



Works Approval

Environmental Protection Act 1986, Part V

Works Approval Holder: Western Areas Limited

Works Approval Number: W5859/2015/1

Registered office: Level 2, 2 Kings Road
WEST PERTH WA 6005

ACN: 091 049 357

Premises address: Cosmic Boy Tailings Storage Facility
Forrestania Southern Cross Road
FORRESTANIA WA 6359
Being mining tenements M77/335 and M77/399, as depicted in Schedule 1.

Issue date: Thursday, 8 October 2015

Commencement date: Monday, 12 October 2015

Expiry date: Thursday, 11 October 2018

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

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore: premises on which – (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam.	50,000 tonnes or more per year	600,000 tonnes per annual period

Conditions

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

Date signed: 8 October 2015

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



Works Approval Conditions

1 General

1.1 Interpretation

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

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

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

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

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

'Commissioning' means the process of operation and testing that verifies the works and all relevant systems, plant, machinery and equipment have been installed and are performing in accordance with the design specification set out in the works approval application;

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

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

'Stage 1' means construction of the first 2.0 metre embankment raise to crest level RL417 m on the existing tailings storage facility, and includes the first 2.0 metre raise of the decant access causeway level to RL415 m;

'Stage 2' means construction of the second 2.0 metre embankment raise to crest level RL419 m on the existing tailings storage facility, and includes the second 2.0 metre raise of the decant access causeway level to RL417 m;

'Stage 3' means construction of the 2.5 metre starter embankment on the southern extension cell to a crest level of RL413.5 m, and includes construction of the decant causeway access and decant structure at the same level;

'Stage 4' means construction of the first 2.5 metre embankment raise to crest level RL416 m on the southern extension cell.

'Works Approval' means this Works Approval numbered W5839/2015/1 and issued under the Act; and

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

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

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



1.2 General conditions

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

Table 1.2.1: Construction Requirements¹		
Document	Parts	Date of Document
Works Approval Application Form	All	14 April 2015
<i>Forrestania Nickel Operations – Cosmic Boy TSF Expansion – Works Approval Supporting Document</i> , prepared by Clark Lindbeck and Associates and dated May 2015	All, including diagrams and attachments	May 2015
<i>Western Areas Limited – Forrestania Nickel Project – Cosmic Boy TSF Embankment Raise – Design Report (Revision 0)</i> , prepared by Coffey Mining Pty Ltd and dated 22 December 2014		22 December 2014

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

2 Information

2.1 Reporting

2.1.1 The Works Approval Holder shall submit a compliance document to the CEO, following the construction of each of Stage 1, Stage 2, Stage 3 and Stage 4 of the works and prior to commissioning of the same.

2.1.2 The compliance document shall:

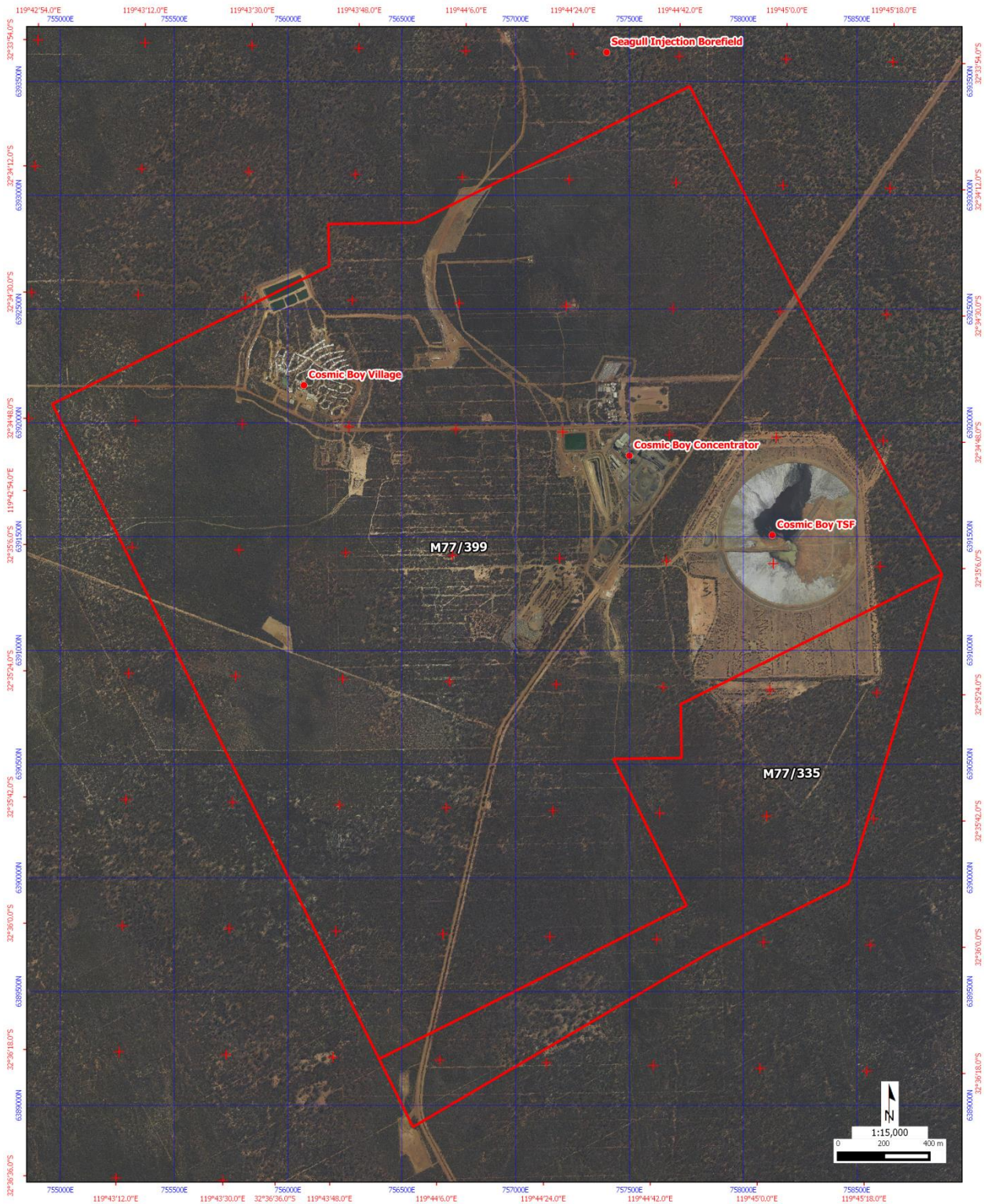
- (a) certify that the works were constructed in accordance with the conditions of the works approval;
- (b) be signed by a person authorised to represent the Works Approval Holder and contain the printed name and position of that person within the company.



Schedule 1: Maps

Premises map

The Premises is shown in the map below. The red line depicts the Premises boundary of this works approval, being mining tenements M77/335 and M77/399, being two of several tenements that constitute the greater Forrestania Nickel Operations.





Decision Document

Environmental Protection Act 1986, Part V

Proponent: **Western Areas Limited**

Works Approval: **W5859/2015/1**

Registered office: Level 2, 2 Kings Road
WEST PERTH WA 6005

ACN: 091 049 357

Premises address: Cosmic Boy Tailings Storage Facility
Forrestania Southern Cross Road
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Being mining tenements M77/335 and M77/399

Issue date: Thursday, 8 October 2015

Commencement date: Monday, 12 October 2015

Expiry date: Thursday, 11 October 2018

Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER), has decided to issue a works approval. DER considers that in reaching this decision, it has taken into account all relevant considerations and that the Works Approval and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by: Daniel Hartnup
Licensing Officer

Decision Document authorised by: Danielle Eyre
Delegated Officer



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1 Purpose of this Document

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



2 Administrative summary

Administrative details		
Application type	Works Approval <input checked="" type="checkbox"/>	
	New Licence <input type="checkbox"/>	
	Licence amendment <input type="checkbox"/>	
	Works Approval amendment <input type="checkbox"/>	
Activities that cause the premises to become prescribed premises	Category number(s)	Assessed design capacity
	5: Processing or beneficiation of metallic or non-metallic ore	600,000 tonnes per annual period
Application verified	Date: 29/06/2015	
Application fee paid	Date: 13/07/2015	
Works Approval has been complied with	Yes <input type="checkbox"/>	No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
Compliance Certificate received	Yes <input type="checkbox"/>	No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
Commercial-in-confidence claim	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Commercial-in-confidence claim outcome		
Is the proposal a Major Resource Project?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Is the proposal subject to Ministerial Conditions?	Referral decision No:	
	Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/>	
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i>)?	Ministerial statement No:	
	EPA Report No:	
Is the Premises within an Environmental Protection Policy (EPP) Area	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
	Department of Water consulted Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Is the Premises subject to any EPP requirements?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>



3 Executive summary of proposal and assessment

Western Areas Limited (WAL) operates a nickel processing plant and tailings storage facility (TSF) under Licence L8041/1990/5 as part of its Forrestania Nickel Operations. The scope of this application relates to an expansion of the existing TSF.

The currently operating TSF, located at the Cosmic Boy site, comprises a single cell in circular shape. WSL proposes to raise the perimeter embankment of the existing cell by 4 m in two stages (Stages 3 and 4) from the current Stage 2 crest level of RL415 m to crest level RL419 m, and construct an additional cell, southern extension, to the south of the existing cell (and raise it once), to provide tailings storage capacity for approximately an additional 10 years of mine life. The proposed works will provide sufficient storage capacity for approximately 3.6 million tonnes (Mt) of future tailings production at a deposited dry density of 1.5 t/m³. The TSF will occupy a final surface area of approximately 54 ha.

Subsequent stages on the existing TSF will be constructed from compacted dry tailings, utilising upstream construction techniques. The downstream batters will be protected by an outer zone of mine waste capping. The southern extension starter embankment will be constructed using a combination of mine waste, material borrowed from within the cell footprint area and compacted tailings.

Tailings in the form of slurry will be discharged sub-aerially and spirally from the perimeter of each cell. Spigotting will be carried out such that the water ponds are maintained around the decant structure, located in the centre of each cell. The top surface of the deposited tailings will assume the form of a valley sloping toward the decant structures at 1.43% (1:70). Surface water liberated from the tailings slurry will be recovered via decant pumps deployed within the decant structures.

The primary environmental risks associated with the proposal relate to the potential adverse impacts or damage from embankment or structural failure, and controlled or uncontrolled release of tailings/water, or seepage. The TSF is classified as a Medium risk, Category 2 facility in accordance with the classification criteria outlined in ANCOLD¹ and the DMP Code of Practice².

Allowance for the temporary storage of the 1:100 year, 72 hour duration storm event has been incorporated into the design of both cells and relies on the correct operation of the facility with respect to freeboard criteria. Critical freeboard criteria are particularly relevant at the end of each filling stage, just prior to the next staged embankment lift.

¹ ANCOLD (1998) *Guidelines on tailings dam design, construction and operation*. Australian National Committee on Large Dams (ANCOLD)

² Department of Mines and Petroleum (2013) *Tailings storage facilities in Western Australia: Code of Practice*



4 Decision table

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

DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
General conditions	W – no conditions	<p>Construction</p> <p>There are no specified conditions required relating to general requirements during construction works. Stormwater management is a requirement of the existing licence; therefore it is not considered necessary to duplicate these requirements on the works approval.</p>	
	L – no change to existing condition	<p>Operation</p> <p>Normal operation</p> <p>There are no specified conditions relating to general requirements for normal operating conditions.</p> <p>Abnormal operation</p> <p><u>Emission Description</u> <i>Emission:</i> Contamination of stormwater with nickel-contaminated waste slurry at unknown concentration. <i>Impact:</i> In large doses nickel can be toxic to many organisms and may result in a reduction of fresh groundwater and surface water quality. Metallic nickel and some other nickel compounds are teratogenic and can be carcinogenic to mammals. Nickel concentrations in plants above 50 µg/g are toxic and can cause growth restraints. <i>Controls:</i> Rainfall runoff will be directed to the existing plant footprint sedimentation pond, which will allow any sediment to settle out. The water in the sump will be periodically pumped to the TSF.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Moderate. <i>Likelihood:</i> Possible.</p>	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><i>Risk Rating: Moderate.</i></p> <p><u>Regulatory Controls</u> L1.2.5 is an existing condition on the licence that requires the operator to prevent stormwater contamination in the first instance, and to treat contaminated stormwater prior to any discharge if required. This condition is considered adequate for managing the risk of impacts from nickel-contaminated stormwater; therefore no additional or changes to existing conditions are required on the licence.</p> <p><u>Residual Risk</u> <i>Consequence: Moderate.</i> <i>Likelihood: Unlikely.</i> <i>Risk Rating: Moderate.</i></p>	
Premises operation	W – no conditions	<p>Construction There are no specified conditions relating to premises operational requirements in this section.</p>	<p>Guidelines on the Safe Design and Operating Standards for Tailings Storage (DME, 1999) (TSF Guideline)</p> <p>Forrestania Nickel Mine - Tailings Storage Audit and Management Review (Coffey Mining Pty Ltd, July 2014) (TSF Audit)</p> <p>Application supporting documentation</p>
	L – new conditions	<p>Operation Normal & abnormal operation <u>Emission Description</u> <i>Emission:</i> Leaching of tailings seepage. <i>Impact:</i> Tailings seepage may cause groundwater contamination that could lead to public health risks and environmental damage or impact. A review of the TSF audit clearly indicates that seepage from the TSF is discharging into groundwater; however the rate of seepage has been poorly defined due to the limited nature of the water balance that has been undertaken for the facility. As a consequence of this, groundwater modelling has been poorly constrained and there is a high degree of uncertainty in the rate of pumping required to reduce groundwater mounding near the TSF. <i>Controls:</i> The existing TSF will be managed to ensure minimal seepage, overflow or leakage in accordance with the TSF Guideline. Permeability testing of the base for the southern expansion indicates low permeability (2.2×10^{-8} m/sec) of mainly neutral-to-alkaline material, which would provide additional buffering capacity for any seepage.</p>	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><u>Risk Assessment – Normal operation</u> <i>Consequence:</i> Moderate. <i>Likelihood:</i> Possible. <i>Risk Rating:</i> Moderate.</p> <p><u>Risk Assessment – Abnormal operation</u> <i>Consequence:</i> Moderate. <i>Likelihood:</i> Likely. <i>Risk Rating:</i> High.</p> <p><u>Regulatory Controls</u> The issue of seepage from the TSF is being addressed through conditions of Works Approval W5839/2015/1, which requires a more comprehensive water balance to be undertaken to enable the seepage component to be determined with a higher degree of certainty. The requirement for additional licence conditions to address the risk of seepage will be determined following a review of the updated water balance and groundwater recovery model.</p> <p><u>Residual Risk – Normal operation</u> <i>Consequence:</i> Moderate. <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Moderate.</p> <p><u>Residual Risk – Abnormal operation</u> <i>Consequence:</i> Moderate. <i>Likelihood:</i> Possible. <i>Risk Rating:</i> Moderate.</p>	
Emissions general	W – no conditions	No emissions of significance are expected during construction of the TSF requiring descriptive limits to be set through the works approval.	
	L – no change to existing condition	Descriptive limits have been set through conditions of the licence and therefore conditions regarding recording and investigation of exceedances of limits has been included.	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Point source emissions to air including monitoring	W – no conditions L – no conditions	Construction & Operation There are no point source emissions to air proposed in the application.	
Point source emissions to surface water including monitoring	W – no conditions L – no conditions	Construction & Operation There are no point source emissions to surface water proposed in the application.	
Point source emissions to groundwater including monitoring	W – no conditions L – no conditions	Construction & Operation There are no point source emissions to groundwater proposed in the application.	
Emissions to land including monitoring	W – no conditions L – no conditions	Construction & Operation There are no emissions to land proposed in the application.	
Fugitive emissions	W – no conditions	Construction <u>Emission Description</u> <i>Emission:</i> Fugitive dust at unknown concentration, generated during ground disturbance activities. Dust, or total suspended particulate matter (TSP) is comprised of coarse particulate matter (CPM), which is generally comprised of particles greater than 10 µm in diameter, and the respirable fraction comprised of particles less than 10 µm in diameter (PM ₁₀). <i>Impact:</i> Dust emissions can be harmful to human health and the environment. Elevated TSP levels can impact ambient environmental quality resulting in amenity impacts and can smother vegetation. PM ₁₀ or PM _{2.5} can be drawn deep into the lungs causing human health impacts. The chemical and physical properties of the particles, the size of the particles and the duration of exposure are all factors which may affect human health impacts. <i>Controls:</i> A water cart with dribble bars will be used to control dust during construction activities, and during operations when required.	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><u>Risk Assessment</u> Consequence: Minor. Likelihood: Rare. Risk Rating: Low.</p> <p><u>Regulatory Controls</u> The risk of fugitive dust emissions from ground disturbance activities during construction works causing amenity impacts and smothering vegetation is deemed to be low (given the distance to the nearest sensitive receptor ~19 km and nearby vegetation to the processing plant area) and is not considered significant enough to warrant site specific conditions on the works approval.</p> <p><u>Residual Risk</u> Consequence: Minor. Likelihood: Rare. Risk Rating: Low.</p>	
	L – new conditions	<p>Operation</p> <p><u>Emission Description</u> <i>Emission:</i> Fugitive dust at unknown concentration, generated during ground disturbance activities and dried tailings liftoff from the TSF. <i>Impact:</i> Dust emissions can be harmful to human health and the environment. Elevated TSP levels can impact ambient environmental quality resulting in amenity impacts and can smother vegetation. Arsenic may be present at elevated concentrations in dust derived from dried tailings, which can impact flora and fauna values within proximity to the TSF. <i>Controls:</i> A water cart with dribble bars will be used to control dust during operations when required. Deposition of tailings into the TSF is rotated regularly with the entire surface renewed every 4 – 6 weeks, thereby maintaining a saturation layer on the surface of the TSF and minimising dust liftoff.</p> <p><u>Risk Assessment</u> Consequence: Minor for general dust emissions; Moderate for dust emissions of arsenic</p>	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>tailings. <i>Likelihood:</i> Unlikely. <i>Risk Rating:</i> Moderate.</p> <p><u>Regulatory Controls</u> The risk of fugitive dust emissions from ground disturbance activities causing amenity impacts and smothering vegetation is deemed to be low (given the distance to the nearest sensitive receptor ~19 km and nearby vegetation to the processing plant area). The risk of fugitive dust emissions from arsenic tailings impacting on flora and fauna values within proximity of the TSF is considered to be moderate. As such, conditions will be added to the licence to require dust control of dried tailings within the TSF.</p> <p><u>Residual Risk</u> <i>Consequence:</i> Moderate. <i>Likelihood:</i> Unlikely. <i>Risk Rating:</i> Moderate.</p>	
Odour	W – no conditions L – no conditions	<p>Construction & Operation Odour is not expected to be significant during construction or operation of the TSF.</p>	
Noise	W – no conditions L – no conditions	<p>Construction & Operation <u>Emission Description</u> <i>Emission:</i> Noise and vibration generated during construction/commissioning and subsequent operation of the TSF (e.g. pumps and agitators). <i>Impact:</i> Annoyance, nuisance of nearby receptors ~19 km away. <i>Controls:</i> Installing modern equipment with low sound power rating.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Minor. <i>Likelihood:</i> Rare. <i>Risk Rating:</i> Low.</p> <p><u>Regulatory Controls</u> The risk of noise emissions impacting on nearby receptors is deemed to be low (given the</p>	<p><i>Environmental Protection (Noise) Regulations 1997 (Noise Regulations)</i></p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>distance to the nearest sensitive receptor ~19 km) and is not considered significant enough to warrant site specific conditions on the works approval or licence. Noise emissions can be adequately regulated through the provisions of the Noise Regulations.</p> <p><u>Residual Risk</u> <i>Consequence</i>: Minor. <i>Likelihood</i>: Rare. <i>Risk Rating</i>: Low.</p>	
Monitoring general	W – no conditions	Construction Monitoring is not required during construction of the TSF. No specified conditions relating to monitoring are required to be added to the works approval.	
	L – no changes to existing conditions	Operation The existing licence includes conditions regarding the requirements of sampling location, monitoring equipment and calibration. No additional conditions or changes to existing conditions relating to general monitoring requirements are required to be added to the existing licence.	
Monitoring of inputs and outputs	W – no conditions L – no conditions	Construction & Operation Monitoring of inputs and outputs is not required to adequately manage emissions during construction or operation of the TSF. No specified conditions relating to process monitoring are required to be added to the works approval or licence.	
Process monitoring	W – no conditions L – no conditions	Construction & Operation Process monitoring is not required to adequately manage emissions during construction or operation of the TSF. No specified conditions relating to process monitoring are required to be added to the works approval or licence.	
Ambient quality monitoring	W – conditions	Construction Ambient quality monitoring is not required during construction of the TSF. No specified conditions relating to monitoring are required to be added to the works approval.	
	L – update existing conditions	Operation Monitoring of ambient groundwater quality around the TSF (i.e. seepage) is an existing requirement of the licence. Depending on the outcomes of groundwater recovery modelling, additional groundwater monitoring and recovery bores will be designed and constructed to monitor for impacts from the expanded footprint. New monitoring locations	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		will need to be added to the licence and the existing monitoring programme will require updating to include the new locations.	
Meteorological monitoring	W – no conditions L – no conditions	Construction & Operation Monitoring of meteorological conditions is not required.	
Improvements	W – no conditions L – no conditions	Construction & Operation No improvements are required.	
Information	W – no conditions L – no additional conditions	Construction & Operation No additional reporting conditions are required to be added to the works approval or licence.	
Licence Duration	N/A	In accordance with the DER guidance statement: Licence duration (May 2015), the works approval will be issued for the standard 3 year duration.	Guidance Statement: Licence Duration (DER, May 2015)



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
20/07/2015	Application advertised in West Australian	Nil.	N/A.
14/09/2015	Proponent sent a copy of draft instrument	Query about submitting separate compliance documents for each stage of TSF construction; and suggestion that recovery and monitoring bores to monitor for impacts of seepage from the new TSF to be dependent on the outcomes of additional groundwater recovery modelling.	Each stage defined in the works approval and allowance for submission of separate compliance documents at the completion of each stage. Ambient monitoring section updated in consideration of the additional groundwater recovery modelling being undertaken through W5839.



6 Risk Assessment

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

Table 1: Emissions Risk Matrix

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