

ENVIRONMENTAL ASSESSMENT REPORT

South Hercules Mine

Mt Hamilton

Minerals and Metals Group (MMG) Rosebery

Report and recommendations of the
EPA Division
Department of Primary Industries, Parks, Water and
Environment

to the Board of the Environment Protection Authority
February 2010



Environmental Assessment Report	
Proponent	Minerals and Metals Group (MMG) Rosebery
Proposal	South Hercules Mine
Location	Mt Hamilton, south of Rosebery
NELMS no.	7922
DA number	Planning Application 116/2009
File	110951
Document	G:\EEO_Enviro_Ops\EAS_Assessments\EAS_Projects\Zinifex South Hercules Mine\Assessment Report\EAR_SouthHerchs.docx
Class of Assessment	2B

Assessment process milestones	
13 June 2008	Notice of Intent submitted
22 July 2008	DPEMP Guidelines issued
1 December 2009	Permit application received by Board
5 December 2009	Start of public consultation period
10 January 2010	End of public consultation period

Acronyms

2WD	Two Wheel Drive
AgLime	Agricultural Lime (predominantly Calcium Carbonate)
AMD	Acidic and Metalliferous Drainage
AWD	All Wheel Drive
Board	Board of the Environment Protection Authority
DIER	Department of Infrastructure, Energy and Resources
DPEMP	Development Proposal and Environmental Management Plan
DPIPWE	Department of Primary Industries, Parks, Water and Environment
EIA	Environmental impact assessment
EMPC Act	<i>Environmental Management and Pollution Control Act 1994</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
ETP	Effluent Treatment Plant
GCL	Geosynthetic Clay Liner
LUPA Act	<i>Land Use Planning and Approvals Act 1993</i>
MMG	MMG AUSTRALIA LIMITED ACN 004 074 962
MRT	Mineral Resources Tasmania (a Division of DIER)
NAF	Non Acid Forming
NAG	Net Acid Generating (defined in permit conditions)
NAPP	Net Acid Producing Potential (defined in permit conditions)
PAF	Potentially acid forming (includes material of Uncertain classification)
RKF	<i>Athrotaxis selaginoides-Nothofagus gunnii</i> short rainforest
SD	Sustainable development
SPWQM	State Policy on Water Quality Management 1997
WRD	Waste Rock Dump

Report summary

This report contains an environmental assessment and recommendations to the Director, Environment Protection Authority in relation to Minerals and Metals Group (MMG)'s proposed South Hercules Mine project.

The proposal involves the upgrade and construction of tracks to access the South Hercules sulphide mineral deposit which will initially be accessed via a small open cut mine pit. The proposal includes construction and operation of an effluent treatment plant, followed by decommissioning and rehabilitation of the site. If the ore proves satisfactory for processing at Rosebery, further mine phases including an expanded open cut mine and underground mining may ensue.

This report has been prepared by the EPA Division of the Department of Primary Industries, Parks, Water and Environment based on information provided by the proponent in the Development Proposal and Environmental Management Plan (DPEMP). The advice of relevant Government Agencies and the public has also been sought and considered as part of this assessment.

Background to the proposal and details of the assessment process are presented in Section 1 of this report. Section 2 describes the context of this assessment. Details of the proposal are contained in Section 3. Section 4 reviews the need for the proposal and considers the project, site and design alternatives. Section 5 summarises the public and Agency consultation process and the key issues raised in that process. The detailed evaluation of key issues is contained in Section 6. Section 7 identifies other environmental issues and the report conclusions are contained in Section 8.

Appendix 1 contains a tabular evaluation of other environmental issues referred to in Section 7. Appendix 2 contains recommended environmental permit conditions for the proposal. Attachment 2 of the recommended permit conditions contains the table of commitments from the DPEMP.

Recommendations

It is recommended that the Director, Environment Protection Authority under delegation from the Board of the Environment Protection Authority:

1. Consider the Division's evaluation of environmental issues associated with the proposal in Section 6 and Section 7 of this report
2. Note that the evaluation has concluded that the proposal is capable of being managed in an environmentally acceptable manner such that it is unlikely that the RMPS and EMPCS objectives would be compromised, provided that the recommendations made in this report are satisfactorily implemented. These recommendations include the implementation of the commitments made by the proponent in the DPEMP and DPEMP Supplement.
3. Approve the proposal subject to the conditions attached to this report.
4. In accordance with s.25(5)(a)(i) of the EMPC Act, notify West Coast Council that the conditions and restrictions detailed in Appendix 2 (recommended permit conditions) must be contained in a permit granted by the planning authority under the LUPA Act in respect of the proposal, if a permit is to be granted.
5. In accordance with s.25(5)(a)(ii) of the EMPC Act, provide Council with a copy of this report to outline the reasons for the conditions and restrictions.

Report approval

Prepared by:



Darryl Cook
Section Head, Assessments Section

Date: 11/2/2010

Reviewed by:



Clare Lond-Caulk
Environmental Officer (Assessments)

Date: 11/2/2010



John Langenberg
Regulatory Officer, Industrial Activities Section

Date: 11/2/2010

Recommendations accepted:



John Mollison
Acting Director, Environment Protection Authority
Under delegation from the Board of the Environment Protection Authority

Date: 12 FEB 2010

Table of Contents

1	Approvals process	1
2	SD objectives and EIA principles	2
3	The proposal	3
4	Need for proposal and alternatives	8
5	Public and agency consultation	9
6	Evaluation of key issues	10
6.1	Acidic and Metalliferous Drainage (AMD)	10
6.2	Nature conservation values	14
6.3	Potential impacts upon cultural heritage values	16
6.4	Mine Closure and Rehabilitation	17
7	Other environmental issues	19
8	Conclusions	20
9	References	21
10	Summary of appendices	22
Appendix 1	Assessment of other environmental issues	23
Appendix 2	Proposed permit conditions	27

1 Approvals process

An application for a permit under the *Land Use Planning and Approvals Act 1993* (LUPA Act) in relation to the proposal was submitted to West Coast Council on 1 December 2009.

The proposal is defined as a 'level 2 activity' under Schedule 2 Subsection 5(c) of the *Environmental Management and Pollution Control Act 1994* (EMPC Act), being a mine. Section 25(1) of the EMPC Act required Council to refer the application to the Board of the Environment Protection Authority (the Board) for assessment under the Act. The application was received by the Board on 1 December 2009.

The assessment has been undertaken by the Director, Environment Protection Authority under delegation from the Board.

The Board required that additional information to support the proposal be provided in the form of a Development Proposal and Environmental Management Plan (DPEMP) prepared in accordance with guidelines jointly issued by the Board and West Coast Council. The guidelines were issued to the proponent on 22 July 2008.

A draft of the DPEMP was submitted to the EPA Division for comment prior to its formal submission. A final DPEMP was submitted to Council with the permit application. The DPEMP was released for public inspection for a 28-day period commencing on 5 December 2009. Advertisements were placed in the Advocate newspaper and on the EPA web site. The DPEMP was also referred at this time to relevant government agencies for comment. Two public submissions were received.

2 SD objectives and EIA principles

The proposal must be considered by the Director in the context of the sustainable development objectives of the Resource Management and Planning System of Tasmania (RMPS), and in the context of the objectives of the Environmental Management and Pollution Control System (EMPCS) established by the EMPC Act. The functions of the Board are to administer and enforce the provisions of the Act, and in particular to use its best endeavours to protect the environment of Tasmania, and to further the RMPS and EMPCS objectives.

The Director must undertake the assessment of the proposal in accordance with the Environmental Impact Assessment Principles defined in Section 74 of the EMPC Act.

3 The proposal

The main characteristics of the proposal are summarised in Table 1. A detailed description of the proposal is provided in Section 2 of the DPEMP.

Table 1: Summary of key proposal characteristics

Activity	
<p>Subject to the outcome of large scale metallurgical testing of the South Hercules ore, the proposal may not proceed beyond Phase 1 as described below, in which case decommissioning and rehabilitation will be undertaken as per the DPEMP.</p> <p>West Coast Council has advised that any future mining phases may not require a further development application, hence this assessment report considers the possibility that mining of up to 150,000 tonnes of mineral ore per annum may proceed.</p>	
Location and planning context	
Location	Located in the vicinity of Mt Hamilton and Mt Read in western Tasmania, approximately 7 km south of the Rosebery township.
Land zoning	Natural Resources Zone, West Coast Planning Scheme
Land tenure	State forest
Mining lease	28M/1993 (this large mining lease covers the Rosebery mine and surrounding areas)
Mine Phases	<p>Phase 1, the initial proposal is to:</p> <ol style="list-style-type: none"> 1. Repair and upgrade Mt Read road for 2WD trucks by installing passing bays and safety ramps and by sealing steeper sections and slashing roadside vegetation. 2. Construct a lined ore transfer pad (20m x 20m) and associated drainage system adjacent to the Mt Read road and create a single lane track for AWD trucks to the South Hercules deposit (approximately 1km of new construction including Ring River crossing). 3. Extract 18,000 tonnes of high-grade ore through open cut mining (45m x 30m in plan area) for transport to the Rosebery mill. Establish a pit for extraction of construction materials in NAF material within the footprint of Phase 2. Install and operate an effluent treatment plant to neutralise AMD from the mine pit. <p>Phase 2, if it proceeds, would involve expansion of the open cut to approximately 2 ha in area and 45m in depth. Waste rock dumps would need to be established for storage of up to 1.1m tonnes of waste rock. A decline, ventilation shafts and power supply would also be established in preparation for Phase 3 mining. A larger effluent treatment plant would be required and synergies for remediation of the old Hercules mine would be explored and implemented.</p> <p>Phase 3 would involve underground production mining.</p> <p>Phase 4 is mine closure</p>
Bond	Currently a \$12.1m bank guarantee is in place for the broader Rosebery Mining Lease, this to be reviewed by MRT in the light of the South Hercules proposal.

Existing site	
Land Use	<p>Most of the area covered by the proposal has been disturbed historically by mining and related activities associated with the century-old Hercules Mine. Wildfires in the 1890s and 1980s have also caused significant disturbance to vegetation in the area.</p> <p>The area is not readily accessible to the public. Mt Read Road is periodically utilised by authorised persons for access to communications/weather equipment and to nature reserves located to the south and east of the proposal.</p>
Topography	<p>The proposed mine is located in a mountainous area at an elevation of about 950m. The area is drained by steeply incised valleys draining to the Pieman river (the watershed boundary of the Henty River is nearby).</p>
Geology	<p>The complex geology of the site is summarised as a zinc-rich volcanic hosted massive sulphide deposit within the Cambrian Mt Read Volcanics.</p>
Local region	
Climate	<p>The proposal site is located in a very high rainfall area (average rainfall exceeds 3,500 mm <i>pa</i>) and is highly exposed to the prevailing westerly winds “Roaring Forties”. Mean daily maximum temperatures range from 4°C in winter to 14°C in summer.</p>
Surrounding land and uses	<p>The area is remote and the only vehicular access is via locked gates. Some ecotourism occurs in relation to nearby nature reserves.</p> <p>The nearby Hercules Mine is no longer operational, but is subject to monitoring and rehabilitation activities from time to time. The nearby township of Williamsford may in future be subject of some minor residential development. The walking track to Montezuma Falls commences near Williamsford.</p> <p>The Murchison Highway, a section of which will be used for transport of ore from the proposal, is a major West Coast transport route for industry, tourist and local traffic.</p>
Species of conservation significance	<p>The following threatened flora are present within the proposed footprint of the activity:</p> <p style="padding-left: 40px;"><i>Orites milliganii</i> (Toothed orites)</p> <p style="padding-left: 40px;"><i>Planocarpa sulcata</i> (Grooved cheeseberry)</p> <p>One threatened vegetation community is also present in the vicinity of the proposal:</p> <p style="padding-left: 40px;"><i>Athrotaxis selaginoides</i>-<i>Nothofagus gunni</i> short rainforest</p>
Proposed infrastructure	
Major equipment	<p>Earthmoving equipment for excavation. Haulage vehicles will include both All Wheel Drive (AWD) trucks to transport ore to the ore transfer pad and 2WD trucks for transport of ore to the Rosebery mill.</p>
Other infrastructure	<p>A two-stage effluent treatment plant to neutralise AMD and collect resultant metal hydroxide precipitates prior to discharge of treated effluent.</p>
Inputs	
Energy	<p>Portable 15 kva generators will be required to supply power for crib rooms and pumps for Phase 1 mining. Power for subsequent phases will require extension of the transmission line from level 7 of the old Hercules Mine.</p> <p>Diesel fuel for earthmoving equipment and haul trucks.</p>
Wastes and emissions	
Liquid	<p>Potential AMD from open cut pits, waste rock dumps and underground workings.</p>
Atmospheric	<p>Dust, engine exhaust.</p>
Solid	<p>General refuse, waste rock.</p> <p>Portable toilets will be used during operations.</p>

Noise	From earthmoving equipment, haulage trucks and blasting.
Greenhouse gases	<p>Greenhouse gases will be emitted during the construction process from vegetation clearance and machinery operations.</p> <p>The most significant greenhouse emissions from the project are likely to arise from mining and particularly the haulage of ore to Rosebery.</p> <p>The DPEMP considers the greenhouse gas emissions of Phase 1 to be relatively minor and of short duration. Machinery will be appropriately maintained to minimise such emissions.</p>
Commissioning and operations	
Project timetable	MMG hopes to commence and conclude Phase 1 mining during the summer/autumn of 2009/10. Phase 2/3 would involve up to 3-4 additional years of mining.

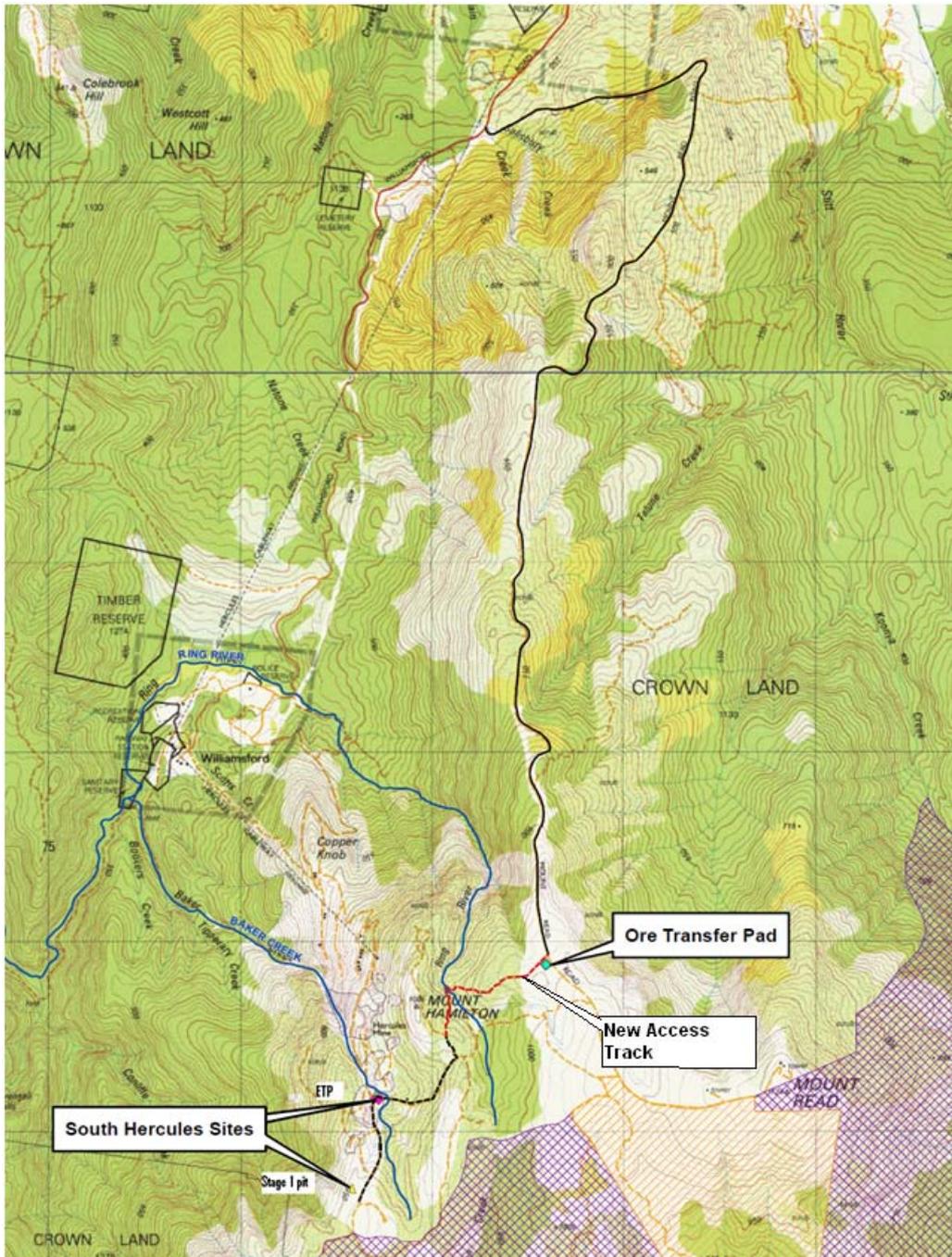


Figure 1: General site plan (Figure 2 of the DPMP)

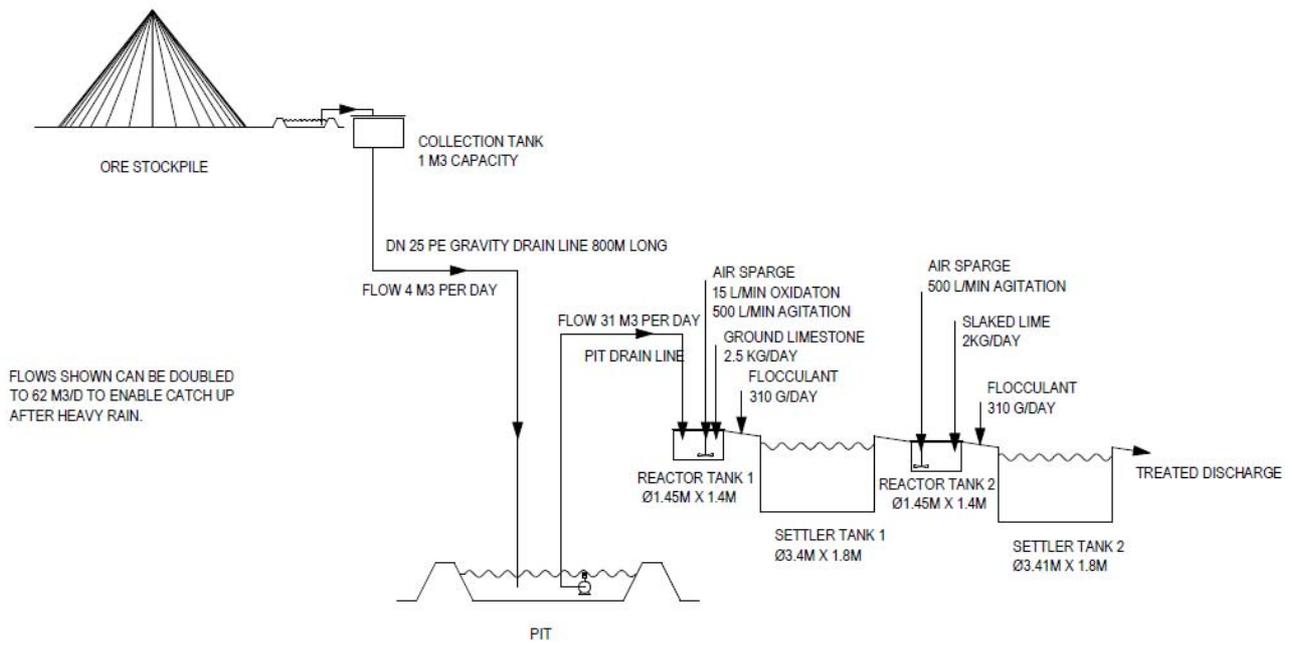


Figure 2: Effluent treatment process overview (Figure 6 of the DPMP).

4 Need for proposal and alternatives

The South Hercules mine proposal is initially to improve access in order to conduct bulk metallurgical testing of the South Hercules ore at the Rosebery mill. Such testing is necessary to determine whether processing of the ore is feasible, if not the project will not proceed further and mine closure plans will be implemented.

Section 2.3 of the DPEMP discusses mine closure alternatives for the pit, such as clay capping or full water cover. Clay available on site is not considered suitable for construction of a clay cap and a full water cover would require construction of a substantial dam wall that would have long term maintenance requirements. A combination of partial water cover and imported geosynthetic clay liner is therefore adopted.

Alternatives for treatment of the mine effluent are also discussed in Section 2.3 of the DPEMP. Construction of a single effluent treatment plant on disturbed ground adjacent to the mine pit with a drainage system to collect and convey drainage from the ore transfer pad under gravity is considered preferable.

Should the proposal proceed to Phases 2/3, Section 2.4.5 of the DPEMP states that MMG will investigate synergies between the South Hercules operation and decommissioning and rehabilitation of the historic Hercules Mine. In particular, the DPEMP mentions the potential to treat South Hercules and Hercules mine water concurrently and the potential to use NAF material from South Hercules for remediation earthworks at the Hercules mine.

5 Public and agency consultation

Two public representations were received. The main issues raised in the representations included:

- Queried whether the proposal would be likely to impact a proposed residence at Williamsford
- Expressed concern that the proposal may disturb the peace and quiet of Williamsford (noise, dust) and that the mine may not be properly rehabilitated at the close of mining.

The DPEMP was referred to a number of government agencies/bodies with an interest in the proposal. Responses were received from the following:

- Department of Infrastructure, Energy and Resources; and
- Forestry Tasmania.

The following Divisions/Areas of the Department of Primary Industries, Parks, Water and Environment also provided submissions on the DPEMP:

- Aboriginal Heritage Tasmania;
- Resource Management and Conservation Division; and
- Scientific Officer (Water), EPA Division;

6 Evaluation of key issues

The key environmental issues relevant to the proposal that were identified for detailed evaluation in this report were:

- Prevent and mitigate the formation of acidic and metalliferous drainage (AMD);
- Potential impacts upon nature conservation values;
- Protection of cultural heritage values; and
- Mine closure and rehabilitation

These issues are discussed individually in the following Sections.

6.1 Acidic and Metalliferous Drainage (AMD)

Description

Sulphide minerals from underground begin to oxidise when exposed to atmospheric oxygen in the presence of water, resulting in the formation of sulphuric acid. Metals present in the minerals readily dissolve in acidic conditions and may then be transported into the downstream environment. Dissolved metals can have significant deleterious impacts upon aquatic ecosystems at low concentrations.

The environment downstream of the South Hercules deposit has been severely impacted by more than a century of mining at the Hercules Mine, together with various other small, historic mines in the Ring River catchment. When compared to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ, 2000) existing water quality downstream of the proposal is shown to exceed guidelines values for protection of 80% of aquatic species and guidelines for recreational water quality and aesthetics by factors of greater than one thousand in some cases and consistently by factors of 10 or more. Section 3.2.6 of the DPMP provides a summary of available downstream water quality data.

Control of AMD can be achieved through careful identification and management of potentially acid forming (PAF) rock types to minimise their contact with oxygen, along with treatment of any residual AMD to remove toxic metals prior to discharge.

The Phase 1 Open Cut will be excavated almost entirely within recoverable ore and will therefore generate no waste rock that may contribute to acid formation. Soil scraped off the surface of the deposit is expected to be non-acid forming (NAF).

The final walls of the Phase 1 pit will contain PAF material which may generate acidic seepage to the mine pit.

Section 4.5.1 of the DPMP states that the South Hercules ore is potentially acid forming with a relatively short reaction time and little neutralising capacity. Section 2.1.3 of the DPMP proposes that the ore transfer pad will be lined and bunded with all drainage reporting to the mine pit via a storage tank and pipe system adjacent to the proposed AWD access track.

A two-stage effluent treatment plant is proposed in Section 2.1.5 of the DPMP to neutralise all water discharged from the pit and to collect the resultant metal hydroxide precipitates prior to release of the water to Bakers Creek.

Should Phase 2 (and beyond) proceed, it will introduce a number of additional complexities in relation to AMD, such as a larger and deeper mine pit, waste rock dumps, underground workings, interaction with Hercules remediation and a larger effluent treatment plant. Detailed planning for these matters has not yet been undertaken

Management measures

Phase 1

The DPEMP lists the following relevant commitments:

1. Three samples will be taken from the surface area of the Open Cut for NAG and NAPP testing prior to excavation to confirm material is NAF.
2. All material excavated from the Open Cut will be taken off-site for processing.
3. Laboratory testing, of initial inflows and treated effluent, will be carried out during operation to confirm the efficacy of the system and make minor modifications if required.
4. ETP discharge will be shut off if pH falls below the design level of 8.5.
5. An ETP Operations Register will be developed and require daily signoff.
6. Three samples will be taken from the borrow pit for NAG and NAPP testing prior to excavation to confirm material is NAF.
7. A 10 tonne stockpile of AgLime will be maintained onsite during operation to neutralise PAF material in case of emergency.

Phases 2 and 3

Section 2.4.6 of the DPEMP lists the following environmental safeguards:

1. If Phase 2 proceeds, WRD's will be designed to capture and contain all acid drainage for treatment.
4. Potentially contaminated water from Phases 2 and 3 would be directed to an ETP for treatment to a level deemed appropriate by the EPA in accordance with the *State Policy on Water Quality Management*.
6. If Phase 2 proceeds, an AMD Management Plan will be prepared and submitted to the EPA for approval prior to proceeding.
7. If Phase 2 proceeds, MMG, in consultation with the Director, EPA, will investigate synergies between the operations, decommissioning and rehabilitation of the South Hercules Mine and the remediation of historical disturbance and pollution associated with Hercules Mine.

Submissions

Comment from the Scientific Officer (Water) is summarised below.

Evaluation

Phase 1

Locating the construction materials borrow pit within in the Phase 2 pit footprint is supported, subject to **Commitment 6**.

The DPEMP indicates that Phase 1 construction and mining is to be completed within a period of approximately 3 months. This is generally considered a very short period of time for development of substantial AMD conditions. The proposed two-stage effluent treatment plant is therefore considered adequate to neutralise any AMD generated during Phase 1.

Neutralisation of acid alone will not achieve the desired environmental protection. It is most important that metal hydroxide precipitates are collected and retained, otherwise they will simply redissolve in the acidic conditions known to exist downstream of the South Hercules site.

The first stage of effluent treatment involving addition of ground limestone along with aeration and addition of flocculant, coupled with a second stage involving addition of slaked lime (Ca(OH)₂) and

further settling, is considered to represent best practice for the treatment of unavoidable AMD, providing that a pH of 8.5 is achieved and residence time is sufficient to allow settling of all precipitates. The Scientific Officer (Water) recommended inclusion of a limit on discharge of total suspended solids (**Conditions E2 and E3**).

The Scientific Officer (Water) notes that it may take some experimentation in order to achieve the correct settings for the effluent treatment plant. This may be difficult during such a short period of operations, however the knowledge gained may prove invaluable for future treatment of AMD.

Based on a worst case scenario of South Hercules pit water exhibiting similar AMD conditions to the severely polluted waters discharged from the Hercules Mine via Williamsford, the discharge from the effluent treatment plant is predicted to meet the ANZECC and ARMCANZ 2000 guidelines for protection of 80% of freshwater aquatic species with the exception of Copper, Manganese and Zinc.

Given the highly degraded nature of the downstream environment and the low likelihood of severe AMD conditions occurring during the short Phase 1 period, the proposal satisfies the *State Policy on Water Quality Management (SPWQM)* in relation to protected environmental values.

The degraded nature of the receiving environment should not be regarded as an excuse for introducing new sources of pollution. Furthermore, Section 37.2 of the SPWQM requires that proposals to rework old mines include actions to reduce the effects of AMD. The additional alkalinity introduced to Bakers Creek via the effluent treatment plant may provide some environmental benefit, however this is likely to be overwhelmed by AMD from the Hercules Mine.

The GCL lined and bunded ore transfer pad (including a layer of AgLime to provide buffering capacity) together with a gravity fed pipe network to convey runoff to the effluent treatment plant is considered sufficient to protect the relatively pristine upper Ring River from inadvertent release of AMD. Regular inspection and maintenance of this system will be necessary (**Condition E2**).

Based on 100 years of rainfall data, the effluent treatment plant will be sized to treat an average flow of 31 m³/day from the mine pit, ore transfer pad and groundwater seepages. A maximum short term load of 62 m³/day is provided for. Any extreme rainfall events in excess of this amount can be accommodated by storage within the mine pit, allowing delayed treatment.

Phase 2/3

The DPEMP notes that further detailed design work will be required following a decision to proceed beyond Phase 1. Subject to such design work and the submission of appropriate management plans (**Condition E6**), the conceptual plan for phases 2/3 presented in Section 2.4 is considered adequate to ensure prevention and treatment of AMD.

In view of Section 37.2 of the SPWQM it is considered most important that MMG, having inherited responsibility for the historic Hercules Mine via a long chain of linked companies, exploits opportunities to improve downstream water quality and promote recovery of degraded aquatic ecosystems. Should South Hercules proceed beyond Phase 1, it creates the potential to increase pollutant loads on an ongoing basis in an already burdened system (even after taking into account best practice treatment and prevention of AMD). Concurrent efforts to reduce historic pollution are therefore considered necessary.

Potential synergies between operation of the South Hercules Mine and decommissioning/rehabilitation of the Hercules Mine listed in Section 2.4.5 of the DPEMP that should be diligently explored include:

1. The establishment of a ETP that treats South Hercules water as well as the Hercules AMD currently passing through the Williamsford settling ponds; and
2. The use of NAF or acid neutralising waste rock from South Hercules to backfill or plug Hercules adits and flood underground adits.

It is recommended that MMG be required to explore and detail such matters in an AMD Management Plan (**Condition E6**).

Ongoing monitoring of the activity is recommended from the outset, to document baseline condition of both surface and groundwaters and to ensure that any changes are detected early (**Conditions M1, M2, M3, M4 M5**)

Recommendations

The following standard (generic) conditions are recommended for inclusion in the permit:

- E1** Perimeter drains
- E5** Design and maintenance of settling ponds
- G1** Compliance with EMPCA and the DPEMP.
- M2** Samples to be analysed at NATA laboratories
- M3** Groundwater bores
- M4** Signage of monitoring points
- G2** Access to and awareness of conditions and associated documents
- G3** Incident response
- G4** No changes without approval
- G5** Change of responsibility
- G6** Change of ownership
- G8** Complaints register
- G9** Availability of the EMP
- G10** Annual Environmental review

The following site-specific conditions are recommended for inclusion in the permit:

- G7** Compliance with the commitments and environmental safeguards outlined in the DPEMP
- G11** Phase 2 must not commence without approval
- E2** Collection and treatment of water
- E3** Effluent quality limits for discharge
- E4** Stormwater management
- E6** AMD Management Plan
- M1** Monitoring requirements as specified in a table
- M5** Maintenance of monitoring equipment

6.2 Nature conservation values

Description

Construction works associated with access roads, the mine pit and associated infrastructure have the potential to destroy important natural values, such as rare flora, fauna and geomorphologic values. The South Hercules deposit is situated in an alpine area and has clearly been subject to significant historical disturbance.

Detailed studies of flora, fauna and geoconservation values are provided as appendices to the DPEMP.

Of the 15 vegetation communities identified in the vicinity of the proposal, one is listed as threatened under the *Nature Conservation Act 2002*, being *Athrotaxis selaginoides-Nothofagus gunnii* short rainforest.

Two threatened alpine plant species were located within the proposal area, *Planocarpa sulcata* (grooved cheeseberry) and *Orites milliganii* (toothed orites). Both of these species are listed as Rare under the Tasmanian *Threatened Species Protection Act 1995*. The DPEMP acknowledges that, after careful planning to avoid these species where possible, up to 401 individuals of *Planocarpa sulcata* and 167 *Orites milliganii* will be impacted by Phase 1 of the proposal. Section 2.4.4 of the DPEMP identifies that an additional 31 individuals of *Planocarpa sulcata* will be impacted by phases 2/3.

The proposal site lies within three broad geoconservation areas; Western Tasmanian Blanket Bogs, Central Highlands Cainozoic Glacial Area and the Rosebery-Hercules Alteration Mineralisation.

Management measures

Stronghold areas of *Planocarpa sulcata* and *Orites milliganii* totalling 400 and over 700 individuals respectively have been identified in the area and will be avoided during mining and associated works.

Rather than upgrade existing tracks through an area of *Athrotaxis selaginoides-Nothofagus gunnii* short rainforest (RKF), the DPEMP proposes construction of a new AWD access road (refer to Figure 1) through non-threatened vegetation types.

Appendix E of the DPEMP acknowledges that an application for a 'Permit to Take Native Flora' will need to be submitted to DPIPWE in accordance with threatened species legislation, prior to destruction of any listed flora.

Submissions

A submission from the Resource Management and Conservation Branch of DPIPWE (RMC) noted that there will be impacts to the above named species. RMC supports the recommendations in Appendix E of the DPEMP aimed at minimising these impacts, including that a bridge be built over a small creek (the upper Ring River) surrounded by RKF, rather than a culvert, in order to minimise the impacts to the threatened vegetation community that grows along the creek.

The impacts are considered significant, in particular the number of *Planocarpa sulcata* individuals to be taken. A 'permit to take' will be required.

Evaluation

A short distance downstream of the South Hercules site, the downstream environment is known to be severely contaminated by AMD from the historic Hercules Mine. Aquatic ecosystems have been shown to be depauperate for a considerable distance downstream of the Hercules Mine and are therefore unlikely to be impacted by the proposal.

Appendix C of the DPEMP finds that there are unlikely to be any impacts upon geoconservation areas, due to the absence of such features within the proposal area, or in the case of the Rosebery – Hercules Alteration Mineralisation, the proposal may prove beneficial by exposing cuttings in a manner that may prove useful for education purposes. RMC concur that significant impacts are not anticipated.

The proposal area may provide habitat for certain rare fauna species as described in Appendix E of the DPEMP. The likelihood of impacts is considered very small due to the minimal area of disturbance, the general absence of trees with large hollows within the area to be disturbed and the lack of known records of significant species (such as eagle nests).

The DPEMP does not adopt the recommendation in Appendix E regarding construction of a bridge rather than a culvert over the upper Ring River due to cost. It is accepted that the difference between the impact of a culvert versus a bridge may be relatively small.

Further discussions with DPIPWE indicated that no further information was required from the proponent. Disturbance should be limited to that which is absolutely necessary.

It is recommended that the operation be carried out generally in accordance with the DPEMP. The DPEMP does not list specific commitments in relation to nature conservation values, hence a site-specific condition is recommended (**Condition FF3**).

Recommendations

The following site-specific conditions are recommended for inclusion in the permit:

FF3 Protection of flora species and communities

6.3 Potential impacts upon cultural heritage values

Description

Open cut mining has the potential to destroy cultural heritage values in this area which has a history of mining activity extending back over more than a century. The DPEMP cites a report by ArcTas 2009 which identified 8 cultural heritage sites within the general Hercules/Williamsford area.

The DPEMP states that, of the sites identified by ArcTas 2009, Phase 1 will only impact the Ruinous Tramway Section, which is said to be of low significance. Phases 2/3 will impact the L & M Lodes Open Cut (this will be the location of the underground portal) which is also said to be of low significance).

Management measures

The DPEMP states that if any Aboriginal heritage sites, relics or features are identified during operations, works will cease and advice will be sought from Aboriginal Heritage Tasmania.

Phases 2/3 will be designed to avoid the Mt Read Mine Assay Office and the No. 1 Adit and Tramway, both of which are considered by ArcTas 2009 to be of High Significance.

Submissions

Aboriginal Heritage Tasmania advised that there are no known matters of Aboriginal heritage in the proposal area and no requirement to undertake an Aboriginal heritage survey.

Heritage Tasmania indicated that the proposal involves no matters for which they have statutory responsibility. Heritage Tasmania requested that a copy of ArcTas 2009 be appended to the DPEMP. Following provision of this report further comment was provided as follows:

“Heritage Tasmania supports the recommendation that no further action is required in respect of the tramway feature that will be impacted by the mine.

Although not subject to direct impact by the open cut pit or the mine's site office, the heritage assessment report identifies that several significant heritage features are quite close and could suffer from indirect impact. It would be beneficial if the consultant's recommendation of a buffer zone around these features were established, perhaps coupled with some information being provided to workers regarding the importance of these features, so that they take care not to damage them when moving around the area.”

Evaluation

The discussion of heritage matters provided in the DPEMP is considered adequate. A site-specific condition is recommended as per the advice of Heritage Tasmania (**Condition G12**).

6.4 Mine Closure and Rehabilitation

Description

Due to the finite nature of mining operations and their susceptibility to external economic influences, mine closure planning should commence before the operation commences. Substantial environmental liabilities may remain at mine closure and these should be adequately provided for both financially and through provision of up-to-date mine closure plans.

Prevention and mitigation of any ongoing AMD will be a critical feature of mine closure for the South Hercules proposal.

Management measures

Phase 1

The DPEMP includes the following commitments in relation to mine closure:

13. Monitoring of water levels within the open cut will be undertaken following closure to confirm water permeability.
14. GCL will be extended to cover the lower batters and pit floor if water retention levels are found to be lower than estimated.

Phases 2 and 3

The DPEMP includes the following environmental safeguards in relation to mine closure:

3. On completion of Phase 2 and 3 mining (should they occur) all PAF waste rock would be returned to the pit/underground and incorporated in the mine decommissioning and rehabilitation to prevent it from becoming an ongoing source of AMD
7. Prior to Phase 2 and 3 mining a Mine Closure Plan would be prepared in general accordance with the Minerals Council of Australia's Strategic Framework for Mine Closure (2000).

Submissions

A public submission expressed concern that rehabilitation of the mine following closure may be unsatisfactory, as was the case with the Hercules Mine and Williamsford township.

Evaluation

Phase 1

As shown in Table 1, a bond is in place for the Mining Lease and there are plans to review the bond in the light of the South Hercules proposal.

Phase 1 will not generate any waste rock (DPEMP Commitment 2), however the mine pit itself would present an ongoing source of AMD if not encapsulated appropriately.

It is widely considered Best Practice Environmental Management to place PAF materials under a permanent water cover of at least 1 metre depth. In the case of South Hercules it is acknowledged that a substantial dam structure requiring long term maintenance would be required in to keep the pit walls under water.

The proposal, as shown in Figure 21 of the DPEMP, to cut final pit wall slopes back to 2:1 (horizontal:vertical) followed by encapsulation with an imported Geosynthetic Clay Liner (GCL) prior to covering with a 1 metre deep layer of NAF material to act as a growth medium for revegetation purposes is considered appropriate. It is noted that the very high rainfall and high

altitude of the proposal area will assist in ensuring that the encapsulation materials remain damp throughout the year, thereby providing a saturated layer which excludes ingress of atmospheric oxygen to sulphide minerals in the pit walls.

The permeability of the final pit and any seasonal variations in pit water level are currently unknown, hence commitments 13 & 14 are appropriate to ensure that sections of the pit that do not remain under water cover will be subject encapsulation using imported GCL and local NAF materials.

A water cover of 1 metre depth is considered adequate by the Scientific Officer (Water) given the very small size of the proposed open cut pit. It is noted that planning for a 1 metre cover must include allowance for drought, etc.

Phase 2/3

Should mining proceed beyond Phase 1, a Mine Closure Plan should be prepared and submitted to the Director (**Condition DC5**), recommended **Condition DC7** requires encapsulation of PAF materials.

The proposal to return all PAF waste rock to the mine pit or underground workings is considered to represent best practice (**Environmental Safeguard 3**). If it transpires that the pit and/or underground workings do not retain water year-round, detailed encapsulation plans may be required (**Commitment 14, Condition E6**). This would nonetheless be considered preferable to leaving waste rock in above-ground WRDs.

Recommendations

The following standard (generic) conditions are recommended for inclusion in the permit:

- DC1** Notification of cessation
- DC2** DRP Requirements
- DC3** Stockpiling of surface soil
- DC4** Suspension of activity
- DC5** Mine Closure Plan
- DC6** Mine rehabilitation

The following site-specific conditions are recommended for inclusion in the permit:

- E6** AMD Management Plan
- DC7** Additional closure requirements for the prevention/treatment of AMD

7 Other environmental issues

In addition to the key issues, the following environmental issues are considered relevant to the proposal and have also been evaluated.

- Atmospheric emissions
- Traffic Impacts
- Noise and vibration
- Weed and disease management
- Fire management
- Management of wastes and dangerous substances

Details of this evaluation, along with recommended permit conditions, are contained in Appendix 1.

8 Conclusions

The EPA Division is of the view that:

1. the RMPS and EMPCS objectives have been duly and properly pursued in the assessment of the proposal; and
2. the assessment of the proposal has been undertaken in accordance with the Environmental Impact Assessment Principles; and
3. the recommendations set out in this report accord with the Board's responsibilities in relation to these objectives and principles.

This assessment has been based upon the information provided by the proponent in the permit application.

This assessment has incorporated specialist advice provided by Divisions of DPIPWE in relation to a number of issues.

It is concluded that the proposal is capable of being managed in an environmentally acceptable manner such that it is unlikely that the RMPS and EMPCS objectives would be compromised, provided that the recommendations made in this report are satisfactorily implemented, including the commitments made by the proponent in the DPEMP.

9 References

ANZECC & ARMCANZ 2000. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, *Australian Water Quality Guidelines for Fresh and Marine Waters, National Water Quality Management Strategy*, Australian and New Zealand Environment and Conservation Council, Canberra.

ArcTas Pty Ltd 2009. *HISTORIC CULTURAL HERITAGE ASSESSMENT SOUTH HERCULES MINE & ENVIRONS FINAL REPORT* by Parry Kostoglou June 2009

GHD 2009. *Minerals and Metals Group (MMG) Rosebery, Report for South Hercules Mine Development Proposal and Environmental Management Plan*.

10 Summary of appendices

Appendix 1 Assessment of other environmental issues

Appendix 2 Proposed permit conditions, includes DPEMP Commitments at Attachment 2

Appendix 1 Assessment of other environmental issues

Issue
Atmospheric Emissions
Description of Potential Impacts
<p>Dust may be emitted from disturbed areas, stockpiles, and transport routes.</p> <p>Air emissions will emanate from the operation of combustion engines on site, e.g. loaders, 2WD and AWD haulage trucks and light vehicles. Emissions will include burnt hydrocarbons as well as local fugitive dust.</p> <p>The proposal area is a considerable distance from any sensitive receptors and rainfall exceeds evaporation year round.</p>
Management Measures Proposed in DPEMP
<p>Section 4.1 of the DPEMP states that control measures will be outlined in a Construction Environmental Management Plan. Ongoing dust control measures may include dampening of surfaces, covering of stockpiles and postponement of work during excessively windy conditions.</p> <p>Vehicles will be appropriately maintained to minimise vehicular emissions.</p>
Public and Agency comment
<p>Public representations expressed concern that dust may affect proposed residences in Williamsford.</p>
Evaluation and Recommendations
<p>Williamsford, being some 2 km from the proposed mine, is highly unlikely to be impacted by dust from the mine itself. The main transport route to the South Hercules Mine is via the Mt Read Road, which at its closest point is at least 1.5 km from Williamsford. The typical recommended separation distance for dust of this nature is 300m.</p> <p>The DPEMP indicates that the Williamsford Road may be used as an emergency access route for light vehicles; this road will also continue to be used periodically for monitoring and rehabilitation of the Hercules Mine. Standard Condition A2, which requires that dust is controlled to the extent necessary to prevent environmental nuisance or harm, is recommended for inclusion in the permit.</p> <p>The transport route is sealed from the point at which Mt Read Road meets Williamsford Road to the Rosebery Mine. Ore transport may generate dust, therefore it is recommended that the proponent be required to comply with standard Condition A1 which requires measures to prevent escape of materials from vehicles.</p>

Issue
Traffic Impacts
Description of Potential Impacts
<p>Haulage of ore from the South Hercules Mine to the Rosebery Mine will utilise existing public roads, including the Murchison Highway</p>
Public and Agency comment
<p>The Roads and Traffic Division (DIER) raised concerns about the proposed signage, warnings lights and use of the intersection between Williamsford Road and the Murchison Highway.</p>
Evaluation and Recommendations
<p>DIER's concerns were forwarded to MMG for consideration and action as appropriate. Any permit conditions regarding road upgrades and road safety are a matter for the consideration of the West Coast Council in consultation with DIER.</p>

Issue
Noise and Vibration
Description of Potential Impacts
Blasting will occur during the mining process. Noise will be produced by normal mining processes including haul trucks, loaders, excavators and drill rigs.
Management Measures Proposed in DPEMP
Section 4.4 of the DPEMP states that machinery will be maintained to minimise noise impacts and hearing protection will be worn by employees.
Public and Agency comment
Public representations expressed concern that the peace and quiet of Williamsford may be disrupted.
Evaluation and Recommendations
The typical recommended attenuation distance for blasting noise and vibration is 1 km. Recommended attenuation distances for machinery operations are lower than 1 km. Williamsford is approximately 2 km from the South Hercules proposal site. The intervening hill topography could also be expected to provide considerable noise reduction.
As noted under discussion of atmospheric emissions above, the main haul route for the South Hercules proposal is some distance from the town of Williamsford. The Williamsford route may be used periodically for light vehicle access and for access to the historic Hercules Mine.
Haulage of South Hercules ore involves transport through Rosebery on the Murchison Highway. Noise caused by haulage of South Hercules ore will be significantly diluted by the considerable volume of existing traffic which already utilises the Murchison Highway (as described in Appendix F of the DPEMP).
No noise conditions are recommended.

Issue
Weed and Disease Management
Description of Potential Impacts
The spread of invasive weeds and diseases may occur via the disturbance and movement of soil, material and machinery.
Appendix E of the DPEMP notes that the proposal area is dominated by native species. One isolated occurrence of an introduced species <i>Ulex europaeus</i> (Gorse), a declared weed, was recorded on site. No evidence for <i>Phytophthora cinnamomi</i> , <i>Chalara australis</i> (Myrtle Wilt) or <i>Chytrid</i> frog fungus was found.
Management Measures Proposed in DPEMP
Section 4.7.4 of the DPEMP includes the following points: <ul style="list-style-type: none"> • Remove the known occurrence of gorse from Mt Read Road prior to construction and monitor this site to check the species does not re-establish in this area; • In general, machinery should be cleaned of large clods of dirt and vegetative material before moving from an existing works area to a new works zone; and • Utilising local NAF material to minimise the risk of inadvertently introducing weed species or plant pathogens to site by the introduction of external fill.
Public and Agency comment
No comment received.
Evaluation and Recommendations
Phytophthora is unlikely to be a concern in those areas of the proposal area above 850m altitude.
It is recommended that the proponent be required to comply with standard Condition FF1 which requires that weeds on the land be managed to the satisfaction of the Director. Non-standard Condition FF2 requires that weed and disease hygiene be carried out in accordance with the DPEMP and the <i>Tasmanian Washdown Guidelines</i> .

Issue
Fire Management
Description of Potential Impacts
<p>The site is located in a high altitude area that has been impacted historically by bushfires.</p> <p>Vegetation types that are highly sensitive to fires are known to exist in proximity to the proposal.</p> <p>There is the potential for the activity to act as an ignition source causing bushfires with associated loss of habitat and atmospheric emissions.</p>
Management Measures Proposed in DPEMP
<p>All vehicles and machinery will be kept in good working order to minimise the potential for fires on site.</p> <p>Any fuels required during the construction phase will be limited in quantity and will be stored in appropriately bunded facilities as discussed in Section 4.6 of the DPEMP.</p> <p>Appropriate fire fighting equipment will be kept on site during the construction phase and site staff trained in emergency procedures and use of fire fighting equipment.</p> <p>DPEMP Commitment 10 states that fire prevention and control plans will be reviewed and updated to include the South Hercules mine site.</p>
Public and Agency comment
<p>No comments received. Parks & Wildlife raised the issue of fires during the scoping phase (in relation to nearby reserves).</p>
Evaluation and Recommendations
<p>The measures contained within the DPEMP are considered sufficient, in particular the broader fire prevention and control plans for the Mining Lease should be updated (Commitment 10). The lighting of fires must be in accordance with local fire permit restrictions. No further recommendations.</p>

Issue
Management of Wastes and Dangerous Substances
Description of Potential Impacts
The proposal requires use of fuels, lubricants, explosives, slaked lime and flocculants, all of which may cause environmental impacts if released. Inappropriate disposal of waste can lead to environmental harm and/or nuisance.
Management Measures Proposed in DPEMP
For Phase 1, Section 4.6.4 of the DPEMP states that: <ul style="list-style-type: none"> Explosives will not be permanently stored onsite. Slaked lime and flocculants for water treatment will be appropriately stored, as per MSDS requirements within the amenities area, in a weatherproof enclosure such as a shipping container. For Phase 2/3, Section 2.4 of the DPEMP states that: <ul style="list-style-type: none"> Fuel will be stored on site in accordance with <i>AS1940 The Storage and Handling of Flammable and Combustible Liquids</i>. Small quantities of other hazardous materials such as oils and lubricants will be stored on pallet bunds within stores in accordance with Australian Standards. Transportable explosives magazines will be brought to site and stored underground within a secure lockup enclosure.
Public and Agency comment
No comment received.
Evaluation and Recommendations
It is recommended that the proponent be required to comply with standard permit conditions H1, H2, H3 and H4 regarding the management of hazardous substances. LO3 is also recommended for inclusion in the Information Schedule. To ensure that waste is not disposed of on site, it is recommended that the proponent be required to comply with Standard condition WM1 which requires that all waste be removed from site (by an authorised person in the case of controlled waste).

Appendix 2 Proposed permit conditions