



Decision Document

Environmental Protection Act 1986, Part V

Proponent: Northern Star Resources Ltd

Licence: L6498/1995/11

Registered office: Level 1
388 Hay St
SUBIACO WA 6008

ACN: 092 832 892

Premises address: Jundee Operations
SHIRE OF WILUNA
WILUNA WA 6646
Mining tenements: G53/20, L53/52, L53/60, L53/68 - L53/73, L53/75,
L53/99, L53/100, L53/102, L53/112, L53/113, L53/117, L53/136 - L53/138,
L53/142, L53/143, L53/153, L53/169, L53/174, M53/155, M53/156,
M53/182, M53/191, M53/192, M53/196 - M53/199, M53/221, M53/226,
M53/228 - M53/230, M53/235 - M53/237, M53/245 - M53/250, M53/326,
M53/347, M53/372, M53/412 - M53/414, M53/441, M53/446, M53/451,
M53/452, M53/461, M53/477 - M53/480, M53/492, M53/535 - M53/541,
M53/552, M53/588, M53/589, M53/611, M53/707, M53/708, M53/711,
M53/712, M53/836, M53/874, M53/895, M53/911, M53/929, M53/935,
M53/940, M53/966, PL34.

Issue date: Thursday, 21 November 2013

Commencement date: Friday, 22 November 2013

Expiry date: Thursday, 21 November 2024

Decision

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

Decision Document prepared by: Louise Lavery
Licensing Officer

Decision Document authorised by: Tim Gentle
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 type="checkbox"/> New Licence <input type="checkbox"/> Licence amendment <input checked="" type="checkbox"/> Works Approval amendment <input type="checkbox"/>	
Activities that cause the premises to become prescribed premises	Category number(s)	Assessed design capacity
	5	3 000 000 tonnes per annual period
	6	3 000 000 tonnes per annual period
	52	42.21 MW
	54	150m ³ per day
	64	600 tonnes per annual period
73	10 000m ³	
Application verified	Date: 27/6/16	
Application fee paid	Date: N/A	
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"/>	Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/>
Is the proposal subject to Ministerial Conditions?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Ministerial statement No: EPA Report No:
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>)?	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 within an Environmental Protection Policy (EPP) Area Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes, include details here, eg Site is subject to SO ₂ requirements of Kwinana EPP.		

3 Executive summary of proposal and assessment

Jundee Operations (Jundee) is an operational gold mine recently acquired by Northern Star Resources from Newmont Asia Pacific. The Jundee Process Plant is currently fed with ore from three underground mines. Surface mining was suspended indefinitely in 2007, following depletion of viable surface stocks.

Jundee is located approximately 55 km north-east of the township of Wiluna and is situated on the Jundee, Lake Violet and Millrose Pastoral Leases. Land use in the Jundee area is a mixture of mining and pastoral enterprise. The major pastoral properties with a direct relationship are Barwidgee/Yandal, Millrose, Lake Violet and Jundee stations. Northern Star is the leaseholder of Jundee which continues to be sublet to Millrose Station.

Jundee comprises two historically separate operations called Jundee and Nimary. Following aggregation of the operations, the Nimary processing site was decommissioned in 2007 with final rehabilitation completed in 2010.

In 1995 a Notice of Intent was lodged with the Department of Mines for the Nimary Gold Project, on behalf of the Wiluna Joint Venture, headed by majority shareholder Eagle Mining Pty Ltd. The Nimary Gold Project comprised the Nim 1, Nim 2, Nim 3 and Nim 4 open pits.

Also in 1995, the adjacent Jundee Operations was commissioned by Great Central Mines Pty Ltd (GCM). Nimary and Jundee were immediate neighbours, separated by a tenement boundary with different owners. Two mills were constructed, one at Nimary and one at Jundee. In 1997 GCM acquired the Eagle/Nimary leases incorporating Nimary and Jundee as one operation.

In April 2000, GCM was acquired by Normandy Mining Limited (Normandy). In February 2002, Newmont Yandal Pty Ltd acquired Normandy. In July 2015 the site was acquired by Northern Star Resources. Currently the premises has a nominal rated throughput covered by the licence to process 3 000 000 tonnes of ore per annum. Processing of ore is through the Carbon in Pulp (CIP) and



Carbon in Leach (CIL) process, with tailings disposal to Tailings Storage Facilities (TSF) 2 and Fisher In-pit TSF. Underground mining commenced in 2007.

TSF1 was commissioned in October 1995 and was used until November 1999. Construction of TSF 2 commenced in February 1999 and was completed in June 1999. Deposition commenced into TSF 2 in November 1999 and this facility was used on a continuous basis until August 2004. TSF 2 has been used on a rotational basis since the commissioning of the Fisher In-pit TSF in August 2004. Fisher Pit was used continuously until October 2007. Tailings deposition is currently cycled between the Fisher Pit and TSF 2 with the aim of optimising water return by depositing into the Fisher Pit in the hotter summer months to help improve water recoveries.

The licence allows for the following activities at the Jundee Operations:

- Carbon in pulp (CIP) and carbon in leach (CIL) process plant and associated infrastructure;
- Tailings disposal into Tailings Storage Facilities (TSFs): TSF 2 and Fisher In-pit TSF;
- A bioremediation facility which utilises treated wastewater from the sewage treatment facility and may be used for the disposal and treatment of hydrocarbon contaminated soils and oily water removed from the minesite;
- Decommissioned TSF 1 for the treatment of contaminated soils and materials including sewage water; and
- Electrical power is generated on-site using six 2.2 MW gas engine generators, two 950kW gas engine generators, two 730 kW gas engine generators, one 900kW diesel engine generator and six 750 kW diesel engine generators. Additionally, three 750 kW diesel engine generators at Nimary.

September 2015 Amendment

This Licence was the result of an amendment sought by the Licensee to alter the freeboard limit for the Fisher In-pit TSF. It also includes a transfer of ownership and a conversion to a current format licence.

August 2016 Amendment

This amendment authorises the construction of 6 gas generators, a waste heat recovery unit and associated infrastructure as to increase the capacity of the power station to a total installed capacity of 42.2MW.

The new power station will comprise of the following major equipment:

- 6 x 11kV gas generators and auxiliaries
- 1 x HV Switchboard (10 tier)
- 6 x Generator Control Panels
- 1 x 415V MCC
- 1 x 11kV/415V Auxiliary Transformer
- 6 x Cooling System Radiators
- 1 x 10,000L Lube oil tank
- 1 x Gas Power Station Building – 35m x 18m
- 1 x Switch Room comprising HV Room / LV Room and Office

The waste heat recovery unit comprises:

- Exhaust collector system
- Exhaust heat exchanger module



- Exhaust collector skid
- Thermal governing skid
- Wet steam cycle module
- Organic Rankin cycle module
- Cooling system

Three redundant groundwater bores have also been removed from the monitoring requirement in Table 3.3.1. General conditions found to be inconsistent with DER's *Guidance Statement: Setting Conditions, October 2015* have also been removed from the Licence. The due dates for the improvement requirements under condition 4.1.1 have also been revised.



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	Previous licence conditions L1.2.1 - L1.2.3	<p>August 2016 Amendment</p> <p>These conditions have been removed from the licence in accordance with the <i>Guidance Statement: Setting Conditions</i> as these general conditions are considered not enforceable.</p>	<p>General provisions of the <i>Environmental Protection Act 1986</i>.</p> <p>DER (2015) <i>Guidance Statement: Setting Conditions</i>, October 2015</p>
Premises operation	L1.2.1 L1.2.5	<p>September 2015 Amendment</p> <p>Normal operation <u>Emission Description</u> <i>Emission:</i> Spill of saline water, process slurry or tailings slurry or liquor from pipelines. Tailings pipelines transfer tailings to the TSFs and tailings return lines transfer decant water back (tailings liquor) back to the process plant. Borefield pipelines transfer saline water from the water borefield to the processing plant.</p> <p><i>Impact:</i> A spill of saline water, process slurry or tailings outside of bunding may impact on surrounding vegetation dependent on location. The spill may also result in localised soil contamination.</p> <p><i>Controls:</i> All overland pipelines containing either tailings, saline water, or tailings decant water are bunded and regularly inspected. Records are kept of inspections.</p>	<p>General provisions of the <i>Environmental Protection Act 1986</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><u>Risk Assessment</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Moderate</p> <p><u>Regulatory Controls</u> L1.2.1 was added to the Licence to ensure that the systems are in place to isolate pipelines transferring materials with saline, alkaline or cyanide constituents, and that these systems are implemented and maintained, and/or that pipelines containing these constituents have bunding capacity sufficient to contain spills. This condition replaces conditions W4(a) and W4(b) on the previous licence.</p> <p>L1.2.5 details that tailings pipelines, return water pipelines and borefield pipelines require scheduled inspections. L1.2.5 in part replaces previous licence conditions W6, W7(a), W7(b) and W7(c).</p> <p><u>Residual Risk Assessment</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Moderate</p>	
	L1.2.2	<p>September 2015 Amendment</p> <p>Containment infrastructure requirements are detailed in condition L1.2.2.</p> <p>DER's assessment and decision making in relation to the TSFs' operation including provision of freeboards and related ambient groundwater quality monitoring, is detailed in Appendix A.</p>	
	L1.2.3 L1.2.4	<p>September 2015 Amendment</p>	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		Condition L1.2.3 replaces condition W14 on the previous licence and has not been reassessed. Freeboard requirements for the effluent storage ponds in condition L1.2.4 address points (ii) and (iii) of previous licence condition W14. In 2012 the western embankment of the village effluent ponds was raised to ensure the ponds held capacity for a 1/100 year, 72 hour duration storm event.	
	L1.2.6	September 2015 Amendment Condition L1.2.6 details requirements for management of waste. It replaces previous licence conditions W10(b), W10(d), W10(e), W15, S1(a), S2(c), S2(d), S2(e) and has not been reassessed.	General provisions of the <i>Environmental Protection Act 1986</i> .
	L1.2.7, L1.2.8	September 2015 Amendment Conditions L1.2.7 and L1.2.8 replace conditions S1(b), S2(a) and S2(b) on the previous licence and have not been reassessed.	General provisions of the <i>Environmental Protection Act 1986</i> .
	L1.2.9	August 2016 Amendment Construction - - New Gas Generators and Waste Heat Recovery Unit Refer to Appendix B for DER's assessment and decision making for new construction works to install additional power station capacity, waste heat recovery unit and associated infrastructure.	General provisions of the <i>Environmental Protection Act 1986</i> .
Point source emissions to air including monitoring	L1.2.9, L2.2.1 L3.2.1 – L3.2.3	August 2016 Amendment Construction and Operations – New Gas Generators Refer to Appendix B for DER's assessment and decision making. Normal Operation – Existing Power Generation <u>Emission Description</u> <i>Emission:</i> Combustion gases (NO _x , SO _x and particulates) from diesel and	Ambient Air Assessment Criteria, National Environmental Protection Measure (Ambient Air Quality) NSW Protection of the Environment Operations



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>gas generators released to air via emission points A3 – A18 (refer Table 2.2.1).</p> <p><i>Impact:</i> Reduced local air quality. The nearest sensitive receptor is 20 km away.</p> <p><i>Controls:</i> Efficient low NOx burners are proposed to prevent the generation of NOx. Maintenance procedures are in place to optimise the combustion process.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Insignificant <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Low</p> <p><u>Regulatory Controls</u> The generators are an efficient design. L1.2.3 requires the equipment including emissions control measures to be maintained on a regular basis. No monitoring is prescribed.</p> <p><u>Residual Risk</u> <i>Consequence:</i> Insignificant <i>Likelihood:</i> Unlikely <i>Residual Risk Rating:</i> Low</p>	(Clean Air) Regulation 2010, Schedule 4
	L2.2.1, L4.1.1	<p>September 2015 Amendment</p> <p>Two emission points to air (A1 and A2) have been identified as part of this amendment and added to the Licence. Further information was requested as per IR1 of Table 4.1.1, condition L4.1.1, to assist in determining the significance of these emissions. Pending this information, the requirement for monitoring can be assessed.</p>	NSW Protection of the Environment Operations (Clean Air) Regulation 2010, Schedule 3



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Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>August 2016 Amendment</p> <p>IR1 (for air emission background information) was completed and hence the requirement under L4.1.1 has been removed from the Licence.</p>	
Point source emissions to groundwater including monitoring	L2.3.1, L3.2.1	<p>September 2015 Amendment</p> <p>Condition L2.3.1 authorises discharge of mine dewater to the main pit consistent with the volume limit for category 6. Monitoring condition L3.2.1 requires the volume and quality of this discharge to be monitored and replaces previous licence condition W13(a).</p>	General provisions of the <i>Environmental Protection Act 1986</i> .
Monitoring general	L3.1.1 – L3.1.5	<p>September 2015 Amendment</p> <p>Monitoring conditions L3.1.1- L3.1.5 have been included on the Licence as monitoring of inputs and outputs and ambient groundwater quality are included on the Licence. These conditions replace previous licence conditions W11(b), W11(c) and part of W16(a).</p>	General provisions of the <i>Environmental Protection Act 1986</i> .
Monitoring of inputs and outputs	L3.3.1	<p>September 2015 Amendment</p> <p>Condition L3.3.1 in part replaces previous licence conditions W13(a) and W13(b) (refer also to point source emissions to groundwater section above.). L3.2.1 also adds requirements to monitor tailings deposition, tailings return water and seepage recovery volumes and volume of mine dewater discharged.</p>	General provisions of the <i>Environmental Protection Act 1986</i> .
Ambient environmental quality monitoring	L3.4.1	<p>September 2015 Amendment</p> <p>DER's assessment and decision making in relation to the TSFs' operation including ambient groundwater quality monitoring, is detailed in Appendix A.</p> <p>Groundwater and soil monitoring to assess the performance of the bioremediation landfarm and the TSF 1 has been included in the licence in condition L3.3.1 and replaces the previous licence conditions W11(a) in part</p>	Table A1, Appendix A of Schedule B5a – <i>Guideline on Ecological Risk Assessment</i> , Assessment of Site Contamination NEPM Saprolite Environmental



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>and W16(a).</p> <p>On the basis of data from the 2014 AER and 2015 AER, the requirement to monitor lead levels in soil has been removed from the licence as the lead concentrations are well below the ecological investigation level (EIL) for fresh or aged contamination for areas of ecological significance (this being the highest level of protection – refer Table A1 of Schedule B5a of the Assessment of Site Contamination NEPM). The EIL level is 110 mg/kg for lead, whilst 2014 Jundee data ranged from 7 – 22 mg/kg and 2015 data 7 – 12mg/kg.</p> <p>Similarly as no BTEX (benzene, toluene, ethyl benzene or xylene) or lead in groundwater was recorded above the level of detection and minimal levels of nitrogen and phosphorus in groundwater were detected, these parameters have been removed from Table 3.2.1. BTEX was not recorded above the level of detection in the soil samples so has also been removed from Table 3.2.2. Monitoring total recoverable hydrocarbons in soil and groundwater is sufficient to assess if the bioremediation areas are performing adequately.</p> <p>August 2016 Amendment</p> <p>Administrative corrections were made to the list of Fisher In-pit TSF monitoring bores to be sampled to remove redundant bores FMB06, FMB07 and FMB08. Note 3 was reinstated for Table 3.4.1 to specify that 90% of all bores must be sampled during the quarter.</p>	<p>(2015) <i>Annual Environmental Report to the Department of Regulation; Licence No.6498/1995/11 1 January to 31 December 2014</i>, March 2015</p> <p>Saprolite Environmental (2014) <i>Annual Environmental Report to the Department of Regulation; Licence No.6498/1995/11 1 January to 31 December 2013</i>, March 2014</p>
Improvements	L4.1.1	<p>September 2015 Amendment</p> <p>Tasks IR2, 3, 4 of Table 4.1.1 relate to including monitoring of selenium as part of the metal analytical suite for ambient groundwater quality. Selenium has the potential to be biomagnified within food webs through uptake by plants or soil fauna, and so it is important to limit the discharge of this element into shallow soils to reduce risks of environmental harm taking place.</p>	<p>Licensee supplied information</p> <p>NSW <i>Protection of the Environment Operations (Clean Air) Regulation 2010</i>, Schedule 3</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>The risk of selenium entering local food webs locally is minimal provided the perched water table is maintained at depths greater than about 1 metre below the ground surface. Selenium is associated with saline groundwater in the goldfields, hence the inclusion of investigatory monitoring of this parameter.</p> <p>August 2016 Amendment</p> <p>A new IR1 has been added to the improvement table 4.1.1 for the Licensee to develop and submit to the CEO a commissioning plan for the new power station, prior to commissioning.</p> <p>Following a request by the Licensee dated 25 May 2016, DER has extended the due date for IR 4 to 30 November 2016.</p>	<p>ANZECC (2000) <i>Water Quality Guidelines for fresh and marine water quality</i>, Section 3 Aquatic ecosystems.</p> <p>Letter from Garry Mills, Northern Star Resources to DER, 25 May 2016</p>
Information	L5.1.1 – 5.1.4 L5.2.1 - 5.2.3	<p>September 2015 Amendment</p> <p>Conditions relating to the management of records and complaints, notification requirements and the submission of an annual audit compliance report and annual environmental report are included in the Licence. These replace previous licence conditions G2 (a), G2 (b), G2 (c) and G3.</p>	General provisions of the <i>Environmental Protection Act 1986</i> .
	L5.3.1	<p>September 2015 Amendment</p> <p>Condition L5.3.1 replaces previous licence conditions G1(a), G1 (b) and G1(c).</p>	
Licence Duration	N/A	<p>August 2016 Amendment</p> <p>An extension to the licence expiry date was made by separate amendment notice on 29 April 2016.</p>	DER (2016) Amendment by Notice, 29 April 2016



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
13/08/2015	Proponent sent a copy of draft instrument	Corrections to tenements, capacities for category 6 and 73 provided, confirmation of infrastructure listed in Table 1.3.1 and edit to timeframe for submission of IR1 under Licence condition 4.1.1.	Comments adopted into the Licence and Decision Document where appropriate.
05/07/2016	Licensee sent a copy of draft instrument	Additional proposal to include assessment and approval of a 1.5MW waste heat recovery unit to capture heat from exhaust gases of the new gas generators.	Assessment of waste heat recovery unit included in decision document and licence.



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



Appendix A

Premises operation including ambient groundwater monitoring

Emission Risk Assessment – Operations

Emission Description

Emission: Seepage of tailings liquor from TSF 2 and the Fisher In-Pit TSF into groundwater raising the standing water levels of groundwater and altering groundwater quality surrounding the TSF.

Impact: Tailings seepage containing heavy metals, cyanide and elevated salinity as compared to background levels (Background TDS of 1000mg/L to 2000mg/L with seepage being in excess of 10000 mg/L) resulting in an alteration of groundwater quality. Groundwater mounding due to seepage also has the potential to impact adjacent vegetation through inundation of vegetation root systems.

Controls: Jundee Operations operates a network of seepage recovery bores (refer to Table 3.4.1 of the Licence) to reduce groundwater mounding attributable to TSF 2 and to the Fisher In-pit TSF. Nimary TSF is decommissioned and tailings deposition to TSF 1 is currently not occurring.

Jundee has also prescribed internal performance targets and triggers with associated management actions to increase seepage recovery in response to monitoring data, if required as part of their Groundwater Recovery Seepage Management Plan (see also Regulatory Controls below).

Risk Assessment

Consequence: Moderate

Likelihood: Possible

Risk Rating: Moderate

Regulatory Controls

A monitoring program for ambient groundwater depth and quality surrounding TSF 1 and TSF 2, Fisher In-pit TSF and decommissioned Nimary TSF is required by Licence condition L3.4.1.

Works approval W5164/2012/1 for the stage 6 embankment raise required Jundee Operations to develop a Groundwater Recovery Seepage Management Plan (GRSMP) to manage seepage associated with TSF 2 operations. The GRSMP, dated August 2013, was submitted to DER in 2013. The objective of this plan is to prevent impact to vegetation from rising groundwater levels. A vegetation survey conducted as part of the GRSMP has ascertained that the root profile of the locally dominant species *Acacia aneura* and *Acacia pruinocarpa* did not extend beyond the first metre below ground level. Hence a standing water level (SWL) limit of 1m bgl has been placed on the Licence as part of condition L3.4.1.

Groundwater quality limits for pH, total dissolved solids (TDS) and weak acid dissociable cyanide concentration are also included in Table 3.4.1 of condition 3.4.1. If a result is recorded in excess of the limits notification requirements to DER are included in Licence condition 5.3.1.

It should be noted that over the life of L6498/1995/11 the TDS limit has been gradually increased in response to increasing salinity of the groundwater surrounding the TSFs, however the limit of TDS of 14,000 mg/L is unchanged from the existing Licence. The groundwater quality limits have been included on the Fisher In-Pit TSF monitoring bores.

Residual Risk

Consequence: Moderate

Likelihood: Unlikely



Risk Rating: Moderate

References

ANZECC (2000) *Water Quality Guidelines for fresh and marine water quality*, Section 3 Aquatic ecosystems.

Newmont Jundee Operations (2013) *Groundwater Recovery Seepage Management Plan*, August 2013.

Emission Risk Assessment – Emergency Operation

Emission Description

Emission: Release of supernatant liquors or tailings from Fisher In-pit TSF from overtopping during high rainfall event.

Impact: Tailings solids and liquors containing heavy metals and cyanide released to land. Localised soil contamination and potential to impact adjacent vegetation and fauna.

Controls: An engineering assessment of the freeboard requirements for Fisher In-Pit TSF was conducted (Coffey 2014). This included a survey of the tailings beach levels and existing capacity. The freeboard required for a 1 in 100 year, 72 hour duration storm event was calculated (250mm). The engineering assessment concluded that a 300 mm freeboard for the TSF was low risk of overtopping, providing the earth bund surrounding the TSF is maintained to a height of at least one metre (section 6, Coffey 2014).

The one metre perimeter containment bund surrounds the Fisher In-pit TSF to prevent stormwater ingress from adjacent areas and to also provide emergency storm containment.

Daily visual inspections of freeboard are conducted.

Risk Assessment

Consequence: Moderate

Likelihood: Unlikely

Risk Rating: Moderate

Regulatory Controls

Licence condition L1.2.2 requires that the containment bund surrounding Fisher In-pit TSF is maintained to a height of at least one metre.

The requirement to maintain a total freeboard of 300 mm is included on the Licence as part of condition L1.2.4.

Condition L1.2.5 requires daily visual inspections to confirm freeboard capacity is available. A requirement to complete an annual survey of the operating level/capacity of the Fisher In-pit TSF has also been included in Table 1.2.3, condition L1.2.5.

Residual Risk Assessment

Consequence: Moderate

Likelihood: Unlikely

Risk Rating: Moderate



References

Australian National Committee on Large Dams (ANCOLD) (2012) *Guidelines on Tailings Dams: Planning, Design, Construction, Operation and Closure*, May 2012.

Coffey (2014) *Northern Star Resources Jundee Gold Operations Fisher Pit TSF Freeboard Assessment Report*, 23 October 2014.



Appendix B

Point source emissions to air including monitoring

Power Generation

The emissions to air from point sources at Jundee Operations has altered with the proposal to install 6 x 3MW gas generators and one 1.5MW waste heat recovery unit. The installation of the additional gas generation may allow for decommissioning of existing diesel generators, resulting in a further reduction in overall emissions from the current operation. The Licensee intends not to operate the 18MW in its entirety, rather install the additional capacity to provide for greater redundancy capacity (Northern Star Resources 2016). It is also the Licensee's intent to decommission some diesel generators following installation and commissioning of the new power station

NOx emissions from the diesel generators are typically an order of magnitude larger than gas (in the range of 5000 – 8000 mg/m³).

The new gas generators are an efficient design. Expected NOx emissions are equal to, or less than 500 mg/m³ for each (Zenith Pacific 2016).

Abnormal Operation

Emission Description

Emission: Combustion gases (NOx, CO, CO₂, CH₄) in excess of design criteria from gas generators via waste heat recovery stack or individual stacks. The gas generators are able to operate in open (vent from individual unit) or closed cycle (vent via common exhaust via waste heat recovery heat exchanger). Refer to Figure 9 following for further detail of the process flow.

Impact: Reduced local air quality. The design criterion for NOx emissions from the new gas generators is estimated at equal to, or less than 500mg/Nm³ (Zenith Pacific 2016). In the absence of any Western Australian criteria, Schedule 4 of the NSW Protection of the Environment Operations (Clean Air) Regulations has been used as a reference. The emission concentration limit for NOx emissions from new stationary combustion engines in NSW is 450mg/m³.

There are no adjacent receptors. The nearest population is at the accommodation camp for the mine which is located 5 km away from the power station. The nearest sensitive receptor is Wiluna, 50 km south-west from the Premises.

Controls: No specific emissions abatement is proposed. Regular maintenance will be conducted to ensure the generators are operating as per design.

Risk Assessment

Consequence: Insignificant, the nearest sensitive receptor is 50 km away

Likelihood: Unlikely, maintenance procedures are in place

Risk Rating: Low

Regulatory Controls

Quarterly emissions monitoring by stack testing has been imposed to validate emissions and maintenance of the combustion process for the first twelve months of operation for the new generators. Following results that indicate that the operation of the generators is well managed, the requirement for monitoring will be removed from the Licence as per the requirements for the existing gas generators. The monitoring requirements are detailed in condition L3.2.1.



Residual Risk

Consequence: Insignificant

Likelihood: Unlikely

Residual Risk Rating: Low

References

Northern Star Resources (2016) Licence Amendment Application L6498/1995/11, 27 May 2016

Schedule 4 of *NSW Protection of the Environment Operations (Clean Air) Regulations 2010*

Zenith Pacific Pty Ltd (2016) Jundee Gold Mine, 18MW Power Station Project, Facility Description, Document No: JU004 –DOC-001, 9 May 2016

