



Application for Licence Amendment

Part V Division 3 of the *Environmental Protection Act 1986*

Licence Number	L8644/2012/1
Licence Holder	Big Bell Gold Operations Pty Ltd
ACN	090 642 809
File Number	2012/002162-1
Premises	Cue Gold Operations – Tuckabianna Project Mining Tenements: M20/55, M20/108, M20/111, M20/176, M20/183, M20/208, M20/195 and M20/247 CUE WA 6640
Date of Report	23 November 2020
Proposed Decision	Intent to grant revised licence

MANAGER, RESOURCE INDUSTRIES

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Table of Contents

1. Decision summary	1
2. Scope of assessment	1
2.1 Regulatory framework	1
2.2 Application summary	1
3. Risk assessment	2
3.1 Source-pathways and receptors	2
3.1.1 Emissions and controls	2
3.1.2 Receptors	2
3.2 Risk ratings	2
3.3 Detailed risk assessment for seepage of tailings	5
3.3.1 Seepage emissions	5
3.3.2 Pathway and receptors	5
3.3.3 Applicant controls	5
3.3.4 Risk rating	5
3.3.5 Regulatory controls	5
4. Consultation	7
5. Conclusion	7
5.1 Summary of amendments	7
References	9
Appendix 1: Application validation summary	10
Table 1: Licence Holder controls	3
Table 2: Sensitive human and environmental receptors and distance from prescribed activity	3
Table 3. Risk assessment of potential emissions and discharges from the Premises during operation	4
Table 4: Consultation	7
Table 5: Summary of licence amendments	8

1. Decision summary

Licence L8644/2012/1 is held by Big Bell Gold Operations Pty Ltd (Licence Holder) for the Cue Gold Operations – Tuckabianna Project (the Premises), located at Mining Tenements: M20/55, M20/108, M20/111, M20/176, M20/183, M20/208, M20/195 and M20/247, CUE WA 6640.

This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the operations of the Premises. As a result of this assessment, Revised Licence L8644/2012/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

2.2 Application summary

On 11 August 2020, the Licence Holder submitted an application to the department to amend Licence L8644/2012/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments were sought:

- Remove a blocked groundwater monitoring point (JMB003); and
- Increase the licence limit for TSF2 groundwater monitoring bores for sulphate from 2,000 mg/L to 3,000 mg/L, and for TDS from 4,000 mg/L to 5,000 mg/L.

On 22 October 2020, the applicant submitted a notification to the department regarding the completion of construction works for the putrescible waste dump and the department has considered that the related conditions (Conditions 13 to 16) should be removed from the licence.

This amendment is limited only to changes to these changes in Categories 5 and 64 activities from the existing Licence. No changes to the aspects of the existing Licence relating to Category 6 have been requested by the Licence Holder.

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guidance Statement: Risk Assessments* (DER 2017).

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this Amendment Report are detailed in Table 1 below. Table 1 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

3.1.2 Receptors

In accordance with the *Guidance Statement: Risk Assessment* (DER 2017), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder's from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 2 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guidance Statement: Environmental Siting* (DER 2016)).

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guidance Statement: Risk Assessments* (DER 2017) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 3.

The Revised Licence L8644/2012/1 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. modifications to the groundwater monitoring in the vicinity of TSF2.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 1: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Seepage	TSF2	Seepage to soils and groundwater	<p>Ceased discharging tailings material into the TSF2 in October 2018.</p> <p>Installed a diversion channel to direct water from the north-eastern corner of TSF2 to the western creekline. A large volume of water pools at the north-eastern corner of TSF2 following periods of rainfall. It is possible that this water is seeping through the TSF2 in a north-south direction towards TBS3.</p> <p>Installed a weather station to determine whether there is a correlation between rainfall and water quality at TBS3.</p> <p>Ongoing quarterly sampling at the TSF2 monitoring bores for the parameters outlined in Table 9 of Licence L8644/2012/1 will be undertaken.</p>

Table 2: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Local Government Reserve – Tuckabeena Well	<p>Reserved area located within the prescribed premises boundary (Tenement M20/108). An abandoned stock watering well, the Tuckabeena Well, lies 500 m to the south of TSF2. There are no current plans for use of this well for pastoral activities.</p> <p>Is not considered to be a potential receptor for the risk assessment.</p>
Environmental receptors	Distance from prescribed activity
Flora and Vegetation	<p>Most vegetation has been cleared at the Premises due to mining operations with only some small minor strands of remnant vegetation remaining.</p> <p>No Threatened Ecological Communities, Priority Ecological Communities or Threatened or Priority flora have been recorded at the premises.</p> <p>Low Mulga woodlands are present at the premises and are well represented throughout the region.</p> <p>Flora and vegetation surrounding the TSF are a potential receptor for the risk assessment</p>
Groundwater	<p>The Premises is located on a greenstone belt, which forms the drainage divide between two drainage systems and terminates at Lake Austin which is located approximately 22 km south of TSF2.</p> <p>There is one minor drainage line at the Premises which terminates at the Jaffa's Folly pit.</p> <p>Current standing water level (SWL) at TBS3 is 13.12 m; however, SWLs have ranged from 18.3 m (January 2013) to 11.4 m (May 2015). TBS4 (11.9 m) and TBS5 (17.2 m) have remained relatively stable since 2013.</p> <p>Groundwater is a potential receptor for the risk assessment.</p>

Table 3. Risk assessment of potential emissions and discharges from the Premises during operation

Risk Event					Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
Operation								
Category 5 – TSF Storage of tailings material in the uncapped disused TSF	Seepage of tailings water containing elevations in TDS and Sulphates	Infiltration through soils to groundwater causing degradation of groundwater quality	Groundwater values	Refer to Section 3.1.1	C = Moderate L = Possible Medium Risk	N	Condition 12 <u>Condition 17</u>	Refer to section 3.3
	Seepage of tailings water	Increasing groundwater levels due to seepage can cause impacts to the health and survival of vegetation (waterlogging/ increased salt concentrations)	Native vegetation in the vicinity of TSF2		C = Moderate L = Possible Medium Risk	Y	Condition 12	

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guidance Statement: Risk Assessments* (DER 2017).

Note 2: Proposed Licence Holder's controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

3.3 Detailed risk assessment for seepage of tailings

3.3.1 Seepage emissions

Deposition of tailings into the TSF2 ceased in October 2018 and the Licence Holder has notified the department that sulphate and TDS have been exceeded only at bore TBS3 for each consecutive quarter since 18 March 2018 and 14 January 2019, respectively. No observable seepage has occurred at the TSF2 walls (as reported within the 2019 Annual Environmental Report).

The Applicant has indicated the seepage is due to a bedrock fracture beneath the TSF2, and/or surface water flows through the TSF. Pooled water at the north-eastern corner of the TSF2 following rainfall may be seeping through the TSF towards TBS3.

The Applicant has stated that vegetation appears in good health, however, from the 2019 Annual Environmental Report, the Applicant has reported a reduction in vegetation health at each vegetation monitoring point, likely attributable to changed climatic conditions similar to observations made at other reference sites.

3.3.2 Pathway and receptors

Seepage will infiltrate through soils to groundwater causing degradation of groundwater quality to downstream receptors. Seepage could increase groundwater levels and affect the health and survival of vegetation (waterlogging/ increased salt concentrations) in the vicinity of TSF2.

3.3.3 Applicant controls

An 11 December 2019 amendment outlined the following management actions:

- Monthly groundwater sampling at TBS3 in addition to quarterly sampling;
- Quarterly photographic vegetation monitoring around TBS3 and at analogue sites;
- Installation of a weather station to investigate whether there is a correlation between surface water flows and water chemistry at TBS3; and
- Construction of a diversion channel from the north of the TSF2 to address pooling of water at the north-eastern base of TSF2.

These actions have been implemented at the site. The Applicant proposes to cap the TSF2 when the deposited tailings have dried and consolidated (anticipated to take at least two years), and the material strength is sufficient to withstand the placement of capping materials.

3.3.4 Risk rating

The Delegated Officer considers that the risk of seepage is a **Medium** risk. This is because of the likelihood is **Possible** as the seepage could occur at some time, particularly during times of high rainfall at the premises. The consequence is **Moderate** as it could include mid-level onsite impacts such as localised groundwater mounding/surface expressions, contamination of the groundwater, and low-level offsite impacts and Specific Consequence Criteria (for environment) may not be met.

3.3.5 Regulatory controls

The Delegated Officer considers that the following is relevant for the assessment of seepage:

- sulphate and TDS limits in groundwater monitoring bore TBS3 continue to be exceeded but no exceedances have occurred for the other bores (TBS2, TBS4 and TBS5);

- the most likely cause of the observed increases in sulphate concentrations and TDS levels in bore TSB3 is seepage from TSF2;
- groundwater contamination caused by the seepage from TSF2 is localised and likely has a restricted spatial distribution, largely confined to a discrete fracture system in bedrock near TSF2;
- materials consolidation in TSF2 is expected to take at least two years, which indicates that seepage will be expected during that time;
- the applicant installed a weather station at the site to investigate if there is a correlation between surface water flows and water chemistry at TSB3;
- the applicant has constructed additional drainage structures to assist draining of pooled water at the north-eastern base of the TSF2; and
- given the relatively low salinity of groundwater in the area, phreatophytic vegetation (mulga species which are widely distributed near the Tuckabianna mine site) may be sensitive to elevated concentrations of sulphate and TDS.

The Delegated Officer considers that the increase in sulphate and TDS is acceptable in bore TBS3. Considering the underlying hydrogeology at TSF2, if there are exceedances at the bores other than TSF3, these would require further investigation.

To distinguish between the chemical composition of groundwater from seepage and the natural composition of groundwater in the area, further parameters have been added to the groundwater monitoring program for all bores around TSF2; sodium, potassium, calcium, chloride and bicarbonate ions.

Given the nature of the mineralisation and the geochemical characteristics of groundwater in the area, the following metals have also been included in the groundwater monitoring program for all bores around TSF2; cobalt, vanadium and molybdenum.

The Delegated Officer notes that impacts to the downstream Tuckabeena Well have not been recorded to date. This could be because the well is monitoring a different fracture system to the TBS3 bore, as the contamination likely has a restricted spatial distribution. A better gauge of where contamination may be located would be to use electrical or electromagnetic geophysical investigations to determine the extent of contamination from the TSF.

Considering that seepage could be expected from TSF2 for more than two years, further controls may be required to manage the risk to downstream receptors. The Delegated Officer considers that an Improvement Program is required to:

- determine the relationship between surface water flows and water chemistry at TSB3;
- investigate measures to limit pooling on the north eastern base of TSF2;
- implement ground-based electrical or electromagnetic geophysical investigations in transects around TSF2 to determine the instance, distance and depth to which groundwater contamination extends from the TSF; and
- identify what controls may be required in future, for example;
 - installing additional monitoring bores at the edge of the plume to monitor if the plume is expanding over time; and/or
 - installing wick drains in TSF2 or capping TSF2 with a store-and-release cover and vegetation to limit water infiltration, to assist with consolidation of tailings if there are stability concerns for the TSF walls (in consultation with the Department of Mines, Industry Regulation and Safety, as per Section 5 of this document).

The vegetation around TSF2 is mulga vegetation which is phreatophytic and may be sensitive to elevated concentrations of sulphate and TDS if the water table reaches the vegetation root zone (approximately 8 mbgl). No limit on standing water levels has been proposed at this stage as the licence currently contains conditions to measure standing water levels and monitor vegetation around the TSF, which are reported in the Annual Environmental Report.

4. Consultation

Table 4 provides a summary of the consultation undertaken by the department.

Table 4: Consultation

Consultation method	Comments received	Department response
Department of Mines, Industry Regulation and Safety advised of proposal 10/09/2020	<p>A geotechnical audit and management review of TSF2 was undertaken in October 2018 by CMW Geosciences. DMIRS reviewed the report in April 2019 and noted that erosion of the TSF2 embankments had been occurring since 2014, The proponent advised that erosion repair works were scheduled for September 2019. No other issues were raised in relation to the stability of TSF2 at the time of the geotechnical review. Confirmation that the remedial works were undertaken as planned has not been received by DMIRS to date.</p> <p>An updated Mine Closure Plan (MCP) for the Tuckabianna Project was submitted to DMIRS in October 2020; the environmental assessment of this document is yet to commence. The review will include an assessment of the proposed closure strategy and long-term stability of the TSF as well as an assessment of the proposed completion criteria relating to landform stability and groundwater quality.</p> <p>DMIRS notes that a timeframe for consolidation of the tails is not currently included in the 2020 MCP document.</p>	N/A
Licence Holder was provided with draft amendment on 11/11/2020	N/A	N/A

5. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

5.1 Summary of amendments

Table 5 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 5: Summary of licence amendments

Section of licence	Proposed amendments
Title page	Added full category 5 category description
Explanatory notes	Deleted. This guidance is available in the department's Guideline: Industry Regulation Guide to Licensing (June 2019).
Definitions and interpretation	<p>Heading deleted.</p> <p>Definitions relocated to after the conditions as per current template.</p> <p>Added the licence history as per the current template.</p> <p>Updated the interpretation as per the current template.</p> <p>Tables numbering throughout document updated.</p> <p>Administrative errors corrected.</p>
Ambient environmental quality monitoring	<p>Table 8 updated as follows:</p> <ul style="list-style-type: none"> • Groundwater bore TBS3 separated out for increased Sulphate and TDS limits; • Groundwater bore JMB003 deleted. As there is adequate hydrological representation from other monitoring bores, no replacement is necessary; and • Additional analytes: sodium, potassium, calcium, chloride, bicarbonate ions, cobalt, vanadium and molybdenum.
Conditions 13 to 16	Applicant has notified that the works for the disposal of putrescible wastes has been undertaken and has notified the department via written communication. Conditions removed as they have been satisfied.
Improvement program (new Condition 13)	Improvement program which requires a program of ground-based electrical or electromagnetic geophysical investigations in transects around TSF2 to determine the distance and depth to which the groundwater contamination extends from the TSF. A report on the relationship between surface water flows and water chemistry at TSB3, whether the diversion of surface water upstream of TSF2 has prevented pooling on the north eastern base of TSF2, includes the results of ground-based electrical or electromagnetic geophysical investigations and identifies what further controls for reducing seepage are required, based on the outcomes of the above analysis.
Conditions 17 to 23	Conditions renumbered to 14 to 20, respectively.
Condition 17	AER condition updated to the Conditions Library.
Definitions	Definitions relocated as per current template.
Schedule 1: Maps	<p>Replaced premises map with the map from the supporting document, which contains all the Mining Tenements on the licence.</p> <p>Julies Reward Pit Groundwater Monitoring Bore Locations Map bore JMB003 crossed out.</p>
Schedule 2: Prescribed Premises Categories	Deleted as this information is on the cover page of the licence.
Schedule 3: Reporting and Notification forms	<p>Heading number update to Schedule 2.</p> <p>Updates to form GR2 to reflect changes in the licence.</p>

References

1. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
2. DER 2017, *Guidance Statement: Risk Assessments*, Perth, Western Australia.
3. DER 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.

Appendix 1: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)				
Application type				
Works approval	<input type="checkbox"/>			
Licence	<input type="checkbox"/>	Relevant works approval number:		None <input type="checkbox"/>
		Has the works approval been complied with?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Has time limited operations under the works approval demonstrated acceptable operations?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Date Report received:		
Renewal	<input type="checkbox"/>	Current licence number:		
Amendment to works approval	<input type="checkbox"/>	Current works approval number:		
Amendment to licence	<input checked="" type="checkbox"/>	Current licence number:	L8644/2012/1	
		Relevant works approval number:	N/A	<input type="checkbox"/>
Registration	<input checked="" type="checkbox"/>	Current works approval number:	None	<input type="checkbox"/>
Date application received	11/08/2020			
Applicant and Premises details				
Applicant name/s (full legal name/s)	Big Bell Gold Operations Pty Ltd			
Premises name	Cue Gold Operations – Tuckabianna Project			
Premises location	Mining Tenments M20/55, M20/108, M20/111, M20/176, M20/183, M20/195, M20/208 and M20/247 Cue WA 6640			
Local Government Authority	Shire of Cue			
Application documents				
HPCM file reference number:	A1921710			
Key application documents (additional to application form):	Supporting Document and Mining Tenement Reports			
Scope of application/assessment				
Summary of proposed activities or changes to existing operations.	Licence amendment to remove a groundwater monitoring point (JMB003) and increase the licence limit for sulphate and TDS			

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 5 Processing or beneficiation of metallic or non-metallic ore	1,400,000 tonnes per annual period	N/A
Category 6 Mine dewatering	1,700,000 tonnes per annual period	N/A
Category 64 Class II putrescible landfill site	500 tonnes per annual period	N/A

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Licence amendment N/A
Has the applicant obtained all relevant planning approvals?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	No clearing is proposed.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Licence/permit No: GWL 176056(3) allows the abstraction of up to 11,900,000 kilolitres (kL) of water from pits and production bores across CGO
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

<p>Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004</i>, <i>Environmental Protection (Controlled Waste) Regulations 2004</i>, <i>State Agreement Act xxx</i>)</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p><i>Mining Act 1978</i> <i>Rights in Water and Irrigation Act 1914</i> <i>Dangerous Goods Safety Act 2004</i> Environmental Protection (Controlled Waste) Regulations 2004</p>
<p>Is the Premises within an Environmental Protection Policy (EPP) Area?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises subject to any EPP requirements?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i>?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Seven reports Date of classification: 15/04/2020</p>