

# **Amendment Report**

# **Application for Licence Amendment**

#### Part V Division 3 of the Environmental Protection Act 1986

Licence Number	L8803/2013/1
Licence Holder	BHP Iron Ore Pty Ltd
ACN	008 700 981
File Number	2013/0003982-2~8
Premises	Yarnima Power Station
	Part of Mining Lease 244
	NEWMAN WA 6753
	As defined by the Premises map attached to the Amended Licence
Date of Report	19 May 2023
Proposed Decision	Revised licence granted

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## 1. Decision summary

Licence L8803/2013/1 is held by BHP Iron Ore Pty Ltd (Licence Holder) for the Yarnima Power Station (the Premises), located 2km northwest of Newman.

This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the construction and operation of the modified Premises. As a result of this assessment, Amended Licence L8803/2013/1 has been granted.

## 2. Scope of assessment

#### 2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <a href="https://dwer.wa.gov.au/regulatory-documents">https://dwer.wa.gov.au/regulatory-documents</a>.

#### 2.2 **Premises overview**

The Yarnima Power Station supplies power to the town of Newman and a number of existing mining operations and associated rail infrastructure owned by the Licence Holder within the Pilbara Region. Currently the Premises has a power generation capacity of 233MWe (maximum energy generation capacity rather than annualised throughput) and comprises of the following:

- Three Seimans SGT-800 Combined Cycle Gas Turbines (CCGTs) with Heat Steam Recovery Generators (HRSG);
- Temporary Power Station (TPS) comprising of 35 Cummins QSK50 1.03 MW (de-rated capacity) diesel generators fitted with Selective Catalytic Reduction (SCR) technology;
- Four 0.963MW emergency backup diesel generators (Cummins KTA50) to supply power should one or more of the Cummins QSK50 engines fails; and
- Three 1.7MW black start diesel generators installed on site (for starting the CCGTs after a power outage) and associated bulk diesel storage infrastructure.

The Yarnima Power Station provides critical power supply for BHP's mining operations as well as domestic supply for the town of Newman.

#### 2.3 Application summary

On 20 March 2023 the Licence Holder submitted an application to the department to amend Licence L8803/2013/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The application relates to the installation of temporary emergency back-up diesel generators to support scheduled maintenance of the existing CCGTs due to occur between May and September 2023.

During the planned maintenance period, at least one of the Seimans SGT-800 CCGTs will be offline for maintenance. To ensure there is sufficient generating capacity in the event that a second CCGT is offline (e.g. due to an unplanned trip), the Licence Holder proposes to install an additional 18 Cummins QSK50 generators to provide emergency back-up power generation.

The emergency back-up generators will only be installed on the premises on a temporary basis to support the proposed maintenance works (between May and September 2023) and are not expected to operate under normal conditions (i.e. only to operate in an emergency scenario if a second CCGT experiences an unplanned outage).

In the event that the emergency back-up generators are required to be operated, they will only

operate for a maximum of 400 hours (over the total four month maintenance period) until the offline CCGT is operational.

The overall generating capacity of the premises does not change as a result of the amendment as the emergency diesel generators will only ever be run if two or more CCGTs are offline and as such the current licenced output of 233MWe will not be exceeded.

At the completion of the maintenance works, the back-up generators will be decommissioned and removed from site.

#### 2.4 Air emissions modelling

The Licence Holder undertook predictive air emissions modelling to determine the impacts to ambient air quality in the event that the emergency back-up generators are required to operate. The model predicts ground level concentrations (GLC) of NOx, CO, SO<sub>2</sub> and particulates ( $PM_{10}$  and  $PM_{2.5}$ ) and compares them against the relevant NEPM criteria. Modelling assumes continuous operation of the emergency generators and therefore considers worst case emissions scenarios.

The operational scenario used in the modelling assumes that the following equipment is operating:

- one of the existing CCGTs is operational on natural gas;
- the existing TPS consisting of 35 Cummins QSK50 generators with SCR technology functioning; and
- 18 QSK50 emergency back-up generators without SCR technology.

Other local emission sources were also included to provide an assessment of cumulative impacts on the town of Newman.

The modelling study was reviewed by the department and it was concluded that the modelling generally meets the requirements of the *Air Quality Modelling Guidance Notes* (DoE 2006) and that the assumptions and conclusions of the modelling are reasonable. Some modelling limitations were identified however it was considered that these would be unlikely to change the outcome of the assessment.

The annual average NOx GLC is expected to be  $\leq 10\%$  of the NEPM standard of  $28\mu g/m^3$  at all receptors. CO and SO<sub>2</sub> from the proposal were also predicted to be below their respective standards (37% and <1%). The project is expected to contribute <1% to ground level PM<sub>10</sub> and PM<sub>2.5</sub> concentrations which is not considered to be significant.

The department noted that the initial predictive air emissions model demonstrated the possibility of an exceedance to the 1 hr NEPM standard. The applicant conducted further modelling to verify the model outcomes. Under review, it was determined that the model was overly conservative and included the operation of 24 emergency generators, rather than the 18 as proposed in the amendment application.

The applicant further verified the updated model, incorporating the site-specific meteorological assumptions, and reduced operational hours for the emergency generators (from 400 hours to 200 hours).

With the updated predictive air emissions modelling, it was determined that the probably of exceedance to the hourly NEPM standard was 0.0000338.

The predictive air emissions model also assessed a range of adverse meteorological conditions, namely:

- Westerly to north-westerly winds;
- Wind speeds between 2m/s and 6m/s;

- Mixing heights lower than 400m; and
- Stability class 4 (neutral) to 6 (extremely stable).

The Licence Holder undertook an analysis of the meteorology experienced in the local area to understand the likelihood of these conditions occurring a coinciding with operation of the emergency diesel generators. The analysis indicated that between May and September, meteorological conditions synonymous with NOx exceedances were only likely to occur for less than 6% of the time (Table 1).

Table 1: Occurrence of meteorological conditions associated with top ten NOx
concentrations.

Receptor	Town Monitor (R1)	Town Monitor (R1) Nearest sensitive receptor (R4)		
Annual	153 hours	479 hours	22 hours	
	(1.7% of the time)	(5.5% of the time)	(0.3% of the time)	
May to September	72 hours	202 hours	15 hours	
	(2% of the time)	(5.5% of the time)	(0.4% of the time)	

**Key findings:** The Delegated Officer has considered the air quality modelling assessment and determined the following:

- Predictive air emissions modelling for the proposal demonstrated CO, SO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> to be within NEPM emissions standard.
- Predictive air modelling demonstrated that operation of the emergency generators (under worst-case emissions coinciding with worst-case meteorological conditions) would rarely exceed NO<sub>2</sub> guideline levels (probably 3 in 100,000).
- The following factors are relevant to the assumptions contained within the model:
  - The emergency back-up generators will only operate for a limited number of hours and only if two or more CCGTs are offline (e.g. due to an unplanned trip);
  - The emergency back-up generators are temporary (for a four-month period); and
  - The emergency back-up generators will be decommissioned once the maintenance on the CCGTs is complete.
- The risk assessment will consider any requirement for additional controls.

#### 2.5 Noise emissions predictive modelling

The Licence Holder engaged a consultant (Talis) to assess the potential noise impacts from the proposed emergency back-up diesel generators. The noise modelling considered the worst-case emergency situation when all 18 emergency diesel generators, together with one existing CCGT and 35 existing generators in the TPS, are operating together. The modelled noise emission level from such an emergency situation was predicted to be 38.7 dB(A) at the closest noise sensitive receiver at the town of Newman, representing 8.7 dB exceedance of the night-time assigned noise level as prescribed in the Environmental Protection (Noise) Regulations 1997.

Impacts from noise on receptors in Newman is a complex matter given the proximity of the town to a number of significant noise sources. Other noise sources contributing to noise impacts in Newman include the neighbouring Newman Power Station, BHP operated Mt Whaleback and

Eastern Ridge mining operations and the associated iron ore railway line situated 1 km north of Newman, between the town and the premises.

Noting that the town of Newman experiences relatively high ambient noise levels from other industrial sources, and that the emergency generators will only operate in an emergency situation, and only for a short-term period under a worst-case scenario (up to 200 hours), the Delegated Officer considers that noise impact from the operation of the emergency generators is not likely to be significant.

### 3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guidance Statement: Risk Assessments* (DER 2017).

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

#### 3.1 Source-pathways and receptors

#### 3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this Amendment Report are detailed in Table 2 below. Table 2 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Emission	Sources	Potential pathways	Proposed controls
Noise	Operation of 11 Cummins QSK50	Air/ wind dispersion	Back-up generators will only provide temporary emergency back-up power in
Air emissions	engines		the event that a CCGT experiences an unplanned outage.
			Generators will only be situated onsite for a short period (May to September 2023).
			Generators will be operated for a maximum of 200 hours (~9 days) over the course of the maintenance period.
			No period in the shutdown plan where the scenario of a single gas turbine is planned.
			Maintenance staff and specialist contractors will be on standby at the premises to respond to any maintenance issues or turbine trips to rectify any issues quickly.
Hydrocarbons	Accidental release associated with loss of containment of	Discharge to land and infiltration to	Generators and transformers are situated with a self-contained bund to contain any hydrocarbon leaks.
	primary of secondary	soils and	Fuel will be supplied from the existing

#### **Table 2: Licence Holder controls**

Emission	Sources	Potential pathways	Proposed controls
infrastructure including bunds, pipes and valves,		groundwater	diesel storage tanks on the premises.

#### 3.1.2 Receptors

In accordance with the *Guidance Statement: Risk Assessment* (DER 2017), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder's from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 3 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guidance Statement: Environmental Siting* (DER 2016)).

# Table 3: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Newman town site	2km southeast of the Premises
Environmental receptors	Distance from prescribed activity
Whaleback Creek	Ephemeral creek located approximately 200m southeast of the Premises and is a main tributary of the Fortescue River
Newman Water Reserve	The Premises is located within the Newman
Priority 1 Public Drinking Water Source Area (PDWSA) proclaimed under the <i>Country Areas</i> <i>Water Supply Act 1947</i>	Water Reserve, a P1 PDWSA. Groundwater is located approximately 20m below ground level (bgl).
Hamersley – Fractured Rock Aquifer proclaimed under the <i>Rights in Water and Irrigation Act</i> 1914	

#### 3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guidance Statement: Risk Assessments* (DER 2017) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

The Amended Licence L8803/2013/1 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises.

The conditions in the Amended Licence have been determined in accordance with Guidance Statement: Setting Conditions (DER 2015).

Licence: L8803/2013/1

# Table 4. Risk assessment of potential emissions and discharges from the Premises during construction, commissioning and operation

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls		
Source/Activi ties Potential emission Potential pathways and impact Receptors Licence Holder's controls										
Construction	Construction									
Installation of 18 Cummins	Dust	Air/windborne pathway causing	Residential areas 2km					y slight in scale, of very short duration and the		
QSK50 generators	Noise	impacts to health and amenity	south east					oo great for any impacts to occur. No regulatory mental Protection (Noise) Regulations 1997 apply.		
Commissioning	/ Operation (inclu	ding time-limited-op	erations operations)							
	Air emissions (NOx, SO <sub>2</sub> , CO, particulates)	Air/windborne pathway causing impacts to health and amenity	Residential areas 2km southeast	Refer to Section 3.1.1	C = Moderate L = Rare <b>Medium Risk</b>	Y	Condition 1, <u>12</u> , 13, <u>26,</u> <u>30</u>	Refer to section 5		
Operation of 18 temporary Cummins QSK50 emergency back-up generators	Noise	Air/windborne pathway causing impacts to health and amenity	Residential areas 2km southeast Alinta Power Station situated on western boundary	Refer to Section 3.1.1	C = Minor L = Rare <b>Low Risk</b>	Y	Condition 12	Modelling indicates that worst case noise emissions may exceed above the standard. The Delegated Officer considers that the likelihood of this occurring is rare and that in the unlikely event that generators are operated, impacts will be minor and short-term in nature. Therefore, the Delegated Officer considers that noise risks can be managed under conditions limiting the operation of the emergency generators to short term period (maximum of 200 hours between May and September 2023) and only during an emergency scenario (i.e. when a second CCGT experiences an unplanned trip). The existing licence also requires noise monitoring and further works regarding noise emissions from the premises that are considered sufficient to mitigate noise emissions from the premises.		
	Accidental release: Loss of	Direct discharge, land overflow,	Soil, vegetation and ephemeral surface	Refer to Section	C = Minor	Y	Condition1 and 12	Noted that no new fuel storage is proposed as diesel will be supplied from existing infrastructure.		

Licence: L8803/2013/1

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Source/Activi ties	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
	containment of primary or secondary infrastructure including liners, bunds, pipes and valves.	contaminated stormwater runoff and/or infiltration	water creek 200m south of Premises. Infiltration and contamination of Priority 1 PDWSA (directly beneath the Premises) over time. Depth to groundwater is ~20m bgl.	3.1.1	L = Rare Low Risk			Risks associated with storage of diesel in existing storage facilities has not been reassessed.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Guidance Statement: Risk Assessments (DER 2017).

Note 2: Proposed Licence Holder's controls are depicted by standard text. Bold and underline text depicts additional regulatory controls imposed by department.

Licence: L8803/2013/1

# 4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

#### Table 5: Consultation

Consultation method	Comments received	Department response		
Licence Holder was provided with the draft decision for comment on 19/05/2023.	BHP advised of a typographical error in the amended licence condition number and otherwise accepted the licence and waived the remainder of the comment period.	Error corrected.		

### 5. Decision

Based on the assessment in this decision report, the Delegated Officer has determined the proposal to install 18 Cummins generators for a short-term period to support planned maintenance of the CCGTs will not pose an unacceptable risk to public health or the environment. This determination is based on the following:

- The generators will only be installed for a short -term period between May and September 2023;
- The generators are to provide emergency back-up power generation only and will only operate in an unplanned emergency situation (i.e. in the even that a second CCGT experiences an unplanned trip) to maintain power generating capacity;
- In the event that the emergency back-up generators are required to operate, they will only operate for a short period (maximum 200 hours) to enable the tripped CCGT to be brought back online;
- Predictive air quality modelling indicates that the probability of emissions from the premises exceeding NEPM NO<sub>2</sub> standards at the closest receptor is 3 in 100,000 or 0.0000338.

Based on the nature of the project, and the trivial probability of exceedance, the assessed risk is considered Medium. The Delegated Officer does not expect a NEPM exceedance event will occur and additional regulatory controls can be imposed on the licence to manage the residual risk.

To mitigate any residual risk associated with the operation of the emergency generators, operational limits have been imposed on the licence to ensure that the emergency back-up generators are only operated in emergency situations during the scheduled maintenance period (May to September 2023) and for a maximum of 200 hours.

The Delegated Officer notes that diesel generators are normally optimised for operations at medium to high engine loads as low load operations of diesel engines can lead to poor combustion which causes increased emissions (including NO<sub>2</sub>). Noting this, a requirement to operate the generators at the optimum load recommended by the manufacturer has been included on the Licence to ensure that the generators are not operated in a low-load state.

The Delegated Officer also notes that air quality modelling assumes that SCR technology is installed and operational on all TPS generators. SCR technology is critical for lowering NOx emissions from the TPS and reducing contributions of NOx to ambient GLC. Noting this, the Licence requires that the emergency diesel generators are only operated when SCR technology is installed and operational on the TPS.

Controls are also placed on the licence to ensure that maintenance staff are available to respond to unplanned outages, and ensure that if these outages occur, the operation of the emergency generators is minimised.

The Licence Holder is required to monitor operational performance of the generators, including number of hours run, and report this in a performance report to be submitted after completion of the maintenance works.

## 6. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that an Amended Licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

## References

- 1. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
- 2. DER 2017, Guidance Statement: Risk Assessments, Perth, Western Australia.
- 3. DER 2015, Guidance Statement: Setting Conditions, Perth, Western Australia.
- 4. Department of Environment (DoE) 2006, Air Quality Modelling Guidance Notes, Perth Western Australia
- 5. Department of Water and Environmental Regulation 2022. Notice of Amendment of Licence Reporting Requirements Section 59(2), Section 59(1)(A) and 59(1)(B) Environmental Protection Act 1986 Licensed Prescribed Premises, Perth, Western Australia.

# **Appendix 2: Application validation summary**

SECTION 1: APPLICATION SUMMARY									
Application type									
Amendment to licence	$\boxtimes$	Current licence number:	L8803/	2013/1	2013/1				
Amendment to licence		Relevant works approval number:			N/A	$\boxtimes$			
Date application received		20 March 2023							
Applicant and Premises details									
Applicant name/s (full legal name/s)		BHP Iron Ore Pty Ltd							
Premises name		Yarnima Power Statio	n						
Premises location		Part of AML70/244 NEWMAN WA 6753							
Local Government Authority		Shire of East Pilbara							
Application documents									
HPCM file reference number:		2013/003982-2~8							
Key application documents (additional to application form):		Application Form & Supporting Document including: <ul> <li>Air Quality Assessment</li> <li>Environmental Noise Assessment</li> </ul>							
Scope of application/assessment									
Summary of proposed activities or changes existing operations.		Licence amendment Construction and operation of an Emergency Power Station comprising of 18 x 1.03MW diesel generators to provide emergency back-up power during maintenance on the existing gas turbines scheduled to occur between May-September 2023 (4 month period).							
Category number/s (activities that cause	e the	premises to become p	rescribe	ed premises)					
Table 1: Prescribed premises categories	S								
Prescribed premises category and description		essed production esign capacity Proposed changes to the production design capacity (amendments only)							
Category 52: Power generation	233	MWe	expecte site as	To change – additional generators are not expected to increase the total power output of the ite as the EPS will only operate in emergency ituations (i.e. if existing CCGTs become offline).					
Category 73: Bulk storage of chemicals, etc.	00m3 in aggregate	regate No change – no additional fuel storage propo			orage proposed.				
Legislative context and other approvals									
Has the applicant referred, or do they inter refer, their proposal to the EPA under Par of the EP Act as a significant proposal?	Yes 🗆 No 🖂		Referral decision Managed unde Assessed unde	r Part V I					
Does the applicant hold any existing Part Ministerial Statements relevant to the application?	Yes □ No ⊠ Ministerial statement No: EPA Report No:			x					

Has the proposal been referred and/or assessed under the EPBC Act?	Yes 🗆 No 🛛	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ⊠ No □ Existing Licence	Certificate of title General lease Expiry: Mining lease / tenement Expiry: Other evidence Expiry:
Has the applicant obtained all relevant planning approvals?	Yes 🗆 No 🗆 N/A 🛛	Mining tenure / State Agreement – planning approval not required.
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes 🛛 No 🗆	CPS No: 5617/5 Issued by DMIRS. No clearing is proposed.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes 🗆 No 🖂	N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes 🗆 No 🖂	N/A
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes 🗆 No 🖂	N/A
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ⊠ No □	Name: Newman Water Reserve         Priority: P1         Are the proposed activities/ landuse         compatible with the PDWSA (refer to         WQPN 25)?         Yes □ No □ N/A ⊠         Existing premises – no change to type of         activities. Referral not required.
Is the Premises subject to any other Acts or subsidiary regulations (e.g. Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx)	Yes 🛛 No 🗆	Iron Ore (Mount Newman) Agreement Act 1964
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes 🗆 No 🛛	
Is the Premises subject to any EPP requirements?	Yes 🗆 No 🛛	
Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i> ?	Yes 🛛 No 🗆	Classification: Contamination – remediation required Date of classification: 10 Dec 2020