ANNEXURE Q
LOY YANG POWER MINE REHABILITATION WHOLE OF LIFE COST REPORT – 2011 UPDATE (FEBRUARY 2012)

Loy Yang Power

Mine Rehabilitation

Whole of Life Cost Report - 2011 Update

February 2012

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Appendices

1. Introduction

1.1 General

This report presents a Cost Model for the Whole of Life Rehabilitation of the land covered by the Loy Yang Power mining licence MIN 5189. This report supersedes earlier report 31/12247/05/104497 (issued in August 2005, and in May 2008 as a draft update). The land covered by Exploration Licence 4863 is not included in this report.

The model is based on meeting the rehabilitation principles from the September 2003 "Strategic Framework for Rehabilitation and Closure Planning". The plan defined how and when areas are to be rehabilitated.

The current mine business plan involves the completion of coal winning in 2048. The shape of the rehabilitation areas and the timing of rehabilitation works conform with the mine business plan.

The long term proposal is to flood the mine after completion of mining activities. A final water level of RL –10.0 has been adopted, which provides for adequate weight balance against heave from rebounding aquifer pressures. Rock beaching has been assumed to be the treatment for the ultimate erodable shoreline areas.

Rates for the various rehabilitation works have been taken from the DPI "Rehabilitation Liability Calculator", unless actual experience in the Loy Yang Mine has shown different rates to apply. At the closure of the mine, coal handling equipment, pipelines and dredgers will be dismantled, rehabilitation completed and the mine made safe for ultimate public access to areas suitable for this purpose; areas such as final batters steeper than 1 in 3 will be restricted from public access. Groundwater depressurisation will be ongoing but will be progressively reduced as the mine void is flooded.

A "Current Liability" has been shown each year for each area, and for the whole of the mine. This liability rises and falls as land is disturbed and then rehabilitated. Under an early closure scenario, the Current Liability would represent the cost of rehabilitating the mine from that closure point. A program of works to complete the rehabilitation activities under such a scenario would have to be determined at that time.

Appendix A contains a plan of the mining licence area showing a breakdown of areas, while Appendix B provides a description of each of the areas.

1.2 Rehabilitated Form

After mining operations have been completed, the mine void will be allowed to flood to a level where the long term inflows and evaporation are balanced. The estimated water level where this balance will occur is approximately RL -10 m. Hydrostatic pressures in the aquifers beneath the mine void will be counterbalanced by the depth of water in the void (ie weight balance) when the lake level reaches RL -27 m. Refer to Section 2.13 for further discussion on aquifer depressurisation post mining.

The rehabilitation treatment for the exposed coal batters under this scenario is for the planting of trees on the exposed coal batters and benches, as described in Section 2.2.

2. Rehabilitation Works

2.1 Mine Batters Above TL1

The treatment undertaken for the overburden batters (ie those above TL1) continues as previously undertaken with the batters dozed to 1V:3H in a cut and fill operation. This represents approximately 144 m³ per metre run of batter assuming an existing overall batter height of around 24 metres at slope 1V:1H

Further allowances are included for levelling, topsoiling and grassing. Rates for these items of work were supplied by Loy Yang Mine and are shown in the cost spreadsheet, escalated as described in Section 3 .

2.2 Mine Coal Batters

The batters and benches between TL1 and RL -10 m will be exposed in the long term. The treatment proposed for these areas is for minimal modification of the coal surfaces, with planting using mixed species native trees. A trial currently underway for Loy Yang Power will determine the most suitable trees for this purpose. The trees being considered for this purpose are casuarinas, acacias and eucalypts. Indicative rates have been supplied by personnel undertaking the tree study.

Batters subject to erosion by wave action in the vicinity of RL -10 m will be protected by beaching consisting of 150 mm concrete or rock spalls. Concrete spalls are planned to be sourced from demolition of the raw coal bunker and other concrete structures. Batters protected in this way will include internal overburden dump batters and coal batters containing interseam materials. Sound coal batters and benches in the vicinity of RL-10 will generally not be beached.

There is some 29,500 m^3 of concrete in the superstructure of the raw coal bunker available for recycling as concrete spalls. Based on a bulking factor of 2, this would equate to 59,000 m^3 of spalls.

2.3 Mine Below RL-10

The batters and benches below RL -10 m will be ultimately flooded. This requires bores to be progressively sealed prior to inundation occurring. . Most bores will be sealed during the operational phase of the mine, and therefore considered to be an operational cost and not a rehabilitation cost. Refer to Section 2.13 below for more information on bore sealing following the completion of mining operations.

It is assumed that no other interim or final rehabilitation of these areas is required unless an interim treatment provides an operational benefit.

2.4 Overburden Dumps

Some areas of the external overburden dump will require dozing of batters to create a stable rehabilitated landform. Dozing of overburden batters to general shape is carried out progressively as part of the routine dump operation, and the cost of this work is not considered a rehabilitation cost.

Areas generally only require minor dozing and grading prior to topsoiling and grassing. An allowance is included for 800 m³ of minor dozing per hectare to bring the dump areas to final shape.

The program for closure of the external dump has changed since the last issue of this report, with TS4 and TS5 now scheduled to transfer to the internal dump in 2018 and 2022 respectively. The timing of the rehabilitation activities on the external dump has been changed to reflect this, with a number of activities being brought forward compared with previously.

The previous costing for the external dump was based on dumping to Level 3. The current design for the dump is based on a fourth level on the dump, which extends the footprint of the dump to the south by some 76.6 Ha, however areas 15 and 16 are marginally reduced compared with previously (by 6.1 Ha and 3.5 Ha respectively).

Most of the internal dumping will be below the final inundation level of RL -10 m. Only the final (3rd) dump level will be above RL -10 m. As with the external dump, batter and top surface dozing will be carried out progressively and are assumed to be part of the dump operational costs. An allowance is included for 800 m³ of minor dozing per hectare to bring the dump areas to final shape.

2.5 Leached Ash Landfill

Leached ash landfill cells are located within Areas 16 and 18 in the external overburden dump (refer to Appendix A and Appendix B for location and description of these areas). These cells will require dozing of batters and clay capping to create a stable landform for rehabilitation. All major grading and clay capping is assumed to be part of the ash dumping operational costs. For rehabilitation, these areas will only require minor grading prior to topsoiling and grassing. The leachate collection underdrainage system will continue to operate after the completion of surface rehabilitation.

Groundwater monitoring for water quality in the vicinity of the leached ash fill areas will continue after final surface rehabilitation for some 5 years to ensure that the leached ash is stable and not affecting local groundwater quality.

2.6 Topsoil

Topsoil is removed annually ahead of the overburden removal operation. With progressive rehabilitation, topsoil will be carted directly to the rehabilitation works. Excess topsoil will be placed in stockpile for future rehabilitation works. A substantial quantity of topsoil will need to be stockpiled for rehabilitation works which will be undertaken following the completion of coal winning operations. Based on the projected rehabilitation development shown in this model, approximately 300,000 m³ of topsoil will need to be in stockpile at the completion of overburden removal in 2045. An allowance of $4.20/m³ has been made for placement of topsoil into stockpile which is a figure derived from experience at Loy Yang Mine. Excavation from stockpile for placement on rehabilitation areas is included in the topsoiling rate.

2.7 Raw Coal Bunker and Crushers

The demolition and rehabilitation of the Raw Coal Bunker (RCB) is a significant items in the rehabilitation of the Loy Yang Mine. Estimates for demolition and rehabilitation of the RCB have been drawn from

earlier work (Geo-Eng July 1996) with escalation factors applied (refer to Section 3). Demolition of the RCB is based on the recovery of all equipment prior to razing the concrete superstructure with explosives, covering the raft footing with a clay layer, then topsoiling and grassing. Further options for the demolition of or alternate uses for the RCB structure need to be investigated, with the potential to reduce the current estimate.

The original Bill of Quantities for construction of the Raw Coal Bunker (SECV specification 77/220, contract C12) provides the following quantities of concrete: 36,000 m^3 of 30 MPa concrete in raft footing, 18,500 m^3 of 45 MPa concrete in prestressed piers, and 11,000 m^3 of 30 Mpa concrete in remaining areas (shear walls, coal tables, over-run bay, etc). The above quantities do not include precast panels that line the bunker slots. Cordell (2011) provides a cost of $128/ m^3 for break up and disposal of concrete beams and columns. Based on the Cordell rate, and excluding the cost of removing the precast items, the cost of removing the RCB concrete superstructure would be some $3.8 million, which is consistent with the present allowance for demolition of the RCB. The demolished concrete is proposed for recycling as beaching material along the lake shoreline as described in Section 2.2 of this report.

Separate allowances are provided for demolition and removal of the crusher houses, RCB Drive Tower and ground slabs. Elevated conveyor galleries are included with the RCB Drive Tower and Crushers.

2.8 Mine Plant

All overburden removal and coal winning plant will be removed from the mine at the time of mine closure.

2.8.1 Bucket Wheel Excavators

The four bucket wheel excavators (BWEs) will be dismantled and removed from the mine. An allowance for the salvage value of the BWEs has been included in the costing.

2.8.2 Conveyors

All ground level and elevated conveyors and associated plant will be removed from the mine. An allowance for salvage value of the conveyors and associated plant and structures has been included in the costing. Presently there are some 30 km of conveyors, which will increase as the mine develops through Block 2 peaking at approximately 39 km. Thereafter, as the mine retreats through Block 3, the total conveyor length reduces to the point where at the completion of mining there is planned to be approximately 20 km of conveyors that will require removal.

2.8.3 Power Supply

Significant components of the mine power supply include:

- 1 substation (LYS) which includes 3 x 66 kV / 22 kV transformers;
- 22 kV aerial feeders around the perimeter of the mine at “grass level”, and down the mine batters;
- Power Distribution Centres (PDCs) at the ends of aerial feeders;
- Ground level cables between PDCs and plant (22 kV for BWEs, 6.6 kV for conveyors, and further

step down for aquifer and dirty water pump stations).

As with the conveyor system, the total length of aerial feeders will peak as the mine reaches the end of Block 2, and thereafter will progressively reduce as the mine develops into Block 3.

The salvage value of the aerial feeders and cable remaining in service at the end of mining is expected to be high, and this has been incorporated into the costing.

2.9 Fire Service Network

The majority of the fire service network will be removed at the completion of mining. A tanker filling point will be established on the Southern Batters for ongoing fire protection purposes. This point will be supplied from the fire service reservoir which will be retained in the long term.

2.10 Artesian Collection System

The artesian collection system will be progressively removed from the mine as it becomes redundant. Any remaining artesian collection system infrastructure on the mine floor at the time of closure will be removed to allow flooding of the base of the mine to commence. The remainder of the collection system will be removed after the lake has reached weight balance at RL -27 and the pumping bores are turned off. Refer to Section 2.13 and 2.14 for discussion monitoring of aquifer pressures during lake filling and after the pumping bores are turned off.

The observation network will be retained to monitor aquifer pressures as the lake is developed, and some of the observation network will be retained for the longer term to monitor the rebound in aquifer pressures after the lake has reached weight balance at RL -27 and the pumping bores are turned off.

2.11 Buildings and Infrastructure

Estimates for demolition of buildings have been drawn from earlier work (Geo-Eng July 1996) with an escalation factor applied. Buildings in the present Coal Production Complex and nearby Contractors Area as well as 2 areas in the former Construction Storage Area are planned to be retained for ongoing commercial or industrial use. Concrete slabs from demolished buildings and conveyors will be demolished and removed. Concrete rubble from these slabs can be used for shoreline areas requiring rock beaching.

Buildings to be demolished include the Crusher House Switchroom and Fuel Handling Workshop, both adjacent to the Raw Coal Bunker, as well as small buildings at each of 3 radio communications towers

2.12 Roads and Retained Infrastructure

Existing surfaced roads will be retained to provide access to the designated commercial/ industrial areas and other places within the rehabilitated site. Existing perimeter roads around the mine and the external overburden dump will also be retained to provide access to the rehabilitated areas.

2.13 Aquifer Depressurisation and Lake Development Post Mine Closure

To maintain safe conditions in the mine in the immediate period after the cessation of mining operations, depressurisation of aquifers will continue to be required until adequate weight balance is provided to counter uplift forces from aquifer pressures (pressures at the time of mine closure as well as ultimate rebounding pressures following the cessation of depressurisation). The weight balance will be provided by a combination of the internal dump and the flooding of the mine void to form a lake.

2.13.1 Lake Development

The Rehabilitation Master Plan for the mine provides various scenarios for filling of the lake, with the minimum estimated time for the lake to reach RL -27 m being some 11 years after coal winning ceases. This scenario is based on using the following sources of water for the 211 year period to flood the mine:

- full utilisation of Loy Yang Power's 40 Gl/year Bulk Entitlement under the Water Act,
- 15 Gl/year of groundwater extraction from the Traralgon Formation, and,
- flood flows from the Traralgon Creek,

RL -27 m is the lake level adopted for weight balance to be achieved, while the ultimate equilibrium level for the lake is approximately RL -10 m.

Other scenarios for lake filling that do not include the use of the Bulk Entitlement, or flood flows from Traralgon Creek, indicate at least 27 years to reach RL -27 m. In this rehabilitation costing, 15 Gl/year of groundwater extraction from the Traralgon Formation has been adopted for lake filling, requiring a period of 27 years of operation of 5 Traralgon Formation aquifer depressurisation pumping bores post mine closure, to maintain safe pressures until the lake level reaches RL -27 m.

For earlier closure scenarios, less water will be required to fill the lake due to the smaller void volume, and therefore the current liability is less than the ultimate liability for mine closure in 2048.

To assign a current liability for the cost of the lake development in any year up to the time of planned closure in 2048 (ie for the case of mine closure art any time prior to 2048), the lake volume and perimeter based on a surface level of RL -27 have been calculated based on the current mine, as well as for the ultimate development in 2048, and a simple straight-line interpolation applied for each year between now and 2048.

Based on the survey progress plan of 30 September 2011, the volume of water in a lake with surface level at RL -27 is 150 million m^3, while the lake perimeter at this level would be 9.7 km. This compares with a perimeter in 2048 of some 12 km and volume of 650 million m^3. On this basis the cost of shoreline treatment for closure now is some 81% of the cost of closure in 2048, while for lake filling it is only 23% of the 2048 cost, and this is reflected in the cost model.

2.13.2 Bore Sealing

All redundant bores are planned to be sealed prior to mine closure. This leaves the operational bores at mine closure as the only bores requiring sealing, after they have been shut down. All operational observation bores at the time of mine closure will be of the sealed type and include piezometers, and will

therefore not require sealing upon decommissioning.

Five M2C aquifer pumping bores, and five Traralgon aquifer pumping bores are assumed to be operating at the time of mine closure, and an allowance for sealing all of these bores is included in the cost model.

The M2C aquifer pumping bores are assumed to be required for xx years after mine closure, by which time the weight provided by the internal dump and developing lake will balance the uplift pressures (current and rebounding) in the M2C aquifer. These bores will be decommissioned and sealed at that time.

All five Traralgon aquifer pumping bores are assumed to operate until the lake reaches RL -27 some 27 years after mine closure. Although the rate of depressurisation could be reduced as the lake level rises, all five bores are assumed to operate at full capacity until this time, in order to minimise the time required for the lake to reach RL -27. All five pumping bores would then be decommissioned and sealed.

Up to ten observation bores are assumed to be maintained and monitored while the groundwater pumps are still operating during the lake filling stage. Up to five of these bores are assumed to be maintained and monitored after the groundwater pumps have been decommissioned, in order to monitor aquifer pressures in the region of the mine void in the longer term.

Allowances for sealing of pumping bores are $21,800 for each M2C aquifer bore and $40,000 for each Traralgon aquifer bore.

2.14 On-going Maintenance

After completion of coal winning operations, a number of mining support activities will need to continue until final rehabilitation activities have been undertaken or the water level in the remnant void has reached sufficient level. Activities include:

- Operation of groundwater bores until the water level in the remnant void has reached sufficient level to ensure stability of batters (as described in clause 2.13 above).
- Monitoring and analysis of information from groundwater and stability monitoring bores until batter and mine floor stability is achieved, as well as longer term monitoring of the rebound in aquifer pressures following the cessation of groundwater pumping.
- Monitoring of groundwater quality in the vicinity of ash landfill areas on the external overburden dump.
- Collection and pumping of leachate from ash dumps until leachate levels become insignificant.
- Collection and treatment of any acid mine drainage or seepage.
- Maintenance of drainage paths, shorelines, etc. on areas subject to ultimate inundation.

The spreadsheet for the rehabilitation cost model now extends to 2078, 30 years after the completion of coal winning activities, to allow for ongoing aquifer depressurisation during the lake filling period within the mine void, as well as groundwater monitoring for (i) pressures in the aquifers under the mine during the filling period, and (ii) quality in aquifer/s in the vicinity of the leached ash landfills in the overburden dump/s. It is assumed that most of the mine rehabilitation activities are completed within the first five

years after mine closure, with most of the maintenance activities occurring in the 4th and 5th years post closure. Prior to this time, these activities are assumed to be included in the mine operational costs.

2.15 Land Value

Parcels of land owned by Loy Yang Power, both within and external to its mining licence area that have not been disturbed by mining, could be divested following the achievement of various milestones in the development of the mine, with the values of these parcels being used to offset part of the present rehabilitation liability. This land is generally located around the periphery of the mining licence area, and can be classified as follows:

- Land available to be divested at any time (outside ML area; subject to ability to maintain land use restrictions, eg for fire protection);
- Land available to be divested after completion of external overburden dumping operations (2025);
- Land available to be divested in the vicinity of the proposed Traralgon Bypass (outside ML area; those parts of land parcels either side of the proposed road, not covered by the public acquisition overlay (PAO); it is suggested that this land not be divested until the road design is finalised and associated land acquisition requirements are determined, at which time land can be subdivided);
- Land available to be divested after cessation of mining operations (outside ML area);
- Land subject to Fernbank Development; and,
- Potential Development sites (Eastland).

A table identifying the parcels of land, and associated valuations, is provided in Appendix D. This table also indicates the zoning of the land under the Latrobe Planning Scheme (SUZ1 or FZ), and whether it is affected by the Public Acquisition Overlay for the future Princes Freeway Bypass of Traralgon, or the State Resource Overlay (in the case of land not zoned SUZ1).

Conservative values for each parcel of land have been adopted, based on recent sales data. Table 1 below provides a summary of the information in Appendix D.

Table 1 Possible Land Divestment Summary

Land Type	Within ML area	Area (Ha)	Value	Comments
Can be divested at any time	No	93	$1.5M	Land use restrictions would apply (fire protection)
Can be divested after completion of External Overburden Dump	Yes	161	$1.0M	Can be divested from 2025 onwards
Can be divested after design finalised and land acquisition requirements for Traralgon Bypass are confirmed	No	284	$10.2M	Dependent on timing of bypass; includes $2M for land directly affected by PAO, $6.9M for land north of PAO (ie Traralgon side), and $1.3M for land south of PAO (ie mine side)
Can be divested after cessation of mining operations	No	277	$2.8M	Can be divested from 2048 onwards
Subject to Fernbank Development	No	34	$0.1M	
	Yes	307	$1.9M	
Potential Development Sites (Eastland)	No	53	$0.4M	Within EL
	Yes	107	$0.6M	
Subtotal within ML		575	$3.5M	
Subtotal outside ML		741	$15.0M	
Total		**1316**	**$18.5M**	

3. Costing of Rehabilitation

3.1 General

For the purpose of this report, the mine has been divided into a number of areas based on timing of activities and rehabilitation treatments. These areas are shown on the plan included as Appendix A. Details of each area (name, size of area, current status, proposed mining activity, end use, rehabilitation requirements and timing) are included in Appendix B.

The "Remove Plant" item in the cost model (Area A22) includes the activities described in this report under Sections 2.8 (Mine Plant), 2.9 (Fire Service Network) and 2.10 (Artesian Collection System).

The cost of rehabilitation work is based on the estimated rehabilitation areas, the treatment of each rehabilitation area, the quantities estimated from proposed batter cross sections, and unit rates for the rehabilitation work.

The general treatment for the rehabilitation work is as outlined in Section 2 and the rates used for the majority of the rehabilitation works are provided in the cost model.

A worksheet has been developed for each area showing when the rehabilitation liability arises (typically as land is disturbed) and its value, as well as expenditure and schedule of rehabilitation works. The rehabilitation work is either undertaken as the mine develops (eg. progressive rehabilitation of worked out overburden batters), or at the end of coal winning activities.

A summary spreadsheet of the Whole of Life costs for each area is included in Appendix C. Graphs showing cumulative and annual rehabilitation expenditure for the Whole of Life, as well as "Current Liability" (in case of early closure) are also included in Appendix C.

3.2 Rates

Rates have been taken from the DPI "Rehabilitation Liability Calculator" unless actual experience in the Loy Yang Mine has shown different rates to apply. Estimates for demolition of buildings and structures from the report prepared by Geo-Eng in 1996 were escalated by a factor of 1.34 for the 2008 cost review (change in CPI since 1996), and have been escalated by a further 9% for this review (both factors sourced from ABS).

Some earthworks rates for this review have been sourced from information provided by RTL however most rates are based on the rates used in the 2008 review, escalated by 9% which is the change in CPI from June 2008 to June 2011. The "Rates" worksheet in the cost model shows those escalated from 2008 values, and those included as new values.

4. Summary

4.1 General

The total planned expenditure on rehabilitation of land covered by Loy Yang Power's mining licence from 2011 onward is some $61 million. However due to the approach adopted by Loy Yang Power to carry out progressive rehabilitation, the maximum liability at any point in time over the remaining life of the mine and beyond, is some $32 million, which occurs in 2011,

This liability reduces over the coal winning period of the mine life, with expenditure required following completion of coal winning of some $30 million.

The cash flow for rehabilitation work over the operational life of the mine averages approximately $800,000/year.

The rehabilitation activities over the mine life, and beyond, can be categorised into four areas as shown in Table 2.

Table 2 Rehabilitation Categories

Type of Rehabilitation	Total Liability $M	Current Liability (2011) $M	Max. Current Liability $M (year)	Remaining Liability at end of mining (2048) ~~-~~$M
Progressive land disturbance (routine mining activities) & rehabilitation	19.6	3.8	3.8 (2011)	1.2
External overburden dump	11.7	8.4	8.4 (2011)	0.2
Plant removal at end of mining	3.2	4.2	5.1 (2028)	3.2
Post mining rehabilitation activities (excluding removal of raw coal bunker, drive tower and crushers)	~~26.5~~15.3	~~15.8~~4.6	~~25.6~~14.4 (2047)	~~25.5~~14.3
Sub-total	**$49.9M**	**$21.0M**		**$18.8M**
Removal of raw coal bunker, drive tower and crushers	11.2	11.2	11.2 (2047)	11.2
Total	**$61.1M**	**$32.2M**		**$30.0M**

4.2 Funding of Rehabilitation Works

Each year Loy Yang Power carries out progressive rehabilitation of areas disturbed by mining, mainly trimming, topsoiling and seeding of overburden batters in the mine, as well as completed areas of the external overburden dump. These activities will continue throughout the life of the mine and external overburden dump, and will also be undertaken for the internal dump. These activities are undertaken

using recurrent annual budget provisions allocated for this task.

There will be a short term increase in land rehabilitation costs for several years around the mid 2020's associated with the end of the life of the external dump. Various options are available for the funding of these works including the divestment of land not required for mining (refer Section 2.15 above).

The maximum liability for plant removal occurs in 2028 when Block 2 has developed to its maximum easterly extent. After this time, the overburden system is in retreat through Block 3, and total operational conveyor lengths start to reduce. It is expected that the salvage value of mine plant at the end of the mine life will offset the $3.2 million provision for its removal. Table 3 below shows estimated values of various salvageable assets totalling some $6.2 million.

Table 3 Salvage / Asset Value

Item	Typical	Estimated Salvage Value $M
Electrical Equipment	Cubicles, cable, poles	0.6
Electrical Plant	Motors, drives, pumps	2.5
Mechanical Plant	Conveyors, bucket wheel excavators	0
Mechanical Structures	Conveyor galleries	0
Buildings	Offices	0.6
	Workshop (3 no.)	2.5
Total		**$6.2M**

Post mining rehabilitation works will peak in the years immediately after mine closure with demolition and removal of buildings and structures, including the raw coal bunker, then settle to a steady annual provision, mainly for the ongoing depressurisation of aquifers, and associated filling of the lake in the mine void. Any opportunity to supplement the filling of the lake will assist in reaching weight balance earlier, with a beneficial consequence being early cessation of aquifer depressurisation. The provision for these activities at the end of mining is $25.6 million, however the current liability (2011) is $15.8 million as the mine void is not developed to its ultimate size.

It is recommended that future reviews of the whole of life mine plan consider the placement of internal dump material to minimise the amount of water required to achieve post-mining weight balance against ultimate rebounded aquifer pressures.

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Appendix A

Plan of Mining Licence Area

Rehabilitation Areas (Drawing F197D053B)

Appendix B

Description of Rehabilitation Areas

AREA 1 – MINE OUTLET AREA

Area:	**33 Ha**
Current Status:	Site is occupied by outlet conveyors.
Proposed Mining Activity	Outlet area to be widened marginally for internal overburden conveyors.
Commitment to Rehabilitate	Current
End Use:	Area dozed, topsoiled and grassed
Rehabilitation:	Cannot be rehabilitated until after coal winning is completed and outlet conveyors removed.

AREA 2 – SOUTHERN BATTERS BLOCK 1

Area:	**92 Ha**
Current Status:	Worked out batters.
Proposed Mining Activity	No further mining activity.
Commitment to Rehabilitate	Current.
End Use:	Overburden batter to be dozed to 3 to 1 and grassed. Batters and benches between overburden batter and RL –10 to be planted with mixed species of native plants.
Rehabilitation:	Overburden batter cannot be rehabilitated until after 600 dewatering main is relocated. Rehabilitate overburden batter in stages from say 2014 to 2021. Plant remaining batters from 2015 to 2027.

AREA 3 - WESTERN BATTERS BLOCK 1 - OVERBURDEN

Area:	**52 Ha**
Current Status:	Worked out batters.
Proposed Mining Activity	No further mining activity.
Commitment to Rehabilitate	Current. Majority of the overburden batter has been dozed and grassed
End Use:	Overburden batter to be dozed to 3 to 1 and grassed. Batters and benches between overburden batter and RL –10 to be planted with mixed species native plants.
Rehabilitation:	Remnant overburden to be rehabilitated following completion of southern batters 2021 – 2022. Plant remaining batters from 2023 to 2028.

AREA 4 – NORTHERN BATTERS BLOCK 1

Area:	**91 Ha**
Current Status:	Excavation of the overburden batter is completed. Excavation of coal batter progressing. Coal benches provide access to conveyor tail ends.
Proposed Mining Activity	No further mining activity. Batters completed to below inundation level.
Commitment to Rehabilitate	Current. Overburden batter has been dozed and grassed.
End Use:	Overburden batter dozed to 3 to 1 and grassed. Batters and benches between overburden batter and RL –10 to be planted with mixed species native plants.
Rehabilitation:	Plant remaining batters from 2030 to 2035.

AREA 5A – NORTHERN BATTERS BLOCK 2 ABOVE RL -10

Area:	**123 Ha**
Current Status:	Excavation of overburden and coal batters only partly completed.
Proposed Mining Activity	Remaining batters to be excavated.
Commitment to Rehabilitate	Area currently committed to final rehabilitation is 4 Ha of overburden batters. Remaining area will be progressively created by 2028.
End Use:	Overburden batter dozed to 3 to 1 and grassed. Batters and benches between overburden batter and RL –10 to be planted with mixed species native plants.
Rehabilitation:	Overburden batter to be progressively rehabilitated by 2030, plant remaining batters from 2030 to 2045.

AREA 5B – NORTHERN BATTERS BLOCK 2 BELOW RL -10

Area:	**125 Ha**
Current Status:	No excavation
Proposed Mining Activity	Batters to be excavated
Commitment to Rehabilitate	No rehabilitation
End Use:	Inundation
Rehabilitation:	No rehabilitation

AREA 6A – EASTERN BATTERS BLOCK 2 ABOVE RL -10

Area:	**65 Ha**
Current Status:	No excavation
Proposed Mining Activity	Batters to be excavated.
Commitment to Rehabilitate	Batters to be excavated in 2028.
End Use:	Overburden batter dozed to 3 to 1 and grassed. Batters and benches between overburden batter and RL –10 to be planted with mixed species native plants.
Rehabilitation:	Overburden batter to be progressively rehabilitated from 2029 to 2035, plant remaining batters from 2040 to 2048.

AREA 6B – EASTERN BATTER BLOCK 2 BELOW RL -10

Area:	**46 Ha**
Current Status:	No excavation
Proposed Mining Activity	Batters to be excavated
Commitment to Rehabilitate	No rehabilitation
End Use:	Inundation
Rehabilitation:	No rehabilitation

AREA 7 – EASTERN BATTERS BLOCK 3

Area:	**93 Ha**
Current Status:	No excavation
Proposed Mining Activity	Batters to be excavated
Commitment to Rehabilitate	Nil at present; batters to be excavated from 2029 to 2036.
End Use:	Overburden batter dozed to 3 to 1 and grassed. Batters and benches between overburden batter and RL –10 to be planted with mixed species native plants.
Rehabilitation:	Overburden batter to be progressively rehabilitated from 2030 to 2037, plant remaining batters from 2048 – 2051).

AREA 8 – SOUTHERN BATTERS BLOCK 3

Area:	**100 Ha**
Current Status:	No excavation
Proposed Mining Activity	Batters to be excavated.
Commitment to Rehabilitate	Batters to be excavated in 2037 to 2045.
End Use:	Overburden batter dozed to 3 to 1 and grassed. Batters and benches between overburden batter and RL –10 to be planted with mixed species native plants.
Rehabilitation:	Overburden batter to be progressively rehabilitated from 2038 to 2047, plant remaining batters from 2049 to 2052.

AREA 9A – SOUTHERN BATTERS BLOCK 2 ABOVE RL -10

Area:	**-**
Current Status:	Part excavated
Proposed Mining Activity	Batters to be excavated when operations return through Block 3.
Commitment to Rehabilitate	Batters to be progressively excavated to 2028.
End Use:	Batters will be removed when Block 3 excavation progresses, 2029 to 2045
Rehabilitation:	Rehabilitation only required if mine closes before Block 3 completed. A commitment for rehabilitation of this batter is included in the cost model, until it is finally removed by Block 3 excavation in 2045.

AREA 9B – SOUTHERN BATTERS BLOCK 2 BELOW RL -10

Area:	**-**
Current Status:	Part excavated
Proposed Mining Activity	Batters to be excavated.
Commitment to Rehabilitate	Batters to be progressively excavated to 2028.
End Use:	Batters will be removed as Block 3 excavation progresses
Rehabilitation:	No rehabilitation (area to be inundated).

AREA 10 – INTERNAL OVERBURDEN DUMP

Area:	**498 Ha**
Current Status:	Floor of mine.
Proposed Mining Activity	Overburden to be dumped.
Commitment to Rehabilitate	Lower levels of dump are below RL-10. Final level of dump will be above RL-10 and require rehabilitation. Final level commences around 2033 and develops till end of coal winning in 2048.
End Use:	Area to be topsoiled and grassed.
Rehabilitation:	Progressively rehabilitated from 2037 to 2052.

AREA 11 – FLOOR AREA - BLOCK 2

Area:	**369 Ha**
Current Status:	Partly excavated.
Proposed Mining Activity	Excavated floor of mine.
Commitment to Rehabilitate	No commitment. Below RL-10
End Use:	Inundation
Rehabilitation:	No rehabilitation.

AREA 12 – FLOOR AREA - BLOCK 3

Area:	**466 Ha**
Current Status:	No mining commencement to date
Proposed Mining Activity	Excavated floor of mine.
Commitment to Rehabilitate	No commitment for areas below RL-10; interim stabilisation for areas above RL -10 (220 Ha)
End Use:	Inundation below RL -10
Rehabilitation:	No rehabilitation below RL -10, otherwise interim stabilisation from 2048 to 2051.

L100 FACE

Area:	**Variable**
Current Status:	2200 metres of moving face.
Proposed Mining Activity	Continued excavation.
Commitment to Rehabilitate	Continual commitment while L100 is developing. Rehabilitation only required if mine closes before Block 3 completed.
End Use:	Final L100 face will become part of Area 8, Southern Batters Block 3.
Rehabilitation:	Rehabilitation only required if mine closes before Block 3 completed. A commitment for rehabilitation of this face is included in the cost model, until L100 overburden removal operations are completed in 2045.

AREA 13 – EXTERNAL OVERBURDEN DUMP, WESTERN BATTERS LEVELS 1 AND 2

Area:	**94 Ha**
Current Status:	Rehabilitation completed
Proposed Mining Activity	No further activity.
Commitment to Rehabilitate	Nil
End Use:	Grassed
Rehabilitation:	Complete

AREA 14 – EXTERNAL OVERBURDEN DUMP, WESTERN BATTERS LEVEL 3

Area:	**99 Ha**
Current Status:	61 Ha grassed to date. Dump development continuing over remaining area.
Proposed Mining Activity	Overburden dumping to continue until 2014.
Commitment to Rehabilitate	Full area currently available.
End Use:	Area to be topsoiled and grassed.
Rehabilitation:	Continued rehabilitation to 2016.

AREA 15 – EXTERNAL OVERBURDEN DUMP, SOUTHERN BATTERS LEVEL 3

Area:	**66 Ha**
Current Status:	Dump development to continue over total area.
Proposed Mining Activity	Overburden dumping to be undertaken until 2023.
Commitment to Rehabilitate	Area will be expanded to 2018 as the development of the extended Level 4 is undertaken.
End Use:	Area to be topsoiled and grassed.
Rehabilitation:	Rehabilitation to be undertaken between 2013 and 2025,

AREA 15A – EXTERNAL OVERBURDEN DUMP, SOUTHERN FOOTPRINT EXTENSION LEVEL 4

Area:	**77 Ha**
Current Status:	Dump development to continue over total area.
Proposed Mining Activity	Overburden dumping to be undertaken until 2022.
Commitment to Rehabilitate	Area will be expanded to 2022 as the development of the extended Level 4 is undertaken. Topsoil will be removed prior to overburden dumping and used for other areas of dump rehabilitation.
End Use:	Area to be topsoiled and grassed.
Rehabilitation:	Rehabilitation to be undertaken between 2015 and 2024,

AREA 16 – EXTERNAL OVERBURDEN DUMP, NORTHERN & EASTERN BATTERS LEVEL 3

Area:	**104 Ha**
Current Status:	Dump development to continue over total area (includes ash dumps).
Proposed Mining Activity	Overburden dumping complete. Ash placement to be undertaken until at approximately 2020
Commitment to Rehabilitate	Full area currently available.
End Use:	Area to be topsoiled and grassed.
Rehabilitation:	Rehabilitation to be undertaken between 2014 and 2026, ongoing leachate collection and monitoring of groundwater quality.

AREA 17 – EXTERNAL OVERBURDEN DUMP FINISHED SURFACE - WEST

Area:	**83 Ha**
Current Status:	Dump development to continue over total area.
Proposed Mining Activity	Overburden dumping to continue until 2022.
Commitment to Rehabilitate	Full area currently available.
End Use:	Area to be topsoiled and grassed.
Rehabilitation:	Rehabilitation to be undertaken between 2013 and 2025,

AREA 18 – EXTERNAL OVERBURDEN DUMP FINISHED SURFACE - EAST

Area:	**117 Ha**
Current Status:	Dump development to continue over total area (includes ash dumps).
Proposed Mining Activity	Overburden dumping to continue until 2018.
Commitment to Rehabilitate	Full area currently committed.
End Use:	Area to be topsoiled and grassed.
Rehabilitation:	Rehabilitation to be undertaken between 2013 and 2025, ongoing leachate collection and monitoring of groundwater quality.

AREA 19 – DREDGER ERECTION SITE

Area:	**8 Ha**
Current Status:	Store yard
Proposed Mining Activity	Nil
Commitment to Rehabilitate	N/A
End Use:	Retain for use as industrial area.
Rehabilitation:	No rehabilitation

AREA 20 – REMOVAL OF RAW COAL BUNKER

Area:	**25 Ha**
Current Status:	Occupied by operating rising conveyors, raw coal bunker and crusher houses.
Proposed Mining Activity	Nil
Commitment to Rehabilitate	Full area currently committed.
End Use:	Area to be topsoiled and grassed.
Rehabilitation:	Structures to be demolished and area landscaped, topsoiled and grassed. Concrete slabs and footings for conveyors to be removed (except for RCB raft footing – covered with fill and rehabilitated).

AREA 21 – MINE PRODUCTION CENTRE

Area:	**51 Ha**
Current Status:	Occupied by mine production centre buildings, workshops and stores depots.
Proposed Mining Activity	Nil
Commitment to Rehabilitate	Current.
End Use:	Major buildings will be retained and used for commercial and industrial use. Some buildings may be demolished and associated area landscaped, topsoiled and grassed (10 Ha allowance).
Rehabilitation:	Rehabilitation after mining operations completed,

AREA 22 – REMOVAL OF PLANT

Area:	**-**
Current Status:	All mine plant operational.
Proposed Mining Activity	Continue operating to end of mine life.
Commitment to Rehabilitate	Current
End Use:	Plant to be scrapped (BWE's, stackers, conveyors, fire service pipes, power lines).
Rehabilitation:	Items to be removed from site after mine closure.

AREA 23 – REMOVE/SEAL BOREHOLES

Area:	**-**
Current Status:	Operational pumping and observation bores.
Proposed Mining Activity	Nil
Commitment to Rehabilitate	All redundant bores to be sealed by or shortly after completion of mining operations. Progressive sealing of old bores is currently undertaken as an operational activity – to continue as required.
End Use:	Some pumping and observation bores will be required to operate until water level in the mine void has reached a sufficient level to ensure mine stability; some observation bores may be required beyond this time for monitoring of aquifer pressures.
Rehabilitation:	Bores to be sealed by or shortly after completion of mining operations, except for those required for ongoing depressurisation until lake level reaches safe weight balance level.

AREA 24 – ONGOING MAINTENANCE

Area:	**-**
Current Status:	Various operational activities across the mining licence area.
Proposed Mining Activity	Nil
Commitment to Rehabilitate	These maintenance activities include collection and treatment of ash dump leachate, maintenance of drains and shorelines, monitoring and analysis of groundwater and stability bores, collection and treatment of AMD, and maint. of rehabilitated areas.
End Use:	Various.
Rehabilitation:	This item is an allowance for maintenance of rehabilitated areas.

AREA 25 – SHORELINE TREATMENT

Area:	**Approximately 12 km of ultimate shoreline at RL-10**
Current Status:	RL-10 level developed for Block 1 and portion of Block 2.
Proposed Mining Activity	Continued excavation to end of mining operation.
Commitment to Rehabilitate	Current although increasing over time as mine is developed and shoreline perimeter increases. Some 4 km of the ultimate shoreline to have shoreline treatment.
End Use:	Shoreline for stabilised mine flood level.
Rehabilitation:	Rock beaching and stabilisation of batter areas prone to erosion at the RL-10 shoreline after completion of mining operations.

AREA 26 – FIRE SERVICE RESERVOIR

Area:	**28 Ha**
Current Status:	Operational fire service water storage.
Proposed Mining Activity	Continued use to end of mining operations and beyond.
Commitment to Rehabilitate	N/A.
End Use:	Retain for use as fire water storage.
Rehabilitation:	Area above free surface level to be topsoiled and grassed..

AREA 26 – LAKE FILLING

Area:	
Current Status:	Partly mine void and partly future mining area.
Proposed Mining Activity	Continued use to end of mining operations.
Commitment to Rehabilitate	Current although increasing over time as mine is developed, and volume and surface area of proposed lake increases.
End Use:	Passive water storage; refer also to other tables for areas 5B, 6B, 9B, 11 & 12.
Rehabilitation:	After completion of mining operations: ongoing depressurisation of aquifers to maintain mine void floor stability and source of water for lake filling

AREA 39 – SOUTHERN BATTERS - BLOCK 2 - GRASS LEVEL

Area:	**35 Ha-**
Current Status:	Part excavated
Proposed Mining Activity	Batters to be progressively excavated to 2028.
Commitment to Rehabilitate	Current – interim rehabilitation at Grass Level
End Use:	Batters will be removed as Block 3 excavation progresses
Rehabilitation:	Interim rehabilitation.

Appendix C

Cost Model Summary

Summary Cost Table

Graphs:

- Cumulative Expenditure
- Annual Expenditure
- Current Liability

Appendix D

Parcels of Undisturbed Land

Figure 1 - Plan of Land Parcels with Aerial Photo Background

Table of Land Parcels

This *Mine Rehabilitation Whole of Life Cost Report – 2011 Update* (Report) has been prepared by GHD Pty Ltd (GHD) for Loy Yang Power Management Pty Ltd (Loy Yang Power) under Loy Yang Power Order No 20010030 "Provision of Mine Planning, Earth Sciences and Associated Services", and associated Modifications as at the date of this Report (the Contract). The Contract, and relevant sections in this report, provide a list of the information relied upon in preparing this report, and any limitations/ assumptions made. This report may only be used/relied upon by Loy Yang Power.

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