



Licence Number	L8544/2011/1
Licence Holder	FMG Nullagine Pty Ltd
ACN	153 447 646
2011/003178-1	2011/003178-1
Premises	Nullagine Iron Ore Project Mining Lease M46/515, M46/522 and M46/523 NULLAGINE WA 6758
Date of Amendment	16/12/2019
Decision	Licence amendment granted

1. Definitions and interpretation

Definitions

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

Table 1: Definitions

Term	Definition
Amendment Report	refers to this document
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986</i> (WA)
EP Regulations	<i>Environmental Protection Regulations 1987</i> (WA)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
mg/L	milligrams per litre
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Report applies, as specified at the front of this Amendment Report.
Project area	Nullagine Iron Ore Project area
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>
Licence Holder	FMG Nullagine Pty Ltd

2. Amendment Description

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 is limited only to an amendment to the monitoring condition 2.3.1 monitoring of ambient groundwater quality. No changes to the aspects of the original licence (L8544/2011/1) relating to Categories 5 or 89 have been requested by the Licence Holder.

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

- *Guidance Statement: Regulatory Principles* (July 2015)
- *Guidance Statement: Setting Conditions* (October 2015)
- *Guidance Statement: Decision Making* (February 2017)

Purpose and scope of assessment

FMG Nullagine Pty Ltd (the applicant) applied for an amendment to licence L8544/2011/1 on 20 August 2019. The applicant requested to add a note below Table 2.3.1, 'Monitoring of ambient groundwater quality', which is 'No sample required if bore is dry', in the case where a landfill monitoring bore is dry, and a water sample cannot be taken. The premises is located on Mining Leases M46/515, M46/522 and M46/523, in Nullagine, Western Australia, on the north eastern edge of the Hamersley Basin. Licence L8544/2011/1 authorises activities associated with category 5 and 89 prescribed premises as shown in Table 2.

Table 2: Prescribed Premises Categories

Category number	Category Description	Category production or design capacity	Approved Premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes or more per year	6,000,000 tonnes per annual period
89	Putrescible landfill site	More than 20 but less than 5,000 tonnes per year	500 tonnes per annual period

The applicant requested the current amendment as they would like to be consistent with one of their other licences (L8454/2010/2). A risk assessment has been undertaken in Section 3.

Revision of Licence

DWER has revised the Licence (L8544/2011/1) and has updated the licence including all the changes made under this Amendment application. The obligations of the Licence Holder have not changed in revising the Licence.

In the revised licence, the DWER has also:

- *updated the format and appearance of the Licence; and*
- *corrected any clerical mistakes and unintentional errors.*

3. Amendment history

Table 3 provides the amendment history for L8544/2011/1.

Table 3: Licence Amendments

Instrument	Issued	Amendment
L8544/2011/1	11/07/2011	Licence for category 12
L8544/2011/1	12/07/2012	Licence amendment to include category 89
L8544/2011/1	24/09/2012	Licence amendment to increase the capacity of category 12
L8544/2011/1	16/06/2016	Licence amendment to include category 5, remove category 12, extend the premises boundary, include ambient groundwater monitoring, extend the duration and conversion to v2.9 format licence.
L8544/2011/1	28/07/2017	Licence transferred to FMG Nullagine Pty Ltd
L8544/2011/1	16/12/2019	An amendment to the Table 2.3.1 “Ambient groundwater quality”, including updates of the licence into the current licence format.

4. Location and receptors

Siting context

The prescribed premises is located about 45 Km southwest of Nullagine in the Shire of East Pilbara, on the Bonney Downs pastoral lease. The premises is operated in the mining tenements M46/515, M46/522 and M46/523, which are held by Fortescue Metal Group Ltd. The existing prescribed premises comprises with the crushing plant, a landfill and a bioremediation facility.

Climate and rainfall

The climate and rainfall data for the project area can be obtained from the Marble Bar Meteorological Station, which is located 25 km to the northeast of Nullagine. The region is classified as semi-arid to arid, with high temperatures, low and variable rainfall and high evaporation and characterized with hot, wet summers and warm, dry winters. Average temperature at Marble Bar ranges between 35.5⁰C to 19.7⁰C.

The wet season occurs over the summer months between December and March (Emerge Associates, 2013). Precipitation predominantly from tropical cyclones and isolated monsoonal thunderstorms during the summer months characterized with occasional heavy rainfall. Thus, the annual rainfall in the region is highly variable, both temporally and spatially (Emerge Associates, 2013). The annual evaporation is 3300 mm with a daily average of 9.1 mm. The excess of evaporation over rainfall is typical for semi-arid and arid areas in Australia (Emerge Associates, 2013). Consequently, lack of rainfall results in minimal recharge to the regional aquifer systems.

Regional Hydrology

The Nullagine Water Reserve is a Public Drinking Water Source and is located greater than 10 km downstream of the landfill site. Groundwater beneath the Nullagine Iron Ore Project area occurs predominantly in deep, ranging 44.0 m to 65.0 m below ground level (Emerge Associates, 2013). However, during the field investigations, it was identified that low yielding fractures can be found between 8.0 m to 27.0 m depth.

Groundwater quality of the project area varies from fresh to slight brackish and has a neutral pH. Aquifers in the area are likely to be small, disjointed fractured rock system that are unlikely to be connected any way to major creeks. Aquifers in the surrounding area are not developed other than for pastoral use due to the low water production.

Under the existing licence, the applicant is required to undertake six-monthly groundwater monitoring at the premises. The results of this monitoring events are depicted in the Table 4 below.

The relevant assessment criteria for regional groundwater is depicted in Table 5.

Table 4: Summary of the water quality data from the Investigation Wells in the landfill

Parameter	2018				2017				2016/2015			
	IMW2	IMW3	IMW4	IMW6	IMW2	IMW3	IMW4	IMW6	IMW2	IMW3	IMW4	IMW6
pH	7.4	7.4	7.3	7.2	7.3	7.4	7.1	7.4	7.2	NR	7.4	7.7
TDS	560	2000	920	1650	585	1850	830	1155	532	1591	497	842
TN	5.1	1.8	2.9	0.8	6.8	2.8	2.3	6.2	-	-	-	-
Phosphorous	0.05	0.1	0.11	0.06	<0.05	0.2	0.09	<0.05	-	-	-	-
TRH	<0.25	<0.25	0.26	<0.25	0.064	<0.05	0.08	0.05	-	-	-	-
SWL	10.43	10.22	10.36	12.21	8.67	10.01	8.21	10.56	9.97	10.97	10.65	12.49

area

Note - NR: No Reading

Table 5: ANZECC and DoH NPUG Guideline values

Element	ANZECC & ARMCANZ (2000) ¹ Short term Trigger Values in irrigation water (short term – up to 20 years)	DoH (2014) Non-Potable Groundwater Use ² (NPUG)
pH	6-8.5	6.5-8.5
TDS	-	6000 mg/L
TN	25-125 mg/L	-
Phosphorous	0.8-12 mg/L	-
TRH	-	-

Note: 1 - ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for Fresh and Marine Water Quality.

2 - DoH (2014) Contaminated sites ground and surface water chemical screening guidelines.

5. Risk Assessment

5.1. Risk matrix and risk criteria

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 6 below.

Table 6: 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

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 7 below.

Table 7: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
		Environment	Public health* and amenity (such as air and water quality, noise, and odour)	
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite 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
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite 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
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite 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
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite 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
Rare	The risk event may only occur in exceptional	Slight	<ul style="list-style-type: none"> onsite impact: minimal 	<ul style="list-style-type: none"> Local scale: minimal to amenity

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
		Environment	Public health* and amenity (such as air and water quality, noise, and odour)	
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> • onsite impacts: catastrophic • offsite impacts local scale: high level or above • offsite 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
	circumstances		<ul style="list-style-type: none"> • Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> • Specific Consequence Criteria (for public health) met

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

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

"onsite" means within the Prescribed Premises boundary.

5.2. Description of risk event

Contamination of groundwater from seepage of leachate.

5.3. Description and general characterisation of emission

Any failure in the irrigation system may cause seepage of leachate into groundwater. Therefore, continuous monitoring of groundwater is required to verify that groundwater contamination has not occurred. Thus, sampling of water in the investigation wells is vital.

5.4. Description of any potential adverse impact from the emission

The applicant has requested to amend the groundwater monitoring condition in the existing licence by adding a note: "no sample is required if the bores are dry", which will not make it an offence under the licence if a monitoring event results in a dry bore. Nevertheless, failure in monitoring the groundwater quality may result in failure to identify any contamination of groundwater.

Looking at the previous monitoring data, it is apparent that the investigation wells contains water almost every monitoring round (Table 4). Thus, it is confirmed that the bores are not continuously dry and the proposed amendment has minimal impact on the identification of any direct impacts to the groundwater from the process.

Prominently, the data in the Table 4, when compared to ANZECC (2000) and DoH NPUG (2014) criteria, shows that there is no any indication of contamination of the groundwater in the project area. Nitrogen and Phosphorous values in the groundwater samples are below the lower limits of the guideline trigger values. pH values of the water samples are ranges between 7 and 8, which is normally considered as the drinking water limits.

The depth of water is considered to be greater than 20m below ground level and although the surface geology consists of fractured rock, no controls for leachate containment have been amended as part of this assessment, therefore the risk level of impacts from leachate has not changed.

The evaporation rate of the area is usually high, so the potential of having a surface runoff of the leachate is unlikely unless a heavy rainfall occurs.

Therefore, the possibility of contamination of groundwater by the seepage and surface water runoff of leachate is deemed to be low.

Considering all the above facts and in absence of the any indication of current contamination, it is acceptable to have no monitoring samples in the occasional circumstances when the bores are dry.

5.5. Key Findings

The Delegated Officer has reviewed the information regarding the impact of seepage of landfill water on groundwater and has found:

1. The risk of leachate to groundwater has not changed through this amendment.

6. Consultation

The Licence Holder was provided with the draft Amendment Notice on 13 December 2019 for review and comment. The Licence Holder responded on 16 December 2019 waiving the remaining comment period and has accepted all the proposed changes in the draft Amendment Report and the Licence.

7. Conclusion

The Delegated Officer has determined that no reason has been identified to refuse the amendment request to the licence L8544/2011/1. The delegated officer has determined that the proposed amendment is acceptable. The Licence has been updated to include the proposed amendment.

7.1. Summary of Amendments

A summary of the proposed amendments as below. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

1. The department's address has changed from the address below:

~~Chief Executive Officer
Department Administering the Environmental Protection Act 1986
Locked Bag 33
CLOISTERS SQUARE WA 6850~~

to the new address below:

Director General
Department Administering the Environmental Protection Act 1986
Locked Bag 10
Joondalup DC WA 6919

2. The term "Licensee" has replaced with the "**Licence Holder**"

3. Condition number 1.2.1 of the licence has removed on the basis of that the objectives of the relocation of the mobile crushing plant do not include any environmental concerns. Previous Condition number 1.2.2. of the licence has become Condition 1.2.1 in the new licence.

4. Table 2.3.1 has been amended by inserting a table note to authorise the proposed amendment to the licence and shown in the underlined bold text below:

Table 2.3.1: Monitoring of Ambient Groundwater Quality

Monitoring of ambient groundwater quality				
Monitoring point reference and location on Map in Schedule 1 ²	Parameter	Units	Averaging period	Frequency
IMW2, IMW3, IMW4 and IMW6	Standing water level	mbgl	Spot sample	Six monthly
	pH ¹	-		
	Total Dissolved Solids	mg/L		
	Total N			
	Phosphorus			
Total Recoverable Hydrocarbons				

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

Note 2: No sample required if bore is dry

5. Schedule 2 of the licence has amended by deletion of the text shown in strikethrough from:

Schedule 2: ~~Reporting and notification forms~~

and the insertion of the bold text shown in underline below,

Schedule 2: **Prescribed Premises Categories**

6. New schedule has added as Schedule 3 to include Reporting and notification forms and shown in bold underline text below.

Schedule 3: Reporting and notification forms

LAUREN FOX

A/MANAGER – RESOURCES INDUSTRIES

REGULATORY SERVICES

An officer delegated by the CEO under section 20 of the EP Act

Appendix 1: Key documents

	Document title	Availability
1	Amendment application form	DWER records (A1816272)
2	Licence L8544/2011/1- FMG Nullagine Pty Ltd	accessed at www.dwer.wa.gov.au
3	DER, July 2015. <i>Guidance Statement: Regulatory Principles</i> . Department of Environment Regulation, Perth.	accessed at www.dwer.wa.gov.au
4	DER, October 2015. <i>Guidance Statement: Setting Conditions</i> . Department of Environment Regulation, Perth.	
5	DWER, June 2019. <i>Guideline: Decision Making</i> . Department of Water and Environment Regulation, Perth.	
6	Groundwater Monitoring Program - Nullagine Landfill And Bioremediation Facility. Emerge Associates, 2013	DWER records (A636740)
7	Annual Environmental Monitoring Report 2018. Fortescue Metal Pty Ltd, 2019	DWER records (A1777972)
8	Annual Environmental Report 2017. Fortescue Metal Pty Ltd, 2018	DWER records (A1647216)
9	Annual Environmental Report 2016/2015. BC Iron Nullagine Pty Ltd, 2017	DWER records (A1178154)
10	ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for Fresh and Marine Water Quality.	Accessed at https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000
11	DoH (2014) Contaminated sites ground and surface water chemical screening guidelines.	Accessed at https://ww2.health.wa.gov.au
12	Mobile Crusher Relocation Environmental Management Plan 2016	DWER records (A1399929)