



Works Approval

Environmental Protection Act 1986, Part V

Works Approval Holder: Hanking Gold Mining Pty Ltd

Works Approval Number: W4732/2010/1

Registered office: Allendale Square, Level 29
77 St Georges Terrace
PERTH WA 6000

ACN: 161 566 490

Premises address: Marvel Loch Gold Mine
Tenements G77/1- 3M77/7, 8, 10, 31, 112, 113, 137, 138, 239, 431,
525, 638, 640,660, 702, 745-747, 790, 977, 1036, L77/91, 112, 126,
128, 145, 162, 167, 173,
MARVEL LOCH WA 6426

Issue date: 24 September 2010

Commencement date: 25 September 2010

Expiry date: 24 September 2018

The following category/s from the *Environmental Protection Regulations 1987* cause this Premises to be a prescribed premises for the purposes of the *Environmental Protection Act 1986*:

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore	50 000 tonnes or more per year	2,600,000 tonnes per annual period

Conditions

This Works Approval is subject to the conditions set out in the attached pages.

.....
Danielle Eyre
Officer delegated under section 20
of the *Environmental Protection Act 1986*



Works Approval Conditions

1 General

1.1 Interpretation

1.1.1 In the Works Approval, definitions from the *Environmental Protection Act 1986* apply unless the contrary intention appears.

1.1.2 In the Works Approval, unless the contrary intention appears:

'Act' means the *Environmental Protection Act 1986*;

'annual period' means the inclusive period from 1 April until 31 March in the following year;

'CEO' means Chief Executive Officer of the Department of Environment Regulation;

'CEO' for the purpose of correspondence means;
Chief Executive Officer
Department Administering the Environmental Protection Act 1986
Locked Bag 33
CLOISTERS SQUARE WA 6850
Email: info@der.wa.gov.au

'Premises' means the area defined in the Premises Map in Schedule 1 and listed as the Premises address on page 1 of the Works Approval;

'Schedule 1' means Schedule 1 of this Works Approval unless otherwise stated;

'Works Approval' means this Works Approval numbered W4732/2010/1 and issued under the *Act*; and

'Works Approval Holder' means the person or organisation named as the Works Approval Holder on page 1 of the Works Approval.

1.1.3 Any reference to an Australian or other standard in the Works Approval means the relevant parts of the standard in force from time to time during the term of this Works Approval.

1.1.4 Any reference to a guideline or code of practice in the Works Approval means the current version of the guideline or code of practice in force from time to time, and shall include any amendments or replacements to that guidelines or code of practice made during the term of this Works Approval.



1.2 General conditions

1.2.1 The Works Approval Holder shall construct the works in accordance with the documentation detailed in Table 1.2.1:

Table 1.2.1: Construction Requirements¹		
Document	Parts	Date of Document
Works Approval Application Form	All	14 July 2010
Additional Embankment Raising of Tailings Storage Facility Mining Proposal, Hanking Gold Mining Pty Ltd, Marvel Loch Operations.	All, including Drawings and Appendices	25 May 2010

Note 1: Where the details and commitments of the documents listed in condition 1.2.1 are inconsistent with any other condition of this works approval, the conditions of this works approval shall prevail.

2 Information

2.1 Reporting

2.1.1 The Works Approval Holder shall submit a compliance document to the CEO, following the construction of the works and prior to commissioning of the same.

2.1.2 The compliance document shall:

- (a) certify that the works were constructed in accordance with the conditions of the works approval;
- (b) be signed by a person authorised to represent the Works Approval Holder and contain the printed name and position of that person within the company.



Schedule 1: Maps

Premises map

The Premises is shown in the map below. The red line depicts the Premises boundary.





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1 Purpose of this Document

This decision document explains how DER has assessed and determined the application and provides a record of DER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER's assessment and decision making under Part V of the *Environmental Protection Act 1986*. Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.

2 Administrative summary

Administrative details		
Application type	Works Approval <input type="checkbox"/> New Licence <input type="checkbox"/> Licence amendment <input type="checkbox"/> Works Approval amendment <input checked="" type="checkbox"/>	
Activities that cause the premises to become prescribed premises	Category number(s)	Assessed design capacity
	5: Processing or beneficiation of metallic or non-metallic ore	2,600,000 tonnes per annum
Application verified	Date: N/A	
Application fee paid	Date: N/A	
Works Approval has been complied with	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	
Compliance Certificate received	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	
Commercial-in-confidence claim	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Commercial-in-confidence claim outcome		
Is the proposal a Major Resource Project?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/>
Is the proposal subject to Ministerial Conditions?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Ministerial statement No: EPA Report No:
Does the proposal involve a discharge of waste	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	



into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i>)?	Department of Water consulted Yes <input type="checkbox"/> No <input type="checkbox"/>
Is the Premises within an Environmental Protection Policy (EPP) Area Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes include details of which EPP(s) here.	
Is the Premises subject to any EPP requirements? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes, include details here, eg Site is subject to SO ₂ requirements of Kwinana EPP.	

3 Executive summary of proposal and assessment

The Marvel Loch Gold Mine Tailings Storage Facility (TSF) has been assessed as a “prescribed premises” under category number 5, within Schedule 1 of the *Environmental Protection Regulations 1987*. This Decision Document assesses the additional embankment raising for the TSF lift only; consequently, there is no reference to any of the other activities undertaken at the premises. The Marvel Loch TSF has had a history of seepage issues on the northern and southern sides. The proposed works to raise the TSF by 5 metres will also include significant measures to mitigate and manage this seepage.

The Marvel Loch Gold Mine is a standard gold mine and mill, operated by Hanking Gold Mining Pty Ltd after it was purchased from St Barbara Pty Ltd in April 2013. Hanking Gold Mining Pty Ltd currently hold a licence (L4597/1988/13) under Part V of the *Environmental Protection Act 1986* (the Act) for the purposes of processing and beneficiation of metallic ore.

The Marvel Loch Gold Mine is centred at Marvel Loch, 30 kilometres (km) south of the town of Southern Cross and 360 km east of Perth. Southern Cross has an annual average rainfall of 280mm. Annual evaporation is estimated to be 2 635mm per year. A 1 in 100-year storm event will generate approximately 166mm of rainfall. The TSF is located directly adjacent to the mine pit and process area on gently sloping land and is surrounded by small trees and shrubs (Figure 1). It is located on shallow bedrock, with subsurface soil being orange brown clay overlying granite. There is a number of gravel pits located to the south of the TSF. The groundwater is hypersaline (up to TDS 200 000mg/l) with a depth greater than 150 m below the surface. The diversion drains have been constructed to direct stormwater away from the toe of the TSF facility so water does not pond against it after high rainfall events. Water is channelled to a specially constructed sump.

This application is for a proposed embankment raising of the existing TSF designed to store an additional 4.5 million tonnes of tailings. The lift total is 5 metres. Also, it is predicted that the proposed elevation will see cater for remaining tailings associated with the remaining lifespan of the mine. No new cells are being constructed. The existing TSF is comprised of three cells which are currently licensed to a height of 1040 mRL. This proposal is to apply to increase the licensed height to 1045 mRL which will comprise of an additional two 2.5 m lifts above 1040 mRL.

The two new cells will be completely inside the existing TSF, which comprises a three cell above ground storage facility with starter embankments constructed with mine waste to crest levels between RL 1081 m and RL 1020 m.

The perimeter embankments of the TSF will be raised in stages by upstream construction techniques using compacted tailings borrowed from within the storage. The downstream batters will be capped with a 500 mm thick layer of competent waste rock as erosion protection. Each embankment lift will be 2.5 m in height to a maximum design height of RL 1045.0 m.

Existing decant facilities will be raised within each of the two cells. The decant water recovery collected will be pumped back to the process plant for re-use and it will be imperative to recover water (clear and turbid) during the filling periods to allow maximum drying of the tailings.



The tailings storage has been assigned a hazard rating of low, Category 1 based on classification outlined in Table 1 and Figure 1 of the Western Australian Department of Mines and Petroleum (DMP) document titled *Guidelines on the Safe Design and Operating Standards for Tailings Storage*, dated May 1999.

The Tailings Storage Facility Operations Manual for Process Plant Staff St Barbara Mine (December 2009). The document includes detail on management of the decant to minimise water on the facility, inspections, emergency action plans etc. A full seepage assessment was included in the application which assessed how much additional seepage was expected as a result of the raise and the size of the seepage management system required to cope with the additional seepage. The proposed seepage works will expand the seepage system to enable to expected volume of seepage to be managed.

The results of the design assessments of the tailings storage site indicate that the TSF can be safely operated on the basis that:

- liberated water is continually removed from the surface of the tailings;
- tailings deposition is cycled around the facility to maximise tailings density and therefore the storage volume;
- the storage is operated in accordance with the details contained in the operating manual;
- the safe operation of the storage relies on the implementation of the tailings operation, management and inspection procedures; and
- the seepage measures are in place in accordance with the details contained in the Seepage Management Plan.

The temporary storage of stormwater produced from a 1 in 100 year, average recurrence interval, 72 hour rainfall event has been allowed for in the design. However, this relies on correct operating procedures being adopted in respect to freeboard criteria.

Independent audits of the TSF will occur on an annual basis. Audits are required in line with tenement condition as follows: *An engineering or geotechnical specialist shall audit and review the active tailings storage facility on an annual basis. The specialist shall review the past performance, validate the design, examine the tailings management, and review the results of monitoring. Any deficiencies noted in the audit and review report shall be submitted to the State Mining Engineer with the annual environmental review, and should be accompanied by a recent survey pick-up of the facility and an updated tailings storage data sheet.* Seepage is normally assessed as part of these audits because it impacts on structural integrity as well as the environment.

Surface water and supernatant water liberated from the tailings slurry will be recovered from the impoundment area of each cell via a decant pump deployed within the centrally located decant structure. Return water will be pumped back to the process plant.

New seepage recovery trenches have been detailed in section 9 of the application – Seepage Management. The works are being undertaken to manage the predicted increase in seepage as a result of increasing the height of the facility.

This Works Approval amendment is the result of an application by the Works Approval Holder to extend the expiry date by three years.



4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987* and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Works Approval Duration	N/A	The Works Approval is being amended to ensure the current owners, Hanking Gold Mining Pty Ltd, have adequate time to complete the works. There have been no changes to the Works Approval plans nor any changes to the receiving environment. The Works Approval has been extended by three (3) years.	Application supporting documentation



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
N/A	Application advertised in West Australian (or other relevant newspaper)	N/A	N/A
16/06/2015	Proponent sent a copy of draft instrument	No comments received	N/A



6. Risk Assessment

Note: This matrix is taken from the DER Corporate Policy Statement No. 07 - Operational Risk Management

Table 1: Emissions Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High