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EXPLORATION LICENCE 20/80 LAUNCESTON
EXPLORATION PROGRESS REPORT FOR
QUARTER ENDED 22 NOVEMBER, 1983

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M.J. Carr December, 1983

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1. SUMMARY

An exploration drilling programme commenced in the Rosevale Coalfield sector of EL 20/80 during October, and as of the end of the reporting period 27 open and 2 partly cored holes had been drilled in the Loatta deposit, and 3 open holes completed in the northern part of Pipers Lagoons, to a total metreage of 2,355m. All holes have been geophysically logged. Drilling is still in progress, and scheduled for completion early in December.

Preliminary results for Loatta indicate a somewhat simpler stratigraphic model. A partially eroded uppermost banded coal interval 10-30m thick is separated by approximately 20m of clay from an areally persistent mid coal zone 6-50m thick, which in turn, in the southern part of the deposit, is underlain first by 20-30m of clay then a lowermost split group of seams 7-25m thick. However, mid seam structure contouring suggests greater structural complexity than originally envisaged, with at least the north-eastern and central areas of the deposit having been affected by faulting. Confirmation of these structural disturbances is required.

Indicated brown coal reserves of the Loatta, Pipers Lagoons, and Selbourne deposits remain unchanged at 118 Mt. Indications are that the current phase of exploratory drilling will increase the geological reserves of Loatta by 30-40%. However, mining reserves may not increase correspondingly because of the more complex structural setting identified.

During the reporting period the Hydro-Electric Commission, Tasmania, initiated a power station coal enquiry. CSR responded to this enquiry by submission of a proposal to mine brown coal from the Rosevale Coalfield to supply an on-site 400 MW power station over its 30-year economic life. Copies of documentation prepared in support of this submission have been forwarded to the Department of Mines. These studies show that a two-bucketwheel mining operation based on the Loatta and Pipers Lagoons deposits could economically supply up to 5 Mtpa of brown coal whilst maintaining sufficient flexibility to vary product tonnages in response to forecast fluctuating power station demand. Environmental investigations to date have identified no factors which would preclude mine and power station development at Rosevale.

2. INTRODUCTION

2.1 Scope of Report

This report summarises geological and mining investigations conducted by CSR Limited in Exploration Licence (EL) 20/80 Launceston, and more specifically, the Rosevale Coalfield, during the three month period ended 22 November, 1983. Background information on previous studies is also provided.

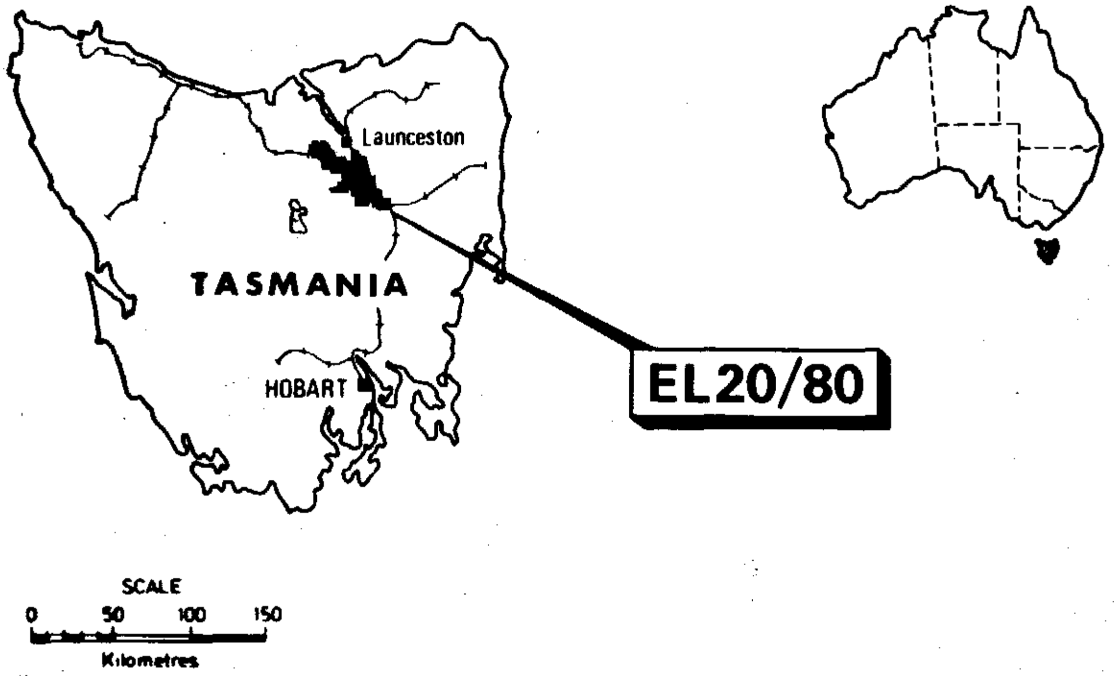
2.2 Tenement Details

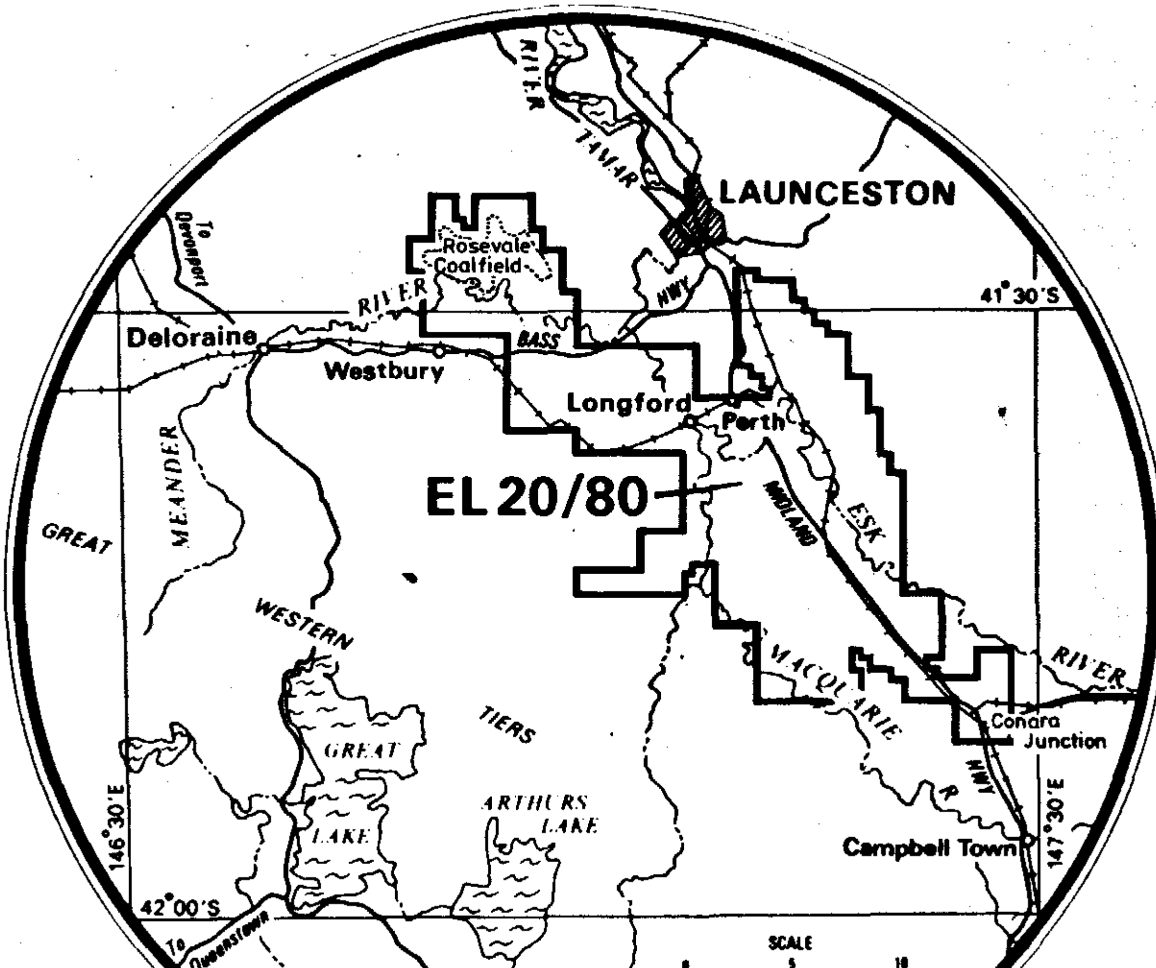
EL 20/80, originally covering an area of 2,339 km^2, was granted to AAR Limited (a wholly-owned subsidiary of CSR) on 19 September, 1980. The term of the EL has been progressively extended as first oil shale then coal exploration continued. In February 1983 the licence was transferred from AAR Limited to CSR Limited and the area was reduced to 984 km^2. The tenement is currently due to expire on the 22nd August, 1984.

2.3 Location, Access, Climate, Physiography, and Land Use

EL 20/80 extends northwards from Conara Junction to the southern suburbs of Launceston, thence continues north-west from Longford as far as Rosevale and Westbury (Figure 2.3).

The Rosevale Coalfield, defined on the basis of three closely related yet discrete brown coal deposits, is located near the north-western corner of EL 20/80, 20 km due west of Launceston and 12 km north-east of Westbury. The Bass Highway and the Western railway line pass 8 - 10 km south of the deposits.





EXPLORATION LICENCE 20/80
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FIGURE 2·3

Local access to the coalfield is via sealed and good quality unsealed shire roads linking Westwood and Rosevale settlements with Carrick, Hagley and Westbury. Farm tracks provide dry weather access to the greater part of the three deposits. During the wet winter and spring months local pastures become boggy and restrict the movement of vehicles off farm roads.

The climate of the area is temperate, with cold winters in which low-level snowfalls are occasionally recorded and warm, drier summers. Annual rainfall averages 750mm, falling principally in the winter months. January through March is generally dry and is the ideal time for exploration activity.

Topography of the Rosevale area is a reflection of the local geology, with the soft, coal-bearing, Tertiary Launceston Beds expressed as physiographic lows, and the more erosion-resistant Jurassic dolerites and Permo-Triassic sediments occurring as hills around the northern, eastern and western margins of the coal deposits. Late Tertiary basalts cover isolated areas of the Launceston Beds, forming low flat-topped hills and ridges. Total relief in the immediate environs of the coalfield is of the order of 50m. However, a major range of hills separates the Rosevale basin from Launceston, and encircles it to the north.

Southerly flowing ephemeral streams drain the coalfield area, through various low gradient marshy zones (e.g. Pipers Lagoons) into the Meander River, which is the major water course around Westbury and is the source of Westbury's reticulated water supply. The river crosses the Tertiary basin just south of the coal deposits, though it does pass over the southern limit of one coal area, before joining the South Esk River close to Hadspen.

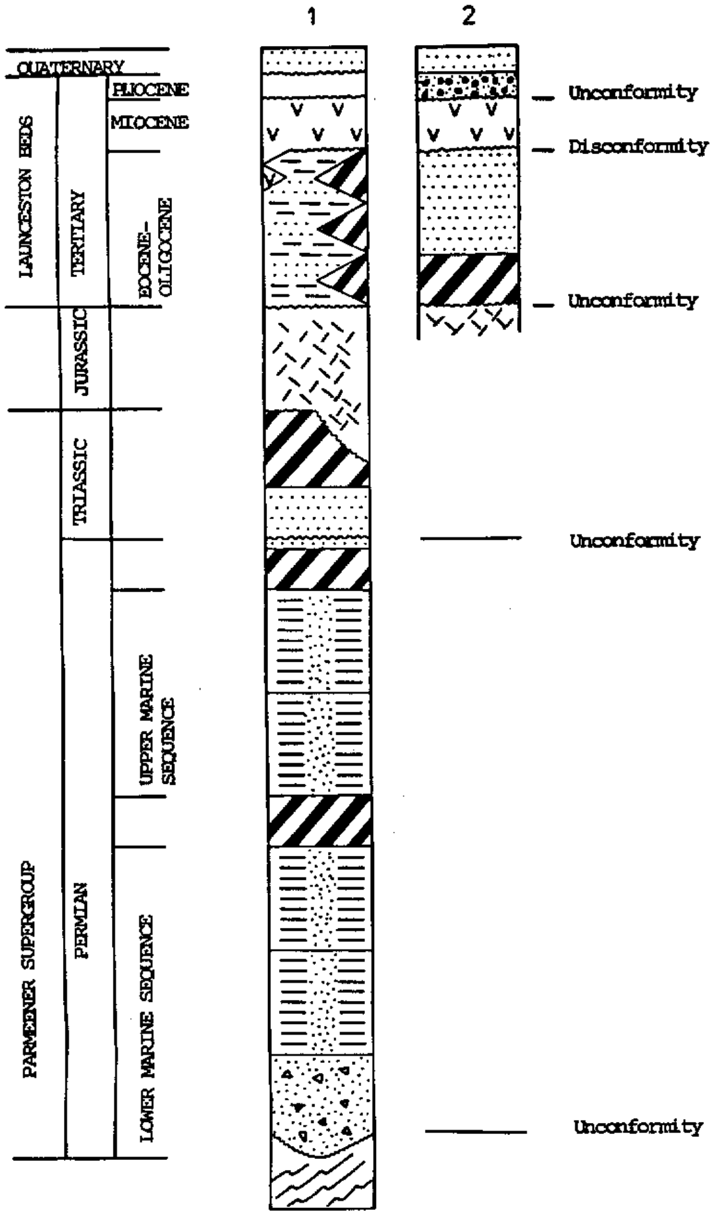
The principal land use over the Rosevale Coalfield is sheep and cattle raising, with small areas being under cultivation. With the exception of the most easterly of the coal deposits, Pipers Lagoons, which is largely covered with light forest, the land on and around the coalfield has been cleared and improved to varying degrees. Little prime quality pastoral land exists in the area.

3. GEOLOGY OF EL 20/80 LAUNCESTON

3.1 Regional Geological Setting

Tertiary brown coals at Rosevale occur in a different structural and stratigraphic setting from Tasmania's better-known Permo-Triassic black coals. Within EL 20/80, it is the Permo-Triassic Parmeener Supergroup and intrusive Jurassic tholeiitic dolerite dykes and sills, which constitute "basement" to the Tertiary coal-bearing Launceston Beds. Black coal has been recorded from EL 20/80 at several horizons within the Parmeener Supergroup (see stratigraphic column, Figure 3.1.1), but not in quantities of any economic significance. Dolerites, as sills up to 300m thick, have consistently intruded Parmeener sediments in the Launceston Basin area at the base of the Triassic succession.

Early in the Tertiary a series of north to north-west trending grabens formed, in which predominantly non-marine sediments ranging up to 1,000m in thickness accumulated. Four main grabens are recognised, and each contains traces of brown coal or carbonaceous material. The northern part of the Midlands Graben (Figure 3.1.2), known as the Launceston Basin, contains the largest volume of Tertiary sediments in Tasmania, and consequently has the best potential for development of brown coal deposits in the state. The presence of brown coal has been recorded at several locations in the Launceston Basin, extending from Conara Junction in the south, north to Launceston and north-west to Rosevale (Figure 3.1.3).



Stratigraphic Name	Lithological Description	Prospective Area in EL 20/80	Thickness Range
	Alluvium		
Upper Zone	Gravel, boulder beds		
Middle Zone	Alkali – Olivine basalts		Up to 60m
	Clay, Silt, Sand Brown Coal and Oil Shale	Loatta, Pipers Lagoons and Selbourne Deposits	0-1,000m
Lower Zone		Breadalbane Lignite	
Dolerite Intrusion	Medium to course grained, tholeiitic dolerite		0-305m
Fingal or Newtown Coal Measures	Feldspathic Sandstone Black coal Seams	Longford Coal Field Norwich and Pateena Mines	0-200m
Knocklofty or Ross Sandstone	Quartzose Sandstone		60-100m
Cygnet Coal Measures Jackey Formation	Carbonaceous Sandstone and Shale with Plant Fragments.	thin coal seams	less than 45m
Bogan Gap Group	Predominantly unfossiliferous mudstone		up to 200m
Poatina Group	Fossiliferous Mudstone and Sandstone		40-100m
Mersey Coal Measures Liffey Group	Carbonaceous Quartz-Mica Sandstone and Shale, thin coal seams		30-49m
Golden Valley Group	Unfossiliferous erratic rich mudstone, shale limestone and sandstone		45-60m
Quamby Mudstone	Unfossiliferous, dark grey pyritic mudstone. Includes Tasmanite Oil Shales of Railton-Latrobe Area		75-120m
Stockers Tillite	Tillite and erratic rich mudstone		0-140m
Basement Silurian	Turbidite sequences, dominately shale and siltstone		
Ordovician	Siliceous conglomerate		
Cambrian	Turbidite sequences containing quartzite		
Precambrian	Quartzite		

Note: Column 2 after Johnson 1873 only applies to Stratigraphy of Launceston Area

Compiled from information contained in Mathews (1974).

CSR Limited
Coal Division

EXPLORATION AND EVALUATION GROUP CSR

DRAWING	DATE
DRAWN C. J.	Nov. '82
CHECKED	
REVISED	Oct. '83

STRATIGRAPHY OF THE PARMEENER SUPERGROUP AND LAUNCESTON BASIN IN EL 20/80

SCALE

FIGURE 3·1·1

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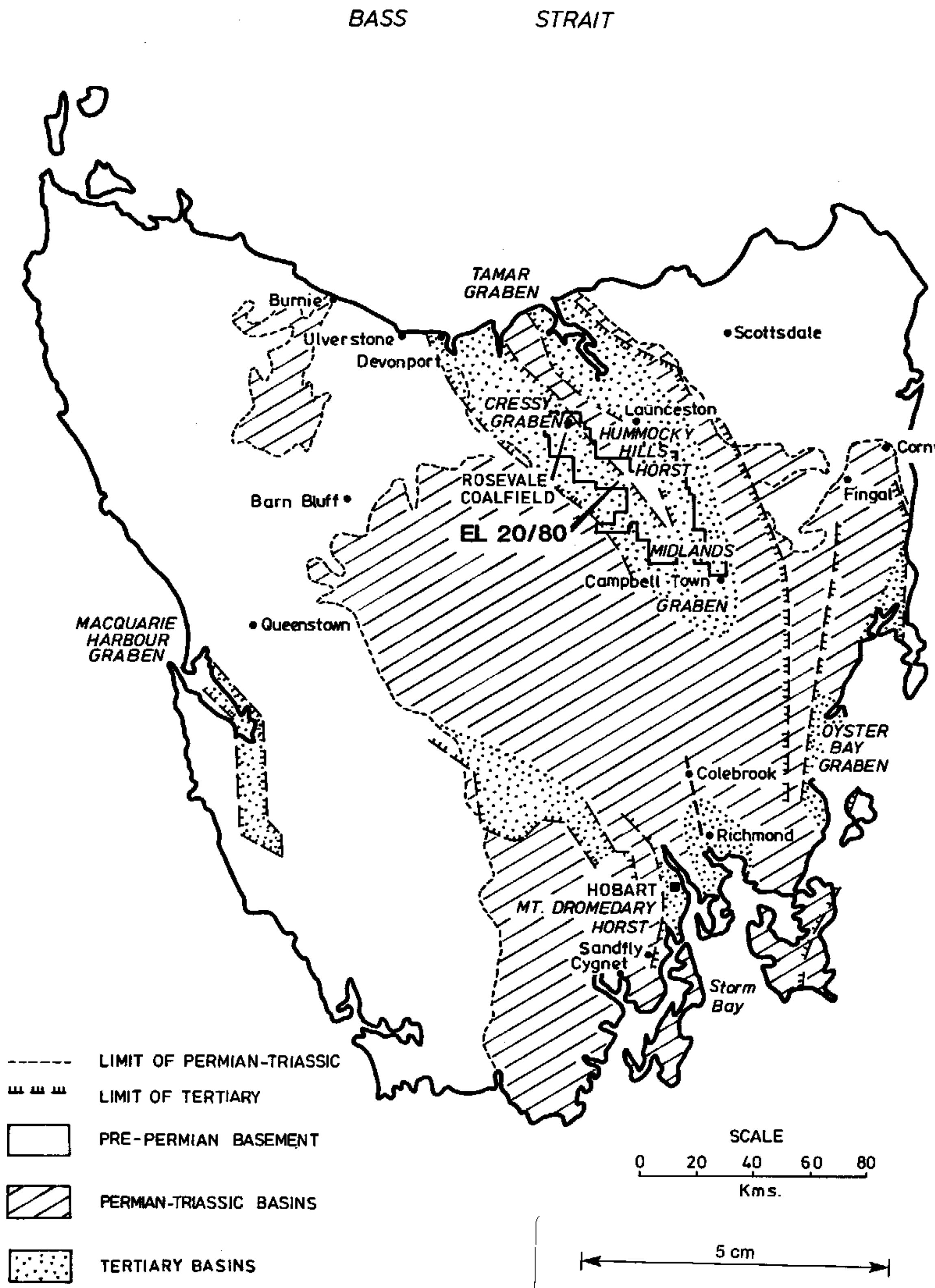

CSR Limited Coal Division	EXPLORATION AND EVALUATION GROUP	CSR
DRAWING / DATE	SEDIMENTARY BASINS AND TERTIARY STRUCTURAL ELEMENTS OF TASMANIA	SCALE AS SHOWN
DRAWN C.J. Dec. '82		FIGURE 3-1-2
CHECKED		
REVISED Oct. '83		DRAWING No 70020 – 92

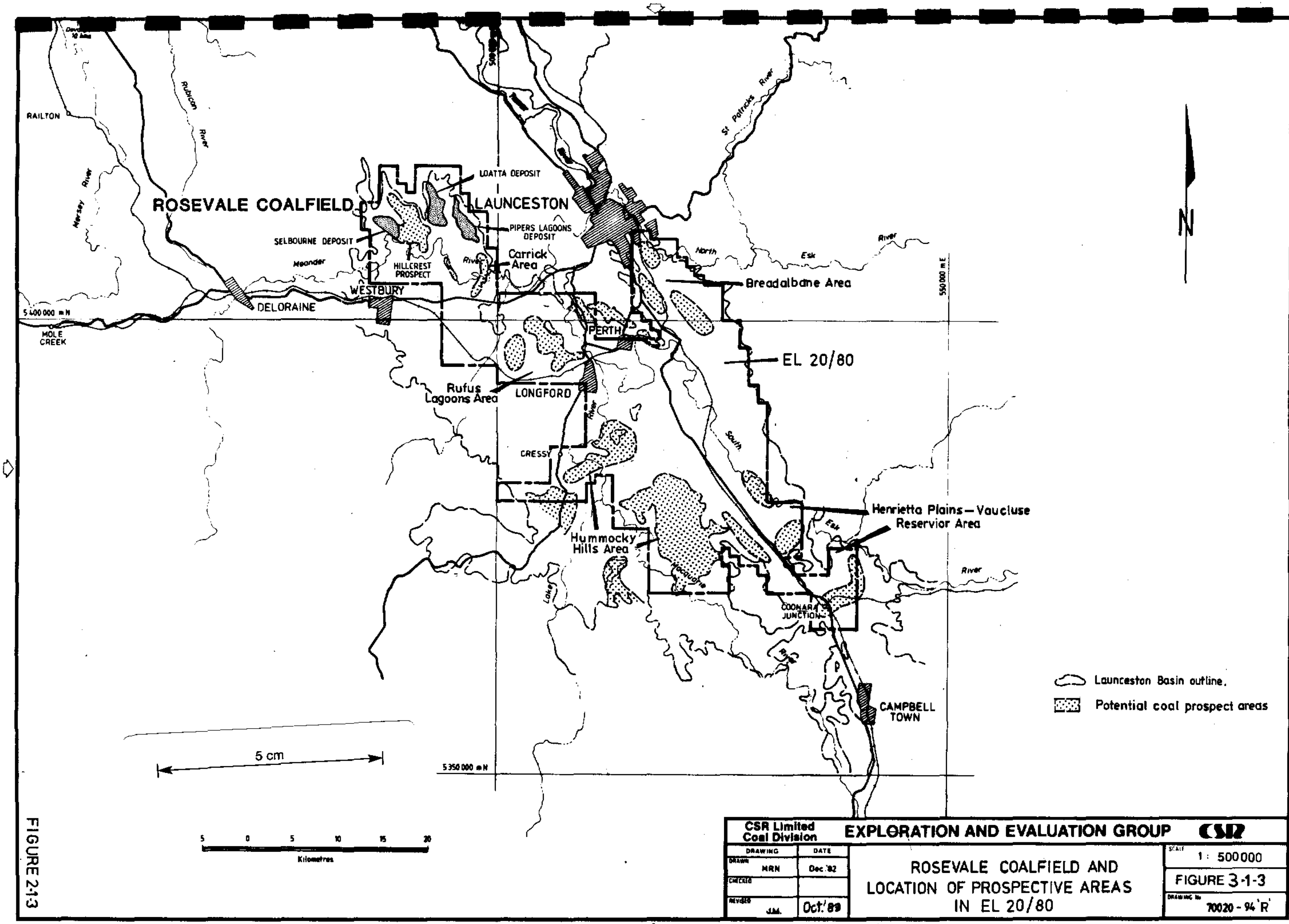

FIGURE 2·1·3

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The Launceston Basin is further subdivided by the Hummocky Hills Horst into a western (Cressy) graben and an eastern (Tamar) graben. The Rosevale Coalfield is located on the eastern edge of the Cressy Graben.

Deposition of sediments in the grabens commenced in the Paleocene to Lower Eocene and continued until the Upper Oligocene. The sequence is composed primarily of non-marine clays, silts, sands and gravel, with brown coal and carbonaceous facies, together with minor marine or brackish water sediments. Environments of deposition were in a state of constant flux during the Tertiary, alternating from fluviatile to lacustrine to subaerial, and are reflected in the rapid lateral facies changes revealed from exploratory drilling. The primary source of the inorganic sediments which infilled the Tertiary grabens was the sandstone, siltstone and mudstone of the Parmeener Supergroup and the Jurassic dolerite.

Basin-wide correlation of Tertiary strata, and particularly brown coal horizons, has not been established in the Launceston Basin, nor has a formal intrabasinal stratigraphic sequence. Johnson (1888) proposed the term "Launceston Beds" for the Tertiary succession and arbitrarily divided it into three zones. The lower zone contains laminated strata, with brown coal seams and fossilised leaves, resting unconformably upon Parmeener Supergroup strata. It is presumed to have accumulated in a lacustrine flood-plain environment. The middle zone is represented by cross-bedded fluviatile sands, as well as clay, silt, oil shale and brown coal. The upper zone comprises gravel and boulder beds on terraces flanking the present course of the Tamar River. The brown coal at Rosevale nominally lies within a dominantly fine clastics facies of Johnson's "middle zone".

Late Tertiary "Newer" volcanics (basalt flows) extensively overlie the Launceston Beds and because the Tertiaries occupy topographically low areas there is widespread veneering by uppermost Tertiary and Quaternary marsh and swamp deposits, alluvium and colluvium.

3.2 Local Geology of the Rosevale Coalfield

The Rosevale Coalfield comprises three discrete brown coal deposits, the Loatta, Pipers Lagoons and Selbourne deposits, together with a less well defined area having coal potential referred to as the Hillcrest prospect (Figure 3.2.1).

The coal deposits lie close to the eastern edge of the Cressy Graben, in a series of restricted "embayments" in the pre-Tertiary basement (locally Jurassic dolerite). Individual coal basins are constrained by outcropping or sub-cropping dolerite and in certain cases the contact between Tertiary sediments and basement rocks is steep, suggestive of penecontemporaneous downwarping or fault displacement.

At Rosevale the Tertiary Launceston Beds comprise a monotonous sequence of interbedded clays, carbonaceous clays and brown coal, with minor sandy intercalations. They have yet to be subdivided stratigraphically. The strata pinch out towards the basin margins by onlap onto basement, and thicken rapidly towards the depositional centres. Total thickness represented locally is not known - one drillhole has penetrated 143m of Tertiary sediments without significant change in lithology.

Whilst clay is the dominant lithology, sandy beds constitute up to a few percent of the drilled section in a number of holes, and locally may comprise 25-30% of a known section. The sands are therefore considered to be lenticular in section, but insufficient is known of their areal distribution and spatial relationships to determine their environment of deposition, whether channel, fan plain, or deltaic. Individual sand bands range in thickness from 2m to about 12m, and almost always occur well down in the Tertiary pile (at depths over 50m).

Exploration drilling by CSR has identified up to four principal brown coal horizons comprising up to 12 individual seams. The three stratigraphically highest horizons occur at depths of 4m to 75m, and have been used for reserve calculation. All seams are lenticular, generally thinning towards basement highs.

The brown coal seams have been correlated using characteristic downhole geophysical log signatures and by examination of cross-sections. Correlations can be made with reasonable confidence in the central areas of the deposits where maximum coal development occurs, but become tentative towards the margins. Seam correlation between deposits has not been possible, although with additional drilling, the Hillcrest prospect may provide a link between Loatta and Selbourne.

Cumulative overburden ratios (expressed as bank cubic metres overburden per tonne of coal) calculated to the lowest workable horizon at Loatta, Pipers Lagoons and Selbourne are, respectively, 3:1, 5:1, and 8.3:1.

Remnants of late Tertiary basalt cap the Launceston Beds in a number of areas around the margins of the Rosevale coal deposits, forming prominent hills and ridges. Up to 12m of weathered volcanic material has been recorded in drilling to date. The maximum thickness likely to be present on the coalfield is estimated to be 20m. Recent cover, soil, clay and sand is volumetrically insignificant except in low-lying swampy areas.

4. EXPLORATION AND GEOLOGICAL EVALUATION

4.1 Previous Exploration and Geological Evaluation

CSR has undertaken three coal drilling programmes on EL 20/80 over the periods March-April, 1981, October-December 1981 and March-April, 1982. In all 106 holes were completed to a total metreage of 6,888.3m. The later programmes concentrated on the Rosevale area and of the 106 holes drilled 60 are located on the Rosevale Coalfield (refer to Figure 3.2.1 for borehole locations). Some 27 drillholes lie within the three main deposits, 11 in Loatta (8 non-core, 3 core), 12 in Pipers Lagoons (7 non-core, 5 core), and 4 at Selbourne (1 non-core, 3 core). Coring intervals were determined from adjacent logged open holes and KMLC (100mm diameter) cores were taken from about 1m above each seam to well into floor rock.

All but three of the Rosevale drillholes have been geophysically logged, the earlier ones with a portable S.I.E. unit, the later ones with truck-mounted digital equipment utilising a full suite of probes (gamma, dual-spaced density, caliper, neutron, resistivity, and S.P.). By establishing an empirical relationship between logged long-spaced density and measured ash content (from core analysis) it has been possible to utilise logged non-cored holes for estimation of seam ash content to a high degree of reliability.

Both cuttings and drillcore were logged in detail. Cored intervals were logged immediately after drilling to minimise bed moisture loss. They were then sealed in PVC tubing or plastic for despatch to CSR's NATA-registered testing laboratory. Analytical work on ply samples generally comprised determination of total moisture, specific energy and relative density, together with proximate analysis. Selected mining ections were then composited and a more comprehensive suite of tests undertaken.

All borehole data (geological and analytical) have been encoded for computer manipulation and drillhole profiles prepared. Subsequent geological evaluation has centred on plan and section generation and computation of coal reserves. Most recent work has been in the area of seam lithotype analysis and sedimentological modelling.

4.2 Exploration During the Three Month Period Ended 22 November, 1983

4.2.1 Drilling Progress

CSR commenced its 1983 exploration drilling programme in EL 20/80 on October 17. Site investigations have been confined to the Rosevale Coalfield sector of the EL area, and largely to the Loatta deposit. As at 22 November, 1983, work was still in progress, and is scheduled for completion early in December.

Up to the reporting date, 27 open and 2 partly cored holes had been drilled in the Loatta deposit, and 3 open holes completed in the northern part of Pipers Lagoons, to a total metreage of approximately 2,355m. All drillholes have been geophysically logged by BPB, using CCS (dual-spaced density natural gamma, and caliper), neutron, focussed electric, and in certain cases sonic, sondes.

In conjunction with the exploratory drilling, investigations in support of engineering and geotechnical studies have been undertaken. Special 100mm diameter core samples were obtained for stockpile testing by Rheinbraun in Germany, penetrometer tests undertaken on coal and overburden core samples, and piezometers set in key drillholes.

4.2.2 Preliminary Results

Whereas the 1983 drilling programme remains incomplete, sufficient holes have been drilled to allow certain provisional conclusions to be made. Computer modelling of the Loatta deposit has commenced, with the view to generating a full suite of graphic sections, seam and overburden isopach and structure contour plans, and geophysically derived coal quality plots, in addition to recalculating reserves and mining strip ratios. This information, together with borehole logs and analytical data, will be included in future progress reports, as results come to hand.

The three holes drilled in the northern part of the Pipers Lagoons deposit have confirmed continuity of coal and correlation of seams between the northern lobe and the main body of the coal deposit. No changes are therefore suggested to the given geological interpretation and coal reserves.

Drilling to date at Loatta, however, indicates a somewhat simpler stratigraphic picture, the result of regrouping and recorrelation of seams. An uppermost banded coal horizon, which ranges in thickness over 10 - 30m, appears to be restricted to the north-western part of the deposit, and occurring as it does very close to surface is limited by erosion. Approximately 20m of clay separates the upper seam from a variably split middle horizon 6 - 50m thick, averaging about 30m. This middle zone persists areally over the greater part of the deposit, though has been subject to erosion in certain areas. In the south, a lower seam group, 7 - 25m thick, occurs 20 - 30m below the main mid horizon.

With the assistance of geophysical log information, coal horizons, and certain individual coal plies, can now be reasonably positively correlated between data points 250 - 500m apart. Correlations are less certain in the south-western sector of the deposit, where both stratigraphic and structural problems are apparent, and where borehole separation exceeds 500m. Considerable stratigraphic and lateral variation of working sections within the correlatable coal horizons is in evidence.

Preliminary structure contouring of the persistent middle coal horizon suggests greater structural complexity than originally envisaged. A narrow south-south-east plunging syncline, with limb dips of 6^{o} - 8^{o}, in the north of the deposit, gives way to generally flatter structures in the south. North-north-west and north-east trending faulting is indicated by seam RL differences in the northern half of Loatta. Confirmation of these suggested structural disturbances is required.

Indicated in situ geological reserves at Loatta will probably exceed the original estimate of 56 Mt by about 15 Mt. However, because of the structural setting total extraction may not be possible, in which case recoverable reserves could be somewhat reduced.

The latest round of exploration has demonstrated that drilling on 250m centres (with more closely-spaced drilling in structurally disturbed zones) will be required for elevation of reserve status to "measured".

Overburden to coal ratios have yet to be calculated. First impression is that mean O.R. will probably be higher than indicated in the original mining study, especially in early mine years.

Geotechnical data (from penetrometer and other core testing) are currently being collated. The sandy aquifer identified below the lower seam in the northern portion of Loatta is now known to be of very limited areal extent, and therefore is unlikely to pose a significant dewatering problem.

Core from the first two cored holes at Loatta is presently undergoing testing at CSR's NATA - registered laboratory in Brisbane. Analytical results are awaited.

4.3 Future Exploration and Geological Evaluation

Beyond assimilation and compilation of results from the current programme, future geological investigations must centre on:

- evaluating brown coal prospects previously identified within EL 20/80 yet outside the immediate Rosevale Coalfield area;
- at Rosevale, increasing confidence in less positive seam correlations, and demonstrating seam continuity within deposit bounds;
- resolving apparent structural difficulties;
- improving definition of deposit limits;
- upgrading reserve status to a "measured" category and increasing total reserves;
- assessing consistency of coal quality by obtaining a wider distribution of sample points (cored boreholes);
- determining the impact of variation in key geotechnical and hydrogeological parameters.

5. COAL RESOURCES OF EL 20/80

5.1 Brown Coal Reserves

Pending receipt of final reults from the current exploration exercise, indicated geological ("in situ") brown coal reserves of the Rosevale Coalfield, and EL 20/80, remain unchanged at 118 Mt, as detailed in Table 5.1.1. Inferred resources are very small.

Reserve figures are reported according to the Geological Survey of Queensland guidelines (as quoted in Australian Standard 2519-1982) in the absence of a more suitable scheme. It is acknowledged that for brown coal deposits in general, and especially those as variable as Rosevale, reserve measurement criteria designed for black coals are not wholly applicable. Specifically, indicated reserves at Rosevale were calculated from cored and geophysically logged non-cored drillholes according to the following criteria:

- cored and non-cored holes are spaced not more than 2km apart, and generally less than 1km, such that coal seams can be correlated with a reasonable degree of confidence;

- limits of coal deposits are projected, on available geological data, for a limited distance from points of observation (drillholes), always less than 750m and usually under 300m;

- coal seams must have a minimum thickness of 1.5m and a weighted mean dry basis ash content of less than 50% (or approximately 27.5% ash at a nominal 45% total moisture coal);

TABLE 5.1.1

Brown Coal Reserves, EL 20/80

Area	Indicated Class 1 Mt	Indicated Class 2 Mt	Total Mt	Inferred * Resources
Loatta	33	23	56	V. Small
Pipers Lagoons	23	20	43	-
Selbourne	14	5	19	V. Small
Hillcrest	-	-	-	V. Small
Total	70	48	118	

* "V. Small" inferred resources means less than 20 Mt

- partings greater than 0.5m thick and containing over 50% (dry basis) ash are excluded from reserve calculation;

- ash values from non-cored holes are derived from geophysical logs using an empirical linear density versus ash relationship established by calibrating geophysical logs against analysed core sections.

Class 1 indicated reserves for the Rosevale Coalfield wre calculated for specific seams provided each seam was cored at three or more sites, situated less than 2km apart, and provided seam correlation could reasonably be demonstrated. Indicated Class 2 status applies where these criteria (except drillhole spacing) cannot be met, as is the case towards the margins of the coal deposits where correlations are at present tentative.

5.2 Coal Quality

Quoted coal quality data are based on core samples from 11 partially cored holes in the Loatta, Pipers Lagoons and Selbourne deposits. Table 5.2.1 shows the weighted average coal quality for the 118 Mt of indicated reserves outlined to date. Analytical results for core obtained during the current phase of drilling are not yet to hand.

Rosevale coal can be described as a typical low sulphur, low specific energy, high ash, and comparatively low moisture, lignite with no known detrimental properties. It is suitable for combustion in existing commercially available boilers designed for coal of this type.

TABLE 5.2.1

Weighted Average Coal Quality, Rosevale Coalfield

Total Moisture Basis

Deposit	R.D.	Total Moisture %	V.M. %	F.C. %	Ash %	Total Sulphur %	Specific Energy MJ/kg
Loatta	1.32	48.1	18.0	12.1	21.8	0.17	7.6
Pipers Lagoons	1.33	46.3	18.0	13.8	21.9	0.11	7.6
Selbourne	1.33	46.4	18.0	11.9	23.7	0.18	7.2
Weighted Mean	1.33	47.2	18.0	12.7	22.1	0.13	7.5

6. RESPONSE TO HEC POWER STATION COAL ENQUIRY

6.1 Background

On October 3, 1983, the Hydro-Electric Commission, Tasmania, issued a power station coal enquiry document as the basis of study into the feasibility of commissioning in the early 1990's a 400 MW thermal power station fired as far as possible on Tasmanian sourced coal. The study was to examine, inter alia:

- the suitability of known resources of both brown and black Tasmanian coal, from the point of view of quality and quantity and cost of production of mineable product coal, which could be reasonably assured to serve the fuel requirements of the proposed power station throughout its economic life;

- the ability and cost to match the mining of these resources to the variation in annual fuel demand that will be characteristic of this station.

Accordingly the Hydro-Electric Commission sought information on the availability of local Tasmanian coals for the proposed new power station, to be made available to the appointed consultant at the commencement of the preliminary study, that is, by October 26, 1983.

CSR responded by submitting information on the Rosevale Coalfield in EL 20/80, which, it is believed, contains sufficient brown coal resources to meet the 30-year lifetime energy requirement of the proposed 400 MW power station (estimated at approximately 98 Mt of typical Rosevale quality coal)

The response to the coal enquiry comprised four volumes, covering geology and coal quality, mining, commercial aspects, and environmental and infrastructure issues, presented to the HEC and its consultants over the period October 26 to November 8. In addition, a site inspection was held on November 3.

6.2 Geology, Coal Quality, and Abridged Mining Study

A copy of this primary response to the coal enquiry was forwarded to the Department upon submission on October 26. It was based wholly on information available prior to commencement of the current exploration programme, and therefore contained little or no information not previously included in quarterly EL reports. Tables 6.2.1, 6.2.2, and 6.2.3, extracted from the coal specifications entry, comprise a useful summary of product coal analytical data for working sections in cored drillholes C004, C020, C021R, CO22, and CO33.

6.3 Preliminary Mining Study, 400 MW Case

The Department of Mines is in possession of a copy of the Rosevale Coalfield Preliminary Mining Study. A brief summary follows.

"This study indicates that the most suitable coal supply arrangement is to commence mining in the Loatta deposit and later, when additional coal is required, to transfer operations to the Pipers Lagoons deposit. It is estimated that sufficient reserves exist in the Loatta deposit to supply a 400 MW power station for 17 years, and with the Pipers Lagoons deposit, reserves are sufficient for more than 30 years of power generation.

TABLE 6.2.1

SCHEDULE IV - INDIVIDUAL CORE PRODUCT COAL & COAL ASH PROPERTIES

SITE NUMBER							
BOREHOLE NUMBER		CO20	CO20	CO04	CO21R	CO22	CO33
SAMPLE NUMBER		64255	66557	66556	68582	68583	68584
CORE DIAMETER	mm	100	100	100	100	100	100
INTERVAL THICKNESS	m	3.75	18.19	18.05	7.37	15.68	5.93
From	m	21.40	7.55	11.81	44.41	8.99	7.93
To	m	25.15	25.74	29.86	51.78	24.67	13.86
CORE RECOVERY	%	100					
COAL RELATIVE DENSITY (as mined basis)		1.33	1.34	1.35	1.32	1.33	1.32
FRACTION ANALYSED							
MASS YIELD	%						
DATE OF CORING		12/04/82	12/04/82	3/12/81	4/12/81	25/11/81	6/12/81
DATE OF ANALYSIS		4/11/82	22/04/83	22/04/83	13/10/83	13/10/83	13/10/83
TOTAL MOISTURE	%	47.8	45.0	45.0	46.3	46.8	47.9

DRY BASIS ANALYSIS ANALYTICAL RESULTS

PROXIMATE							
ASH	%	37.5	49.9	45.2	46.3	43.5	41.6
VOLATILE MATTER	%	37.1	30.8	32.9	32.6	35.7	35.4
FIXED CARBON	%	25.4	19.4	21.9	21.1	20.8	22.9
SPECIFIC ENERGY	GJ/t	16.3	11.9	13.1	13.5	14.0	15.1
SULPHUR							
TOTAL	%	0.37	0.39	0.28	0.29	0.31	0.21
PYRITIC	%				0.06	0.07	0.07
SULPHATE	%				0.01		
ORGANIC	%				0.21		
TOTAL SODIUM	%	0.07	0.09	0.11	0.07	0.03	0.13
PHOSPHOROUS	%	0.01	0.01				
CHLORINE	%	0.035	0.063	0.066	0.039	0.031	0.119
CARBON DIOXIDE	%				0.32	0.19	0.14

DRY ASH FREE BASIS ANALYTICAL RESULTS

VOLATILE MATTER	%	59.3	61.4	60.0	60.7	63.2	60.7
FIXED CARBON	%	40.7	38.6	40.0	39.3	36.8	39.3
SPECIFIC ENERGY	GJ/t	26.06	23.8	23.9	25.1	24.9	25.9
ULTIMATE							
CARBON	%	65.30	60.87	61.29	63.02	62.04	64.04
HYDROGEN	%	6.0	6.13	5.91	5.94	6.19	6.00
NITROGEN	%	1.18	1.16	1.24	1.00	0.87	0.83
SULPHUR	%	0.60	0.78	0.52	0.53	0.55	0.36
OXYGEN (DIFF)	%	26.92	31.06	31.04	29.51	30.35	28.77

TABLE 6.2.2

SCHEDULE IV (CONT) - INDIVIDUAL CORE PRODUCT COAL & COAL ASH PROPERTIES

BOREHOLE NUMBER		CO20	CO20	CO04	CO21R	CO22	CO33
SAMPLE NUMBER							
MOIST. HOLD CAPACITY AT 30° C, 97% R.H.	%						
CRUCIBLE SWELL NUMBER							
HARDGROVE GRIND. INDEX			65	65			
ASH FUSIBILITY TEMPERATURES (Reducing Atmosphere)							
DEFORMATION	°C	1290	1380	1360	1560	+1600	1400
SPHERICAL	°C	+1600	+1600	+1600	+1600	+1600	+1600
HEMISPHERE	°C	+1600	+1600	+1600	+1600	+1600	+1600
FLOW	°C	+1600	+1600	+1600	+1600	+1600	+1600
SLAGGING INDEX (0.8 DEF +0.2HEMI)	°C	+1352	+1424	+1408	+1568	+1600	+1440
COAL ASH ANALYSES							
SiO_2	%	49.5	53.4	49.0	54.0	48.8	58.7
Al_2O_3	%	35.5	35.4	37.6	32.4	38.3	31.2
FE_2O_3	%	3.54	3.18	3.38	3.70	3.55	3.19
CaO	%	2.05	1.21	1.33	1.74	1.55	1.11
MgO	%	1.82	1.22	1.48	1.20	0.94	0.89
TiO_2	%	0.58	1.09	1.15	1.12	1.22	1.48
Na_2O	%	0.81	0.21	0.31	0.33	0.10	0.38
K_2O	%	0.40	0.50	0.51	0.72	0.33	0.50
P_2O_5	%	0.08	0.13	0.08	0.06	0.07	0.12
Mn_3O_4	%	0.01	0.02	0.01	0.02	0.02	0.03
SO_3	%	1.63	1.07	1.14	1.3	0.96	0.74
TRACE ELEMENT ANALYTICAL RESULTS (ppm,dry basis)							
As (as As_2O_3)			1.8		2.6	1.7	1.6
Ba (as Ba)			190.0		212	120	228
Ca (as Ca)			<0.05				
Hg (as Hg)			0.2				
Mo (as Mo)			<0.5				
Pb (as Pb)			2.7				
Se (as Se)			0.6				

NOTE: 1. Hole CO20 (sample number 64255) is an undiluted sample and is included for comparative purposes only. This hole is not included in the statistics in Schedule V.

2. Relative density and total moisture are calculated over the full mining section which includes the sample section. This excludes sample number 64255 where moisture is calculated from the individual ply moisture analyses and the relative density is analysed on the test sample.

TABLE 6.2.3

SCHEDULE V - AVERAGE PRODUCT COAL & COAL ASH PROPERTIES
AREA
PRODUCT: ROM OR WASHED
TONNAGE KT

PROPERTY		No. of Samples	Average	Standard Deviation	Range Low Value	Range High Value
TOTAL MOISTURE	%	5	46.2	1.24	45	47.9
DRY ASH FREE ANALYSES						
VOLATILE MATTER	%	5	61.2	1.22	60.0	63.2
FIXED CARBON	%	5	38.8	1.22	36.8	40.0
SPECIFIED ENERGY	GJ/t	5	24.7	0.88	23.8	25.9
ULTIMATE						
CARBON	%	5	62.25	1.29	60.87	64.04
HYDROGEN	%	5	6.03	0.12	5.91	6.19
NITROGEN	%	5	1.02	0.18	0.83	1.24
SULPHUR	%	5	0.55	0.15	0.36	0.78
OXYGEN	%	5	30.15	1.00	28.77	31.06
DRY BASIS ANALYSES						
PROXIMATE						
MOISTURE	%					
ASH	%	5	45.3	3.13	41.6	49.9
VOLATILE MATTER	%	5	33.5	2.06	30.8	35.7
FIXED CARBON	%	5	21.2	1.30	19.4	22.9
SPECIFIC ENERGY	GJ/t	5	13.5	1.18	11.9	15.1
TOTAL SULPHUR	%	5	0.30	0.071	0.21	0.39
TOTAL SODIUM	%	5	0.09	0.038	0.03	0.13
PHOSPHOROUS	%	1	0.01			
CHLORINE	%	5	0.064	0.034	0.031	0.119
CARBON DIOXIDE	%	3	0.22	0.09	0.14	0.32
ARSENIC (As203)	ppm	4	1.9	0.5	1.6	2.6
CRUCIBLE SWELL NUMBER						
HARDGROVE GRIND. INDEX		2	65	0	65	65
MOIST. HOLD CAPACITY AT 30C, 97% R.H.	%					
ASH FUSIBILITY TEMPS (Red Atmos)						
DEFORMATION	°C	5	1460	111	1360	+1600
HEMISPHERE	°C	5	+1600	0	+1600	+1600
SLAGGING INDEX	°C	5	1488	89	+1408	+1600
COAL ASH ANALYSES						
SiO_2	%	5	52.8	4.09	48.7	54.0
Al_2O_3	%	5	35.0	3.12	31.2	38.3
Fe_2O_3	%	5	3.40	0.23	3.18	3.70
CaO	%	5	1.39	0.26	1.11	1.74
MgO	%	5	1.15	0.24	0.89	1.48
TiO_2	%	5	1.21	0.16	1.09	1.48
Na_2O	%	5	0.27	0.11	0.10	0.38
K_2O	%	5	0.51	0.14	0.33	0.72
P_2O_5	%	5	0.09	0.03	0.06	0.13
Mn_3O_4	%	5	0.02	0.01	0.01	0.03
SO_3	%	5	1.04	0.21	0.74	1.30
BaO	%	-	-	-	-	-

"Based on the limited geological information available, it has been assumed that coal and overburden will be mined with bucketwheel excavators (BWE's), loading via bandwagons when necessary, to conveyors which will transport the coal to the power station and the overburden to the overburden dump. As there is not a great depth of overburden in this mine, each bucketwheel excavator will mine coal, overburden and parting material. The required outputs and low strip ratios in the first two years make it possible to supply the total mine requirements with one BWE. As the output requirements get too high for one BWE a second BWE will be introduced together with a second face conveyor, trunk conveyor, dump conveyor and tripper stacker. Each BWE will operate on a separate system. The overburden dump will be initially located external to the pit but as mining advances, overburden will be placed in the pit behind the mining operation.

"This type of mining operation would allow selective mining of coal over full seam intervals and thereby achieve maximum economic coal recovery and greatest quality control.

"A 400 MW power station would consume 70 million tonnes of coal, with a heat content of 7.1 MJ/kg, over the first 20 years, and about another 28 million tonnes from years 21 to 30, a total of 98 million tonnes over 30 years.

"The construction and operational phases of the project would require a significant number of skilled people. The construction workforce is estimated to be 120. The mine's operational manning would reach 237 by Year 9.

"A high voltage power supply for normal construction purposes would be required by both the mine and the power station, while the operating mine would require a 22 kV supply. This could be drawn from the power station itself or if suitable, from the existing high voltage transmission system. Some upgrading and relocation of roads will be required in the area.

"While the permanent operational labour force would be accommodated within existing cities and towns in the area, it is likely that some good quality temporary accommodation, such as a construction camp or caravan park, would be required during construction".

6.4 Coal Pricing and Commercial Aspects

Details on coal pricing and the proposed supply agreement remain confidential to the HEC and CSR.

6.5 Infrastructure and Environment

Included with this report is a copy of "Rosevale Coalfield - Project Picture, Infrastructure, and Environment, 400 MW Case", as supplied to the HEC in response to the October coal enquiry. Following is a summary of the study.

This report describes the physical layout of the project and gives a preliminary overview of stockpiling, the infrastructure requirements and environmental considerations. Some assumptions are made in respect of the power station but these are for overall study purposes and are not intended to indicate a preferred location or design.

A study by Rheinbraun shows that a 600,000t stockpile is possible and would use techniques proven by stockpiling large tonnages of similar coal in Europe. The coal would be laid out in 6 x 100,000t stockpiles in a system that would be designed to accommodate the total production of the mine. Stockpile surfaces would be stabilized by water sprays and a quick growing grass. Any drying out or degradation is expected to be limited to this stabilized surface layer. Laboratory tests on the coal show a low liklihood of spontaneous combustion although this would be a major consideration in the design and operation of the system.

Total project water requirements are estimated at 5,550 ML/a - 250 ML/a for mine and 5,300 ML/a for power station. The main supply could be from the South Esk River which, subject to the approval of HEC, has the capacity to supply full project requirements. It is likely however, that subject to additional studies, a significant proportion of the total requirement could be obtained from other sources including a storage dam in the area and by recovery and re-use of ground and surface water.

The major wastes are groundwater and surface water (mine); ash, waste water and flue gas (power station); sewage and industrial wastes (combined).

Depending upon final plant design, water quality, water quantity and environmental standards the following disposal strategies are proposed:

- use of surface and groundwater from the mine for power station cooling;

- water not so used to be treated (if required), and discharged to either the Tamar or the Meander River;

- water that cannot be economically upgraded could be evaporated and/or used for dust control on fly ash;

- the sale of fly ash to the construction or cement industry;

- disposal of the balance of the ash in the overburden of dump area after dampening to control dust.

It is probable that sewage and domestic wastes from the mine and the power station would be treated in a common plant and disposed to the Meander River. A common approach would also be probable for oils and solid wastes which would be sold or placed in an approved tip area.

Electric power for construction could come from a new 66 kV line constructed across the Grassy Hut Tier from the Launceston area. The operating power supply for the mine would be drawn from the power station switchyard.

Main access to the site would be from a new, upgraded road off the Bass Highway and it is proposed that a new ring road be built around the site to re-direct local traffic away from the works area.

Manning during construction will peak at 852 about 5 years after site work commences and remain above or near 600 for the next six years. The permanent operating workforce will be about 480. A preliminary survey indicates that the area including Launceston would have the capability to house and support this workforce with some expansion of the existing facilities.

Launceston airport, 25 km south-east, is the nearest meteorological recording station and this data is assumed representative of the project area. This shows winds predominantly north and north west with direct westerly winds towards Launceston between 3% and 8% of the time. Annual rainfall is 709mm and evaporation is 1,395mm.

The groundwater table in the area is high and two aquifer systems have been identified. An aquifer exists below the coal measures and a series of lower yield, aquifers occur within the coal measure sequences. For mining, studies indicate a need to depressurize the lower aquifer to control floor conditions in the pit and to dewater the coal measures for pit stability. Mine dewatering as such should have little effect on regional groundwater outside the immediate mine area because of the low transmissivities of the coal measure sequences. "Groundwater harvesting" to supply power station cooling water may have a significant regional effect and is to be studied further.

Much of the area is low gradient and can become very wet in places. Drainage is by Pipers Lagoon Creek. The surface water regime will be altered by the mining operation and a series of diversion drains are proposed to redirect the water. This system will include retention ponds for the removal of particulate matter before the water is re-used or returned to natural watercourses.

Natural vegetation and fauna is typical of agricultural areas in Northern Tasmania and no endangered or rare species are reported or identified. Some additional surveys will be required in the swampy areas which overlie a section of the Loatta deposit.

Current land use is grazing and cropping.

Some archeological sites have been found but none is believed to be of major significance. No buildings in the area are on the Register of the National Estate or the National Trust.

Insufficient data exist to prepare an environmental impact statement but that work which has been done has identified the major considerations. All these require further study. They are:

Mine	topographic changes
	air quality effects
	groundwater - effects and management
	surface water - effects and management
	soils and land use impact rehabilitation
Power Station	visual effects
	air quality and emissions
	ash disposal
	water supply and waste water disposal

Further studies are also required to evaluate the likely socio-economic effects of the proposed project.

These preliminary studies have not identified any environmental factors that would preclude the development.

7. REFERENCES

Banks, M.R., Maxwell, R.A., Spry, A.	1962	The Geology of Tasmania. Jour. Geol. Soc. Aust. V9, Part 2.
Australian Standard 2519-82	1982	Guide to the Evaluation of Hard Coal Deposits Using Borehole Techniques.
Burns, S.D.	1981	A Review of the Longford Basin, Tasmania, Australia. Mines Administration Pty. Limited. (Unpublished Company Report).
Ellis, P.	1982a	Six Monthly Report for the Period Ending 19th January, 1982. Exploration Licence 20/80 Launceston, Tasmania. AAR Limited. (Unpublished Company Report).
Ellis, P.	1982b	Three Monthly Report for the Period Ending 22nd May, 1982. Exploration Licence 20/80 Launceston, Tasmania. AAR Limited. (Unpublished Company Report).
Ellis, P.	1982c	Six Monthly Report for the Period Ending 22nd August, 1982. Exploration Licence 20/80. Launceston, Tasmania, AAR Limited. (Unpublished Company Report).
Ellis, P.	1982d	Exploration Licence 20/80 Launceston, Tasmania. A Review of the Coal Resources and Prospectivity. CSR Limited. (Unpublished Company Report).
Ellis, P.	1982e	Exploration Licence 20/80 Launceston, Tasmania. A Review of the Non-Coal Resources and Prospectivity. CSR Limited. (Unpublished Company Report).

Ellis, P.	1982f	Three Monthly Report for the Period Ending 22nd November 1982. Exploration Licence 20/80 Launceston. AAR Limited. (Unpublished Company Report).
Ellis, P.	1983a	Report on Area Relinquished. 22nd February 1983. Exploration Licence 20/80 Launceston, Tasmania. AAR Limited. (Unpublished Company Report).
Ellis, P.	1983b	Exploration Licence 20/80 Launceston, Annual Exploration Progress Report and Exploration Progress Report for Three Month Period Ended 22nd February 1983. CSR Limited. (Unpublished Company Report).
Ellis, P.	1983c	Exploration Licence 20/80 Launceston, Exploration Progress Report for Three Month Period Ended 22nd May 1983. CSR Limited. (Unpublished Company Report).
Ellis, P.	1983d	Exploration Licence 20/80 Launceston, Exploration Progress Report for Three Month Period Ended 22nd August 1983. CSR Limited. (Unpublished Company Report).
Johnston, R.M.	1873	Regarding the Composition and Extent of Certain Tertiary Beds In and Around launceston. Proc. Roy. Soc. Tas. 1873, pp 39-47.
Johnston, R.M.	1888	Systematic Account of the Geology of Tasmania. Government Printer, Hobart.
Matthews, W.L.	1974	The Geology and Groundwater Resources of the Longford Tertiary Basin. Bull. Geol. Surv. Tasm. 59.

Mengel, D.C.	1977	The Roles of the Geological Survey of Queensland in Exploratory Coal Drilling, in the Aus. I.M.M. Southern Queensland Branch Symposium on Coal Borehole Evaluation, October 1977.
Middleton, T.W.	1973	Launceston Basin Project, Report on Phase I Exploration Drilling in the Launceston Basin Area, Tasmania. Getty Oil Development Co. Limited. Open File, Mines Department, Tasmania.
Osborne, R.	1981	Six Monthly Report for the Period Ending 23rd August, 1981. Exploration Licence 20/80 Launceston, Tasmania. AAR Limited. (Unpublished Company Report).

CSR Limited
Coal Division

EXPLORATION AND EVALUATION GROUP

CSR

DRAWING	DATE
DRAWN A.Y.	Sept.'82
CHECKED	
REVISED I.W.	Oct.'83

EL 20/80 LAUNCESTON
WESTBURY AREA
BROWN COAL DEPOSITS & PROSPECTS

SCALE 1:25000

FIGURE 3-2-1

DRAWING No. 70020 – 72

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