



## Application for Licence Amendment

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

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<b>Licence Number</b>	L8358/2009/2
<b>Licence Holder</b>	Northern Star (Echo Mining) Pty Ltd
<b>ACN</b>	120 974 567
<b>File Number</b>	DER2015/001858
<b>Premises</b>	Bronzewing Gold Mine 106 McClure Road  Legal description –  Mining tenements M36/146, M36/200, M36/263, M36/295, L36/183, L36/200 and L36/245  As defined by the Premises maps attached to the Revised Licence
<b>Date of Report</b>	2 July 2021
<b>Decision</b>	Revised licence granted

**A/MANAGER, RESOURCE INDUSTRIES  
REGULATORY SERVICES**

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

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## 1. Decision summary

Licence L8358/2009/2 is held by Northern Star (Echo Mining) Pty Ltd (Licence Holder) for the Bronzewing Gold Mine (the Premises), located at Mining Tenements M36/146, M36/200, M36/263 and M36/295.

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 operation of the Premises. As a result of this assessment, Revised Licence L8358/2009/2 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 4 December 2020, the Licence Holder submitted an application to the department to amend Licence L8358/2009/2 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following proposed amendments are being sought:

- Modification of the premises boundary address and map to include three additional mining tenements (L36/183, L36/200 and L36/245).
- Inclusion of Central Pit as a new dewatering discharge location. An existing pipeline network and corridor, which is contained within earthen bunds, will be utilised.
- Reduction of inspection frequencies for the dewatering pipelines and sewage evaporation ponds.
- Inclusion of Central Pit dewatering monitoring.
- Removal of 'further investigations' conditions 11 and 12 from the licence.

Condition 11 required the Licence Holder to review existing hydrogeological and geophysical data from the area to determine whether additional monitoring bores around the existing Tailings Storage Facility (TSF) known as TSF1 (Bronzewing) should be constructed. The results were to be submitted to the CEO by 13 May 2019.

Condition 12 required a review of the sampling and analytical methods for nitrate monitoring undertaken as part of the Seepage Management Plan for TSF1 (Bronzewing), to determine whether these are adequate to protect the environment. The results were to be submitted to the CEO by 13 May 2019.

This amendment report is limited only to the proposed changes to Categories 5, 6 and 85 activities within the Existing Licence. No changes to the aspects of the existing Licence relating to Categories 52, 73 and 89 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 *Guideline: 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.

**Table 1: Licence Holder controls**

Emission	Sources	Potential pathways	Proposed controls
<b>Category 6: Mine dewatering</b>			
Saline water	Orelia and Lotus Pits (dewatering source)	Direct discharge to land via pipeline leaks/rupture	Pipeline located within earthen bund. Installation of a telemetry system or an automatic cut-off system. Visual pipeline inspections for pipeline integrity.
Saline water	Orelia and Lotus Pits (dewatering source)	Direct discharge to Central Pit causing contamination of pit water	Water quality within Central Pit and the source pits are similar. They can all be described as moderately saline, which is reflective of background regional groundwater quality. The following Total Dissolved Solids (TDS) levels (ppm) were found in each pit: Central Pit – 3,923 Orelia Pit – 5,956 Lotus Pit – 3,017 pH between the three pits ranges from 7.83 to 7.98.
Saline water	Central Pit	Direct discharge to land via overtopping of pit	A survey completed in February 2021 confirmed Central Pit contains 3 GL of water. The water storage volume in Central Pit is estimated to be 4,681,999 kL. A minimum of 50 m freeboard below the Central Pit crest level is planned to be maintained.
Saline water	Central Pit	Seepage through base of pit causing mounding of groundwater	Central Pit is considered to act as a sink, given the high evaporation rates (approximately 3,000 mm/year). Hydrogeological assessments have outlined there are steep hydraulic gradients towards the pit which reflects the low

Emission	Sources	Potential pathways	Proposed controls
			<p>permeability of the basement rock aquifer around Central Pit.</p> <p>The nearest groundwater user is the Bronzewing Mine Site which abstracts water from BTP2 bore, approximately 4.5 km north of Central Pit.</p> <p>Considering the high evaporation rates and low permeability of the surrounding rock mass the pit has been excavated within, the Licence Holder considers it unlikely there will be any impact to the environment.</p>
<b>Category 85: Sewage facility:</b>			
Treated effluent	Sewage evaporation ponds	Overtopping of ponds	The Licence Holder has proposed to reduce the frequency of inspections from 12 hourly to 48 hourly of the sewage evaporation ponds. The Licence Holder has stated that due to high evaporation rates, low rainfall and that the ponds are oversized at approximately 30,000 m <sup>3</sup> capacity given the plant throughput of <100 m <sup>3</sup> per day, the risk of overtopping is deemed low.
<b>Category 5: Processing or beneficiation of metallic or non-metallic ore</b>			
Tailings seepage (including cyanide and arsenic)	TSF1 (Bronzewing)	Seepage through base of TSF causing contamination and mounding of groundwater	A seepage management plan for TSF1 (Bronzewing) was submitted to the department in November 2016. Due to the inactive nature of TSF1 (Bronzewing); the aquifer parameters, the ongoing natural decline in water levels with time as well as the consistent compliance hydrochemistry, it is planned that no active measures be implemented that will alter the current recovery regime.

### 3.1.2 Receptors

In accordance with the *Guideline: 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 environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DER 2016)). There are no human receptors in close proximity to the Premises. Barwidgee Station is the nearest human receptor located 40km away.

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

Environmental receptors	Distance from prescribed activity
Wanjarri Nature Reserve	A Class A Nature Reserve located 6.5 km west of the Premises
Native Vegetation	<p>Native Vegetation type is predominantly Mulga low woodlands on plains and often rich in ephemerals. It is also characterised by hummock grasslands, saltbush scrublands and samphire shrublands. A targeted search was carried out in 2004 by Outback Ecology to identify any Priority Flora or Declared Rare Flora. There was none identified.</p> <p>Surrounding pipeline corridor – approximately 5 m and 25 m from the pipeline due north and south respectively.</p>
Groundwater	<p>Groundwater in the area is generally fresh to brackish (5,000 to 10,000 mg/L Total Dissolved Solids (TDS)) and the pre-mining table ranged from 8 to 12 metres below ground level (mbgl). Depth to groundwater encountered at approximately 16 mbgl from compliance bore 200 m west of Central pit. Relatively, the Central Pit lake water was surveyed to be 88 m below surface. The closest groundwater supply source is the Thompson Well Borefield, located 5 km downstream of the premises. This bore is used to provide raw water for the Bronzewing site village. There are no other pastoral bores nearby.</p>

## 3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk assessments* (DWER 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 incomplete 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 L8358/2009/2 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises.

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

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

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
<b>Operation</b>								
Seepage of tailings from TSF1 (Bronzewing) Source: <ul style="list-style-type: none"> <li>TSF1 (Bronzewing)</li> </ul> Activities: <ul style="list-style-type: none"> <li>Tailings and contaminated water disposal to TSF1 (Bronzewing)</li> </ul>	Seepage	Leachate	Groundwater	Refer to section 3.1	C = Moderate L = Almost certain <b>High Risk</b>	N	<b><u>Conditions 11 and 12</u></b>	During a review of the licence in 2018, conditions 11 and 12 were added, requiring further investigations, as a result of the risk assessment (risk of seepage rated as high) and an internal review of the Licence Holder's Seepage Management Plan by DWER's Contaminated Sites Branch. The findings of the investigations were required to be submitted to DWER by 13 May 2019. However, they were never submitted. This will be recorded as a non-compliance against the conditions.  The results of these reviews are required to be submitted in order for DWER to be satisfied that seepage from TSF1 (Bronzewing) is appropriately managed. Therefore, the risk

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Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
								assessment and conditions will remain with a new submission date of 13 December 2021.
Dewatering activities: mine dewater discharged into Central Pit	Saline water through pipeline rupture	Direct discharge	Surrounding native vegetation	Refer to section 3.1	C = Moderate L = Possible <b>Medium Risk</b>	Y	Conditions 2 and 3	N/A
	Lateral movement of pit lake water through pit wall	Seepage through pit walls causing groundwater mounding and/or contamination	Groundwater and native vegetation through groundwater mounding	Refer to section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 9	N/A
	Overtopping of saline water	Direct discharge	Surrounding native vegetation	Refer to section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 9	N/A
Sewage evaporation ponds	Sewage	Direct discharge from overtopping and nutrient loading to land	Surrounding native vegetation	Refer to section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 3	N/A

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: 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.

## 4. Consultation

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

**Table 4: Consultation**

Consultation method	Comments received	Department response
Licence Holder was provided with draft amendment on 15 June 2021	Refer to Appendix 1	Refer to Appendix 1

## 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**

Condition no.	Proposed amendments
Cover page	Premises address updated with three additional mining tenements.
Condition 1	Table 2 of condition 1 has been amended to include dewatering from Orelia and Lotus Pits to Central Pit.
Condition 2	Table 3 of Condition 2 has been updated to include operational requirements of the dewatering pipelines as per the applicants controls.
Condition 3	Table 4 of condition 3 has been amended to reflect new inspection frequencies for dewatering pipelines and sewage evaporation ponds.
Condition 9	Table 7 of condition 10 has been amended to add Central Pit to the dewatering monitoring requirements.
Conditions 11 and 12	The due date of the results of the further investigations review, regarding TSF1 (Bronzewing) seepage management have been amended to 13 December 2021.
Schedule 1	Updated premises boundary map.

## References

1. DWER 2016, *Guideline: Environmental siting*, Joondalup, Western Australia.
2. DWER 2017, *Guideline: Risk assessments*, Joondalup, Western Australia.
3. Department of Environment Regulation (DER) DER 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. Northern Star (Echo Mining) Pty Ltd 2020, Resources Bronzewing Gold Mine – Licence Amendment Application L8358/2009/2, Subiaco, Western Australia

## Appendix 1: Summary of Licence Holder's comments on risk assessment and draft conditions

Decision Report reference	Summary of Licence Holder's comment	Department's response
3.1.1	The Licence Holder was requested to confirm capacity of Central pit to receive dewatering. The Licence Holder has provided the water storage volume estimate, determined by surveying the volume between the current Central Pit water level and 10 m below the saddle which passes between Central Pit and the Discovery In Pit TSF.	Noted and included in Table 1.
3.1.1	The Licence Holder was requested to confirm minimum freeboard to be maintained in the receiving pit. The Licence Holder confirmed a 50 m freeboard would be maintained in Central Pit.	Noted and included in Table 1.
3.1.1	The Licence Holder was requested to provide evaporation and rainfall rates to support the statement in Table 1. Rates were provided and sourced from Bureau of Meteorology.	Noted, the rates support the statement regarding high evaporation and low rainfall.
3.1.1	The Licence Holder was requested to confirm the distance of vegetation to the dewatering pipeline. The Licence Holder has confirmed that vegetation is located approximately 5 m and 25 m due north and due south from the pipeline.	Noted and included in Table 1.

## Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)			
<b>Application type</b>			
Amendment to licence	<input checked="" type="checkbox"/>	Current licence number:	L8358/2009/2
		Relevant works approval number:	N/A <input type="checkbox"/>
Date application received	4 December 2020		
<b>Applicant and Premises details</b>			
Applicant name/s (full legal name/s)	Northern Star (Echo Mining) Pty Ltd		
Premises name	Bronzewing Gold Project		
Premises location	L36/183, L36/200, L36/245, M36/146, M36/200, M36/263 and M36/295		
Local Government Authority	Shire of Leonora		
<b>Application documents</b>			
HPCM file reference number:	A1968274		
Key application documents (additional to application form):	Cover Letter Attachment 2 – BZW Prescribed Premises Map Attachment 3A Attachment 3B – BZW Pipeline Corridor NOI 3955  Further email received on 12 March 2021 titled ‘L8358 – Northern Star Resources Limited NSRL – Bronzewing Mine – Response to Request for Information RFI’		
<b>Scope of application/assessment</b>			
Summary of proposed activities or changes to existing operations.	<i>Licence amendment</i> -Proposal to discharge mine dewater from Orelia Pit to Central Pit using existing pipeline. -Update premises boundary address and map -Decrease frequency of dewatering pipeline and sewage evaporation pond inspections. -Removal of ‘Further Investigations’ conditions as completed -Update references to ‘Echo’ and replace with ‘Northern Star Resources’		
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 6 – mine dewatering	1,000,000 tpa	N/A	
<b>Legislative context and other approvals</b>			

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"/>	Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input 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"/>	Ministerial statement No: EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Certificate of title <input type="checkbox"/> General lease <input type="checkbox"/> Expiry: Mining lease / tenement <input type="checkbox"/> Expiry: Other evidence <input type="checkbox"/> Expiry:
Has the applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Approval: Expiry date: If N/A explain why?
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 not required.
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"/>	Name: N/A Type: N/A Has Regulatory Services (Water) been consulted? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Regional office: Goldfields

<p>Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Name: N/A  Priority: N/A  Are the proposed activities/ landuse compatible with the PDWSA (refer to <a href="#">WQPN 25</a>)?  Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/></p>
<p>Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx</i>)</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p><i>Mining Act 1978</i></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 type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Classification: N/A  Date of classification: N/A</p>