

APPENDIX E

PROPOSED OPEN CUT MINING PROGRAM

Invincible Open Cut Proposed Mining Sequence and Schedule

Mining Sequence

Mark Out

The mine surveyor shall mark out limit of disturbance prior to any disturbance on site. At this stage there is no need to mark any block lines until the clearing operations are completed. Preferably the entire pit limit of disturbance can be marked out at this stage to avoid confusion as mining progresses.

Clearing

The initial step involves the use of large bulldozers to clear and grub new mining areas prior to the commencement of stripping operations. Constant supervision is required at this stage to ensure no clearing operations progress outside the limit of disturbance. If it becomes necessary to use smaller dozers (D6-7) to clear due to the steepness of the terrain, local contractors shall be utilized. At the completion of clearing and prior to top soil removal, surveyors would be required to establish block lines. Ideally clearing would be maintained at two blocks in front of the OB removal operations at all times. Doing so will allow plenty of time and space for benching and drilling of the OB.

Topsoil Removal

The bulldozers then proceed to strip and stockpile the topsoil for removal by wheel loaders. As with all mining operations on site, these operations are constantly monitored by supervisory staff. Big Rim appreciates that top soil is extremely important in the rehabilitation process and being a finite resource, it is carefully removed, spread or stockpiled in accordance with MOP requirements. This is to minimise loss or contamination of topsoil which is later rehandled to rehabilitation areas to create final landforms. Where ever possible, bunds around the Open Cut excavation will be constructed from top soil to minimise rehandling of top soil.

Drill & Blast of OB

After topsoil has been removed the slope is benched to allow access for drills and the blast crew. This benching will be done by dozer.

Overburden Removal

The OB is then blasted to facilitate removal with a FEL and rear dumps. This overburden is trucked to higher level dumps requiring this type of material to

shape dump areas. Use of FEL in preference to hydraulic excavator will reduce the number of ramps required in the mining block.

Waste Placement

A priority is allocated to on waste placement according to the rehabilitation requirements, however, the general protocol for waste placement is to place weathered material mined from the higher work benches on higher dump benches with the material mined from the lower benches being placed at the base levels of the advancing dumps. This results in dump areas being constructed in roughly the same geological sequence as the mining areas. Another benefit of this type of waste placement strategy is to keep haul routes relatively flat and avoid the situation where waste would be trucked from the pit floor to the highest dump benches.

Coaling Operations

Once the bulk of the waste material has been removed the coal horizon is brushed by grader to ensure contamination of the coal is minimized. Irondale coal will be ripped by large dozer (D11 size) using a multi shank ripper arrangement. The multi shank is utilized to limit the number of passes over the prepared coal horizon by dozer, thereby minimizing contamination, fines generation and coal losses. A 992 FEL will then load out the seam with no in-pit stockpiling by dozer. The Lithgow seam will be dug direct from the face by 992 FEL with minimal or no dozer work. Again, this will minimize contamination, fines generation and coal losses. The coal will then be hauled to the Open cut ROM and if required for blending purposes, will be stockpiled by seam.

IB Removal

When the Irondale seam has been removed and final clean up completed, the IB will be drilled and then blasted. In some of the later stages of the project there is a slight chance that old headings may intrude into the mining block. This is not expected to be a concern at this level as there is still 5-7 metres of IB to the top of any headings. If an area is goafed, this will become apparent during the drilling of the IB. Blasting of the IB will clearly define any remaining headings that have not been previously apparent. Following blasting of the IB, the majority will be pushed to fill by large dozer with only the cleanup material being loaded out by FEL.

Coal Crushing and Transport to Product Stockpile

When the coal has been removed it will be crushed and stockpiled at the Open cut ROM. From there it will be transported by rear dump to the product stockpile area allocated to open cut product.

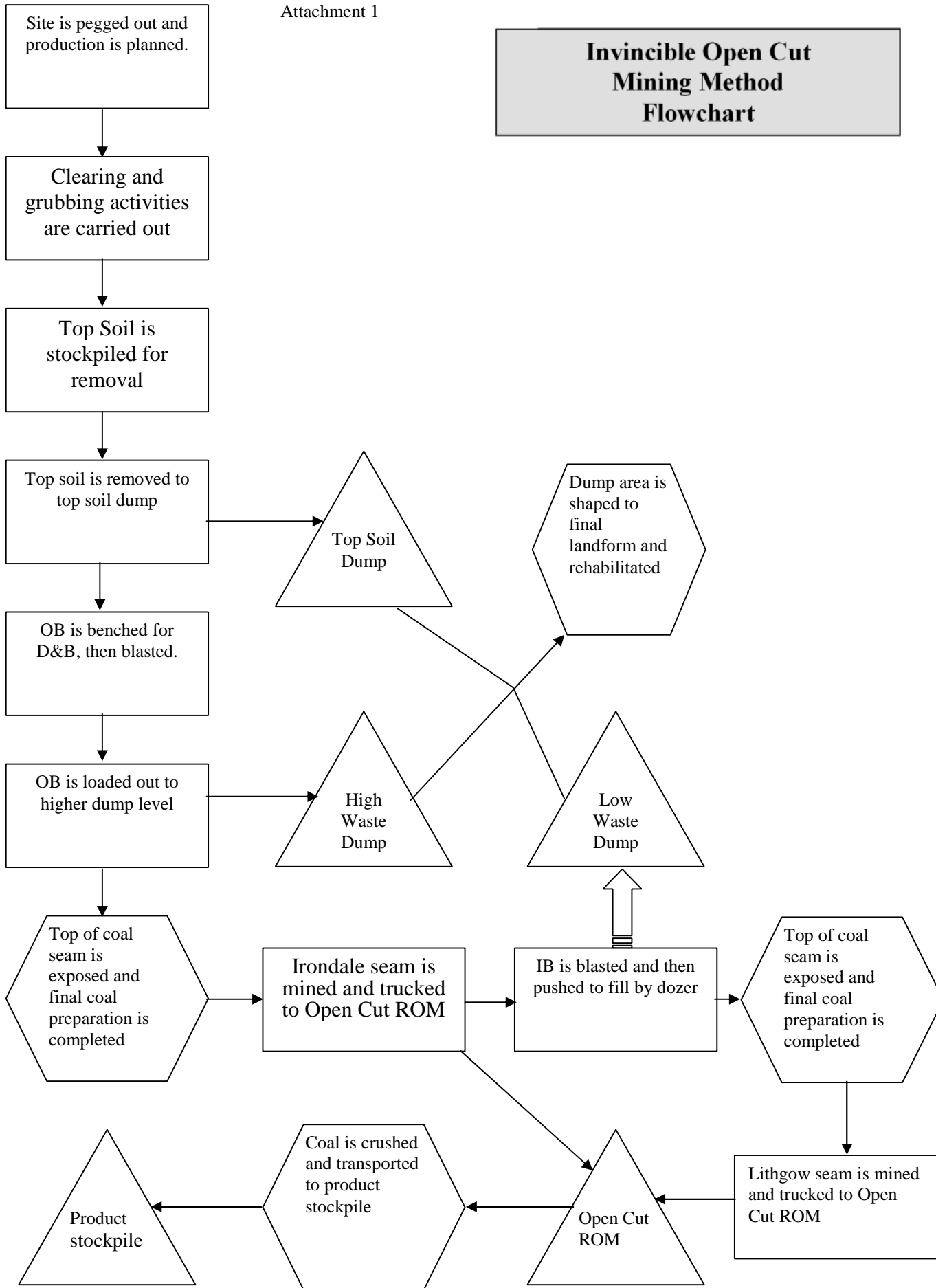
Shaping of Final Landform

As the waste dumps progress, progressive reshaping will take place. This will minimise the mine footprint. Areas that have been reshaped, topsoiled and seeded will be barricaded to prevent further disturbance to the finished areas.

Mining Method Flowchart

This proposed mining method is depicted on the attached flowchart to facilitate ongoing review of the method. This review will result in constant improvement in all facets of the operation.

Invincible Open Cut Mining Method Flowchart



Blasting Overview

General

Particular attention shall be applied in all areas of drill and blast from design through to initiation towards minimizing disruption to the environment through reduction of blast overpressure, dust generation and vibration. Big Rim will enter into a subcontract arrangement with Roche Blasting Service (RBS) to carry out our required drill & blast activities at Invincible Open Cut. Such an arrangement will give Big Rim access to the vast amount of technical and operational knowledge, information and expertise available from RBS. This access will ensure that drill & blast operations are carried out in a manner that will:

- minimise environmental impact;
- produce the most efficient and productive blasts possible;
- limit the potential risk to Coalpac Pty.Ltd.;
- minimise coal losses, particularly with interburden blasting.

RBS have considerable experience regarding drill and blast operations in the Western District. They have previously carried out drill and blast operations at:

- Western Main Open Cut;
- Cullen Valley Mine;
- Invincible Open Cut.
- Lamberts Gully Open Cut
- Baal Bone Project

This experience shall be a reference point for all drill and blast planning on site.

Site Preparation

Prior to the commencement of drilling in an area, the drill site shall be leveled off by a bulldozer to obtain a stable base on which the drilling unit will operate. Depending on machinery availability, the area will also be graded as part of the leveling operation. The back wall of the previous shot in the area shall be scaled down and squared up. This shall create a relatively square free face for the next shot and reduce undercutting of the free face. All of these factors are vital to achieving a blast which is safe and efficient. This preparation should minimise the environmental impact of the blast.

Once the area has been leveled, appropriate barriers and signage shall be put in place thereby restricting area access to authorized personnel. The OCE shall be responsible for the preparation and control of this area. When the signage and barriers are in place, a notice shall be placed on the site safety notice boards indicating that laying out and drilling operations will be in progress and that entry to the area is restricted to authorized personnel.

Blast Design and Planning

The design will be based upon:

- Rock type and density;
- Available stemming materials;

- Depth of bench;
- Surface dimensions of bench;
- Loading unit to be used;
- Environmental constraints (overpressure, ground vibration etc).

The Plan shall include:

- Required burdens and spacings;
- Explosive types and relative bulk strengths to be used;
- Blasthole depth and size;
- Blasthole orientation and angles, where required;
- Drill bit size and wear tolerances;
- Monitoring/supervisory activities;
- Initiation system to be used including necessary delays, where applicable;
- Initiation hardware to be used;
- Any operational or environmental constraints;
- Any other information pertinent to the particular blast.

Upon completion of the blast design it shall be documented and distributed to all relevant personnel.

Drilling Operations

These operations shall be carried out strictly in accordance with all criteria set out in the relevant blast plan. All drill operators shall be aware of and operate within all safety, environmental and operational guidelines at all times. The size and wear rate of each individual drill bit and depth and angle of each blasthole shall be monitored and recorded by the Drill Operator. Particular attention shall be paid to the angle of blastholes when this type of drilling is stipulated in the plan.

Shot Charging

Prior to the commencement of charging, all drill holes will be reinspected with respect to:

- conformance to blast plan;
- final wall design;
- position of free face;
- consistent hole sizing and depth;
- orientation of blastholes.

If any blastholes are found to be too shallow, too deep, out of position or there is a requirement for extra holes due to excessive burden, then appropriate corrective actions shall be authorized as soon as practicable.

Charging sheets shall be used on all blasts to record:

- individual hole depths;
- quantities and relative bulk strength of explosives used;
- type of stemming material utilized;
- depth of stemming;
- primers and accessories used.

The tie up of the blast shall be recorded and reviewed to ensure that the maximum instantaneous charge (MIC) criteria is not exceeded.

Blasting Procedures

Prescriptive procedures shall be developed to stipulate:

- minimum proximity of personnel, machinery and equipment to blast;
- minimum proximity of personnel to affected areas;
- dealing with overcharged blastholes;
- placement of guards and warning signs;
- notification of intended blasting and sleeping shots to all personnel;
- communication procedures for firing and all clear signals;
- post blast inspections;
- dealing with misfires;
- liaison with neighbours to give prior notice of blasting activities and monitor the effects of such activities after each blast
- monitoring of all blasts for noise, vibration and performance;
- blasting in close proximity to residential areas.

All drill and blast procedures shall be documented, reviewed and distributed to relevant personnel. Site safety audits will include reviews of all drill and blast procedures relating to safety matters for adequacy and effectiveness. Drill and blast activities and performance will be reviewed on a monthly basis at site management review meetings.

Proposed Explosives and Initiation Methods

RBS propose to use reduced density explosives for the Overburden blasting on site. Such explosives will provide a number of benefits for the project including:

- Reduction in environmental impact;
- Cost efficiencies;
- Minimized coal losses through blasting.

The IB will require the use of increased density explosives for the most cost effective result. Both of these types of bulk explosive have been used to good effect in this district previously. RBS will work closely with Big Rim to ensure the most efficient combinations of explosives are used throughout the project.

It is proposed that NONEL initiation systems will be used. While RBS have access to, and are experienced in the use of, electronic initiation systems, it is considered that there would be no palpable advantage in the use of such a system. If monitoring of blasts indicates that there may be a performance advantage by the use of such systems, then RBS have the capability to use electronics for subsequent shots.

For the initial blasts, a conservative approach will be adopted in Maximum Instantaneous Charge (MIC), Powder factor (PF), explosive density and pattern design. Consultation between all involved will allow subsequent blasts to be adjusted to deliver the best possible results for all blasting activities.