PRELIMINARY PRESENTATION

WOODBURY COAL PROJECT

COSTAIN AUSTRALIA LIMITED
VICTOR PETROLEUM & RESOURCES LIMITED
NOVEMBER 1983

Summary Statement

The Woodbury Coal Deposit is favourably located in the Central Midlands of Tasmania adjacent to the Midland Highway and the main north-south railway line linking Hobart and Launceston and is in close proximity to existing community intrastructure including the towns of Campbell Town and Oatlands.

Drilling by Victor Petroleum & Resources Ltd in conjunction with its Tasmanian partner North West Bay Co Pty Ltd has resulted in the establishment of 24.8 million tonnes of insitu measured and indicated reserves of triassic black coal amenable to open cut mining with an attractive stripping ratio.

It is proposed to uncover the coal seams with an electric walking dragline the size of which is dependent on whether the annual production is set at 380,000 tonnes or 600,000 tonnes. The employment created by the project is estimated to be 119 jobs directly or 157 for the larger scale operation.

Preliminary float sink testing indicate that a suitable coal product for power station consumption can be produced. Furthermore the ability through selective mining by open cut methods, may result in the production of a coal product not requiring beneficiation.

The special advantages of the proposed Woodbury coal project can be outlined as follows:

- suitability of the coal seams for dragline stripping would be directly reflected in the coal price.
- coal seam recoveries of between 85% and 95% would be achievable through the open cut mining.
- the proposed open cut mining will justify the creation of a large "in pit" coal exposed inventory of 100,000 tonnes and thus could guarantee the continuity and regularity of supply.

Additional drilling is required to facilitate comprehensive float sink and coal preparation studies to produce the product coal to meet power station specifications, to outline the most attractive areas for mining and detailed open pit design, and to prove up additional reserves.

In conclusion the feasibility and environmental impact studies, design and construction phases of the development can be carried out in conjunction with the construction of the coal fired thermal power station to meet the supply requirements by 1991.

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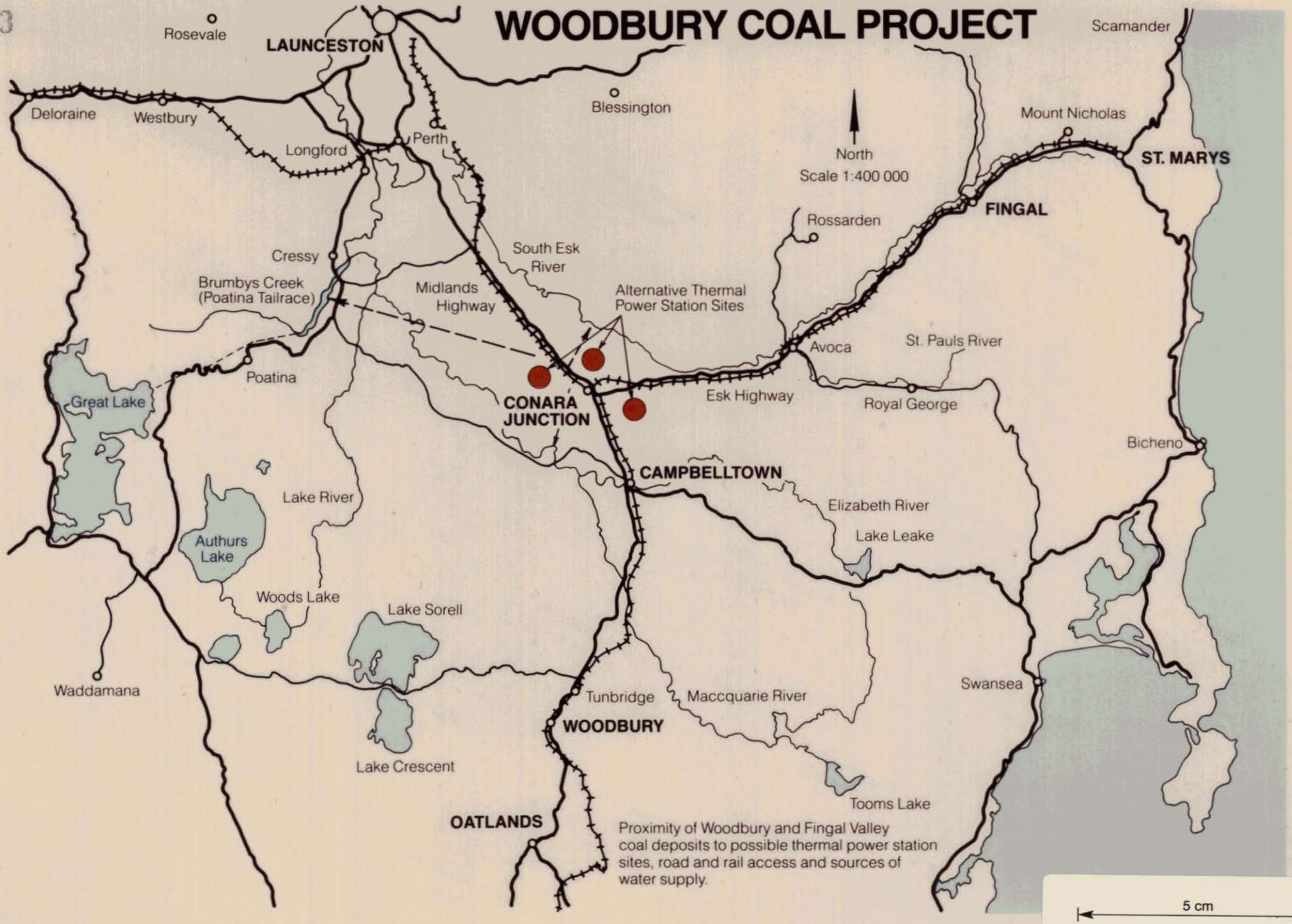

Proximity of Woodbury and Fingal Valley coal deposits to possible thermal power station sites, road and rail access and sources of water supply.

The Woodbury Coal Project

1 Location, Geography and Mining Title

The Woodbury Coal Deposit is located at Woodbury in the Central Midlands of Tasmania approximately 5 kms east of the Midland Highway and the main north-south railway line connecting Hobart and Launceston which are 80 and 85 kms to the south and north respectively. The main population centres of Campbell Town and Oatlands are 30 kms and 15 kms to the north and south respectively.

The Woodbury area consists of undulating pastoral lands which are principally used for the grazing of sheep. The area is within a rainshadow area with the average annual rainfall of 300 mm.

Victor Petroleum & Resources Ltd, have a joint venture/option agreement with a private Tasmanian Company, North West Bay Co Pty Ltd which is the licence holder of Exploration Licence 31/80. In addition the company is the licence holder of EL 16/81 which is included in the agreement with North West Bay Co Pty Ltd.

Coal lease applications have been made covering the coal deposit. Consent of the private landowners remains to be obtained for the leases to be granted. Furthermore lengthy discussions with the Minister of Mines and his department, has established that the Tasmanian government will consider acquiring the private land on this company's behalf, subject to certain conditions including

- the completion of a feasibility demonstrating a viable project of significant economic benefit to the state
- an assessment of the impact on the environment of the development of the project
- a total unwillingness of the private landowners to negotiate.

It is this company's view that an agreement can be reached directly with the private landowners.

2 Stratigraphy, Structural Geology and Geotechnical Report

Lithology & Stratigraphy

The middle to late Triassic stratigraphy of the Woodbury area consists of a coal measures sequence overlying a tuff and siltstone sequence. The coal measures sequence consists of lithic sandstone, mudstone (grey, brown and carbonaceous), coal, minor siltstone and rare tuffs. The tuff-siltstone sequence consists of lithic and sub-lithic sandstone, siltstone and mudstone (cream, grey, green) with numerous tuff (and volcanic) bands, and is apparently devoid of coal.

Consideration of coal seam and general stratigraphic correlations indicates two components to the Woodbury Coal Deposit, namely the Western Area and the Eastern Area. The boundary between the areas is located approximately 5 km east of the Midland Highway. The Western Area contains five coal seams named, L, M, N, O and P, while the Eastern Area contains five coal seams, defined as A, B, C, D and E.

Stratigraphic evidence suggests the Western Area is younger than the Eastern Area, with Seam E being the apparent correlate of seam L.

Structure & Faulting

The orientation of the lithic arenite (Coal Measures) sequence is variable according to the effects of both primary depositional features, and subsequent modification by dolerite intrusions during the Jurassic, and faulting in mid to late Mesozoic and the Tertiary.

The combination of a gravity survey (Leaman, 1981) and photo linear studies, reveals several graben and horst structures in the Woodbury area. The most significant of these structures are the NE (062°) trending Kuranda Graben, the ESE (112) trending Woodbury Trough, and the ESE trending Black Tier - Bellevue Hill and Glen Morey Horsts. The Kuranda Graben is approximately 4 km long and 0.7 km wide, while the Woodbury Trough is at least 9 km in length, and approximately 1 km wide.

Major faults in the area are the Woodbury Faults South and North defining the Woodbury Trough, the Kuranda Faults 1 and 2 defining the Kuranda Graben, the Woodbury Fault North and the Ratharney Fault (112°) defining the Glen Morey Horst and the Glen Morey Fault (145°).

Displacement across these faults ranges from approximately 15 m (Kuranda Fault 1), to 25 m (Kuranda Fault 2), to 25-100 m (Woodbury Fault South); throws across the Woodbury Fault North decrease toward the east, from 45 m (536 000E - 538 000E), to 30 m (539 000E), to 25 m (540 000E) to 15 m (541 000E).

The Kuranda Graben is thought to predate the Woodbury Trough because the latter is not offset across the former, but the Woodbury Trough margins are diffracted from approximately 112° to approximately 102° in strike within the Kuranda Graben. Likely ages for these structures are Jurassic and Tertiary respectively.

The Coal Measures Sequence ranges in attitude from 2° NW (310) from 535 000E - 539 000E, (north of the Kuranda Graben and the Woodbury Trough), to flat within the Kuranda Graben; dips within the Woodbury Trough in the Western Section are approximately 1° NW (310°) from 534 000E - 537 500E, and in the eastern section consists of variable 2°N to 2°S dips superimposed on a general 1° WNW attitude from 537 500E - 541 000E. The Glen Morey Horst apparently dips at approximately 1 to the south.

The nett effect of the faulting has been to produce both parallel sided and polygonal shaped blocks, containing different coal seams placed in Juxtaposition.

3 Description of the Coal Deposit and Coal Reserves

The Woodbury Coal Deposit reserves were outlined as a result of the drilling of 74 cored and open rotary holes for a total of 6300 metres of drilling within the Woodbury Bells Lagoon area. The insitu measured and indicated reserves are based on 18 of these holes.

The estimated insitu measured and indicated reserves based on drill hole information and amenable to open cut mining total 24.8 million tonnes consisting 10 million tonnes of measured and 14.8 million tonnes of indicated reserves. These reserves are based on a maximum overburden limit of 10:1. Estimates have also been made using a maximum overburden limit of 7:1, and a minimum seam thickness of 0.5 m. The data is summarized in the following tables.

The coal seams have been intersected from a minimum depth of 4 metres. Coal reserves have been estimated to a maximum depth of approximately 50 metres.

The overburden consists largely of a lithic sandstone with minor shale, mudstone partings. The partings within the coal seam consists of grey and brown mudstone and siltstone and carbonaceous shales.

As discussed above the coal seams are generally flat dipping, and vary in thickness from 0.67 m to 2.86 m including partings.

Additional exploration within the proposed mining area is required to allow comprehensive sink float testing and coal preparation studies, to confirm the most attractive mining areas, to assist in open cut pit design and to further test the potential for additional reserves to those quoted.

Parameters & Method Used in Calculation of Open Cut Coal Reserves

Introduction

The terminology employed in the determination of the coal reserves at Woodbury is based on the procedures defined by the Geological Survey of Queensland and the Standing Committee on Coal Field Geology of New South Wales (Code for Calculating and Reporting Coal Reserves - Third Edition ratified since 1977 - as shown in SAA DR 81033, January, 1981).

The calculation of the open cut reserves at Woodbury was based on all relevant factors as discussed below. All drill holes were logged according to lithology, geophysical properties (with some exceptions) and observable coal seam characteristics. Proximate analysis, ash analysis, ash fusion temperatures and sink float testing were conducted by S.G.S. Australia Pty Ltd in Sydney, on the total coal seam obtained from HQ drilling.

Reserve calculations were made using a composite ash cut off of 50% and 40.5% respectively and are discussed below.

Insitu Reserve Calculations

Reserve calculations based on a composite 50% Ash cut off were determined by:

- excluding individual coal sub-seams with an ash content greater than 50%.
- including individual coal sub-seams with ash content greater than 50% Ash if the composite ash content of the seam was less than 50%.
- Figure (3) depicts specific energy and relative density versus ash, and the line of best fit for the relative density - ash data was used to determine the ash contents of those blocks for which no direct ash data existed.
- excluding stone bands within the seams greater than 300 m in thickness if clearly distinguishable from coal from the cumulative coal thickness.
- including carbonaceous mudstone floors to coal seams if less than 300 mm in thickness.
- using a weighted average relative density for a composite seam calculated by weighting the relative density of each sub-seam by its thickness.

- calculating the maximum overburden thickness on the basis of a maximum 10:1 or 7:1 stripping ratio.

- excluding coal seams above the base of oxidation or where direct information was not available above 10 metres below the surface.

- the limits of reserve block boundaries as the mid point between drill holes, and or faults as interpreted from the detailed gravity survey or photo lineaments and or in the absence of drill holes in close proximity, the coal seams were assumed to continue for 0.5 m (for measured reserves) or 1.0 km (for first class indicated reserves). Km ?

The tonnage of coal in a given block was then calculated by multiplying the reserve block area, by the cumulative coal seam thickness and the average weighted density as applicable. Details of the reserve estimates are provided in Tables 3 and 4 and parameters used in Appendix 1.

Reserve calculations based on a composite 40.5% cut off were determined as above except with the following modifications:

- separate coal seams with an ash content greater than 40.5% ash were excluded.

- coal seams with an ash content greater than 40.5% where accompanied by other lower ash coal seams such that the composite value was less than 40.5% Ash were included.

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SUMMARY OF WOODBURY COAL SEAM CHARACTERISTICS USED IN RESERVE CALCULATIONS

(with a maximum overburden stripping ratio of 10:1, average stripping ratio 6.5 - 6.7)

SEAM	COMPOSITE THICKNESS in Metres	ASH CONTENT %	COAL SEAM CHARACTERISTICS ESTIMATED for a 19-20% Ash Coal			TOTAL RESERVES in Million Tonnes	
			V.M.%	S.E. MJ/kg	S %	MEASURED	INDICATED
P, O, N	3.0	40.5	-	-	-	-	0.990
O, N, M	2.37	36.5	12.3	25.6	0.29	0.720	1.100
N, M,	2.02	33.2	11.9	25.8	0.30	1.103	0.693
D	2.04 - 3.70	34.7 - 46.0	8.8 - 28.1	21.9 - 25.2	0.25 - 0.36	2.011	3.148
C	1.28 - 2.11	37.6 - 44.0	11.4 - 25.0	22.1 - 27.2	0.37 - 0.40	2.544	6.593
D	2.40 - 2.93	40.5 - 48.5	26.6	22.9	0.37	3.643	2.264
					TOTAL:	10.021	14.788
						24.8 MILLION TONNES	

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SUMMARY OF WOODBURY INSITU RESERVE ESTIMATES

RESERVES in Million Tonnes			ASH CONTENT % (average)	ASH CUT OFF %	MAXIMUM OVERBURDEN RATIO	AVERAGE OVERBURDEN RATIO
TOTAL	MEASURED	INDICATED				
24.8	10.02	14.79	40.7	50	10:1	6.5 - 6.7
15.1	5.51	9.16	41.6	50	7:1	5.1 - 5.3
15.3	6.10	9.17	35.6	40.5	10:1	7.4 - 7.7
* 21.1	8.52	12.56	41.2	50	10:1	

* using a minimum seam thickness of 0.5m.

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TABLE 3: WOODBURY COAL DEPOSIT - MEASURED RESERVE using 50% Ash Cut Off

Block	Hole(s)	Composite Seam Intersection in m.	Seam	Depth of Oxidation	Maximum Depth of Overburden	Density	Area (Km^2)	Tonnes x 10^6 10:1 7:1	AVERAGE Ash (%)	AVERAGE VM (%)	AVERAGE [illegible] (%)	[illegible]
1.	W30	2.37	O,N,M,	10.0	(40.3 ((28.9)	1.60	0.19 (NA)	0.720 (NA)	36.5	12.3	25.4	[illegible]
2.	W30	2.02	N, M,	10.0	(33.5 ((24.1)	1.56	0.35 (NA)	1.103 (NA)	33.2	11.9	25.7	[illegible]
3.	W32	1.97	C	7.3	(37.2 ((26.6)	1.79	0.40 (0.40)	1.410 (1.410)	44.0	24.0	27.8	[illegible]
4.	W25	1.61	C	11.2	(28.7 ((20.5)	1.68	0.29 (NA)	0.784 (NA)	43.0	25.0	22.1	[illegible]
5.	W1 (W39)	2.11	C	11.2	(37.1 ((26.6)	1.66	0.10 (0.06)	0.350 (0.210)	41.2	18.7	23.6	[illegible]
6.	W39	2.93	D	≤10.0	(51.3 ((36.8)	1.65	0.38 (0.31)	1.837 (1.499)	40.5	26.6	22.9	[illegible]
7.	W46	2.40	D	≤10.0	(44.4 ((31.8)	1.75	0.43 (0.31)	1.806 (1.302)	48.5	26.6	22.9	[illegible]
8.	W61	2.49	B	8.0	(42.6 ((30.5)	1.61	0.20 (0.09)	0.802 (0.361)	37.2	14.7	25.2	[illegible]
9.	W41	2.79	B	9.80	(46.9 ((33.6)	1.58	0.23 (0.12)	1.014 (0.529)	34.7	8.8	24.1	[illegible]
0.	W41	2.04	B	9.80	(34.5 ((24.7)	1.59	0.06 (0.06)	0.195 (0.195)	35.7	8.6	24.1	[illegible]
TOTAL USING OVERBURDEN : COAL RATIO OF 10:1								10.021	40.6	20.1	24.1	[illegible]
TOTAL USING OVERBURDEN : COAL RATIO OF 7:1								5.506	42.4	22.5	24.1	[illegible]

TABLE 3: WOODBURY COAL DEPOSIT - INDICATED RESERVE using 50% Cut Off

Block	Hole(s)	Composite Seam Intersection in m.	Seam	Depth of Oxidation	Maximum Depth of Overburden	Density	Area (Km^2)	Tonnes x 10^6 10:1 7:1	AVERAGE Ash (%)	AVERAGE VM (%)	AVERAGE ESTIMATED SG (MJ/Kg)	AVERAGE ESTIMATED (illegible)
1.	W9	3.00	P, O, N,	10.0	(52.5 ((37.6)	1.65	0.20 (NA)	0.990 (NA)	40.5	-	-	-
2.	W30/23	2.37	O, N, M,	<10.0	(40.3 ((28.9)	1.60	0.29 (NA)	1.100 (NA)	36.5	12.3	25.9	0.1
3.	W30/23	2.02	N, M,	<10.0	(33.5 ((24.1)	1.56	0.22 (NA)	0.693 (NA)	33.2	11.9	25.8	0.39
4.	W10/7	1.90	C	≤10.0	(37.2 ((24.6)	1.71	0.96 (0.96)	3.119 (3.119)	42.7	-	-	-
5.	W32	1.97	C	7.3	(37.2 ((26.6)	1.79	0.49 (0.34)	1.728 (1.200)	44.0	24.0	27.3	2.7
6.	W25	1.61	C	11.2	(28.7 ((20.5)	1.68	0.16 (NA)	0.433 (NA)	43.0	25.0	22.1	0.39
7.	W39	2.93	D	≤10.0	(51.3 ((36.8)	1.65	0.06 (0.06)	0.290 (0.290)	40.5	26.6	22.9	0.37
8.	W47	1.28	C	10.2	(22.3 ((16.0)	1.64	0.09 (0.07)	0.189 (0.147)	37.6	11.4	24.6	0.39
9.	W41	2.79	B	9.8	(46.9 ((33.6)	1.58	0.11 (0.06)	0.485 (0.264)	34.7	8.8	24.4	0.36
0.	W41	2.04	B	9.8	(34.5 ((24.7)	1.59	0.01 (0.01)	0.032 (0.032)	35.7	8.6	24.1	0.1
1.	W49	3.70	B	12.4	(62.2 ((44.6)	1.58	0.45 (0.45)	2.631 (2.631)	34.7	-	-	-
2.	W63	1.20	B	13.2	(23.9 ((17.1)	1.89	0.16 (0.06)	0.363 (0.136)	46.0	28.1	21.3	1.0

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TABLE 3 : Page 2 WOODBURY COAL DEPOSIT - INDICATED RESERVE using 50% Cut Off

lock	Hole(s)	Composite Seam Intersection in m.	Seam	Depth of Oxidation	Maximum Depth of Overburden	Density	Area (Km^2)	Tonnes x 10^6 10:1 7:1	AVERAGE ESTIMATED Ash (%)	VM (%)	SE (MJ/kg)	S ( )
13.	W4/48	1.91	C	8.2	(33.6 ((24.1)	1.66	0.24 (0.10)	0.761 (0.306)	41.2	-	-	-
14.	W13/15/ 46	2.40	D	≥ 10.0	(44.4 (31.8)	1.75	0.47 (0.36)	1.974 (1.512)	48.5	-	-	-
TOTAL USING OVERBURDEN : COAL RATIO OF 10:1								14.788	40.8			
TOTAL USING OVERBURDEN : COAL RATIO OF 7:1								9.637	41.2			

GRAND TOTAL (MEASURED & FIRST CLASS INDICATED) FOR 10:1 RATIO = 24.8 X 10^6 TONNES CONTAINING 40.7% ASH.

GRAND TOTAL (MEASURED & FIRST CLASS INDICATED FOR 7:1 RATIO = 15.1 X 10^6 TONNES CONTAINING 41.6% ASH.

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TABLE 4: WOODBURY COAL DEPOSIT - MEASURED RESERVE using 40.5% Ash Cut Off

lock	Hole(s)	Composite Seam Intersection in m.	Seam	Depth of Oxidation	Maximum Depth of Overburden	Density	Area (Km^2)	Tonnes x 10^6	AVERAGE ESTIMATED Ash (%)	VM (%)	[illegible] (%)	[illegible]
1.	W30	2.37	O, N, M,	< 10.0	40.3	1.60	0.19	0.720	36.5	12.3	25.4	[illegible]
2.	W30	2.02	N, M,	< 10.0	33.5	1.56	0.35	1.103	33.2	11.9	25.[illegible]	[illegible]
3.	W32	1.36	C	7.3	23.5	1.63	0.28	0.621	38.7	>24.0	>2[illegible]	[illegible]
4.	W39	2.12	D	≤ 10.0	34.8	1.54	0.29	0.947	31.7	>26.6	>2[illegible]	[illegible]
5.	W46	1.51	D	≤ 10.0	26.4	1.65	0.28	0.698	40.5	>26.6	>2[illegible]	[illegible]
6.	W61	2.49	B	8.0	42.6	1.61	0.20	0.802	37.2	14.7	25.2	[illegible]
7.	W41	2.79	B	9.8	46.9	1.58	0.23	1.014	34.7	8.8	24.[illegible]	[illegible]
8.	W41	2.04	B	9.8	34.5	1.59	0.06	0.195	35.7	8.6	24.1	[illegible]
						TOTAL:		6.100	35.61			

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TABLE 4 : WOODBURY COAL DEPOSIT - FIRST CLASS INDICATED RESERVE using 40.5% Ash Cut Off

Block	Hole(s)	Composite Seam Intersection in m.	Seam	Depth of Oxidation	Maximum Depth of Overburden	Density	Area (Km^2)	Tonnes x 10^6	AVERAGE Ash (%)	AVERAGE VM (%)	ESTIMATED SE (MJ/kg)	ESTIMATED [illegible]
1.	W9	3.00	P, O, N,	≥ 10.0	52.5	1.65	0.20	0.990	40.5	-	-	-
2.	W30/23	2.37	O, N, M,	< 10.0	40.3	1.60	0.29	1.100	36.5	12.3	25.6	0.29
3.	W30/23	2.02	N, M,	< 10.0	33.5	1.56	0.22	0.693	33.2	11.9	25.8	0.30
4.	W10/7	1.36	C	≥10.0	22.7	1.57	0.88	1.879	34.0	-	-	-
5.	W39	2.12	D	≥10.0	34.8	1.54	0.06	0.196	31.7	>26.6	>22.9	<0.37
6.	W47	0.98	C	10.2	15.9	1.52	0.07	0.104	30.0	>11.4	>24.6	<0.39
7.	W41	2.79	B	9.8	46.9	1.58	0.11	0.485	34.7	8.8	24.3	0.36
8.	W41	2.04	B	9.8	34.5	1.59	0.01	0.032	35.7	8.6	24.1	0.36
9.	W49	3.7	B	12.4	62.2	1.58	0.45	2.631	34.7	-	-	-
10.	W4/48	1.50	C	8.2	25.0	1.57	0.12	0.283	34.0	-	-	-
11.	W13/15/46	1.51	D	≥10.0	26.4	1.65	0.31	0.772	40.5	-	-	-
						TOTAL:		9.165	35.64			

GRAND TOTAL - MEASURED AND FIRST CLASS INDICATED 15.265 35.63

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[illegible] of the Woodbury Deposit have been [illegible] physical, chemical, general stratigraphic and [illegible] characteristics. Table 1 summarizes the characteristics, while Table 2 presents the detailed data. The lower four seams show a trend from Seam A to Seam D of decreasing ash, associated with increasing volatile matter and specific energy characteristics of the coal.

In the western area the characteristics of coal seams L, M, N, O and P of the Woodbury Coal Deposit are not as clearly defined, and further core drilling is required to enable reliable comments to be made in this regard.

Detailed bore core logs and proximate analyses have been provided.

TABLE 1

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SUMMARY OF WOODBURY COAL SEAM CHARACTERISTICS

SEAM	AVERAGE THICKNESS	NO OF SUB-SEAMS	AVERAGE INSITU CHARACTERISTICS (AIR DRIED BASIS)			
			MOISTURE %	ASH %	V.M. %	S.E. MJ/kg.
A	0.48	2	4.6	43.5	7.7	17.0
B	0.83	4	3.4	38.5	10.7	18.8
C	1.87	3	4.3	31.5	15.5	21.1
D	2.10	-	4.8	32.7	19.9	22.4
E	2.0	3	-	-	-	-

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COAL SEAM CHARACTERISTICS

Hole	Seam	Seam Thickness (m)	Sub Seam	Sub Seam Thickness (m)	No. of Stone Bands	Type of Stone Bands	Roof	Floor	m(%)	a(%)	VM (%)	Fixed C (%)	SE MJ/kg	S (%)	Cl (%)
[illegible]	D	1.05	-	-	-	-	ms/gry	ms/brn	5.6	26.0	20.0	48.3	22.8	.45	.01
[illegible]	D	2.86	-	-	2	ms,c	ss	ms/c/brn	4.1	27.8	19.8	48.3	22.1	.46	.04
[illegible]	D	2.40	-	-	3	ms,c(2) ms/brn(1)	ss	ms,gry	-	44.4	-	-	-	-	-
125	C	1.61	C4	0.20	-	-	ss	ms/gry	-	-	-	-	-	-	-
			C3	0.33	2	ms/c/gry	ms/gry	ms/gry	-	-	-	-	-	-	-
			C2	0.57	1	ms/brn	ms/gry	ms/gry	5.1	39.5	18.1	37.3	17.6	.43	.03
			C1	0.51	-	-	ms/c	ms/gry	4.3	27.9	21.2	46.6	22.4	.47	.04
132	C	1.97	C3	0.97	2	ms/brn	ms/gry	ms/gry	6.1	29.1	18.9	45.9	21.5	.43	.01
			C2	1.00	1	silt/gry	ms/gry	ms/c	5.8	31.5	16.6	46.1	21.1	.47	.01
138	C	2.16	C3	1.06	2	ms/c	ss	ms/c	3.7	29.7	16.1	50.5	22.1	.37	.02
			C2	1.10	2	ms/brn	ms/gry	ms/gry	4.5	28.4	16.7	50.4	22.5	.43	.01
139	C	2.07	C3	0.49	1	ms/brn	ms/gry	ms/gry	4.3	36.0	15.2	44.5	20.4	.43	.01
			C2	0.91	2	ms/brn	ms/gry	ms/gry	5.4	29.3	16.5	48.8	22.1	.45	.01
			C1	0.67	-	-	ms/gry	ms/gry	4.3	28.6	15.3	51.8	22.7	.47	.02
146	C	2.08	C3	0.50	1	ms/brn			-	-	-	-	-	-	-
			C1, 2	1.58	2	ms/c/brn	ms/gry	ms/c	-	31.8	-	-	-	-	-
147	C	1.28	C1, 2	-	1	ms/brn	ms/c	ms/c	2.3	34.6	7.9	55.2	20.3	.38	.03
148	C	1.91	C3	0.89	?	-	ss	ms/brn	-	-	-	-	-	-	-
			C1, 2	1.02	1	ms/gry	ms/gry	silt/gry	-	28.6	-	-	-	-	-
52	B	1.00	B4	-	-	-	ms/gry	ms/c	3.8	33.7	13.1	49.4	21.1	.36	.01
59	B	0.51	B4	-	-	-	ms/gry	ms/c	4.2	45.9	4.8	45.1	16.6	.49	.03
60	B	0.65	B4	-	-	-	ss	ms/gry	2.6	29.9	15.6	51.9	23.0	.44	.04
61	B	2.79	B4	0.75	-	-	ms/gry	ms/c	2.7	32.1	8.0	57.2	21.6	.36	.03
			B2,3	1.49	-	-	ss		2.2	40.7	6.1	51.0	18.2	.25	.04
			B1	0.55	-	-	ms/c		2.2	34.5	8.3	55.0	19.9	.66	.05

cont'd...

COAL SEAM CHARACTERISTICS

Hole	Seam	Seam Thickness (m)	Sub Seam	Sub Seam Thickness (m)	No. of Stone Bands	Type of Stone Bands	Roof	Floor	m(%)	a(%)	VM (%)	Fixed C (%)	SE MJ/kg	S (%)	Cl (%)
W46	B	0.60	B4	-	-	-	ss	ms/c	1.8	46.0	7.6	44.6	17.4	.24	.04
W47	B	0.59	B4	-	-	-	ms/gry	ms/c	2.7	43.1	6.6	47.6	16.2	.55	.03
W48	B	0.75	B4	-	1	ms/c	ms/gry	ms/gry	-	35,8	-	-	-	-	-
W61	B	2.43	B4	0.83	-	-	ms/gry	ms/gry	3.2	28.0	15.7	53.1	23.2	.51	.01
			B2,3	1.66	2	ms/carb.	ms/gry	ms/gry	3.8	34.8	10.8	50.6	20.1	.25	.03
W63	B	1.20	-	-	3	ms/carb.	ms/gry	silt/gry	6.0	44.7	16.9	32.4	14.4	.25	.05
W40	A	0.67	A2	0.26	-	-	ms/carb	ms/carb	3.8	39.2	4.7	52.3	17.0	.46	.03
			A1	0.41	-	-	ms/carb	ms/carb							
W41	A	0.95	A2	0.45	-	-	ms/carb	ms/carb	5.1	52.5	-	-	-	-	-
			A1	0.40	-	-	ms/carb	ms/carb	4.2	56.4	-	-	-	-	-
W61	A	0.77	A2	0.45	-	-	ms/carb	ms/carb	8.1	41.4	5.3	45.2	15.3	.79	.04
			A1	0.32	-	-	ms/carb	ms/carb							
W36A	A	0.78	A1,2	-	-	-	ss	ms/carb	1.9	39.2	13.0	45.9	18.7	.25	.03

018

Preliminary float/sink testing has been carried out on the coal which indicates that it is technically feasible to substantially reduce the raw ash content of the coal, although as discussed below, potential exists through selective mining to produce a by pass product to meet the maximum 30% Ash 21 GJ/t. specifications. Preliminary sink float results of three bore holes follow.

019

SGS Australia Pty. Ltd.

Sydney

74 McEvoy Street,
Alexandria, N.S.W.,
P.O. Box 163, Redfern, 2016
Tel.: 699 7625
Telex: AA 22395
Cables: Supervise

Victor Petroleum and Resources
Suite 3, 1373 Burke Road
East Kew
Victoria 3102

Attention: Mr E Eschuys

Your ref.:

Our ref.:

Date: 7/8/81

Coal Washability Study

Three seam sections have been analysed as requested for sizing and washability. In each case a composite was prepared from plies within designated coal sections, utilising the maximum amount of available sample. These composites, comprising coal of nominal topsize 12.7mm were first sized at 0.5mm. The plus 0.5mm fraction was then float/sink separated at gravities of 1.35, 1.40, 1.45, 1.50, 1.55, 1.60, 1.65, 1.70, 1.80, 1.90 and 2.00. Ash was determined on each fraction. The minus 0.5mm fraction was further sized at 250, 125 and 75 microns. Ash was determined on each size fraction. The results of these analyses, determined on drillholes W39 (22.54-25.47 metres), W41 (11.50-12.25, 16.55-19.32, 22.75-23.30 metres) and W46 (18.30-20.76 metres) appear on the following three pages.

Yours faithfully

H. Read

Harold Read
Manager - Coal Exploration Services

SGS Australia Pty. Ltd.

496022

DDH W39

22.54 - 25.47 metres

Initial sample Mass : 2.00 kg.

Table 1.

Sizing Analysis	Mass %	Ash %	
12.7 x 0.5mm	92.1	38.9	(by calculation)
0.5 x 0.25mm	4.4	49.3	
0.25 x 0.125mm	1.8	43.4	
0.125x 0.075mm	0.8	55.3	
Minus 0.075mm	0.9	55.4	

Table 2. Float/sink Analysis of +0.5mm Fraction

Relative Density	Fractional Mass %	Fractional Ash %	Cumulative Mass %	Cumulative Ash %
Floats 1.35	16.7	8.5	16.7	8.5
S1.35 - F1.40	8.0	12.8	24.7	9.9
S1.40 - F1.45	8.3	18.3	33.0	12.0
S1.45 - F1.50	8.6	22.1	41.6	14.1
S1.50 - F1.55	5.4	28.4	47.0	15.7
S1.55 - F1.60	3.8	33.4	50.8	17.1
S1.60 - F.165	3.1	37.5	53.9	18.2
S1.65 - F1.70	2.6	41.2	56.5	19.3
S1.70 - F1.80	6.4	46.9	62.9	22.1
S1.80 - F1.90	7.7	54.0	70.6	25.6
S1.90 - F2.00	5.1	60.3	75.7	27.9
Sinks 2.00	24.3	73.2	100.0	38.9
Plus 0.5mm (by calculation)	92.1	38.9	92.1	38.9
Minus 0.5mm (from table 1.)	7.9	49.3	100.0	39.7

THE RESULTS OF THIS TEST IS CONSIDERED TO BE REPRESENTATIVE OF THE WASHING CHARACTERISTICS OF THE WOODBURY COAL.

H. Read

Harold Read
Manager - Coal Exploration Services

021

SGS Australia Pty. Ltd.

496023

DDH W41

11.50 - 12.25, 16.55 - 19.32, 22.75 - 23.30 metres

Initial sample Mass : 2.00 kg.

Table 1.

Sizing Analysis	Mass %	Ash %	
12.7 x 0.5mm	93.2	53.8	(by calculation)
0.5 x 0.25mm	3.0	57.9	
0.25 x 0.125mm	1.8	58.4	
0.125x 0.075mm	1.2	60.0	
Minus 0.075mm	0.8	60.5	

Table 2. Float/sink Analysis of +0.5mm Fraction

Relative Density	Fractional Mass %	Fractional Ash %	Cumulative Mass %	Cumulative Ash %
Floats 1.35	0.2	7.4	0.2	7.4
S1.35 - F1.40	0.3	8.1	0.5	7.8
S1.40 - F1.45	3.8	10.7	4.3	10.4
S1.45 - F1.50	5.1	15.1	9.4	12.9
S1.50 - F1.55	6.4	19.9	15.8	15.8
S1.55 - F1.60	9.4	24.9	25.2	19.2
S1.60 - F.165	8.4	29.2	33.6	21.7
S1.65 - F1.70	6.3	35.1	39.9	23.8
S1.70 - F1.80	11.1	40.5	51.0	27.4
S1.80 - F1.90	3.8	50.5	54.8	29.0
S1.90 - F2.00	2.6	55.4	57.4	30.2
Sinks 2.00	42.6	85.6	100.0	53.8
Plus 0.5mm (by calculation)	93.2	53.8	93.2	53.8
Minus 0.5mm (from table 1.)	6.8	48.4	100.0	53.4

PLEASE NOTE THE VERY HIGN "RUN OF MINE" ASH VALUE 53.8% OF THE SAMPLE PRIOR TO TESTING. THIS VALUE RESULTS FROM THE INCLUSION OF TWO STONE BANDS WHICH ARE EXCLUDED FROM THE RESERVE CALCULATIONS.

H. Read

Harold Read
Manager - Coal Exploration Services

022

SGS Australia Pty. Ltd.

496024

DDH W46

18.30 - 20.76 metres

Initial sample Mass : 0.60 kg.

Table 1.

Sizing Analysis	Mass %	Ash %	
12.7 x 0.5mm	95.5	49.3	(by calculation)
0.5 x 0.25mm	2.5	53.8	
0.25 x 0.125mm	0.9	60.1	
0.125x 0.075mm	0.5	61.0	
Minus 0.075mm	0.6	57.8	

Table 2. Float/sink Analysis of +0.5mm Fraction

Relative Density	Fractional Mass %	Fractional Ash %	Cumulative Mass %	Cumulative Ash %
Floats 1.35	8.8	8.5	8.8	8.8
S1.35 - F1.40	4.8	12.5	13.6	9.9
S1.40 - F1.45	3.5	17.2	17.1	11.4
S1.45 - F1.50	3.7	23.2	20.8	13.5
S1.50 - F1.55	4.7	28.8	25.5	16.3
S1.55 - F1.60	3.0	30.8	28.5	17.8
S1.60 - F.165	5.7	35.7	34.2	20.8
S1.65 - F1.70	4.6	41.9	38.8	23.3
S1.70 - F1.80	8.9	48.2	47.7	28.0
S1.80 - F1.90	11.8	55.1	59.5	33.3
S1.90 - F2.00	14.0	67.3	73.5	39.8
Sinks 2.00	26.5	75.9	100.0	49.3
Plus 0.5mm (by calculation)	95.5	49.3	95.5	49.3
Minus 0.5mm (from table 1.)	4.5	56.4	100.0	49.3

H. Read

PLEASE NOTE THE VERY HIGH ASH VALUE OF THE SAMPLE PRIOR TO WASHING.

Harold Read
Manager - Coal Exploration Services

6 Product Coal and Coal Ash Properties

Detailed proximate analytical data on all bore core samples have been supplied. Indicative product coal and coal ash properties are summarized as follows.

024

496026

COAL ANALYSIS REPORT

REPORT No. SL1161 DATE IN 20/8/81 DATE OUT 15/9/81

CLIENT: Victor Petroleum and Resources CLIENT REFERENCE:

ADDRESS: Suite 3, 1373 Burke Road
East Kew. VIC 3102

RESULTS TO: Mr E Eschuys COPY TO:

SAMPLE REFERENCE: PROXIMATE ANALYSES RESULTS OF THE APPROPRIATE FRACTIONS AFTER WASHING TESTS.

ANALYSIS		W39 22.54-25.47 CF 1.70		W41 11.50-12.25m 16.55-19.32m 22.75-23.30m CF 1.65		W46 18.30-20.76metres CF 1.65	
Total Moisture %							
Moisture %	*	4.4		3.2		3.4	
Ash %	*	19.9		23.3		21.4	
Volatile Matter %	*	23.1	30.5	8.9		23.0	
Fixed Carbon %	*	52.6		64.6		52.2	
Crucible Swelling No.	*	½		0		½	
Specific Energy MJ/kg	*	25.32		24.86		28.84	
	**	33.44		33.82		33.04	
Total Sulphur %	*	0.49		0.47		0.44	
Carbon %							
Hydrogen %							
Nitrogen %							
Oxygen %							
Carbon Dioxide %							
Hardgrove Grind-ability Index.	*	70		53		Insufficient sample	

DETERMINED IN ACCORDANCE WITH: AS1038

BASIS RESULTS REPORTED ON *Air dried ** Dry, ash-free

H. Read

Harold Read
Manager - Coal Exploration Services

This Laboratory is registered by the National Association of Testing Authorities, Australia. The test(s) reported herein have been performed in accordance with its terms of registration.

Core No.	W39	W43	W46
Coal Seam Interval	22.54-25.47	11.50-12.25 16.55-19.32 22.75-23.30	18.30-20.76
C.F.	1.70	1.65	1.65
Ash Content	19.9	23.3	21.4
Ash Fusion (Reducing conditions)			
Initial Deformation	1260	1300	1220
Initial Spherical	1310	1350	1350
Initial Hemisphere	1320	1380	1360
Initial Flow	1370	1410	1380
Ash Mineral Analysis			
SLO_2	55.7	53.6	48.1
Al_2O_3	24.1	23.8	26.5
Fe_2O_3	3.65	2.42	3.45
CaO	10.03	13.95	14.83
MgO	2.83	1.61	2.58
Na_2O	0.21	0.65	0.37
K_2O	0.67	0.53	1.18
T_2O_2	0.93	0.96	1.04
Mn_3O_4	0.21	0.18	0.35
So_3	1.44	2.79	1.52
P_2O_5	0.045	0.028	0.046
BaO	0.02	0.05	0.03
	99.835	100.568	99.996
Hardgrove Grindability Index	70	53	Not Determined

Product Coal Specification

The preliminary indicative proposed product coal quality specifications is for a 25% ash, with a specific energy of 23.0 - 25.6 GJ/t. sulphur 0.8 , moisture 4.5%, with volatile matter and fixed carbon remaining to be determined but anticipated to meet the specifications required.

8. DEVELOPMENT CRITERIA:

8.1 MINING PROPOSAL:

The proposed development involves the establishment of an open cut dragline strip mining operation and the development of supporting surface facilities.

The mine could be designed to produce in the range of 380,000 to 600,000 tonnes of product coal per annum over a 20-year period. The annual tonnage could be increased above 600,000 tonnes following a successful core drilling programme.

As described in Section 2, the coal deposit is dissected by several major faults. These faults, coupled with seam loxlines and stripping ratio limits, form the boundaries of the several mining areas (Plan No. 2).

Within the mine block areas, mining would proceed from the loxline to the eventual pit limit, either a fault or a stripping ratio cut-off. The thin coal seams do not represent a mining problem since the overburden is shallow and the overburden to coal stripping ratios are attractive (5.3:1 - 6.6:1 cubic metres per tonne).

It is proposed to uncover the coal seam with an electric walking dragline, the size of the dragline being dependent on the required annual production rates. Coal would be mined using front-end loaders tipping into rear dump trucks. These trucks would haul the coal to the coal preparation plant to be crushed and washed to meet the power station specification.

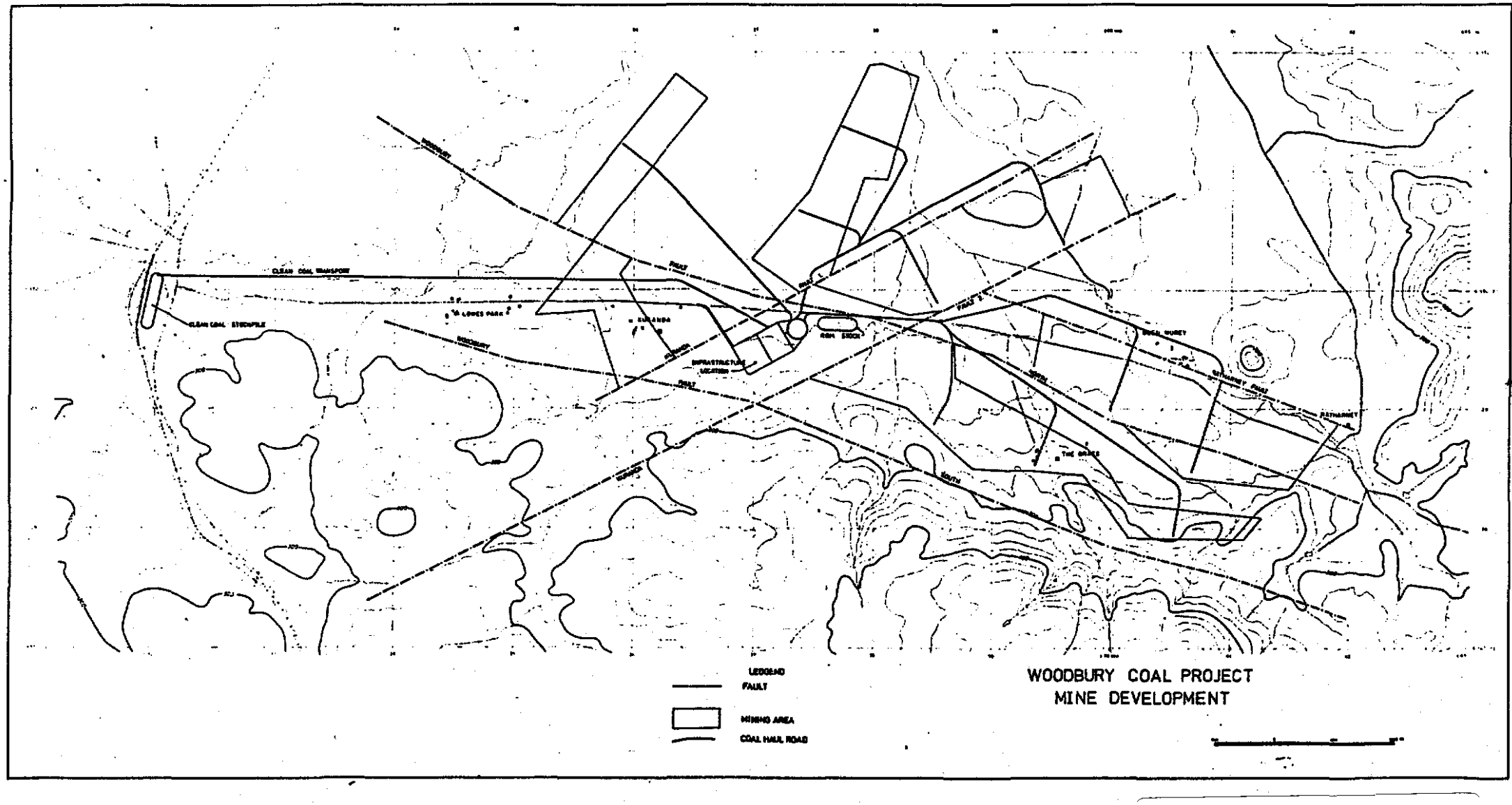
Using the above method, coal seams as thin as 30 centimetres can be recovered, and stone bands within coal seams can be extracted at the coal face. The interburden between the coal seams would also be extracted by the same front-end loader and rear dump truck fleet as for the coaling operation.

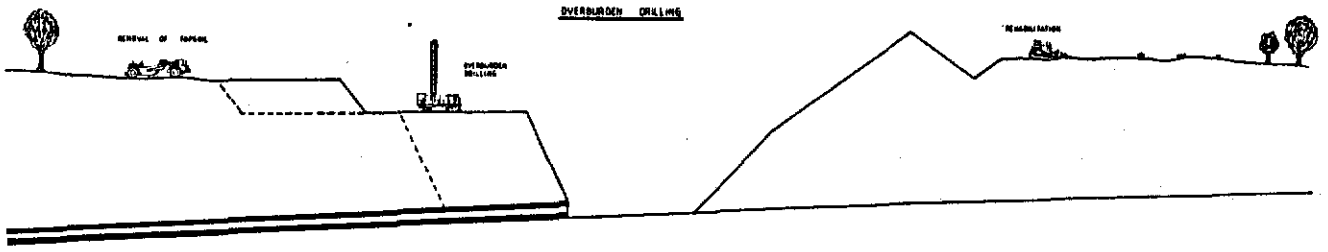
It is anticipated that all overburden will require blasting, and that partings and coal could be ripped by tracked dozer.

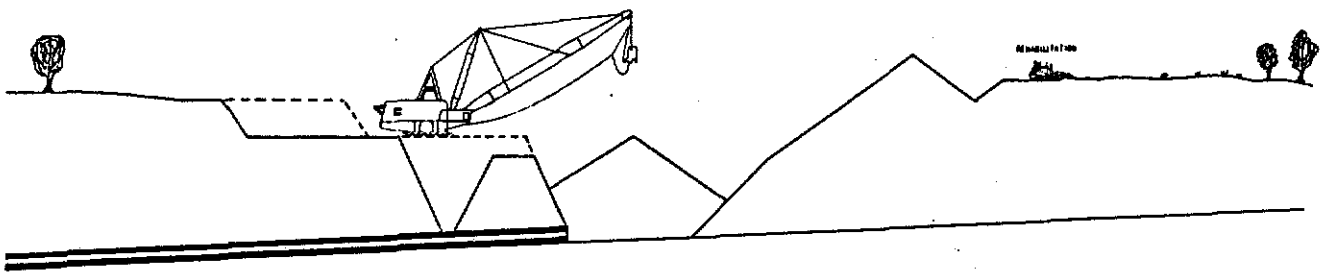
Dragline spoil rehabilitation would occur concurrently with dragline mining, and would be kept within 100 metres of the mining operations. Washery rejects would be disposed of in the dragline spoil.

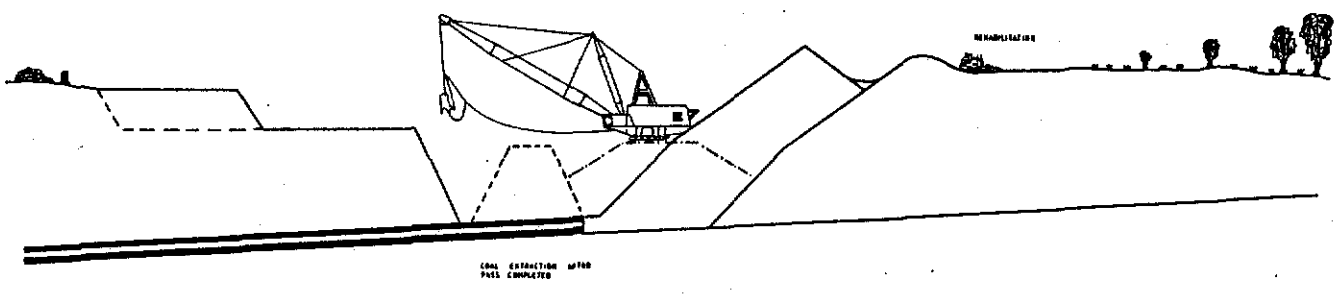
Coal handling facilities, preparation plant, workshops and offices are proposed to be located on the "down-thrust" fault block bounded by the Kuranda No. 1 & 2 faults and the Woodbury North and South faults. This location is central to the mining areas, and has good access along the Woodbury Road to the main Midland Highway and the rail line.

Coal transport from the mine to the rail loading facility would be by truck or conveyor belt depending on the annual sales tonnage.


LEGEND
FAULT
MINING AREA
COAL HAUL ROAD
WOODBURY COAL PROJECT
MINE DEVELOPMENT
5 cm







WOODBURY COAL PROJECT

PROPOSED MINING METHOD

8.2 SITE SERVICES:

8.2.1 WATER:

It is anticipated that the mine will be self-sufficient in water, the main supplies being internally generated water from seepage into the open pit, collection of storm water run-off and/or borefield supplies.

8.2.2 ELECTRIC POWER:

The mine will have its own power reticulation system drawing supply from the State Grid. Maximum demand would be between 2mW and 4mW, with power consumption from 0.5M kWh per month to 1M kWh per month depending on the scale of operation. The favoured mine reticulation voltage would be 11kVA to 33kVA.

8.3 MAJOR MINING PLANT LIST:

Based primarily on Costain's experience with mining equipment performance and productivities at the Ravensworth and Warkworth Mines, the following major plant lists have been assembled for the proposed Woodbury Coal Project:-

8.3.1 MINING PLANT FOR 380,000 TONNES PRODUCT PER ANNUM:

TASK	PLANT DESCRIPTION	NUMBER OF UNITS
Overburden Drilling	Electric Blast Hole Drill, 270mm diameter holes.	1
Midburden and Partings Drilling	Blast Hole Drill, 150mm diameter holes.	1
Overburden Excavation	Electric Dragline, 19 cubic metre bucket.	1
Coal and Partings Excavation	Caterpillar 992C Front-End Loader.	2
Coal and Partings Haulage	85T Rear Dump Trucks.	5
General Site Services	Caterpillar D8 Sized Tracked Dozer.	1
Rehabilitation	Caterpillar D8 Sized Tracked Dozer.	1
Coal and Parting Ripping	Caterpillar D9L Sized Tracked Dozer.	1
Coal Clean-Up	Rubber-Tyred Dozer.	1
Road Maintenance	Caterpillar 14G Sized Grader.	1
Dust Control	Water Trucks.	2

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8.3.2 MINING PLANT FOR 600,000 TONNES PRODUCT PER ANNUM:

TASK	PLANT DESCRIPTION	NUMBER OF UNITS
Overburden Drilling	Electric Blast Hole Drill, 310mm diameter holes.	1
Midburden and Partings Drilling	Blast Hole Drill, 150mm diameter holes.	1
Overburden Excavation	Electric Dragline, 39 cubic metre bucket.	1
Coal and Partings Excavation	Caterpillar 992C Front-End Loader.	2
Coal and Partings Haulage	85T Rear Dump Trucks.	8
General Site Services	Caterpillar D8 Sized Tracked Dozer.	1
Rehabilitation	Caterpillar D9L Sized Tracked Dozer.	1
Coal and Parting Ripping	Caterpillar D9L Sized Tracked Dozer.	2
Coal Clean-Up	Rubber-Tyred Dozer.	1
Road Maintenance	Caterpillar 16G Sized Grader.	1
Dust Control	Water Trucks.	2

8.4 MANNING LEVELS:

It has been Costain's policy, both in Australia and abroad, to recruit the workforce for a new mining venture from the surrounding communities. This policy would continue in the advent of the establishment of an open cut mine at the Woodbury Site.

The skills required for open cut mining are similar to those found in the earthmoving and construction industries, namely plant operators, tradesmen, clerical and administrative skills. On-the-job training programmes would be sufficient to increase the workforce skills to the desired level.

The following tables represent "indicative" manning levels for two production cases:-

ACTIVITY	380,000 TONNES PER ANNUM	600,000 TONNES PER ANNUM
Mining	50	64
Coal Preparation	10	13
Maintenance	35	46
Administration and Management	24	34
TOTAL:	**119**	**157**

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9. SPECIAL FEATURES:

The Woodbury coal deposit is ideally suited to extraction by dragline techniques. The coal is shallow, the stripping ratio attractive, and a sufficient resource available for a continuous long-term mining operation.

The relationship between a major open cut mine located on the Woodbury coal deposit on the nearby population centres of Campbelltown and Oatlands would be mutually beneficial. The mining operation would recruit labour and draw services from the local area, while the local communities realise the benefits of increased employment, trade and commerce.

Rail line location immediately to the west of the proposed mine site represents a major financial and strategic advantage with respect to coal transport between the proposed mine and power station. The location of the rail line will ensure that coal transport costs are kept to a minimum.

Special advantages of the proposed Woodbury coal project can be outlined as follows:-

* Suitability of the coal seams for dragline stripping would be directly reflected in the coal price.

* All coal seams greater than 30 centimetres in thickness would be recovered by the mining described in Section 8.

* Coal seam recoveries between 85% and 95% would be achievable through open cut mining at the Woodbury Site.

* Coal seams would be selectively mined, and interseam stone bands removed in-pit, the aim of the above being optimum blending for high washery yields and the possible production of run-of-mine coal of sufficiently high quality to allow by-passing the wash plant.

  Removal of stone bands and coal seam blending would allow production of a consistent coal product.

* The proposed Woodbury open cut is of sufficient scale to justify the creation of a large "in-pit" coal exposed inventory. A coal exposed inventory in the order of 100,000 tonnes would guarantee the continuity and regularity of coal supply.

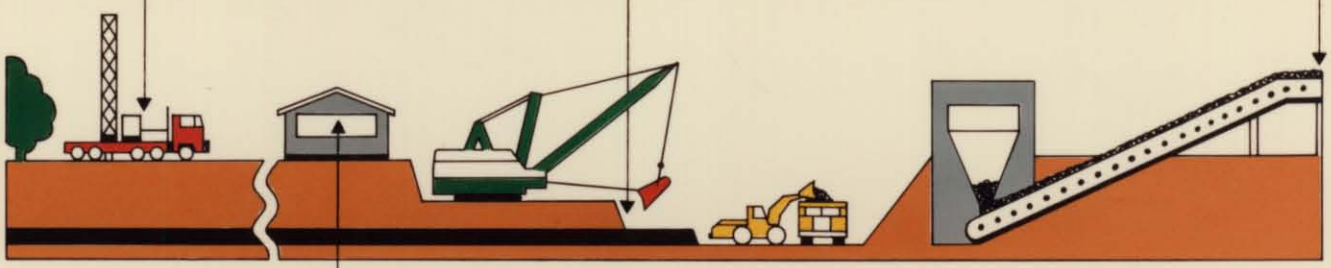
* * * * *

REPRESENTATIVE FLOW-CHART
WARKWORTH COAL QUALITY CONTROL PROGRAM

Exploration drilling has provided information for predictions of quality and quantity of coal deposits.

In-pit sampling and analysis is taken ahead of the coal extraction for indicative short term information.

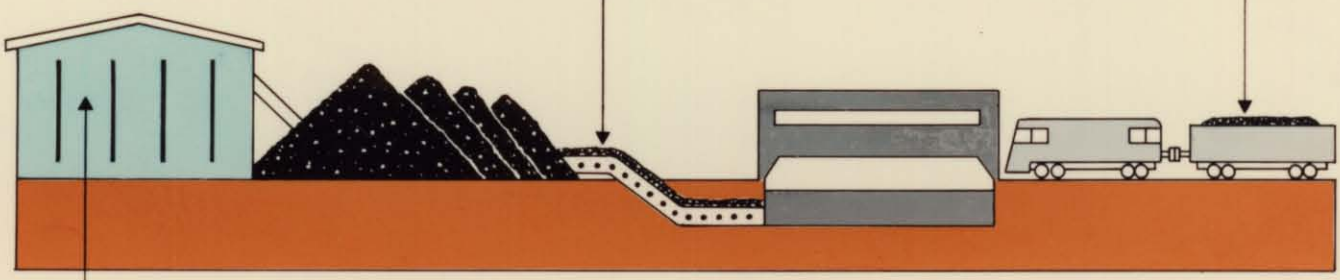
The first operational step in quality assurance, to check that coal quality is as predicted, is performed by an automatic belt sampler conforming to Australian Standard AS-1676-1975 prior to Raw Coal stockpiling.

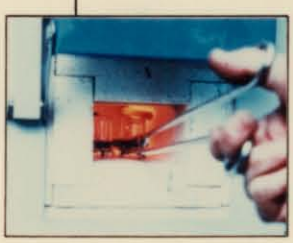


The information from exploration drilling is used in the formulation of mine plans. The information is stored in a central computer facility and is used by Mine Geologists and Mining Engineers for the prediction of short and long term quality control and mine scheduling.

A final check on the product quality leaving the washery is undertaken by the clean coal automatic belt sampler which also conforms to AS-1676-1975.

As trains arrive at the port each train is sampled to ensure that product is on specification prior to shipment.





Analysis of samples taken from the automatic belt sampler and throughout the washery are undertaken by an on site laboratory.

Hourly reports to pit operations assist in maintaining dilutions to a minimum.

Information provided to the washery operations can assist in the fine tuning of the automated washing plant.

A superintending sample for contractual obligations is taken as the coal is being loaded onto the ship.

10. COST ESTIMATES:

On the basis that only a very preliminary study has been completed at this stage, and significant additional exploration work is required to confirm the significance of the deposit, no estimates of Capital Costs have been included.

Further, in relation to the provision that operating and maintenance cost estimates be provided, under normal circumstances, such information would only be provided for a "cost plus" sales contract.

* * * * *

11. INDICATIVE COAL SUPPLY PRICE:

As detailed previously, prior to submitting any indicative coal prices for a range of annual coal tonneages, additional exploration and proving of the attractive mining areas contained within the Leases must be completed.

* * * * *

12. **VARIATION IN QUANTITY:**

At this stage in the development of the mining plans, it is not possible to specify precisely the requirements and effects of variable annual coal sales.

However, it is possible to comment that, within the planning to date, short-term variations in the requirement for coal would be handled through stockpiles adjacent to the coal preparation plant, with some ability to absorb a reduced requirement as "in-pit" inventory.

Variations in requirement of a longer term nature would naturally require greater advanced notification to the Mine Operator. At the time of concluding a Coal Supply Contract, this matter would be fully addressed, to ensure that the Operator maintained the ability to comply with the Client's requirements for reduced delivery without the need to retrench mining labour.

* * * * *

13. **LEAD TIME FOR DEVELOPMENT:**

Upon agreement being reached regarding the likely annual tonneage requirements as well as the responsibility for completing the additional exploration works, then it is estimated that this exploration programme would take up to six months to complete to the stage of confirming the proven reserves within the Lease.

At this stage, detailed final mine planning and equipment selection would commence as well as design of the coal preparation and handling facility.

Following the completion of all detailed planning, applications would be made for all requisite approvals from the relevant Statutory Authorities.

Once those approvals were in place, then a period of about two years would be required to complete site infrastructure and coal preparation plant construction as well as manufacture from overseas and local erection of the dragline.

It is envisaged that all of the above would, however, be completed prior to the commissioning of the first unit of the power station, assuming planning and development of the mine progressed concurrently with that of the power station.

* * * * *

14. COMPANY'S EXPERIENCE AND AFFILIATIONS:

THE COSTAIN GROUP:

Costain is a leading international construction group which began operations in the United Kingdom more than a century ago.

In the last 40 years, Costain has been active in every continent, and has formed operating companies in many countries in order that it might respond quickly to new demands and new developments wherever they occur.

Costain's range of technical and managerial skills and its substantial resources enable the Group to tackle a wide variety of work in civil engineering, building, property development, housing, foundation engineering, dredging, process engineering, concrete products and mining.

COSTAIN AUSTRALIA LIMITED:

Costain Australia is a publicly-listed Company on both the Sydney and Melbourne Stock Exchanges. Currently, 67% of the shares are held by the Costain Group out of the United Kingdom.

Costain Australia is the largest of the overseas-based subsidiaries of the Costain Group.

Its operations are national and include building construction, property development, housing, civil engineering through the acquisition of Pearson Bridge Pty. Limited, and, of course, mining.

Costain Australia has been involved in numerous major construction projects in various Australian cities, some of these being the National Bank House and the State Bank Centre in Melbourne, the Sydney Stock Exchange, the Belconnen Mall project in Canberra, and, more recently, the Paradise Centre on the Gold Coast.

As well as city-based development, the Company has extended its operations to rural areas, where it is developing housing and industrial estates, and constructing a wide range of buildings.

Tasmanian Works:

In particular, Pearson Bridge Pty. Limited, a wholly-owned Costain Australia Subsidiary, have completed the following civil works in Tasmania:-

* Acid Jetty Risdon - Electrolytic Zinc Company of Australasia Limited (1970);

* Wharf Risdon - Electrolytic Zinc Company of Australasia Limited (1971);

* Decline Mine Tunnel - Mount Lyell Mining & Railway Company Limited (1970);

* Busbar and Intake Shafts, Strathgordon - The Hydro Electric Commission, Tasmania (1971 - 1972);

* Tailrace Tunnell, Strathgordon - The Hydro Electric Commission, Tasmania (1974 - 1976);

* Tasman Bridge Widening - Hobart (1976 - 1977);

* Ore Storage Bins, Rosebery - Electrolytic Zinc Company of Australasia Limited (1981);

* Forth Bridge, Devonport - Department of Main Roads (1983).

THE MINING DIVISION:

Ravensworth Mine:

Costain's involvement in mining in Australia was born with the award, in 1967, of a contract to Costain Mining Limited of London to open up the Ravensworth No. 2 surface coal mine in the Hunter Valley, 215 kilometres north-west of Sydney. After mobilisation from resources in the United Kingdom, the contract was assigned to Costain Australia Limited, who is now fully responsible for operating the mine.

From reserves of 65 million tonnes, the contract required coal to be supplied at 4 million tonnes per annum to the Electricity Commission of New South Wales' power station at Liddell, the total contract tonneage amounting to 50.8 million tonnes.

Two Costain-owned Bucyrus-Erie 1370W draglines strip overburden to uncover two seams of coal. The upper seam averages about 4.5 metres in thickness and, being separated into leaves by stone bands, it requires selective recovery. The lower seam averages 6 metres in thickness, and contains only minor stone bands. The mine covers 1,000 hectares within an area 5.6 kilometres by 2.4 kilometres.

OVERBURDEN REMOVAL

COAL LOADING

ONGOING REHABILITATION

Ancillary mining equipment owned by Costain includes D9 tractor dozers, rubber-tyred dozers, front-end loaders, overburden drills, shovels, graders, cranes, pumps and small utility items. Coal is transported in 110-ton haulers to a crushing plant, and fed via a 4,900-tonne storage bin onto the Client's conveyor belt for delivery to the Liddell Power Station.

Although the initial contract did not include a requirement to restore the mine site, an order was received from the Client in 1976 to rehabilitate mined-out areas. Progressive rehabilitation now returns the site to suitable grazing.

In 1981, arrangements were made at the request of the Electricity Commission of New South Wales to increase production to 5 million tonnes per annum, and the consequent increase in overburden removal is achieved with a Bucyrus-Erie 295B1 mining shovel loading into Euclid 170-tonne trucks.

Warkworth Mine:

In 1976, Costain Australia Limited participated in a successful bid to lease coal in the Hunter Valley, New South Wales, and Warkworth Associates was formed as a joint venture to develop the lease and mine the coal. Costain Australia Limited is a 25% shareholder in the venture and, as managing partner, is responsible for exploration, investigation, evaluation, construction and management of the mine. A Bucyrus-Erie 1370W dragline has been constructed, and production in line with current annual commitments of 2.5 million tonnes commenced in July, 1981.

U.K. EXPERIENCE:

As detailed previously, the Costain Group has been involved in open cut coal mining since 1947.

Since that time, the Company has operated as Contractor to the National Coal Board Open Cast Executive in the United Kingdom on a total of eleven sites.

Two of the more significant operations are detailed:-

Acorn Bank - Northumberland, England:

During this multi-strip mining operation, some 7 million tonnes of coal were extracted involving the removal of 90 million cubic metres of overburden to a maximum depth of 71 metres. The coal was lifted out of the cuts by derrick cranes situated on the highwall. This innovative approach was necessitated by the physical constraints at the site.

After 11 years' operation, this contract was completed in April, 1966 and, by the end of 1967, the land was restored to high agricultural standards. The peak production was 11 million cubic metres of overburden per annum, and this was attained by the use of two Bucyrus-Erie 1150B 19 cubic metre draglines supported by 4 cubic metre shovels and ancillary plant.

At the time, this contract employed the largest concentration of earthmoving equipment in Europe, and was the springboard for moving into larger mining contracts.

Westfield - Fife, Scotland:

Because of depth and geological disturbance of the coal seams, the deposit is being worked as an open pit. Costain are currently producing 1.5 million tonnes per annum of coal involving the removal of 10 million cubic metres of overburden per annum from depths of up to 230 metres (i.e., greater than 750 feet). This site has certain features which are of interest:-

(i) The mine site was overlane by some 3 million cubic metres of peat which was removed by dredging and pumping into previously constructed reception lagoons. This operation was carried out by Costain's dredging organisation, and provided a satisfactory solution to a difficult problem.

(ii) 23 million cubic metres of overburden were crushed and transported 5 kilometres by high-speed conveyor, transferred to spreading equipment, and used to re-contour large areas of waste land which were reclaimed to agriculture.

(iii) The coal occurs in five seams comprising 16 leaves, each of which is worked separately from basins with dips varying from horizontal to 80 degrees. The seams are selectively mined using face shovel equipment assisted, where necessary, by rubber-tyred dozers.

THE DOLET HILLS MINING VENTURE, LOUISIANA, UNITED STATES OF AMERICA:

More recently, Costain has established a presence in open cut mining in the United States of America through the Dolet Hills Mining Venture.

Dolet Hills Mining Venture is substantially owned by the Costain Group through subsidiaries of Costain Holdings Incorporated of Chicago (60%) and Costain Australia Limited (20%). The balance is owned by a subsidiary of J. A. Jones Construction Company of Charlotte, North Carolina.

The joint venture was awarded a contract to mine 2.3 million tonnes of lignite per annum for 25 years on 16th March, 1982, based on an offer submitted to the Central Louisiana Electric Company and South Western Electric Power Company in August, 1981. These utilities are jointly building a 640mW power station adjacent to the mine which will be ready to accept lignite commencing in August/September, 1985.

Lignite will be recovered from a single seam averaging 1.8 metres in thickness and covered by up to 30 metres of marine and river deposited sands, silts and clays. The stripping ratio averages 9 cubic metres of overburden per recoverable tonne.

The joint venture has had responsibility for obtaining all government consents to open up and operate the mine, and this task was accomplished by October, 1983. The Dolet Hills Mining Venture is also to fully finance the mine, and an $85 million line of credit was negotiated with United States and British banks and signed in June, 1983.

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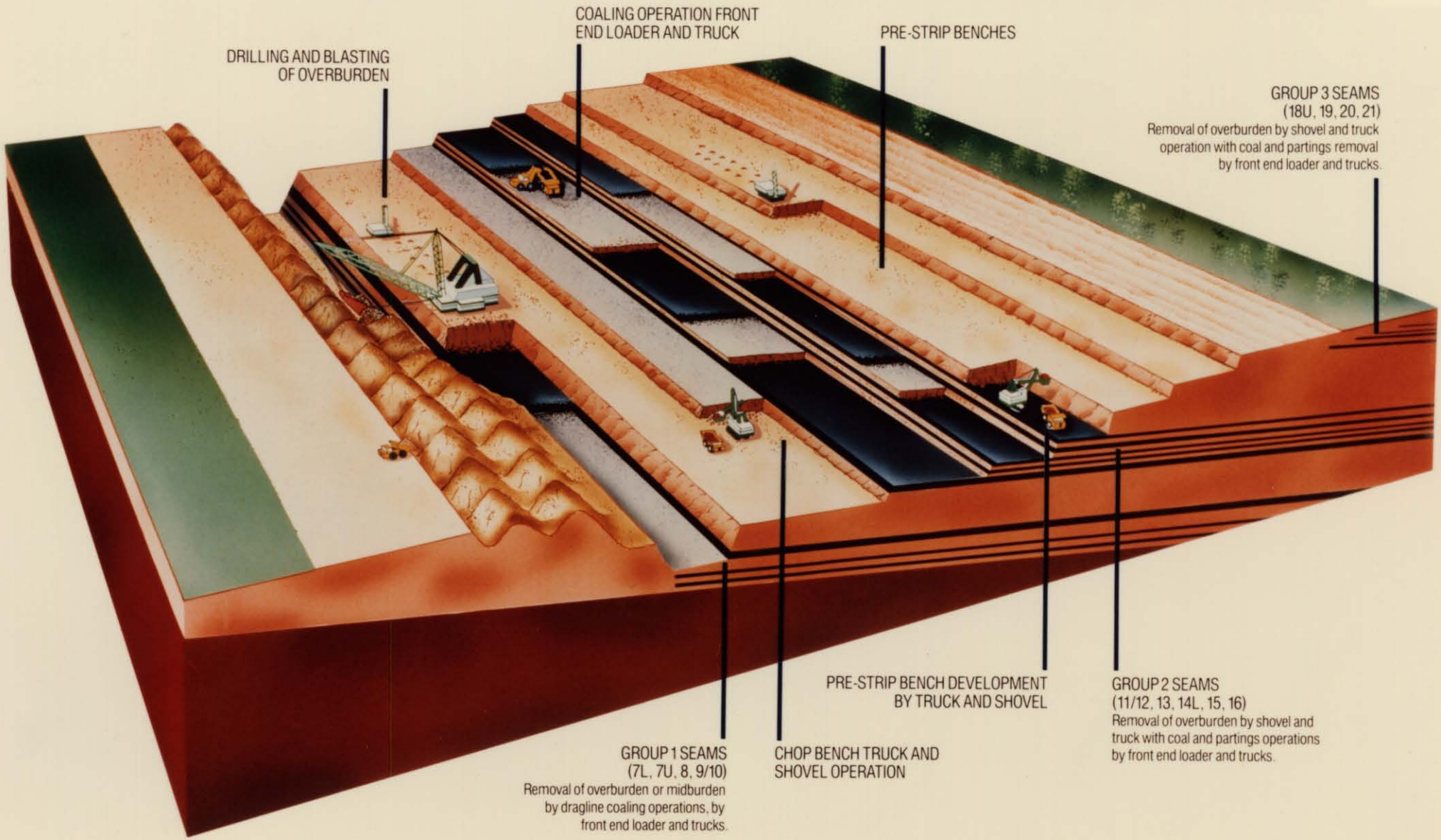
ISOMETRIC PRESENTATION OF THE WARKWORTH MULTI-SEAM MINE METHOD



MANUFACTURING

Costain Concrete

Costain Concrete has been involved in the design and manufacture of pre-stressed mono block railway sleepers for 35 years. Approximately 15 million sleepers, equivalent to over 10,000 km of track, have been produced in the UK. Associate company Genstar Costain has supplied over 2 million sleepers to Canadian National Railways.

Kwikform

Kwikform has been involved in the rationalisation of its manufacturing business and the development of 'supply and fix' in the system scaffolding operations during 1982.

Kwikform's 'Kwikstage' shoring is being used extensively in the Nuclear Energy Programmes at Heysham and Torness. In North Wales and South West England, 31 bridges currently under construction are being supported by Kwikstage shoring while overseas both standard and purpose made shutters have been ordered for Korea (£1.1 million) Saudi Arabia (£800,000) and Oman (£536,000). Equipment valued over £1 million is being supplied to Caracas Metro, Venezuela.

Pilcon

Two recent developments at Pilcon are the selling of a wide range of pre-stressing equipment and the establishment of a Singapore branch to serve its South East Asian market. The company continues to successfully manufacture drilling rigs and site investigation equipment.

HOUSEBUILDING

Costain has house-building operations in the UK, Germany, North America and Australia.

In the UK Costain Homes is continuing its policy of programmed expansion. During 1982 the company built 404 new homes and in 1983 expects to increase this number to 660 and to achieve 1,500 a year by 1986 thus demonstrating the Group's commitment to a greater investment in and return from house-building.

In the past years the company's main area of activity has been the middle and upper middle markets but in response to changing economic conditions it is broadening its activity with more emphasis in the low cost sector.

In Germany the Group has consolidated and rationalised its investment with its principal partner Adt AG. In a climate of lower interest rates and increasing confidence in the German economy the Group anticipates improved results in the period ahead.

Costain Limited the Canadian public company in which the Group holds a 49.9 percent interest, has been experiencing an improvement in the housing market following one of the most difficult economic periods in North America for 30 years. In 1982 the company's bankers and the Group provided funds to strengthen the company. It is well placed with land holdings in Arizona, Washington DC and Florida in the USA and in Ontario and Alberta in Canada.

Houses in Arizona, USA built by Costain Limited of Canada

GEOTECHNICAL ENGINEERING

Over £1 million worth of contracts were awarded to Foundation Engineering at the beginning of 1983. These included site investigations for the proposed North Devon Link Road and the East London River Crossing. Recently the engineering services have been extended to include mineral and water exploration on a world wide basis from centres in Nigeria, the Middle East and South East Asia.

A Pilcon Wayfarer drilling rig being used by Foundation Engineering on a site at Abu Dhabi, UAE.

ZIMBABWE

Having been established for over 29 years in Zimbabwe, Costain (Africa) Ltd's experience in working in the country is reflected in the significant number of building and civil engineering projects being undertaken at present. In the Harare area work includes extension contracts for the University of Zimbabwe, a new teacher training college and a number of office developments. A container terminal is being constructed for the National Railways of Zimbabwe and a rehabilitation centre at Ruwa for the Ministry of Social Services.

Extension to head office building now under construction for Old Mutual In Harare, Zimbabwe

AUSTRALIA

Costain Australia is a public company covering Australia and the Pacific Basin. While its main emphasis is on mining (see Mining Section) the company embraces a wide range of activities including building, civil engineering, housebuilding and land and property development. Turnover for 1982 was £117 million.

Pearson Bridge, a subsidiary, undertakes most forms of heavy civil construction. This includes shafts, bridges, dams, port works, petro-chemical plant and civil works, pipeline installation, building construction, and significant tunnelling work.

Recent contracts include coal jetty loading facilities near Bowen on the Queensland coast and a 1,200 metre long decline drift tunnel for Western Mining at Stawell in Victoria.

In New South Wales, the construction division is building a 24-storey office block for the State Superannuation Board and a five-storey office building valued at £3.2 million for Provident and Pensions Holdings Pty. In Melbourne construction of a 24-storey luxury apartment building is in progress.

A 2 4km jetty and travelling gantry being constructed at Abbot Point Port Development, Queensland, Australia, which will handle 8 million tonnes of coal for export to Japan.

NORTH AMERICA

Costain has made substantial investments in the USA. Apart from the Group's mining activity in Louisiana and West Kentucky (see Mining Section) and housing (through the Canadian public associated company, Costain Ltd) the Group is also involved in process engineering related activities. Consolidated X-Ray Service Corporation based in Dallas specialises in non-destructive examination of pipelines and pressure vessels, pumps and valves.

Weld testing equipment being used by Consolidated X-Ray Service Corporation in Dallas, USA.

NIGERIA – COSTAIN (WEST AFRICA) LTD

With over 30 years' building and civil engineering experience in Nigeria, Costain (West Africa) a 37.6 percent associate company is working in partnership with Costain International undertaking UK financed projects including the Oyo Water Project, and the Iwopin Township and Paper Mill. In addition it carries out major civil engineering and building projects within Nigeria and has a current turnover of £56 million.

The Iwopin paper and pulp mill nearing completion, in Nigeria.

DREDGING

Cobla, the Costain-Blankevoort group of dredging companies in conjunction with associated companies operate a modern, versatile dredging fleet. Cobla has been employed to widen and deepen existing waterways, reclaim new areas, create new ports and provide shipping facilities all over the world. To meet client's requirements the company designs specific equipment such as the self-elevating walking heavy duty cutter suction dredger which was designed and constructed to dredge the 20km long, 300 metre wide approach channel to the Mina Jebel Ali Harbour in Dubai. Since completion of this project in 1982, the fleet has been successfully redeployed in Europe and the Middle East.

PROCESS ENGINEERING

Costain has been engaged in the process contracting industry for over 25 years. Costain Process is emerging as a full range process contractor structured to meet the needs of the market through the 80's and beyond.

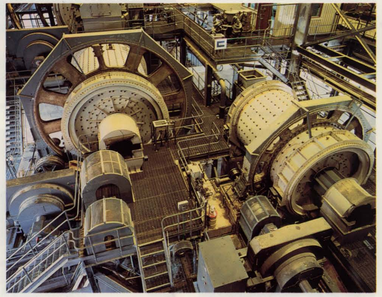
The range of services covered by these companies include project management, process and engineering design, procurement, construction (offshore and onshore), planned maintenance, industrial services and systems engineering.

Particular areas of technological concentration include oil/gas production (off and onshore) enhanced oil recovery, speciality chemicals, non ferrous metal, cement and general industrial plant.

Typical current projects range from a major crude oil treatment complex on Das Island, Abu Dhabi, a copper smelter in the Oman, refinery and petro-chemical facilities in Saudi Arabia, a food production plant, ancillary power station facilities, to the emergency shut down systems for a major ethylene plant in the UK. They have carried out the fifth annual shut-down to be undertaken of one of the world's major LNG complexes on Das Island.

Heavy duty cutter suction dredger with booster station at work in Jebel Ali, UAE.

Costain Process Engineering & Construction through Yahya Costain, was responsible for the mechanical, electrical and instrumentation installations at the Oman Mining Company's Sohar Copper Concentrator and Smelter Plants.



COSTAIN

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May 1983

COSTAIN

FACTS ON COSTAIN GROUP 1983

Costain, one of the UK's major construction and civil engineering Groups, currently operates in over 30 countries throughout the world.
While contracting remains the main activity of the Group, Costain has expanded into related activities including mining, dredging, process engineering, property and housing and continues to maintain a significant share of the market both at home and overseas. Some two-thirds of the Group's £710 million turnover for 1982 came from overseas projects.

In this booklet we highlight some of the many and varied principal activities of the Costain Group in 1982-3.

DID YOU KNOW?

Costain employed some 17,000 people of whom over 12,000 worked outside Britain.

The Costain Group won the Queen's Award for Export Achievement for the fifth time. It was first received by Costain Civil Engineering in 1971, by Kwikform in 1978, then by Costain International in 1976, 1978 and 1983.

Costain was successful in winning a $1,000 million tender in Louisiana, USA, against major competition for a 25-year lignite mining contract with production due to start in 1986.

The Thames Barrier is the world's largest movable flood barrier. The largest underwater pour (pier four) comprised 6,600 cu m of concrete and took three days of round the clock pouring. The total weight of steel in the barrier is 51,000 tonnes and the total volume of concrete is 214,000 cu m. Following a revised agreement in 1978/79 the project was completed ahead of schedule and below cost budget – a significant achievement both technically and industrially.

The Zimbabwe company Costain (Africa) achieved a good performance based on the many years of experience gained by the Costain operations in that country.

During the very difficult market conditions of 1982 Costain redeployed its entire dredging fleet throughout the Middle East and Europe following the completion of the deep water 73 berth port at Jebel Ali, Dubai in February 1982.

Costain acquired a 50 percent interest in coal properties and the existing Pyro deep coal mining operations in West Kentucky – one of the largest underground coal mines in the USA.

Costain's success overseas is mainly attributable to the mobility of its staff and their ability to work in difficult terrain and climatic conditions. An example of this is at El Hassa in Jordan where Costain employees are working in the desert on a contract to remove 21 million cubic metres of rock for the Jordan Phosphate Mines Company.

With the skill and knowledge gained by working overseas since the 1930's, Costain International has earned a reputation for carrying out large complex jobs overseas. This is reflected in its current order book which indicates the company's success in winning many major contracts throughout the world.

Costain established a project management capability in the process engineering and construction markets.

Aerial view of the GLC's Thames Barrier at Woolwich Reach, with the 10 steel gates in the defence position.

CIVIL ENGINEERING

* Costain Civil Engineering is involved in major projects throughout Europe with the main current emphasis on motorway and marine construction.
* The company's turnover for 1982 was £75m.
* This year Costain Civil Engineering completed over £68 million of work on the M25 where 15km of motorway and a number of major structures were built, plus the contract for the South Eastern section of the Ipswich Bypass, in addition to the Colchester and Totnes Bypasses.
* In joint venture with Cementation, Costain has been awarded the £44.5 million M25/M4 Interchange.
* The company is currently undertaking:–

  A 9km stretch of the A470 trunk road in South Wales. The £6 million phase one of the Rochester Way Relief Road. Continuing work at Heathrow.
* The Thames Barrier, hailed as a milestone in civil engineering, was built by the Costain/Tarmac/HBM joint venture. It took eight years to build at a cost of £300 million. During this time it was manned by a staff of 500 and a labourforce of 2,000 at peak. The barrier is the world's largest movable flood barrier.

Ipswich Southern Bypass showing the Seven Hills Interchange.

COSTAIN CONSTRUCTION

* The Building Division of the Costain Group is responsible for carrying out building contracts throughout Europe. Currently its main activity is in the United Kingdom where it carries out a wide variety of building and renovation contracts to a value in excess of £100 million annually.
* Costain Construction's turnover for 1982 was £93m.
* Contracts presently under construction include:–

  The Ramada Hotel, Reading.

  Substructure work for Lloyds of London redevelopment in Leadenhall Street.

  Projects in the retail sector for Tesco, ASDA and British Home Stores.

  Various health sector projects such as the £9.3 million extension to Winchester District Hospital and the new £2 million Health Centre in Thamesmead.

  Major works at Heathrow Airport.

  A £10 million office block at Wilton Road, London for Townsend Thoresen Properties.
* Numerous industrial and commercial projects are also underway.

  Specialist engineering services are provided by E. J. Cook & Co. (Engineers) Limited.

The main auditorium of the Theatre Royal, Plymouth, which has seating for 1,300 people at three levels.

Work in progress on the M25 motorway showing automated equipment used to lay and level concrete on the carriageways at the rate of 650 linear metres per day.

A 12-storey office and shop development for the Town & City Group of Companies in association with the Norwich Union Insurance Group at Cambridge Circus, London WC2.

St Crispin House, Park Lane, Croydon – a prestige development for Property Growth Assurance Company Limited, clad with mirrored glass.

INTERNATIONAL CONTRACTING

* The skill and knowledge gained by working abroad since the 1930's is the foundation for the immense development projects undertaken by Costain International throughout the world.
* Typical building and civil engineering contracts include airports, power stations, buildings, tunnels, docks, harbours and industrial installations.
* The company's turnover for 1982 was £103m.
* Major projects currently under construction or recently completed include:–

  Grain storage silos, an animal feed mill, civil works for the Sohar Copper Complex and Rusayl Cement Works, all in Oman.

  Management contracts include an earth-filled dam in Sri Lanka and the Barclays International Bank, Cairo.

  Major civil engineering works include a power station at Victoria Dam, Sri Lanka and an elevated dual carriageway over the sea and reclaimed land, in Hong Kong.

  Sports complexes include the Bahrain National Stadium, and camel racing grandstands at Al Wathba and Al Ain in Abu Dhabi.

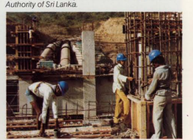
  In Nigeria, the £100 million Oyo Water Project the largest of its type to be awarded in West Africa is being carried out by Costain International and Costain (West Africa) to provide water supplies and irrigation networks covering an area of 2,800 sq km.

  Whilst the Group's operation in recent years has been based in the Middle East, only 15 percent of the Group's turnover now comes from this area and this underlines the success the Group has achieved in the last three years in spreading its activities. For instance, Costain has been able to capitalise on its presence in Nigeria over many years and has combined with UK financial institutions to win work.

Barclays International Bank, Cairo, a project management contract for Costain International.

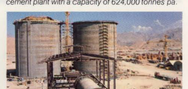
The 81-span elevated 2,250 metres dual carriageway, known as the Island Eastern Corridor, being constructed by Costain International-Pearson Bridge.

Construction of a 210 MW hydro-electric power station which is part of the Victoria Dam and Hydro-electric Project being constructed for the Mahaweli Authority of Sri Lanka.

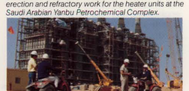


The Bahrain National Stadium with seating for 30,000 spectators, showing the football pitch and Olympic running track. Consultants were Module 2 Bahrain Limited.

The Oman Cement Works at Rusayl – a dry process cement plant with a capacity of 624,000 tonnes pa.



The Process Engineering Division of Costain International was responsible for the mechanical erection and refractory work for the heater units at the Saudi Arabian Yanbu Petrochemical Complex.



MANAGEMENT DESIGN

One of the Group's most recently formed divisions known as Costain Management Design is undertaking projects on a design and construct basis, management fee and other types of contract tailored to meet the specific needs of the client.

PROPERTY

The Costain Group's main property interests are located in the UK, Australia and Europe.

In the UK the substantial benefits obtained by County and District Properties joining the Costain Group in 1980 have been reflected in the rationalisation of the Group's property activities with consequent improvement in results.

During 1982 County and District sold its development in Hammersmith, and completed properties including the Hertford Town Centre shopping scheme and the Queen's House office development in Harrow. More modest investment schemes which are moving to final development stage include smaller schemes at Reading and Hammersmith.

The current property investment portfolio is in excess of £80 million.

In Australia the company is actively engaged in a major £30 million scheme in Sydney which is in the course of development having been pre-let and pre-sold.

Major office development in the centre of Farnborough, Hampshire, to be developed by County and District Properties on a four acre site, which will provide 105,000 sq ft gross of office space.

MINING

The Group has been in coal contracting, working for the National Coal Board since 1942. Over the years, it has expanded this key skill into three areas: coal contracting, mine ownership and other mining.

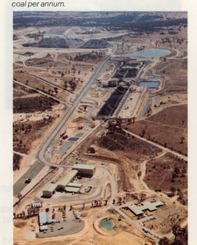
Coal Contracting

In coal contracting Costain supplies tonnage to mine-based power stations covering the three continents of the UK, Australia and the USA. In the UK at the Westfield opencast mine in Fife, Costain is contracted to supply the National Coal Board until 1985. Last year the mine produced 1 million tonnes of coal.

At the Ravensworth Mine in New South Wales, Australia, Costain has contracted to supply coal until 1985. Currently one of the largest strip mining contracts in the country some 4.3 million tonnes of coal was produced there last year.

The contract to supply lignite from the Dolet Hills Mine in Louisiana, USA will commence at the end of 1985 and continue until 2010 with supply at the rate of 2.5 million tonnes per annum.

Aerial view of the Warkworth Mine in New South Wales, Australia with capacity of 2.5 million tonnes of coal per annum.



Coal Mine Ownership

Costain either manages directly or participates in managing, development and sales of coal deposits to the power generating, and to a lesser extent the steel market, from two investments in Australia and the USA – at both surface and deep mines.

The Warkworth mine in Australia where Costain has a 25 percent interest and manages the mine, supplies coal to the Japanese, European and home markets. In 1982 this involved sales of 900,000 tonnes of coal. In the USA Costain has a 50 percent interest in the Pyro underground mine in West Kentucky which produces coal for the US home market. Some 3.1 million tonnes of coal were sold in 1982.

In both countries the mines have favourable mining conditions and are situated adjacent to an infrastructure giving easy access to markets. In the USA, Pyro also owns the rail link and port facilities.

Other Mining

In Jordan, Costain has constructed a dragline and is acting as contractor to remove overburden exposing massive supplies of phosphate for Jordan Phosphate Mines Company. In 1982 some 10 million cubic metres of rock was removed.

Charging bore holes in the coal face of a deep mine in Western Kentucky, owned and managed by Pyro Mining Company.

An aerial view of Ravensworth mine photographed in December, 1979

The Costain Group of Companies

The Group

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Costain Mining has been a major contractor to the British National Coal Board Open Cast Executive for some 35 years. In that time, the Company has successfully mined both large and small projects by strip mining and open pit methods, and has made a speciality of rehabilitation of mined-out areas.

Costain Australia Limited

Costain Australia is the largest of the overseas-based subsidiaries of the Costain Group. It was formed in 1960, and went public in 1972, with some 34 percent of the shares currently being held in Australia.

Its operations are national and include building construction, property development, housing, concrete sleepers, civil engineering through the acquisition of Pearson Bridge Pty. Limited, and, of course, mining.

Costain Australia has been involved in numerous major construction projects in various Australian cities, some of these being the National Bank House and the State Bank Centre in Melbourne, the Sydney Stock Exchange, the Belconnen Mall project in Canberra, and, more recently, the Paradise Centre on the Gold Coast.

As well as city-based development, the Company has extended its operations to rural areas, where it is developing housing and industrial estates and constructing a wide range of buildings.

Mining Division

Backed by the technical experience of Costain's world-wide mining activities, Costain Australia won the contract from the Electricity Commission of New South Wales to operate Ravensworth No. 2 Open Cut Mine. Building on the experience gained there, the Division continues actively seeking further contract mining opportunities. In addition, using senior staff based on site at Ravensworth, it undertakes complete mining feasibility studies and design projects on a consulting basis. This service is available to any interested parties, not only groups who are potential contract mining clients.

The Mining Division also has an interest in Warkworth Associates Consortium, and, as the managing partner, is responsible for bringing the Warkworth Mine on stream to produce both steaming and soft coking coal for export markets.

Technical Data

General

Lease Area		843 hectares
Seams Extracted		Ravensworth Seam Bayswater Seam
Composite Specification:	Ash	22.7% to 24.1%
	Specific Energy	22.20 MJ/kg.
	Moisture	8%
	Sulphur	Less than 0.5%
	Volatiles	Greater than 20%
	Ash Fusion Temperature	Greater than 1,260°C.
	Hardgrove Index	57
Contractural Tonneage		50,802,500 tonnes
Annual Production:	1977	3,827,090 tonnes
	1978	4,600,933 tonnes
	1979	4,337,120 tonnes

1370W Dragline

Weight of Machine	2,740 tonnes
Length of Boom	81.5 metres
Bucket Capacity	48/49 cubic metres 95 – 105 tonnes
Weight of Empty Bucket	66 tonnes
Height of Boom Point	55 metres
Maximum digging depth	46 metres
Tipping Radius	73 metres
Drag Rope Diameter	85 millimetres
Hoist Rope Diameter	75 millimetres
Installed Power	9,250 kiloWatts

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COSTAIN

RAVENSWORTH

No. 2 Open Cut Colliery

In 1967, following the calling of tenders internationally, the contract for the supply of coal to Liddell Power Station from Ravensworth No. 2 Open Cut was awarded to the Costain Group of Companies, with the operations being carried out by the Mining Division of Costain Australia Limited.

Liddell Power Station has a total installed generating capacity of 2,000 megaWatts feeding into the New South Wales State Grid. The Station, with its twin stacks each 170 metres high, is set on a peninsula jutting into the 1,200 hectare man-made Lake Liddell, which provides the cooling water. Liddell Power Station, which consumes in excess of 5,000,000 tonnes of coal per year, provides over 30 percent of the State's total power requirements.

The Mining Lease, which covers approximately 890 hectares, contains in excess of 60 million tonnes of recoverable coal from two seams; the upper, Ravensworth seam, averages 3 to 4 metres in thickness, and is heavily interleaved with stone bands; the lower seam, the Bayswater, averages 6 metres in thickness, and is of a more uniform nature. These coal measures are basin shaped, dipping at 1:17 on the flanks and at 1:34 from the north.

The actual contract is for a total of 50,802,500 tonnes being delivered over a 14 year period commencing in 1972.

Operations at the Mine are conducted on a strip mining basis using two Bucyrus-Erie 1370W draglines which weigh 2,740 tonnes each, walk at 0.258 kilometres per hour, and have an installed capacity of 9,250 kiloWatts. These machines are responsible for moving all the overburden from on top of the coal.

The coal, which is produced at a rate of more than 4 million tonnes per year, is transported to the coal preparation plant in haulers which carry a payload of 110 tonnes.

Costain's plant investment at Ravensworth exceeds $A70,000,000 on a replacement basis, and, as well as the major items of plant, includes ancillary equipment such as dozers, graders, cranes and pumps. All operations are meticulously planned in the short and long term, ensuring that all plant works continuously and efficiently.

In 1977, the contract was varied to provide for the progressive rehabilitation of the areas disturbed by mining which are re-shaped to suitable contours, topsoiled and cultivated in such a manner as to return the land to a suitable condition for cattle grazing. At the end of the contract period, these works will have virtually caught up with the disturbed mining areas.

In the meantime, operations on site proceed on a 24 hours per day, 7 days per week basis, employing up to 230 people for the contract duration.

The Mining Process

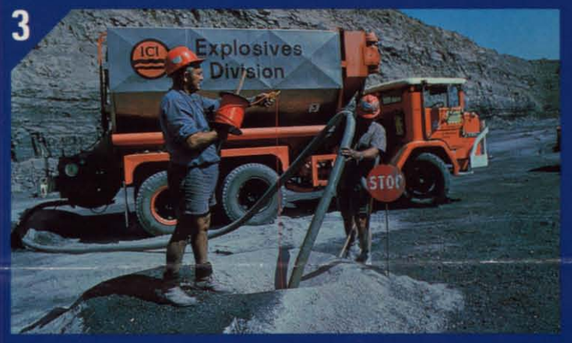
1

Topsoil Stripping: The first step in the mining process is the stripping of topsoil, which is then stockpiled for future rehabilitation work. Topsoil stripping is carried out by scraper and bulldozers.

2

Overburden Drilling: Bucyrus-Erie 45 Rotary drill rigs are used to drill 270 millimetre diameter blast-holes to a specified pattern in the overburden material in preparation for loading with bulk explosives.

3



Overburden Blasting: As with the drilling patterns, the quantity of bulk explosive loaded into each hole is varied according to rock type and the depth and width of the cut. ANFO and Iregel Slurry blasting agents are used to achieve efficient ground preparation for the draglines.

4

Overburden Removal: All of the material previously prepared by blasting is removed by Bucyrus-Erie 1370W draglines equipped with 49 cubic metre buckets, which dig down to depths of up to 45 metres to expose the coal seams, casting the overburden into the void of the previous cut from which the coal has been extracted.

5

Coal Loading: After the draglines bare the coal seams in preparation for extraction, the top of the seams are cleaned by rubber-tyred bulldozers, and, in the case of the Bayswater seam, the coal is drilled and blasted to improve loading efficiency. Coal loading is carried out by either 2400 B.L.H. Lima face shovels or front-end loader, both equipped with 9 cubic metre buckets.

6

Coal Transportation: Coal is hauled from the coal face to the coal preparation plant in diesel-powered Caterpillar bottom dump haul units with payloads of 110 tonnes each. These 450 kiloWatt units carry the coal along haul roads up to a distance of 5½ kilometres to the preparation plant located at the northern end of the Mine.

7

Coal Crushing: At the coal preparation plant, the coal is dumped into hoppers which feed two rotary breakers, where the coal is reduced to less than 200 millimetres in size. Thereafter, it passes to further hoppers which supply a bank of six ring mills, further reducing the coal to its final size of less than 32 millimetres.

8

Liddell Power Station: Coal from the ring mills passes to a 5,500 tonne concrete silo, at which point the coal becomes the responsibility of the Electricity Commission of New South Wales. From the silo, the coal is weighed, sampled for quality analysis, and transported, by overland conveyor, some 8½ kilometres to the stockpile area at the Power Station.

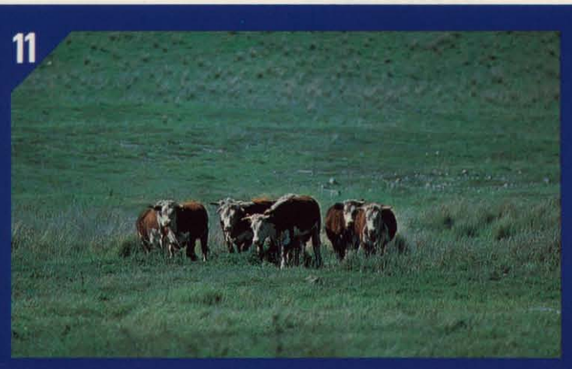
9

Spoil Reformation: Once the operations in a particular area have progressed a sufficient number of cuts, then bulldozers are used to re-shape the conical spoil piles to a form similar to the surrounding countryside. The re-shaped area is then left for 12 to 24 months to ensure that any settlement that takes place can be re-dressed.

10

Topsoil Spreading and Cultivation: Extensive testing, both on site at Ravensworth and at other mine sites in the area, has shown the autumn season to be the most favourable time of the year at which to cultivate. Following the spreading of some 10 centimetres of topsoil, the areas are chisel-ploughed and cultivated with various blends of grass seed and fertilizer as advised by the Soil Conservation Service of New South Wales.

11



On-Going Attention to Rehabilitated Areas: In order to ensure that cultivated areas get off to a good start, an on-going programme of aerially spreading fertilizer is adopted. At various stages, tree planting is carried out, and the land is eventually returned to agricultural purposes, such as cattle grazing.

12

Maintenance Operations: With the large capital outlay in equipment, scheduled maintenance programmes have been established as the normal practice on site, providing for 24-hour maintenance coverage, to ensure that all of the equipment continues to contribute to the production from the Mine. The majority of maintenance works are carried out on site by Costain employees.