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Oaky Creek Coal - Improving Productivity

B Nicholls¹ and P Lynch²

LOCATION

Oaky Creek Coal Pty Ltd. currently mines high quality coking coal from both underground and open cut operations at its Oaky Creek Mine. Coal is transported by rail to the Dalrymple Bay Coal Terminal south of Mackay and to the Gladstone Coal Terminal. Oaky No.1 Underground Mine, Open Cut and Highwall Mine have concentrated on seams from the German Creek Formation, one of the major productive coal measure formations in the Bowen Basin Coalfields. (Fig. 1) location map.

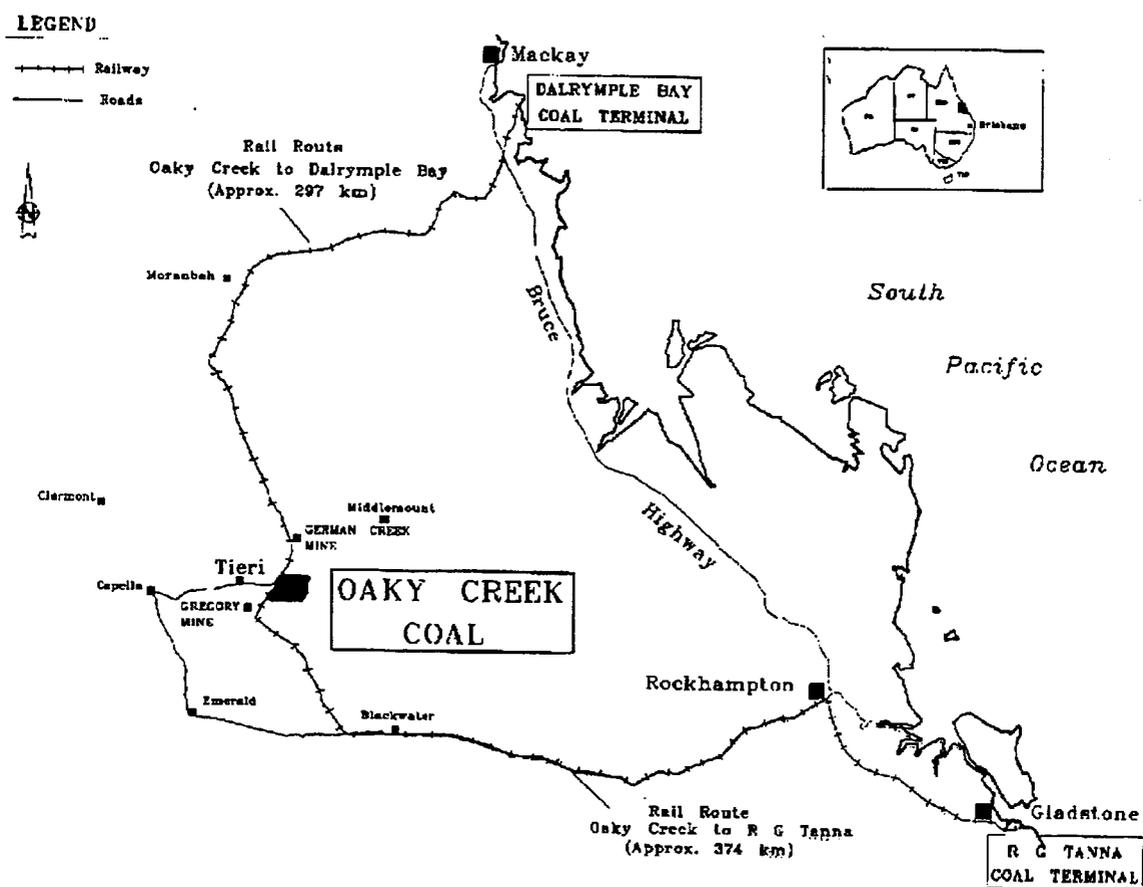


Fig. 1 - Location

¹ General Manager, Oaky Creek Coal Pty. Ltd.

² Oaky North Manager, Oaky Creek Coal Pty. Ltd.

BACKGROUND

Oaky Creek Coal is located 100km from Emerald in central Queensland. It mines the German Creek, Corvus, Aquila and Pleaides seams to produce high quality coking blends. Mining started in 1982 with coal being exported to steel mills in Japan, India, SE Asia, Europe, North Africa and South America. The open cut mine was established to produce 2.5 Mt a year and is currently producing approximately 1.5 Mt of product coal. Increasing stripping ratios has driven the requirement to go to underground mining operations. Highwall mining has been practised from several abandoned highwalls during the past three years.

The N°1 underground mine was started in 1989 off an open cut highwall to expand the total coal capacity from the site and improve coal quality when mixed with coal from the open cut operation. The underground has suffered from a chequered history, with the longwall being development constrained at the end of the first block after commencing early in an effort to maintain cash flow. Flooding from surface water inflow in 1996, a lack of underground experience in the initial project team coupled with a staff turnover around 30% pa have contributed to a history of poor performance.

The mining conditions to date in the N°1 underground are good, with good roof, low in-seam gas make, minimal faulting and consistent (≈3m) working section. Gas make within the mine is low but pockets of H₂S restrict mining rates when longwall mining in the affected areas. Annual tonnage has varied since the commencement of longwall mining due to a number of factors, however it is currently running at three million tonnes per year increasing to almost four million from mid 1998.

Following lengthy negotiations and final acceptance of an Enterprise Bargaining Agreement (EBA), production records for a shift, 24hr, weekly and monthly periods, were broken. In September 1997 production was 390,000 ROMt coal from the No. 1 Underground mine. A contract is to be awarded for longwall gateroad drivage (approx 30,000m) for the North East section of the mine to ensure continuity of longwall production and cash flow.

Oaky Creek Coal (OCC) has recently signed an EBA for both the N°1 Mine, Oaky North and Surface Operations in which it is stated "... that the company may employ outside contractors and in whatever work it determines at its sole discretion ..." with minimal qualifiers.

This reflects the OCC operating philosophy and what the authors believe should be a standard management prerogative throughout the industry.

ROM coal is sourced from six locations. Three open cut pits and three underground mines, two of which currently operate longwalls.

Four seams varying in thickness from 800mm to 4.5m. are mined from the open cuts. The seams and thickness are set out below and a stratographical section is shown in Fig. 3.

<u>SEAM</u>	<u>THICKNESS</u>
Pleaides	800mm
Aquila	800mm - 1,800mm
Corvus	600mm
German Creek	1,500mm - 4,600mm

The main thrust in the open cut operations is the development of increased Aquila seam quantities required for product blending.

German Creek seam open cut reserves will be exhausted by September 1998 when the first dragline will be shutdown.

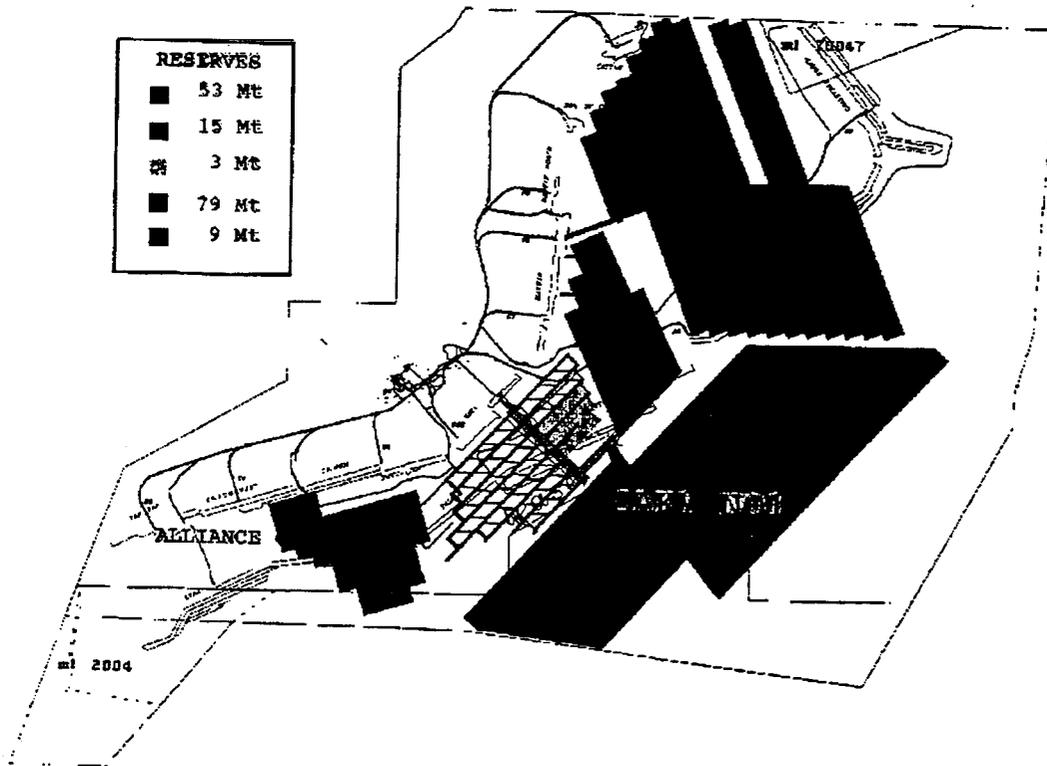


Fig. 2 - Oak creek's current operations mine plans

Increasing volumes of German Creek coal will be mined from the underground mines predominantly from three longwalls. The Oaky North project will commence longwalling early in 1999.

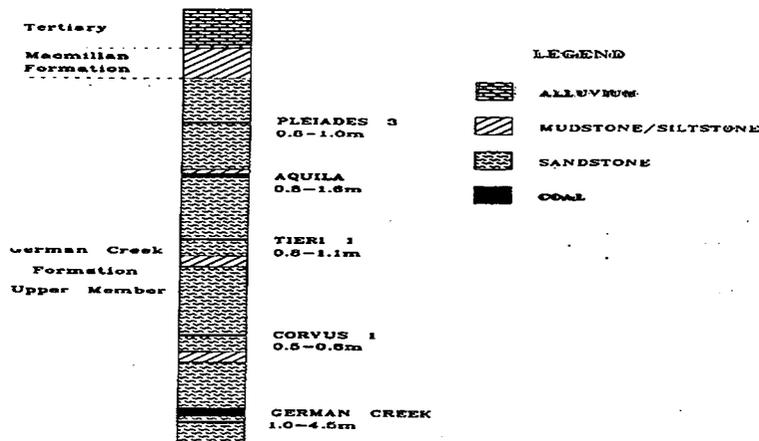


Fig. 3 - Typical stratigraphic section

The projected Run of Mine (ROM) production profile is shown on (Fig. 4) ROM Production Graph

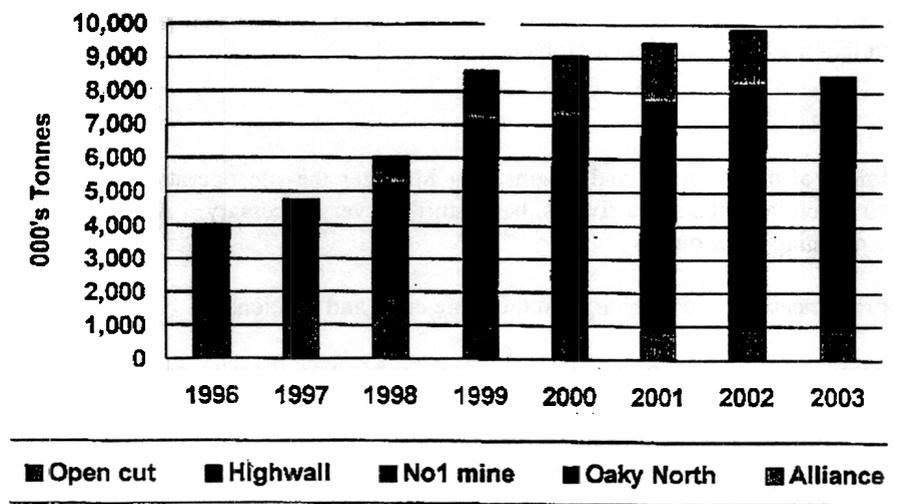


Fig. 4 – Run of mine production

THE TURN AROUND STRATEGY

Operational constraints - were many varying from increasing strip ratios in the open cuts with reducing equipment availabilities to very short (<1,000m) longwall blocks which can be extracted in less than three months.

Lack of confidence by the shareholders in the ability of Oaky creek Coal Pty Ltd to show any return on the investment had created a cost constraint downwards spiral with increasing downtimes on major equipment.

No real commitment had been made as to the future direction of the business by either management or employees until late in 1996 when the value of the resources was realised. The enormous task of removing industrial constraints brokers was recognised, assessed and seen as being achievable albeit at potentially horrendous cost.

Industrial constraints - revolved around an extremely militant group who basically controlled all the workforce and were effectively the de-facto managers of the business. When challenged on their attitudes and the continued industrial losses (46 days in 18 months to November 1996) the custom and practice argument reined supreme.

The strategy was put in place to try to negotiate an EBA for the site but differentiating between underground, open cut and CPP operations.

Some 362 customs/practices and union policies were tabled almost all of which had to be removed if the business was to have a future. Given the quality of some of the people in the workforce and the value of the resource plus the level of the investment, the challenge had to be met up front. Introduction of the Federal Workplace Relations Act on 31 December

1996 enhanced our resolve to turn the tables, remove the industrial constraints and put the business into a profitable position. Financial year 1995/96 had resulted in a \$ 30mil loss. Financial year 1996/97 resulted in a \$ 300,000 profit.

On top of these two major constraints we had a planning dilemma which, simply stated, was there was no integrated planning in place across the site. Each production area basically did its own thing and the hope was it would all come together in the end. That philosophy cannot work and will not work and so enormous amounts of time, money and energy were being wasted by not having an integrated planning procedure for the six mining operations and the four raw coal products. This had to be addressed urgently and a Planning and Engineering Manager was appointed in January 1997.

THE WAY FORWARD

The two immediate things to fix were the industrial climate and the lack of co-ordinated planning. The quality of the OCC coking product is such that marketing was not a problem.

Integrated Planning

Subsequent to the appointment of the Planning and Engineering Manager the site operational planning was gradually brought under one banner to co-ordinate the site activities, basic stuff but very necessary. A major task which required a complete re-structure of the planning function.

Result - an immediate improvement in mine planning and therefore costs and efficiency.

Mine activities were integrated to enable optimisation of the Coal Preparation Plant to ensure product quality through planned raw feed availability.

Management to manage

The de-facto management by the lodge executive had to be removed and the management team had to take the reigns of management and leadership, probably for the first time for a long time at Oaky Creek Coal. This meant entering into serious negotiations to achieve separate EBAs across the site and tackling unacceptable practices head on.

Persuading middle management that we intended to do this was at first difficult - how could it be done? - it can't be done!! were common questions and thoughts from a team who up until early 1997 had almost no control.

To convince people two things happened:

1. the workforce and union were told up front we intended to regain management control and manage, with or without their co-operation and
2. every issue where we had the right to exercise management control and decision making was taken on and settled either at the mine, or usually in the AIRC. During the negotiating period for the EBAs, we were also selective to make sure we took on issues we believed we could not lose.

Correction of the industrial dilemma followed on from the insistence on our part to manage the mine. At no time were we attempting to remove union involvement from the operational activities, conversely, we were embracing participation at all levels to improve the systems in use and give operators more say in how we did things. We publicly acknowledged the fact that there is (and always has been) an enormous amount of talent in the workforce that needs to be harnessed. We are actively promoting, in all facets of the OCC operations, involvement of our production and maintenance teams. The non-negotiable issues taken on in the EBA discussions were:

- no minimum manning;
- no demarcation;

- unfettered use of contractors;
- no overtime limitations; and
- removal of all past customs and practices.

Whilst the EBAs proved extremely difficult to achieve, the results since acceptance of the EBAs, initially at the N°1 underground and surface operations and later at Oaky North, has given us confidence that the operations can now be developed into a highly productive and profitable operation. The underground performance (Fig. 5) with the reduced manning level and use of contractors is now amongst the best in Australia. The Open Cut mine and Coal Preparation Plant have their own management structures and performance bonus arrangements and are continually benchmarking against other Australian mines.

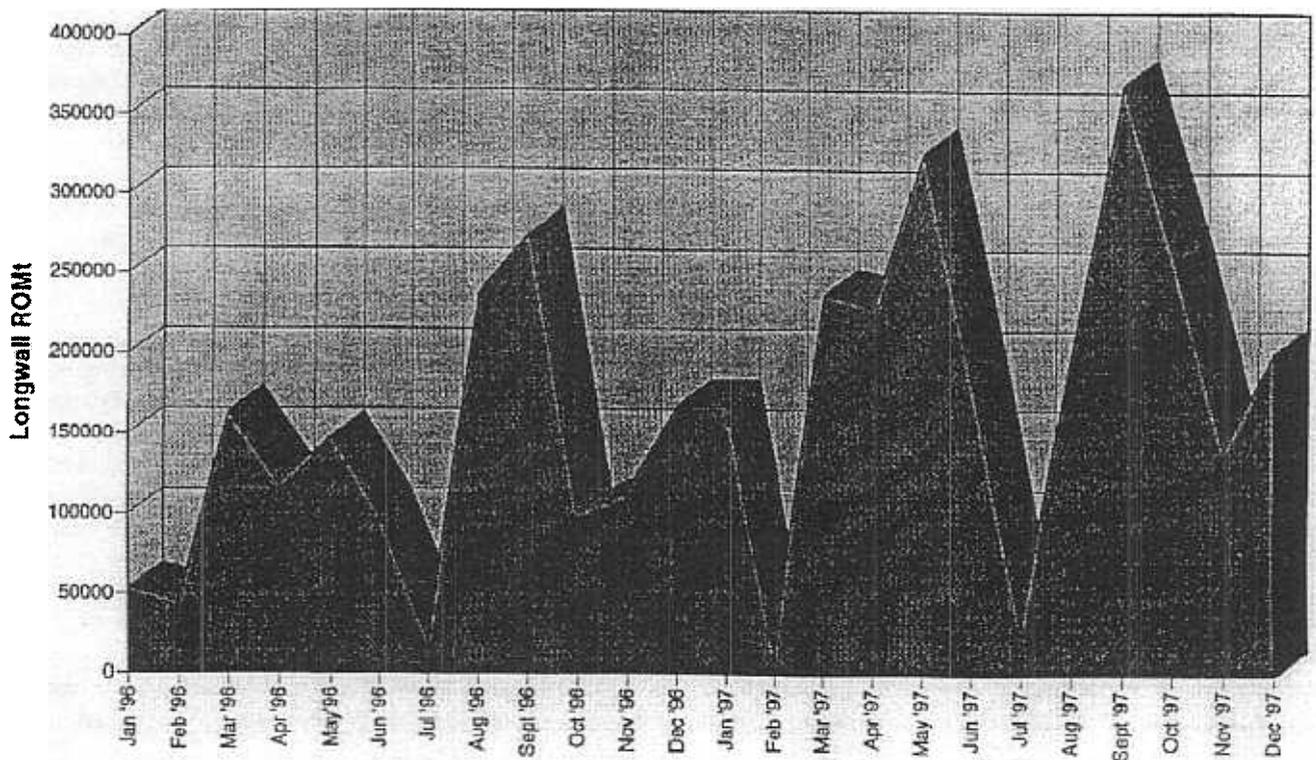


Fig. 5 – Underground performance

The workforce and union are actively encouraged to contribute to the improvements in systems, standards and procedures without being given any de-facto management rights.

Importantly, the management team in the operations areas are in continual communication with all the teams informing and involving team members about what is going on and why. We still have a long way to go to be “good” at communications face to face but it is essential that we succeed in this area.

By implementing a renewed safety culture, MIMSafe (MIM safety and health strategy) and NOSA standards, the whole site has improved dramatically in standards and the culture of OCC is changing rapidly to one that will not accept poor standards or work practices. Again the change is welcomed but not fast enough.

Achieving the objective of correcting the industrial dilemma has been difficult, costly and unfortunately cost some 80 jobs. The actions had to be taken to get OCC to where it now is - productive and efficient and providing shareholders the confidence to further invest in the underground operations. The Oaky North Project being approved in December 1997 at a cost of \$218m is evidence of that confidence.

ADDITIONAL CASH GENERATION STRATEGIES

Longwall punch mine

After lengthy negotiations during 1995/96, an area of the southern part of the lease was sub-leased to Thiess Namoi Joint Venture to develop a longwall punch mine off the Crinum pit highwall. Longwall operations commenced in October and the mine is designed to produce 1.2mt ROM product for washing in the Oaky Creek Coal Preparation Plant. This provides not only additional volume and cashflow but also the opportunity to market a third coking coal product. This mine at 1.2mtpa has a projected life of 6 years.

Increased Oaky No. 1 Longwall performance

Considerable effort and management time was put into ensuring the main cash generator at the mine, the N°1 mine longwall, was driven as hard as possible. This has been done successfully since the start of 1997 (Tables 2 through 5) Longwall Performance) and this longwall is now one of the top performers in Australia using 9 year old supports on short (200m x 1000m) blocks.

Development into the long North East blocks is currently being done partly by Oaky Creek and partly by contractors. Commencement of the first long panel LW14, in July 1998 will enable the N°1 mine production to rise to 4mtpa.

Three Dragline strategy

The decision to cut back to 2 draglines was reversed in late 1996 and three draglines have been kept swinging in three different open cut pits. Whilst not highly productive or highly cash positive the additional coal has generated extra cash. Improvements in mine scheduling, employee flexibility, operations planning and the acceptance of an EBA in July 1997 has enabled Oaky Creek Coal to continue this strategy until later in 1998 when the first Dragline will be shut down. This was planned to coincide with the commencement of longwall operations at Oaky North when a substantial increase in underground ROM volume is projected. The two remaining draglines in the Aquila seam will continue after mid 1999 only if operating margins are acceptable.

Medium and long term plans

Implementation of EBAs and improved work practices was and is essential to the long term success of the business. People issues are critical and a highly motivated workforce is the most important factor in the whole success equation.

The confidence of the shareholders in the current operators and management is obvious from the new commitment to Oaky North, the upgrade of the Coal Preparation Plant and the potential development of the South Eastern area of the No. 1 mine with an investment in another longwall.

The reserves (Table 1) are considerable, the coal quality high and the people amongst the best in the coal industry.

The transition from open cut to fully underground operations will be dependent on the margin achieved from open cut coal after mid 1999 and the volume of product we can get into the market place at an acceptable price.

With what has been achieved over the past 15 months, the signing of EBA's across the site, removal of industrial constraints and the rights of management to manage, Oaky Creek Coal can, and will be the best underground operation in the Australian industry.

support of the MIM Board was gained to initiate a small scale development operation from an existing open cut highwall thereby accessing the main longwall reserves. Fig. 7 shows Oaky North Mine plan with geology.

The development operation was used to win further support for a future longwall operation by proving the viability of the mine and eliminating the major risks perceived by the Board. These were mainly three fold, geology, industrial

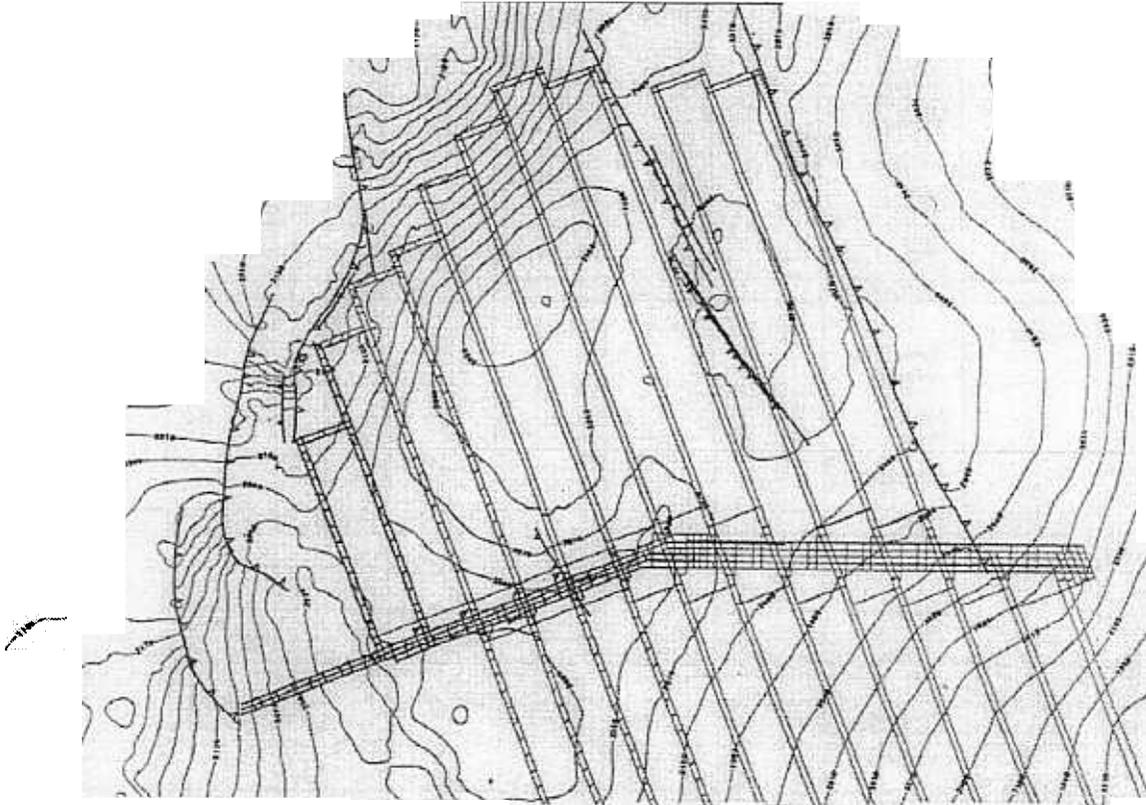


Fig. 7 – Oaky Mine plan geology

relations and the ability to achieve or exceed industry best performance in development. The operation was commenced in October 1995 with a single continuous miner development operation manned 24 hours per day five days per week. A second continuous miner unit was brought on line in January 1997. In December 1997 a third unit was added, to be manned on a part time basis.

A full blown feasibility study was undertaken in April 1996 being internally driven with consultants used selectively to provide input on specific areas which were identified to be their strengths. This study has been used as the baseline for Board approvals and as a measure of our ability to achieve results both in terms of advance rate and capital expenditure. The original proposal of April 1996 has been further enhanced by successive optimisation efforts which are based on doing things smarter, not simply cheaper.

The project was given full approval on 1 December 1997 immediately following the signing of a three year Enterprise Bargaining Agreement. During the process of negotiating the EBA not one single dispute occurred over the eight month period of the discussions. In fact since the mine commenced operation only 24 hours has been lost due to a site issue.

The mine is characterised by a number of innovative approaches to underground mine project development, all of which have proved to be overwhelmingly successful and will ensure its place amongst the world's best.

Human resources

Every single employee at Oaky North was only employed following successful advancement through a rigorous targeted selection process. Each person irrespective of their position was hired on their merit and what they had to offer the organisation. Employees who were successful in achieving employment then received significant amounts of training to ensure they had the necessary skills to ensure the mine's success. A person's ability to receive training efficiently was a principle part of their selection. Wages employees were selected from a mix of experienced and inexperienced sources. The ratio of inexperienced to experienced is considered high by industry standards. This involved commitment to considerably high levels of training but was more than worth it to avoid a mine of industry standard.

Employees are given the trust and respect they deserve and are expected to pro-actively contribute to the improvement of mine performance. They are expected to carry high levels of responsibility and be held accountable. This is achieved through the use of a very flat management structure to ensure decisions are not lost in a waffle of management beaurocracy but retained as much as possible at the shop floor. To date Oaky North has eliminated the entire shift management level and replaced it with a strong team focused group of front line supervisors. This has created a high degree of job satisfaction amongst the work force and reduced the size of the management structure.

Development operations

Development is carried out by conventional continuous miner and shuttle car methods. A development panel incorporates a Joy 12CM12 'C' 5.2m single pass miner. This unique machine incorporates two pivot points to allow interchanging from thick to thin seam configurations. It is equipped with four on board ARO 4000 series rigs and two rib bolters. The machines include a material supply system from Roberts Engineering. Two Joy 15 SC 32 50/50 cars are provided with wide low ground pressure tyres to cope with a soft floor condition. Stammler 14BF breaker feeders are utilised to discharge the coal onto the 1050mm conveyors.

Roof support consists of a staggered 4/6 bolt pattern at 1.0m centres using 2.1m high strength bolts fully encapsulated with a two speed chemical. 1.2m rib bolts are installed on both sides of the roadways at 2.0m centres. 6.1m point anchored flexi-bolts are installed during primary development driveage in areas of high horizontal stress and weak roof conditions. The roof has a tendency to suffer a buckling failure, the flexi-bolts act to support the dead weight of the de-stressed failed roof beam. A continual geotechnical monitoring program is employed throughout the mine.

All development at Oaky North is on 1050mm belt. This allows the belt moves to be quick and efficient and allows development inventory to run ahead of the longwall without tying up large amounts of expensive longwall structure. Ventilation is by 17.5m³/s fans from ABB using 610mm fibreglass tubes. Each panel is powered via a 1MVA IP55 substation feeding via a 150mm² cable to a six outlet FLP gate end box.

Development crew size is dependant an the resources available and the total work load scheduled for the shift, a panel will not stop cutting due to an artificial manning barrier. The basic concept of our development success is to keep the systems simple and repetitive to foster confidence and improvements. Last financial year a total of 12,296m were developed with one miner for a full year and a second machine for five months. Figs. 8 and 9 show the performance for 96/97 and 97/98 financial years, respectively. So far this financial year we have developed 9,868m for the first six months from two machines.

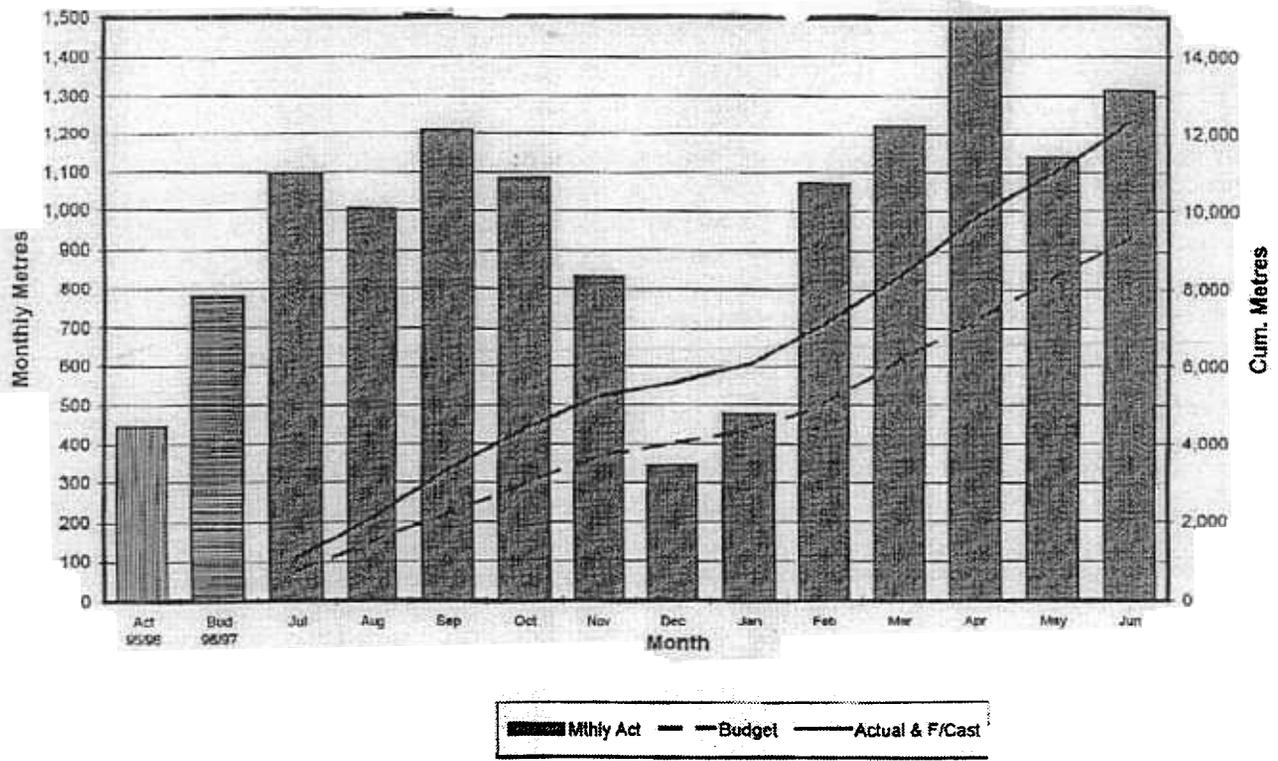


Fig. 8 – 96/97 financial year performance

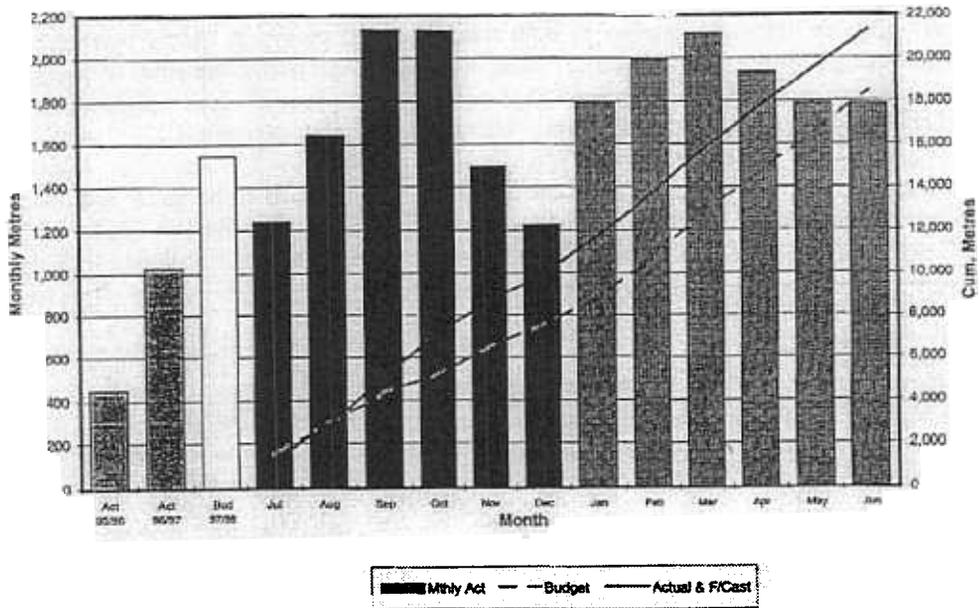


Fig. 9 – 97/98 financial year performance

Longwall operations

A longwall will be installed in January 1999 at which time about three and a half blocks of inventory will exist. The faces are 260m centre to centre with the extraction height of the first eight panels over 4.5m. The longwall will be the highest capacity commercially available utilising state of the art automation to minimise the need for operators on the face. Due to the nature of our coal and the dryness of the seam, dust will be a problem.

The conveyor system to handle the longwall coal will include 1600mm gatebelts rated at 4,500tph continuously, running at 4.4 m/s. These will discharge onto a 2000mm trunk belt rated at 6,500 tph continuously, running at 4.1m/s. The first trunk belt will be a 2.7km long single flight conveyor servicing the first six panels with the single drivehead located in the fresh air at the highwall portal. The coal will be taken by a similar belt up an open cut ramp and discharged onto a 150,000t single cone ROM stockpile. The coal is then reclaimed and transported to the Coal Preparation Plant by overland conveyor. Fig. 10 shows Coal Clearance route

A production rate of over 4.0mtpa is being targeted with a high degree of confidence that this figure can be exceeded within one year of the longwall starting production.

Construction

The project construction is managed by the operations team with a minimal use of consultants to ensure ownership and a finished product which matches the company's requirements. A conscious decision was made to steer away from EPCM style construction based on the poor track records which prevail in our industry. The East Site Facilities Plan is shown in Fig. 11.

Significant use is made of MIM's buying power and internal commercial expertise. However, the main prerequisite to achieve this was the ability of the persons employed to operate the mine. All have enough industry experience to know how they don't want things to turn out at the end of the day and are prepared to make decisions for which they will be held accountable. Unfortunately too many people in the coal industry have been prepared to relinquish this responsibility to a third party with little or no operational experience in lieu of being held responsible for a possible mistake. This soft management approach will never achieve the competitive edge required to survive.

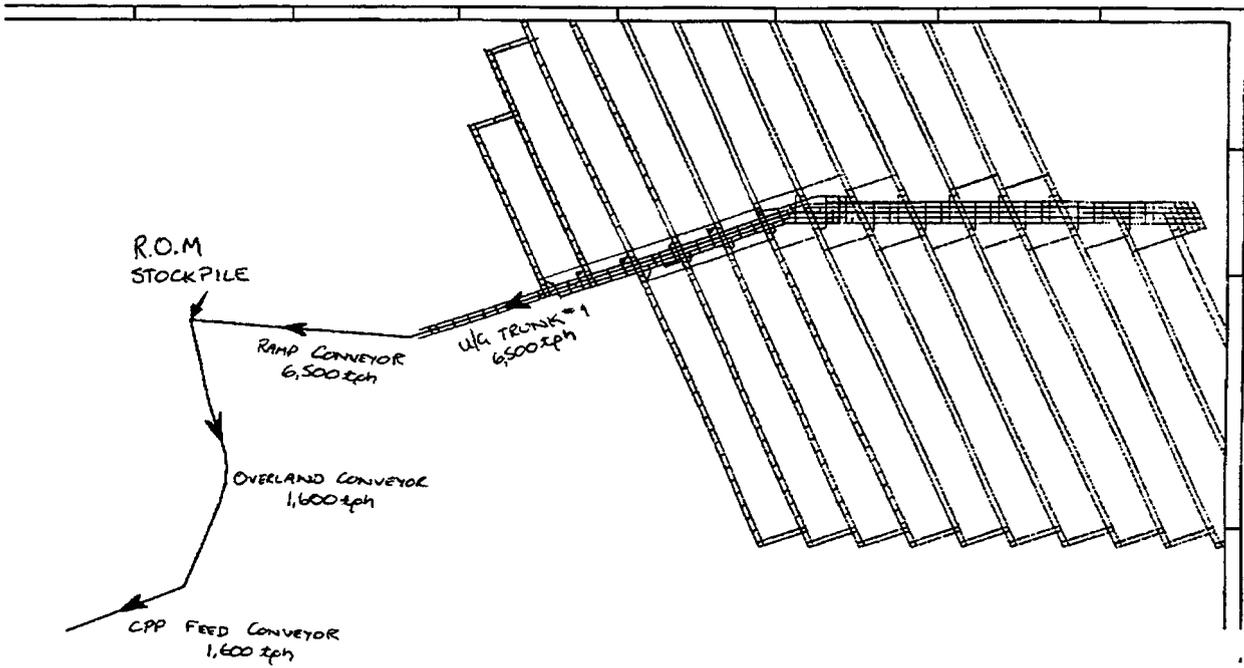


Fig. 10 - Coal clearance route

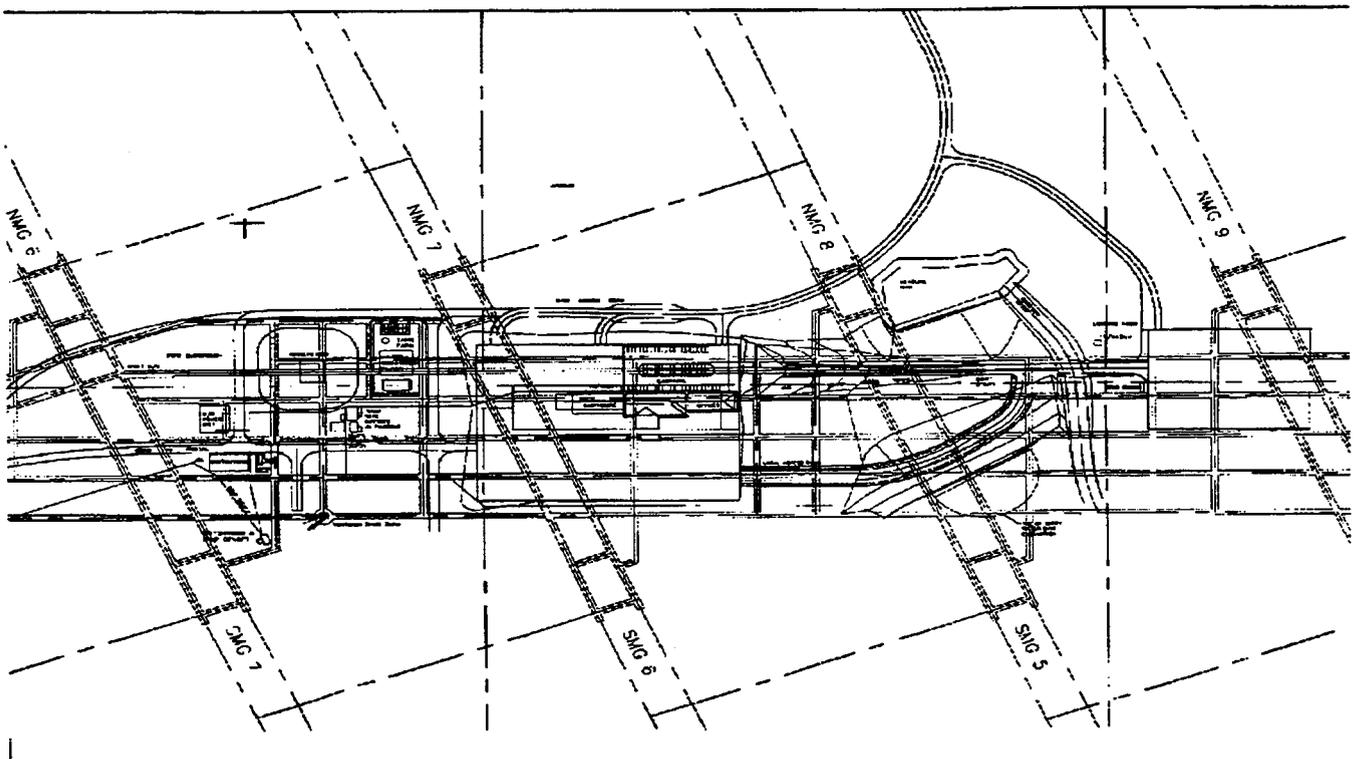


Fig. 11 - East site facilities plan

Table 2 - Average production mine days worked (tonnes) - individual Longwalls³

No	Mine	L/W	Tonnes	Shearer
1	West Wallsend	16	12,765	Long Airdox EL 1000
2	Oaky Creek No. 1	10	12,727	Long Airdox EL 1000
3	Oaky Creek No. 1	9	11,818	Long Airdox EL 1000
4	South Bulga	3	11,465	Long Airdox EL 1000
5	Crinum	1	11,335	Long Airdox EL 1000
6	Southern	702	11,277	Long Airdox EL 1000
7	Wambo	8	10,652	Mitsui Miike
8	South Bulga	4	10,319	Long Airdox EL 1000
9	Central	207	10,062	Eickhoff EDW-230
10	North Goonyella	4	10,039	Joy 6LS

Table 3. Average production mine days worked (tonnes) - Longwall mine total⁴

No	Mine	Tonnes	Shearer
1	Crinum	11,335	Long Airdox EL 1000
2	Oaky Creek No. 1	11,112	Long Airdox EL 1000
3	Southern	10,760	Long Airdox EL 1000
4	South Bulga	10,609	Long Airdox EL 1000
5	Dartbrook	9,874	Long Airdox EL 1000
6	Wambo	9,635	Mitsui Miike
7	Kenmare	9,540	Joy 6LS
8	Ullan	9,514	Eickhoff EDW-450
9	Central	9,401	Eickhoff EDW-230
10	Baal Bone	8,340	Eickhoff EDW-300/380, Joy 4LS

Source: New South Wales Joint Coal Board Australian Longwall Mining Statistics.

³ Australian Longwall Mining Operations, Period 29th December 1996 to 27th September 1997

Table 4 - Tonnes per man⁴

No	Mine	Tonnes	Shearer
1	Oaky Creek No. 1	15,676	Long Airdox EL 1000
2	South Bulga	13,189	Long Airdox EL 1000
3	Kenmare	8,711	Joy 6LS
4	Wambo	8,021	Mitsui Miike
5	Baal Bone	7,620	Eickhoff EDW-300/380 Joy 4LS
6	Gordonstone	6,962	Long-Airdox EL1000
7	Ullan	6,892	Eickhoff EDW-450
8	Central	6,861	Eickhoff EDW-230
9	Ellalong	6,454	Long-Airdox AM 500
10	Springvale	6,268	Joy 4LS

Table 5 - Total Longwall mine production⁴

No	Mine	Tonnes	Shearer
1	Gordonstone	2,610,733	Long Airdox EL 1000
2	South Bulga	2,387,125	Long Airdox EL 1000
3	North Goonyella	2,381,183	Joy 6LS
4	Ullan	1,950,296	Eickhoff EDW-450
5	Dartbrook	1,807,008	Long-Airdox EL 1000
6	Oaky Creek No. 1	1,755,668	Long-Airdox EL1000
7	Wambo	1,676,458	Mitsui Miike
8	Baal Bone	1,676,333	Eickhoff EDW 300/380 Joy 4LS
9	Springvale	1,579,437	Joy 4LS
10	Cordeaux	1,566,864	Mitsui Miike

Source: New South Wales Joint Coal Board Australian Longwall Mining Statistics.

Australian Longwall Mining Operations Period 29th December 1996 to 27th September 1997