



Licence Number	L8008/2004/3
Licensee	Ravensthorpe Nickel Operations Pty Ltd
ACN	092 506 584
Registered business address	Level 1, 24 Outram Street WEST PERTH WA 6005
Date of amendment	3 February 2017
Prescribed Premises	Category 5 - Processing or beneficiation of metallic or non-metallic ore Category 31 – Chemical Manufacturing 52 – Electric Power Generation 54 – Sewage Facility
Premises	Ravensthorpe Nickel Operations RAVENSTHORPE WA 6346

Amendment

The Chief Executive Officer (CEO) of the Department of Environment Regulation (DER) has amended the above licence in accordance with section 59 of the *Environmental Protection Act 1986* as set out in this Amendment Notice.

Date signed: 3 February 2017

Tim Gentle

Manager Licensing (Resource Industries)

an officer delegated under section 20 of the Environmental Protection Act 1986 (WA)

Amendment Notice

This notice is issued under section 59 of the *Environmental Protection Act* 1986 (EP Act) to amend the licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

Amendment Description

The Licensee submitted an application on 21 November 2016 to use the limonite pond of the Sands Reject Storage Facility (SRSF) for evaporating decant liquor from their Tailings Storage Facility (TSF). Currently the Premises uses 19 evaporation ponds (a series of HPDE lined ponds to the east of the TSF) to dispose of excess water from the tailings circuit. The Premises still has excess tailings/process water to manage, however, and propose to use the inactive limonite pond of the SRSF as an additional evaporation pond.

The SRSF consists of two ponds that were constructed according to works approval W4873/2011/1. These ponds, a limonite pond and a saprolite pond, were intended to store saline sands from the beneficiation process. To date these ponds have not been used. Both ponds are fully lined with 1.5mm thick HDPE, with a leak detection system comprising draincoil pipes in shallow trenches in gravel underlying the HDPE. The leak detection system is shown in Figure 2 following.

Each pond is bunded with a raised bund between the two ponds. The ponds gently slope towards a collection channel. The channel is bunded with a 600 mm compacted laterite toe bund. The channel directs overland flow via gravity to a sump. This sump is connected to a lined overflow pond which provides capacity in the event of a large storm event. The capacity of the overflow pond is sufficient to contain a 1 in 100 year 72 hour storm event (approximately 180mm).

The construction completion certificate for W4873 was originally submitted in January 2012 and accepted by the then Department of Environment and Conservation. The use of the SRSF was authorised by the Licence L8008 at the amendment dated 9 February 2012, which also added a number of groundwater monitoring bores surrounding the facility to monitor for potential leakage. The SRSF and its associated bores were subsequently removed at an amendment dated 17 October 2013, at the request of the Licensee.

The Licensee now intends to allow the saprolite pond to overflow to the environment in the event of a storm, as only incident rainfall will be captured on that pond. The capacity in the overflow collection pond will be retained for the limonite pond only.

Modifications to pipework at the SRSF will be made to distribute the decant water on the perimeter of the limonite pond liner.

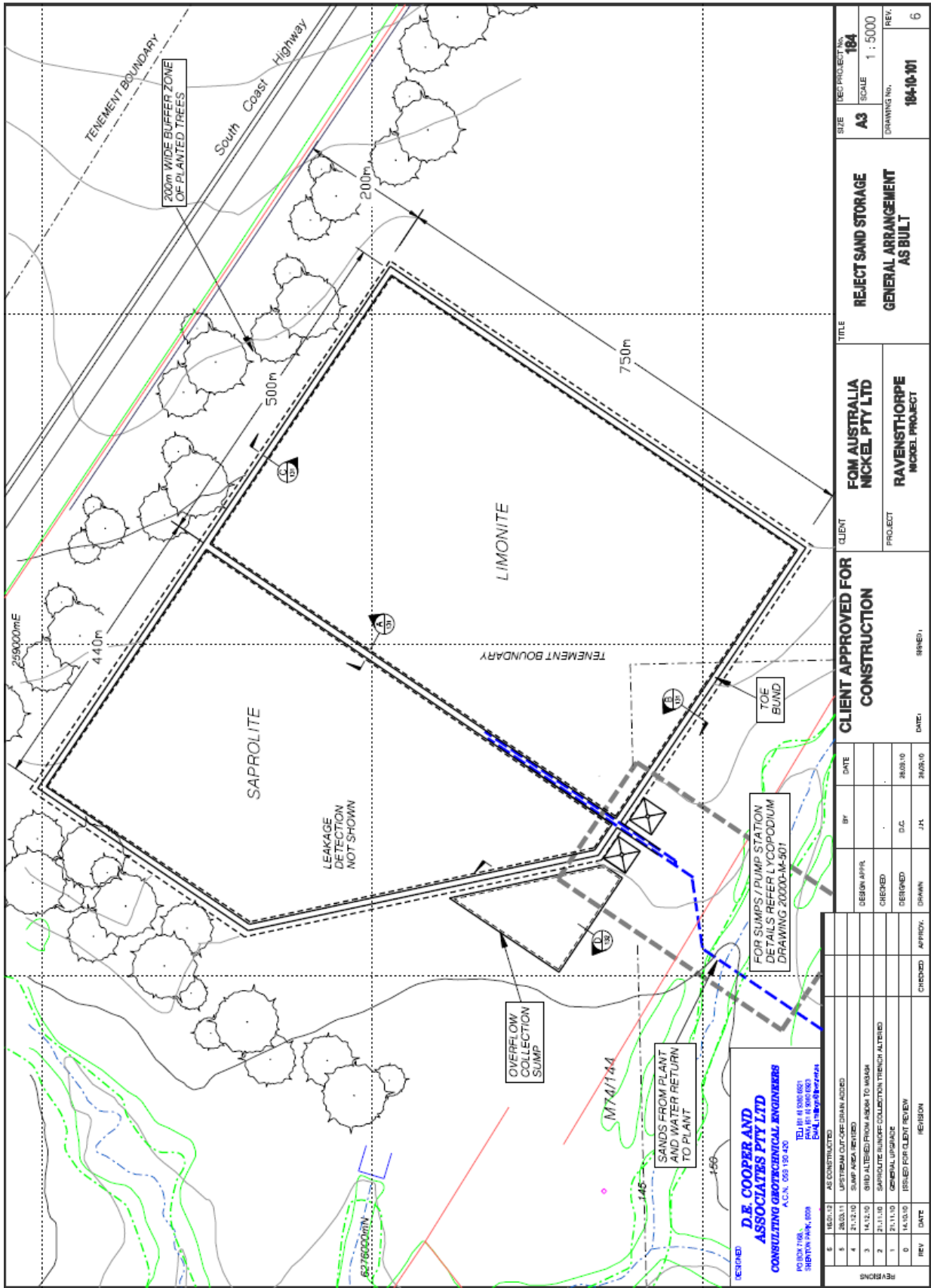


Figure 1: As Built General Arrangement Drawing of Sands Reject Storage Facility, showing overflow pond and toe bund.

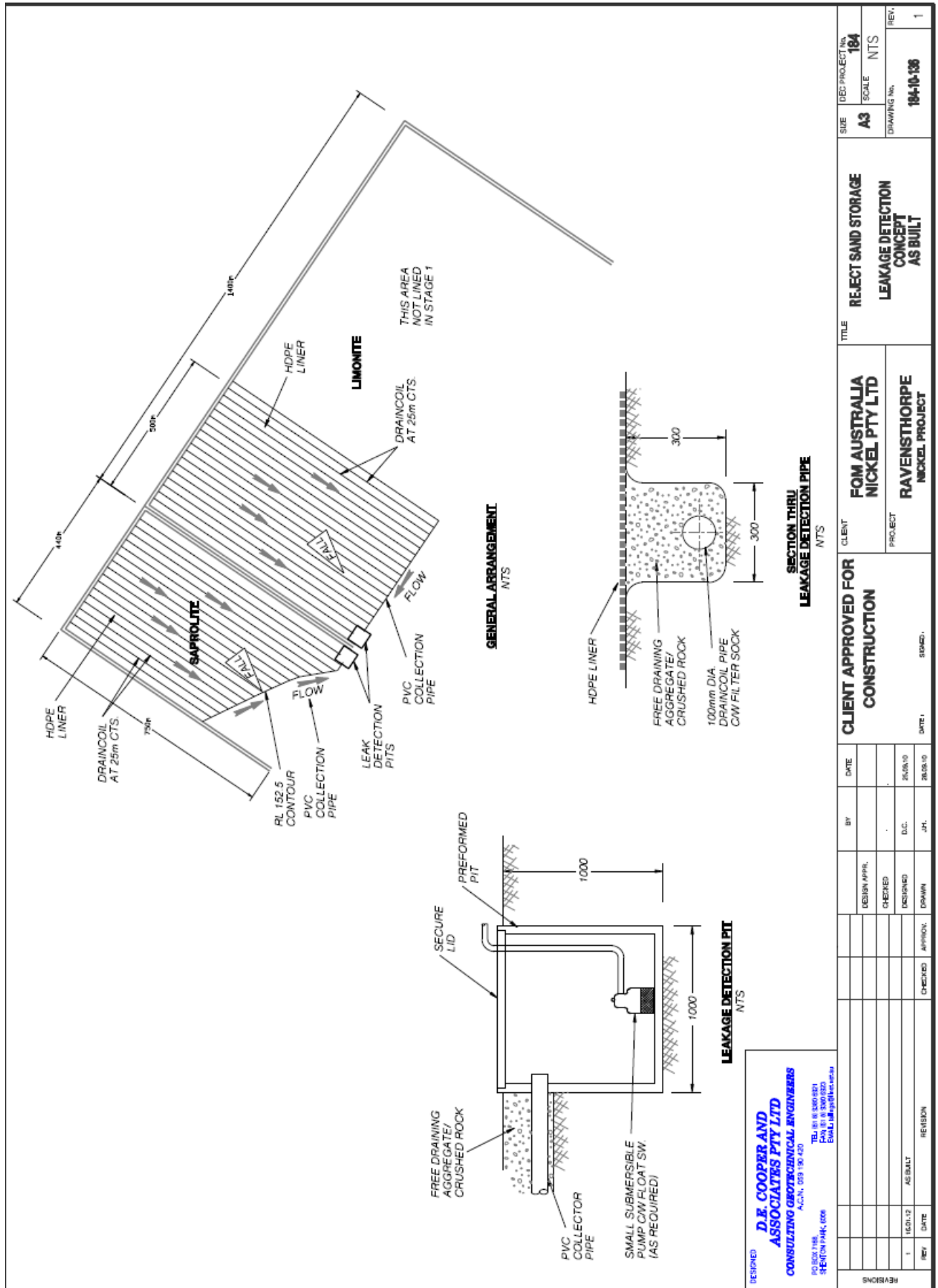


Figure 2: As built drawing of the SRSF Leakage Detection System

Decision

Risk Assessment Methodology

The risk assessment following utilises the risk rating matrix as shown in Table 1, recently updated in accord with DER's *Guidance Statement: Risk Assessments (November 2016)*. The risk criteria used in the matrix below is further defined in Table 2.

Table 1: Risk Rating Matrix

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

Table 3: Risk criteria definitions (taken from DER's *Guidance Statement: Risk Assessments*)

Consequence		
The following criteria will be used to determine the consequences of a risk event occurring:		
	Environment	Public Health* and Amenity (such as air and water quality, noise, and odour)
Severe	<ul style="list-style-type: none"> on-site impacts: catastrophic off-site impacts local scale: high level or above off-site impacts wider scale: mid level or above Mid to long term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Major	<ul style="list-style-type: none"> on-site impacts: high level off-site impacts local scale: mid level off-site impacts wider scale: low level Short term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Moderate	<ul style="list-style-type: none"> on-site impacts: mid level off-site impacts local scale: low level off-site impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid level impact to amenity
Minor	<ul style="list-style-type: none"> on-site impacts: low level off-site impacts local scale: minimal off-site impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Slight	<ul style="list-style-type: none"> on-site impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal impacts to amenity Specific Consequence Criteria (for public health) criteria met

Likelihood	
The following criteria will be used to determine the likelihood of the risk event occurring.	
Almost Certain	The risk event is expected to occur in most circumstances
Likely	The risk event will probably occur in most circumstances
Possible	The risk event could occur at some time
Unlikely	The risk event will probably not occur in most circumstances.
Rare	The risk event may only occur in exceptional circumstances

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*

* In applying public health criteria, DER may have regard to the Department of Health's, *Health Risk Assessment (Scoping) Guidelines*

“on-site” means within the prescribed premises boundary

Risk Assessment

1. Emission: Leakage of tailings liquor to groundwater

The consequence of a release of the tailings liquor from the limonite pond impacting on ambient groundwater is rated as **moderate**. The underlying groundwater quality has salinity of between 4 000 – 30 000 mg/L total dissolved solids and a pH of between 4 and 7. There are no current users of the local groundwater.

The likelihood is rated as **rare** given the engineering of limonite ponds, with a HDPE liner supported by a leakage detection system.

Consequently the risk is rated as **medium**.

Regulatory controls

The use of the limonite pond is authorised by an amendment to condition 1.3.2. Weekly inspection of the leakage detection pit is required by an amendment to condition 1.3.4. Ambient groundwater monitoring of three existing bores in the vicinity of the limonite pond is required by an amendment to condition 3.5.1. Groundwater flow at the Premises is predominately to the south, and these bores are located to the south and east of the limonite pond.

2. Emission: Overflow of the limonite pond or overflow pond to land during a storm event

The consequence of a release of the tailings liquor from the limonite pond impacting on adjacent land and vegetation is rated as **moderate**. It is likely that the overflow of the limonite pond would occur to the south given its gradient slopes south. Likewise the overflow pond is located to the south of the SRSF, so any overflow from that pond would release to the south. A drainage channel is located to the south of the SRSF and there is potential for spills/overflows to travel to the undisturbed vegetation to the west via this channel.

The likelihood is rated as **rare** given the contingency controls in place to capture stormwater: overflow pond with capacity for 1 in 100 year, 72 hour duration rainfall event and a 600mm toe bund at the collection channel.

Consequently the risk is rated as **medium**.

Regulatory controls

The freeboard to be maintained on the limonite pond is 800mm to ensure there is capacity to contain a 1 in 100 year, 72 hour duration pond. Condition 1.3.3 will be amended accordingly. Condition 1.3.4 has been amended to require daily inspections of the limonite pond's freeboard.

3. Emission: Spill from tailings pipelines feeding the SRSF

The consequence of a release of tailings liquor from the limonite pond on adjacent land and vegetation is rated as **moderate**, given the location of undisturbed vegetation to the west of the main tailings pipeline to the plant for part of the distance. Nearer to the SRSF the pipeline corridor crosses a drainage channel to the south of the SRSF. A spill in this location could be transported to the undisturbed area to the south west of the SRSF.

The likelihood is rated as **unlikely** given the tailings pipelines are bunded and have automatic cut offs installed in the event of a loss of flow. Existing pipelines will be

utilised to transfer tailings to SRSF.

Consequently the risk is rated as **medium**.

Regulatory controls

Modifications to existing pipelines at the SRSF are authorised. The regulatory controls prescribed by the existing condition L1.3.1 apply for piping that will be used to transport the tailings decant liquor from the TSF to the SRSF.

4. Other

DER has also made some minor administrative amendments to remove the template of the Annual Audit Compliance Report from Schedule 2 of the Licence as this template can now be downloaded from the public der website at www.der.wa.gov.au.

Amendment History

Instrument	Issued	Amendment
L8008/2004/3	17/10/2013	Amendment
L8008/2004/3	07/04/2014	Amendment to authorise discharge of treated wastewater from WWTP to irrigation area
L8008/2004/3	01/09/2016	Amendment to add new TSF4
L8008/2004/3	03/02/2017	Amendment Notice 1 Authorise use of the limonite pond of the Sands Reject Storage Facility (SRSF) as an additional evaporation pond for tailings decant water.

Amendment

1. Table 1.3.1 of condition 1.3.2 of the licence is amended by the by the insertion of the red text shown in underline below:

Table 1.3.1: Containment Infrastructure			
Containment point reference	Containment Name	Material stored	Infrastructure requirements
Map reference 1	Saprolite Buffer Pond	Saline slurry of crushed saprolite based ore	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 2	Limonite Buffer Pond	Saline slurry of crushed limonite based ore	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 3	Process Water Pond	Hypersaline water and runoff	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 4	Water Treatment Pond	Desalinated water	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less

Table 1.3.1: Containment Infrastructure

Map reference 5	Raw Water Pond	Seawater imported from Mason Bay	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 6	Hypersaline Pond	Hypersaline water (reject stream from the desalination plant)	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 7	Wastewater Treatment Plant Pond	Domestic wastewater (sewage)	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 8	Bioremediation Pad	Hydrocarbon contaminated soil	Integrity of the concrete liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 15	RO Brine Pond	Hypersaline rejects from the Reverse Osmosis plant	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 18	Beneficiation Ponds	Hypersaline water	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 19	Stormwater South – Bottom (SP1)	Stormwater	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 20	Stormwater South – Top (SP2)	Stormwater runoff	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 21	HV Workshop Pond	Heavy Vehicle Workshop run-off	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 22	Stormwater Pond (SP3)	Stormwater runoff	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 23	Sewage Contingency Pond (Decommissioned)	Rain water	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 24	HY21 Turkeys Nest	Stormwater runoff	Integrity of the clay liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 25	Mine Drainage – North	Saline water	Integrity of the clay liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less

Table 1.3.1: Containment Infrastructure

Map reference 26	Farm Dam	Freshwater	Integrity of the clay liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 27	Rejects Facility Dam	Saline water	Integrity of the clay liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 28	Mine Drainage South	Stormwater runoff	Integrity of the clay liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
-	TSF 1 & 2	Tailings from Process Plant	Integrity of the 300mm clay liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
-	Evaporation ponds	Treated process water from TSF and Process Plant	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
Map reference 29	Mining Turkey's Nest	Saline water	Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less
-	<u>Limonite Pond (Sands Rejects Storage Facility)</u>	<u>Tailings decant liquor</u>	<u>Integrity of the synthetic liner to be maintained in an intact and unperforated state with a seepage rate of 10^{-9} m/s or less</u>

2. Condition 1.3.3 of the licence is amended by the insertion of the red text shown in underline below:

1.3.3 The Licensee shall maintain the following freeboards for specified containment infrastructure in Table 1.3.1:

- 300mm a minimum top of embankment operational freeboard for all evaporation and wastewater treatment ponds;
- an operational freeboard of 300 mm for TSF 1 and TSF 2 as measured from the bottom of the spillway of TSF 1 and 2 respectively, to the tailings beach;
- 800mm for all stormwater ponds, process ponds, the limonite pond and mine dams; and
- 1000mm for all buffer ponds.

3. Condition 1.3.4 of the licence is amended by the deletion of text in strikethrough and the insertion of the red text shown in underline below:

1.3.4 The Licensee shall:

- (a) undertake inspections as detailed in Table 1.3.2;
- (b) where any inspection identifies that an appropriate level of environmental protection is not being maintained, take corrective action to mitigate adverse environmental consequences as soon as practicable; and
- (c) maintain a ~~record~~ written log of all inspections undertaken with each inspection to be signed by the responsible person.

Table 1.3.2: Inspection of infrastructure		
Scope of inspection	Type of inspection	Frequency of inspection
Tailings pipelines	Visual <u>inspection for pipeline integrity</u>	Daily
Return water lines	Visual <u>inspection for pipeline integrity</u>	Daily
Embankment freeboard	Visual to confirm required freeboard capacity is available	Daily
Tailings decant/supernatant ponds	Visual assessment of pond size and position	Daily
Evaporation ponds/ wastewater treatment ponds/ buffer ponds <u>/limonite pond</u>	Visual assessment of freeboard	Daily
<u>Limonite Pond - Leakage Detection Pit</u>	<u>Check pit for liquor collection</u>	<u>Weekly</u>

Table 3.5.2 of condition 3.5.1 of the licence is amended by the insertion of the red text shown in underline below:

Table 3.5.2: Monitoring of ambient groundwater quality						
Monitoring point reference and location	Parameter	Limit	Units	Averaging period	Frequency	
Irrigation Area RWC52, RWC53, RWC54, RWC55	Standing water level	-	mbgl	Spot sample	Quarterly	
	pH		-			
	Electrical conductivity		dS/m			
	Total suspended solids, total nitrogen, total phosphorus	-	mg/L			
TSFs and evaporation ponds MB1, MB2, MB4, MB5, MB6, MB7, MB8, MB9, MB10, MB11, MB12, MB13, MB14, MB15, MB61, MB62, MB63. RWB01, RWC20, RWC27(D), RWC30, RWC35, RWC 42. Buffer ponds MB17, MB18, MB21, MB22, MB23. <u>Limonite Pond (Sands Reject Storage Facility)</u> <u>MB24, MB25, MB34.</u>	Standing water level	-	mbgl	Spot sample	Quarterly	
	pH		-			
	Electrical conductivity		dS/m			
	Total dissolved solids, carbonate, bicarbonate, hydroxide, total alkalinity, calcium. chloride, potassium, magnesium, sulfur, sulfate. Aluminium, arsenic, barium, beryllium, cadmium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, tin, vanadium, zinc.	-	mg/L			

<i>TSFs</i> <i>PZ1, PZ2, PZ3,</i> <i>PZ4, PZ5, PZ7,</i> <i>PZ8, PZ9. PZ10.</i> <i>PZ11. PZ12.</i> <i>RWC49, RWC50,</i> <i>RWC56, MB60.</i>	<i>Standing water level</i>	-	<i>mbgl</i>	<i>Spot</i> <i>sample</i>	<i>Quarterly</i>
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4. Figure 6 of Schedule 1 is amended by the replacement of the existing map with the map following:

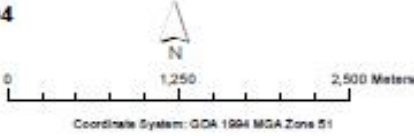


RNO Groundwater Monitoring - L8008/2004

Groundwater Monitoring Locations as of 21 December 2016

Date: 22/12/2016 Drawn By: Darlus Hakayobe

File: G:\User\Administrator\DarlusH\211221_L8008_2004_A\Awardment.mxd



Legend

- ENV_GDW_LicensedBores_2112201
- Prescribed Premise Boundary



FQM AUSTRALIA NICKEL

5. The licence is amended by the removal of the Annual Audit Compliance Report template in Schedule 2.
6. Condition 4.1.2 of the licence is amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:
 - 4.1.2 ~~The Licensee shall complete an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the conditions of the Licence, and any previous licence issued under Part V of the Act for the Premises for the previous annual period.~~

The Licensee must submit to the CEO an Annual Audit Compliance Report within 60 days after the annual period, indicating the extent to which the Licensee has complied with the conditions in this Licence for the annual period.

7. The licence is amended by the insertion of the definitions below:

'Annual Audit Compliance Report' means a report in a format approved by the CEO as presented by the licensee or as specified by the CEO from time to time and published on the Department's website.

Appendix 1: Key Documents/References

	Document Title	Availability
1	DER (2015) <i>Guidance Statement: Regulatory Principles.</i>	https://www.der.wa.gov.au
2	DER (2015) <i>Guidance Statement: Setting conditions</i>	
3	DER (2016) <i>Guidance Statement: Licence duration</i>	
4	DER (2016) <i>Guidance Statement: Licensing and works approvals</i>	
5	DER (2016) <i>Guidance Statement: Risk Assessments</i>	
6	L8008 Licence amendment application received by DER 21 November 2016	DER document record: A1328416
7	Works Approval W4873/2011/1	DER document record: A381929