

# 06\_5346

Mount Nicholas Coal Mine Resource Summary and  
Coal Specification (TASCOAL)  
Sedgman and Associates Proprietary Limited; Tasman  
Anon EL5/1961

MINE	
File Ref.	524/7/2
30M	
File Ref.	2600
Action Order	Details
NOTED BY	
CIM	
TEE	
Responsible	Date

TASMANIA COAL COMPANY N.L.

MOUNT NICHOLAS COAL MINE

RESOURCE SUMMARY

AND

COAL SPECIFICATION

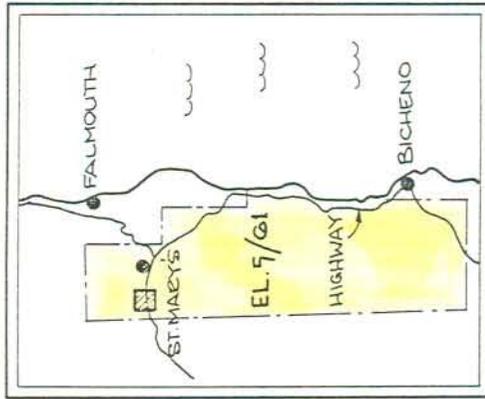
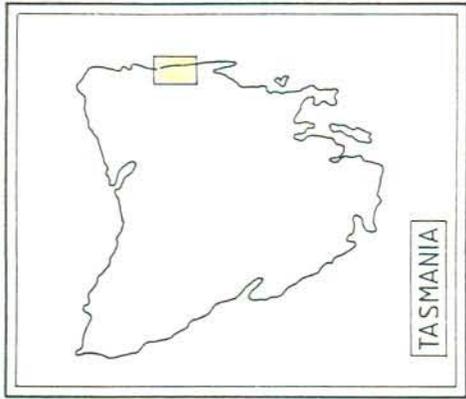
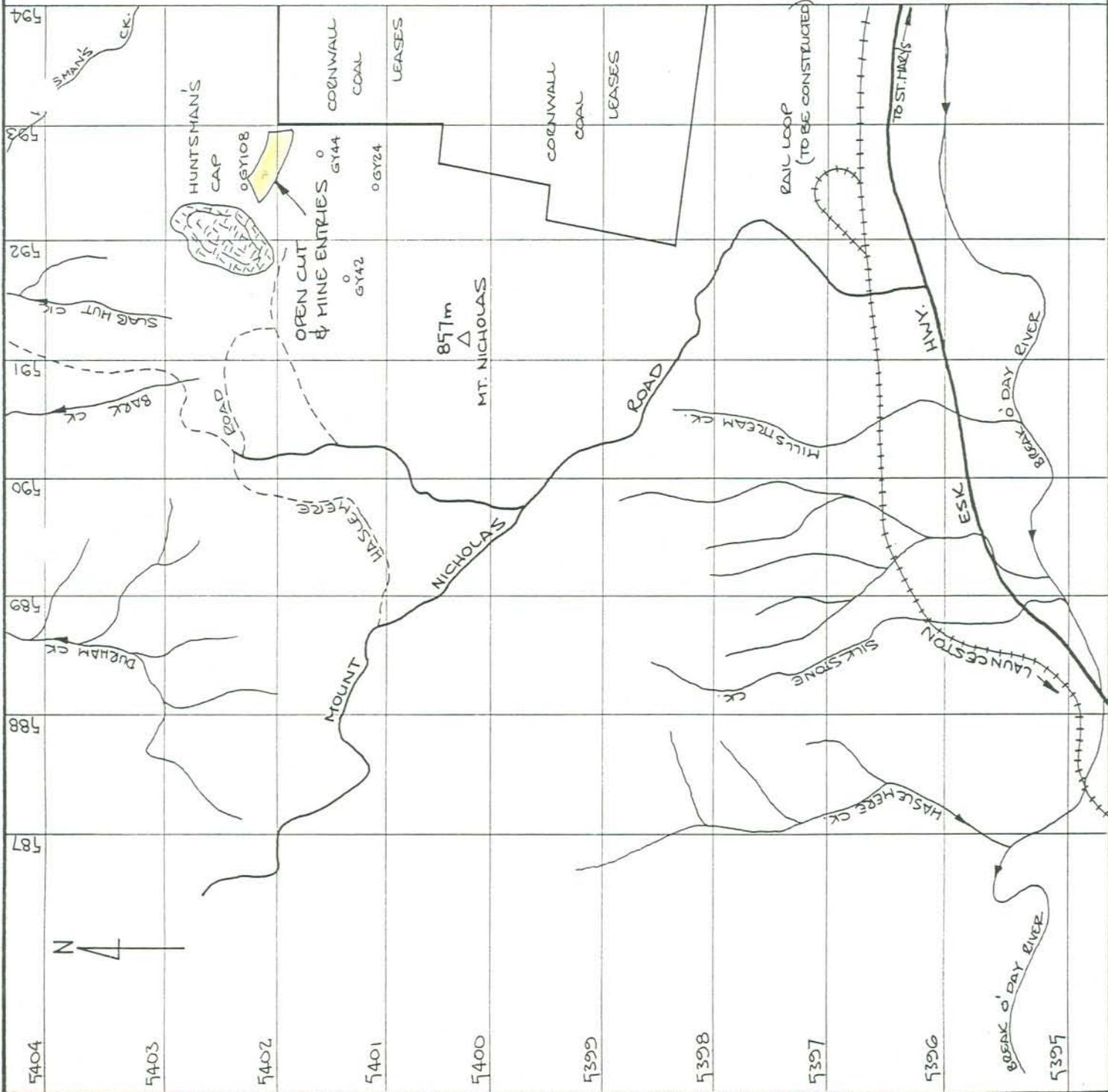
[ TASCOAL ]

# 06\_5346

Mount Nicholas Coal Mine Resource Summary and  
Coal Specification (TASCOAL)  
Sedgman and Associates Proprietary Limited; Tasman  
Anon EL5/1961

89/N65/004R3/1

Prepared by: Sedgman & Associates Pty Ltd  
J/N GSR 004  
1 August, 1989



PREPARED BY

*Sodgman and Associates*

TASMANIA COAL Co. N.L.

MT NICHOLAS PROJECT  
LOCATION PLAN

1.0 INTRODUCTION

The Mt. Nicholas coal reserves are held under Exploration licence EL 5/61 by a joint venture between Shell Oil Company of Australia (60%) and Industrial and Mining Investigations Pty Ltd (40%). The Tasmania Coal Company N.L. (TASCOAL) has obtained from Shell, the right to mine the coal reserves for a minimum period of 10 years.

Exploration of the property by Shell and others (including numerous cored drillholes), in the period 1971 to 1983 has clearly established the geology, quality and marketability of the coal.

TASCOAL has further assessed the property in detail, with the objective of servicing the local (Tasmanian) market with superior quality coal, and of exporting a small proportion of the product should the opportunity arise. The final stages of project evaluation are in progress and the programme for mine establishment and coal sales are:

Government Approvals	September 1989	(1989-1990)
Final Open Pit Production Drilling	October 1989	(1989-1990)
Completion of Infrastructure Negotiations	December 1989	
Sales Contracts Established	March 1990	
Open Cut Mining Commences	June 1990	LATER
Preparation Plant Established and Commissioned	July 1990	LATER
Commercial Coal Despatched	August 1990	LATER
Underground Mine Commences	July 1991	FORWARD
First Export Coal Shipment	Mid 1992	DEFERRED

The mine will be established on a small open-cut pit which will provide some 100,000 tonnes of coal, and an underground mine will then be established into the coal seam from the base of the open cut pit. <sup>MINING</sup> <sup>ADVISED</sup> <sup>AS</sup>

The life-of-mine is over 20 years at a production rate of approximately 200,000 tonnes of saleable coal per annum. The coal offers a much higher quality product to Tasmanian coal consumers than existing supplies, in addition to the potential to enter the export market in a small way.

## 2.0 GEOLOGY

### 2.1 Exploration

Recent exploration of the Mt. Nicholas deposit began in 1971 when the Tasmania Department of Mines drilled a series of holes along the Nicholas Range, one (DOM13) being within, and another (DOM8) being 200 m west of, the prospective mining area.

In 1979, The Shell Company of Australia (SCOA) commenced exploration of the Mount Nicholas area. From 1980 through June 1981, 17 slimcore holes were drilled, totalling 2073 m, and resulted in most of the coal reserves being upgraded to measured status. From March to June 1982, drilling of another 1945 m - comprising 11 slim coreholes and 17 uncored holes - took place, to better define probable mining conditions and to improve geological definition.

Drill cores were logged at the drill site and subsequently photographed in colour. Emphasis was placed on geotechnical core description. Selected core samples were point load tested and others were preserved in foil for more detailed laboratory testing. Only 9 drillholes were geophysically logged prior to the 1982 phase, because of the limited availability of logging equipment. Some 23 holes drilled in 1982 were geophysically logged.

In October 1982, SCOA commenced drilling large diameter coreholes. The quantity and varied types of drilling, coupled with the professional exploration management of SCOA, assure the status of reserves, and allow high confidence in the geology and quality of the coal.

The prospective mining area is contained in a north-south trending graben structure, and is bounded by the northern and southern L2 subcrops, the EL 5/61 boundary in the west, and a neighbouring lease on the east.

## 2.2 Coal Seams

A typical stratigraphic section of the Mount Nicholas prospect is shown in Figure 1.

Four coal seams are of economic interest. In descending order they are:

Middle 1	(M1)
Middle 2	(M2)
Lower 1	(L1)
Lower 2	(L2)

All four seams are comprised of dull coal suitable for steam raising.

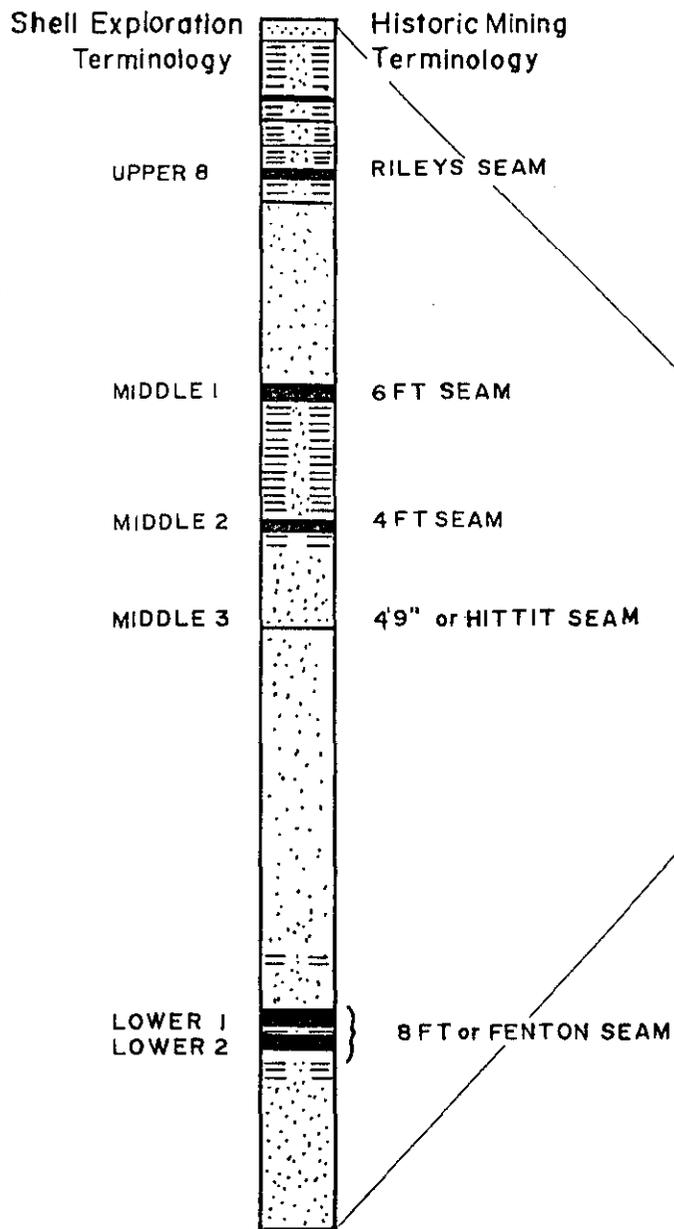
The L1 and L2 seams have the thickest coal sections and in the very long term, are the most important economically. The thickness of the L2 seam exceeds 3 m in the north of the prospect. The L1 seam exceeds 3 m thickness in the south and thins northwards where it combines with L2.

The M2 seam reaches economic thickness in the north-east of the prospect, and M1 has sufficient thickness and quality for exploitation over most of the prospect. The M2 and M1 seams can both be prepared to significantly better quality specification than the L1 and L2 seams.

The M1 and M2 seams are the target for commercial coal extraction by TASCOAL because of their superior quality.

ECONOMIC  
COAL MEASURES

(~1:1000)



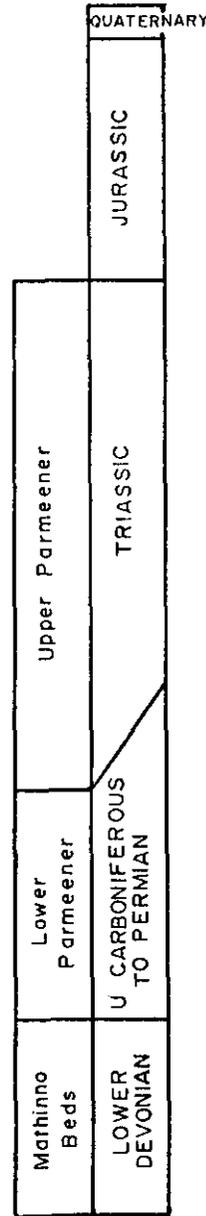
STRATIGRAPHIC  
COLUMN

(~1:5000)



CLASSIFICATION

(simplified)



LEGEND

-  Colluvium
-  Dolerite
-  Coal
-  Arenite
-  Argillite
-  Limestone

MT NICHOLAS AREA

STRATIGRAPHIC SECTION

Author	Coal Division	Date	November 1982	Fig 1
Report No	CEPR 31/82	Drawing No	2717	

### 2.3 Structure and Intrusion

Three doleritic intrusions are known to intersect the coal sequence. One exposed intrusion named Huntsmans Cap is the largest and northermost, and is thought to be a feeder pipe. To its immediate south, a northerly trending dolerite dyke outcrops. The third intrusive was intersected in drillhole GY43.

All the mineable reserves are contained within a north-south trending graben. The boundary faults of the graben each have a throw of approximately 60 m, and the fault lines are accurately defined. Drill-hole spacing is not sufficient to detect faults with throws of less than a few metres, but there are expected to be several faults with small displacements.

Major structures have a north-south orientation, parallel to the dolerite dyke.

Seam dips average 1° to 2° to the south.

### 2.4 Geohydrology

The sites of portals and all surface facilities are above flood levels.

Local creeks flow throughout the year, and local water supplies are adequate for mine operating purposes.

All coal seams which are proposed to be mined are above the regional water table. The only sediments with adequate reservoir characteristics are the coal seams, and the probability of perched water tables is low, since the coal seams drain to the dip along their southern subcrops.

2.5 Roof and Floor Conditions

These vary widely from good to very poor, but there are no problems sufficient to seriously hinder or stop mining advance.

Roof will be supported by W-straps and rockbolts 1.5 to 1.8 m long. Where very soft floor conditions are encountered, the thickness of the coal seam is often sufficient to climb the machines onto a coal floor.

For the bord and pillar system planned, the mining conditions will be handled by conventional equipment and methods.

### 3.0 COAL RESERVES

Reserves within the prospective mining area have been estimated on the basis of fault locations, theoretical yield contours and mining thickness isopachs developed by SCOA from drillhole information. Reserve estimation has been restricted to areas potentially available for mining.

Estimated total reserves are:

	('000s t)		
	<u>In-Situ</u>	<u>Recoverable</u>	<u>Marketable</u>
Middle 1 seam	9,202	5,857	4,400
Middle 2 seam	3,363	2,354	1,970
Lower 1 seam	5,391	2,833	1,720
Lower 2 seam	28,562	19,994	14,740
	<hr/>	<hr/>	<hr/>
	46,518	31,038	22,830

The L2 seam contributes 64% to the total recoverable reserve, at an average yield of 77%.

The reserves are considered overall to be of measured status.

Recoverable reserves are the reserves remaining after application of seam height, barrier width and mining recovery parameters to the in-situ reserve, after application of mining. They represent extractable in-situ coal.

Marketable Reserves represent product, containing 17% to 22% ash, on an air dried basis; moisture content has not been adjusted to saleable level. They are derived by applying the theoretical yields to the recoverable reserves, then multiplying by 0.9 to account for expected coal processing efficiency.

For operations by TASCOAL, the in-situ reserves for early exploitation have been reassessed for the M1 and M2 seams only. These seams are targeted for mining because of the higher quality of the coal which can be produced and the relative ease of mining.

Reserves to be exploited are summarized:

	('000s t)		
	<u>In-Situ</u>	<u>Recoverable</u>	<u>Marketable</u>
M2 Seam	4,600	2,300	1,725
M1 Seam	8,400	4,200	3,150
	-----	-----	-----
	13,000	6,500	4,875

These reserved are sufficient for over 25 years at the planned rate of extraction.

#### 4.0 COAL QUALITY

The Coal Specification of the Mt. Nicholas Product is shown on the following page. A similar specification will apply to domestic and export sales.

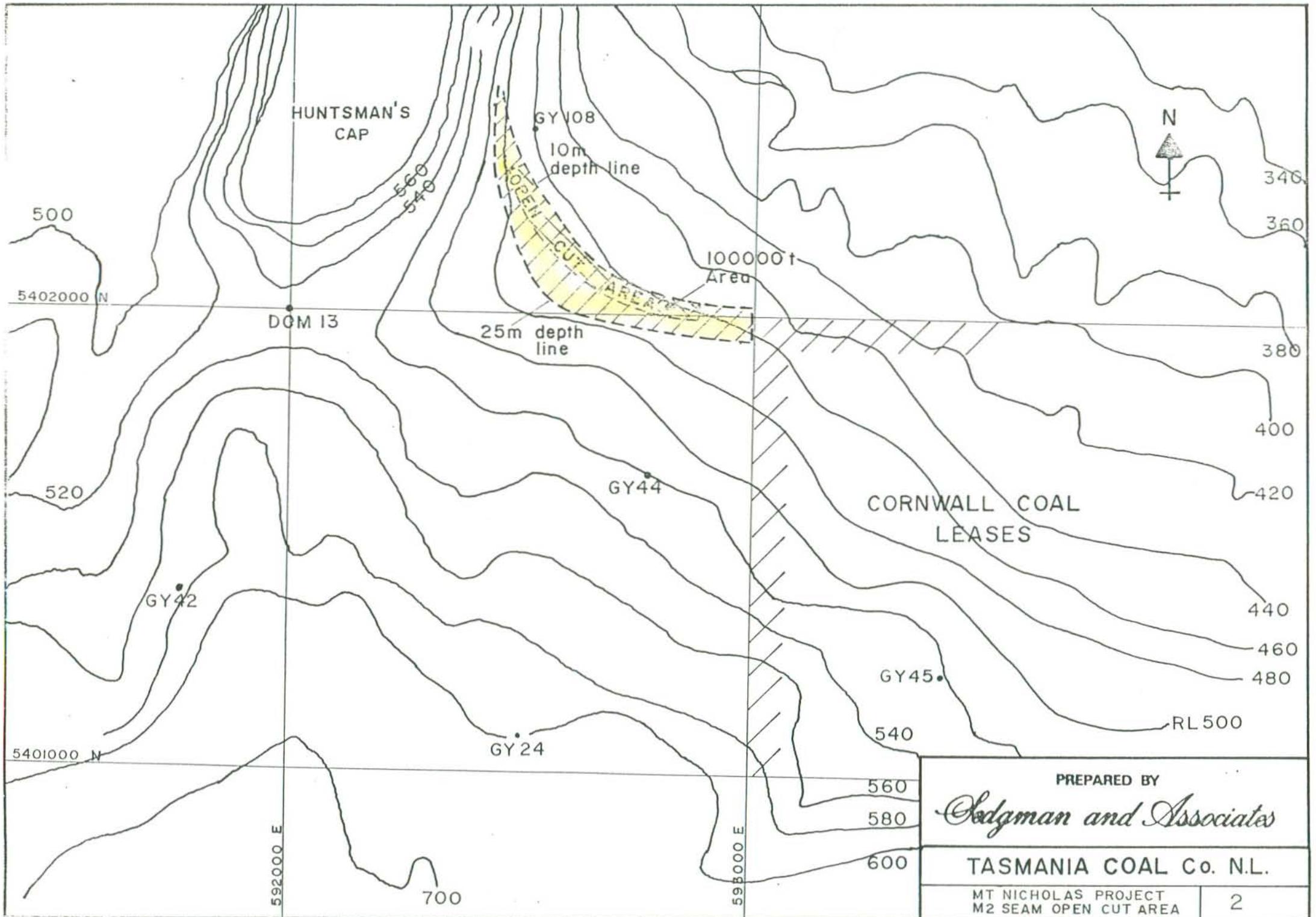
For domestic sales the low Ash Content and high Specific Energy compared with current Tasmanian coal products are attractive. Also, the low sulphur content, low arsenic content and extremely low phosphorous content will become increasingly important to environmentally conscious industry.

For export sales the Ash Content would approach the highest level of Australian exports, and the Specific Energy would approach the lowest acceptable for export sales. For this reason, the very best quality locations of the mine may be reserved for export product should this be convenient to production scheduling and enhance this market sector.

However the very low phosphorous content (one-tenth) of many Australian thermal coals), the low sulphur content, and high ash fusion values enhance the potential access of this coal to small niche markets.

MOUNT NICHOLAS COAL PROJECT  
TYPICAL THERMAL COAL SPECIFICATION

<u>Sizing</u>		45 x 0	
<u>Proximate Analysis</u>		<u>Air Dried</u>	<u>As Received</u>
Moisture	%	5.0	13.0
Ash	%	17.2 (20 max)	15.8
V.M.	%	27.0	24.7
Fixed Carbon	%	50.8	46.5
 <u>Ultimate Analysis</u>			
Carbon	% D.A.F.	79.63	
Hydrogen	% D.A.F.	4.55	
Nitrogen	% D.A.F.	1.46	
Sulphur	% D.A.F.	0.44	
Oxygen	% D.A.F.	13.92	
Sulphur	% A.D.	0.34	
Chlorine	% A.D.	0.02	
Phosphorus	% A.D.	0.002	
Arsenic	ppm As203	< 1.00	
Spec. Energy	Mj/kg A.D. D.A.F.	24.90 32.00	
Hardgrove Grindability		57.00	
Abrasion Index	mg/kg	23.60	
 <u>Ash Fusion</u>			
Deformation	Deg. C	1526	
Spherical	Deg. C	> 1600	
Hemisphere	Deg. C	> 1600	
Flow	Deg. C	> 1600	
 <u>Forms of Sulphur</u>			
Pyritic Sulphur		0.05	
Sulphate Sulphur		< 0.01	
Organic Sulphur		0.29	
 <u>Petrographic Analysis</u>			
Vitrinite	% m.m.f.	27.70-34.20	
Exernite	% m.m.f.	3.80-13.70	
Inertinite	% m.m.f.	56.70-65.70	
Ro max. all Vitrinite		0.68-0.70	



PREPARED BY <i>Sedgman and Associates</i>	
<b>TASMANIA COAL Co. N.L.</b>	
MT NICHOLAS PROJECT M2 SEAM OPEN CUT AREA	2

## 5.0 MINING

The mine for the Mt. Nicholas project has been designed to supply coal at the maximum level of 240,000 tonnes per year (ROM) for a ten year period. The majority of this production will come from underground operations but initially a small open cut will be developed. The open cut will provide early coal and long term access to the underground mine operations.

The area identified as suitable for open cut mining is shown in Figure 2. Within this area close definition of 100,000 tonnes of raw coal in the M2 Seam is being undertaken by further drilling to a maximum depth of 25 metres. The open cut coal will be progressively stripped and mined. This approach will mean that a large amount of the overburden will be deposited back into already mined areas. Other overburden will be used for construction of tailings dams, roads and site earthworks.

Based on 2.7 metres of coal, cut width of 50 metres and 90 percent pit recovery, a strike length of some 550 metres will eventually be stripped. The total quantity of overburden expected to be moved is 540,000 bcm including allowance for ramps and batters, giving a strip ratio of 5.4 to one (bcm/ROM coal).

The stripping and mining will be contracted out operations. Mined coal will be transported by truck to a surface stockpile near the coal preparation plant.

It is anticipated that detailed production drilling will establish additional open cut reserves in the M1 and M2 seams. These reserves will extend the life of the open cut operation.

## 5.1 Underground Mining

Underground mining will be carried out in both the M2 and M1 seams.

### (a) Reserves Used

As a general rule all reserves in both seams which are thicker than 1.5 metres are considered for mining.

The reserve plans (Figures 3 and 4) show that recoverable reserves in the M2 seam lie almost exclusively to the north-east of recoverable reserves in the M1 seam. Accordingly seam interaction effects need not be considered generally and coal losses in the M1 seam are negligible.

### (b) Mine Plan - M2 Seam

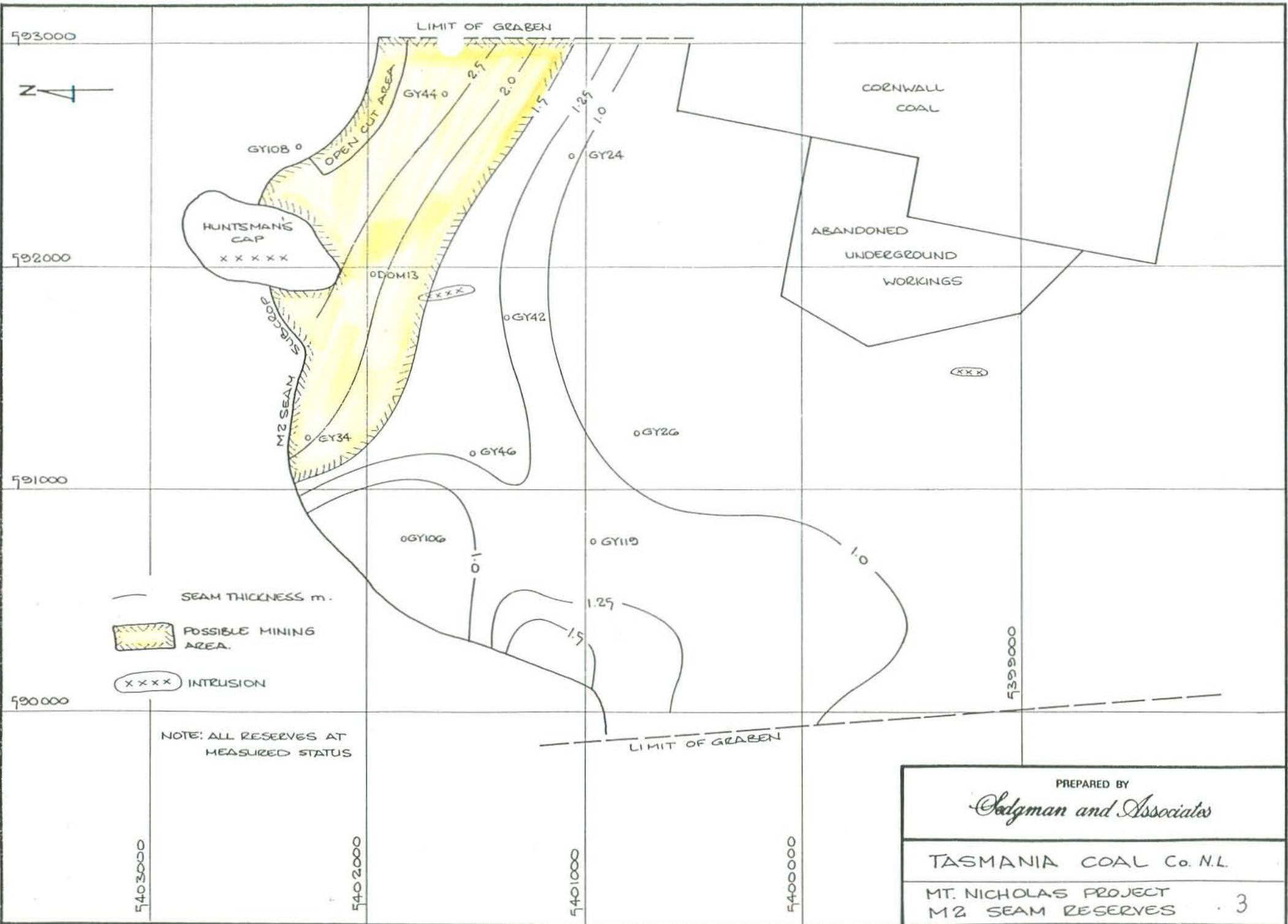
The M2 seam will be mined before the M1 seam.

Entry to the seam will be via the highwall of the open cut.

Three entries will be driven to serve as conveyor road (central roadway) man and materials access road (eastern roadway) and return ventilation road (western roadway). The conveyor and man/materials roads will be intake airways.

The mining system to be used consists of development roadways at full seam height and width metres to the extremities of the reserve and then full or partial extraction as conditions permit by splitting and fendering pillars.

Barriers are left around igneous intrusions, near the subcrop of the seam and near the open cut, and near the graben on the eastern side of the mine area.



523000

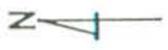
522000

521000

520000

5403000  
5402000  
5401000  
5400000

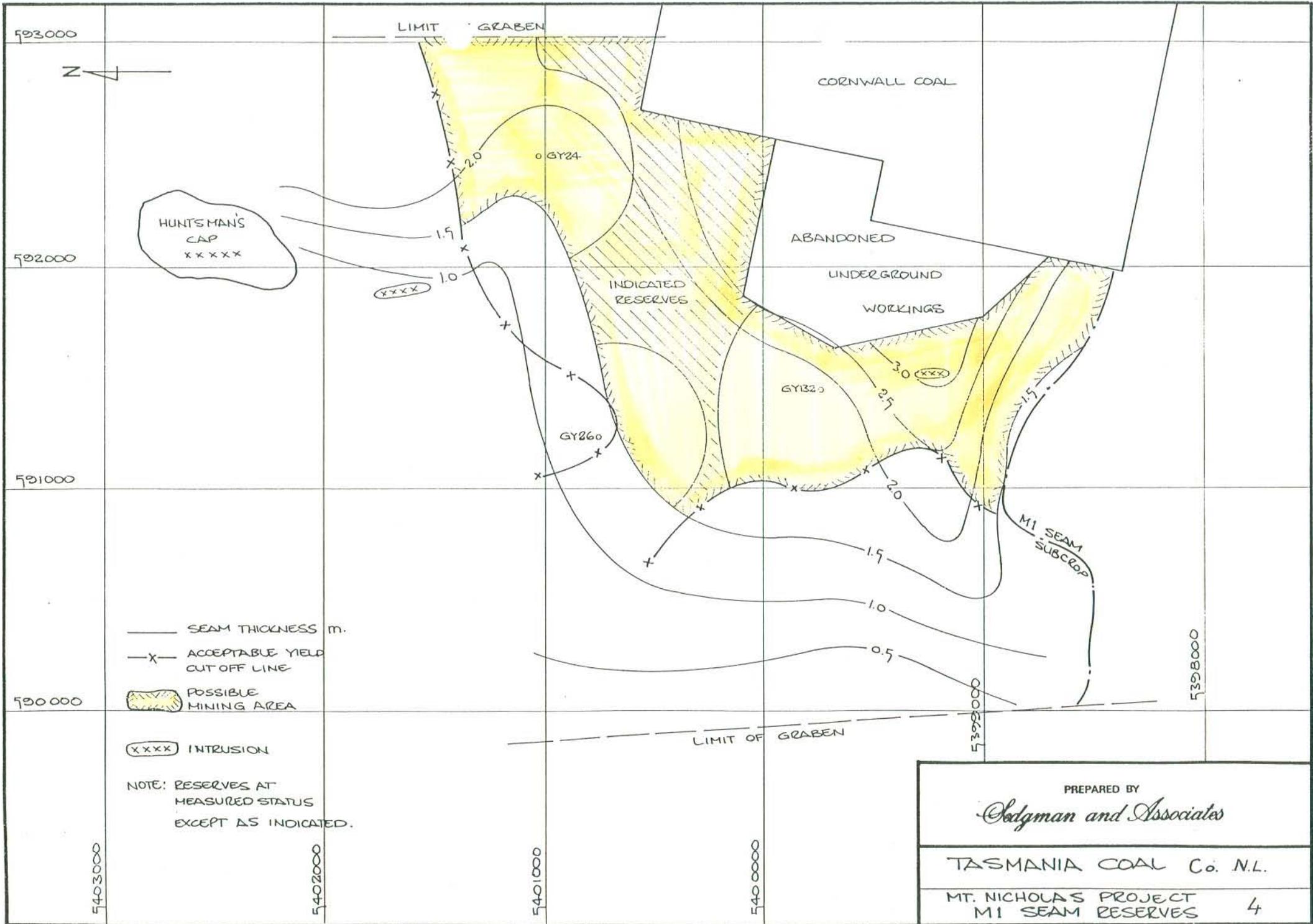
5395000



- SEAM THICKNESS m.
- POSSIBLE MINING AREA.
- INTRUSION

NOTE: ALL RESERVES AT MEASURED STATUS

PREPARED BY <i>Sidgman and Associates</i>
TASMANIA COAL Co. N.L.
MT. NICHOLAS PROJECT M2 SEAM RESERVES



PREPARED BY  
*Sedgman and Associates*  
 TASMANIA COAL Co. N.L.  
 MT. NICHOLAS PROJECT  
 M1 SEAM RESERVES 4

The mining sequence extracts the thickest seam sections near the entries early and later moves to thinner more distant areas. A large barrier is maintained for the SW headings at the completion of mining of the M2 seam to ensure long term integrity for access to the M1 seam.

(c) Mine Plan - M1 Seam

Entry will be via drifts up from the M2 seam. Seam separation is approximately 10 metres in this area. Three drift headings are planned.

The mining system will be similar to that envisaged for the M2 seam.

Mining barriers are allowed for around igneous intrusions, the eastern graben, the Cornwall coal leases, the abandoned underground workings and subcrop areas.

(d) Production

Production estimates are based on a productivity level of 400 tonnes per continuous mine shift. This level is currently being exceeded in the adjacent Blackwood and Duncan Mines.

Annual production level is estimated as 240,000 ROM tonnes as follows:-

Maximum production weeks per year	52
less shutdown weeks	3
Actual production weeks	49
Days per week	5
Production days possible	245
less public holidays	7
other shutdowns	<u>8</u>
Rostered production days	230
Shifts per day	3
Rostered production shifts	690
Utilisation of shifts, %	87
Budget production shifts	600
Budget annual production, t	240,000

## (e) Schedule

Production from the M2 seam is scheduled to start in July 1991. Between July and December 1991 the schedule allows for a build up of labour and opening up of the mine. In the first half of 1992 production of 100,000 tonnes is envisaged. 1992/93 production will reach 240,000 tonnes and full production will be achieved thereafter. On this basis the M2 seam will be worked out by early 1997 at which time access will be made to the M1 seam.

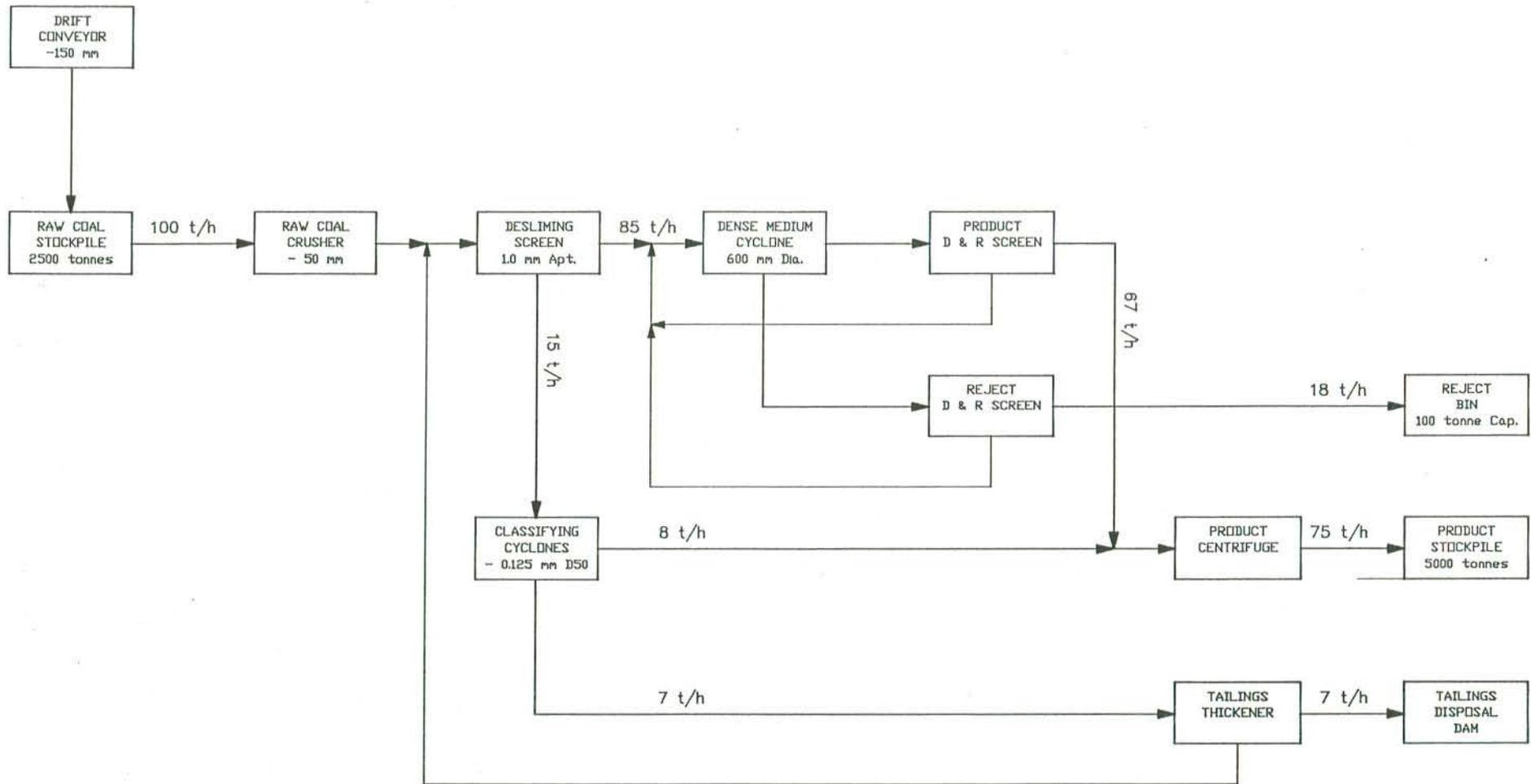
A significant reserve exists after 1999 in the M1 seam and operations would be expected to continue for a further 5-7 years thereafter before access to the lower quality L2 or L1 seams becomes necessary.

## 6.0 COAL PROCESSING

To achieve a high quality product, all of the raw coal will be processed in an efficient dense medium cyclone separator. The preparation plant flowsheet is shown in Figure 5.

The plant is a small, single stream system with a capacity of 100 tph, which separates low ash coal from high ash waste. The waste material is trucked back to the open cut area for landfill disposal. Other waste is generated as tailings which flows to an approved tailings dam system for dewatering and later reclamation.

Product coal is closely controlled to 17% ash specification. It is dewatered in a centrifuge and passes to stockpile storage from where it is trucked a distance of 10 km to the railhead, or for some coal direct to consumers.



			<small>This drawing is confidential and is the property of PEDGEMAN AND ASSOCIATES. It must not be disclosed to a third party, copied or used without the written consent of PEDGEMAN AND ASSOCIATES.</small>		DRAWN CHECKED DESIGNED PROCESS ENGINEER APPROVED	SCALE N.T.B.	<b>Pedgeman and Associates</b> SERVICES TO THE COAL INDUSTRY <b>TASMANIA COAL COMPANY</b> MOUNT NICHOLAS PROJECT COAL PREPARATION PLANT PROCESS FLOWSHEET	D40 FILE No. TMS0041 CONTRACT No. <b>GSR</b> REV <b>0</b> DRAWING NUMBER <b>CP-01</b>
REV	DESCRIPTION	BY	DATE	PHOTOGRAPHIC SCALE				