Government of Western Australia
Department of Environment Regulation

Works Approval

Environmental Protection Act 1986, Part V

Works Approval Holder: **St Ives Gold Mining Company Pty Ltd**

Works Approval Number: **W5858/2015/1**

Registered office: Level 5, 50 Colin Street
WEST PERTH WA 6005

ACN: 098 386 273

Premises address: St Ives Gold Mine
Mining tenements as described in Schedule 1
KAMBALDA WA 6442

Issue date: Thursday, 17 September 2015

Commencement date: Monday, 21 September 2015

Expiry date: Thursday, 20 September 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
05	Processing or beneficiation of metallic or non-metallic ore	50 000 tonnes or more per year	900 000 tonnes per annual period

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

.....
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;

'CEO' for the purpose of correspondence means;
Chief Executive Officer
Department Administering the Environmental Protection Act 1986
Locked Bag 33
CLOISTERS SQUARE WA 6850
Telephone: (08) 9333 7510
Facsimile: (08) 9333 7550
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;

'Works Approval' means this Works Approval numbered W5858/2015/1 and issued under the Act;

'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 Requirements[1]

Document	Parts	Date of Document
Works Approval Application – St Ives Gold Mine M15/1540, M15/1541, M15/1542, M15/1562, M15/1630 and M15/1631	All	April 2015
Email correspondence from Bronwen Smith of St Ives Gold Mining Company Pty Ltd, "RE: Leviathan In-pit TSF works approval – further questions".	All	11 June 2015

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.

1.2.2 The Works Approval Holder shall undertake commissioning in accordance with the commissioning plan detailed in section 3.5 of the Works Approval Application.

2 Information

2.1 Reporting

2.1.1 The Works Approval Holder shall submit a compliance document to the CEO, following the construction 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.

2.2 Notification

2.2.1 The Works Approval Holder shall ensure that the parameters listed in Table 2.2.1 are notified to the CEO and are in accordance with the notification requirements of the table.

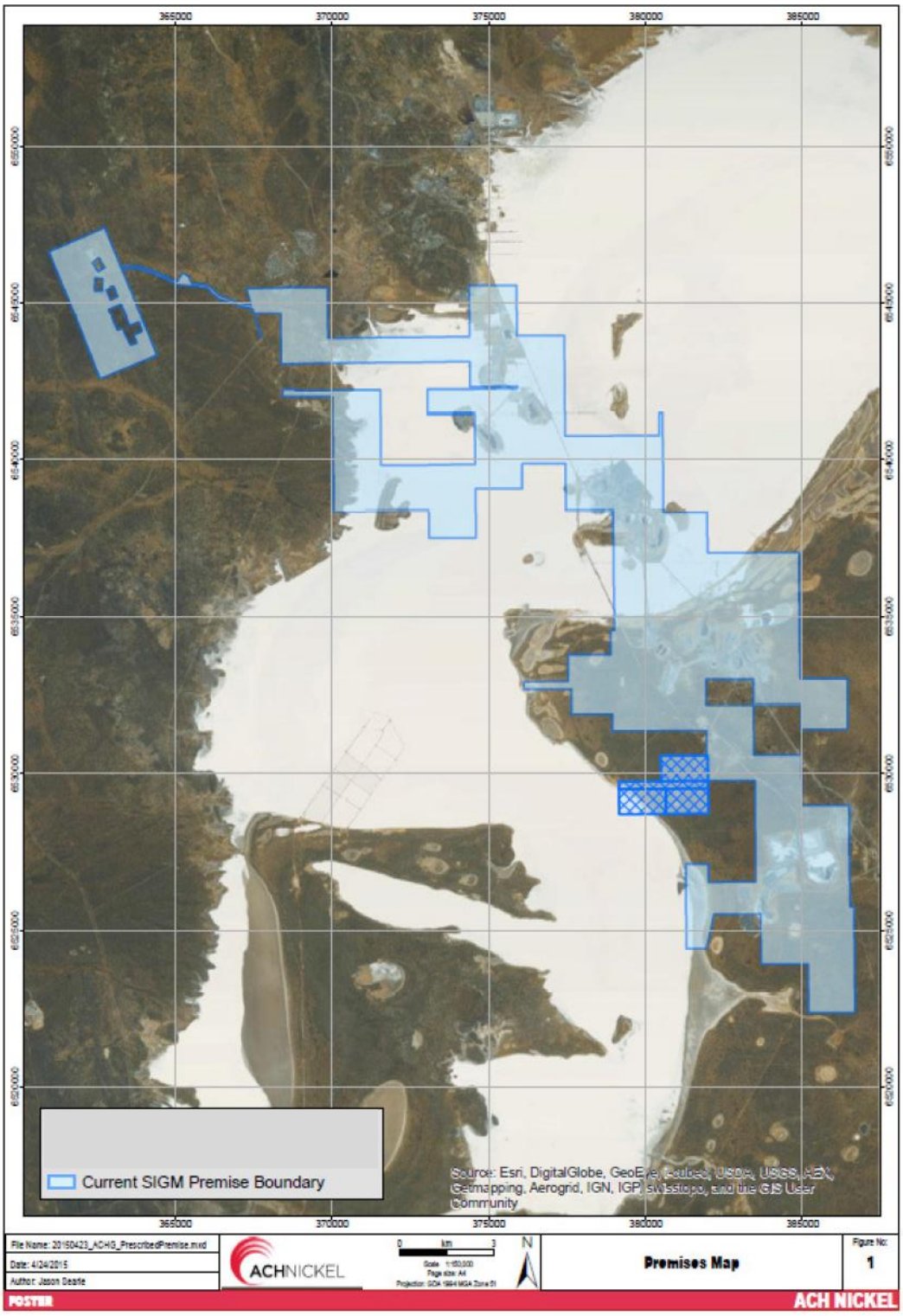
Table 2.2.1: Notification requirements

Condition or table (if relevant)	Parameter	Notification requirement	Format or form
1.2.2	Commencement of commissioning	7 days prior to start	None specified
	Completion of commissioning	7 days after completion	

Schedule 1: Maps

Premises map

The Premises is shown in the map below. The blue line depicts the Premises boundary.



Premises tenement list

The Premises boundary is defined by the tenements listed in the table below:

St Ives Gold Mining Pty Ltd				
L15/214	M15/1544	M15/1579	M15/1629	M15/1695
M15/300	M15/1546	M15/1580	M15/1630	M15/1698
M15/476	M15/1549	M15/1581	M15/1631	M15/1699
M15/1226	M15/1550	M15/1590	M15/1632	M15/1702
M15/1495	M15/1556	M15/1591	M15/1633	M15/1703
M15/1496	M15/1559	M15/1593	M15/1634	M15/1802
M15/1503	M15/1560	M15/1594	M15/1657	
M15/1509	M15/1561	M15/1607	M15/1658	
M15/1513	M15/1562	M15/1608	M15/1659	
M15/1516	M15/1564	M15/1610	M15/1664	
M15/1517	M15/1565	M15/1611	M15/1668	
M15/1518	M15/1566	M15/1612	M15/1669	
M15/1527	M15/1567	M15/1614	M15/1670	
M15/1531	M15/1568	M15/1615	M15/1673	
M15/1532	M15/1570	M15/1618	M15/1675	
M15/1537	M15/1572	M15/1619	M15/1687	
M15/1540	M15/1573	M15/1622	M15/1690	
M15/1541	M15/1575	M15/1623	M15/1692	
M15/1542	M15/1576	M15/1627	M15/1693	
M15/1543	M15/1578	M15/1628	M15/1694	

Government of Western Australia
Department of Environment Regulation

Decision Document

Environmental Protection Act 1986, Part V

Proponent: St Ives Gold Mining Company Pty Ltd

Works Approval Number: W5858/2015/1

Registered office:	Level 5, 50 Colin Street WEST PERTH WA 6005
ACN:	098 386 273
Premises address:	St Ives Gold Mine Mining tenements as described in Schedule 1 KAMBALDA WA 6442
Issue date:	Thursday, 17 September 2015
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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 legal requirements and that the works approval and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by:	Clarrie Green Licensing Officer
Decision Document authorised by:	Danielle Eyre Delegated Officer

Contents

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 ☒ New licence ☐ Licence amendment ☐ Works approval amendment ☐	
Activities that cause the premises to become prescribed premises	**Category number(s)**	**Assessed design capacity**
	5	9,000,000 tonnes per annual period
Application verified Application fee paid	Date: 29 June 2015 Date: 24 July 2015	
Works approval has been complied with Compliance certificate received	Yes ☐ No ☐ N/A ☒ Yes ☐ No ☐ N/A ☒	
Commercial-in-confidence claim	Yes ☐ No ☒	
Commercial-in-confidence claim outcome		
Is the proposal a Major Resource Project?	Yes ☒ No ☐	
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986*?	Yes ☐ No ☒	Referral decision No: Managed under Part V ☒ Assessed under Part IV ☐
Is the proposal subject to Ministerial conditions?	Yes ☒ No ☐	Ministerial statement No: 879 EPA Report No: 1493
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the *Environmental Protection Act 1986*)?	Yes ☒ No ☐ Department of Water consulted Yes ☐ No ☒	
Is the premises within an Environmental Protection Policy (EPP) Area Yes ☐ No ☒ If Yes include details of which EPP(s) here.		
Is the premises subject to any EPP requirements? Yes ☐ No ☒ If Yes, include details here, eg Site is subject to SO_2 requirements of Kwinana EPP.		

3 Executive summary of proposal and assessment

The St Ives Gold Mine (SIGM) is located approximately 8 km south of Kambalda and operated by St Ives Gold Mining Company Pty Ltd (St Ives). Mining operations on Lake Lefroy are licenced under L8485/2010/2 and approved under Ministerial Statement 879. SIGM ore is currently mined from both underground mines and open pits with surface stockpiles processed via both mill/Carbon-In-Pulp (CIP) and heap leach plants.

Groundwater in the area is in the range of 50,000 to 300,000 mg/L total dissolved salts (TDS) with groundwater quality in the vicinity of Lake Lefroy ranging between 274,000 to 423,000 mg/L TDS and metal levels reflective of the mineralogy in the region. Mining operations are both land and lake based, where the latter operations are based on Lake Lefroy, a salt lake covering an area of 544 km^2. Playa lakes such as Lake Lefroy are prominent within the Salinaland Division and occur as dendritic and partly interconnected chains that outline fossil drainage systems (Dames & Moore 1999).

This Works Approval is for the development of Leviathan complex as a tailings storage facility (TSF) for the Lefroy Mill. The Leviathan complex consists of the current open-cut pits Leviathan, Paddy's, Britannia, Sirius and Britannia Footwall. The currently active TSF, TSF4, has shown signs of seepage with rising groundwater exceeding trigger levels on the Licence. The high salinity of rising groundwater around the facility presents a risk to surrounding native vegetation should groundwater intercept the root zone. It is estimated that Leviathan has 36,500,000 m^3 of capacity which would accommodate 10 years of tailings disposal and reduce the risk to vegetation.

The Project includes the following aspects:

- Construction of new monitoring bores around the Leviathan complex.
- Installation and commissioning of piping and pumping system for discharging tailings from the Lefroy Mill to the Leviathan complex.
- Installation and commissioning of piping and pumping system for recovering tailings supernatant (return water) from the Leviathan complex to mill process water tanks or mill return dams.

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			
Licence section	**Condition number** **W = works approval** **L= licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
General conditions	W1.2.1 – 1.2.2 L1.2.1 – 1.2.3	**Construction** General conditions have been applied to the Works Approval that require St Ives to construct the pipeline infrastructure in accordance with commitments outlined in application documents. **Operation** Conditions 1.2.1 – 1.2.3 will remain in the Licence.	Application supporting documentation Environmental Protection (Unauthorised Discharges Regulations, 2004).
Premises operation	L1.3.1, 1.3.3 – 1.3.6	**Construction** No premises operation conditions have been applied to the Works Approval. **Operation** Premises operation conditions on the existing Licence will be retained to manage tailings delivery pipelines, return pipelines and discharges to the TSF. Regular inspections, bunding and telemetry systems will ensure that any unintentional and unauthorised discharge is quickly identified to minimise impacts to the environment.	Application supporting documentation General provisions of the *Environmental Protection Act 1986*
Emissions general	L2.1.1	**Construction** No emissions and discharge limits have been applied to the works approval. **Operation** The continued recording and investigation of limit exceedances will remain a requirement of the Licence.	

DECISION TABLE			
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	N/A	**Construction and operation** No point source emissions to air are anticipated during the construction or operation of the Leviathan In-pit TSF.	General provisions of the *Environmental Protection Act 1986*
Point source emissions to surface water including monitoring	N/A	**Construction and operation** There are no anticipated point source emissions to surface water as a result of construction or operation of the Leviathan In-pit TSF.	Application supporting documentation General provisions of the *Environmental Protection Act 1986* Environmental Protection (Unauthorised Discharges Regulations, 2004).
Point source emissions to groundwater including monitoring	L2.4.1 and L3.5.1	**Construction and Commissioning** There are no anticipated point source emissions to groundwater during construction of tailings pipelines or bunding. Commissioning involves pressure testing of tailings pipelines, which will result in the discharge of approximately 5,000 kL of abstracted groundwater to the Leviathan In-pit TSF. St Ives operations currently involve the discharge of dewater to open-cut pits, permitted by the Licence L8485/2010/2. As the proposed discharge will display similar characteristics to groundwater at the base of the Leviathan Pit impacts are likely to be insignificant. **Operation** DER's assessment and decision making are detailed in Appendix A.	General provisions of the *Environmental Protection Act 1986*
Emissions to land including monitoring	N/A	**Construction** No discharges to land are anticipated during the installation of tailings and return pipelines and construction of bunding. **Commissioning and Operation**	Environmental Protection (Unauthorised Discharges Regulations, 2004).

DECISION TABLE			
Licence section	**Condition number W = works approval L= licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
	L1.3.1	The disposal of tailings to an in-pit TSF is not assessed as an emission to land. See section on point source emissions to groundwater. *Emission Risk Assessment – Pipeline leak or failure* <u>Emission Description</u> *Emission:* Discharge to native vegetation with tailings or return water from a leaking/ruptured pipeline. Tailings and return water is characterised as alkaline, hypersaline with total dissolved solids ranging between 35,000 and 80,000 mg/L and having elevated weak acid dissociable cyanide concentrations (10 to 110 mg/L). *Impact:* Elevated salt and cyanide can inhibit germination and growth of plants and even result in death. The area between the Lefroy Mill and Leviathan In-pit TSF is heavily disturbed with little vegetation present. In addition, no known priority species or ecological communities have been identified in the vicinity of the proposed works. *Controls:* Leak detection telemetry will be installed on the pipeline to trigger an alarm should a variation in flow rates by more than 5% for 10 minutes or more than 10% for two minutes be detected. In addition, St Ives propose to construct bunding around all pipelines and regularly inspect the pipeline route for leaks. <u>Risk Assessment</u> *Consequence:* Minor *Likelihood*: Unlikely *Risk Rating:* Moderate <u>Regulatory Controls</u> Existing Licence conditions requiring regular inspections of pipelines and the operation of telemetry systems/bunding adequately control all pipelines transporting environmentally hazardous materials at SIGM. No further conditions are proposed for the Licence and therefore the residual risk	

DECISION TABLE			
Licence section	**Condition number W = works approval L= licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		remains unchanged.	
Fugitive emissions	W1.2.1 L2.6.1	**Construction** Emission Description *Emission:* Dust generated by earthmoving equipment and additional vehicle movements. *Impact:* Reduction in local air quality and the potential for dust to deposit on nearby local flora. No priority flora has been identified near to the Leviathan In-pit TSF. *Controls:* In order to control the dust emissions during construction St Ives have committed to implement the SIGM Dust Management Procedure (SIG-ENV-PR029) and SIGM Air Quality Standard (SIG-ENV-PR010). These documents require the operation of water trucks during construction of bunding and the enforcement of speed limits on unsealed roads. Risk Assessment *Consequence:* Insignificant *Likelihood*: Unlikely *Risk Rating:* Low Regulatory Controls St Ives controls are expected to adequately manage dust emissions during construction. **Operation** Dust conditions have already been applied to the Licence to require St Ives to operate in accordance with the SIGM Dust Management Procedure (SIG-ENV-PR029), which is expected to adequately manage the generation of dust at SIGM.	General provisions of the *Environmental Protection Act 1986*

DECISION TABLE			
Licence section	**Condition number W = works approval L= licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
Odour	N/A	**Construction and operation** No conditions relating to odour have been applied to the Works Approval as construction is not expected to generate significant odour emissions. The deposition tailings is also not expected to generate significant odours and therefore no additional odour conditions will be added to the Licence.	
Noise	N/A	**Construction and operation** Noise is likely to be generated by increased vehicle movements and earth moving. However, noise is not anticipated to interfere with the amenity of the nearest human receptor during either construction or operation as they are located approximately 14 km away. In addition, due to the high salt content of Lake Lefroy native fauna does not frequent the area. No noise conditions have been applied to the Works Approval or Licence.	
Monitoring general	N/A	**Construction** No monitoring conditions have been applied to the Works Approval. **Operation** General monitoring condition 3.1.1 will remain on the Licence to ensure that all samples are collected in accordance to the relevant Australian Standards and are submitted to a laboratory with NATA accreditation.	
Monitoring of inputs and outputs		**Construction and operation** No input or output monitoring will be included on the Licence or Works Approval as a result of the Leviathan In-pit TSF.	
Process monitoring		**Construction and operation** There are no specified conditions relating to process monitoring.	
Ambient quality monitoring	L3.5.1	**Construction** No ambient quality monitoring will be required through the Works Approval. **Operation** Local groundwater contains elevated levels of TDS in the range of 150,000 to 250,000 mg/L. It is anticipated that the operation of the Leviathan In-pit TSF	Australian Standard AS/NZS 5667.1 – Water Quality Sampling – Guidance on the Design of sampling, programs, sampling techniques and

DECISION TABLE			
Licence section	**Condition number W = works approval L= licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		will result in some seepage. Although groundwater uses are limited as a result of high salinities, groundwater mounding has the potential to result in vegetation death in the event that mounding intercepts the root zone. Therefore groundwater monitoring conditions (including standing water level limits and notification requirements) will be applied to the five proposed monitoring bores situated around the Leviathan In-pit TSF.	the preservation and handling of sample.
Meteorological monitoring	N/A	**Construction and operation** There are no meteorological monitoring requirements under this Works Approval or Licence.	
Improvements	N/A	No improvements are proposed for the Works Approval or Licence in relation to the Leviathan In-pit TSF.	
Information	L5.3.2	Table 5.2.3 will be updated to include the Leviathan In-pit TSF monitoring bores, requiring the notification of standing water levels rising above 6 metres below ground level.	N/A
Works Approval Duration	N/A	The Works Approval has been issued for three years.	N/A

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
02/09/2015	Proponent sent a copy of draft instrument	No comments received	N/A

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
There are anticipated direct emissions to groundwater as standing water levels around the TSF the intercept groundwater base of the Leviathan In-pit TSF. Previous open-cut and underground mining within the Leviathan complex has required dewatering meaning that standing water levels are expected to rise naturally as the facility acts as a groundwater sink. Modelling suggests that a tailings plume entering the surrounding groundwater would not spread significantly beyond the underground mine footprint as groundwater is expected to flow into the pit or be directed to other nearby sinks such as North Orchin or Thunderer pits. The estimated hydraulic conductivity of pit walls in the Leviathan complex are approximately 10^{-7} to 10^{-9} metres per second suggesting that horizontal movement of contaminants within groundwater will be limited.

As groundwater surrounding the Leviathan In-pit TSF is hypersaline with a TDS concentration of on average 150,000 and 250,000 mg/L, it is unlikely that groundwater can support any stygofauna populations. However, the introduction of tailings to the Leviathan In-pit TSF has the potential to lead to rises in groundwater levels beyond what would be naturally occurring.

DER has reviewed St Ives' impact assessment for seepage risks from the TSF and is satisfied that the assessment provided by the proponent has been undertaken in an appropriate manner. DER has scrutinised the St Ives' proposal to ensure they adequately prevent and mitigate the impacts of seepage and is satisfied that appropriate controls will be adopted at the premises.

Emission Risk Assessment – Normal operation
Emission Description
Emission: Seepage from the Leviathan In-pit TSF resulting in groundwater mounding.
Impact: Rising standing water levels into the root zone of native vegetation is likely to result in significant vegetation death due to the high salt content of groundwater.
Controls: The disposal strategy will require rotation of the discharge points to different areas of the open pits to control the size and location of the supernatant pond. Settlement and management of tailings and water recovery will be aided by:

- relocating discharge points and create new beaches;
- discharging tailings into the Britannia, Sirius, Britannia Footwall and Paddy's pits on a campaign basis, enabling operational pauses in tailings placement to the Leviathan pit, as required; and
- the prioritisation of return water usage at Lefroy Mill.

St Ives proposes to further reduce the risk of groundwater mounding above natural levels by incorporating a two metre freeboard. As the surrounding area of each pit of the Leviathan In-pit TSF is heavily disturbed, the freeboard is expected to result in standing water levels falling below the root zone at the location of the nearest vegetation.

Risk Assessment
Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate

Regulatory Controls
Existing standing water level monitoring (L3.5.1) and notification conditions (L5.3.2) on the Licence will incorporate the proposed bores around the Leviathan In-pit TSF. No further changes will be made to the Licence although DER will closely monitor standing water levels to ensure that the risk to local

vegetation does not increase during tailings deposition to the Leviathan In-pit TSF. Monitoring controls do not reduce the risk of environmental impact although they do serve as tools to trigger further mitigation measures if required.

Residual Risk
Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate