

# **Amendment Report**

## **Application for Licence Amendment**

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

Licence Number	L8422/2010/2
Licence Holder	Edna May Operations Pty Ltd
ACN	136 365 001
File Number	DER2017/000298-1
Premises	Edna May Gold Project
	Warrachuppin Road
	WESTONIA WA 6423
	Mining tenements: M77/88, M77/110, M77/124, G77/122 and L77/18
	As defined by the Premises maps attached to the Revised Licence
Date of Report	21 September 2020
Decision	Revised licence granted

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## 1. Decision summary

Licence L8422/2010/2 is held by Edna May Operations Pty Ltd (Licence Holder) for the Edna May Gold Project (the Premises), located at M77/88, M77/110, M77/124 and L77/18, Westonia.

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 construction and operation of the Premises. As a result of this assessment, Revised Licence L8422/2010/2 has been granted.

The Revised Licence issued as a result of this amendment consolidates and supersedes the existing Licence previously granted in relation to the Premises. The Revised Licence has been granted in a new format with existing conditions being transferred, but not reassessed, to the new format.

## 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 <a href="https://dwer.wa.gov.au/regulatory-documents">https://dwer.wa.gov.au/regulatory-documents</a>.

### 2.2 Application summary

On 7 April 2020, the Licence Holder submitted an application to the department to amend Licence L8422/2010/2 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- The installation of a leach feed thickener;
- The close circuiting of the existing cone crusher with a sizing screen; and
- The installation of a lead nitrate storage and liquid oxygen storage and distribution facility.

This amendment is sought to enable economic extraction of precious metal from a new ore source. Externally sourced ore will be transported to the ore run of mine (ROM) where it will be milled and processed through a Carbon in Leach (CIL) processing plant. Tailings are to be discharged in the existing tailings storage facility (TSF) located within the integrated waste landform (IWL). The TSF has one cell, an associated decant tower and submersible pump which returns supernatant claim water to the process water pond.

#### Ore body:

The Licence Holder is proposing to extract ore from the Tampia deposit located 12km southeast of Narembeen and 100km south of the Edna May goldmine in the Wheatbelt region of Western Australia. Road haulage distance to the Edna May mill is around 140km. Tampia Hill Gold Project is located on Mining Tenement M70/816 and held by Ramelius Resources Ltd.

Ore is not processed at the Tampia mine and therefore the site does not currently hold a licence under Part V of the EP Act.

#### **Existing tailings characteristics:**

- Salinity of slurry water at 33g/L (similar to site groundwater)
- Total cyanide (CN) in slurry water 80 120 mg/L

- Weak acid dissociable cyanide (WAD CN) in slurry water 50mg/L
- pH of slurry ex plant 9- 10
- Average slurry density ex-plant is 52% solids
- Settled tailings dry density 1.3t/m<sup>3</sup>
- Particle size distribution (%sand-silt-clay) 52%-44%-4% passing 75 microns
- Hydraulic Conductivity of between 10<sup>-5</sup>m/sec and 10<sup>-7</sup> m/sec
- Tailings beach slope 0.5 to 1%

#### Externally sourced tailings properties:

The tailings will have particle size distribution P80 of 125 $\mu$ m. A PSD completed by CSIRO is included below:



The solid content of the tailings will be 55 to 60%w/w in water.

The solids dry density has been measured 2.95g/cm<sup>3</sup>

The following is taken from a CMW Geoscience report dated 10 April 2018 and entitled "Tailings Storage Facility Tampia Gold Project" (Ref. PER2017-0464AD Rev 1):

A geochemical characterisation of the tailings was performed by MBS Environmental (MBS Environmental, 2018)

The results of the tailings characterisation indicated:

- Classification as non-acid forming (NAF) as a consequence of a substantial excess of acid neutralising capacity (ANC) over potential acidity produced by oxidation of sulphide and arsenic minerals.
- Significant geochemical enrichment of metalloid elements arsenic and tellurium.
- Minor geochemical enrichment of metals including chromium, molybdenum and manganese.

Seepage from fresh tailings is predicted to be:

- Alkaline, with pH values between 9.8 and 10.8, depending on dilution with incident rainfall in the TSF.
- Non-saline, unless saline water is used in the processing plant.

- Metalliferous, with elevated concentrations of arsenic and copper.
- MBS recommended a very low permeability barrier such as a compacted clay liner in order to reduce seepage from the TSF.

The properties of the tailings were assessed against the current tailings properties and a summary provided by Coffey (2020), the summary concludes that the future tailings and existing tailings are comparable in terms of settling characteristics, however the future tailings will be finer and have lower hydraulic conductivity. The report found that the effect at the existing IWL could conservatively be regarded as negligible i.e. a slight reduction in both seepage and water recovery. Tampia will provide 20-30% of the total Edna May feed processed at Edna May.

This amendment is limited only to changes to Category 5 activities from the Existing Licence. No changes to the aspects of the existing Licence relating to Category 6, 61, 64 have been requested by the Licence Holder.

Table 1 below outlines the proposed changes to the existing Licence

 Table 1: Proposed throughput capacity changes

Category	Current throughput capacity	Proposed throughput capacity	Description of proposed amendment	
5	3,200,000 tonnes per annual period	No change proposed.	The Licence Holder has upgraded the current processing facility to allow for the processing of a new ore body.	

### 2.3 Consolidation of Licence

As part of this amendment package the department has consolidated the licence by incorporating changes made under the Amendment Notices as summarised in Table 2.

Instrument	Issued	Summary of approval
L8422/2010/2	10 March 2016	Licence granted
Amendment Notice 1	20/12/2018	Amendment Notice 1 – To allow construction of three new ponds to accept liquid waste, to increase the septage limit to 1255 KL per annual period and to change the waste acceptance.

Table 2: Licences consolidated in this amendment

The obligations of the licence holder have not changed in consolidating the licence. The department has not undertaken any additional risk assessment of the Premises related to previous Amendment Notices.

In consolidating the licence, the CEO has:

- updated the format and appearance of the Licence;
- deleted the redundant AACR form set out in schedule 1 of the previous licence and advise the licence holder to obtain the form from the department's website;
- revised licence condition's numbers, and removed any redundant conditions and realigned condition numbers for numerical consistency; and
- corrected clerical mistakes and unintentional errors.

The full consolidation of licence conditions as they relate to this Revised Licence are detailed in Section 5.1. Previously issued Amendment Notices will remain on the department's website for future reference and will act as a record of the department's decision making.

## 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 construction and operation which have been considered in this Amendment Report are detailed in Table 3 below.

Table 3 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Emission	Sources	Potential pathways	Proposed controls		
Dust	Process facility traffic during construction and operations.	Air/windborne pathway wind direction is predominantly in an easterly direction (BoM, 2019)	Water trucks fitted with sprays/dribble bars water unsealed and regularly trafficked areas such as access tracks, work areas and haul roads. Limits on vehicle speeds and restricted access to roadways [maximum 20km/hr limit)		
	Recycle crusher sizing screen	Air/windborne pathway	Covers on transfer points and chutes Testwork review and design completed by compliant engineers at GRES.		
			Covers and dampening. Use all practicable measures to minimise airborne dust.		
			Regular dust monitoring in accordance with site Environmental Management Plan:		
			<ul> <li>There are 9 depositional dust gauges located around the premises and one located at the Western Borefield is used to gather background data for comparison.</li> </ul>		
			<ul> <li>Additional onsite management is undertaken in the event that monitoring results indicate a maximum increase in depositional dust (from background concentrations) of 2g/m<sup>2</sup>/month annual average</li> </ul>		
Noise	Recycle crusher sizing screen	Air/windborne pathway	There is a Noise Management Plan in place and management strategies are in place to minimise impacts of noise on sensitive receptors.		

 Table 3: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
			<ul> <li>Includes:         <ul> <li>Annual noise monitoring at six locations around the premises to measure the impacts to sensitive receptors and management strategies to minimise noise. Noise bunds on site around the open pit.</li> </ul> </li> <li>An Environmental Noise Assessment, February 2020 was submitted as part of the application.</li> </ul>
Water containing supernatant low solids concentration water	Leach feed thickener	Direct discharge, overflow	Leach feed thickener product will be stored in two locations. Supernatant low solids concentration water will overflow the thickener into a launder and will be pumped to the existing water storage pond. Thickened solids and water stream will be pumped to existing leach feed tanks. Input streams to the thickener are slurry flow from the existing grinding circuit, water from existing process water pumps and dissolved flocculent (in water) from new flocculent preparation and distribution system. Leach feed thickener has a concrete bund, overflow tank with transfor pumps, leach feed
			thickener underflow pumps.
Discharge of waste from chemical storage (liquid oxygen and	Liquid waste storage facility	Direct discharge	Liquid oxygen concrete pad storage and pipework to comply with Australian Standard AS1894-1997 The storage and handling of non-flammable cryogenic and refrigerated liquids (AS1894-1997)
ieau fiitrate)			Protective bollards included in the design and will be installed as per supplier requirements.
			Bunding around the lead nitrate will utilise a double skinned storage tank as well as concrete bunding that will drain to an existing sump. The sump discharges to a thickener feed hopper. Pumping for the lead nitrate is to be placed in the existing plant bunding. Lead nitrate delivery utilises an existing delivery pad.
			A Dangerous Goods Map has been developed and submitted.
			Concrete for vessel and tankage foundations and bunding shall be Grade 32MPa to Australian Standard AS3600 – 2018 Concrete Structures (AS3600). All structural concrete shall be cured in accordance with AS3600 with the finish to be free of defects as per engineered design drawings (see Figure 1 and Figure 2).
			Liquid Oxygen is a cryogenic fluid, so spillage is unlikely to require clean-up due to its rapid evaporation. Lead nitrate is located adjacent to existing bunding with sump pump allowing removal of any spilled lead nitrate from outer skin of tank.
			Flocculent storage and distribution is utilising existing site flocculent systems. An additional

Emission	Sources	Potential pathways	Proposed controls
			pump is to be added to the pump bank at the flocculent area which will be positioned within the footprint of the existing two pumps.
Tailings	Tailings from new ore source	Seepage of TSF	The IWL has an underdrainage collection system and a seepage collection system.
			IWL has a compacted clay liner of approximately 1 x 10 <sup>-8</sup> m/s
			Perimeter seepage interception trenches and surface water diversion bunds are in place to mitigate potential impacts to nearby surface water receptors (see Figure 3).
		Overtopping of TSF	As of September 2019, the TSF has an approved design capacity of 4.5 Mt which will be sufficient capacity to store externally processed ore expected to be processed over the next several years.
			A minimum operational (wall) freeboard of 300mm and minimum total (beach and wall) freeboard is 500mm.
		Pipeline failures, and / or supernatant ponds	Tailings are pumped through polyethylene pipe to the IWL for permanent disposal. The pipeline is located within bunded works of compacted clay, designed to contain spillage from a failure in the pipeline.
Chemical	Processing gaseous emissions	Air/windborne pathway	EMO annually submits an energy and emission report under sections 19, 22G and 22X of the National Greenhouse and Energy Reporting Act 2007 (NGER).



Figure 1: Liquid Oxygen Design bunding



Figure 2: Lead Nitrate Storage Tank



#### Figure 3: Piezometer location and seepage trenches

### 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 4 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)).

Table 4: Sensitive huma	an and environmental	receptors and	distance from	prescribed
activity				

Human receptors	Distance from prescribed activity
Closest residential receptor	Immediately adjacent the western premises boundary Westonia Town is 1km south of the premises boundary
Environmental receptors	Distance from prescribed activity
Rights in Water and Irrigation Act 1914 (RIWI Act 1914) – Groundwater area – Westonia Groundwater Area	Within premises boundary
Eucalypt woodlands of the Western Australian Wheatbelt (Threatened Ecological Community and Priority 3 Ecological Community) <i>Eucalyptus longicornis</i> (Red Morrel Woodland of the Wheatbelt) (Priority 1 Ecological Community)	Within premises boundary
Eremophila resinosa (Threatened Flora)	Within premises boundary
<i>Eucalyptus salmonophloia</i> (Salmon gum woodlands) (Priority 3)	Within premises boundary
Austrostipa blackii (Priority 3)	Within premises boundary
Acacia ancistrophylla var. perarcuata (Priority 3)	Within premises boundary
Carrabin Nature Reserve and Sandford Rocks Nature Reserve	Located 6.8km south east of the premises boundary and 6.2km south of the premises boundary.
Groundwater	Within the Westonia area groundwater occurs in weathered and fractured bedrock aquifers with depths to groundwater varying between 28 – 40m below ground level (mbgl) (pre-mining levels). Groundwater levels have since declined as a result of dewatering of the main Edna May pit (53m AHD). Dewatering at the site has created a cone of depression >100m deep around the pit. All groundwater extracted from production and dewatering bores is used in processing and dust suppression. Groundwater levels are monitored on site at the IWL

	(TSF). The shallowest groundwater was monitored at monitoring bore M12 at 7.24 mbgl.
	The current groundwater quality from the extraction sources in 2018 has a near-neutral pH and is hypersaline. Groundwater from the monitoring bores ranged between 24,500 – 49,300 mg/L TDS.
Surface water	Ephemeral creeks in the general area drain into a number of salt lakes; the nearest of which is Lake Mount Brown, located approximately 50 km north of the premises.
	Drainage is to the northeast and normally terminates 35km to the northwest at Lake Camion – Lake Brown.





Figure 3-2: Location of the project relative to residential properties and Westonia townsite

### Figure 4: Distance to sensitive receptors



Figure 2-1: Existing Edna May Gold Mine layout

#### Figure 5: Site Layout



Figure 6: Leach feed thickener and storage facility

### 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 5.

The Revised Licence L8422/2010/2 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. Category 5 activities.

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

Risk Event				Risk rating <sup>1</sup>	Licence			
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood	Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Construction								
Placement and installation of the leach feed thickener, close circuiting of the existing cone crusher with sizing screen, installation of chemical storage facilities.	Dust	Air/windborne pathway causing impacts to health and amenity	Residences immediately west and 1km south	Refer to Section 3.1.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	N/A	N/A
	Noise			Refer to Section 3.1.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	N/A	N/A
Operation								
Operation of the leach feed thickener and sizing screen.	Dust	Air/windborne pathway causing impacts to health and amenity	Residences immediately west and 1km south Threatened and Priority flora	Refer to Section 3.1.1	C = Moderate L = Unlikely Medium Risk	Y	N/A	N/A
Operation of the leach feed thickener and sizing screen.	Noise	Air/windborne pathway causing impacts to health and amenity	Residences immediately west and 1km south	Refer to Section 3.1.1	C = Moderate L = Unlikely Medium Risk	Y	N/A	N/A
Chemical storage facility	Chemical spills / leaks	Direct discharge to surface water and seepage to groundwater causing contamination of waters or	Underlying groundwater Surrounding native vegetation (priority, listed fauna / flora	Refer to Section 3.1.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 10 and Table 3	Conditioning of the design and construction specifications for the bunding has been included to manage the potential risk of chemicals discharged into the environment.

#### Table 5. Risk assessment of potential emissions and discharges from the Premises during construction, and operation

Licence: L8422/2010/2

Risk Event		Risk rating <sup>1</sup>	Licence					
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood	Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
		deterioration of local/ regional surface water ecosystems.	/TEC)					
Deposition of new tailings into existing TSF	Seepage – tailings leachate to soils and groundwater via the floor of the TSF or through the embankment. Contaminants at concentrations of concern (arsenic, cyanide, lead, mercury, molybdenum, cadmium) can pose risk in seepage.	Infiltration to groundwater causing contamination and groundwater mounding.	Underlying groundwater Surrounding native vegetation (priority, listed fauna / flora /TEC)	Refer to Section 3.1.1	C = Major L = Possible <b>High Risk</b>	Ν	Condition 3, 9 <u>Condition 16 &amp;</u> <u>Table 5</u> <u>Condition 17 &amp;</u> <u>Table 6</u>	See Section 3.3
	Overtopping of TSF (breach of freeboard)	Overland runoff potentially causing ecosystem disturbance or contamination	Surrounding native vegetation (priority, listed fauna / flora /TEC) Watercourses, drainage lines	Refer to Section 3.1.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 4	N/A
Pipeline failures – risk of release of tailings or decant under pressure to adjacent vegetation	Tailings slurry	Overland runoff to soil, surface water and groundwater causing contamination	Land and ecosystems bordering or surrounding pipelines.	Refer to Section 3.1.1	C = Moderate L = Unlikely Medium Risk	Y	Condition 1	N/A

Licence: L8422/2010/2

Risk Event					Risk rating <sup>1</sup>	Licence		
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood	Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
			Pipeline failures can result in inundation by decant water and toxicity from tailings causing adverse effects on the environment.					
Deposition of new tailings into existing TSF	Toxic exposure to fauna (birds & bats) from supernatant ponds; especially for low salinity and tailings contain high concentrations of soluble metals / metalloids (specifically cyanide)	Direct contact (ingestion)	Fauna (birds and bats) within the premises.	Refer to Section 3.1.1	C = Moderate L = Possible <b>Medium Risk</b>	Ν	Condition 17 and Table 6	Research has indicated that gold processing tailings with residual WAD-CN in solution above 50mg/L, with a salinity of less than 50,000mg/L present a risk to wildlife health (Adams et al, 2008), Table 5 of the licence requires WAD-CN in tailings supernatant in the TSF to remain below a limit of 50mg/L.

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 from the new ore sources into the existing TSF can result in an increase in seepage and additional contaminants impacting on the groundwater quality.

#### Seepage:

Groundwater monitoring around the existing TSF has indicated that there is significant seepage occurring from the eastern and north-western margins of the TSF on the basis of increasing metal and cyanide concentrations in some monitoring bores.

A water balance assessment that was undertaken by Rockwater consultants in 2018 suggests that currently the seepage rate from the TSF is about 1.9 mm/day. Additional information is required to understand the extent of the seepage, such as the distribution of the seepage from the TSF, the thickness and hydraulic properties of regolith materials that overlie the bedrock in the area, and the duration of the seepage as there is a risk that a groundwater mound beneath a TSF could increase in elevation and radial extent if allowed to continue for a prolonged period of time. Given that there is no increase in throughput associated with this amendment, it is recommended that further studies into seepage and site geology be undertaken at a later date.

The assessment of water level changes for the period of 2018-2019 by Coffey consultants suggest that groundwater mounding is relatively localised near the TSF. Water level data provided in a report prepared by Coffey consultants indicated that significant rises in the elevation of the groundwater potentiometric surface over this time period were only recorded in the following monitoring bores: MB13 (+1.07 metres), MB15 (+0.15 metres), MB7 (+0.07 metres) and MB19 (+0.10 metres). The most significant measured water level rise was near the north-eastern corner of the TSF (in bore MB13) (see Figure 7).



Figure 7: Monitoring bore locations

#### **Tailings properties:**

Information provided by the licence holder about the physical properties of the tailings material that would be produced from processing of ore from the Tampia mine site suggested that Tampia tailings would generally have similar physical properties to those produced by the processing of ore at the Edna May mine site. Although the hydraulic conductivity of Tampia tailings material is expected to be lower than that of the tailings currently present in the TSF at the Edna May mine site. This could reduce the efficiency of water recovery from the tailings if they form a significant proportion of the total mass of material that is to be discharged to the TSF. It is currently expected to be around 30% of the tailings.

However, it appears that no information has been provided about the geochemical behaviour of the Tampia tailings, particularly under the hypersaline conditions with elevated cyanide concentrations that are present in the TSF at the Edna May mine site. This means that it is currently not known whether the disposal of these materials in the TSF will significantly change the chemical composition of leachate, and concentrations of chemical constituents of potential concern (CCOPC) that would seep from this facility. It is therefore recommended that leach tests are carried out on processed ore materials from the Tampia mine site to determine their likely leaching behavior in the Edna May TSF.

### 3.3.2 Pathway and receptors

Seepage from the base or through the embankment of the TSF to groundwater causing groundwater mounding. The premises is adjacent to surrounding native vegetation Eucalypt woodlands of the Western Australian Wheatbelt that is listed as a Threatened Ecological Community (TEC) and Priority 3 Ecological Community.

### 3.3.3 Applicant controls

The TSF has an underdrainage collection system and a seepage collection system. The TSF has a compacted clay liner of approximately  $1 \times 10^{-8}$ m/s. The licence holder has indicated that potential impacts to nearby surface water receptors are managed with existing sediment capture and surface water controls structures (toe drains and bunds).

The licence holder proposes to use the existing monitoring bores to monitor for characteristics of tailings that may occur in seepage of the TSF.

### 3.3.4 Risk rating

Seepage is currently occurring, and the actual extent requires further investigation. No further controls have been proposed by the licence holder. The Delegated Officer has considered the consequence to be **Major**.

The additional tailings to be discharged to the TSF will contain additional contaminants. The Delegated Officer considers the likelihood as **Possible**, although there is still uncertainties around this which need to be investigated further.

The Delegated Officer has compared the consequence and likelihood of this risk event and determine the overall rating is **High.** Based on this rating, the risk event is subjected to regulatory controls.

### 3.3.5 Regulatory controls

#### Seepage:

A groundwater level limit is included in the amended licence conditions for the TSF to ensure that management measures would be implemented to protect the health of vegetation if exceeded. The limit is that the depth of the groundwater potentiometric surface should be maintained at a depth of greater than three metres below the ground surface at each monitoring bore site. Condition 16 and Table 5 has been updated - estimate of seepage loss has been added to the parameters of the water balance to determine the extent of the seepage of the TSF and monitor the potential contamination from the seepage.

Condition 17 and Table 6 has been updated - to include standing water level monitoring for every bore including a limit of 3m(BGL).

#### **Tailings properties:**

Additional leaching tests are included on the licence to be carried out on processed ore materials from the Tampia mine site to determine their likely leaching behaviour in the Edna May TSF. The leaching tests include:

- (i) Short-term leaching tests using a liquid that has the same chemical composition, salinity and cyanide concentration to that which is present in the TSF. These tests could be undertaken using a modified ASLP test procedure, and would indicate the concentrations of CCOPC that would be released from the Tampia materials under relatively oxidising conditions near the surface of the TSF; and
- (ii) Sub-aqueous (saturated) column leaching tests (see e.g. Watson et al., 2016; Søndergaard et al.,2018) on Tampia processed ore materials using liquid with the same chemical composition, salinity and cyanide concentration to that which is present in the TSF. These tests would enable the leaching behaviour of these materials to be determined under anoxic conditions at depth within the TSF. As these tests take at least three months to be undertaken, it is recommended that they are undertaken while tailings disposal is being carried out (*i.e.* approval of tailings disposal is not delayed until these tests have been undertaken).

Condition 18 and 19 – to undertake short term leaching testing and sub-aqueous column leaching tests.

#### Groundwater monitoring:

Additional chemical parameters are included in the groundwater monitoring suite for the premises. This is considered to be necessary, as the current range of monitored parameters does not adequately cover the potential range of CCOPC that could be released from tailings materials in the TSF, and cannot be used for assessing the extent to which leakage has taken place from the facility. The following parameters are included in the groundwater monitoring suite:

- (i) *Major ions* these include sodium, potassium, calcium (already being measured), magnesium, chloride, bicarbonate and sulfate ions.
- (ii) **Additional metals** It is recommended that the following metals are added to the groundwater monitoring suite for the TSF: tungsten, vanadium, cobalt, nickel and chromium.

Condition 17 and Table 6 updated to include additional parameters in monitoring suite.

## 4. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

#### Table 6: Consultation

Consultation method	Comments received	Department response
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal 24 July 2020	DMIRS replied on 3 August stating that DMIRS has no comment in regards to the proposed modifications outlined with the Part V licence amendment application. DMIRS confirms that a Mining	N/A

Licence: L8422/2010/2

	Proposal under the Mining Act 1978 has not been received for this site containing the new ore source, however this is not a constraint for the amendment application.	
Licence Holder was provided with draft amendment on 15 September 2020.	<ul> <li>The additional information that was requested is outlined below:</li> <li><u>The Applicant to provide maximum allowable speed limit:</u> <ul> <li>The maximum allowable speed limit:</li> <li>The maximum allowable speed limit for traffic on roadways through the facility during construction and operation is 20 km/hr</li> </ul> </li> <li><u>Applicant to provide a copy of the Dangerous Goods Map</u></li> <li>A copy of the current site dangerous good map is attached to this email (rm_surv_0600 à rm_surv_0603)</li> <li>A map of the planned works identifying dangerous goods layout is also attached (Dangerous good map planned works). EMO will update the site maps with this additional information on completion of construction.</li> <li><u>Registered business address:</u></li> <li>Level 1, 130 Royal Street, East Perth, WA, 6004</li> <li>DWER to check the text in Table 7: Annual Environmental Report requirements. Is condition 19, Non-compliance notifications, was meant to be referring to Condition 20?</li> <li>Licence Holder waived remainder of comment period.</li> </ul>	Additional information has been included in the Licence and Amendment Report. Table 7 has been amended to Condition 20 referring to non- compliances.

## 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 7 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.

Condition no.	Proposed amendments			
10 and Table 3	Inclusion of controls to construct and operate the chemical storage facility			
16 and Table 5	nclude estimate of seepage loss in the water balance			
17 and Table 6	Changes to groundwater monitoring requirements to changes to parameter suite. Addition of monitoring of decant pond and limits of weak acid dissociable cyanide. Addition of a limit for the SWL.			
18 and 19	Leaching tests of Tampia ore.			
20	Non-compliance reporting			
25 and Table 7	Inclusion of non-compliance notifications and clarity around groundwater data submission.			

#### Table 8: Consolidation of licence conditions in this amendment

Existing condition	Condition summary	Revised licence condition	Conversion notes
1.1.1 1.1.2	Interpretation and definitions	N/A Interpretation section, Definitions and Table 1	Redundant condition. Revised to current licensing format.
1.1.3	Australian or other standard	N/A Interpretation section, Definitions and Table 1	Redundant condition. Revised to current licensing format.
1.1.4	Reference to code of practice	N/A Interpretation section, Definitions and Table 1	Redundant condition. Revised to current licensing format.
1.2.1	Premises operation	Condition 1	New numbering.
1.2.2	Dewatering effluent to be used for dust suppression	Condition 2	New numbering.
1.2.3 and Table 1.2.1	Containment infrastructure	Condition 3	New numbering.
1.2.4	Freeboard requirements	Condition 4	New numbering.
1.2.5 and Table 1.2.2	Waste acceptance condition and table.	Condition 5 and Table 2	New numbering.
1.2.6	Landfill and bioremediation facility operations	Condition 6	New numbering.
1.2.7	Fencing requirements	Condition 7	New numbering
1.2.8	Windblown waste	Condition 8	New numbering
1.2.9	Tailing Storage Facility seepage management	Condition 9	Revised to current licensing format.
2.1.1	Investigate exceedances	Condition 20	Revised to current licensing format.

Existing condition	Condition summary	Revised licence condition	Conversion notes
2.2.1 and Table 2.2.1	Emission points to land	Condition 11	Revised to current licensing format.
3.1.1	General monitoring	Condition 12	New numbering.
3.1.2	Monitoring timeframes	Condition 13	New numbering.
3.1.3	Monitoring equipment	Condition 14	New numbering.
3.1.4	Calibration requirements	Condition 15	New numbering.
3.2.1 and Table 3.2.1	Monitoring of emissions to land	Condition 16 and Table 5	Revised to current licensing format. Additional parameters for the E1 (TSF).
3.3.1 and Table 3.3.1	Monitoring of ambient groundwater quality	Condition 17 and Table 6	Revised to current licensing format. Additional changes to monitoring.
-	Leaching tests	Condition 18 & 19	New condition
4.1.3	Complaints	Condition 21	Revised to current licensing format.
4.1.2	Annual Audit Compliance Report	Condition 22	Revised to current licensing format.
4.1.1	Maintaining accurate records	Condition 23	New condition
4.1.1	Maintaining accurate records	Condition 24	New condition
4.2.1 and Table 4.2.1	Reporting – Annual Environmental Report	Condition 25	Revised to current licensing format. Additional changes to the submission of groundwater monitoring data.
4.3.1	Notification	N/A	Redundant condition, deleted from licence.
Schedule 1: Maps	Premises map	Schedule 1: Maps	New naming convention, no change to map
Schedule 2 Reporting & notifications	Annual Audit Compliance Report Form N1 Notification	N/A	Redundant attachment. Deleted from Licence Forms accessed at <u>www.dwer.wa.gov.au</u>

## References

- 1. Australian Government Bureau of Meteorology (BoM), 2019 wind speed and direction rose, Southern Cross, Western Australia.
- 2. Coffey Services Australia Pty Ltd (Coffey) 2020, *Memorandum: Application for an amendment to Licence (L8422/2020/2) under the Environmental Protection Act 1986 Request for further information,* Perth, Western Australia
- 3. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
- 4. DER 2017, Guidance Statement: Risk Assessments, Perth, Western Australia.
- 5. DER 2015, Guidance Statement: Setting Conditions, Perth, Western Australia.
- Adams, M.D., Donato, D.B., Schulz, R.S. and Smith, G.B., 2008, Influences of Hypersaline Tailings on Wildlife Cyanide Toxicosis; MERIWA Project M398 (II) 'Cyanide Ecotoxicity at Hypersaline Gold Operations' Final Report Volume 2 – Definitive Investigation.
- Pyatt, F.B. and Pyatt, A.J., 2004. The bioaccumulation of tungsten and copper by organisms inhabiting metalliferous areas in North Queensland, Australia: An evaluation of potential health implications. *Journal of Environmental Health Research*, 3(1), 23-18. The paper is available from web site <u>http://irep.ntu.ac.uk/id/eprint/22214/1/192364\_Pages%20from%20744%20Pyatt%20Pu</u> blisher.pdf.
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- Watson, A., Linklater, C. and Chapman, J., 2016. Backfilled Pits Laboratory-scale tests for assessing impacts on groundwater quality. Proceedings of the AusIMM Lifeof-Mine Conference, Brisbane, 28-30 September. The paper is available from web site <u>https://www.srk.co.za/sites/default/files/file/AWatson\_BackfilledPits\_2016\_0.pdf</u>.

## **Appendix 1: Application validation summary**



Government of Western Australia Department of Water and Environmental Regulation

#### VALIDATION CHECKLIST:

#### WORKS APPROVAL, LICENCE, REGISTRATION, AND AMENDMENT APPLICATIONS

Roles and Responsibilities for validation of works approval and/or licensing applications:

Licensing Officer: you are to validate the application package to ensure that information provided is complete and accurate. In order to complete this task, you must complete Sections 1, 2, 3 and 4. If further information is required from the applicant during validation then complete Section 6.

Delegated Officer: you are to check that the validation has been undertaken appropriately and endorse that there is sufficient information to commence assessment. In order to complete this task, you must review Sections 1, 2, 3 and 4 and complete Section 5. If the Licensing Officer has determined that further information is required you must also review Section 6.

Notes:

Red text is optional/guidance text. Green text is instructional text.

SECTION 1: APPLICATION SUMMARY								
	Relevant works approval number:		None					
	Has the works appr with?	oval been complied	Yes 🗆 No 🗆					
	Has time limited operation works approval dem acceptable operation	Yes 🗆	Yes 🗆 No 🗆 N/A 🗆					
	Environmental Com Critical Containmen Report submitted?	Yes 🗆 No 🗆						
	Date Report received:							
	Current licence number:							
	Current works approval number:							
	Current licence number:	L8422/2010/2						
	Relevant works approval number:		N/A					
Registration			None					
Date application received								
Applicant and Premises details								
Applicant name/s (full legal name/s)								
		ARY  ARY   Relevant works approval number:  Has the works approval number:  Has time limited operation  Environmental Com Critical Containmen Report submitted?  Date Report receive  Current licence number:  Current licence number:  Current licence number:  Relevant works approval number:  Current works approval number:	ARY  ARY  ARY  Relevant works approval number:  Has the works approval been complied with?  Has time limited operations under the works approval demonstrated acceptable operations?  Environmental Compliance Report / Critical Containment Infrastructure Report submitted?  Date Report received:  Current licence number:  Current works approval number:  Current works approval number:  AREV  Current works approval number:  AREV  Current works approval number:  Current works approval number: Current works approval number: Current works approval number: Current works Current works approval number: Current works approval number: Current works Current works approval number: Current works Current works Approval number: Current works Approval number: Current works Approv	Image: Constraint of the second se				

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Premises name	Edna May Operations Pty Ltd		
Premises location	M77/88, M77/110, M77/124, G77/122 and L77/18		
Local Government Authority	Westonia		
Application documents			
HPCM file reference number:	DER2017/000298-1 DWERDT271038		
Key application documents (additional to application form):	Application form Attachment 2b GRES Thickener drawing and placement Atachment 3c Atmospheric Emissions testing Attachment 2 Premises map emissions Attachment 2 Site layout Attachment 2c drawing from survey Attachment 3A Edna May processing Attachment 6A Emissions and discharges Attachment 8 EMO DWER Licence Attachment 8a Tenement Registration Attachment 8b site water – flow diagram Attachment 9 proposed amendment fee		
Scope of application/assessment			
Summary of proposed activities or changes to existing operations.	<ul> <li>Construction of modification of plant: <ul> <li>Installation of a leach feed thickener</li> <li>The close circuiting of the existing cone crusher with a sizing screen</li> <li>The installation of a liquid oxygen storage and distribution facility</li> <li>The installing of a lead nitrate storage and distribution facility</li> </ul> </li> <li>Licence amendment</li> <li>Operation of ore processing:</li> <li>Modify the existing Edna May processing facility to enable economic extraction of precious metal from a new ore source. The above plant modifications are required.</li> </ul>		

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Category number/s (activities that cause the premises to become prescribed premises)						
Table 1: Prescribed premises categor Prescribed premises category and description	ries Asses desigi	essed production or gn capacity			Proposed changes to the production or design capacity (amendments only)	
Category 5: processing or 5 beneficiation of metallic or non- metallic ore	3,200, period	0,000 tonnes per annual od			N/A	
Category 6: mine dewatering	1,900, annua	000 tor I period	ines or more pe	er	N/A	
Category 61: liquid waste facility	1255 k	kL per ar	nnual period		N/A	
Category 64: Class II or III stepstrescible landfill site	5,000	tonnes p	per annual period		N/A	
Legislative context and other approva	als					
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 🗆	No 🖂	R M A	eferral decision No: lanaged under Part V □ ssessed under Part IV □	
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?		Yes 🗆	No 🛛	M E	linisterial statement No: PA Report No:	
Has the proposal been referred and/or assessed under the EPBC Act?	1	Yes 🗆	No 🖂	R	eference No:	
Has the applicant demonstrated occupancy (proof of occupier status)?	,	Yes 🛛	No 🗆	C G M 20 0	ertificate of title □ eeneral lease □ Expiry: lining lease / tenement ⊠ Expiry: 022 other evidence □ Expiry:	
Has the applicant obtained all relevant planning approvals?		Yes 🗆	No 🗆 N/A 🛛	A E If	pproval: xpiry date: N/A explain why?	
Has the applicant applied for, or have a existing EP Act clearing permit in relation to this proposal?	an on	Yes 🗆	No 🖂	C N	PS No: N/A lo clearing is proposed.	
Has the applicant applied for, or have existing CAWS Act clearing licence relation to this proposal?	an in	Yes 🗆	No 🛛	A Li N	pplication reference No: N/A icence/permit No: N/A lo clearing is proposed.	

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Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes 🗆 No 🛛	Application reference No: Licence/permit No: Licence / permit not required.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes 🗆 No 🖂	Name: N/A Type: Has Regulatory Services (Water) been consulted? Yes I No I N/A I Regional office:
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes 🗆 No 🖂	Name: N/A Priority: P1 / P2 / P3 / N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to <u>WQPN 25</u> )? Yes  No  N/A
Is the Premises subject to any other Acts or subsidiary regulations (e.g. Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx)	Yes 🗆 No 🗆	
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes 🗆 No 🛛	
Is the Premises subject to any EPP requirements?	Yes 🗆 No 🛛	
Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i> ?	Yes 🛛 No 🗆	Classification: possibly contaminated – investigation required Date of classification: N/A
Direct interest stakeholders		
Shire of Westonia	Letter to be sent 🛛 Yes 🖾 No 🗆	

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DMIRS	Letter to be sent	Yes 🛛	No 🗆
	Letter to be sent	Yes 🗆	No 🗆
	Letter to be sent	Yes 🗆	No 🗆
	Letter to be sent	Yes 🗆	No 🗆

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SECTION 2: RECEPTORS						
The nearest town of Westonia	Is approximately 1 km south of the Premises.					
Human receptors	Distance from activity / prescribed premises					
Residential Premises	1 km from the proposed activities					
Environmental receptors	Distance from activity / prescribed premises					
Specified Ecosystems	Parks and Wildlife Managed Lands and Waters – Sandford Rocks Nature Reserve 4km north east					
Underlying groundwater (non-potable purposes)	Westonia Groundwater area. Groundwater salinity – 14000 - 35000					
TECs/PECs	Within the premises boundary- Eucalypt woodlands or the Western Australian Wheatbelt					
	Red Morrel Woodlands or the Wheatbelt – 2kms east of the pit					
Threatened priority flora	Within the premises boundary -					
Threatened priority fauna	Within the premises boundary -					

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#### SECTION 3: PRELIMINARY RISK ASSESSMENT TABLE

Risk Event			Risk rating	Applicant		Justification for		
Source/Activities	Potential emissions	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	controls sufficient?	Conditions of licence	regulatory controls
Construction								
Placement and installation of the leach feed thickener, close , circuiting of the existing cone	Dust	Air/windborne pathway causing	Residences 1km south					
crusher with sizing screen, installation of chemical storage facilities.	Noise	impacts to health and amenity						
Operation								
Operation of leach feed thickener.	Dust	Air/windborne pathway causing impacts to health and amenity	Residences 1 km south					

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	Noise	Air/windborne pathway causing impacts to health and amenity	Residences 1 km south			
Storage of liquid oxygen and lead nitrate	Discharge of chemicals to land / water	Direct discharge to vegetation adjacent to storage facilities	Underlying groundwater Surrounding native vegetation (priority, listed fauna / flora /TEC)			
Pipeline failures – risk of release of tailings or decant under pressure to adjacent vegetation	Tailings slurry	Overland runoff to soil, surface water and groundwater causing contamination	Land, and ecosystems bordering or surrounding pipelines. Pipeline failures can result in inundation by decant water and toxicity from tailings causing adverse effects on the environment.			
Processing of new ore Tailings deposition	Seepage – tailings leachate to soils and groundwater via the floor of the TSF or through the	Infiltration to groundwater causing contamination and groundwater mounding.	Underlying groundwater Surrounding native vegetation (priority, listed fauna / flora /TEC)			

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	embankment. Contaminants at concentrations of concern (arsenic, cyanide, lead, mercury, molybdenum, cadmium) can pose risk in seepage.					
	Overtopping of TSF (breach of freeboard)	Overland runoff potentially causing ecosystem disturbance or contamination	Surrounding native vegetation (priority, listed fauna / flora /TEC) Watercourses, drainage lines			
Deposition of new tailings into existing TSF	Toxic exposure to fauna (birds & bats) from supernatant ponds; especially for low salinity and tailings contain high concentrations of soluble metals / metals / metaloids (specifically cyanide)	Direct contact (ingestion)	Fauna (birds and bats) within the premises.			

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#### SECTION 4: VALIDATION RECOMMENDATION - LICENSING OFFICER (TO COMPLETE)

- I confirm that Part 15: Declaration and signature of the application form is complete (as per instructions in Part 15).
- I confirm that I have checked all the information within the application form.
- I confirm that there is sufficient information within the application and supporting documentation to undertake a risk assessment (refer to preliminary risk assessment in Section 3) relating to the emission source, pathway and receptor linkages.

#### RECOMMENDATION

- Validation is complete: I am satisfied with the validation and recommend that the Delegated Officer validate the application.
- Application in-complete and further information required. Request additional information and clarification from the applicant as outlined in Section 6 below.
- Recommend Decline to Deal.
- Return (for amendment applications only)

#### COMMENTS

- Further information requested:
  - Details on new ore body and tailings
  - TSF performance review
  - Reagents to be used
  - Additional information re: receptors
  - Emissions and discharges noise management
  - Consultation who has been contacted

#### RFI sent 29 May 2020

Additional information received: 9 July 2020

 Name:
 Josephine Tuohy

 Date:
 20 July 2020

#### SECTION 5: VALIDATION - DELEGATED OFFICER (TO COMPLETE)

#### RECOMMENDATION

I am satisfied with the Licensing Officer's validation (Section 1 and 4) and will validate the application.

☑ I have reviewed Section 3 and agree with the preliminary risk assessment (Note DO changes) [include comments if relevant].

□ Further information is required. Park application and request additional information and clarification from the applicant as detailed in Section 6 below (Table to be included in Schedule 1 of formal RFI letter).

Recommend Decline to Deal.

#### Return (for amendment applications only)

#### COMMENTS

Based on the validation and preliminary risk assessment a reduced decision report should be prepared . Noted that								
Applicant ha	as provided a response to the RFI.							
Name:	Lauren Fox							
Date:	20/7/20							

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