



Application for Licence Amendment

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

Licence Number	L9155/2018/1
Licence Holder	Karora (Higginsville) Pty Ltd
ACN	108 547 217
File Number	DER2018/001153
Premises	Higginsville Gold Project HIGGINSVILLE, WA, 6443 M15/351, M15/289, M15/225, M15/642, M15/348, M15/31, M15/786, M15/506, M15/507, M15/620, M15/629, M15/639, M15/640, M15/580, M15/581, M15/597, L15/225, L15/288, L15/302, G15/19, G15/23, M15/528, M15/231, M15/748, M15/512, M15/352, M15/610, M15/375, M15/338, M15/1790, M15/1814, L15/282, L15/347, G15/26, G15/27, G15/29, L15/382, L15/389, M15/325, M15/681, M15/817, M15/1132 and L15/298.
Date of Report	2 August 2024
Decision	Revised licence granted

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1. Decision summary

Licence L9155/2018/1 is held by Karora (Higginsville) Pty Ltd (Licence Holder) for the Higginsville Gold Project (the Premises), located at Higginsville Gold Mine.

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 L9155/2018/1 has been granted.

The Revised Licence issued as a result of this amendment consolidates and supersedes the existing Licence/Works Approval previously granted in relation to the Premises.

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 Premises Description and Amendment summary

Higginsville Gold Operations is located 125 km south of Kalgoorlie, within the Eastern Goldfields region. The site includes multiple open pit and underground mining operations, with all ore processed at the Higginsville processing plant. Ore processing involves standard crush, grind, gravity and carbon-in-leach (CIL) circuits with a throughput of approximately 1.5 million tonnes per annum (Mtpa). The site has a paddock-style tailings storage facility (TSF) and three in-pit TSFs (Aphrodite, Fairplay East and Vine in-pit TSFs). Hypersaline mine dewater from mining is pumped to the processing plant for use, or discharged to disused open pits. The site is also licensed for sewage and landfill facilities.

On 24 February 2024, the Licence Holder submitted an application to the department to amend Licence L9155/2018/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Dewatering from Atreides pit to allow mining of ore and discharging into the nearby Louis pit or Josephine pit. A turkey's nest is also proposed to provide access to raw water for dust suppression during mining. No additional increase to the approved dewatering volume is required under this amendment.
- An extension to the expiry date of licence L9155/2018/1 which expires on the 17/09/2024.
- Amend the premises boundary to include mining tenement M15/1132.
- Change the Licence Holder name from Avoca Mining Pty Ltd to Karora (Higginsville) Pty Ltd.

This amendment is limited only to changes to Category 06. No changes to the aspects of the existing Licence relating to Category 5, 54 and 64 have been requested by the Licence Holder.

Table 1 below outlines the proposed changes to the existing Licence.

Table 1: Proposed changes

Category	Current design/throughput capacity	Description of proposed amendment
Category 05: Processing or beneficiation of metallic or	1,500,000 tonnes per year	No changes proposed

non-metallic ore		
Category 06: Mine dewatering	5,515,000 tonnes per year	No changes proposed to dewatering/discharge volumes. Applicant seeks approval to additional source (new pit) and discharge points only (2 pits).
Category 54: Sewage facility	No more than 200 cubic metres per day	No changes proposed
Category 64: Class I or II putrescible landfill	20 tonnes or more per year	No changes proposed

2.2.1 Proposed activities

Category 6

The Licence Holder is planning to commence the Atreides cutback project which will take approximately 6 months to mine. Accessing the pit will require dewatering below the standing water level and discharging raw water into the Louis pit located 800 m to the east, or Josephine pit located 700 m to the north (Figure 1). The dewatering location will be confirmed once final mine designs have been completed but both locations are feasible discharge points.

Standing water level (SWL) in the Atreides pit is 9 m below surface and approximately 74,304kL will need to be transferred to Louis or Josephine pit to commence mining. The SWL in Louis pit is currently 46 m and Josephine is 32 m below surface. The life of the project which is approximately 6 months.

The dewatering of Atreides pit will require a HDPE pipeline approximately 800 m in length to be constructed to the Louis pit and a 750 m pipeline to the Josephine pit. The pipeline infrastructure will transfer hypersaline water and will be installed in an appropriate containment trench with scour sumps installed at regular intervals. The pipeline routes will be installed along access tracks and ROM areas which have been disturbed during previous mining activities in the area. Daily inspections will be undertaken along the pipeline route and at the discharge location to detect any issues. Hypersaline water will be discharged into the disused pits which both already contains hypersaline water, albeit of a lower TDS.

Atreides pit has a neutral pH and is hypersaline with results between 6.9 and 6.1 pH, and total dissolved solids (TDS) between 320,000 and 122,000 mg/L. Louis pit has a neutral pH between 7.4 and 6.4 pH and TDS between 95,000 and 83,000 mg/L. Josephine pit has also has a neutral pH between 7.6 and 7.2 with TDS between 94,000 and 110,000 mg/L. Given the hyper-salinity of the groundwater water in the region, there is no beneficial usage for stock watering or fauna consumption.

Groundwater in the area of the pits and underground is hypersaline and exists primarily within fractured rocks and shear zones.

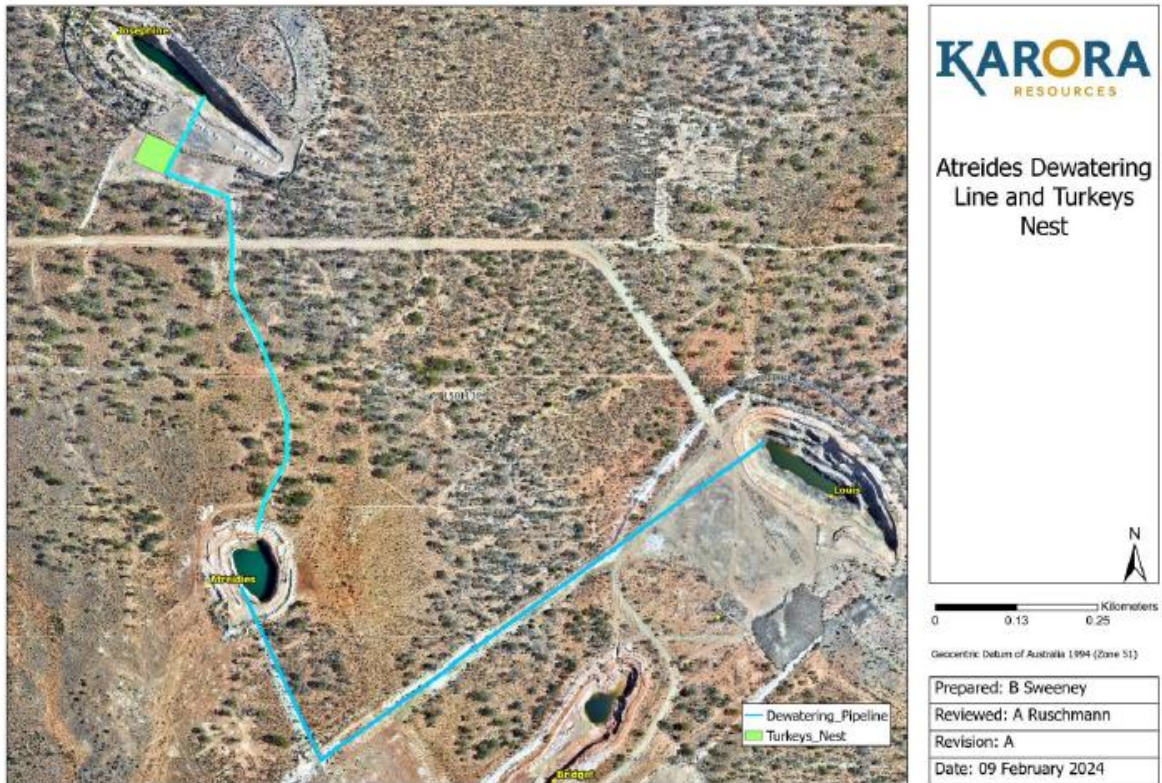


Figure 1 – Atreides, Josephine and Louis pits and pipeline route.

A turkey's nest is also proposed at the Josephine pit to provide an available option for water storage. The turkey's nest will allow water to be stored and utilised via a standpipe for watercarts conducting dust suppression on haulage roads. The turkey's nest will have maximum dimensions of 80 m x 80 m to a maximum height of 3 m. It will be HDPE lined and have a freeboard of 0.5 m maintained during operation. The turkey's nest will be installed on the existing Josephine ROM pad footprint and no additional clearing is required.

A water balance for the mining project has been provided by the Licence Holder. The Josephine pit has an estimated volumetric capacity of 271,633 kL and Louis pit a capacity of 638,161 kL. These two pits are therefore able to accommodate the proposed transfer of 74,304 kL to be dewatered from Atreides pit.

Extension of licence duration

The Delegated Officer has granted an extension of one year under this Licence amendment to enable sufficient time for the licence holder to undertake the proposed dewatering activities before the licence expires.

3. Other approvals – Department of Energy, Mines, Industry Regulation and Safety (DEMIRS)

A Mining Proposal was approved for a cutback to the Atreides pit in May 2016 (Reg ID:59305). An updated Mining Proposal was submitted to DEMIRS to cover dewatering infrastructure and any clearing requirements on M15/1132. The proposal is currently under assessment.

4. 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* (DWER 2020).

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.

4.1 Source-pathways and receptors

4.1.1 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 2 below.

Table 2 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 2: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Dust	Construction/ earthworks of borefield pipelines and bunding Turkey nest construction/ excavations	Air/windborne pathway	<ul style="list-style-type: none"> Standard dust suppression measures (i.e. use of water cart) proposed to control dust emission. Water for dust suppression will be available from Atrides pit.
Hypersaline water	Operation of dewatering pipelines resulting in rupture/leaks of pipeline causing hypersaline water discharge into surrounding environment	Direct discharge to soils, vegetation, and surface water	<ul style="list-style-type: none"> Pipeline infrastructure will be installed in secondary containment (v-drains) with scour sumps at regular intervals along the route to capture any overflow. Daily inspections of the dewatering pipeline route will be undertaken.
	Use of hypersaline water for dust suppression	Direct discharge to soils and vegetation	<ul style="list-style-type: none"> No controls proposed.
	Discharge of hypersaline water to Louis and Josephine pits and turkey nest resulting on overtopping of pits or turkey nest and discharge into surrounding	Direct discharge to soils, vegetation, and surface water	<ul style="list-style-type: none"> Monthly water level readings will be collected from a survey points to determine water levels and volumes in the pit lakes. Extraction and discharge volumes from the pit will be

Emission	Sources	Potential pathways	Proposed controls
	environment		collected monthly.
	Discharge of hypersaline water to turkey nest, Louis and Josephine pits resulting in seepage through the pit/pond base and walls to groundwater	Seepage to soils and groundwater	<ul style="list-style-type: none"> Field water samples (pH, TDS, conductivity) from the pits will be collected quarterly and analysed for any changes in quality. A full analysis by a NATA lab will be completed annually. Licence holder indicated discharge pits will act as groundwater sinks. Groundwater within the area is hypersaline.

4.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), 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 3 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 (*Guideline: Environmental siting* (DWER 2020)).

Table 3: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from activity / prescribed premises
No human receptors within 50km identified	Norseman is the closest town, located 55 km north of along the Coolgardie-Esperance Highway.
Environmental receptors	Distance from activity / prescribed premises
Surrounding vegetation	<p>The Premises area is mapped as Pre-European vegetation type Binneringie – 9 which is described as medium woodland; coral gum (<i>Eucalyptus torquata</i>) and Goldfield's blackbutt (<i>E. lesouefii</i>), also some medium woodland – <i>E. transcontinentalis</i> and <i>E. flocktoniae</i>.</p> <p>Priority flora within 1 km from proposed activities:</p> <p><i>Frankenia glomerata</i> (P4)</p> <p><i>Calandrinia lefroyensis</i> (P1)</p> <p><i>Ptilotus rigidus</i> (P1)</p>
Underlying groundwater (non-potable purposes)	Fractured bedrock. Depth to groundwater ~16 to 20m near the pits. Groundwater salinity ranges between 60,000 and 200,000mg/L.
Surface Water	The Project area falls within the broader Balladonia Water Catchment. Drainage lines within the majority of the Project area are poorly defined and are only likely to flow following major

	<p>rainfall events.</p> <p>Closest drainage is 200 from dewatered pit.</p>
<p>Lake Cowan</p>	<p>Lake Cowan (1.6 km south of dewatered pit) - a wetland of sub-regional, intersects the southern extent of the Project area. The lake represents part of a former palaeodrainage channel and covers an area of approximately 4,460 square kilometres (km²). The lake is predominately dry but may contain water following heavy rain. Water ponded in the lake is most likely lost to evaporation and seepage.</p>

4.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in Section 4.1. 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 4.1), 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 L9155/2018/1 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 4.

The Revised Licence L9155/2018/1 that accompanies this Amendment Report authorises emissions associated with the operation of the premises dewatering discharge points.

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

Table 4. Risk assessment of potential emissions and discharges from the Premises during operation

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Operation								
Source: Mine dewater abstracted from Artreides pit Activity: Transfer of mine dewater from Artreides pit to Louis, Josephine pit or Josephine turkey's nest	Mine dewater – Hypersaline	Potential pathway: <ul style="list-style-type: none"> Seepage of mine dewater through the base and walls of pits or turkey's nest to soil and groundwater. Potential impacts: <ul style="list-style-type: none"> Groundwater contamination and mounding causing impacts to native vegetation health. 	<ul style="list-style-type: none"> Native vegetation – located adjacent or nearby to the pits 	Refer to Section 3.1.1	C = Minor L = Unlikely Low Risk	Yes	Condition 8, 20, 30, 31	N/A
		Potential pathway: <ul style="list-style-type: none"> Mine dewater discharged to land from rupture/leak of dewatering pipeline. Potential impacts: <ul style="list-style-type: none"> Reduced surface water quality or contamination; and Soil sodicity, areas impacted by hypersaline or contaminated water may become dispersive, causing increased erosion/ sedimentation. 	<ul style="list-style-type: none"> Native vegetation (located adjacent to the existing dewatering pipeline/pits); Surface water Heritage sites 	Refer to Section 3.1.1	C = Minor L = Possible Medium Risk	Yes	Condition 1, 5, 8	N/A
		Potential pathway:	<ul style="list-style-type: none"> Native vegetation located adjacent 	Refer to Section	C = Minor	Yes	Condition 1,	N/A

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
		<ul style="list-style-type: none"> Mine dewater discharged to land from overtopping of pits or turkey nest. <p>Potential impacts:</p> <ul style="list-style-type: none"> Reduced surface water quality or contamination; and Soil solidity, areas impacted by hypersaline or contaminated water may become dispersive, causing increased erosion/sedimentation 	to or nearby pits/turkey's nest	3.1.1	L = Unlikely Medium Risk		8, 11, 20	
<p>Source: Mine dewater abstracted from Artreides</p> <p>Activity: Mine dewater used for dust suppression.</p>		<p>Potential pathway:</p> <ul style="list-style-type: none"> Direct mine dewater discharge to land from a water transport vehicle. <p>Potential impacts:</p> <ul style="list-style-type: none"> Soil solidity, impacted areas may become dispersive, causing increased erosion/sedimentation; and Impacts to native vegetation health 	Native vegetation – in direct contact of mine dewater used for dust suppression.	Refer to Section 3.1.1	C = Slight L = Unlikely Low Risk	No	<u>Condition 15</u>	This source pathway receptor linkage was not discussed in the application. Although it is considered low-risk, condition 15 has been added to reduce the potential for environmental impacts on native vegetation to an acceptable level.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk assessments* (DWER 2020).

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

5. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

Table 5: Consultation

Consultation method	Comments received	Department response
Ngadju Native Title Aboriginal Corporation on 25 March 2024	No comments received	N.A
Licence Holder was provided with draft amendment on 5 July 2024	Comment from Licence Holder received on 17 July 2024: Add 'when in operation' to the frequency of monitoring for emission points G1 – G6 in Table 12.	The Delegated Officer has determined to amend the condition to provide flexibility (and prevent an administrative non-compliance) when no discharges occur during a given month or quarter. Should any discharge occur on any day during a monitoring period, the licence holder is required to collect a sample to maintain compliance with this condition.

6. 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.

6.1 Summary of amendments

Table 6 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 6: Summary of licence amendments

Condition no.	Proposed amendments
Cover page	Licence holder name changed to Karora (Higginsville) Pty Ltd
Cover page	Duration extender for one year
Licence History	Removed WA and previous Licence and added this amendment
Condition 8 Table 5	Josephine turkey's nest and Artreides dewatering pipelines
Condition 11 Table 7	Emission points to Louis pit and Josephine pit have been added
Condition 15	Condition added to manage vegetation impacts due to hypersaline water being used for dust suppression
Condition 20 Table 12	Amended pit lake water monitoring requirements.

Condition 21 Table 13	Addition of monitoring requirements for water discharge volumes.
Condition 29	Turkey's nest construction reporting requirements.
Schedule 1 – Figure 1	Figure updated
Schedule 1 – Figure 15	New figure added showing dewatered pit, pipelines and discharge points

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.