



Licence Number L8041/1990/5

Licence Holder Western Areas Limited

ACN 091 049 357

File Number: DER2015/000458

Premises Forrestania Nickel Operations
Forrestania – Southern Cross Road
FORRESTANIA WA 6359

Legal description –
Mining Lease M74/57, M74/58, M74/90, M74/91,
M77/335, M77/399, M77/545, M77/568, M77/574,
M77/582, M77/583, M77/584, M77/586, M77/587,
M77/588, M77/589, M77/912, L74/44, L70/111,
L77/104, L77/141, G70/226 and G70/231

Date of Amendment Thursday, 14 December 2017

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act and follows.

Date signed: 14 December 2017

Tim Gentle

Manager Licensing (Resource Industries)

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

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
AHD	Australian Height Datum
CEO	Chief Executive Officer CEO for the purposes of notification means: Director General Department Administering the <i>Environmental Protection Act 1986</i> Locked Bag 33 Cloisters Square PERTH WA 6850 info-der@dwer.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986</i> (WA)
Existing Licence	the Licence issued under Part V, Division 3 of the EP Act and in force prior to this Notice
Licence Holder	as specified at the front of this Notice
L/s	litres per second
m ³ /d	cubic metres per day
Notice	refers to this document
Prescribed Premises	has the same meaning given to that term under the EP Act
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Quarterly	refers the 4 inclusive periods from 1 July – 30 September, 1 October – 31 December, and in the following year, 1 January – 31 March, and 1 April – 30 June
Spot sample	refers to a discrete sample representative at the time and place at which the sample is taken
TSF	Tailings Storage Facility

Amendment Notice

This amendment is made pursuant to 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.

This Notice is limited to changes to the groundwater monitoring program at the Mossco Farm evaporation pond. No changes have been made to other aspects of the Existing Licence.

The following guidance statements have informed the decision made on this amendment:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessment (February 2017)*

Amendment description

This notice is the result of a written request by the Licence Holder to formalise changes to the groundwater monitoring program at the Mossco Farm evaporation pond, Forrestania Nickel Operations. The changes have been proposed through the submission of a groundwater management plan, which was required as an improvement by the Existing Licence to address long term management of pond seepage.

Changes proposed in the plan include:

- equipping additional groundwater recovery bores, such as MFE08;
- adding newly constructed bores MFE26 and MFE27 to the monitoring schedule, with groundwater level triggers set;
- rotating discharge throughout the three cell ponds every 3 to 4 months; and
- continue utilising the Sibelius re-injection borefield to lower the discharge volumes to Mossco Farm.

Background

The Forrestania Nickel Operations is a nickel mining and processing venture located in the Eastern Goldfields province of the Yilgarn Block, approximately 400 km east of Perth. The operations consist of two underground mines, an ore processing plant and tailings storage facility, and an extensive mine water management network.

Up to 6.4 million tonnes of hypersaline mine water is discharged into a network of aquifer re-injection bore fields, evaporation ponds and abandoned underground mine workings, as part of dewatering to allow the mining of ore.

The main dewatering disposal site is currently the Mossco Farm evaporation pond, a large paddock-style storage facility. It was initially constructed in 2011 for the planned re-opened Diggers Rock mine; however this mine has remained non-operational and the pond has instead been used for disposing mine water from the Flying Fox and Cosmos mines.

Groundwater levels have been rising in the vicinity of the pond since discharge commenced in late 2011. The rate of rise in two of the eastern-most groundwater monitoring bores increased significantly after August 2012, and impacts to nearby native vegetation was evident in early 2013 (Rockwater, 2016). The Licence Holder has been operating a groundwater recovery program since late 2013, utilising six active recovery bores. An additional eight recovery bores have since been installed and remain on standby.

In 2013 the licence was amended to include management targets at specific compliance monitoring bores and quarterly reporting of exceedances. Due to continued reporting of exceedances at bore MFE08, in April 2016 the licence was again amended to require the development of a Groundwater Management Plan for the effective, long term management of groundwater mounding in the vicinity of the pond.

The Groundwater Management Plan was submitted in July 2016 (Rockwater, 2016). Based on modelling results presented in the plan, the Licence Holder has proposed to convert MFE08 into a recovery bore, and pumping from that bore be commenced to better manage groundwater levels on the western side of the pond.

Decision

Based on the information provided in the Groundwater Management Plan, DWER supports the

proposal to convert MFE08 into a recovery bore, and the addition of newly constructed bores MFE23 – MFE28 to the monitoring schedule, with a 4 m static water level limit to be adopted for MFE27 (to replace MFE08).

It is noted the Licence Holder has proposed a revised groundwater monitoring strategy, which incorporates an increase in the frequency of water level monitoring to quarterly in selected bores located close to the pond, in addition to annual monitoring of water quality parameters.

It is also noted the Groundwater Management Plan does not provide any information about background water quality in the aquifer underlying the pond; therefore it is unclear whether seepage poses a significant risk to groundwater quality in the area. Given the extent of seepage that has been identified to date, it is likely that a plume of saline groundwater is present beneath the pond. As such, further monitoring of water quality parameters in bores around the pond is required to characterise any adverse impacts on local groundwater quality, including an increase in the frequency of monitoring to quarterly for electrical conductivity and pH in bores MFE01, MFE02, MFE04, MFE18, MFE19, MFE20, MFE21 and Cells 1 – 3.

A more extensive suite of analytes may be required in future if groundwater monitoring indicates any evidence of contamination in the local aquifer as a result of seepage from the pond.

Amendment history

Table 2 provides the amendment history for L8041/1990/5.

Table 2: Licence amendments

Instrument	Issued	Amendment
L8041/1990/5	14/04/2016	Licence amended following full review. Changes made where necessary to update and remove superfluous conditions. Category 12 added to authorise various on-site crushing and screening operations. Category 5 design capacity increased to 680,000 tpa. Improvement added to develop a groundwater management plan for the effective, long-term management of groundwater mounding in the vicinity of Mossco Farm pond.
L8041/1990/5	12/12/2017	Amendment Notice 1 – changes to groundwater monitoring schedule to incorporate recommendations of the groundwater management plan (this Notice)

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 28 November 2017. Minor clarifications were sought and adjustments have been made accordingly.

Amendment

- Definitions of the Existing Licence are amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

'Anniversary Date' means 1 October of each year;

'Annual Period' means a 12 month period commencing from ~~the inclusive period from 1 July until 30 June in the following year;~~

'Compliance Report' means a report in a format approved by the CEO as presented by the Licence Holder or as specified by the CEO from time to time and published on the Department's website;

~~'Vegetation Monitoring Plan' means the document titled Revised Vegetation Monitoring Program – Forrestania Nickel Project, prepared by Western Areas and dated 14 May 2014;~~

- Table 3.2.1 of the Existing Licence is amended by the insertion of the red text shown in underline below:

Table 3.2.1: Monitoring of point source emissions to groundwater

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Emission point reference	Monitoring point reference	Parameter	Units	Averaging period ²	Monitoring frequency
G1 – G11	MG1 – MG11 (discharge point into pit/borefield)	Volumetric flow rate (cumulative)	L/s m ³ /d	Continuous	Monthly, when discharging
		pH ¹	-	Spot sample	Annual, when discharging
		Electrical conductivity ^{1,2}	µS/cm		
		Total dissolved solids ¹	mg/L		
		<u>Sulfate, chloride, sodium, ammonia (as nitrogen), total nitrogen, total phosphorus, total aluminium, total iron</u>			
<u>Aluminium³, arsenic³, chromium³, cadmium³, iron³, manganese³, nickel³, selenium³, zinc³</u>					

Note 1: Prior to the commencement of dewatering activities on the Premises, monitoring must be undertaken at least 6-monthly.

Note 2: Referenced to 25°C.

Note 3: Dissolved, filtered samples.

3. Table 3.3.1 of the Existing Licence is amended by the insertion of the red text shown in underline below:

Table 3.3.1: Process monitoring

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Monitoring point reference	Process description	Parameter	Units	Monitoring frequency	Method
-	Processing of ore	Amount of ore processed	tonnes	Annually	None specified
-	Tailings disposal	Amount of tailings disposed into the TSF and sent to paste plants	m ³	Continuous	
-	TSF water recovery	Amount of water recovered from the TSF			
-	TSF water management	Phreatic surface levels within TSF embankments	m AHD	Monthly	
-	Mine dewatering	Cumulative amount of mine dewater abstracted from the Flying Fox and Spotted Quoll mining operations	m ³	Continuous	
<u>WQ1 – WQ3⁴</u>	<u>Monitoring of ambient water quality within Mossco Farm evaporation pond</u>	pH ¹	-	Annually	AS/NZS 5667.10
		Electrical conductivity ^{1,2}	µS/cm		
		Total dissolved solids ¹	mg/L		
		<u>Sulfate, chloride, sodium, ammonia (as nitrogen), total nitrogen, total phosphorus, total aluminum, total iron</u>			
		<u>Aluminium³, arsenic³, chromium³, cadmium³, iron³, manganese³, nickel³, selenium³, zinc³</u>			

Note 1: In-field non-NATA accredited analysis permitted.

Note 2: Referenced to 25°C.

Note 3: Dissolved, filtered samples.

Note 4: Mossco Farm evaporation pond monitoring locations (MFEP1 – MFEP3).

4. Table 3.4.1 of the Existing Licence is amended by the insertion of the red text shown in underline below:

Table 3.4.1: Ambient environmental quality monitoring

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Monitoring point reference and location ⁴	Parameter	Limit	Units	Averaging period	Frequency
GQ1 – GQ10	Standing Water Level (SWL)	-	m AHD mbgl	Spot sample	Quarterly
GQ11 – GQ27		≥8			
GQ35 – GQ48					
GQ28		≥5			
GQ29 – GQ34		≥4			
GQ49 – GQ56					
GQ61					
GQ1 – GQ62	pH ¹	-	-		Annually ⁵
	Electrical conductivity ^{1,2}	-	µS/cm		
	Total dissolved solids ¹	-	mg/L		
	<u>Sulfate, chloride, sodium, ammonia (as nitrogen), total nitrogen, total phosphorus, total aluminum, total iron</u>	-			Annually
	<u>Aluminium³, arsenic³, chromium³, cadmium³, iron³, manganese³, nickel³, selenium³, zinc³</u>	-			

Note 1: In-field non-NATA accredited analysis permitted.

Note 2: Referenced to 25°C.

Note 3: Dissolved, filtered samples.

Note 4: See cross reference of monitoring point reference with WAL bore ID in Schedule 1.

Note 5: Quarterly for Mossco Farm evaporation pond monitoring bores (GQ49 – GQ62).

5. Condition 3.4.2 of the Existing Licence is amended by the deletion of the text shown in strikethrough below:

3.4.2 The Licence Holder shall undertake a six-monthly assessment of vegetation within the area of influence of any mine dewater re-injection bores and evaporation ponds, in accordance with the ~~Vegetation Monitoring Plan.~~

6. The Existing Licence is amended by the deletion of the following Conditions:

~~4.1.1 The Licensee shall complete the improvements in Table 4.1.1 by the date of completion in Table 4.1.1.~~

~~4.1.2 The Licensee, for improvements not specifically requiring a written submission, shall write to the GEO stating whether and how the Licensee is compliant with the improvement within one week of the completion date specified in Table 4.1.1.~~

7. Condition 4.1.2 of the Existing Licence is amended by the deletion of the text shown in strikethrough below:
- 4.1.2 The Licence Holder must submit to the CEO within 90 days of the Anniversary Date, a ~~shall complete an Annual Audit Compliance Report~~ indicating the extent to which the Licence Holder has complied with the Conditions in this ~~of the Licence, and any previous licence issued under Part V of the Act for the Premises for the previous Annual Period.~~*
8. Condition 4.2.1 of the Existing Licence is amended by the deletion of the text shown in strikethrough below:
- 4.2.1 The Licence Holder must submit to the CEO within 90 days of the Anniversary Date, an Annual Environmental Report ~~by 1 October in each year. The report shall~~ containing the information listed in Table 4.2.1 in the format or form specified in that table.*

Appendix 1: Key documents

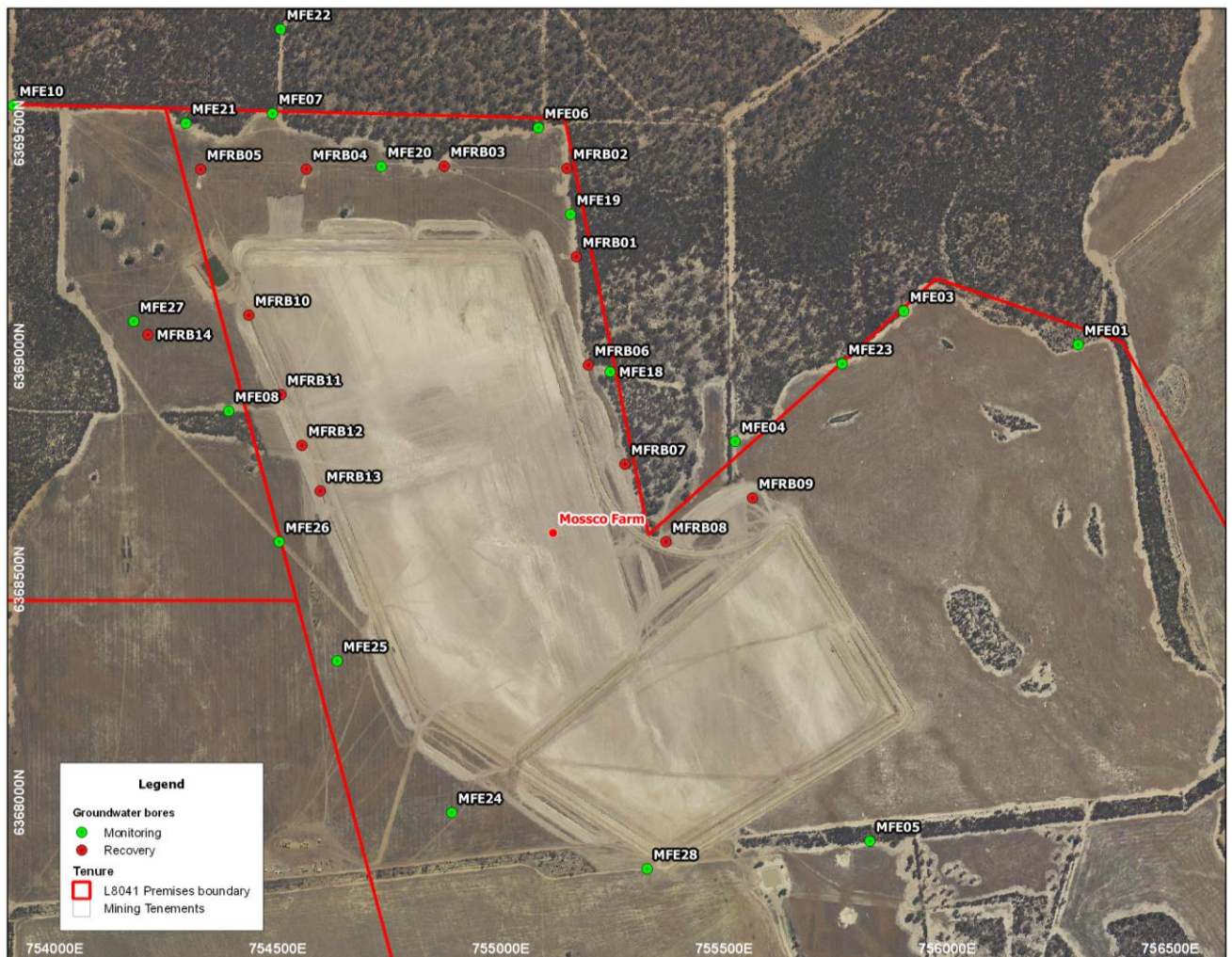
	Document title	In text ref	Availability
1	Licence L8041/1990/5 – Forrestania Nickel Operations	L8041/1990/5	accessed at www.dwer.wa.gov.au
2	Rockwater, June 2016. <i>Forrestania Nickel Operation – Mossco Farm Evaporation Pond – Groundwater Management Plan</i> . Prepared by Rockwater Pty Ltd for Western Areas Ltd.	Rockwater, 2016	
3	DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	DER, 2015a	accessed at www.dwer.wa.gov.au
4	DER, February 2017. <i>Guidance Statement: Risk Assessment</i> . Department of Environment Regulation, Perth.	DER, 2017a	
5	DER, February 2017. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.	DER, 2017b	

Schedule 1: Monitoring point references

Monitoring point reference	WAL bore ID	Area	SWL	pH, EC, TDS	Major ions, metals and metalloids			
GQ1	MB01	Cosmic Boy TSF	Quarterly	Annually	Annually			
GQ2	MB02							
GQ3	MB03							
GQ4	MB04							
GQ5	MB05							
GQ6	MB06							
GQ7	MB08							
GQ8	MB09							
GQ9	MB10							
GQ10	MB11							
GQ11	FFMB21					Flying Fox Mine	Quarterly	Annually
GQ12	FFMB22							
GQ13	FFMB23							
GQ14	FFMB24							
GQ15	FFMB25							
GQ16	SB06	Sibelius borefield	Quarterly	Annually	Annually			
GQ17	SB08							
GQ18	SB14							
GQ19	SB18							
GQ20	SB19							
GQ21	SB21							
GQ22	SB22							
GQ23	SB25							
GQ24	LA01	Liquid Acrobat borefield				Quarterly	Annually	Annually
GQ25	LA04							
GQ26	LA06							
GQ27	LAX2							
GQ28	LA07							
GQ29	SG01		Seagull borefield					
GQ30	SG02							
GQ31	SG03							
GQ32	SG05							
GQ33	SEX3							
GQ34	SEX4							
GQ35	CBP2	Cosmic Boy old underground mine workings						
GQ36	CBP3							
GQ37	CBX7							
GQ38	CBX9	Digger Rocks South	Quarterly	Annually	Annually			
GQ39	DRW10							
GQ40	DRX13							
GQ41	DRX14							
GQ42	DRX18							
GQ43	DRMB14							
GQ44	DRMB02							
GQ45	DRMB03A							
GQ46	DRMB15							
GQ47	DRMB18							
GQ48	DRMB19							

Monitoring point reference	WAL bore ID	Area	SWL	pH, EC, TDS	Major ions, metals and metalloids
GQ49	MFE01*	Mossco Farm evaporation pond	Quarterly	Quarterly	Annually
GQ50	MFE02*				
GQ51	MFE03*				
GQ52	MFE04*				
GQ53	MFE18*				
GQ54	MFE19*				
GQ55	MFE20*				
GQ56	MFE21*				
GQ57	MFE23				
GQ58	MFE24				
GQ59	MFE25				
GQ60	MFE26				
GQ61	MFE27*				
GQ62	MFE28				

*static water level limit of 4 m applies.



MOSSCO FARM EVAPORATION POND
Map of groundwater monitoring locations



The Department of Water and Environmental Regulation does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, omissions or other consequences which may arise from relying on any information depicted.