Telfer Project, Expansion of Telfer Gold Mine, Great Sandy Desert

Newcrest Mining Limited

Report and recommendations
of the Environmental Protection Authority

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Contents

Page

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal by Newcrest Mining Limited to expand the Telfer Gold Mine.

Based on the information provided, the EPA considered that while the proposal has the potential to have an effect on the environment, the proposal could be readily managed to meet the EPA's environmental objectives. Consequently, it was notified in *The West Australian* newspaper on 5 August 2002 that the EPA intended to assess the proposal through Assessment on Referral Information.

The proponent has submitted a referral document for this proposal setting out the detail of the proposal, potential environmental impacts, and giving a number of appropriate commitments to manage the potential environmental impacts that were identified (Newcrest Mining Limited 2002a). The EPA considers that the proposal described can be managed in an acceptable manner subject to these commitments and recommended conditions being made legally binding.

The EPA therefore has determined under Section 40(1) that the level of assessment for the proposal is Assessment on Referral Information, and this report provides the EPA advice and recommendations in accordance with Section 44(1).

The Telfer Gold Mine was constructed in 1975 and was operated until November 2000, when it was put on care and maintenance. The mine has not previously been assessed by the EPA.

This proposal is for an expansion of the Telfer Gold Mine. The proposed Power Supply and Infrastructure Corridor associated with this proposal is being dealt with separately. The mine expansion would result in increased power requirements and so a number of options are proposed to transport energy from Port Hedland to the mine site. The Power Supply and Infrastructure Corridor proposal is set out in a separate referral to the EPA (Newcrest Mining Limited 2002b). The mine expansion and power supply proposals have been separated because it is likely that the mine and power supply will eventually be operated by different proponents. Nevertheless, the proposals have been developed and assessed in parallel. The EPA has assessed the power supply proposal through the Environmental Protection Statement process. The EPA's report and recommendations on the power supply proposal is contained in Bulletin 1058 (EPA 2002).

2. The proposal

This proposal involves the recommencement and expansion of mining at the Telfer Gold Mine (see Figure 1) to include the mining and processing of 400 million tonnes of gold ore at a rate of up to 23 million tonnes per annum, and the transport of copper concentrate to Port Hedland by road. Key components of the expansion include:

- expansion of existing underground mining areas and deepening of the existing open pits;
- extensions to the existing southern waste rock dump and several other dumps;
- construction of a new tailings storage facility;
- construction of a new ore processing plant and associated infrastructure;
- expansion of the capacity of water supply borefields;
- upgrading of the existing accommodation village to accommodate 650 people; and
- transport of copper concentrate to Port Hedland via road.

As a comparison, the existing Telfer Gold Mine covers some 1 800 ha and the current proposal would disturb a further 1 800 ha of previously undisturbed land (refer to Figures 2 & 3).

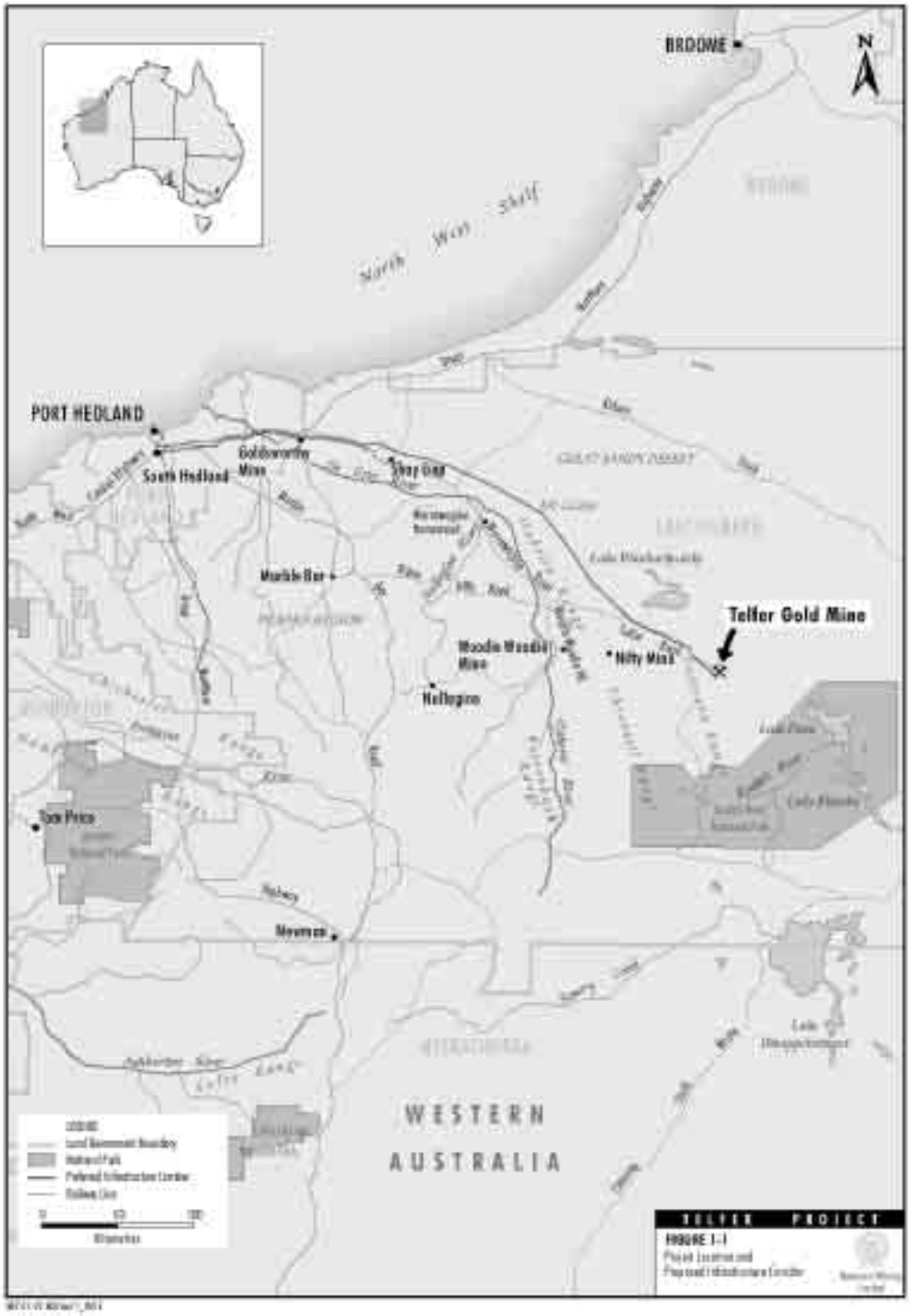

Figure 1 Project Location (Source: Newcrest Mining Limited, 2002a)

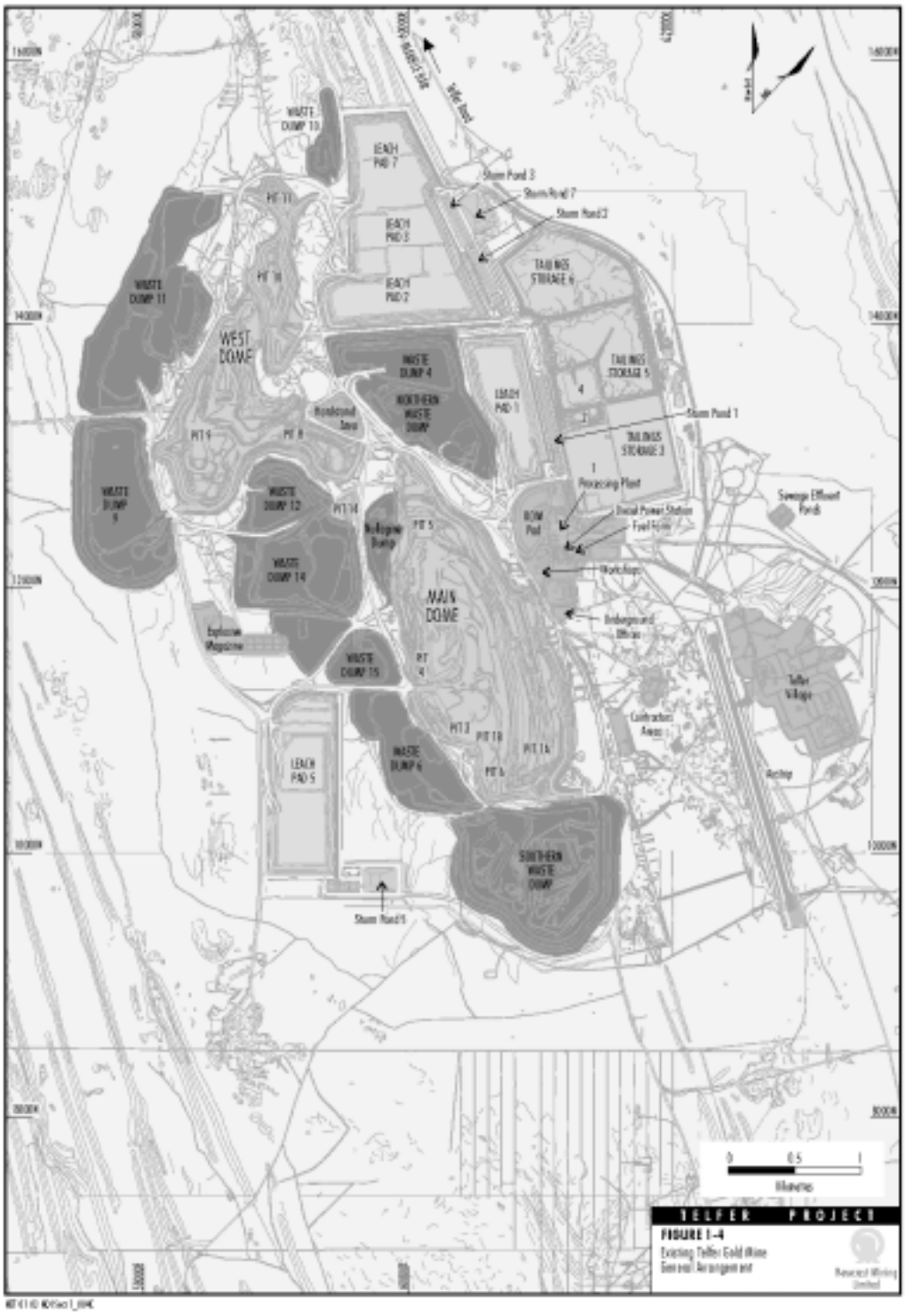

Figure 2 ***Existing Telfer Mine, General Arrangement (Source: Newcrest Mining Limited, 2002a)***

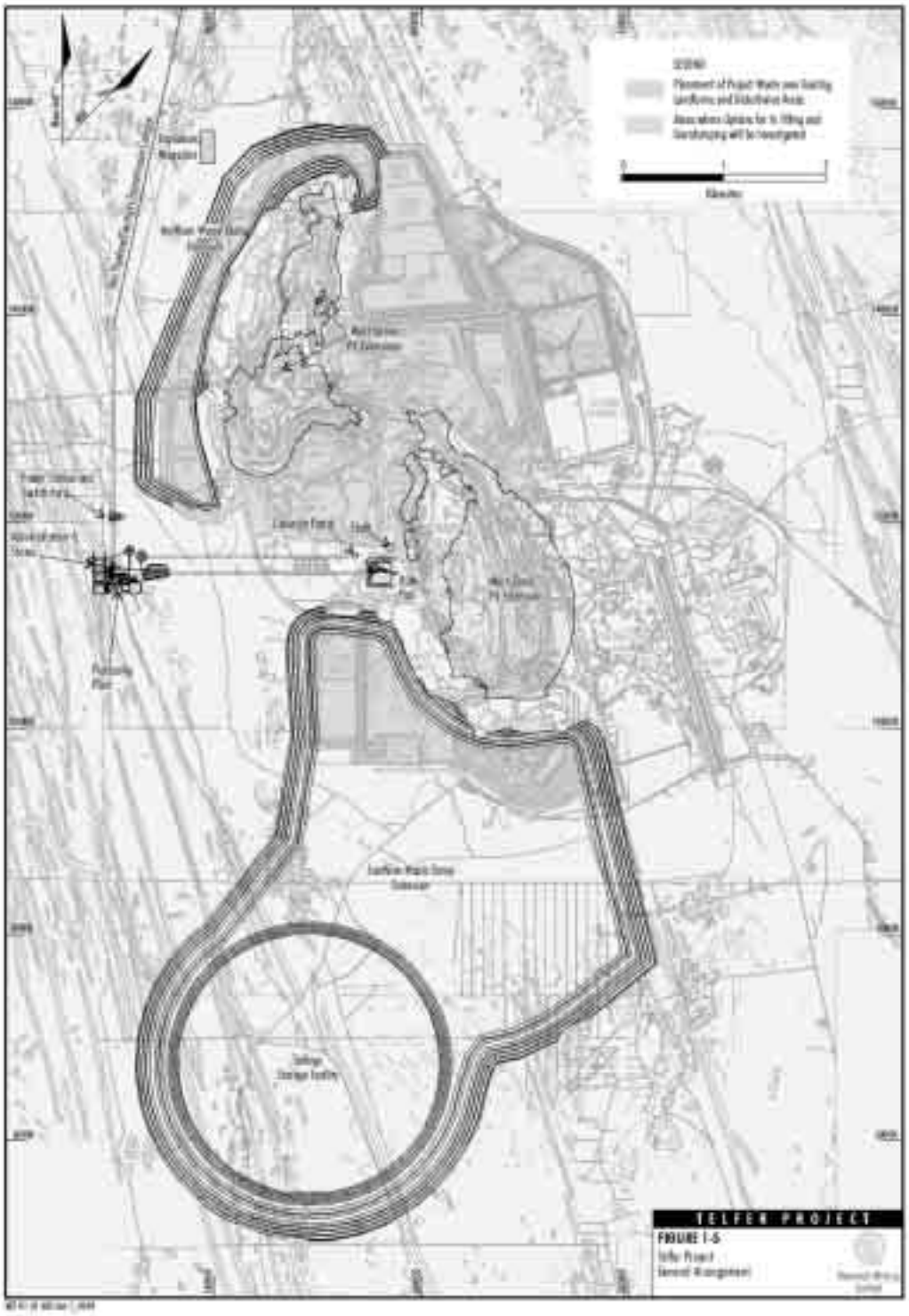

Figure 3 ***Telfer Project Expansion, General Arrangement (Source: Newcrest Mining Limited, 2002a)***

The main characteristics of the proposal are summarised in Table 1 below.

Table 1: Summary of key proposal characteristics

Element	Proposed Telfer Project		
Life of Mine	Approximately 25 years		
Land Disturbance Area	The existing Telfer Gold Mine covers some 1,800 ha. The proposal will disturb a further 1,800 ha		
Surface Mining	Conventional truck and shovel open pit mining techniques in the Main Dome and West Dome pits.		
Underground Mining	Sublevel caving operations in the Telfer Deeps Ore Zone below the Main Dome pit.		
	Options for materials handling from the underground to the surface include a conveyor incline ***or*** haulage shaft.		
Ore Production	Up to approximately 23 million tonnes per annum of ore (including dump leach ore).		
Ore Processing	Use of parts of the existing processing plant and/or construction of a new ore processing plant comprising conventional copper and pyrite flotation and CIL circuits to treat sulphide ore.		
Processing Throughput	Up to 20 million tonnes per annum		
Low Grade Ores	Existing dump leach facilities will be used to treat low grade oxide ore.		
Waste Rock Production	Up to approximately 90 million tonnes per annum		
Waste Rock Dumps	Two waste dump extensions will be developed to contain approximately 1,300 Mt of waste material.		
Tailings Disposal	A new tailings storage facility will be constructed to contain some 370 Mt of tailings.		
Products	Gold Bullion and gold/copper concentrate.		
Concentrate Transport Method	Copper concentrate will be transported by road from Telfer to Port Hedland.		
Port Hedland Concentrate Facility	The existing facility will be expanded to include a new 25,000 t concentrate storage shed.		
Transport Requirements	Up to 290 truck round trips per month hauling consumables and mineral concentrate.		
Water Supply	Water supply requirements increased from 44 ML/day to some 50 ML/day.		
	Existing borefield capacity (44 ML/day) to be expanded to supply up to 65 ML/day.		
	Waters produced by mine dewatering to be included in the Project raw water supply.		
Employment	Up to 1300 people during construction and approximately 650 people during the operational period.		
Major Consumables	**Agent**	**Estimated Maximum Annual Usage**	**Estimated Maximum Storage Quantity**
	Lime	37,000 t	4,800 t
	Sodium Cyanide	8,350 t	810 t
	Carbon	120 t	10 t
	Antiscalant	240 t	20 t
	Caustic Soda	4,500 t	145 t
	Hydrochloric Acid	240 t	20t
	Collector	425 t	60 t
	Xanthate	1,400t	200 t
	Frother	190 t	20 t
	Flocculant	650 t	66 t
	Grinding Media	18,800 t	2,025 t
	Sodium Hydrogen Sulphide	1,400 t	95 t
	Sulphuric Acid	11,200 t	590 t
	Sodium Sulphide	13,500 t (years 1 and 2 only)	935 t
	Diesel	70 ML/annum (average 45 ML/annum)	9 ML

Abbreviations

Mtpa million tonnes per annum
Mt million tonnes
CIL Carbon in Leach
t tonnes
ML million litres
ha hectares

3. Consultation

During the preparation of the referral information, the proponent has undertaken consultation with government agencies and companies with a direct interest in the project and other key stakeholders. Consultation was also undertaken with the local community via information booklets, newsletters, newspaper advertisements, and public information days. The organisations consulted, the comments received, and the proponent's response are included in Section 1.6 of the referral information (Newcrest Mining Limited, 2002a).

4. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

It is the EPA's opinion that the following environmental factors relevant to the proposal require detailed evaluation in this report:

a) flora and fauna — clearing and loss of habitat;

b) dewatering and borefield operations — drawdown effects on groundwater resources and stygofauna;

c) greenhouse gas emissions — from mining and processing;

d) Acid Mine Drainage — management of potentially acid forming waste rock; and

e) mine closure — planning for closure and integration with existing facilities.

4.1 Flora and fauna

The EPA's environmental objective for this factor is to maintain the abundance, diversity, geographic distribution, and productivity of flora and fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

Assessment

The mine expansion would result in the disturbance of an additional 1 800 ha through the establishment of waste rock dumps and a tailings storage facility. The Telfer Gold Mine lies in a largely undisturbed desert region. An ecological survey of the project area has been carried out by the proponent that concluded the land-forms, vegetation units, and fauna habitats of the mine-site are widely replicated both locally and in the region. The project site does not contain any declared rare flora, and any threatened fauna species that may use this habitat are not limited to the project area. Although much of the project area will be rehabilitated, there will be a substantial change in the landforms and so it cannot be assumed the same habitats will be restored in rehabilitated areas.

Given that the proposal area lies within a much larger area of similar environmental values and does not contain any flora or fauna of particular significance, the loss of 1 800 ha of land is acceptable, provided that controls are in place to prevent unnecessary disturbance. As a result of both environmental and economic considerations the project has been kept within a fairly compact footprint. Where possible, new facilities have been located on, or adjacent to, existing disturbed areas. The proponent will also put in place environmental management systems, plans, and procedures to ensure that disturbance is kept to a practicable minimum (Appendix 2, Commitments 1, 2, & 4).

The EPA considers that its objective for this factor can be met provided the proponent's commitments are implemented.

4.2 Dewatering and borefield operations

The EPA's environmental objectives for this factor are to:

- maintain the quantity and quality of groundwater such that existing and potential environmental values and ecosystems are maintained (including subterranean fauna); and
- improve understanding of subterranean fauna through appropriate research including sampling, identification, and documentation.

Assessment

Dewatering of the ore-body and the abstraction of groundwater from borefields for processing of the ore, will draw down the groundwater aquifers in the vicinity of the mine.

These activities are a resumption and expansion of past dewatering and abstraction. As a result of these past activities the proponent has a good understanding of the groundwater systems of the mine and borefield areas. Groundwater modeling predicts that the proposal will result in drawdown of groundwater aquifers over an increased area, but that this effect will be confined to the local area (that is, within a 10 km radius of the mine). This modeling has been reviewed by the Water and Rivers Commission, which is satisfied that all water resource issues and any potential impacts on these resources can be managed within existing legislation.

The predicted impacts are not likely to have any significant impact on any groundwater dependent ecosystems. Groundwater levels in the area are naturally 40-70 m below the ground surface and so the desert vegetation is not dependent on groundwater. However, there are invertebrate fauna that live in the aquifers and the impact of dewatering on these fauna is considered below.

Subterranean fauna includes both troglofauna (terrestrial subterranean fauna) and stygofauna (aquatic subterranean fauna). Both of these are important because of their species richness, evolutionary history and adaptations, and the evidence they can provide for continental drift. Hence they are significant in terms of Australian faunal biodiversity (EPA, 1997).

Preliminary survey work has found stygofauna at the mine-site and the borefields that appear to be unique to the area. However, the fauna do not seem to be restricted to any particular aquifer habitat within the overall area and are found in areas outside of the predicted 10 km radius of impact. Furthermore, stygofauna have been found in areas that have been subject to large mine-induced groundwater level variations in the past. Hence, any effect on stygofauna is expected to be localised and not significant at a regional level. Also, the proponent is intending to conduct a monitoring programme to increase knowledge about stygofauna.

The EPA considers that while there is little risk to stygofauna of the region, it is important to improve knowledge of these fauna and understanding of their response to groundwater drawdown. The EPA therefore recommends that a Subterranean Fauna Sampling Plan be implemented (Attachment 2, Condition 6).

4.3 Greenhouse gas emissions

The EPA's environmental objective for this factor is to ensure that all reasonable and practicable measures are taken to minimize the emission of greenhouse gases.

Assessment

The proposal will emit up to 800 000 tonnes of $CO_{2\text{-}e}$/annum (carbon dioxide equivalent per annum), most of which is a result of the use of electricity (that is, emissions generated by the power station). The proponent has compared the greenhouse gas efficiency of the proposal with previous mining and processing at Telfer and concluded that the use of natural gas as a fuel, rather than diesel, results in improved efficiency. Greenhouse gas emissions for various power supply options (subject to a separate assessment, EPA 2002) are shown in Table 2 below, along with comparisons with past mining.

Table 2 Telfer Greenhouse Gas Emission Indices

Year/Option	Ore Processed in Processing Plant	CO_2 Emissions		Emission Indices	
				(i)	(ii)
		Total	Power Supply	kg CO_2 (Total)/t (Ore Processed)	kg CO_2 (Power Supply)/t (Ore Processed)
Telfer Gold Mine - 1997/98	1.98 Mt[1]	150,648 t	87,376 t[2]	76.1	44.1
Telfer Gold Mine - 1998/99	2.22 Mt[1]	134,548 t	78,037 t[2]	60.6	35.2
Telfer Project (Option 1a)	20 Mt/yr	649,000 t	500,000 t	32.5	25.1
Telfer Project (Option 1b)	20 Mt/yr	589,000 t	440,000 t	29.5	22.1
Telfer Project (Option 2(a))	20 Mt/yr	798,000 t	649,000 t	40.0	32.5
Telfer Project (Option 2(b))	20 Mt/yr	736,000 t	588,000 t	36.8	29.4

1 A high proportion of ore produced at Telfer Gold Mine was from dump leach ore treatment (75-90%)
2 Assuming 58% of total CO_2 emissions were for power supply for ore processing

For proposals of this scale the EPA routinely recommends that a greenhouse gas emission management plan be developed to ensure that efficiencies are incorporated into the detail of the initial design, and that emissions and efficiencies are reviewed throughout the life of the project (Appendix 2, Condition 7).

4.4 Acid Mine Drainage

The EPA's environmental objectives for this factor are to:

- ensure that wastes are contained within appropriately designed dumps to minimise the potential for acid mine drainage; and
- maintain the quantity and quality of surface and ground-waters such that existing and potential environmental values and ecosystems are maintained.

Assessment

The expanded mine will excavate much more unweathered material than past mining and so has a greater potential to generate Acid Mine Drainage. Acid Mine Drainage is the term used to describe the process in which exposure of sulphide minerals (that are more likely to occur in unweathered material) to atmospheric oxygen and water generates acid, that then leaches from the sulphide bearing material taking with it metals that have been dissolved by the acid. To prevent Acid Mine Drainage it is necessary to have in place a system that: clearly identifies potentially acid forming material, selectively handles this material, and stores the material so that leachate is not generated.

In this proposal a significant proportion of the waste rock has the potential to cause Acid Mine Drainage and therefore waste rock placement and management will need to be well controlled. The proponent has carried out test-work to determine the amount of waste rock that would need to be managed to prevent Acid Mine Drainage. Taking a precautionary approach (that also treats "indeterminate material" as "potentially acid forming") the proponent estimates that approximately a quarter of the waste rock would need to be treated as potentially acid forming (PAF) material. This test-work has included development of a model of the waste that can be used to reliably identify PAF material. The proponent has also outlined in general terms how it will deal with PAF material through encapsulation under compacted inert material to minimise infiltration and exposure to oxygen. Recognising the large amount of waste to be handled, the proponent has given a commitment to develop a Waste Rock Management Plan to ensure that thorough procedures will be put in place to deal with the PAF material (Appendix 2, Commitment 10).

The EPA considers that the proponent's commitment to implement a Waste Rock Management Plan satisfactorily addresses this issue.

4.5 Mine closure

The EPA's environmental objectives for this factor are to ensure:

- that decommissioning and rehabilitation are carried out in a planned sequential manner consistent with best practice;
- ecosystem function is maintained following mine closure; and
- that as far as is practicable, the post-mining landform is, safe, stable, non-erodible, and is integrated into the surrounding environment.

Assessment

This proposal will disturb a further 1800 ha of land and continue the process of altering the landscape from that of a relatively flat desert to one of high relief (deep pits and high waste dumps). It is especially important for a mine of this size that planning for decommissioning and closure is undertaken early to ensure that the final landforms are properly designed and able to function as ecological systems in the long term. In this case, there is also the opportunity to integrate the new waste dumps and tailings storage facility with existing structures at the mine and so optimise the final closure design.

In the referral document the proponent has put forward conceptual plans for closure and started to set out rehabilitation criteria for various landforms that will be created. The proponent has also committed (Appendix 2, Commitment 11) to prepare more detailed closure plans within three years and review these on a regular basis. An important input into the closure plan will be the Groundwater Management and Final Void Study (Appendix 2, Commitment 3).

Based upon the conceptual plans put forward by the proponent and the planning process set out in the commitments, the EPA considers that its objectives for this factor can be met.

5. Conditions and Commitments

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented. The proponent's commitments as shown in Appendix 2, should be made enforceable.

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Newcrest Mining Limited to expand the Telfer Gold Mine is approved for implementation. Matters addressed in the conditions include:

- the requirement that the proponent shall fulfill the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 2;
- development and implementation of a Subterranean Fauna Sampling Plan; and
- development and implementation of a Greenhouse Gas Emissions Management Plan.

6. Conclusions

The EPA has considered the proposal by Newcrest Mining Limited to expand the Telfer Gold Mine.

The EPA believes that in the referral document the proponent has given proper consideration to all the environmental factors related to this proposal, and demonstrated that predicted environmental impacts are acceptable. The EPA commends the proponent for the high quality of its referral document, and in particular, the thoroughness with which environmental issues have been investigated and discussed. In this report the EPA has chosen to highlight those factors that it considers will require close attention throughout the life of the mine and also added standard conditions to replace commitments for some factors.

The EPA notes that, as this proposal is situated in a remote location and in a fairly uniform environment, it does not raise any major site-specific environmental issues. The environmental impacts are generally related to the large scale of the proposal and so have the potential to be managed through proper planning and operational procedures. The EPA considers that the main issues associated with expansion of the mine are: loss of flora and fauna habitat through clearing; drawdown impacts of dewatering and borefield operations; greenhouse gas emissions; potential Acid Mine Drainage; and mine closure. For each of these it has been demonstrated that the predicted environmental impact is not significant at the regional scale, and that environmental systems and procedures will be put in place to properly manage and minimise these impacts.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for the expansion of the Telfer Gold Mine, being proposed by Newcrest Mining Limited.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 4.
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2, including the proponent's commitments.
4. That the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

Appendix 1

References

Newcrest Mining Limited 2002 (a), *Telfer Project, Notice of Intent — Additional Referral Information*. Prepared by Resource Strategies for Newcrest Mining Limited, July 2002.

Newcrest Mining Limited 2002 (b), *Telfer Project, Power Supply and Infrastructure Corridor, Environmental Protection Statement.* Prepared by Resource Strategies for Newcrest Mining Limited, July 2002.

EPA 1997, *Extensions to Exmouth Marina Harbour, Landcorp: Report and recommendations of the Environmental Protection Authority*, Environmental Protection Authority Bulletin 868.

EPA 2002, *Telfer Project, Power Supply and Infrastructure Corridor, Port Hedland to Telfer Gold Mine, Great Sandy Desert — Report and Recommendations of the Environmental Protection Authority*, Bulletin 1058

Appendix 2

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Statement No.

RECOMMENDED CONDITIONS AND PROCEDURES

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

TELFER PROJECT, EXPANSION OF TELFER GOLD MINE, GREAT SANDY DESERT

Proposal: The expansion of mining at the Telfer Gold Mine to include the mining and processing of 400 million tonnes of gold ore at a rate of up to 23 million tonnes per annum, and the transport of copper concentrate to Port Hedland by road, as documented in schedule 1 of this statement.

The expansion will require the development or expansion of mine facilities and infrastructure at the Telfer Gold Mine.

Proponent: Newcrest Mining Limited

Proponent Address: Level 9, 600 St Kilda Road, MELBOURNE VIC 3004

Assessment Number: 1445

Report of the Environmental Protection Authority: Bulletin 1059

The proposal referred to above may be implemented subject to the following conditions and procedures:

Procedural Conditions

1 Implementation and Changes

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of the conditions in this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment and Heritage, prior to the expiration of the five-year period referred to in condition 4-1. The application shall demonstrate that:

- the environmental factors of the proposal have not changed significantly;
- new, significant, environmental issues have not arisen; and
- all relevant government authorities have been consulted.

Note: The Minister for the Environment and Heritage may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

Environmental Conditions

5 Compliance Audit and Performance Review

5-1 The proponent shall prepare an audit program in consultation with and submit compliance reports to the Department of Environmental Protection which address:

- the implementation of the proposal as defined in schedule 1 of this statement;
- evidence of compliance with the conditions and commitments; and
- the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement. Usually, the Department of Environmental Protection prepares an audit table which can be utilised by the proponent, if required, to prepare an audit program to ensure that the proposal is implemented as required. The Chief Executive Officer is responsible for the preparation of written advice to the proponent, which is signed off by either the Minister or, under an endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

5-2 The proponent shall submit a performance review report every five years after the start of the operations phase to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority, which addresses:

- the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;
- the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;
- significant improvements gained in environmental management, including the use of external peer reviews;
- stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
- the proposed environmental targets over the next five years, including improvements in technology and management processes.

6 Subterranean Fauna Sampling Plan

6-1 Prior to commissioning of the ore processing plant, the proponent shall develop a Subterranean Fauna Sampling Plan for mine and borefields to the requirements of the Environmental Protection Authority.

Note: Advisory bodies:

- Department of Environmental Protection;
- Department of Conservation and Land Management; and
- Western Australian Museum.

The objective of this Plan is:

- to increase scientific knowledge about subterranean fauna to assist in the conservation of this element of the environment.

This Plan shall address:

1 subterranean fauna surveys of the areas to be affected by dewatering operations and borefield operations to assist in establishing the conservation significance of any species within the affected areas;

2 characterisation of subterranean fauna habitats to be affected by dewatering operations and borefield operations, and identification of similar subterranean fauna habitats outside the affected areas;

3 subterranean fauna surveys of similar habitats outside the areas to be affected by dewatering operations and borefield operations to assist in establishing the conservation significance of fauna within the areas to be affected; and

4 specific measures to record and preserve biological information on any species collected in the project area.

6-2 The proponent shall implement the Subterranean Fauna Sampling Plan required by condition 6-1.

6-3 The proponent shall make the Subterranean Fauna Sampling Plan required by condition 6-1 publicly available, to the requirements of the Environmental Protection Authority.

6-4 The proponent shall submit the results from the Subterranean Fauna Sampling Plan to the Environmental Protection Authority, the Department of Conservation and Land Management, and the Western Australian Museum.

6-5 In the event that the Environmental Protection Authority considers, based on the results of the Subterranean Fauna Sampling Plan, that its objective would be compromised, the proponent shall develop an action plan to the requirements and timing of the Environmental Protection Authority.

7 Greenhouse Gas Emissions Management Plan

7-1 Prior to commencement of construction of the processing plant, the proponent shall prepare a Greenhouse Gas Emissions Management Plan to:

- ensure that "greenhouse gas" emissions from the project are adequately addressed and best available efficient technologies are used to minimise total net "greenhouse gas" emissions and / or "greenhouse gas" emissions per unit of product; and

- mitigate "greenhouse gas" emissions in accordance with the Framework Convention on Climate Change 1992, and consistent with the National Greenhouse Strategy;

to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

This Plan shall include:

1 calculation of the "greenhouse gas" emissions associated with the proposal, as indicated in "Minimising Greenhouse Gas Emissions, Guidance for the Assessment of Environmental Factors, No. 12" published by the Environmental Protection Authority;

2 specific measures to minimise the total net "greenhouse gas" emissions and/or the "greenhouse gas" emissions per unit of product associated with the proposal;

3 monitoring of "greenhouse gas" emissions;

4 estimation of the "greenhouse gas" efficiency of the project (per unit of product and/or other agreed performance indicators) and comparison with the efficiencies of other comparable projects producing a similar product;

5 analysis of the extent to which the proposal meets the requirements of the National Greenhouse Strategy using a combination of:

- "no regrets" measures;
- "beyond no regrets" measures;
- land use change or forestry offsets; and
- international flexibility mechanisms;

6 a target set by the proponent for the reduction of total net "greenhouse gas" emissions and/or "greenhouse gas" emissions per unit of product over time, and annual reporting of progress made in achieving this target.

Note: In part 5 above, the following definitions apply:

(1) "no regrets" measures are those that can be implemented by a proponent which are effectively cost-neutral and provide the proponent with returns in savings which offset the initial capital expenditure that may be incurred; and

(2) “beyond no regrets” measures are those that can be implemented by a proponent which involve some additional cost that is not expected to be recovered.

7-2 The proponent shall implement the Greenhouse Gas Emissions Management Plan required by condition 7-1 to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

7-3 The proponent shall make the Greenhouse Gas Emissions Management Plan required by condition 7-1 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Procedures

1 Where a condition states "to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority", the Chief Executive Officer of the Department of Environmental Protection will obtain that advice for the preparation of written advice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

3 Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environmental Protection.

Notes

1 The Minister for the Environment and Heritage will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.

2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposal (Assessment No. 1445)

The proposal is to mine and process oxide and primary ores, and to operate associated facilities at the Telfer Project as specified in the key proposal characteristics (Table 1 below).

Figures

1. Project location
2. Telfer Project General Arrangement
3. Potable Water and Raw Water Borefields

Table 1 Key Proposal Characteristics

Element	Proposed Telfer Project		
Life of Mine	Approximately 25 years		
Land Disturbance Area	The existing Telfer Gold Mine covers some 1,800 ha. The proposal will disturb a further 1,800 ha		
Surface Mining	Conventional truck and shovel open pit mining techniques in the Main Dome and West Dome pits.		
Underground Mining	Sublevel caving operations in the Telfer Deeps Ore Zone below the Main Dome pit.		
	Options for materials handling from the underground to the surface include a conveyor incline ***or*** haulage shaft.		
Ore Production	Up to approximately 23 million tonnes per annum of ore (including dump leach ore).		
Ore Processing	Use of parts of the existing processing plant and/or construction of a new ore processing plant comprising conventional copper and pyrite flotation and CIL circuits to treat sulphide ore.		
Processing Throughput	Up to 20 million tonnes per annum		
Low Grade Ores	Existing dump leach facilities will be used to treat low grade oxide ore.		
Waste Rock Production	Up to approximately 90 million tonnes per annum		
Waste Rock Dumps	Two waste dump extensions will be developed to contain approximately 1,300 Mt of waste material.		
Tailings Disposal	A new tailings storage facility will be constructed to contain some 370 Mt of tailings.		
Products	Gold Bullion and gold/copper concentrate.		
Concentrate Transport Method	Copper concentrate will be transported by road from Telfer to Port Hedland.		
Port Hedland Concentrate Facility	The existing facility will be expanded to include a new 25,000 t concentrate storage shed.		
Transport Requirements	Up to 290 truck round trips per month hauling consumables and mineral concentrate.		
Water Supply	Water supply requirements increased from 44 ML/day to some 50 ML/day.		
	Existing borefield capacity (44 ML/day) to be expanded to supply up to 65 ML/day.		
	Waters produced by mine dewatering to be included in the Project raw water supply.		
Employment	Up to 1300 people during construction and approximately 650 people during the operational period.		
Major Consumables	**Agent**	**Estimated Maximum Annual Usage**	**Estimated Maximum Storage Quantity**
	Lime	37,000 t	4,800 t
	Sodium Cyanide	8,350 t	810 t
	Carbon	120 t	10 t
	Antiscalant	240 t	20 t
	Caustic Soda	4,500 t	145 t
	Hydrochloric Acid	240 t	20t
	Collector	425 t	60 t
	Xanthate	1,400t	200 t
	Frother	190 t	20 t
	Flocculant	650 t	66 t
	Grinding Media	18,800 t	2,025 t
	Sodium Hydrogen Sulphide	1,400 t	95 t
	Sulphuric Acid	11,200 t	590 t
	Sodium Sulphide	13,500 t (years 1 and 2 only)	935 t
	Diesel	70 ML/annum (average 45 ML/annum)	9 ML

Abbreviations

Mtpa	million tonnes per annum
Mt	million tonnes
CIL	Carbon in Leach
t	tonnes
ML	million litres
ha	hectares

Schedule 2

Proponent's Environmental Management Commitments

31 July 2002

Telfer Project, Expansion of Telfer Gold Mine, Great Sandy Desert (Assessment No. 1445)

Newcrest Mining Limited

Proponent's Environmental Management Commitments Expansion of Telfer Gold Mine (Assessment No. 1445)

Number	Topic	Objective	Action	Timing	Whose Advice
1.	Environmental Management System	To install an environmental management system that provides a tool for continual environmental improvement.	The proponent will review and revise the existing Telfer Gold Mine EMS. The revised EMS will provide details of the organisational structure, responsibilities, practices, processes and resources for achieving the proponent's environmental objectives at the mine. The principal components of the EMS will include: • environmental policy; • planning to meet environmental requirements; • implementation and operation to meet environmental requirements; • checking and corrective action; and • management review and continuous improvement. The Management Plans required by other environmental commitments (ie. those presented below) will form part of the EMS.	The EMS will be completed prior to the commissioning of the ore processing plant.	
2.	Environmental Management Plan	Manage environmental impacts of the Project.	1.1 Develop an EMP. The aim of the EMP is to describe how the proponent will address the following: • minimisation of disturbance areas; • protection of environmentally sensitive areas; • minimisation of impacts on native fauna and flora; • prevention of weed and pest infestations; • preservation and management of soil resources; • minimisation of dust and noise impacts; • control of erosion and sedimentation from disturbed areas; • protection of archaeological and anthropological sites/features; • rehabilitation of disturbed areas; and • management of traffic impacts. 1.2 Implement the EMP	Prior to the commencement of the construction period. During operations	WRC, DMPR, CALM
3.	Groundwater Management and Final Void Study	To determine the long-term behaviour and interaction of the final voids with the regional groundwater system.	A groundwater and final void study will be conducted during the initial years of the operation to verify the predicted infilling rates and final pit lake levels within the open pit voids. The long-term water quality of the pit lakes will also be examined. (Note: The findings of the study will be used as input into revisions of the Mine Closure Plan of Commitment 9.)	During the first three years of the operational period.	WRC

Proponent's Environmental Management Commitments (Continued)

Number	Commitment	Objective	Action	Timing	Whose Advice
4.	Flora and Fauna Management Plan	Maintain the abundance, diversity, geographical distribution and productivity of flora and fauna at species and ecosystems levels through the avoidance or management of adverse impacts and improvement in knowledge.	4.1 Prepare a Flora and Fauna Management Plan addressing the following control measures: • protecting native vegetation by limiting clearing as much as practicable; • undertaking rehabilitation of disturbed areas as soon as practical; • avoiding the Priority plant species where possible, particularly where they occur in low-lying habitat areas; • carrying out pre-clearance surveys of the major disturbance areas for rare burrowing mammal species; • if pre-clearance surveys identify rare burrowing mammal species, which cannot be avoided by adjusting the proposed disturbance area, re-location of the individuals will be undertaken, where practicable. 4.2 Implement the EMP	Prior to major land disturbance (pre-clearance surveys) During construction and operation	CALM
5.	Cyanide Monitoring and Management Programme.	To minimise the potential impacts on fauna that could result from elevated cyanide concentrations in Project tailings.	5.1 Prepare a Cyanide Monitoring and Management Programme to ensure that: • weak acid dissociable (WAD) cyanide levels in deposited tailings are kept below 50 mg/L. 5.2 Implement the Cyanide Monitoring and Management Programme.	Prior to the commissioning of the ore processing plant. During operations.	CALM, WRC
6.	Waste Management Plan	Ensure that wastes are contained and isolated and that recycling and reuse are maximised.	6.1 Develop a Waste Management Plan with appropriate procedures for: • collecting; • containing; and • disposing of wastes. 6.2 Implement the Waste Management Plan.	Prior to construction. During construction and operations.	WRC, CALM.
7.	Aboriginal Heritage.	To ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation.	The proponent will ensure that its workforce and contractors are made aware of the requirements of the *Aboriginal Heritage Act, 1972* not to damage or interfere with Aboriginal sites via an induction programme. Consultation with Aboriginal groups with an interest in the Project will continue in order to address Aboriginal heritage issues that may arise.	During construction.	CALM, DIA, Aboriginal Communities.

Number	Commitment	Objective	Action	Timing	Whose Advice
8.	Waste Rock Management Plan	To design and construct waste rock dumps that are compatible with the regional physiography, stable in the long term, and do not present ongoing acid mine drainage risks.	8.1 Prepare and implement a Waste Rock Management Plan which includes the following: • prediction mechanisms and scheduling of potentially acid-forming waste rock (including AMD testwork programmes and refinement of the AMD model); • management procedures and encapsulation mechanisms for waste rock materials identified as having AMD potential. • Management of long-term stability and integration of final waste dumps with the surrounding landforms. 8.2 Implement the Waste Rock Management Plan.	Prior to commissioning of the ore processing plant.	CALM, WRC, DMPR
9.	Mine Closure Plan.	To develop and implement a closure plan that will enable planned closure of the Project and will leave the site in a safe and stable condition such that tenements can be relinquished without any future liability for proponent or the community.	9.1 Development of a Closure Plan which will address: • decommissioning and removal of residual infrastructure; • rehabilitation of mine landforms; • management of final voids; and • post mining monitoring and maintenance requirements. 9.2 Implement the Closure Plan.	Within three years following the commissioning of the ore processing plant (initial closure plan) and with review every three years thereafter. During closure	DMPR

Abbreviations

AMD	Acid Mine Drainage
CALM	Department of Conservation and Land Management
DIA	Department of Indigenous Affairs
DMR	Department of Mineral and Petroleum Resources
WRC	Water and Rivers Commission