.6	8.1	19.6
S1.70	91.9	65.6	100.0	61.9

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	88.6	64.9	88.6	64.9
0.5 w/w x 0.125mm	9.3	61.7	97.9	64.6
Minus 0.125mm	2.1	59.1	100.0	64.5

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	0.4	29.1	0.4	29.1
S1.70	99.6	65.0	100.0	64.9

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	4.7	18.9	4.7	18.9
S1.70	95.3	63.8	100.0	61.7

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.90)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

Table 5.6: Petrographic Analysis Summary

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF1.70)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%		90.24
Yield of Total	%		78.69
Relative Density			1.51
Air-Dried Moisture	%		4.9
Ash	%		18.6
Volatile Matter	%		26.5
Fixed Carbon	%		50.0
Specific Energy	MJ/kg		24.78
Total Sulphur	%		0.36
Chlorine	%		0.02
Phosphorus	%		0.007
Carbon Dioxide	%		0.54
Arsenic	ppm	l.t.	1
Hardgrove Grindability Index			54
Abrasion Index	mg/kg		19.00

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	79.87
Hydrogen	%	4.56
Nitrogen	%	1.44
Sulphur	%	0.47
Oxygen (by difference)	%	13.66

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%		0.02
Sulphate Sulphur	%	l.t.	0.01
Organic Sulphur (by difference)	%		0.34

l.t. denotes less than

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	61.2
Aluminium	as	Al_2O_3	31.5
Titanium	as	TiO_2	1.04
Iron	as	Fe_2O_3	2.71
Calcium	as	CaO	1.36
Magnesium	as	MgO	0.70
Sodium	as	Na_2O	0.31
Potassium	as	K_2O	0.65
Manganese	as	Mn_3O_4	0.07
Phosphorus	as	P_2O_5	0.04
Sulphur	as	SO_3	0.42

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C		1570
Spherical	°C	g.t.	1600
Hemisphere	°C	g.t.	1600
Flow	°C	g.t.	1600

g.t. denotes greater than

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	35.2 %
Exinite	8.2 %
Inertinite	46.2 %
Minerals	10.4 %
Mean Maximum Reflectance	0.73%

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

10.20

CS.42784.B

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

MACERAL ANALYSIS OF COAL

MACERALS						
	VITRINITE A	16.0	17.9	30.6	34.2	VITRINITE
	VITRINITE B	14.6	16.3			
	SPORINITE	6.2	6.9	8.2	9.1	EXINITE
	CUTINITE	0.8	0.9			
	RESINITE	1.2	1.3			
	MICRINITE	1.4	1.6	50.6	56.7	INERTINITE
	MACRINITE	6.8	7.6			
	SEMI-FUSINITE	32.6	36.5			
	FUSINITE	6.8	7.6			
	INERTODETRINITE	3.0	3.4			
	MINERALS *	10.6	mmf	10.6	MINERAL MATTER FREE BASIS	

SAMPLE No. CS.42784.B

OPERATOR: Ray

R max ~~random~~: 0.70

n (MACERALS): 500

n (REFLECTANCE): 100

MINERALS: * Clay, quartz, carbonate, pyrite

REFLECTANCE (546nm / oil refractive index 1.518)

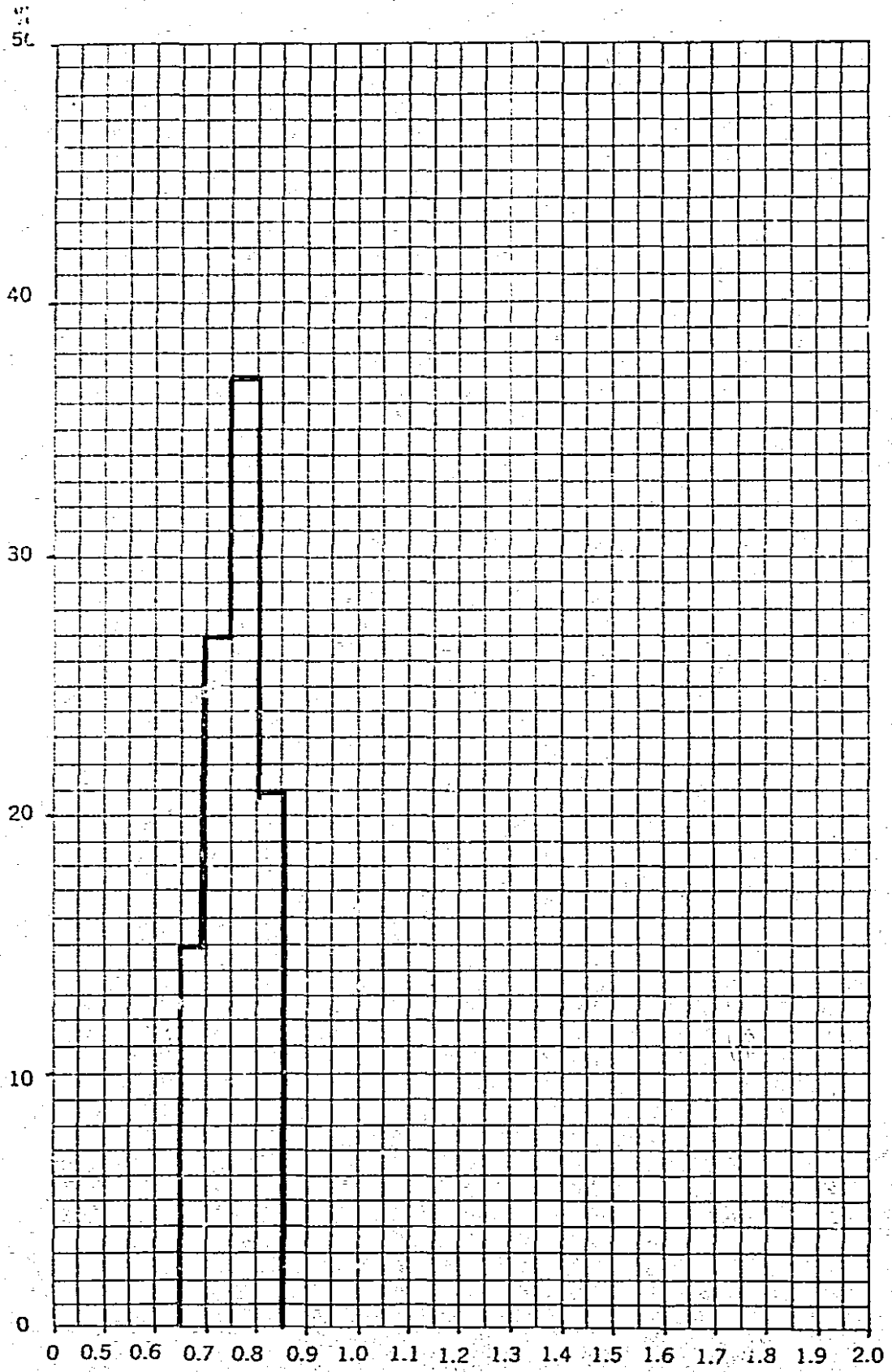
MEAN ~~RANDOM~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.70	PERCENTAGE OF NON-REACTIVES =

10.22

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

REFLECTOGRAM

SAMPLE REFERENCE: CS.42784.B



0.70 % Ro mean max. Vitrinite A only.

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED

10.23

PETROGRAPHIC ANALYSIS

REFLECTANCE MEASUREMENT

CS.42784.B

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE			EXINITE	SEMI-INERT	REACTIVES	
			A	B	A + B				
5	0.50–0.55 0.55–0.60	0.525 0.575		4 6	4 6				
6	0.60–0.65 0.65–0.70	0.625 0.675	8	22 15	22 23				
7	0.70–0.75 0.75–0.80	0.725 0.775	14 19	1	15 19				
8	0.80–0.85 0.85–0.90	0.825 0.875	11		11				
9	0.90–0.95 0.95–1.00	0.925 0.975							
10	1.00–1.05 1.05–1.10	1.025 1.075							
11	1.10–1.15 1.15–1.20	1.125 1.175							
12	1.20–1.25 1.25–1.30	1.225 1.275							
13	1.30–1.35 1.35–1.40	1.325 1.375							
14	1.40–1.45 1.45–1.50	1.425 1.475							
15	1.50–1.55 1.55–1.60	1.525 1.575							
16	1.60–1.65 1.65–1.70	1.625 1.675							
17	1.70–1.75 1.75–1.80	1.725 1.775							
18	1.80–1.85 1.85–1.90	1.825 1.875							
19	1.90–1.95 1.95–2.00	1.925 1.975							
20	2.00–2.05 2.05–2.10	2.025 2.075							
21	2.10–2.15 2.15–2.20	2.125 2.175							
22	2.20–2.25 2.25–2.30	2.225 2.275							
TOTAL NUMBER OF READINGS			52	48	100				
MEAN RANDOM REFLECTANCE									
MEAN MAXIMUM REFLECTANCE					0.70				

11. GRAY 178

L2 SEAM

CASCO REPORT CS 42784 C

Washability Tests

178A L2 9305)
178B L2 9353) Seam Sample

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

11.1

CS.42784.C

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: PRETREATMENT, FLOAT/SINK TESTING AND ANALYSIS OF LARGE DIAMETER CORE - HOLE NOS.930 AND 935 SAMPLE NOS. 9305 AND 9353.

CONTRACT C14-82

DATE RECEIVED: 25 January,1983.

DATE PRELIMINARY REPORT: 17 March,1983.

DATE FINAL REPORT: 30 March,1983.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities Australia

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11.2

CS.42784.C

INTRODUCTION

Two (2) only samples of large diameter core designated:

Sample No.	Thickness (m)
9305	3.11
9353	2.90

ex Hole Nos. 930 and 935, which were received at our NATA Registered Sydney Laboratory for pretreatment, float/sink testing and analysis according to CONTRACT C14-82 VARIATION 1 (Amended Type 3 Analysis).

METHOD:

The above samples of large diameter core were treated as instructed (Letter KTE/23 of 25.1.1983).

Pretreatment, float/sink testing, preparation and analyses were performed according to relevant Australian Standard Methods.

TABLE OF CONTENTS

Section 1: Raw Coal Analysis & Pretreatment.

Section 2: Washability Data.

Section 3: Liberation Tests: 45 x 0.5mm w/w Size Fraction CF1.70 Product.

Section 4: Liberation Tests: 45 x 0.5mm w/w Size Fraction S1.70 Product.

Section 5: Analysis of Washed Coal Composite (45 x 0.5mm w/w CF2.00)

APPENDIX: Petrographic Summary

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CS.42784.C

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

Table 1.1: Sample Numbers and Air-Dried Masses.

Table 1.2: Raw Coal Analysis.

Table 1.3: Initial Size Analysis.

Table 1.4: Synthetic Plant Feed Size Analysis.

Table 1.5: Size Analysis & Raw Coal Data after Drum Tumbling.

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CS.42784.C

SECTION 1: RAW COAL ANALYSIS & PRETREATMENT

TABLE 1.1: SAMPLE NUMBERS AND AIR-DRIED MASSES.

Sample No.	Mass (kg)
9305	27.43
9353	26.76
TOTAL:	54.19

TABLE 1.2: RAW COAL ANALYSIS (Air-Dried Basis)

Air-Dried Moisture	%	4.9
Ash	%	26.5
Volatile Matter	%	23.7
Fixed Carbon	%	44.9
Relative Density		1.59
Hardgrove Grindability Index		57

TABLE 1.3: INITIAL SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	50.2	50.2
22.4 x 11.2mm	19.0	69.2
11.2 x 5.6mm	11.4	80.6
5.6 x 2.8mm	6.7	87.3
2.8 x 1.4mm	4.9	92.2
Minus 1.4mm	7.8	100.0

TABLE 1.4: SYNTHETIC PLANT FEED SIZE ANALYSIS.

Size Fraction	Mass %	Cum.Mass %
45 x 22.4mm	35.3	35.3
22.4 x 11.2mm	18.0	53.3
11.2 x 5.6mm	15.3	68.6
5.6 x 2.8mm	11.1	79.7
2.8 x 1.4mm	7.6	87.3
Minus 1.4mm	12.7	100.0

Page 3 attached

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TABLE 1.5: SIZE ANALYSIS AND RAW COAL DATA AFTER DRUM TUMBLING.

Size Fraction	Fractional Mass%	Fractional Ash%	Fractional T.S.%	Cumulative Mass%	Cumulative Ash%
45 x 22.4mm	30.7			30.7	
22.4 x 11.2mm	18.2	27.6	-	48.9	27.6
11.2 x 5.6mm	16.1			65.0	
5.6 x 2.8mm	10.4			75.4	
2.8 x 1.4mm	8.1			83.5	
1.4 x 0.5mm w/w	3.2	25.0	-	86.7	26.5
0.5 w/w x 0.250mm	4.3	24.3	0.55	91.0	26.4
0.250 x 0.125mm	1.1	25.9	0.47	92.1	26.4
0.125 x 0.063mm	2.7	35.2	0.35	94.8	26.6
Minus 0.063mm	5.2	26.9	0.24	100.0	27.1

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SECTION 2: WASHABILITY DATA.

Table 2.1: Washability Data of 45 x 11.2mm Material (=48.9% of Total)

Table 2.2: Washability Data on 11.2 x 0.5mm w/w Material (=37.8% of Total)

Table 2.3: Washability Data on 0.5 w/w x 0.125mm Material (=5.4% of Total)

Table 2.4: Calculated Washability Data on 45 x 0.5mm Material (=86.7% of Total)

Page 5 attached

TABLE 2.1: WASHABILITY DATA ON 45 x 11.2mm MATERIAL (=48.9% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	54.2	12.8	54.2	12.8
F1.50	12.4	23.1	66.6	14.7
F1.60	9.1	31.3	75.7	16.7
F1.70	5.3	39.6	81.0	18.2
F1.80	3.1	46.9	84.1	19.3
F1.90	2.1	53.9	86.2	20.1
F2.00	1.7	57.7	87.9	20.8
S2.00	12.1	76.4	100.0	27.6

TABLE 2.2: WASHABILITY DATA ON 11.2 x 0.5mm w/w MATERIAL (=37.8% OF TOTAL).

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	42.4	7.9	42.4	7.9
F1.50	17.1	15.9	59.5	10.2
F1.60	9.2	23.8	68.7	12.0
F1.70	8.2	32.8	76.9	14.2
F1.80	5.3	41.7	82.2	16.0
F1.90	3.6	48.6	85.8	17.4
F2.00	2.3	56.0	88.1	18.4
S2.00	11.9	74.3	100.0	25.0

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TABLE 2.3: WASHABILITY DATA ON 0.5 w/w x 0.125mm MATERIAL (=5.4% OF TOTAL)

R.D. Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	24.7	3.4	24.7	3.4
F1.50	25.3	9.4	50.0	6.4
F1.60	15.2	17.8	65.2	9.1
F1.70	5.5	26.4	70.7	10.4
F1.80	5.8	35.1	76.5	12.3
F1.90	4.9	43.0	81.4	14.2
F2.00	3.0	50.6	84.4	15.4
S2.00	15.6	74.0	100.0	24.6

TABLE 2.4: CALCULATED WASHABILITY DATA ON 45 x 0.5mm w/w MATERIAL (=86.7% OF TOTAL)

R.D.Fraction	Fractional		Cumulative	
	Yield%	Ash%	Yield%	Ash%
F1.40	49.06	10.95	49.06	10.95
F1.50	14.45	19.38	63.51	12.87
F1.60	9.14	28.01	72.65	14.77
F1.70	6.56	35.90	79.21	16.52
F1.80	4.06	43.94	83.27	17.86
F1.90	2.75	50.88	86.02	18.92
F2.00	1.96	56.83	87.98	19.76
S2.00	12.02	75.49	100.00	26.46

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SECTION 3:	LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.
Table 3.1:	45 x 0.5mm w/w CF1.70 Product Crushed to Minus 22.4mm
Table 3.2:	22.4 x 0.5mm w/w F1.70 Product Crushed to Minus 11.2mm
Table 3.3:	11.2 x 0.5 w/w F1.70 Product Crushed to Minus 5.6mm

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SECTION 3: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION CF1.70 PRODUCT.

TABLE 3.1: 45 x 0.5mm w/w CF1.70 PRODUCT CRUSHED TO MINUS 22.4mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	97.4	16.4	97.4	16.4
0.5 w/w x 0.125mm	2.5	13.6	99.9	16.3
Minus 0.125mm	0.1	18.0	100.0	16.3

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	98.1	15.8	98.1	15.8
S1.70	1.9	48.5	100.0	16.4

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	93.4	11.0	93.4	11.0
S1.70	6.6	51.0	100.0	13.6

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TABLE 3.2: 22.4 x 0.5mm w/w F1.70 PRODUCT CRUSHED TO MINUS 11.2mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
11.2 x 0.5mm w/w	93.1	15.9	93.1	15.9
0.5 w/w x 0.125mm	5.6	14.7	98.7	15.8
Minus 0.125mm	1.3	14.9	100.0	15.8

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

R.D. Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	95.9	14.7	95.9	14.7
S1.70	4.1	44.1	100.0	15.9

(C) WASHABILITY DATA ON 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	90.3	11.6	90.3	11.6
S1.70	9.7	43.8	100.0	14.7

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TABLE 3.3 11.2 x 0.5 w/w F1.70 PRODUCT CRUSHED TO MINUS 5.6

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	89.9	14.8	89.9	14.8
0.5 w/w x 0.125mm	8.3	14.0	98.2	14.7
Minus 0.125mm	1.8	14.3	100.0	14.7

(B) 5.6 x 0.5 w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	93.6	13.2	93.6	13.2
S1.70	6.4	38.3	100.0	14.8

(C) 0.5 w/w x 0.125 SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	92.4	11.6	92.4	11.6
S1.70	7.6	43.8	100.0	14.0

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION S1.70 PRODUCT.

Tabe 4.1: 45 x 0.5mm w/w S1.70 Product Crushed to Minus 22.4mm

Table 4.2: 22.4 x 0.5mm w/w S1.70 Product Crushed to Minus 11.2mm

Table 4.3: 11.2 x 0.5 w/w S1.70 Product Crushed to Minus 5.6mm

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SECTION 4: LIBERATION TESTS: 45 x 0.5mm w/w SIZE FRACTION SINKS 1.70 PRODUCT.

TABLE 4.1: 45 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 22.4mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
22.4 x 0.5mm w/w	97.3	64.7	97.3	64.7
0.5 w/w x 0.125mm	2.6	59.4	99.9	64.6
Minus 0.125mm	0.1	71.1	100.0	64.6

(B) WASHABILITY DATA ON 22.4 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	2.9	37.4	2.9	37.4
S1.70	97.1	65.5	100.0	64.7

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	3.3	15.6	3.3	15.6
S1.70	96.7	60.9	100.0	59.4

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TABLE 4.2: 22.4 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 11.2mm

(A) SIZE ANALYSIS.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
11.2 x 0.5mm w/w	95.9	65.6	95.9	65.6
0.5 w/w x 0.125	3.3	61.5	99.2	65.5
Minus 0.125mm	0.8	67.9	100.0	65.5

(B) WASHABILITY DATA ON 11.2 x 0.5mm w/w SIZE FRACTION.

Size Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	1.5	30.0	1.5	30.0
S1.70	98.5	66.1	98.5	65.6

(C) 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional Mass%	Fractional Ash%	Cumulative Mass%	Cumulative Ash%
F1.70	6.9	17.8	6.9	17.8
S1.70	93.1	64.7	100.0	61.5

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TABLE 4.3: 11.2 x 0.5mm w/w S1.70 PRODUCT CRUSHED TO MINUS 5.6mm.

(A) SIZE ANALYSIS.

Size Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
5.6 x 0.5mm w/w	89.8	66.2	89.8	66.2
0.5 w/w x 0.125mm	7.9	64.2	97.7	66.0
Minus 0.125mm	2.3	68.8	100.0	66.1

(B) WASHABILITY DATA ON 5.6 x 0.5mm w/w SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	0.7	26.8	0.7	26.8
S1.70	99.3	66.5	100.0	66.2

(C) WASHABILITY DATA ON 0.5 w/w x 0.125mm SIZE FRACTION.

R.D.Fraction	Fractional		Cumulative	
	Mass%	Ash%	Mass%	Ash%
F1.70	3.4	18.4	3.4	18.4
S1.70	96.6	65.8	100.0	64.2

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE (45 x 0.5mm w/w CF2.00)

Table 5.1: Laboratory Analysis

Table 5.2: Ultimate Analysis

Table 5.3: Forms of Sulphur

Table 5.4: Ash Analysis (% of Ash)

Table 5.5: Ash Fusion Characteristics (Reducing Atmosphere)

Table 5.6: Petrographic Analysis Summary

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SECTION 5: ANALYSIS OF WASHED COAL COMPOSITE
(45 x 0.5mm w/w CF2.00)

TABLE 5.1: LABORATORY ANALYSIS (Air-Dried Basis)

Yield of Size Fraction	%	87.98
Yield of Total	%	76.28
Relative Density		1.52
Air-Dried Moisture	%	5.1
Ash	%	19.6
Volatile Matter	%	25.5
Fixed Carbon	%	49.8
Specific Energy	MJ/kg	24.22
Total Sulphur	%	0.33
Chlorine	%	0.02
Phosphorus	%	0.007
Carbon Dioxide	%	0.16
Arsenic	ppm	l.t. 1
Hardgrove Grindability Index		56
Abrasion Index	mg/kg	21.0

l.t. denotes less than

TABLE 5.2: ULTIMATE ANALYSIS (Dry-Ash Free Basis)

Carbon	%	80.01
Hydrogen	%	4.30
Nitrogen	%	1.41
Sulphur	%	0.44
Oxygen (by difference)	%	13.84

TABLE 5.3: FORMS OF SULPHUR.

Pyritic Sulphur	%		0.03
Sulphate Sulphur	%	l.t.	0.01
Organic Sulphur (by difference)	%		0.30

l.t. denotes less than

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TABLE 5.4: ASH ANALYSIS (% of Ash).

Silicon	as	SiO_2	64.6
Aluminium	as	Al_2O_3	30.2
Titanium	as	TiO_2	0.91
Iron	as	Fe_2O_3	2.30
Calcium	as	CaO	0.57
Magnesium	as	MgO	0.54
Sodium	as	Na_2O	0.19
Potassium	as	K_2O	0.52
Manganese	as	Mn_3O_4	0.01
Phosphorus	as	P_2O_5	0.04
Sulphur	as	SO_3	0.12

TABLE 5.5: ASH FUSION CHARACTERISTICS (Reducing Atmosphere).

Temperature:

Deformation	°C	g.t.	1600
Spherical	°C	g.t.	1600
Hemisphere	°C	g.t.	1600
Flow	°C	g.t.	1600

g.t. denotes greater than

TABLE 5.6: PETROGRAPHIC ANALYSIS SUMMARY.

Vitrinite	31.6 %
Exinite	2.8 %
Inertinite	53.2 %
Minerals	12.4 %
Mean Maximum Reflectance	0.71%

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CS.42784.C

APPENDIX

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

MACERAL ANALYSIS OF COAL

MACERALS						
	VITRINITE A	11.6	12.9	25.0	27.8	VITRINITE
	VITRINITE B	13.4	14.9			
	SPORINITE	3.2	3.5	3.8	4.2	EXINITE
	CUTINITE	-	-			
	RESINITE	0.6	0.7			
	MICRINITE	2.2	2.4	61.2	68.0	INERTINITE
	MACRINITE	9.2	10.2			
	SEMI-FUSINITE	36.2	40.2			
	FUSINITE	10.4	11.6			
	INERTODETRINITE	3.2	3.6			
	MINERALS *	10.0	mmf	10.0	MINERAL MATTER FREE BASIS	

SAMPLE No... CS.42784.C

OPERATOR: Fay

R max ~~or Rx~~ 0.67

n (MACERALS): 500

n (REFLECTANCE): 100

MINERALS: * Clay, quartz, carbonate, pyrite.

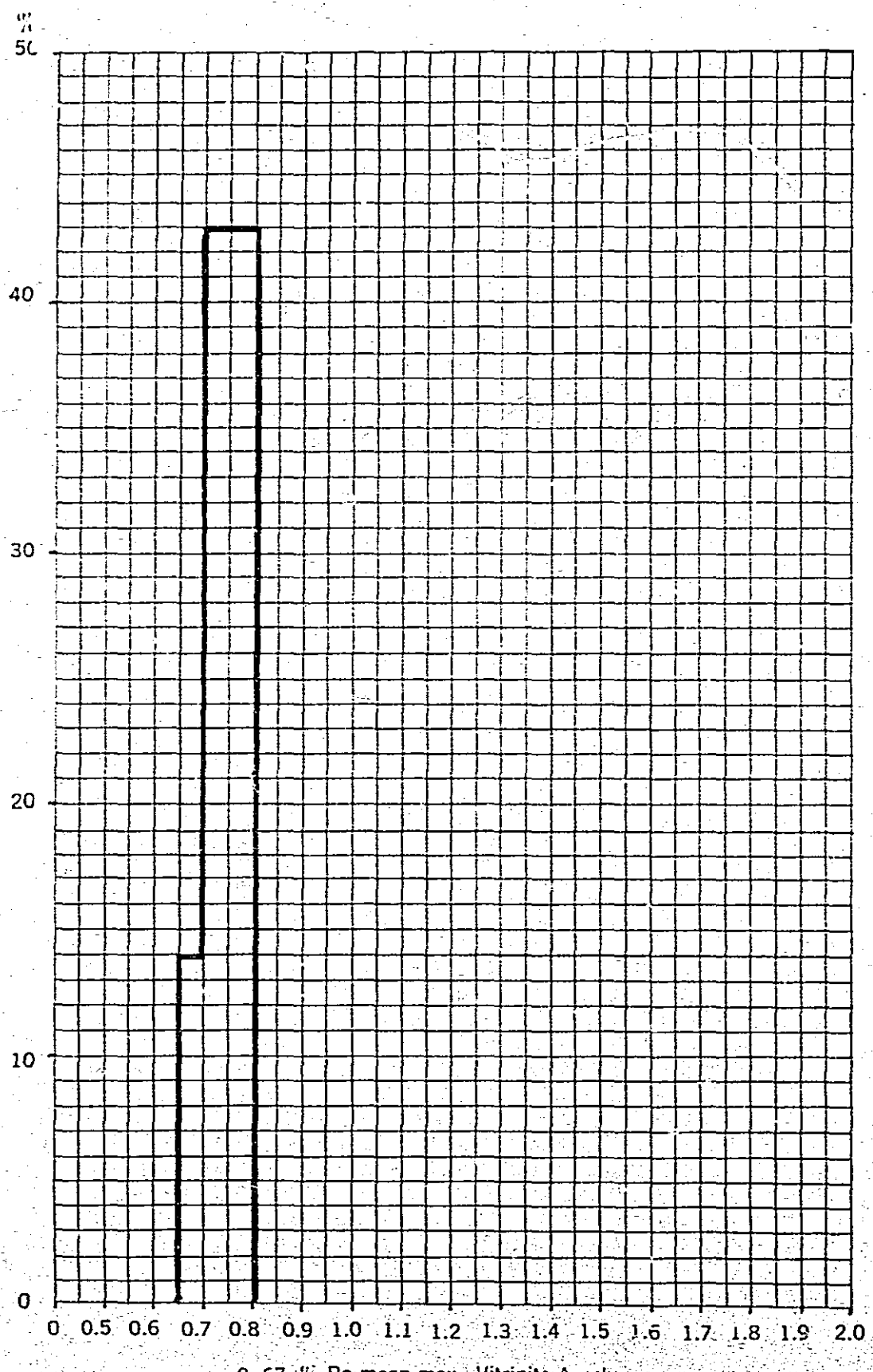
REFLECTANCE (546nm / oil refractive index 1.518)

MEAN ~~RANDOM~~ MAXIMUM REFLECTANCE	A	B	A+B	PERCENTAGE OF REACTIVES =
STANDARD DEVIATION OF THE DISTRIBUTION			0.67	PERCENTAGE OF NON-REACTIVES =

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LTD.

REFLECTOGRAM

SAMPLE REFERENCE: CS.42784.C



0.67 % Ro mean max., Vitrinite A ply.

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED

PETROGRAPHIC ANALYSIS

REFLECTANCE MEASUREMENT

CS.42784.C

V-STEP	REFLECTANCE RANGE — %	CLASS MIDPOINTS	VITRINITE			EXINITE	SEMI-INERT	REACTIVES	
			A	B	A + B				
5	0.50–0.55 0.55–0.60	0.525 0.575		5 7	5 7				
6	0.60–0.65 0.65–0.70	0.625 0.675	6	32 10	32 16				
7	0.70–0.75 0.75–0.80	0.725 0.775	20 20		20 20				
8	0.80–0.85 0.85–0.90	0.825 0.875							
9	0.90–0.95 0.95–1.00	0.925 0.975							
10	1.00–1.05 1.05–1.10	1.025 1.075							
11	1.10–1.15 1.15–1.20	1.125 1.175							
12	1.20–1.25 1.25–1.30	1.225 1.275							
13	1.30–1.35 1.35–1.40	1.325 1.375							
14	1.40–1.45 1.45–1.50	1.425 1.475							
15	1.50–1.55 1.55–1.60	1.525 1.575							
16	1.60–1.65 1.65–1.70	1.625 1.675							
17	1.70–1.75 1.75–1.80	1.725 1.775							
18	1.80–1.85 1.85–1.90	1.825 1.875							
19	1.90–1.95 1.95–2.00	1.925 1.975							
20	2.00–2.05 2.05–2.10	2.025 2.075							
21	2.10–2.15 2.15–2.20	2.125 2.175							
22	2.20–2.25 2.25–2.30	2.225 2.275							
TOTAL NUMBER OF READINGS			46	54	100				
MEAN RANDOM REFLECTANCE									
MEAN MAXIMUM REFLECTANCE					0.67				

12. GRAY 174

CASCO REPORT CS 42512 A

Drop Shatter and Flocculation Tests

174B T11 Immediate Roof of L1 (270mm)

174B T12 280mm below Floor of L1 (190mm)

174B T13 Immediate Roof of L2 (410mm)

174B T14 Immediate Floor of L2 (50mm)

Flocculation Test

174A 8902 Band in M1 (170mm)

See Part 1, Casco Report CS 42458A, Section 6.

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

12.1

CS.42512.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: DROP SHATTER AND FLOCCULATION TESTS OF LARGE DIAMETER CORE-HOLE NO. 895, SAMPLES T11, T12, T13 and T14.

CONTRACT C14-82

DATE RECEIVED: 1 November,1982.

DATE PRELIMINARY REPORT: 4 November,1982 (Our Telex S/6132/82).

DATE FINAL REPORT: 30 November,1982.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities Australia

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12.2

CS.42512.A

INTRODUCTION

Four (4) only samples of large diameter core designated 895 T11, 895 T12, 895 T13 and 895 T14 were received at our NATA Registered Sydney Laboratory for Drop Shatter testing and Flocculation tests.

METHOD:

Each sample was weighed and sized initially at 45mm. The oversize was dropped through three (3) metres and screened at 45mm. The oversize material was repeatedly dropped for a total of twelve passes.

The sample was then drum tumbled to simulated conditions experienced during preparation. The drum tumbled product was wet screened at 0.2mm and flocculation tests carried out where sufficient breakdown product was generated.

Page 3 attached

CS.42512.A

TABLE 1: AS RECEIVED MASSES.

	Sample Number			
	T11	T12	T13	T14
Mass (kg)	4.318	3.627	6.206	7.240

TABLE 2: INITIAL SIZE ANALYSIS.

	Sample Number			
	T11	T12	T13	T14
Size Fraction	Mass%	Mass%	Mass%	Mass%
Plus 45mm	84.2	89.2	78.2	95.3
Minus 45mm	15.8	10.8	21.8	4.7

TABLE 3: MASS % PLUS 45mm MATERIAL REMAINING.

Cum.Drop	Sample Number			
Height (m)	T11	T12	T13	T14
3	47.9	50.4	30.1	53.4
6	34.8	39.2	10.6	40.6
9	26.3	33.0	1.4	32.8
12	19.6	28.7	Nil	27.7
15	14.2	26.3		24.1
18	10.1	24.5		21.3
21	7.0	23.4		19.6
24	5.0	22.7		18.5
27	3.6	22.3		17.7
30	2.3	22.1		17.5
33	1.2	22.0		17.3
36	0.4	19.9		17.2

Page 4 attached

TABLE 4: SIZE ANALYSIS AFTER DROP SHATTER

Size Fraction	Sample Number T11 Mass%	T11 Cum.Mass%	T12 Mass%	T12 Cum.Mass%	T13 Mass%	T13 Cum.Mass%	T14 Mass%	T14 Cum.Mass%
Plus 45mm	0.4	0.4	19.9	19.9	Nil	Nil	17.2	17.2
45 x 22.5mm	70.8	71.2	52.4	72.3	40.4	40.4	52.6	69.8
22.5 x 11.2mm	17.5	88.7	17.7	90.0	8.8	49.2	19.0	88.8
11.2 x 5.6mm	4.2	92.9	6.2	96.2	4.4	53.6	5.9	94.7
5.6 x 2.8mm	2.1	95.0	1.9	98.1	2.4	56.0	2.3	97.0
2.8 x 1.4mm	1.4	96.4	0.8	98.9	2.2	58.2	1.2	98.2
Minus 1.4mm	3.6	100.0	1.1	100.0	41.8	100.0	1.8	100.0

Page 5 attached

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

CS.42512.A

TABLE 5: FLOCCULATION TESTS: MINUS 0.2mm MATERIAL ON SAMPLE NUMBER T13.

TABLE 5.1: FLOCCULATION TESTS: MINUS 0.2mm MATERIAL (3% SOLIDS w/w)

Time (Hours)	Depression of Clear Water Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.1	0.2	0.3	0.3	0.4	0.4
0.5	0.4	0.4	0.4	0.5	0.5
1.0	0.5	0.6	0.6	0.6	0.6
2.0	0.6	0.9	0.9	0.8	0.8
3.0	0.7	1.3	1.0	0.9	0.9
4.0	0.9	1.7	1.2	1.0	1.0
5.0	1.0	2.7	1.6	1.9	1.4
6.0	1.1	4.6	3.0	3.8	2.5
7.0	1.2	6.4	4.8	5.3	4.7
8.0	1.3	7.9	6.4	6.7	6.4
10.0	1.5	9.2	9.2	9.0	9.0
12.0	1.8	9.8	10.2	10.1	9.9
14.0	2.1	10.0	10.3	10.6	10.2
16.0	2.8	10.1	10.4	10.6	10.3
24.0	9.1	10.3	10.4	10.6	10.5
32.0	10.0	10.3	10.4	10.6	10.5
40.0	10.2	10.3	10.4	10.6	10.5
48.0	10.4	10.3	10.4	10.6	10.5
72.0	10.6	10.3	10.4	10.6	10.5
96.0	10.8	10.3	10.4	10.6	10.5

Page 6 attached

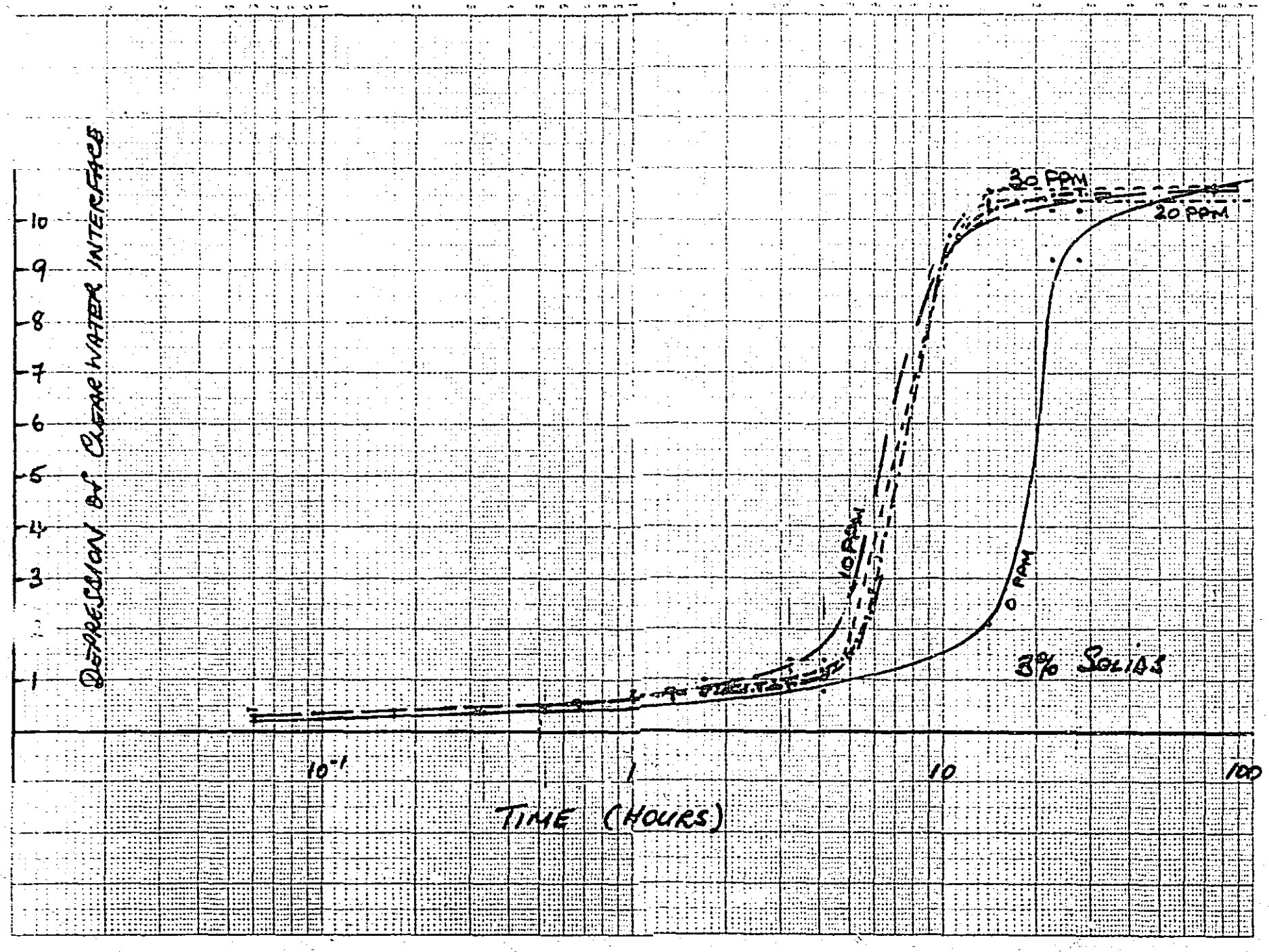
TABLE 5.2: FLOCCULATION TESTS: MINUS 0.2mm MATERIAL (10% SOLIDS w/w)

Time (Hours)	Depression of Clear Water Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.1	0.1	0.2	0.2	0.2	0.2
0.5	0.1	0.2	0.2	0.2	0.2
1.0	0.1	0.2	0.2	0.2	0.2
2.0	0.2	0.3	0.3	0.3	0.3
3.0	0.3	0.3	0.3	0.3	0.3
4.0	0.4	0.4	0.4	0.4	0.4
5.0	0.5	0.5	0.5	0.5	0.5
6.0	0.6	0.6	0.6	0.6	0.6
7.0	0.7	0.7	0.7	0.7	0.7
8.0	0.8	0.7	0.8	0.8	0.8
10.0	0.9	0.8	1.0	1.1	1.0
12.0	1.0	0.9	1.1	1.2	1.1
14.0	1.1	0.9	1.2	1.3	1.2
16.0	1.1	0.9	1.2	1.4	1.2
24.0	1.2	1.0	1.3	1.4	1.3
32.0	1.2	1.0	1.3	1.4	1.3
40.0	1.2	1.0	1.3	1.4	1.3
48.0	1.2	1.0	1.3	1.4	1.3
72.0	1.2	1.0	1.3	1.4	1.3
96.0	1.2	1.0	1.3	1.4	1.3

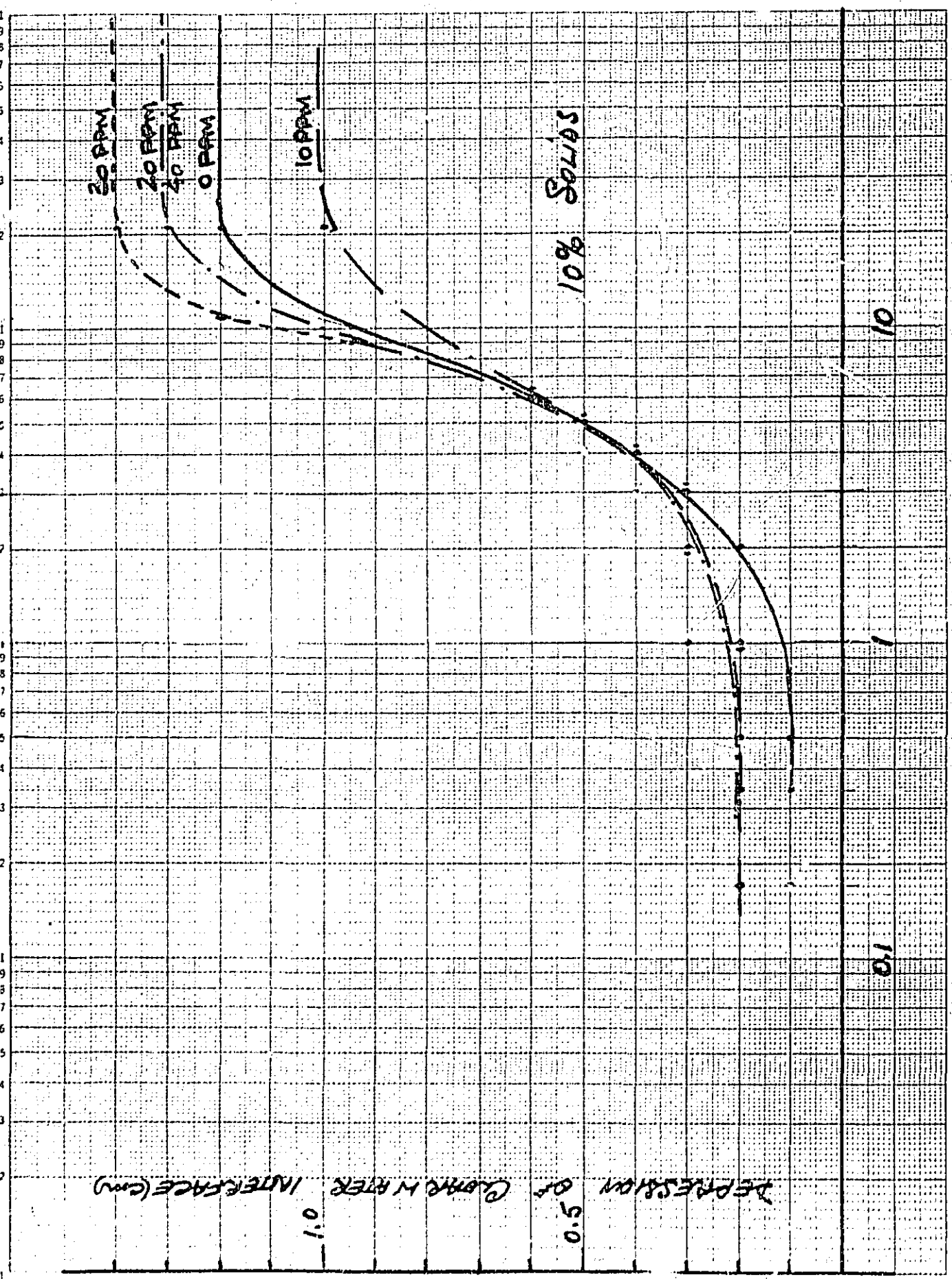
Page 7 attached

TABLE 5.3: FLOCCULATION TESTS: MINUS 0.2mm MATERIAL (30% SOLIDS w/w)

Time (Hours)	Depression of Clear Water Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.1	–	–	–	–	–
0.5	–	–	–	–	–
1.0	–	–	0.2	0.2	0.2
2.0	0.2	0.2	0.2	0.2	0.2
3.0	0.2	0.2	0.2	0.2	0.2
4.0	0.2	0.2	0.2	0.2	0.2
5.0	0.3	0.3	0.3	0.3	0.3
6.0	0.6	0.3	0.3	0.3	0.3
7.0	1.3	1.9	3.1	2.7	1.2
8.0	2.3	2.8	3.7	4.6	4.4
10.0	2.7	3.1	3.8	4.7	4.5
12.0	2.8	3.2	3.8	4.7	4.5
14.0	3.0	3.2	3.8	4.7	4.5
16.0	3.0	3.2	3.8	4.7	4.5
24.0	3.1	3.2	3.8	4.7	4.5
32.0	3.1	3.2	3.8	4.7	4.5
40.0	3.1	3.2	3.8	4.7	4.5
48.0	3.1	3.2	3.8	4.7	4.5
72.0	3.1	3.2	3.8	4.7	4.5
96.0	3.1	3.2	3.8	4.7	4.5


DISPERSION BAND/CRUDE WATER INTERFACE
10
9
8
7
6
5
4
3
2
1
30 PPM
20 PPM
10 PPM
0 PPM
3% SOLIDS
10^{-1}
1
10
100
TIME (HOURS)

12.8


20 PPM
20 PPM
40 PPM
0 PPM
10 PPM
10% Solids
10
1
0.1
0.5
1.0
DEPRESSION OF CLEAR WATER INTERFACE (cm)

DEPRESSION OF CLEAR-WATER INTERFACE (cm)
0
1
2
3
4
5
30 PPM
40 PPM
20 PPM
10 PPM
0 PPM
30% SOLIDS
0.1
1.0
10
100
TIME (HOURS)

13. GRAY 175

CASCO REPORT CS 42539 A

Drop Shatter Tests

175A T2 Immediate Floor of L1 (450mm)

175A T3 Immediate Roof of L2 (430mm)

175A T4 Immediate Floor of L2 (380mm)

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

13.1

CS.42539.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: DROP SHATTER AND FLOCCULATION TESTS OF LARGE DIAMETER CORE-HOLE NO. 900, SAMPLES T2, T3, AND T4.

CONTRACT C14-82

DATE RECEIVED: 9 November,1982.

DATE PRELIMINARY REPORT: 11 November,1982 (Our Telex S/6274/82).

DATE FINAL REPORT: 30 November,1982.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia

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13.2

CS.42539.A

INTRODUCTION

Three (3) only samples of large diameter core designated 900T2 (Floor L1 seam), 900 T3 (roof L2 seam) and 900 T4 (floor L2 seam) were received at our NATA Registered Sydney Laboratory for drop shatter testing and flocculation tests.

METHOD:

Each sample was weighed and sized initially at 45mm. The oversize was dropped through three (3) metres and screened at 45mm. The oversize material was repeatedly dropped for a total of twelve passes where required.

The samples was then drum tumbled to simulate conditions experienced during preparation. The drum tumbled product was wet screened at 0.2mm and flocculation tests carried out where sufficient breakdown product was generated.

Page 3 attached

13.3

CS.42539.A

TABLE 1: AS RECEIVED MASSES.

	Sample Number		
	T2	T3	T4
Mass (kg)	7.595	8.097	7.261

TABLE 2: INITIAL SIZE ANALYSIS.

	Sample Number			
	T2	T3	T4	
Size Fraction	Mass%	Mass%	Mass%	Mass%
Plus 45mm	76.1	97.5	80.4	
Minus 45mm	13.9	2.5	19.6	

TABLE 3: DROP SHATTER DATA.

Mass % Plus 45mm Material Remaining.

Cum.Drop	Sample Number		
Height (m)	T2	T3	T4
3	20.7	52.3	26.4
6	3.9	23.1	4.1
9	1.8	11.7	Nil
12	Nil	5.0	
15		Nil	

Page 4 attached

TABLE 4: SIZE ANALYSIS AFTER DROP SHATTER

Size Fraction	Sample Number T2 Mass%	T2 Cum.Mass%	T3 Mass%	T3 Cum.Mass%	T4 Mass%	T4 Cum.Mass%
Plus 45mm	Nil	Nil	Nil	Nil	Nil	Nil
45 x 22.4mm	60.6	60.6	71.3	71.3	60.0	60.0
22.4 x 11.2mm	24.1	84.7	19.9	91.2	31.5	91.5
11.2 x 5.6mm	9.0	93.7	4.8	96.0	5.3	96.8
5.6 x 2.8mm	2.8	96.5	1.5	97.5	1.2	98.0
2.8 x 1.4mm	1.3	97.8	0.9	98.4	0.6	98.6
Minus 1.4mm	2.2	100.0	1.6	100.0	1.4	100.0

CARGO SUPERINTENDENTS CO. (A/SIA) PTY. LIMITED
(INCORPORATED IN NEW SOUTH WALES)

CARGO FORM SY 101

CS.42539.A

TABLE 5: DEGRADATION AFTER DRUM TUMBLING.

	Sample Number		
	T2	T3	T4
Initial Mass (kg)	7.595	8.097	7.261
No. litres of water used for Drum Tumbling	23	24	22
% Minus 0.2mm after Drum Tumbling	3.0	1.2	4.4
Solids concentration (% w/w) after Wet Screening	0.7	0.2	0.9

14. GRAY 178

CASCO REPORT CS 42891 A

Drop Shatter and Flocculation Tests

178A T1 Immediate Roof of M1 (330mm)

178B T1 Immediate Floor of M1 (190mm)

178B T2 Immediate Roof of M2 (240mm)

178B T3 Immediate Floor of M2 (330mm)

178B T6* Immediate Floor of L2 (310mm)

* Designated T5 on field log

14.1

CS.42891.A

APPLICANT: THE SHELL COMPANY OF AUSTRALIA LIMITED
P.O. BOX 872K,
MELBOURNE VIC. 3001

SUBJECT: DROP SHATTER AND FLOCCULATION TESTS OF LARGE DIAMETER CORES EX HOLE NO. 930 (SAMPLE T1) AND EX HOLE NO. 935 (SAMPLES T1, T2, T3 AND T6).

CONTRACT C14-82

DATE RECEIVED: 25 February,1983.

DATE REPORTED: 26 April,1983.

CARGO SUPERINTENDENTS CO. (A/SIA.) PTY. LIMITED

H.J.Heinrich
Projects Manager

National Association of Testing Authorities, Australia

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14.2

CS.42891.A

INTRODUCTION

Five (5) only samples of large diameter core, designated:

930 T1 - Roof, M1 Seam,

935 T1 - Floor,M1 Seam,

935 T2 - Roof, M2 Seam,

935 T3 - Floor,M2 Seam,

935 T6 - Floor,L2 Seam,

were received at our NATA registered Sydney Laboratory for drop shatter testing and flocculation tests.

METHOD:

Each sample, as received, was weighed and sized initially at 45mm. The oversize material was dropped through three (3) metres and screened at 45mm. The oversize material was repeatedly dropped for a total of ten (10) passes where required.

The drop-shattered material was screened at 45.0, 26.5, 11.2, 5.6, 2.8 and 1.4mm. After weighing, size fractions were reconstituted and drum tumbled to simulate conditions experienced during preparation. Drum-tumbled products were wet-screened at 0.2mm and flocculation tests carried out where sufficient breakdown product was generated.

Page 3 attached

CS.42891.A

TABLE 1: AS RECEIVED MASSES.

SAMPLE NO.	930 T1	935 T1	935 T2	935 T3	935 T6
Mass (Kg)	4.941	3.221	4.550	5.473	5.926

TABLE 2: INITIAL SIZE ANALYSIS.

SAMPLE NO.		930 T1	935 T1	935 T2	935 T3	935 T6
Plus 45.0mm	%	39.0	60.5	80.4	96.3	97.3
Minus 45.0mm	%	61.0	39.5	19.6	3.7	2.7

TABLE 3: DROP SHATTER DATA.

SAMPLE NO. / Cum.Drop Height (m)	% PLUS 45.0mm MATERIAL REMAINING 930 T1	935 T1	935 T2	935 T3	935 T6
3	13.2	19.3	64.6	71.5	85.8
6	7.6	4.9	46.3	61.9	82.5
9	7.3	Nil	28.5	49.2	72.8
12	3.4	-	18.0	26.2	69.8
15	3.3	-	17.6	17.1	56.1
18	3.3	-	16.2	6.9	47.0
21	3.3	-	6.1	6.4	42.5
24	3.1	-	3.7	3.7	35.4
27	Nil	-	3.7	2.1	31.5
30	-	-	3.5	Nil	19.0

Page 4 attached

TABLE 4: SIZE ANALYSIS OF DROP-SHATTERED MATERIAL.

SAMPLE NO.:	930 T1		935 T1		935 T2	
Size Fraction	Mass%	Cum.Mass%	Mass%	Cum.Mass%	Mass%	Cum.Mass%
Plus 45.0mm	Nil	Nil	Nil	Nil	3.5	3.5
45.0 x 26.5mm	44.6	44.6	56.2	56.2	50.2	53.7
26.5 x 11.2mm	46.4	91.0	33.9	90.1	32.7	86.4
11.2 x 5.6mm	6.6	97.6	5.9	96.0	7.3	93.7
5.6 x 2.8mm	1.2	98.8	1.9	97.9	2.8	96.5
2.8 x 1.4mm	0.4	99.2	0.7	98.6	1.3	97.8
Minus 1.4mm	0.8	100.0	1.4	100.0	2.2	100.0

SAMPLE NO.:	935 T3		935 T6	
Size Fraction	Mass%	Cum.Mass%	Mass%	Cum.Mass%
Plus 45.0mm	Nil	Nil	19.0	19.0
45.0 x 26.5mm	57.9	57.9	55.9	74.9
26.5 x 11.2mm	23.3	81.2	15.8	90.7
11.2 x 5.6mm	7.4	88.6	3.9	94.6
5.6 x 2.8mm	4.5	93.1	2.0	96.6
2.8 x 1.4mm	2.4	95.5	1.0	97.6
Minus 1.4mm	4.5	100.0	2.4	100.0

TABLE 5: DEGRADATION AFTER DRUM TUMBLING.

SAMPLE NO. :	930 T1	935 T1	935 T2	935 T3	935 T6
Initial Mass (kg)	4.941	3.221	4.550	5.473	5.926
Litres of Water used for Drum Tumbling	15	10	14	16	18
% Minus 0.2mm after Drum Tumbling	2.6	13.8	4.3	12.4	4.6
Solids Concentration (% w/w) after Wet Screening	0.3	2.6	0.7	2.3	0.9

Page 5 attached

TABLE 6: FLOCCULATION TESTS : MINUS 0.2mm MATERIAL ON SAMPLE 935 T1

TABLE 6.1: FLOCCULATION TESTS : MINUS 0.2mm MATERIAL (3% SOLIDS w/w)

TIME (Minutes)	Depression of Clear Liquid Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.05		1.1	2.0	4.5	3.6
0.25		9.4	9.4	9.5	9.3
0.33		9.6	9.5	9.6	9.3
0.42		9.7	9.6	9.7	9.5
0.50		9.7	9.6	9.8	9.5
0.60		9.8	9.8	9.8	9.6
0.67		9.9	9.8	9.9	9.6
0.75		9.9	9.8	9.9	9.7
0.85		10.0	9.9	9.9	9.7
1.00		10.0	9.9	10.0	9.7
1.28		10.0	9.9	10.0	9.8
1.52		10.1	10.0	10.0	9.8
2.0		10.1	10.0	10.1	9.9
5.0		10.2	10.1	10.1	9.9
10.0		10.2	10.1	10.2	10.0
20		10.3	10.1	10.2	10.0
40		10.3	10.1	10.2	10.0
60		10.3	10.1	10.2	10.0
120		10.3	10.1	10.2	10.0
180		10.3	10.1	10.2	10.0
240	10.0	10.3	10.1	10.2	10.0
302	10.0	10.3	10.1	10.2	10.0

Page 6 attached

TABLE 6.2: FLOCCULATION TESTS : MINUS 0.2mm MATERIAL (10% SOLIDS w/w).

TIME (Minutes)	Depression of Clear Liquid Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.02			0.1	0.3	1.2
0.17		0.1	0.8	1.7	3.2
0.27		0.8	1.1	2.4	4.1
0.35		1.1	1.4	2.9	4.9
0.42		1.3	1.6	3.5	5.2
0.52		1.5	1.9	4.0	5.5
0.77		2.2	2.8	5.1	6.1
1.00		2.8	3.5	5.7	6.4
1.50		4.0	4.8	6.2	6.7
2.00		4.9	5.6	6.5	7.0
3.00		6.1	6.3	6.9	7.2
4.00		6.4	6.6	7.1	7.4
5.00		6.7	6.9	7.3	7.4
7.6		7.2	7.3	7.5	7.7
10.0		7.4	7.5	7.7	7.8
12.5		7.7	7.6	7.8	7.8
15		7.9	7.8	7.8	7.9
20		8.0	7.9	7.8	7.9
30		8.3	8.0	8.0	8.0
60		8.5	8.2	8.1	8.0
120	7.6	8.5	8.3	8.1	8.0
182	7.9	8.6	8.3	8.1	8.0
300	8.2	8.6	8.1	8.1	8.0

Page 7 attached

TABLE 6.3: FLOCCULATION TESTS : MINUS 0.2mm MATERIAL (30% SOLIDS w/w)

TIME (Minutes)	Depression of Clear Liquid Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.03					
0.33					0.1
1.00				0.1	0.5
2.00				0.1	0.8
3.00				0.2	0.8
5.00				0.5	1.2
7.5			0.1	1.3	1.7
10.0		0.1	0.3	1.7	2.1
15.0		0.4	0.4	2.1	2.6
20		0.6	0.7	2.5	3.0
25		0.9	1.0	2.7	3.3
30	0.1	1.1	1.2	2.9	3.4
45	0.2	1.6	1.8	3.4	3.7
60	1.8	1.9	2.2	3.7	3.8
78	2.5	2.2	2.6	3.9	4.0
102	2.9	2.6	3.0	4.1	4.0
130	3.2	3.1	3.4	4.2	4.1
164	3.5	3.2	3.7	4.3	4.1
195	3.7	3.5	3.9	4.4	4.2
259	4.0	3.9	4.2	4.5	4.2
320	4.2	4.1	4.4	4.5	4.2

Page 8 attached

TABLE 7: FLOCCULATION TESTS : MINUS 0.2mm MATERIAL ON SAMPLE 935 T3.

TABLE 7.1: FLOCCULATION TESTS : MINUS 0.2mm MATERIAL (3% SOLIDS w/w)

TIME (Minutes)	Depression of Clear Liquid Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.03					0.2
0.10				0.2	0.5
0.18				0.8	1.1
0.25			0.9	1.3	2.0
0.35			2.2	2.3	3.1
0.43			2.8	3.2	4.5
0.52			3.8	4.0	5.1
0.67			5.2	5.5	6.6
0.83			6.6	6.7	7.2
1.00		4.7	7.5	7.4	7.7
1.27		6.7	8.0	8.0	8.0
1.52		7.7	8.2	8.2	8.2
2.00		8.4	8.5	8.5	8.5
3.0		8.9	8.9	8.9	8.8
4.0		9.1	9.1	9.1	9.0
5.0		9.2	9.2	9.3	9.1
10	0.2	9.6	9.6	9.6	9.4
30	9.7	9.9	9.8	9.8	9.5
60	9.8	10.0	9.8	9.9	9.6
120	9.8	10.0	9.9	9.9	9.6
186	9.8	10.0	9.9	9.9	9.6
240	9.8	10.0	9.9	9.9	9.6
300	9.8	10.0	9.9	9.9	9.6

Page 9 attached

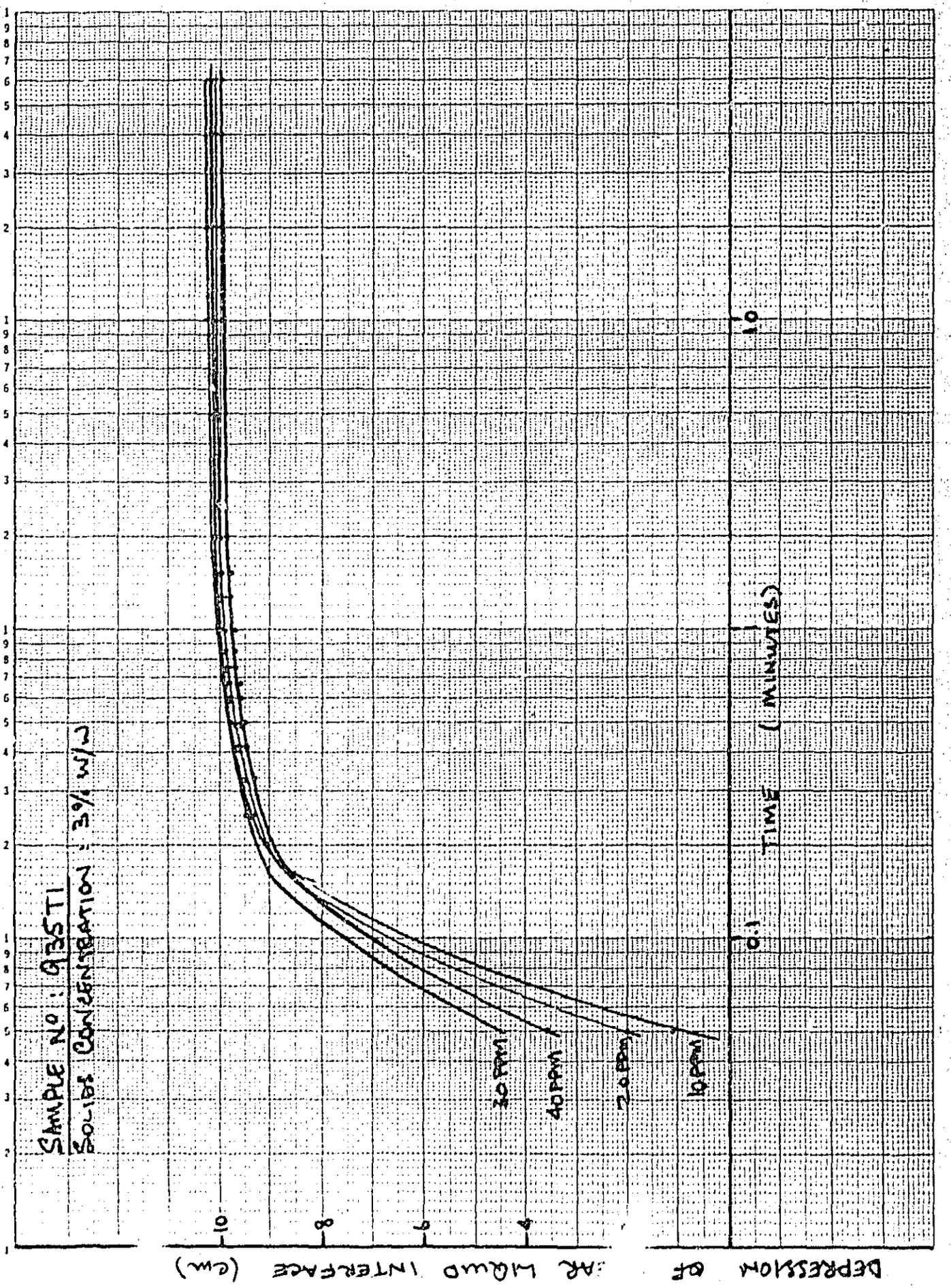
TABLE 7.2: FLOCCULATION TESTS : MINUS 0.2mm MATERIAL (10% SOLIDS w/w)

TIME (Minutes)	Depression of Clear Liquid Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
0.03					0.1
0.17			0.1	0.2	0.4
0.33			0.2	0.5	0.8
0.52			0.3	0.7	1.2
0.67			0.4	1.0	1.5
0.83			0.5	1.2	1.9
1.0		0.1	0.7	1.5	2.3
1.5	0.2	0.3	1.0	2.2	3.4
2.0	0.3	0.6	1.4	3.0	4.1
2.5	0.4	0.9	1.8	3.7	4.7
3.0	0.5	1.1	2.1	4.2	4.9
4.0	0.7	1.4	2.9	4.9	5.4
5.0	0.9	1.8	3.5	5.2	5.6
7.5	1.5	2.8	4.7	5.8	6.1
10.0	2.1	3.6	5.2	6.2	6.4
15	3.3	4.8	5.8	6.6	6.7
20	4.4	5.4	6.2	6.9	6.9
30	5.5	6.0	6.6	7.2	7.0
60	6.5	6.9	7.2	7.5	7.2
90	6.9	7.2	7.5	7.6	7.3
120	7.1	7.4	7.6	7.6	7.4
180	7.5	7.6	7.7	7.7	7.4
240	7.8	7.8	7.8	7.7	7.4
304	7.8	7.8	7.8	7.7	7.4

Page 10 attached

TABLE 7.3: FLOCCULATION TESTS : MINUS 0.2mm MATERIAL (30% SOLIDS w/w)

TIME (Minutes)	Depression of Clear Liquid Interface (cm)				
	0 ppm	10 ppm	20 ppm	30 ppm	40 ppm
10					
21					0.1
30					0.1
61			0.1	0.2	0.4
91			0.3	0.4	0.7
121	0.1	0.2	0.4	0.6	1.0
150	0.3	0.3	0.8	0.8	1.2
185	0.5	0.7	1.0	1.1	1.6
242	0.7	1.0	1.3	1.4	2.0
300	0.9	1.3	1.6	1.8	2.4
411	1.3	1.7	2.2	2.4	3.0
1262	3.4	3.8	4.0	4.0	4.0


SAMPLE NO: 9851T1
SOLIDS CONCENTRATION : 3% W/W
DEPRESSION OF AIR WATER INTERFACE (cm)
TIME (MINUTES)
0.1
1.0
10
8
6
4
30 PPM
40 PPM
20 PPM
10 PPM

SAMPLE Nº: 935 TI

SOLIDS CONCENTRATION: 10% W/W

DEPRESSION OF CLEAR LIQUID INTERFACE (cm)

TIME (MINUTES)

40 PPM

30 PPM

20 PPM

10 PPM

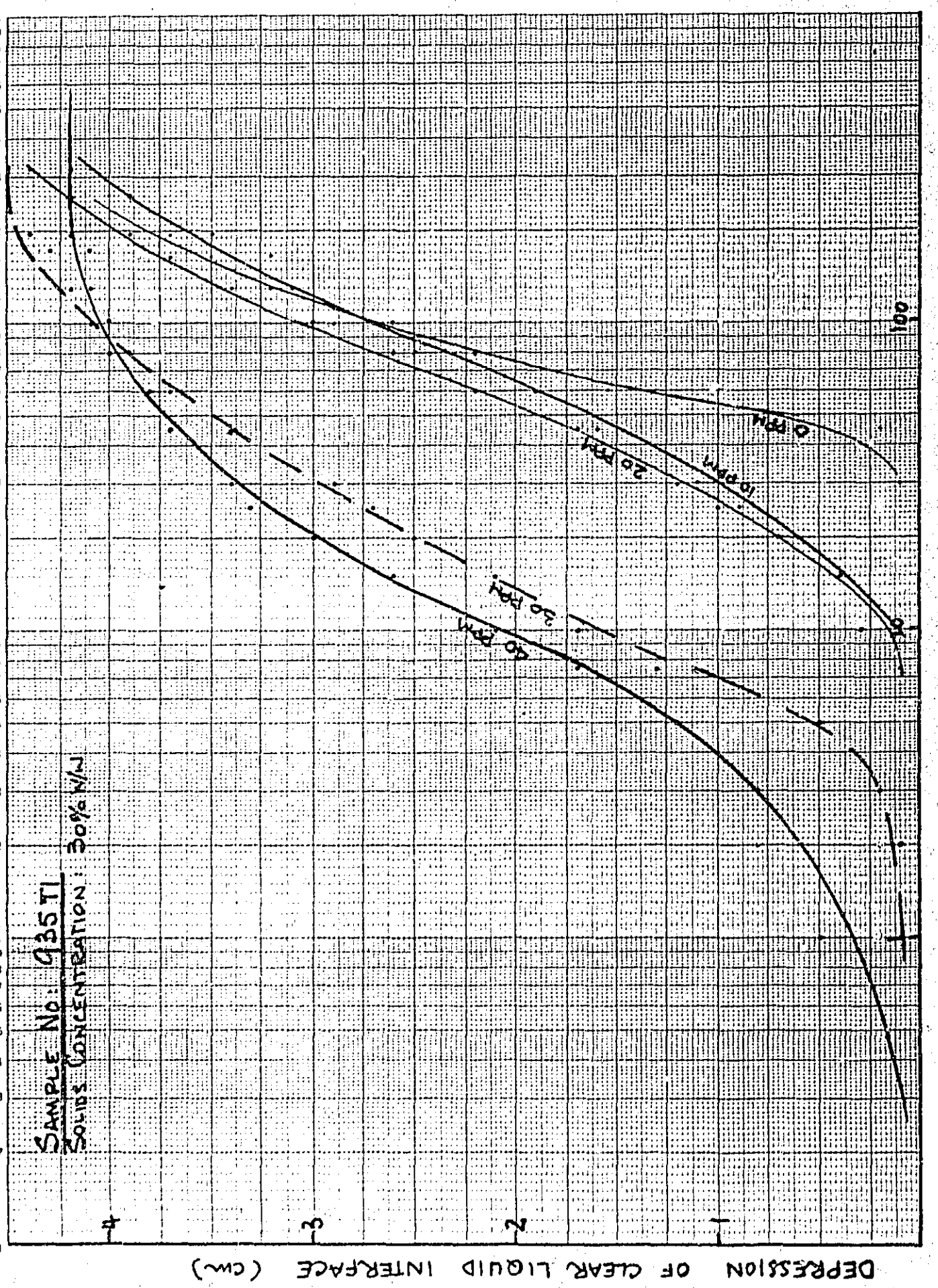
0 PPM

* NO DISTINCT INTERFACE PRIOR TO 120 MINUTES

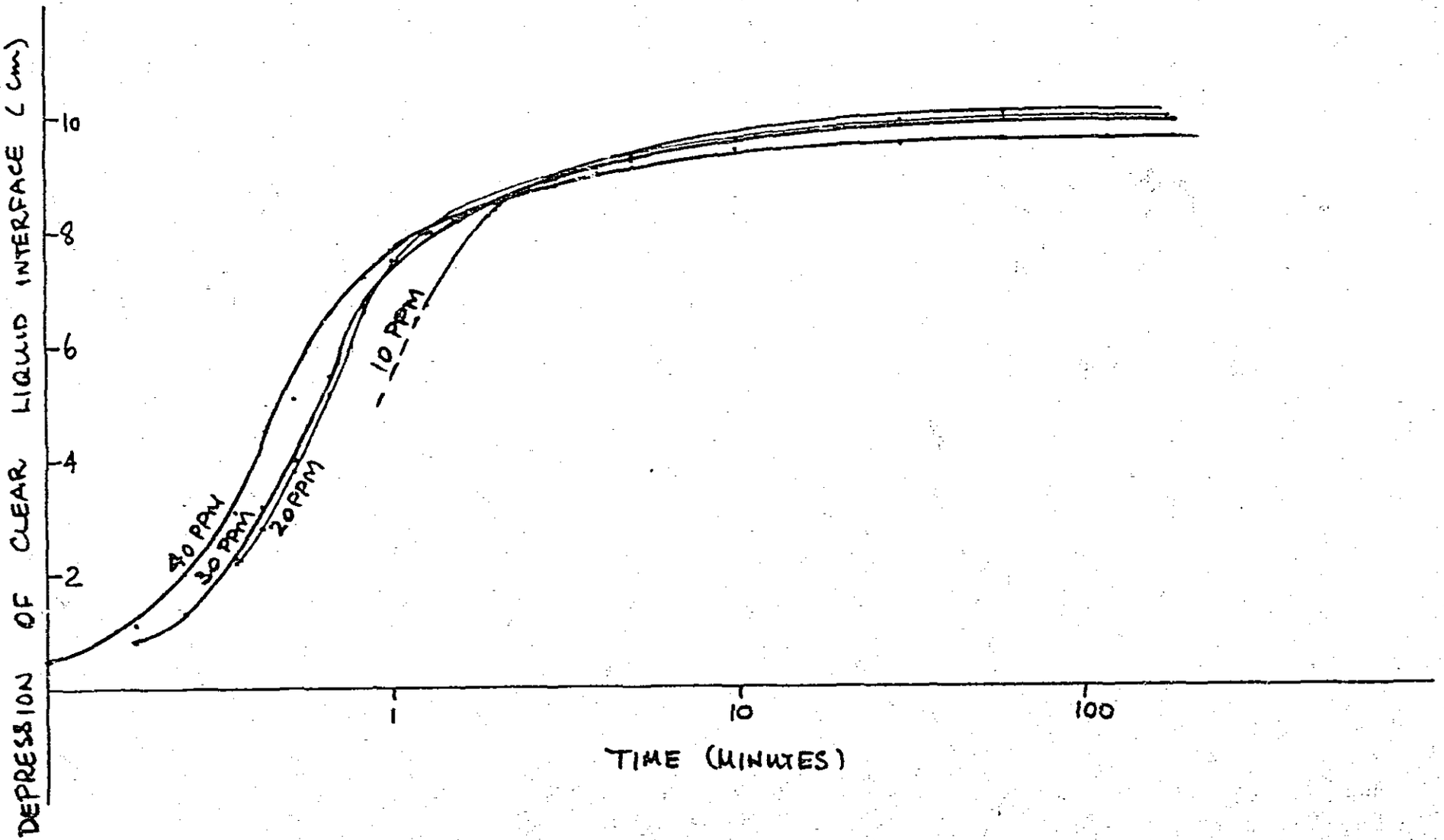
14.12

GOTTFRIED GRAPH PAPERS CHRISTCHURCH N.Z.

GOSHACK GRAPH PAPERS . CHRISTCHURCH N.Z D411Y Log 4 cycle x mm

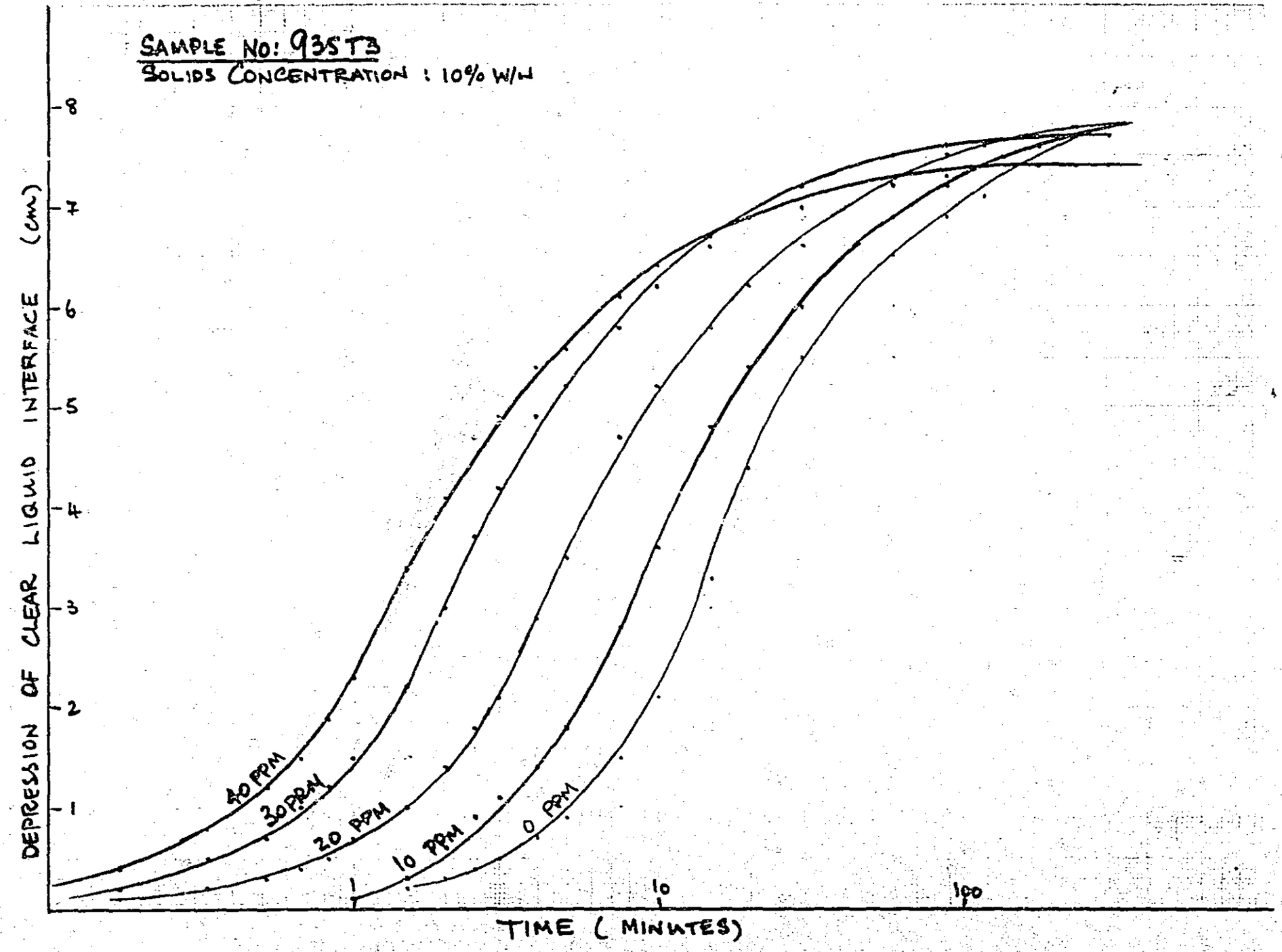


SAMPLE NO: 935 T3
SOLIDS CONCENTRATION : 3% w/w



SAMPLE NO: 935TB

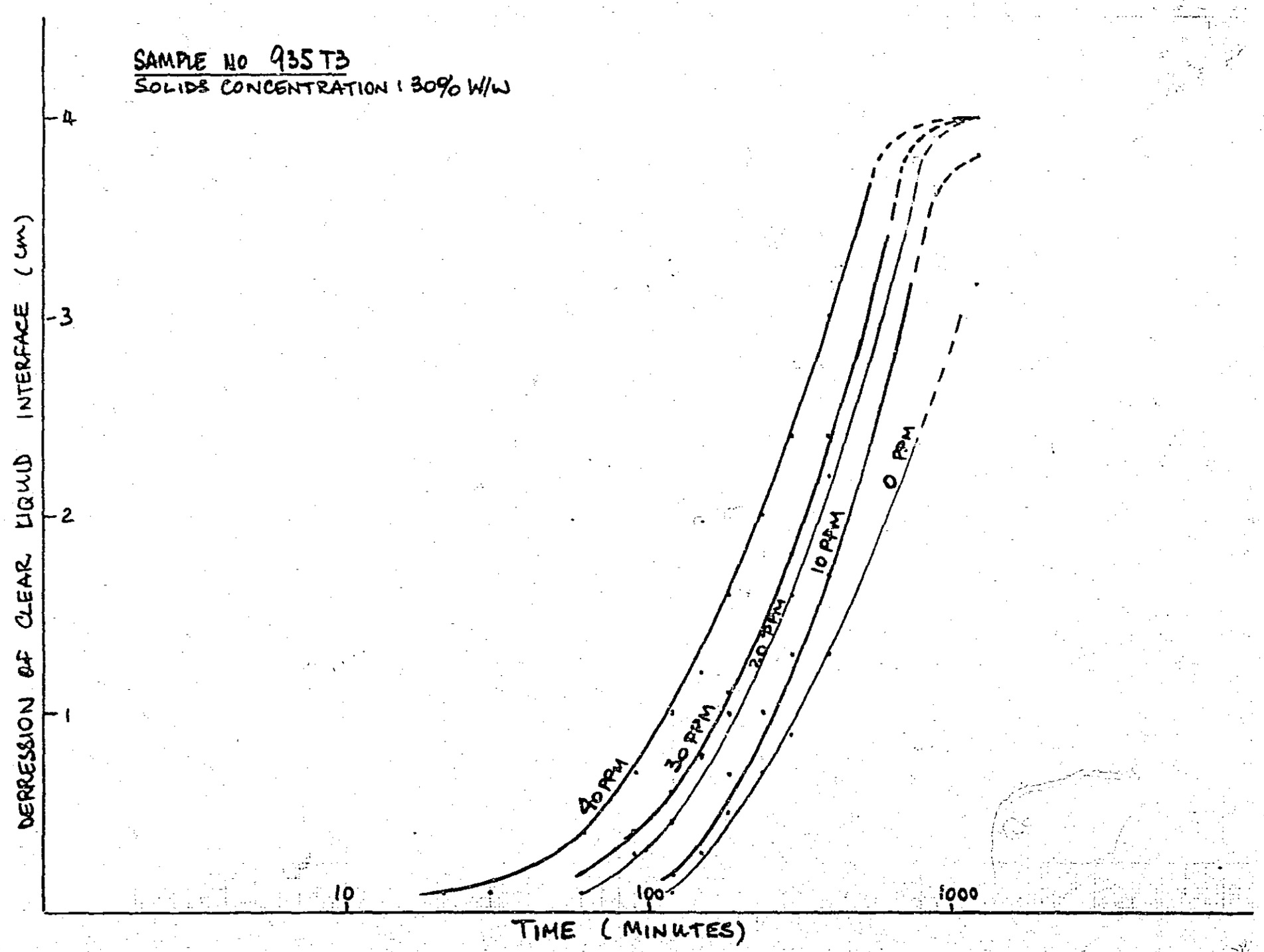
SOLIDS CONCENTRATION : 10% W/W



14.15

SAMPLE NO 935T3

SOLIDS CONCENTRATION : 30% W/W



15. GEOTECHNICAL TESTS

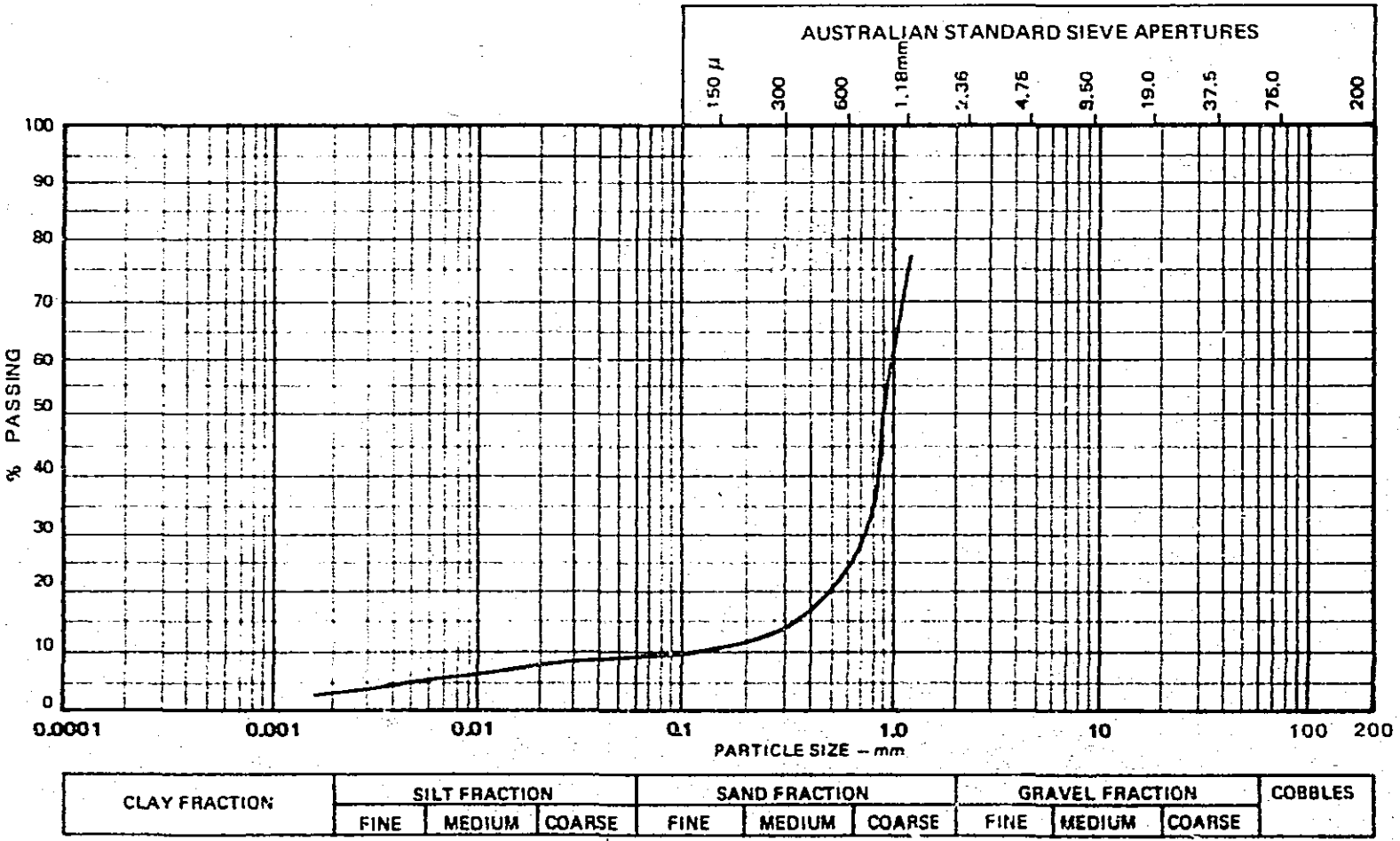
LARGE DIAMETER SAMPLES

Tests carried out at the University of Melbourne, Department of Mining & Metallurgy (W. Bamford)

174A	T11	Immediate Floor of L1	(?)
175B	T1	Immediate Roof of L1	(170mm)
175B	T2	Immediate Floor of L1	(300mm)
176A	T2	Immediate Floor of M2	(330mm)
176B	T1	Immediate Roof of M2	(340mm)
176B	T4	Immediate Floor of L2	(350mm)

LARGE DIAMETER DRILLING - GEOTECHNICAL TESTS

Borehole	Sample No.	Slake Durability Index %	Comment	Liquid Limit %	Plastic Limit %	Casagrande Classification	Comment	Stratigraphic Location
174A	T11	97	High durability					Floor L1
175B	T1	99	Very high durability					Roof L1
175B	T2	91	High durability					Floor L1
176A	T2	42	Low durability	48	30	MI	silty clay - medium plasticity	Floor M2
176B	T1	35	Low durability	43	18	CI	clay - medium plasticity	Roof M2
176B	T4	65	Medium durability	33	18	CL	clayey silt - low plasticity	Floor L2



PARTICLE SIZE DISTRIBUTION

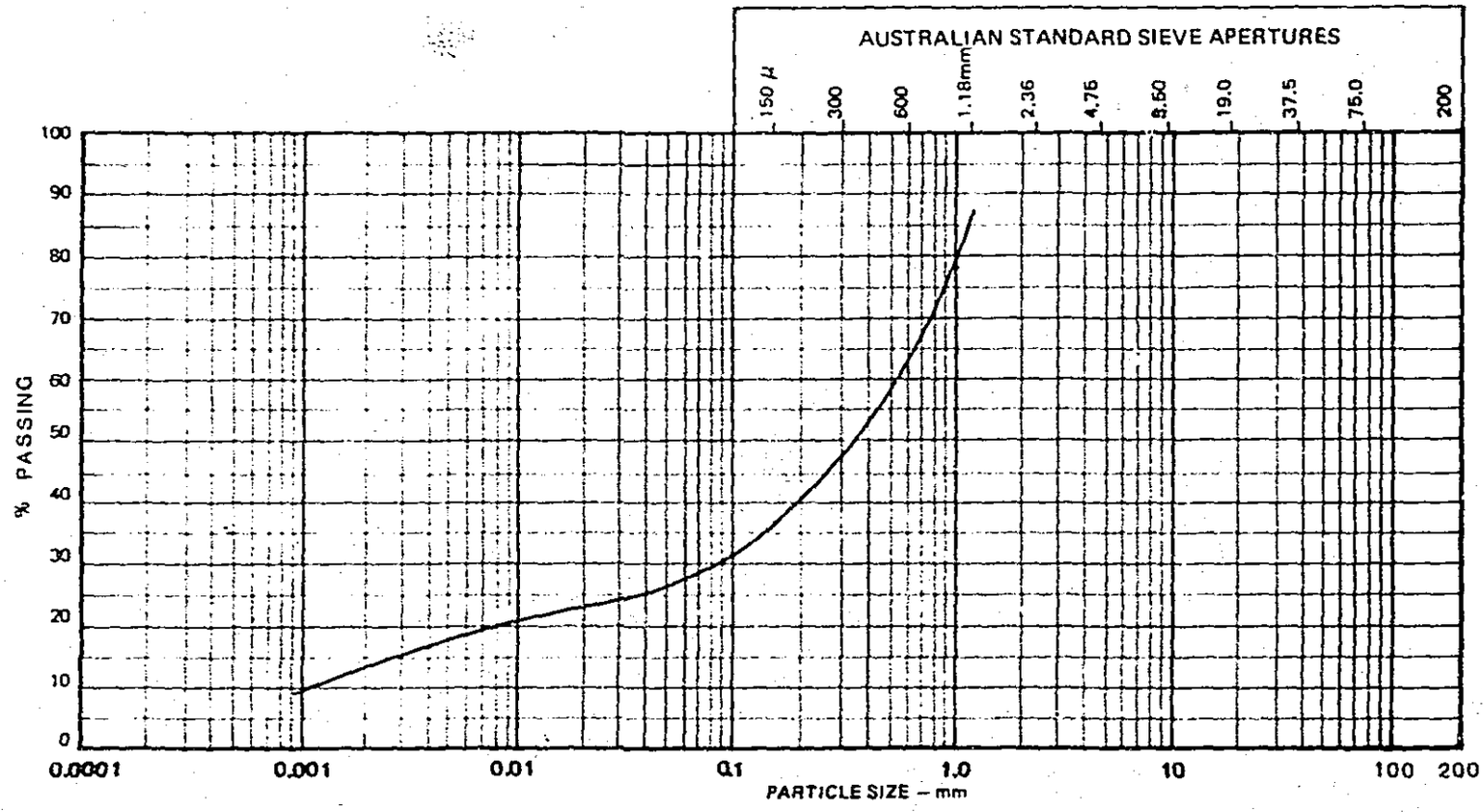
BOREHOLE GY 176B

SAMPLE No. T1 - M2 SEAM ROOF

DEPTH 27.29m

Author:	Date:	Fig. 1
Report No:	Drawing No:	

15.2

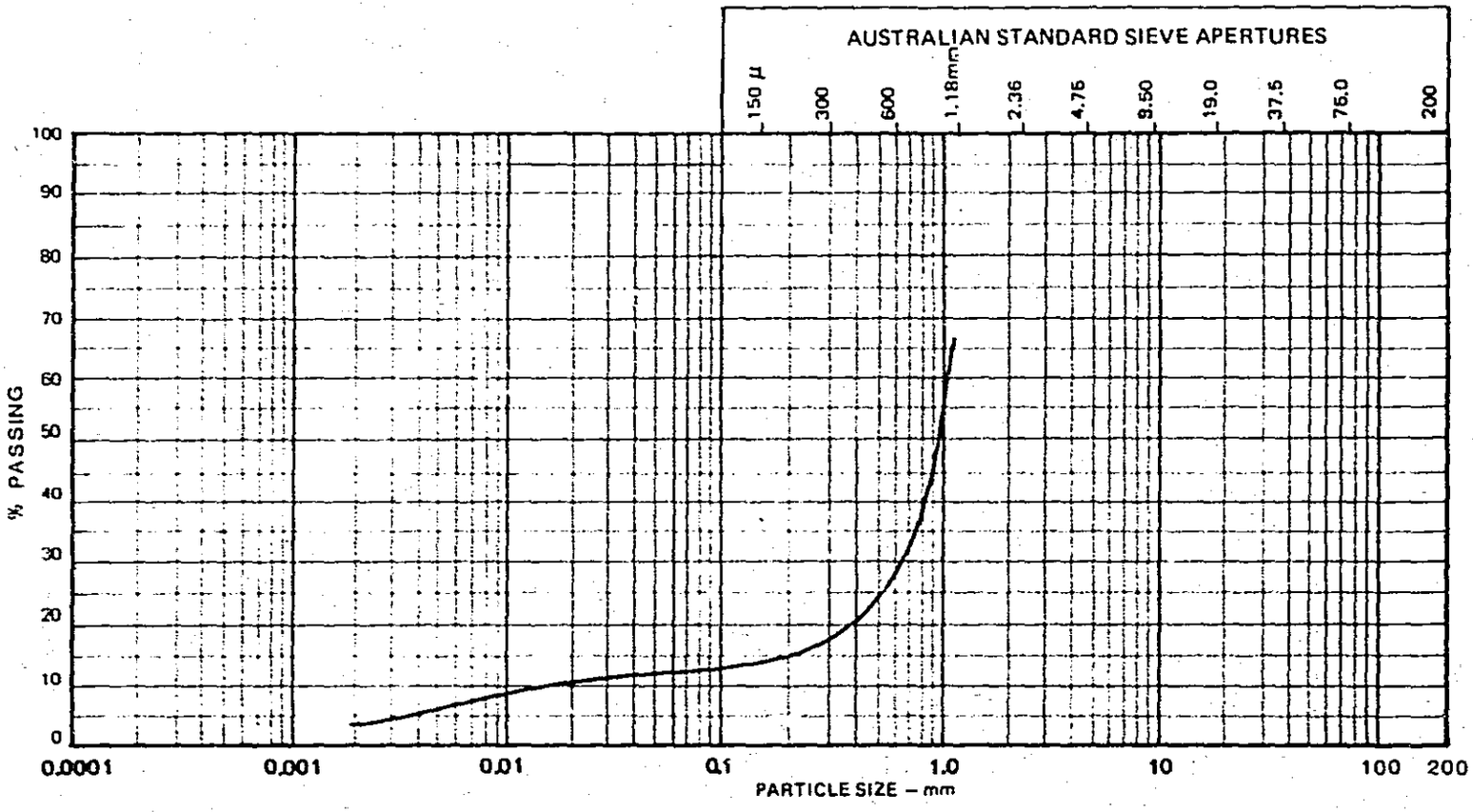


CLAY FRACTION	SILT FRACTION			SAND FRACTION			GRAVEL FRACTION			COBBLES
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	

PARTICLE SIZE DISTRIBUTION

BOREHOLE GY 176A
SAMPLE No. T2 - M2 SEAM FLOOR
DEPTH 28.10m

Author:	Date:	Fig. 2
Report No:	Drawing No:	



CLAY FRACTION	SILT FRACTION			SAND FRACTION			GRAVEL FRACTION			COBBLES
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	

PARTICLE SIZE DISTRIBUTION

BOREHOLE GY 176B
SAMPLE No. T4 - L2 SEAM FLOOR
DEPTH 108.34m

Author :	Date :	Fig. 3
Report No:	Drawing No:	

15.4

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

*** FRAME A01***

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 174AL

HOLE TYPE	CORE
EASTING	591,864 M AM GRID
NORTHING	5,398,612 M AM GRID
ELEVATION	463.04 M
TOTAL DEPTH DRILLED	133.12 M
DRILLING STARTED	20/09/82
DRILLING TIME	15 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	190.0 MM
LENGTH CASED	11.00 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	ASSOCIATED DIAMOND DRILLERS
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P L SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP' DESCRIPTION ***	GEOLOGICAL DESCRIPTION
11.00	11.00			100% DOLERITE	SCREE.
30.00	19.00			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
30.53	0.53			99% SANDSTONE,MEDIUM GRAINED 1% COAL	LIGHT GREY. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
30.99	0.46			70% SANDSTONE,MEDIUM GRAINED 30% COAL	LIGHT GREY. STREAKS, FRAGMENTS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, SOME SEPARATION ALONG BEDDING SURFACES, BEDS DIP' 20 DEG., WITH MUD PELLETS, WITH CARBONACEOUS WISPS.
31.17	0.18			85% SANDSTONE,MEDIUM GRAINED 10% COAL 5% MUDSTONE	LIGHT GREY. FRAGMENTS, STREAKS, BLACK. PELLETAL, FRAGMENTS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
31.23	0.06			80% MUDSTONE 20% SANDSTONE,MEDIUM GRAINED	FRAGMENTS, PELLETAL, GREY. LIGHT GREY. UNWEATHERED, MODERATELY WEAK ROCK.
32.06	0.83			100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
32.36	0.30	100	T1	100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY.
32.42	0.06	100	T2	100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY.
32.63	0.21	100	T3	90% SANDSTONE 10% CARBONACEOUS MUDSTONE	MED.-FINE GRAINED, LIGHT GREY. LAMINAE, STREAKS, BROWN-BLACK.
32.96	0.33			90% SANDSTONE 10% CARBONACEOUS MUDSTONE	MED.-FINE GRAINED, LIGHT GREY. LAMINAE, STREAKS, BROWN-BLACK.
33.02	0.06			95% SANDSTONE 5% COAL	MED.-FINE GRAINED, LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
33.06	0.04			100% CARBONACEOUS MUDSTONE	LENSES, BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
33.18	0.12			75% SANDSTONE,MEDIUM GRAINED 15% CARBONACEOUS MUDSTONE 10% COAL	LIGHT GREY. LENSES, FRAGMENTS, BROWN. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
33.63	0.45			80% SANDSTONE 20% COAL	MED.-COARSE GRAINED, LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS MIDDLE 1 : 429.41 M R.L.	
33.69	0.06		A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
33.74	0.05		A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
33.76	0.02		A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
33.92	0.16		A1	100% COAL, DULL	BLACK, WITH PYRITE ON JOINTS, UNWEATHERED, MODERATELY WEAK ROCK, MODERATELY CLOSE JOINT SPACING, JOINTS DIP 90 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES.
33.93	0.01		A1	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
34.04	0.11		A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
34.20	0.16		A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
34.29	0.09		A2	100% MUDSTONE	GREY, UNWEATHERED, WEAK ROCK, SLOW SLAKING.
34.37	0.08		A2	100% CLAYSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, VERY WEAK ROCK, RAPID SLAKING.
34.48	0.11		A3	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
34.50	0.02		A3	100% CLAYSTONE	CREAM, UNWEATHERED, VERY WEAK ROCK.
34.58	0.08		A3	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
34.75	0.17		A3	70% COAL, DULL WITH FEW BRIGHT BANDS 30% COAL, BRIGHT	BLACK. BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
34.98	0.23		A3	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.05	0.07		A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.24	0.19		A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.28	0.04		A3	100% CARBONACEOUS MUDSTONE	COALY, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.33	0.05		A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.34	0.01		A3	100% CARBONACEOUS MUDSTONE	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.40	0.06		A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

BASE OF MT. NICHOLAS MIDDLE 1 : THICKNESS= 1.77 M; SAMPLED THICKNESS= 1.77 M

35.65	0.25		100% MUDSTONE	GREY, UNWEATHERED, VERY WEAK ROCK.
36.39	0.74		100% MUDSTONE	SILTY, GREY, UNWEATHERED, WEAK ROCK.
37.80	1.41		100% SANDSTONE	MED.-FINE GRAINED, MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.

*** CHIP DESCRIPTION ***

60.00	22.20		100% SEDIMENTARY ROCK

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP DESCRIPTION ***	GEOLOGICAL DESCRIPTION
120.50	60.50			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
120.54	0.04			70% MUDSTONE 30% MUDSTONE	CARBONACEOUS, DARK GREY. GREY. UNWEATHERED, MODERATELY WEAK ROCK.
120.71	0.17			100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
121.44	0.73			85% MUDSTONE 15% CARBONACEOUS MUDSTONE	CARBONACEOUS, DARK GREY. BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
121.73	0.29			80% COAL, DULL 15% COAL, DULL WITH FEW BRIGHT BANDS 5% CARBONACEOUS MUDSTONE	BLACK. BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
122.01	0.28			100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
123.60	1.59	90		70% SANDSTONE,FINE GRAINED 28% SILTSTONE 2% MUDSTONE	LIGHT GREY. BANDS, LENSES, GREY. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
124.03	0.43			65% SILTSTONE 20% SANDSTONE,FINE GRAINED 15% MUDSTONE	GREY. BANDS, LIGHT GREY. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
124.64	0.61			100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
124.77	0.13			90% MUDSTONE 10% MUDSTONE	CARBONACEOUS, DARK GREY. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
125.08	0.31			100% MUDSTONE	MASSIVE, SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
125.34	0.26			75% SANDSTONE,FINE GRAINED 25% SILTSTONE	LIGHT GREY. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
125.67	0.33			100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
125.80	0.13			100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
		TOP OF	MT. NICHOLAS LOWER 1 : 337.24 M R.L.		
125.82	0.02		A4	100% CARBONACEOUS MUDSTONE	COALY, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
126.00	0.18		A4	75% COAL, DULL 25% CARBONACEOUS MUDSTONE	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
127.00	1.00	0	A4	CORE LOSS	
127.32	0.32		A4	70% COAL, DULL WITH FEW BRIGHT BANDS 30% COAL, DULL	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
127.34	0.02		A4	100% TONSTEIN	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
127.42	0.08		A4	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
127.43	0.01		A4	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
127.55	0.12		A4	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
127.61	0.06		A4	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
127.64	0.03		A4	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
127.84	0.20		A4	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
127.95	0.11		A4	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
		BASE OF MT. NICHOLAS LOWER 1 : THICKNESS= 2.15 M; SAMPLED THICKNESS= 2.15 M			
128.00	0.05		T11	100% SILTSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
128.50	0.50		T11	90% SILTSTONE 10% MUDSTONE	GREY. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
128.56	0.06			100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
128.57	0.01			100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
128.82	0.25			100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
129.20	0.38			75% SILTSTONE 25% MUDSTONE	GREY. SILTY, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
130.20	1.00	0		CORE LOSS	
130.90	0.70			100% SILTSTONE	CARBONACEOUS, BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
131.05	0.15			90% MUDSTONE 10% MUDSTONE	BADLY BROKEN, GREY. CARBONACEOUS, DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
		TOP OF MT. NICHOLAS LOWER 2 : 331.99 M R.L.			
131.09	0.04	100	A5	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
131.20	0.11	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.26	0.06	100	A5	100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
131.38	0.12	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.39	0.01	100	A5	100% CLAYSTONE	TUFFACEOUS, CREAM, UNWEATHERED, MODERATELY WEAK ROCK.
131.46	0.07	100	A5	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.49	0.03	100	A5	50% COAL, DULL 40% CLAYSTONE 10% TONSTEIN	BLACK. TUFFACEOUS, CREAM. WHITE. UNWEATHERED, MODERATELY WEAK ROCK.
131.60	0.11	100	A5	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.80	0.20	100	A5	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.84	0.04	100	A5	90% CARBONACEOUS MUDSTONE 10% MUDSTONE	COALY, BLACK. PELLETAL, LIGHT BROWN. UNWEATHERED, MODERATELY WEAK ROCK.
131.85	0.01	100	A5	100% TONSTEIN	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
131.91	0.06	100	A5	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.92	0.01	100	A5	100% TONSTEIN	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
132.05	0.13	100	A5	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
132.06	0.01	100	A5	100% COAL, MID LUSTROUS - DULL	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
132.42	0.36	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
132.50	0.08	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
132.63	0.13	100	A5	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
132.80	0.17	100	A5	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
133.02	0.22	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 1.97 M; SAMPLED THICKNESS= 1.97 M	
133.12	0.10			100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
M1	1.77 M	33.63 - 35.40 M	1.77 M
L1	2.15 M	125.80 - 127.95 M	2.15 M
L2	1.97 M	131.05 - 133.02 M	1.97 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
T1	32.06 - 32.36 M	0.30 M
T2	32.36 - 32.42 M	0.06 M
T3	32.42 - 32.63 M	0.21 M
A1	33.63 - 34.20 M	0.57 M
A2	34.20 - 34.37 M	0.17 M
A3	34.37 - 35.40 M	1.03 M
A4	125.80 - 127.95 M	2.15 M
T11	127.95 - 128.50 M	0.55 M
A5	131.05 - 133.02 M	1.97 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 174BL

HOLE TYPE	CORE
EASTING	591,864 M AM GRID
NORTHING	5,398,605 M AM GRID
ELEVATION	463.04 M
TOTAL DEPTH DRILLED	131.99 M
DRILLING STARTED	05/10/82
DRILLING TIME	17 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	190.0 MM
LENGTH CASED	12.00 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	ASSOCIATED DIAMOND DRILLERS
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P.SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP DESCRIPTION ***	GEOLOGICAL DESCRIPTION
8.50	8.30			100% DOLERITE	SCREE.
32.50	24.00			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
33.11	0.61	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, WEAK ROCK.
33.30	0.19	100	T1	100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, WEAK ROCK.
33.63	0.33	100	T2	100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, WEAK ROCK.
33.80	0.17	100		55% SANDSTONE,MEDIUM GRAINED 45% COAL	FRAGMENTS, BADLY BROKEN, LIGHT GREY. FRAGMENTS, BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS MIDDLE 1 : 429.24 M R.L.	
33.90	0.10	100	A1	100% CLAYSTONE	BROWN, UNWEATHERED, VERY WEAK ROCK, RAPID SLAKING.
34.03	0.13	100	A1	90% COAL, DULL 10% CARBONACEOUS MUDSTONE	BLACK. COALY, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
34.18	0.15	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
34.22	0.04	100	A1	100% CLAYSTONE	BROWN, UNWEATHERED, MODERATELY WEAK ROCK, SLOW SLAKING.
34.30	0.08	100	A1	100% CARBONACEOUS MUDSTONE	GRADING TO, HEAVY DULL COAL, BROWN-BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
34.87	0.57	100	A1	70% COAL, DULL 25% COAL, DULL WITH FEW BRIGHT BANDS 5% MUDSTONE	BADLY BROKEN, BLACK. BANDS, BADLY BROKEN, BLACK. LAMINAE, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
34.90	0.03	100	A1	100% MUDSTONE	BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK, RAPID SLAKING.
35.03	0.13	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.06	0.03	100	A1	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.10	0.04	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, WITH PYRITE ON JOINTS, UNWEATHERED, MODERATELY WEAK ROCK.
35.50	0.40	100	A1	69% COAL, DULL WITH FEW BRIGHT BANDS 30% COAL, DULL 1% MUDSTONE	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. LAMINAE, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
35.51	0.01	100	A1	55% COAL, DULL WITH FEW BRIGHT BANDS 45% MUDSTONE	BLACK. LAMINAE, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
35.55	0.04	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
35.56	0.01	100	A1	55% COAL, DULL 45% MUDSTONE	BLACK. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
35.70	0.14	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.77	0.07	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
35.80	0.03	100	A1	100% MUDSTONE	CARBONACEOUS, BROWN-BLACK, UNWEATHERED, VERY WEAK ROCK.
35.91	0.11	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
	BASE OF MT. NICHOLAS MIDDLE 1 : THICKNESS= 2.11 M; SAMPLED THICKNESS= 2.11 M				
36.09	0.18	100	T3	100% MUDSTONE	GREY, UNWEATHERED, WEAK ROCK.
				*** CHIP DESCRIPTION ***	
122.00	85.91			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
122.70	0.70	100		100% CARBONACEOUS MUDSTONE	DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
123.02	0.32	100		100% CO _, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
123.46	0.44	75		100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
123.60	0.14	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
124.28	0.68	100		75% SANDSTONE,FINE GRAINED 20% SILTSTONE 5% SANDSTONE,MEDIUM GRAINED	LIGHT GREY. BANDS, LENSES, GREY. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
124.64	0.36	100		80% SANDSTONE,MEDIUM GRAINED 15% SILTSTONE 5% COAL	LIGHT GREY. LAMINAE, LIGHT GREY. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
124.82	0.18	100	T11	81% SILTSTONE 10% CALCITE 9% MUDSTONE	GREY. LENSES, WHITE. LAMINAE, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
124.84	0.02	100	T11	100% CLAYSTONE	BANDS, GREY, UNWEATHERED, VERY WEAK ROCK, RAPID SLAKING.
124.91	0.07	100	T11	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
	TOP OF MT. NICHOLAS LOWER 1 : 338.13 M R.L.				

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
124.95	0.04	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.16	0.21	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BAKED, UNWEATHERED, MODERATELY WEAK ROCK.
125.21	0.05	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.22	0.01	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.24	0.02	100	A2	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.25	0.01	100	A2	60% COAL, MID LUSTROUS 40% COAL, BRIGHT	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
125.38	0.13	100	A2	90% COAL, MID LUSTROUS - DULL 10% COAL, BRIGHT	BLACK. BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
125.39	0.01	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.42	0.03	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.50	0.08	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.68	0.18	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.75	0.07	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
125.78	0.03	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
126.30	0.52	100	A2	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
126.31	0.01	100	A2	100% MUDSTONE	BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
126.44	0.13	100	A2	55% COAL, DULL 45% CARBONACEOUS MUDSTONE	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
126.47	0.03	100	A2	85% TONSTEIN 15% COAL, DULL	WHITE. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
126.53	0.06	100	A2	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
126.55	0.02	100	A2	95% CLAYSTONE 5% COAL, DULL	TUFFACEOUS, WHITE. LENSES, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
126.59	0.04	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
126.60	0.01	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
126.62	0.02	100	A2	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
126.66	0.04	100	A2	100% CARBONACEOUS MUDSTONE	BROWN-BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
126.98	0.32	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
127.00	0.02	100	A2	100% MUDSTONE	LIGHT BROWN, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
127.05	0.05	100	A2	100% COAL, HEAVY DULL	CHERTY, COARSE GRAINED, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 1 : THICKNESS= 2.14 M; SAMPLED THICKNESS= 2.14 M	
127.10	0.05	100		100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
127.33	0.23	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
127.52	0.19	100	T12	100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
127.85	0.33	100		95% MUDSTONE 5% COAL	SILTY, GREY. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
128.14	0.29	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
128.94	0.80	100		100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
129.04	0.10	100		100% CARBONACEOUS MUDSTONE	BRIGHT COAL, LENSES, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
129.30	0.26	100		100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
129.60	0.30	100		100% SILTSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
129.75	0.15			100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
130.06	0.31		T13	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
130.16	0.10	100	T13	100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS LOWER 2 : 332.88 M R.L.	
130.59	0.43	100	A3	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
130.60	0.01	100	A3	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
130.65	0.05	100	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
130.66	0.01	100	A3	100% CLAYSTONE	BROWN, UNWEATHERED, VERY WEAK ROCK.
130.69	0.03	100	A3	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
130.84	0.15	100	A3	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
130.96	0.12	100	A3	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
130.97	0.01	100	A3	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
131.03	0.06	100	A3	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
131.18	0.15	100	A3	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.43	0.25	100	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.60	0.17	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
131.93	0.33	0		CORE LOSS	
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 1.77 M; SAMPLED THICKNESS= 1.44 M	
131.99	0.06	100	T14	100% SANDSTONE,FINE GRAINED	CARBONACEOUS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
M1	2.11 M	33.80 - 35.91 M	2.11 M
L1	2.14 M	124.91 - 127.05 M	2.14 M
L2	1.44 M	130.16 - 131.93 M	1.77 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
T1	33.11 - 33.30 M	0.19 M
T2	33.30 - 33.63 M	0.33 M
A1	33.80 - 35.91 M	2.11 M
T3	35.91 - 36.09 M	0.18 M
T11	124.64 - 124.91 M	0.27 M
A2	124.91 - 127.05 M	2.14 M
T12	127.33 - 127.52 M	0.19 M
T13	129.75 - 130.16 M	0.41 M
A3	130.16 - 131.60 M	1.44 M
T14	131.93 - 131.99 M	0.06 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 175AL

HOLE TYPE	CORE
EASTING	590,400 M AM GRID
NORTHING	5,398,693 M AM GRID
ELEVATION	466.70 M
TOTAL DEPTH DRILLED	123.30 M
DRILLING STARTED	18/10/82
DRILLING TIME	7 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	190.0 MM
LENGTH CASED	6.00 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	ASSOCIATED DIAMOND DRILLERS
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P.SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP' DESCRIPTION ***	GEOLOGICAL DESCRIPTION
3.00	3.00			100% DOLERITE	SCREE.
113.20	110.20			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
114.65	1.45	80		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
114.86	0.21	100		75% MUDSTONE 25% CARBONACEOUS MUDSTONE	CARBONACEOUS, DARK GREY. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
115.23	0.37	100		60% SANDSTONE,FINE GRAINED 40% CARBONACEOUS MUDSTONE	LIGHT GREY. LAMINAE, BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
115.51	0.28	100		100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
116.00	0.49	100		85% SANDSTONE,FINE GRAINED 15% CARBONACEOUS MUDSTONE	LIGHT GREY. BANDS, DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
116.18	0.18	100		70% SANDSTONE,FINE GRAINED 30% MUDSTONE	CARBONACEOUS, DARK GREY. BANDS, CARBONACEOUS, DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
116.76	0.58	100		90% SANDSTONE,FINE GRAINED 10% COAL	LIGHT GREY. BANDS, COARSE GRAINED, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
117.02	0.26	100	T1	90% SANDSTONE,FINE GRAINED 10% COAL	LIGHT GREY. BANDS, COARSE GRAINED, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS LOWER 1 : 349.68 M R.L.	
117.12	0.10	0	A1	CORE LOSS	
117.20	0.08	100	A1	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.22	0.02	100	A1	100% MUDSTONE	CARBONACEOUS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
117.25	0.03	100	A1	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.29	0.04	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.32	0.03	100	A1	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.35	0.03	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.37	0.02	100	A1	100% MUDSTONE	BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
117.38	0.01	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
117.39	0.01	100	A1	100% MUDSTONE	BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
117.51	0.12	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.52	0.01	100	A1	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.73	0.21	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.74	0.01	100	A1	60% COAL, DULL 40% COAL, BRIGHT	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
118.00	0.26	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.03	0.03	100	A1	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.08	0.05	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.21	0.13	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.22	0.01	100	A1	60% COAL, BRIGHT 40% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
118.28	0.06	100	A1	100% CARBONACEOUS MUDSTONE	DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
118.32	0.04	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.39	0.07	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.47	0.08	100	A1	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.55	0.08	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.59	0.04	100	A1	100% CARBONACEOUS MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
118.60	0.01	100	A1	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.61	0.01	100	A1	55% COAL, HEAVY DULL 45% TONSTEIN	BLACK. WHITE. UNWEATHERED, MODERATELY WEAK ROCK.
118.64	0.03	100	A1	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
118.68	0.04	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.70	0.02	100	A1	55% COAL, HEAVY DULL 45% MUDSTONE	BLACK. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
118.77	0.07	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.78	0.01	100	A1	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.81	0.03	100	A1	100% MUDSTONE	BRIGHT COAL, STREAKS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
118.87	0.06	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.89	0.02	100	A1	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
118.91	0.02	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.92	0.01	100	A1	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.95	0.03	100	A1	100% COAL, MID LUSTROUS - BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.96	0.01	100	A1	100% MUDSTONE	BANDS, BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
119.00	0.04	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
119.05	0.05	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
119.10	0.05	100	A1	75% COAL, DULL WITH FEW BRIGHT BANDS 25% COAL, DULL	BADLY BROKEN, BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
119.15	0.05	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
119.17	0.02	100	A1	100% MUDSTONE	BANDS, BADLY BROKEN, BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
119.30	0.13	100	A1	70% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, DULL 10% COAL, BRIGHT	BADLY BROKEN, BLACK. BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 1 : THICKNESS= 2.28 M; SAMPLED THICKNESS= 2.28 M	
119.32	0.02	100	T2	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
119.69	0.37	100	T2	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
119.70	0.01	100	T2	100% CARBONACEOUS MUDSTONE	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
119.75	0.05	100	T2	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
120.15	0.40	100		100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
120.22	0.07	100		100% MUDSTONE	COALY, STREAKS, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
120.33	0.11	0		CORE LOSS	
120.35	0.02	100	T3	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
120.57	0.22	100	T3	100% SILTSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
120.74	0.17	100	T3	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
120.76	0.02	100	T3	100% CARBONACEOUS MUDSTONE	COALY, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS LOWER 2 : 345.94 M R.L.	
120.97	0.21	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
120.98	0.01	0	A2	CORE LOSS	

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
121.15	0.17	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
121.16	0.01	0	A2	CORE LOSS	
121.31	0.15	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
121.34	0.03	100	A2	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
121.35	0.01	100	A2	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
121.77	0.42	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
121.79	0.02	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
121.84	0.05	100	A2	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
121.95	0.11	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
121.99	0.04	100	A2	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.01	0.02	100	A2	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
122.03	0.02	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.15	0.12	100	A2	60% COAL, DULL WITH FEW BRIGHT BANDS 30% COAL, DULL 10% COAL, INTERBANDED DULL AND BRIGHT	BADLY BROKEN, BLACK. BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
122.40	0.25	0	A2	CORE LOSS	
122.46	0.06	100	A2	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.57	0.11	100	A2	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 1.81 M; SAMPLED THICKNESS= 1.81 M	
122.60	0.03	100	T4	100% MUDSTONE	CARBONACEOUS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
122.95	0.35	100	T4	100% MUDSTONE	SILTSTONE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
123.13	0.18	100		100% MUDSTONE	SILTSTONE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
123.30	0.17	0		CORE LOSS	

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
L1	2.28 M	117.02 - 119.30 M	2.28 M
L2	1.81 M	120.76 - 122.57 M	1.81 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
T1	116.76 - 117.02 M	0.26 M
A1	117.02 - 119.30 M	2.28 M
T2	119.30 - 119.75 M	0.45 M
T3	120.33 - 120.76 M	0.43 M
A2	120.76 - 122.57 M	1.81 M
T4	122.57 - 122.95 M	0.38 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 175BL

HOLE TYPE	CORE
EASTING	590,414 M AM GRID
NORTHING	5,398,686 M AM GRID
ELEVATION	466.70 M
TOTAL DEPTH DRILLED	122.66 M
DRILLING STARTED	20/10/82
DRILLING TIME	10 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	190.0 MM
LENGTH CASED	6.00 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	ASSOCIATED DIAMOND DRILLERS
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P L SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP DESCRIPTION ***	GEOLOGICAL DESCRIPTION
4.50	4.50			100% DOLERITE	SCREE.
113.60	109.10			100% SEDIMENTARY ROCK	MODERATELY WEAK ROCK.
				*** CORE DESCRIPTION ***	
114.41	0.81	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
115.21	0.80	0		CORE LOSS	
115.24	0.03	100		100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
115.36	0.12	100		98% SANDSTONE,FINE GRAINED 2% COAL	LIGHT GREY. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
115.77	0.41	100		90% CARBONACEOUS MUDSTONE 10% SANDSTONE,FINE GRAINED	DARK GREY. LAMINAE, BANDS, LIGHT GREY. UNWEATHERED, MODERATELY WEAK ROCK.
115.95	0.18	100		80% SANDSTONE,FINE GRAINED 20% CARBONACEOUS MUDSTONE	COALY, STREAKS, LIGHT GREY. LAMINAE, BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
116.56	0.61	100		95% CARBONACEOUS MUDSTONE 5% SANDSTONE,FINE GRAINED	BLACK. LENSES, BANDS, LIGHT GREY. UNWEATHERED, MODERATELY WEAK ROCK.
116.71	0.15	100		100% SANDSTONE	MED.-FINE GRAINED, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
116.76	0.05	100		100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
116.77	0.01	100		100% SANDSTONE,FINE GRAINED	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
116.80	0.03	100		100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.00	0.20	100		95% SANDSTONE,FINE GRAINED 5% COAL	LIGHT GREY. LAMINAE, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
117.17	0.17	100		75% CARBONACEOUS MUDSTONE 15% SANDSTONE,FINE GRAINED 10% COAL	BLACK. BANDS, LIGHT GREY. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
117.34	0.17	100	T1	90% SANDSTONE,FINE GRAINED 10% COAL	LIGHT GREY. LAMINAE, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, EROSIONAL BASAL CONTACT.
				TOP OF MT. NICHOLAS LOWER 1 : 349.36 M R.L.	
117.37	0.03	100	A1	80% COAL, BRIGHT WITH FEW DULL BANDS 20% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
117.44	0.07	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
117.51	0.07	100	A1	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.71	0.20	0	A1	CORE LOSS	
117.77	0.06	100	A1	70% COAL, DULL 30% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
117.79	0.02	100	A1	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
117.89	0.10	0	A1	CORE LOSS	
117.93	0.04	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.94	0.01	100	A1	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
117.96	0.02	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
117.97	0.01	100	A1	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
118.07	0.10	0	A1	CORE LOSS	
118.23	0.16	100	A1	80% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, DULL	BADLY BROKEN, BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
118.24	0.01	100	A1	100% MUDSTONE	BANDS, LIGHT BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
118.34	0.10	0	A1	CORE LOSS	
118.43	0.09	100	A1	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.46	0.03	100	A1	70% CARBONACEOUS MUDSTONE 20% COAL, HEAVY DULL 10% COAL, DULL	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
118.56	0.10	0	A1	CORE LOSS	
118.59	0.03	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.60	0.01	100	A1	60% TONSTEIN 40% COAL, DULL	WHITE. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
118.61	0.01	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.62	0.01	100	A1	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
118.65	0.03	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.75	0.10	0	A1	CORE LOSS	
118.76	0.01	100	A1	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
118.78	0.02	100	A1	100% MUDSTONE	BANDS, LIGHT BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
118.81	0.03	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.88	0.07	100	A1	80% MUDSTONE 20% CARBONACEOUS MUDSTONE	BANDS, GREY. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
118.90	0.02	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
118.94	0.04	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
119.01	0.07	0	A1	CORE LOSS	
119.44	0.43	100	A1	100% COAL, INTERBANDED DULL AND BRIGHT	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 1 : THICKNESS= 2.10 M; SAMPLED THICKNESS= 2.10 M	
119.74	0.30	100	T2	100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
120.23	0.49	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
120.65	0.42	100		100% MUDSTONE	CARBONACEOUS, BADLY BROKEN, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
121.00	0.35	100		100% MUDSTONE	SILTSTONE, BADLY BROKEN, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
121.17	0.17	100		75% MUDSTONE 25% CARBONACEOUS MUDSTONE	BADLY BROKEN, GREY. BADLY BROKEN, DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS LOWER 2 : 345.53 M R.L.	
121.74	0.57	100	A2	75% COAL, DULL 25% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
121.76	0.02	100	A2	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
121.98	0.22	100	A2	100% COAL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.00	0.02	100	A2	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
122.03	0.03	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.06	0.03	100	A2	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
122.13	0.07	100	A2	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.16	0.03	100	A2	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
122.24	0.08	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC X	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
122.32	0.08	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.41	0.09	100	A2	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.43	0.02	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.54	0.11	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.55	0.01	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
122.59	0.04	100	A2	60% CARBONACEOUS MUDSTONE 40% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
122.62	0.03	100	A2	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 1.45 M; SAMPLED THICKNESS= 1.45 M	
122.66	0.04	100		100% SANDSTONE,FINE GRAINED	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
L1	2.10 M	117.34 - 119.44 M	2.10 M
L2	1.45 M	121.17 - 122.62 M	1.45 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
T1	117.17 - 117.34 M	0.17 M
A1	117.34 - 119.44 M	2.10 M
T2	119.44 - 119.74 M	0.30 M
A2	121.17 - 122.62 M	1.45 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 176AL

HOLE TYPE	
EASTING	590,313 M AM GRID
NORTHING	5,401,344 M AM GRID
ELEVATION	486.23 M
TOTAL DEPTH DRILLED	108.00 M
DRILLING STARTED	29/10/82
DRILLING TIME	
CORE SIZE	100.0 MM
HOLE SIZE	190.0 MM
LENGTH CASED	9.00 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	ASSOCIATED DIAMOND DRILLERS
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P. SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP DESCRIPTION ***	GEOLOGICAL DESCRIPTION
11.50	11.50			100% DOLERITE	SCREE.
23.30	11.80			100% SEDIMENTARY ROCK	MODERATELY WEAK ROCK.
				*** CORE DESCRIPTION ***	
24.39	1.09	100		55% SANDSTONE,FINE GRAINED 25% CARBONACEOUS MUDSTONE 20% SILTSTONE	LIGHT GREY. LAMINAE, BLACK. LAMINAE, BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS, WITH MUD PELLETS.
24.72	0.33	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
24.84	0.12	100		100% SILTSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
25.10	0.26	100		100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
25.20	0.10	100		100% MUDSTONE	SILTY, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
25.30	0.10	0		CORE LOSS	
25.40	0.10	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
25.45	0.05	0		CORE LOSS	
25.75	0.30	100		75% COAL, DULL 25% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
25.76	0.01	100		100% CARBONACEOUS MUDSTONE	BANDS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH MUD PELLETS.
25.86	0.10	100		100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
26.30	0.44	100		100% CARBONACEOUS MUDSTONE	DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
26.41	0.11	100		100% MUDSTONE	BADLY BROKEN, GREY, UNWEATHERED, MODERATELY WEAK ROCK, MODERATELY WIDE JOINT SPACING, JOINTS DIP 45 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES.
26.78	0.37	100	T1	100% MUDSTONE	BADLY BROKEN, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
26.86	0.08	100	T1	75% MUDSTONE 25% MUDSTONE	BADLY BROKEN, GREY. CARBONACEOUS, BADLY BROKEN, DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS MIDDLE 2 : 459.37 M R.L.	
26.92	0.06	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
26.93	0.01	100	A1	55% COAL, BRIGHT 45% COAL, DULL	BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE	GEOLOGICAL DESCRIPTION
				*** CORE DESCRIPTION ***	
26.94	0.01	100	A1	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
26.96	0.02	100	A1	100% CARBONACEOUS MUDSTONE	BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
26.98	0.02	100	A1	90% TONSTEIN 10% COAL, HEAVY DULL	WHITE. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
27.36	0.38	100	A1	95% COAL, DULL 5% COAL, BRIGHT	BLACK. BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
27.51	0.15	100	A1	100% COAL, DULL	BADLY BROKEN, FAULT GOUGE, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
27.60	0.09	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
27.69	0.09	100	A1	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
27.73	0.04	0	A1	CORE LOSS	
27.75	0.02	100	A1	80% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, DULL	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
27.76	0.01	100	A1	100% COAL, BRIGHT	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
28.05	0.29	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS MIDDLE 2 : THICKNESS= 1.19 M; SAMPLED THICKNESS= 1.19 M	
28.10	0.05	100	T2	100% CARBONACEOUS MUDSTONE	BRIGHT COAL, STREAKS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
28.38	0.28	100	T2	100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
28.56	0.18	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
29.30	0.74	100		65% SANDSTONE,FINE GRAINED 30% SILTSTONE 5% CARBONACEOUS MUDSTONE	COALY, FRAGMENTS, LIGHT GREY. BANDS, LENSES, GREY. LAMINAE, STREAKS, DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
				*** CHIP DESCRIPTION ***	
102.00	72.70			100% SEDIMENTARY ROCK	UNWEATHERED, MODERATELY WEAK ROCK.
				*** CORE DESCRIPTION ***	
102.70	0.70	20		100% SANDSTONE,MEDIUM GRAINED	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
105.31	2.61	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
105.69	0.38	100	T3	100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE	GEOLOGICAL DESCRIPTION
				*** CORE DESCRIPTION ***	
		TOP OF MT. NICHOLAS LOWER 2 : 380.54 M R.L.			
105.76	0.07	100	A2	100% CARBONACEOUS MUDSTONE	COALY, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
105.87	0.11	100	A2	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
105.91	0.04	100	A2	100% MUDSTONE	LIGHT BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
106.37	0.46	100	A2	70% COAL, DULL 30% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
106.52	0.15	0	A2	CORE LOSS	
106.53	0.01	100	A2	100% TONSTEIN	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
106.58	0.05	100	A2	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
106.66	0.08	100	A2	75% COAL, DULL 20% CARBONACEOUS MUDSTONE 5% MUDSTONE	BLACK. BLACK. LAMINAE, LIGHT GREY. UNWEATHERED, MODERATELY WEAK ROCK.
106.68	0.02	100	A2	100% TONSTEIN	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
106.72	0.04	100	A2	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
106.73	0.01	100	A2	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
106.88	0.15	0		CORE LOSS	
106.90	0.02	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
		BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 1.21 M; SAMPLED THICKNESS= 1.06 M			
106.93	0.03	100	T4	100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
107.41	0.48	100	T4	100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
108.00	0.59	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
M2	1.19 M	26.86 - 28.05 M	1.19 M
L2	1.06 M	105.69 - 106.90 M	1.21 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
T1	26.41 - 26.86 M	0.45 M
A1	26.86 - 28.05 M	1.19 M
T2	28.05 - 28.38 M	0.33 M
T3	105.31 - 105.69 M	0.38 M
A2	105.69 - 106.73 M	1.04 M
A2	106.88 - 106.90 M	0.02 M
T4	106.90 - 107.41 M	0.51 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 176BL

HOLE TYPE	CORE
EASTING	590,319 M AM GRID
NORTHING	5,401,334 M AM GRID
ELEVATION	486.23 M
TOTAL DEPTH DRILLED	108.95 M
DRILLING STARTED	03/11/82
DRILLING TIME	7 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	170.0 MM
LENGTH CASED	14.00 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	ASSOCIATED DIAMOND DRILLERS
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P.SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP DESCRIPTION ***	GEOLOGICAL DESCRIPTION
13.50	13.50			100% DOLERITE	SCREE.
23.50	10.00			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
23.82	0.32	100		100% SANDSTONE,MEDIUM GRAINED	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
23.99	0.17	100		60% SANDSTONE,MEDIUM GRAINED 40% MUDSTONE	LIGHT GREY. BANDS, FRAGMENTS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
24.50	0.51	80		100% MUDSTONE	BADLY BROKEN, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
24.61	0.11	100		100% MUDSTONE	CARBONACEOUS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
24.83	0.22	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
25.40	0.57	100		100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
25.70	0.30	100		100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, VERY WEAK ROCK.
25.73	0.03	100		100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
25.92	0.19	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
26.50	0.58	100		65% COAL, DULL 20% COAL, DULL WITH FEW BRIGHT BANDS 15% CARBONACEOUS MUDSTONE	BLACK. BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
26.81	0.31	100		100% SANDSTONE,FINE GRAINED	CARBONACEOUS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
26.93	0.12	100		55% MUDSTONE 45% CARBONACEOUS MUDSTONE	GREY. DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
27.29	0.36	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
27.63	0.34	100	T1	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS MIDDLE 2 : 458.60 M R.L.	
27.69	0.06	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
27.70	0.01	100	A1	100% CARBONACEOUS MUDSTONE	BANDS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
27.71	0.01	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
27.72	0.01	100	A1	100% MUDSTONE	BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
27.74	0.02	100	A1	100% CARBONACEOUS MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
27.77	0.03	100	A1	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
27.80	0.03	100	A1	75% COAL, HEAVY DULL 25% CARBONACEOUS MUDSTONE	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
27.85	0.05	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
27.86	0.01	100	A1	90% CARBONACEOUS MUDSTONE 10% TONSTEIN	 GREY. UNWEATHERED, MODERATELY WEAK ROCK.
28.30	0.44	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
28.32	0.02	100	A1	100% MUDSTONE	BANDS, BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
28.78	0.46	100	A1	65% COAL, DULL WITH FEW BRIGHT BANDS 35% COAL, DULL	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
28.79	0.01	100	A1	100% MUDSTONE	BANDS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
28.97	0.18	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
29.04	0.07	100	A1	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS MIDDLE 2 : THICKNESS= 1.41 M; SAMPLED THICKNESS= 1.41 M	
29.11	0.07	100	T2	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, VERY WEAK ROCK.
29.41	0.30	100	T2	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
29.50	0.09			100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
				*** CHIP DESCRIPTION ***	
102.60	73.10			100% SEDIMENTARY ROCK	UNWEATHERED.
				*** CORE DESCRIPTION ***	
102.87	0.27	100		90% SILTSTONE 10% SANDSTONE,MEDIUM GRAINED	GREY. LENSES, LIGHT GREY. UNWEATHERED, MODERATELY WEAK ROCK.
106.45	3.58	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
106.84	0.39	100	T3	100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS LOWER 2 : 379.39 M R.L.	
106.89	0.05	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
106.90	0.01	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
107.00	0.10	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
107.03	0.03	100	A2	100% CARBONACEOUS MUDSTONE	BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
107.06	0.03	100	A2	100% CLAYSTONE	CARBONACEOUS, BLACK, UNWEATHERED, VERY WEAK ROCK.
107.12	0.06	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
107.13	0.01	100	A2	55% COAL, BRIGHT 45% COAL, DULL	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
107.32	0.19	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
107.44	0.12	100	A2	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
107.54	0.10	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
107.55	0.01	100	A2	55% COAL, BRIGHT 45% COAL, DULL	LENSES, BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
107.74	0.19	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
107.76	0.02	100	A2	100% TONSTEIN	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
107.82	0.06	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
107.87	0.05	100	A2	100% TONSTEIN	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
107.88	0.01	100	A2	100% CLAYSTONE	LIGHT BROWN, UNWEATHERED, VERY WEAK ROCK.
107.99	0.11	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
108.00	0.01	100	A2	55% COAL, BRIGHT 45% COAL, DULL	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
108.05	0.05	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
108.07	0.02	100	A2	100% TONSTEIN	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
108.12	0.05	100	A2	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
108.17	0.05	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
108.25	0.08	100	A2	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 1.41 M; SAMPLED THICKNESS= 1.41 M	
108.27	0.02	100	T4	100% CLAYSTONE	BROWN, UNWEATHERED, VERY WEAK ROCK.
108.34	0.07	100	T4	100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
108.60	0.26	100	T4	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
108.64	0.04	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
108.95	0.31	100		100% MUDSTONE	SILTSTONE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
M2	1.41 M	27.63 - 29.04 M	1.41 M
L2	1.41 M	106.84 - 108.25 M	1.41 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
T1	27.29 - 27.63 M	0.34 M
A1	27.63 - 29.04 M	1.41 M
T2	29.04 - 29.41 M	0.37 M
T3	106.45 - 106.84 M	0.39 M
A2	106.84 - 108.25 M	1.41 M
T4	108.25 - 108.60 M	0.35 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 177AL

HOLE TYPE	CORE
EASTING	591,220 M AM GRID
NORTHING	5,402,290 M AM GRID
ELEVATION	480.51 M
TOTAL DEPTH DRILLED	104.84 M
DRILLING STARTED	13/12/82
DRILLING TIME	5 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	200.0 MM
LENGTH CASED	19.50 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	ASSOCIATED DIAMOND DRILLERS
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P.SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP DESCRIPTION ***	GEOLOGICAL DESCRIPTION
20.00	20.00			100% DOLERITE	SCREE.
26.50	6.50			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
26.70	0.20	0		CORE LOSS	
26.91	0.21	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
27.04	0.13	100		70% MUDSTONE 30% SANDSTONE,FINE GRAINED	GREY. LENSES, BANDS, LIGHT GREY. UNWEATHERED, MODERATELY WEAK ROCK.
27.43	0.39	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
27.57	0.14	100		80% SILTSTONE 20% MUDSTONE	GREY. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
28.27	0.70	100		60% MUDSTONE 40% SILTSTONE	GREY. BANDS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS MIDDLE 2 : 452.24 M R.L.	
28.55	0.28	100	A1	60% CARBONACEOUS MUDSTONE 40% MUDSTONE	INTERCALATIONS, MUDSTONE, BLACK. CARBONACEOUS, DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
28.62	0.07	100	A1	100% CARBONACEOUS MUDSTONE	COALY, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
28.63	0.01	100	A1	100% MUDSTONE	BANDS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
28.72	0.09	100	A1	100% COAL, HEAVY DULL	BLACK, WITH FRAGMENTS OF PYRITE, UNWEATHERED, MODERATELY WEAK ROCK.
29.00	0.28	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
29.06	0.06	100	A2	100% CLAYSTONE	TUFFACEOUS, CREAM, UNWEATHERED, WEAK ROCK.
29.28	0.22	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
29.38	0.10	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK, MODERATELY CLOSE JOINT SPACING, JOINTS DIP 80 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES, INFILLED WITH CALCITE.
29.39	0.01	100	A2	100% COAL, BRIGHT	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK, MODERATELY CLOSE JOINT SPACING, JOINTS DIP 80 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES, INFILLED WITH CALCITE.
29.71	0.32	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK, MODERATELY CLOSE JOINT SPACING, JOINTS DIP 80 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES, INFILLED WITH CALCITE.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
29.72	0.01	100	A2	60% COAL, BRIGHT 40% COAL, DULL	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
29.83	0.11	100	A2	100% COAL, DULL	GRADING TO, HEAVY DULL COAL, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
29.84	0.01	100	A2	60% TONSTEIN 40% COAL, DULL	GREY. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
29.85	0.01	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
29.86	0.01	100	A2	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
30.10	0.24	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
30.20	0.10	100	A2	100% CARBONACEOUS MUDSTONE	COALY, BADLY BROKEN, BLACK, WITH FRAGMENTS OF PYRITE, UNWEATHERED, MODERATELY WEAK ROCK.
30.28	0.08	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
30.39	0.11	100	A2	100% COAL, DULL	GRADING TO, HEAVY DULL COAL, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
30.65	0.26	100	A2	85% COAL, MID LUSTROUS - DULL 15% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. WITH FRAGMENTS OF PYRITE, UNWEATHERED, MODERATELY WEAK ROCK.
30.67	0.02	100	A2	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
30.72	0.05	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
30.73	0.01	100	A2	100% CARBONACEOUS MUDSTONE	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
30.78	0.05	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
30.82	0.04	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS MIDDLE 2 : THICKNESS= 2.55 M; SAMPLED THICKNESS= 2.55 M	
31.50	0.68	100		100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
				*** CHIP DESCRIPTION ***	
100.00	68.50			100% SEDIMENTARY ROCK	UNWEATHERED, MODERATELY WEAK ROCK.
				*** CORE DESCRIPTION ***	
100.74	0.74	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
100.75	0.01			100% CARBONACEOUS MUDSTONE	BROWN-BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
100.77	0.02			100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
100.78	0.01			100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
100.81	0.03			100% MUDSTONE	TUFFACEOUS, CREAM, UNWEATHERED, MODERATELY WEAK ROCK.
100.85	0.04			100% CARBONACEOUS MUDSTONE	COALY, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
100.89	0.04			100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
101.30	0.41			99% MUDSTONE 1% CARBONACEOUS MUDSTONE	MASSIVE, GREY. STREAKS, FRAGMENTS, DARK GREY. UNWEATHERED, MODERATELY WEAK ROCK.
101.37	0.07	0		CORE LOSS	
101.63	0.26	100	T1	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
101.73	0.10	100	T1	60% MUDSTONE 40% CARBONACEOUS MUDSTONE	INTERCALATIONS, COARSE GRAINED, GREY. STREAKS, LENSES, BROWN-BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS LOWER 2 : 378.78 M R.L.	
101.77	0.04	100	A3	100% CARBONACEOUS MUDSTONE	COALY, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
101.84	0.07	0	A3	CORE LOSS	
101.95	0.11	100	A3	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.07	0.12	100	A3	55% COAL, DULL 25% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, MID LUSTROUS - DULL	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
102.13	0.06	100	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.15	0.02	100	A3	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.30	0.15	100	A3	85% COAL, MID LUSTROUS - DULL 15% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
102.32	0.02	100	A3	100% COAL, BRIGHT WITH FEW DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.37	0.05	100	A3	100% CLAYSTONE	TUFFACEOUS, LIGHT BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
102.41	0.04	100	A3	100% COAL, MID LUSTROUS - DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.43	0.02	100	A3	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.66	0.23	100	A3	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.68	0.02	100	A3	100% COAL, BRIGHT WITH FEW DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.70	0.02	100	A3	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.83	0.13	100	A3	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
102.95	0.12	100	A3	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.05	0.10	100	A3	100% TONSTEIN	CREAM, UNWEATHERED, MODERATELY WEAK ROCK.
103.29	0.24	100	A3	100% COAL, MID LUSTROUS - DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.33	0.04	100	A3	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.36	0.03	100	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.44	0.08	100	A3	100% COAL, MID LUSTROUS - DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.46	0.02	100	A3	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
103.48	0.02	100	A3	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.55	0.07	100	A3	100% COAL, MID LUSTROUS - DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.59	0.04	100	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.72	0.13	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.78	0.06	100	A3	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.89	0.11	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 2.16 M; SAMPLED THICKNESS= 2.16 M	
104.13	0.24	100	T2	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
104.32	0.19	100	T2	100% SILTSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
104.52	0.20	100		100% SILTSTONE	COALY, LAMINAE, GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
104.84	0.32	0		CORE LOSS	

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
M2	2.55 M	28.27 - 30.82 M	2.55 M
L2	2.16 M	101.73 - 103.89 M	2.16 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
A1	28.27 - 28.72 M	0.45 M
A2	28.72 - 30.82 M	2.10 M
T1	101.37 - 101.73 M	0.36 M
A3	101.73 - 103.89 M	2.16 M
T2	103.89 - 104.32 M	0.43 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 177BL

HOLE TYPE	CORE
EASTING	591,226 M AM GRID
NORTHING	5,402,283 M AM GRID
ELEVATION	480.51 M
TOTAL DEPTH DRILLED	104.74 M
DRILLING STARTED	05/01/83
DRILLING TIME	3 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	200.0 MM
LENGTH CASED	19.50 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	H.J.STACPOOLE
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P.SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP' DESCRIPTION ***	GEOLOGICAL DESCRIPTION
19.50	19.50			100% DOLERITE	SCREE.
20.00	0.50			100% SEDIMENTARY ROCK	
26.50	6.50			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
26.65	0.15	100		98% MUDSTONE 2% SILTSTONE	MASSIVE, GREY. LENSES, LIGHT GREY. UNWEATHERED, WEAK ROCK.
26.74	0.09	100		75% SANDSTONE,FINE GRAINED 25% COAL	LIGHT GREY. LAMINAE, BLACK. UNWEATHERED, WEAK ROCK.
27.10	0.36	100		90% MUDSTONE 10% SANDSTONE,FINE GRAINED	MASSIVE, GREY. BANDS, LENSES, LIGHT GREY. UNWEATHERED, WEAK ROCK.
27.87	0.77	100		95% MUDSTONE 5% SANDSTONE,FINE GRAINED	MASSIVE, GREY. BANDS, LENSES, LIGHT GREY. UNWEATHERED, WEAK ROCK.
27.96	0.09	100		100% MUDSTONE	BADLY BROKEN, GREY, UNWEATHERED, WEAK ROCK.
28.14	0.18	100	T1	100% MUDSTONE	GREY, UNWEATHERED, WEAK ROCK, WIDE JOINT SPACING, JOINTS DIP 45 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES.
				TOP OF MT. NICHOLAS MIDDLE 2 : 452.37 M R.L.	
28.21	0.07	100	A1	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, WEAK ROCK.
28.31	0.10	100	A1	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
28.36	0.05	100	A1	98% CLAYSTONE 2% COAL	CALCAREOUS, WHITE. STREAKS, BLACK. UNWEATHERED, WEAK ROCK.
28.41	0.05	100	A1	100% CARBONACEOUS MUDSTONE	COALY, BLACK, UNWEATHERED, WEAK ROCK.
28.42	0.01	100	A1	60% CLAYSTONE 40% COAL, HEAVY DULL	BANDS, GREY-GREEN. BLACK. UNWEATHERED, WEAK ROCK.
28.50	0.08	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK, WIDE JOINT SPACING, JOINTS DIP 60 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES, INFILLED WITH CALCITE.
28.65	0.15	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, WEAK ROCK.
28.79	0.14	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
28.80	0.01	100	A1	100% MUDSTONE	BANDS, GREY, UNWEATHERED, WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
29.14	0.34	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK, MODERATELY CLOSE JOINT SPACING, WITH SLICKENSIDES, JOINTS DIP 90 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES, INFILLED WITH CALCITE.
29.20	0.06	100	A1	80% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, BRIGHT	BLACK. BANDS, BLACK. UNWEATHERED, WEAK ROCK.
29.30	0.10	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
29.40	0.10	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
29.42	0.02	100	A1	100% COAL, INTERBANDED DULL AND BRIGHT	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
29.55	0.13	100	A1	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
29.68	0.13	100	A1	90% COAL, DULL WITH NUMEROUS BRIGHT BANDS 10% TONSTEIN	BADLY BROKEN, BLACK. BANDS, BADLY BROKEN, GREY. WITH PYRITE ON JOINTS, UNWEATHERED, WEAK ROCK.
30.09	0.41	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
30.13	0.04	100	A1	75% COAL, BRIGHT 25% COAL, DULL WITH FEW BRIGHT BANDS	BANDS, BLACK. BLACK. UNWEATHERED, WEAK ROCK.
30.40	0.27	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
30.55	0.15	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BADLY BROKEN, BLACK, WITH FRAGMENTS OF PYRITE, UNWEATHERED, WEAK ROCK.
30.56	0.01	100	A1	100% TONSTEIN	GREY, UNWEATHERED, WEAK ROCK.
30.63	0.07	100	A1	100% COAL, BRIGHT WITH FEW DULL BANDS	BLACK, UNWEATHERED, WEAK ROCK.
				BASE OF MT. NICHOLAS MIDDLE 2 : THICKNESS= 2.49 M; SAMPLED THICKNESS= 2.49 M	
30.84	0.21	100	T2	100% MUDSTONE	GREY, UNWEATHERED, WEAK ROCK.
31.45	0.61	100		100% MUDSTONE	GREY, UNWEATHERED, VERY WEAK ROCK.
				*** CHIP DESCRIPTION ***	
100.00	68.55			100% SEDIMENTARY ROCK	UNWEATHERED.
				*** CORE DESCRIPTION ***	
100.64	0.64	100		99% SANDSTONE,MEDIUM GRAINED 1% COAL	MASSIVE, LIGHT GREY. FRAGMENTS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
100.72	0.08	100		58% SANDSTONE 40% MUDSTONE 2% COAL	MED.-FINE GRAINED, LIGHT GREY. PELLETAL, FRAGMENTS, GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS, WITH MUD PELLETS.

*** FRAME EOS***

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
101.18	0.46	100		100% SANDSTONE,FINE GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK, WIDE JOINT SPACING, JOINTS DIP 30 DEG., OPEN, PLANAR, ROUGH DISCONTINUITIES.
101.23	0.05	100		60% SANDSTONE,FINE GRAINED 40% MUDSTONE	LIGHT GREY. PELLETAL, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
101.25	0.02	100		100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK, ABRUPT BASAL CONTACT.
101.27	0.02	100		100% MUDSTONE	CARBONACEOUS, BANDS, BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
101.33	0.06	100		95% COAL, DULL WITH FEW BRIGHT BANDS 5% MUDSTONE	BLACK. BANDS, BROWN. UNWEATHERED, MODERATELY WEAK ROCK.
101.54	0.21	100		100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
101.69	0.15	100	T3	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
101.73	0.04	100	T3	90% MUDSTONE 10% COAL	GREY. STREAKS, BLACK. UNWEATHERED, VERY WEAK ROCK.
101.83	0.10	100	T3	100% MUDSTONE	BADLY BROKEN, GREY, UNWEATHERED, WEAK ROCK.
102.00	0.17	0		CORE LOSS	
102.14	0.14	100		100% MUDSTONE	CARBONACEOUS, GREY, UNWEATHERED, WEAK ROCK.
				TOP OF MT. NICHOLAS LOWER 2 : 378.37 M R.L.	
102.20	0.06	100	A2	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, WEAK ROCK.
102.35	0.15	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.43	0.08	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.47	0.04	100	A2	100% COAL, DULL	UNWEATHERED, MODERATELY WEAK ROCK.
102.53	0.06	100	A2	100% COAL, MID LUSTROUS - DULL	UNWEATHERED, MODERATELY WEAK ROCK.
102.57	0.04	100	A2	100% MUDSTONE	TUFFACEOUS, LIGHT BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
102.58	0.01	100	A2	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.82	0.24	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.84	0.02	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.90	0.06	100	A2	100% COAL, BRIGHT WITH FEW DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
102.93	0.03	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
103.26	0.33	100	A2	80% COAL, DULL 20% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
103.30	0.04	100	A2	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK.
103.48	0.18	100	A2	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.55	0.07	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.58	0.03	100	A2	95% TONSTEIN 5% COAL	WHITE. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
103.63	0.05	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.70	0.07	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.72	0.02	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.75	0.03	100	A2	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.79	0.04	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
103.85	0.06	100	A2	80% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, DULL	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 1.71 M; SAMPLED THICKNESS= 1.71 M	
103.88	0.03	100	T4	100% SANDSTONE,FINE GRAINED	LIGHT BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
103.89	0.01	100	T4	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
104.08	0.19	100	T4	100% MUDSTONE	SILTSTONE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
104.17	0.09	100		100% MUDSTONE	SILTSTONE, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
104.74	0.57	100		85% SILTSTONE 15% SANDSTONE,FINE GRAINED	CARBONACEOUS, BANDS, GREY. BANDS, LENSES, LIGHT GREY. UNWEATHERED, MODERATELY WEAK ROCK.

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
M2	2.49 M	28.14 - 30.63 M	2.49 M
L2	1.71 M	102.14 - 103.85 M	1.71 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
T1	27.96 - 28.14 M	0.18 M
A1	28.14 - 30.63 M	2.49 M
T2	30.63 - 30.84 M	0.21 M
T3	101.54 - 101.83 M	0.29 M
A2	102.14 - 103.85 M	1.71 M
T4	103.85 - 104.08 M	0.23 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 178AL

HOLE TYPE	CORE
EASTING	592,751 M AM GRID
NORTHING	5,401,656 M AM GRID
ELEVATION	506.38 M
TOTAL DEPTH DRILLED	145.90 M
DRILLING STARTED	30/11/82
DRILLING TIME	15 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	170.0 MM
LENGTH CASED	11.00 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	H.J.STACPOOLE
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P.SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP DESCRIPTION ***	GEOLOGICAL DESCRIPTION
13.30	13.30			100% DOLERITE	SCREE.
57.70	44.40			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
59.71	2.01	100		75% SANDSTONE,MEDIUM GRAINED 25% SANDSTONE,FINE GRAINED	MASSIVE, LIGHT GREY. BANDS, LIGHT GREY. UNWEATHERED, MODERATELY WEAK ROCK, VERY WIDE JOINT SPACING, JOINTS DIP 75 DEG., TIGHT PLANAR, ROUGH DISCONTINUITIES.
59.91	0.20	100		90% SANDSTONE,MEDIUM GRAINED 10% COAL	LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
60.75	0.84	100		100% SANDSTONE	MED.-FINE GRAINED, MASSIVE, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
60.80	0.05	100		55% SANDSTONE 45% COAL	MED.-FINE GRAINED, LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
60.90	0.10	0		CORE LOSS	
61.56	0.66	100		98% SANDSTONE,MEDIUM GRAINED 2% COAL	LIGHT GREY. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
61.90	0.34	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
61.91	0.01	100		100% SANDSTONE,FINE GRAINED	BANDS, LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK.
61.97	0.06	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
62.05	0.08	100		75% SANDSTONE,FINE GRAINED 25% SILTSTONE	INTERCALATIONS, SILTSTONE, LIGHT GREY. LAMINAE, LENSES, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
62.32	0.27	100	T1	99% MUDSTONE 1% COAL	GREY. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
62.38	0.06	100	T1	70% MUDSTONE 30% CARBONACEOUS MUDSTONE	GREY. BANDS, LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				TOP OF MT. NICHOLAS MIDDLE 1 : 444.00 M R.L.	
62.43	0.05	100	A1	95% CARBONACEOUS MUDSTONE 5% COAL, BRIGHT	BLACK. BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
62.44	0.01	100	A1	100% SILTSTONE	CARBONACEOUS, BROWN-BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

*** FRAME KOS***

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
62.50	0.06	100	A1	55% COAL, DULL 45% COAL, BRIGHT	BLACK. BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
62.53	0.03	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.54	0.01	100	A1	100% COAL, BRIGHT	BLACK, WITH CALCITE ON CLEAT, UNWEATHERED, MODERATELY WEAK ROCK.
62.61	0.07	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.62	0.01	100	A1	70% COAL, DULL WITH FEW BRIGHT BANDS 30% COAL, BRIGHT	BLACK. BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
62.65	0.03	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.67	0.02	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.71	0.04	100	A1	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.73	0.02	100	A2	100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
62.75	0.02	100	A2	100% MUDSTONE	CLAYSTONE, GREY, UNWEATHERED, VERY WEAK ROCK.
62.76	0.01	100	A2	100% CLAYSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, VERY WEAK ROCK.
62.89	0.13	100	A2	100% CLAYSTONE	CREAM, UNWEATHERED, WEAK ROCK.
62.96	0.07	100	A3	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
63.03	0.07	100	A3	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
63.08	0.05	0	A3	CORE LOSS	
63.15	0.07		A3	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
63.20	0.05	0	A3	CORE LOSS	
63.21	0.01	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
63.22	0.01	100	A3	100% COAL, BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
63.24	0.02	100	A3	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, WEAK ROCK.
63.25	0.01	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
63.26	0.01	100	A3	100% COAL, BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
63.27	0.01	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
63.28	0.01	100	A3	100% COAL, BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
63.30	0.02	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
63.32	0.02	100	A3	100% COAL, BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
63.35	0.03	100	A3	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, WEAK ROCK.
63.36	0.01	100	A3	100% CLAYSTONE	BROWN, UNWEATHERED, VERY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
63.42	0.06	100	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, WITH FRAGMENTS OF PYRITE, UNWEATHERED, MODERATELY WEAK ROCK.
63.43	0.01	100	A3	100% TONSTEIN	GREY-BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
63.57	0.14	100	A3	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
63.80	0.23	0	A3	CORE LOSS	
63.81	0.01	10	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.09	0.28	100	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.17	0.08	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.22	0.05	100	A3	100% COAL, MID LUSTROUS - BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.25	0.03	100	A3	100% CARBONACEOUS MUDSTONE	BROWN-BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.39	0.14	100	A3	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
64.49	0.10	100	A3	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.50	0.01	100	A3	100% MUDSTONE	BANDS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
64.53	0.03	100	A3	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.54	0.01	100	A3	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.58	0.04	100	A3	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.70	0.12	100	A3	75% COAL, DULL 25% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK, MODERATELY WIDE JOINT SPACING, JOINTS DIP 50 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES.
				BASE OF MT. NICHOLAS MIDDLE 1 : THICKNESS= 2.32 M; SAMPLED THICKNESS= 2.32 M	
65.00	0.30	100	T2	55% SILTSTONE 44% MUDSTONE 1% COAL	INTERCALATIONS, MUDSTONE, LIGHT GREY. BANDS, LAMINAE, GREY. STREAKS, LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
65.22	0.22	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
65.26	0.04	100		100% CARBONACEOUS MUDSTONE	DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
65.28	0.02	100		100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
65.31	0.03	100		100% TONSTEIN	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
65.32	0.01	100		100% CARBONACEOUS MUDSTONE	DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
65.39	0.07	100		100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
65.42	0.03	100		100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE	GEOLOGICAL DESCRIPTION
				*** CORE DESCRIPTION ***	
65.45	0.03	100		100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
65.47	0.02			100% CARBONACEOUS MUDSTONE	DARK GREY, UNWEATHERED, WEAK ROCK.
65.70	0.23			75% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, INTERBANDED DULL AND BRIGHT 5% MUDSTONE	BLACK. BLACK. STREAKS, LENSES, GREY. UNWEATHERED, WEAK ROCK.
65.80	0.10	0		CORE LOSS	
				*** CHIP DESCRIPTION ***	
72.60	6.80			100% SEDIMENTARY ROCK	UNWEATHERED, WEAK ROCK.
				*** CORE DESCRIPTION ***	
73.03	0.43	100		100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, WEAK ROCK, WITH PLANT REMAINS.
73.04	0.01	100		100% CLAYSTONE	BANDS, GREY-BROWN, UNWEATHERED, VERY WEAK ROCK.
73.15	0.11	100		100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, WEAK ROCK, WITH PLANT REMAINS.
73.55	0.40	100	T3	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, WEAK ROCK, WITH PLANT REMAINS.
				TOP OF MT. NICHOLAS MIDDLE 2 : 432.83 M R.L.	
73.64	0.09	100	A4	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
73.67	0.03	100	A4	100% CARBONACEOUS MUDSTONE	BROWN-BLACK, UNWEATHERED, WEAK ROCK.
73.69	0.02	100	A4	100% CLAYSTONE	TUFFACEOUS, CREAM, UNWEATHERED, WEAK ROCK.
73.76	0.07	100	A4	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.82	0.06	100	A4	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
74.00	0.18	100	A4	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
74.66	0.66	100	A4	60% COAL, DULL 40% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
74.67	0.01	100	A4	60% TONSTEIN 40% COAL, DULL	WHITE. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
74.71	0.04	100	A4	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
74.72	0.01	100	A4	75% COAL, HEAVY DULL 25% MUDSTONE	BLACK. LENSES, STREAKS, GREY. UNWEATHERED, MODERATELY WEAK ROCK.
74.79	0.07	100	A4	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
74.98	0.19	100	A4	75% COAL, MID LUSTROUS - DULL 25% COAL, BRIGHT	BLACK. BANDS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
75.00	0.02	100	A4	100% CARBONACEOUS MUDSTONE	COALY, BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
75.45	0.45	100	A4	50% COAL, MID LUSTROUS - DULL 30% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, DULL	BRIGHT COAL, LAMINAE, BLACK. BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
75.54	0.09	100	A4	100% COAL, MID LUSTROUS - DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
75.62	0.08	100	A4	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
75.63	0.01	100	A4	55% COAL, DULL 45% COAL, BRIGHT	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
75.74	0.11	100	A4	75% COAL, DULL WITH NUMEROUS BRIGHT BANDS 25% COAL, DULL	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
75.75	0.01	100	A4	100% CARBONACEOUS MUDSTONE	DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
75.82	0.07	100	A4	80% COAL, MID LUSTROUS - DULL 20% COAL, INTERBANDED DULL AND BRIGHT	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
75.84	0.02	100	A4	100% COAL, BRIGHT WITH FEW DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
75.85	0.01	100	A4	100% TONSTEIN	COALY, STREAKS, CREAM, UNWEATHERED, MODERATELY WEAK ROCK.
75.88	0.03	100	A4	100% COAL, BRIGHT WITH FEW DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
75.89	0.01	100	A4	60% TONSTEIN 40% COAL, DULL WITH FEW BRIGHT BANDS	CREAM. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
75.91	0.02	100	A4	100% COAL, HEAVY DULL	BRIGHT COAL, STREAKS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
76.00	0.09	100	A4	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
76.08	0.08	100	A4	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, WEAK ROCK.
76.10	0.02	100	A4	100% CARBONACEOUS MUDSTONE	BROWN-BLACK, UNWEATHERED, WEAK ROCK.
				BASE OF MT. NICHOLAS MIDDLE 2 : THICKNESS= 2.55 M; SAMPLED THICKNESS= 2.55 M	
76.12	0.02	100	T4	100% CLAYSTONE	COALY, STREAKS, WHITE, UNWEATHERED, WEAK ROCK.
76.16	0.04	100	T4	100% MUDSTONE	GREY, UNWEATHERED, WEAK ROCK.
76.35	0.19	100	T4	100% MUDSTONE	MASSIVE, CARBONACEOUS, DARK GREY, UNWEATHERED, WEAK ROCK.
76.51	0.16	100	T4	100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
77.10	0.59	100		100% MUDSTONE	MASSIVE, SILTSTONE, GREY, UNWEATHERED, WEAK ROCK, WITH PLANT REMAINS.
				*** CHIP DESCRIPTION ***	
132.20	55.10			100% SEDIMENTARY ROCK	UNWEATHERED, WEAK ROCK.
				*** CORE DESCRIPTION ***	
133.21	1.01	75		70% MUDSTONE 30% SILTSTONE	SILTSTONE, MASSIVE, GREY. BANDS, LENSES, GREY. UNWEATHERED, WEAK ROCK, WITH PLANT REMAINS.
133.28	0.07	100		100% SANDSTONE,FINE GRAINED	LIGHT GREY, UNWEATHERED, WEAK ROCK.
133.79	0.51	100		100% SILTSTONE	MASSIVE, GREY, UNWEATHERED, WEAK ROCK.
133.91	0.12	100		100% SANDSTONE,FINE GRAINED	LIGHT GREY, UNWEATHERED, WEAK ROCK.
133.99	0.08	100		100% SILTSTONE	GREY, UNWEATHERED, WEAK ROCK.
134.52	0.53	100		100% SANDSTONE	MED.-FINE GRAINED, MASSIVE, LIGHT GREY, UNWEATHERED, WEAK ROCK.
134.74	0.22	100		100% SILTSTONE	CARBONACEOUS, LAMINAE, GREY, UNWEATHERED, WEAK ROCK.
135.20	0.46	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, BADLY BROKEN, LIGHT GREY, UNWEATHERED, WEAK ROCK.
137.15	1.95	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, WEAK ROCK, BEDS DIP 15 DEG., WITH CARBONACEOUS WISPS.
137.46	0.31	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, CALCAREOUS, LIGHT GREY, UNWEATHERED, WEAK ROCK.
137.51	0.05	100		80% SANDSTONE,MEDIUM GRAINED 20% COAL	MASSIVE, LIGHT GREY. FRAGMENTS, STREAKS, LIGHT GREY. UNWEATHERED, WEAK ROCK.
142.35	4.84	100		75% SANDSTONE,MEDIUM GRAINED 23% SANDSTONE 2% COAL	MASSIVE, LIGHT GREY. MED.-FINE GRAINED, MASSIVE, LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, WEAK ROCK, WITH CARBONACEOUS WISPS.
142.50	0.15	100		80% SANDSTONE,MEDIUM GRAINED 20% COAL	LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, WEAK ROCK.
142.73	0.23	100	T5	98% SANDSTONE,MEDIUM GRAINED 2% COAL	MASSIVE, LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, WEAK ROCK.
				TOP OF MT. NICHOLAS LOWER 2 : 363.65 M R.L.	
142.77	0.04	100	A5	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
142.78	0.01	100	A5	98% MUDSTONE 2% COAL	TUFFACEOUS, GREY-BROWN. STREAKS, BLACK. UNWEATHERED, WEAK ROCK.
142.79	0.01	100	A5	95% COAL, DULL 5% MUDSTONE	BLACK. STREAKS, GREY. UNWEATHERED, WEAK ROCK.
142.81	0.02	100	A5	100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, WEAK ROCK.
142.82	0.01	100	A5	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, WEAK ROCK.
142.87	0.05	100	A5	100% COAL, MID LUSTROUS - DULL	BLACK, UNWEATHERED, WEAK ROCK.
142.98	0.11	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, WITH FRAGMENTS OF PYRITE, UNWEATHERED, WEAK ROCK.
143.09	0.11	100	A5	100% COAL, MID LUSTROUS - DULL	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
143.17	0.08	100	A5	70% COAL, MID LUSTROUS - DULL 30% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK. BADLY BROKEN. UNWEATHERED, WEAK ROCK.
143.47	0.30	100	A5	50% COAL, DULL 30% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, MID LUSTROUS - DULL	BADLY BROKEN, BLACK. BADLY BROKEN. BLACK. UNWEATHERED, WEAK ROCK.
143.48	0.01	100	A5	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, WEAK ROCK.
143.53	0.05	100	A5	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
143.55	0.02	100	A5	75% COAL, DULL 25% MUDSTONE	BLACK. BANDS, GREY. UNWEATHERED, WEAK ROCK.
143.58	0.03	100	A5	100% COAL, DULL	BLACK, UNWEATHERED, WEAK ROCK.
143.62	0.04	100	A5	75% COAL, DULL 25% MUDSTONE	BLACK. BANDS, GREY. UNWEATHERED, WEAK ROCK.
143.67	0.05	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
143.69	0.02	100	A5	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, WEAK ROCK.
143.71	0.02	100	A5	100% MUDSTONE	GREY-BROWN, UNWEATHERED, WEAK ROCK.
143.75	0.04	100	A5	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, WEAK ROCK.
143.85	0.10	100	A5	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
143.98	0.13	100	A5	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
144.10	0.12	100	A5	60% COAL, DULL WITH FEW BRIGHT BANDS 40% COAL, MID LUSTROUS - DULL	BADLY BROKEN, BLACK. BLACK. UNWEATHERED, WEAK ROCK.
144.20	0.10	100	A5	100% COAL, MID LUSTROUS	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
144.54	0.34	0	A5	CORE LOSS	

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
144.69	0.15	100	A5	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
144.72	0.03	100	A5	100% TONSTEIN	WHITE, UNWEATHERED, WEAK ROCK.
144.79	0.07	100	A5	100% COAL, DULL	BLACK, UNWEATHERED, WEAK ROCK.
144.83	0.04	100	A5	100% TONSTEIN	WHITE, UNWEATHERED, WEAK ROCK.
145.08	0.25	100	A5	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
145.12	0.04	100	A5	100% COAL, BRIGHT WITH FEW DULL BANDS	BLACK, UNWEATHERED, WEAK ROCK.
145.31	0.19	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
145.37	0.06	100	A5	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
145.53	0.16	100	A5	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
145.63	0.10	100	A5	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, WEAK ROCK.
145.77	0.14	100	A5	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, WEAK ROCK.
145.79	0.02	100	A5	100% MUDSTONE	BANDS, GREY, UNWEATHERED, WEAK ROCK.
145.84	0.05	100	A5	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 3.11 M; SAMPLED THICKNESS= 3.11 M	
145.88	0.04	100		100% MUDSTONE	BADLY BROKEN, GREY, UNWEATHERED, WEAK ROCK.
145.89	0.01	100		100% CARBONACEOUS MUDSTONE	BROWN-BLACK, UNWEATHERED, WEAK ROCK.
145.90	0.01	100		100% MUDSTONE	GREY, UNWEATHERED, WEAK ROCK.

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
M1	2.32 M	62.38 - 64.70 M	2.32 M
M2	2.55 M	73.55 - 76.10 M	2.55 M
L2	3.11 M	142.73 - 145.84 M	3.11 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
T1	62.05 - 62.38 M	0.33 M
A1	62.38 - 62.71 M	0.33 M
A2	62.71 - 62.89 M	0.18 M
A3	62.89 - 64.70 M	1.81 M
T2	64.70 - 65.00 M	0.30 M
T3	73.15 - 73.55 M	0.40 M
A4	73.55 - 76.10 M	2.55 M
T4	76.10 - 76.51 M	0.41 M
T5	142.50 - 142.73 M	0.23 M
A5	142.73 - 145.84 M	3.11 M

THE SHELL COMPANY OF AUSTRALIA LTD.

BOREHOLE LITHOLOGICAL DESCRIPTION

GRAY

GY 178BL

HOLE TYPE	CORE
EASTING	592,768 M AM GRID
NORTHING	5,401,650 M AM GRID
ELEVATION	506.38 M
TOTAL DEPTH DRILLED	145.55 M
DRILLING STARTED	08/01/83
DRILLING TIME	5 DAYS
CORE SIZE	100.0 MM
HOLE SIZE	200.0 MM
LENGTH CASED	12.00 M
INITIAL WATER LEVEL	
WATER LEVEL AT GEOPHYSICAL LOGGING	
DRILLING FLUID	
DRILLING CONTRACTOR	H.J.STACPOOLE
GEOPHYSICAL LOGGING CONTRACTOR	
LITHOLOGICAL DESCRIPTION BY	P.SANSOM
INFORMATION AVAILABLE :	SAMPLES TAKEN ANALYTICAL DATA LITHOLOGICAL DESCRIPTION

PETROPHYSICAL WIRELINE LOGS RUN : NIL

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CHIP DESCRIPTION ***	GEOLOGICAL DESCRIPTION
12.00	12.00			100% DOLERITE	SCREE.
60.00	48.00			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
60.35	0.35	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
60.44	0.09	100		95% MUDSTONE 5% CARBONACEOUS MUDSTONE	SILTY, GREY. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
60.66	0.22	100		95% MUDSTONE 5% CARBONACEOUS MUDSTONE	SILTY, GREY. LAMINAE, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, MODERATELY CLOSE JOINT SPACING, WITH SLICKENSIDES, JOINTS DIP' 20 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES.
				TOP OF MT. NICHOLAS MIDDLE 1 : 445.72 M R.L.	
60.69	0.03	100	A1	75% SILTSTONE 25% CARBONACEOUS MUDSTONE	CARBONACEOUS, GREY. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
60.90	0.21	100	A1	60% COAL, DULL WITH FEW BRIGHT BANDS 40% COAL, MID LUSTROUS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
60.99	0.09	100	A1	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
61.03	0.04	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
61.16	0.13	100	A1	100% CLAYSTONE	TUFFACEOUS, GREY, UNWEATHERED, VERY WEAK ROCK.
61.18	0.02	100	A1	100% CARBONACEOUS MUDSTONE	COALY, BLACK, UNWEATHERED, WEAK ROCK.
61.29	0.11	100	A1	70% COAL, DULL 30% CARBONACEOUS MUDSTONE	BLACK. BLACK. UNWEATHERED, WEAK ROCK.
61.38	0.09	100	A1	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
61.47	0.09	100	A1	100% CLAYSTONE	TUFFACEOUS, GREY, UNWEATHERED, VERY WEAK ROCK.
61.50	0.03	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
61.62	0.12	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
61.66	0.04	100	A1	100% CLAYSTONE	CARBONACEOUS, TUFFACEOUS, BROWN, UNWEATHERED, VERY WEAK ROCK.
61.77	0.11	100	A1	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.13	0.36	100	A1	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.15	0.02	100	A1	100% COAL, BRIGHT	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.23	0.08	100	A1	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
62.24	0.01	100	A1	100% COAL, BRIGHT	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.32	0.08	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.34	0.02	100	A1	100% COAL, BRIGHT	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.42	0.08	100	A1	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.49	0.07	100	A1	70% COAL, MID LUSTROUS 30% COAL, MID LUSTROUS - BRIGHT	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
62.63	0.14	100	A1	60% COAL, DULL 30% COAL, MID LUSTROUS - BRIGHT 10% COAL, BRIGHT	BLACK. BLACK. LAMINAE, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
62.73	0.10	100	A1	80% COAL, MID LUSTROUS - BRIGHT 20% COAL, BRIGHT	BADLY BROKEN, BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
62.76	0.03	100	A1	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.88	0.12	100	A1	100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK.
62.90	0.02	100	A1	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
62.96	0.06	100	A1	100% COAL, MID LUSTROUS - BRIGHT	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
63.00	0.04	100	A1	90% MUDSTONE 10% COAL, BRIGHT	GREY. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
63.06	0.06	100	A1	70% COAL, DULL 30% COAL, MID LUSTROUS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
63.10	0.04	100	A1	60% CARBONACEOUS MUDSTONE 40% COAL, BRIGHT	BLACK. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
63.19	0.09	100	A1	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
63.20	0.01	100	A1	100% MUDSTONE	BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
63.30	0.10	100	A1	55% COAL, DULL WITH FEW BRIGHT BANDS 25% CARBONACEOUS MUDSTONE 20% COAL, MID LUSTROUS	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.

BASE OF MT. NICHOLAS MIDDLE 1 : THICKNESS= 2.64 M; SAMPLED THICKNESS= 2.64 M

63.35	0.05	100	T1	100% MUDSTONE	CARBONACEOUS, BROWN-BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
63.49	0.14	100	T1	100% SILTSTONE	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
63.57	0.08	100		100% SILTSTONE	LIGHT GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
63.65	0.08	100		100% SILTSTONE	CALCAREOUS, WHITE, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
63.70	0.05	100		100% SILTSTONE	CARBONACEOUS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
63.95	0.25	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
64.01	0.06	100		90% CARBONACEOUS MUDSTONE 10% COAL	CALCAREOUS, WHITE. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
64.05	0.04	100		90% CARBONACEOUS MUDSTONE 10% COAL	DARK GREY. LAMINAE, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
64.08	0.03	100		100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.09	0.01	100		75% CARBONACEOUS MUDSTONE 25% COAL	DARK GREY. LAMINAE, STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
64.23	0.14	100		50% COAL, DULL WITH FEW BRIGHT BANDS 48% COAL, MID LUSTROUS 2% MUDSTONE	BLACK. BLACK. STREAKS, WHITE. UNWEATHERED, MODERATELY WEAK ROCK.
64.28	0.05	100		95% COAL, DULL 5% MUDSTONE	BLACK. PELLETAL, WHITE. UNWEATHERED, MODERATELY WEAK ROCK.
64.36	0.08	100		100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.42	0.06	100		100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.47	0.05	100		100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.48	0.01	100		95% CARBONACEOUS MUDSTONE 5% COAL	BLACK. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
64.49	0.01	100		80% CARBONACEOUS MUDSTONE 20% COAL, BRIGHT	COALY, BLACK. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
64.52	0.03	100		100% SILTSTONE	TUFFACEOUS, GREY, UNWEATHERED, MODERATELY WEAK ROCK.
64.54	0.02	100		75% MUDSTONE 25% COAL	CARBONACEOUS, GREY. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
64.55	0.01	100		55% COAL, INTERBANDED DULL AND BRIGHT 45% CARBONACEOUS MUDSTONE	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
64.66	0.11	100		80% MUDSTONE 15% COAL 5% MUDSTONE	GREY. STREAKS, BLACK. CARBONACEOUS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS, WITH PLANT REMAINS.
64.72	0.06	100		100% COAL, BRIGHT WITH FEW DUL' BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.73	0.01	100		80% MUDSTONE 20% COAL	CARBONACEOUS, DARK GREY. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
64.74	0.01	100		100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.75	0.01	100		100% MUDSTONE	GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
64.81	0.06	100		100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
64.82	0.01	100		100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
64.96	0.14	100		55% COAL, INTERBANDED DULL AND BRIGHT 25% COAL, BRIGHT 20% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				*** CHIP DESCRIPTION ***	
71.50	6.54			100% SEDIMENTARY ROCK	UNWEATHERED, MODERATELY WEAK ROCK.
				*** CORE DESCRIPTION ***	
71.94	0.44	100		100% MUDSTONE	MASSIVE, GREY, UNWEATHERED, WEAK ROCK.
71.95	0.01	100		60% MUDSTONE 40% COAL	GREY. BANDS, BLACK. UNWEATHERED, WEAK ROCK.
72.10	0.15	100		100% MUDSTONE	GREY, UNWEATHERED, WEAK ROCK.
72.34	0.24	100	T2	100% MUDSTONE	GREY, UNWEATHERED, WEAK ROCK.
				TOP OF MT. NICHOLAS MIDDLE 2 : 434.04 M R.L.	
72.42	0.08	100	A2	100% COAL, MID LUSTROUS - BRIGHT	BADLY BROKEN, BLACK, UNWEATHERED, WEAK ROCK.
72.46	0.04	100	A2	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, VERY WEAK ROCK.
72.49	0.03	100	A2	100% MUDSTONE	BROWN, UNWEATHERED, WEAK ROCK.
72.52	0.03	100	A2	100% CARBONACEOUS MUDSTONE	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
72.60	0.08	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
72.63	0.03	100	A2	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
72.87	0.24	100	A2	75% COAL, MID LUSTROUS 25% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK. BLACK. WITH FRAGMENTS OF PYRITE, UNWEATHERED, MODERATELY WEAK ROCK.
72.88	0.01	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.00	0.12	100	A2	90% COAL, MID LUSTROUS - DULL 10% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
73.01	0.01	100	A2	98% MUDSTONE 2% COAL	BANDS, GREY. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
73.06	0.05	100	A2	100% COAL, HEAVY DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.10	0.04	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.20	0.10	100	A2	100% COAL, DULL	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.25	0.05	100	A2	100% COAL, DULL	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.26	0.01	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.33	0.07	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.47	0.14	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.51	0.04	100	A2	100% COAL, BRIGHT WITH NUMEROUS DULL BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.58	0.07	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.71	0.13	100	A2	75% COAL, MID LUSTROUS - DULL 25% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
73.82	0.11	100	A2	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
73.83	0.01	100	A2	100% MUDSTONE	CALCAREOUS, WHITE, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
73.86	0.03	100	A2	100% CARBONACEOUS MUDSTONE	BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
73.88	0.02	100	A2	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
74.22	0.34	100	A2	70% COAL, MID LUSTROUS - DULL 30% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
74.42	0.20	100	A2	100% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
74.43	0.01	100	A2	100% MUDSTONE	TUFFACEOUS, LIGHT BROWN, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
74.48	0.05	100	A2	100% COAL, MID LUSTROUS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE	GEOLOGICAL DESCRIPTION
				*** CORE DESCRIPTION ***	
74.65	0.17	100	A2	100% COAL, DULL WITH NUMEROUS BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
74.66	0.01	100	A2	100% COAL, BRIGHT	BANDS, BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
74.89	0.23	100	A2	80% COAL, DULL WITH FEW BRIGHT BANDS 20% COAL, INTERBANDED DULL AND BRIGHT	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
74.90	0.01	100	A2	100% COAL, BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
74.93	0.03	100	A2	70% CARBONACEOUS MUDSTONE 30% CARBONACEOUS MUDSTONE	BLACK. CALCAREOUS, WHITE. UNWEATHERED, MODERATELY WEAK ROCK.
75.00	0.07	100	A2	90% COAL, DULL 10% COAL, DULL WITH FEW BRIGHT BANDS	BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
75.03	0.03	100	A2	100% COAL, INTERBANDED DULL AND BRIGHT	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
75.13	0.10	100	A2	65% COAL, DULL 25% COAL, HEAVY DULL 10% COAL, BRIGHT	BLACK. BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS MIDDLE 2 : THICKNESS= 2.79 M; SAMPLED THICKNESS= 2.79 M	
75.18	0.05	100	T3	100% MUDSTONE	CARBONACEOUS, DARK GREY, UNWEATHERED, MODERATELY WEAK ROCK.
75.38	0.20	100	T3	99% MUDSTONE 1% COAL	GREY. STREAKS, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
75.46	0.08	100	T3	100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
76.50	1.04	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, MODERATELY WEAK ROCK, WITH PLANT REMAINS.
				*** CHIP DESCRIPTION ***	
140.50	64.00			100% SEDIMENTARY ROCK	
				*** CORE DESCRIPTION ***	
141.25	0.75	100		100% SANDSTONE,MEDIUM GRAINED	MASSIVE, LIGHT GREY, UNWEATHERED, WEAK ROCK, WITH CARBONACEOUS WISPS, VERY WIDE JOINT SPACING, JOINTS DIP 85 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES.
141.29	0.04	100		100% SANDSTONE,MEDIUM GRAINED	BADLY BROKEN, LIGHT BROWN, UNWEATHERED, VERY WEAK ROCK.
141.37	0.08	100	T4	80% SANDSTONE 20% COAL	MED.-COARSE GRAINED, LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, WEAK ROCK, WITH CARBONACEOUS WISPS.

DEPTH TO BASE M	THICKNESS M	REC %	SAMPLE NUMBER	ROCK TYPE *** CORE DESCRIPTION ***	GEOLOGICAL DESCRIPTION
141.45	0.08	100	T4	100% SANDSTONE	MED.-FINE GRAINED, LIGHT GREY, UNWEATHERED, WEAK ROCK.
141.55	0.10	100	T4	75% SANDSTONE,MEDIUM GRAINED 25% COAL	LIGHT GREY. FRAGMENTS, STREAKS, BLACK. UNWEATHERED, WEAK ROCK, EROSIONAL BASAL CONTACT, BEDS DIP 20 DEG., WITH CARBONACEOUS WISPS.
				TOP OF MT. NICHOLAS LOWER 2 : 364.83 M R.L.	
142.20	0.65	100	A3	50% COAL 30% COAL, DULL 20% COAL, MID LUSTROUS	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, VERY WEAK ROCK.
142.21	0.01	100	A3	100% MUDSTONE	BANDS, BADLY BROKEN, BROWN, UNWEATHERED, MODERATELY WEAK ROCK.
142.98	0.77	100	A3	60% COAL, MID LUSTROUS 25% COAL, DULL 15% COAL, DULL WITH FEW BRIGHT BANDS	BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. BADLY BROKEN, BLACK. UNWEATHERED, WEAK ROCK, MODERATELY CLOSE JOINT SPACING, JOINTS DIP 60 DEG., TIGHT, PLANAR, SMOOTH DISCONTINUITIES, INFILLED WITH CALCITE.
143.01	0.03	100	A3	100% TONSTEIN	WHITE, UNWEATHERED, MODERATELY WEAK ROCK, WITH CARBONACEOUS WISPS.
144.13	1.12	100	A3	45% COAL, DULL 30% COAL, DULL WITH FEW BRIGHT BANDS 25% COAL, MID LUSTROUS	BADLY BROKEN, BLACK. BADLY BROKEN. BADLY BROKEN, BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
144.25	0.12	100	A3	100% COAL, DULL WITH FEW BRIGHT BANDS	BLACK, UNWEATHERED, MODERATELY WEAK ROCK.
144.45	0.20	100	A3	50% COAL, INTERBANDED DULL AND BRIGHT 45% COAL, MID LUSTROUS - BRIGHT 5% COAL, BRIGHT	BLACK. BLACK. BLACK. UNWEATHERED, MODERATELY WEAK ROCK.
				BASE OF MT. NICHOLAS LOWER 2 : THICKNESS= 2.90 M; SAMPLED THICKNESS= 2.90 M	
144.76	0.31	100	T5	100% MUDSTONE	GREY, UNWEATHERED, VERY WEAK ROCK, WITH PLANT REMAINS.
145.53	0.77	100		100% MUDSTONE	SILTY, GREY, UNWEATHERED, WEAK ROCK, WITH PLANT REMAINS.
145.55	0.02	100		100% CLAYSTONE	GREY, UNWEATHERED, VERY WEAK ROCK.

SEAM SUMMARY

SEAM	SAMPLED THICKNESS	DEPTH RANGE	THICKNESS
M1	2.64 M	60.66 - 63.30 M	2.64 M
M2	2.79 M	72.34 - 75.13 M	2.79 M
L2	2.90 M	141.55 - 144.45 M	2.90 M

SAMPLE SUMMARY

SAMPLE NUMBER	DEPTH RANGE	THICKNESS
A1	60.66 - 63.30 M	2.64 M
T1	63.30 - 63.49 M	0.19 M
T2	72.10 - 72.34 M	0.24 M
A2	72.34 - 75.13 M	2.79 M
T3	75.13 - 75.46 M	0.33 M
T4	141.29 - 141.55 M	0.26 M
A3	141.55 - 144.45 M	2.90 M
T5	144.45 - 144.76 M	0.31 M