Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Licence Number	L8803/2013/1
Licence Holder	BHP Billiton Iron Ore Pty Ltd
ACN	008 700 981
File Number:	2013/003982
Premises	Yarnima Power Station Legal description – Part of AML70/244 within co-ordinates (MGA Zone 50): E777140 N7416161; E777446 N7415805; E777431 N7415791; E777410 N7415775; E777391 N7415763; E777370 N7415750; E777357 N7415741; E777349 N7415735; E777341 N7415729; E777244 N7415637; E777229 N7415623; E777206 N7415601; E777175 N7415569; E777156 N7415548; E777136 N7415524; E777114 N7415493; E776996 N7415634; E777062 N7415693; E777082 N7415711; E777134 N7415754; E777085 N7415813; E777022 N7415898; E777020 N7415932; E776967 N7415995; and E776953 N7416013, NEWMAN WA 6753
Date of Report	8 July 2020
Decision	**13 July 2020**

1 Definitions and interpretation

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

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
Amendment Report	refers to this document
AS1940: 2004	Australian Standard 1940: 2004: *The storage and handling of flammable and combustible liquids*
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEMS	Continuous Emissions Monitoring System
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the *Environmental Protection Act 1986* 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 *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
dispatchable electricity generation	means electricity that can be used on demand and dispatched at the request of power grid operators, according to market needs.
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
EP Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
EP Unauthorised Discharges Regulations	*Environmental Protection (Unauthorised Discharges) Regulations 2004* (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
Licence Holder	BHP Billiton Iron Ore Pty Ltd
NEPM	National Environmental Protection Measure
NO_2	nitrogen dioxide
Occupier	has the same meaning given to that term under the EP Act.
PDWSA	Public Drinking Water Source Area
PEMS	Predictive Emissions Monitoring System
PM_{10}	used to describe particulate matter that is smaller than 10 microns (µm) in diameter.
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.
Revised/amended Licence	the amended Licence issued under Part V, Division 3 of the EP Act, with changes that correspond to the assessment outlined in this Amendment Report.
Risk Event	as described in *Guidance Statement: Risk Assessment*
SO_2	Sulfur dioxide
$\mu g/m^3$	micrograms per cubic metre

2 Amendment Description

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Prescribed Premises Licence (L8803/2013/1) issued to BHP Billiton Pty Ltd (the Licence Holder) for it's Yarnima Power Station (the Premises).

This Amendment Report considers an application received from the Licence Holder to amend Category 52: electric power generation activities on the Premises. The Licence Holder requested addition of Category 73: bulk storage of chemicals to the Licence and this change has been included for the reason specified in the decision section of this notice (refer section 12.1).

3 Purpose and scope of assessment

On the 3 May 2018, the Licence Holder submitted an application to amend Licence L8803/2013/1 for the Yarnima Power Station. Appendix 1 contains a list of the documents which form the application.

This amendment is limited to amendments to category 52: Electric power generation and includes the following changes to L8803/2013/1:

- Allow for the removal of the requirement to implement a Continuous Emissions Monitoring System (CEMS) of air emissions and replace it with a Predictive Emissions Monitoring System (PEMS);
- Inclusion of the existing 3 x 1.7 Megawatt (MW) Cummins diesel generators for black start operating conditions;
- Inclusion of 24 x (new) Cummins QSK50 1.03MW (de-rated capacity) back-up diesel generators and associated emission to air points to enable provision of additional operational power supply during shut downs and maintenance activities at the Premises and during a transition period of additional energy requirements;
- Inclusion of 4 x (new) Cummins KTA50 0.693MW (de-rated capacity) emergency back-up diesel generators and associated emission to air points to enable provision of additional operational power supply should one or more of the Cummins QSK50 engines fail; and
- Include Category 73 – bulk storage of chemicals to the Licence to allow for the storage of up to 2,000 tonnes of diesel at the Premises for black start and back-up diesel generation requirements.

4 Premises Information

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 of Western Australia. Currently the Premises has a power generation capacity of 198MWe (maximum energy generation capacity rather than annualised throughput).

The Premises comprises three Combined Cycle Gas Turbines (CCGTs) which are normally operated on gas, but have the potential to operate on diesel should the supply of natural gas be interrupted. The CCGTs are fitted with dry low-NOx combustor technology to minimise the emissions of oxides of nitrogen (NOx). Each CCGT is paired with a Heat Recovery Steam Generator (HRSG) which does not burn fuel but supplies steam generated from waste combustion heat to two steam turbine generators (STG's).

The CCGTs are each fitted with two 30m high exhaust stacks, with one used for open cycle operations (emission points A1- A3) and the other used with HRSG (emission points A4 – A6). The CCGTs operate in closed cycle for majority of time with their exhaust coming out of the

respective main stacks (A4 – A6). The open cycle operation is minimal and mainly required during start-up, HRSG purge, shutdown, commissioning after maintenance and very low load demand period.

There are also three 1.7MW black start diesel generators installed on site (for starting the CCGTs after a power outage) and associated bulk diesel storage infrastructure. Exhaust emissions from the black start generators are vented directly to atmosphere via the top of the enclosures (emission points D1 – D3).

The Premises lies 2km west of the Newman Township and adjacent to the Newman Power Station (authorised to operate under L7337/1998/10). Figure 1 shows the location of the Premises in relation to Newman Power Station and the Township of Newman.

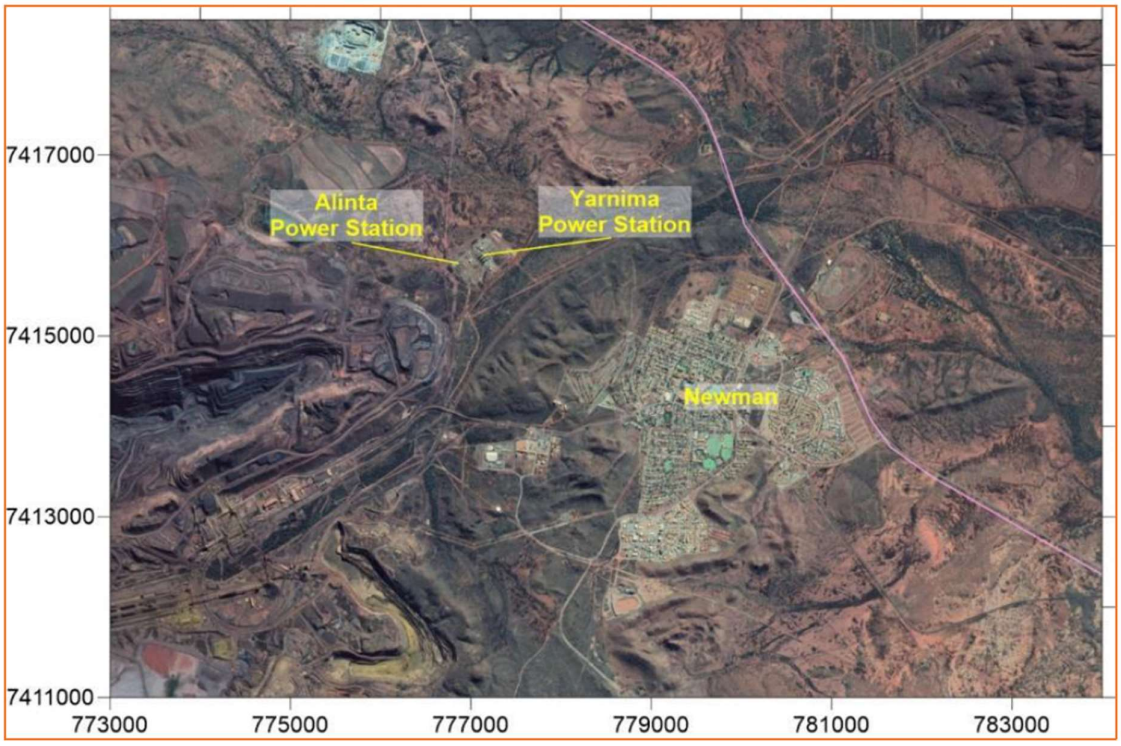

Figure 1: Location of Yarnima Power Station, also showing Newman Power Station (labelled as Alinta Power Station) and the town of Newman

5 Infrastructure

The Premises infrastructure, as it relates to Category 52 activities, is detailed in Table 2. Table 2 identifies existing infrastructure in addition to proposed new infrastructure to be assessed under this amendment application.

Table 2: Yarnima Power Station Category 52 infrastructure

	Prescribed Activity Category 52
	Existing Infrastructure
Generation of power from gas turbine generators to support mining operations in the area (198 MWe).	
1	3 x SGT-800 Siemens combined cycle gas turbine (CCGT) fitted with dry low NOx combustors and Heat Recovery Steam Generation (HRSG)

2	2 x steam turbines
3	3 x 1.7 Megawatt (MW) Cummins diesel generators for black start operating conditions (5.1MW combined)
4	Continuous Emissions Monitoring System unit
4	Oily water treatment system, including lined evaporation pond for storage / treatment of treated water
6	Substation
7	Bunded chemical storage area (storage of oils and lubricants for maintenance)
8	Water treatment plant and storage tanks
9	2 x 800kL Diesel Storage tanks
	New Infrastructure
Generation of power from gas and diesel generators to support mining operations in the area (additional 24 MWe).	
10	24 x Cummins QSK50 1.03MW (de-rated capacity) back-up diesel generators (for operation during CCGT maintenance shutdown periods only)(24MW combined dispatchable electricity generation)
11	4 x

6 Amendment Application

The Licence Holder has requested approval to discontinue the requirement for CEMS monitoring of emissions. In place of this, the Licence Holder has proposed undertaking point source emissions stack testing as an alternative air emissions monitoring method to gauge potential public health impacts on the nearest sensitive residential receptors.

The Licence Holder has also advised of a proposal to operate 24 new 1.03MW (de-rated capacity) back-up diesel generators during maintenance periods to service the CCGTs. The new engines will have a de-rated capacity of 1.03MW each (total 24.72MW) although dispatchable electricy will be limited to 24MW.

The Licence Holder also proposes to install an additional 4 emergency backup diesel generators (Cummins KTA50) with a de-rated capacity of 0.693MW to supply emergency power should one or more of the Cummins QSK50 engines fail. The emergency backup generators will be physically disconnected via circuit breakers and hard stops in the control system. Should the situation arise where one of or more of the KTA50 gensets be required to replace a QSK50 genset, dispatchable electricity will continue to be limited to 24MW as above.

The Licence Holder has also informed DWER of the existing black start diesel generators and bulk diesel storage infrastructure, which are now included in the Revised Licence.

Table 3 below outlines the proposed changes to the Licence throughput capacity associated with the addition of the 15 new diesel back-up generators.

Table 3: Proposed throughput capacity changes

Category	Current capacity	Proposed throughput capacity	Description of proposed amendment
52	198MWe	222MWe	Increase of 24MWe maximum energy generation capacity.

6.1 Removal of CEMS

The Licence Holder has requested removal of the requirement to conduct CEMS monitoring from the Licence. The reasons provided by the Licence Holder for this request is that CEMS units:

- are not reliable;
- are not a true measure of emissions; and
- elevate time and cost behind the maintenance of a system that is not reliable.

As an alternative, the Licence Holder has committed to conducting annual stack test emissions monitoring.

DWER's Air Quality Services branch were consulted about the request to remove CEMS from Existing Licence L8803/2013/1, who conducted a review of CEMS data recorded from Premises operations during previous years. The CEMS data was reviewed against the *Protection of the Environment Operations (Clean Air) Regulation 2010* (NSW) (Clean Air Regulation) in the absence of any similar legislation in Western Australia, as a measure of compliance with prescribed standards for point source emissions from power stations.

With reference to the CEMS data provided for financial year 2017/2018, it was found that NOx emissions from the Premises were above the Clean Air Regulation prescribed standard of 70mg/m^3 for operation on gas, for approximately 6% of the time (approximately 720 to 830 times a year) for Units 1 and 2 respectively; and for 2% of the time for Unit 3 (approximately 200 times a year).

The Licence Holder has advised that this is likely due to limitations in the accuracy of CEMS data during start-up and shut-down sequence of the gas turbines, and during the auto calibrations of the CEMS analyser. There are also times when the gas turbines are required to be operated at very low loads to either prove their reliability following maintenance or a change, or to meet low network demand (such as during a cyclone when all mines are offline, a turbine restart after a trip, or a major supply chain disruption like a train derailment). Such low load operations are part "abnormal" operating conditions, and are critical to ensuring reliable power supply to Newman township is maintained. DWER notes the Licence Holder's advice that the Original Equipment Manufacturer of the gas turbines (Siemens) does not provide NOx emission guarantee at loads below 50% of rated capacity.

In considering alternative emissions monitoring methods to CEMS, DWER's Air Quality Services Branch advised it is very unlikely for annual stack emissions testing to capture the worst case emissions or "abnormal" operating conditions such as those described above that can lead to exceedances during operations, especially when performing stack testing during extended maintenance periods, as is currently the case. As presented in the Licence Holder's predictive air impact assessment, the emissions from the Premises under this scenario may cause exceedance of the Clean Air Regulation for NOx emissions. Based on the above circumstances and the number of potential exceedances from the stack under the maintenance scenario, the Delegated Officer considers PEMS the suitable alternative for monitoring emissions from the Premises, as opposed to stack testing.

PEMS is developed by modelling the process and emission patterns of combustion-based equipment, and executed in real-time on a computer system that has access to the operating data history of the unit to be monitored. The cost of installing and running PEMS are much lower than CEMS and it can ensure continuous and accurate emissions monitoring in compliance with government regulations.

DWER's Air Quality Branch have also recommended that CEMS data continue to be collected and operated concurrently with PEMS to ensure consistency and validation between the two emissions monitoring systems. Should the Licence Holder wish to replace CEMS with PEMS they are required to demonstrate that PEMS results are equivalent to CEMS readings for a period of at least six months where CEMS data is collected and operated concurrently with the

new PEMS. Stack testing is also approved under this amendment and the reason specified in the decision section of this notice (refer section 12).

6.2 Black start diesel generators and bulk diesel tanks

The Licence Amendment incorporates the inclusion of the existing 3 x 1.7 Megawatt (MW) Cummins diesel generators for black start operating conditions and their associated emission to air points (exhaust stacks), as well as the 2 x 8,000kL diesel storage tanks already constructed on the Premises. This is an administrative amendment to ensure all existing infrastructure related to category 52 operations, and their emission points, are captured on the Revised Licence.

6.3 Back-up diesel generators

There is currently a transition period relating to the Licence Holder's mining activities, with the production of ore from Yandi Iron Ore mine in decline and the commencement of a new mine at South Flank and Mining Area C. Additional power generation is required for a period between 2021 and 2026 when all mining areas are expected to be operational.

In order to cope with the additional power demand during this time, the Licence Holder intends to install 24 x 1.03MW (de-rated capacity) Cummins QSK50 back-up generators which will operate on diesel and have a combined generating capacity of 24.72MW to improve reliability of power supply when one of the existing CCGT units is taken off line. The 24 new back-up generator units are expected to operate for up to a maximum of 400 hours per annum to service the transition period. Dispatchable energy generation will be limited to 24MW.

The emission points for the proposed back-up generators will be approximately 2.5 m above ground level (emission points A7 to A30).

DWER's Air Quality Services Branch notes are generally two types of generator configurations commonly deployed, known as "prime" and "emergency" backup generators. Prime generators are usually used as to supplement a site's main source of continuous power. The USEPA (2015) defines emergency backup generators for "emergency purposes" where they are not used for more than the "emergency" threshold of 100 hours per year in total for maintenance, testing, and true emergency occasions (i.e., interruption in the natural gas supply or unplanned maintenance of gas generators). Emergency backup generators may allow 50 hours (out of 100 hours) for non-emergency operation, including peak shaving to provide for events that the existing power generation capacity is unable to meet energy demands, however there are no real time limits on the use of an emergency generator during an emergency situation (unplanned maintenance or unplanned power supply interruptions). DWER considers the use of the 24 Cummins diesel generators at the premises as prime back-up generators, rather than emergency back-up generators due to the use of the generators for planned maintenance of up to 400 hours for annual maintenance of on the CCGT's. The operation of prime generators are therefore required to achieve compliance with the *National Environment Protection (Ambient Air Quality) Measure* (NEPM Ambient Air Quality)(NEPC, 2015).

6.4 Air emissions predictive modelling

The Licence Holder undertook predictive air emissions modelling to determine the impacts to ambient air quality during the operation of the Premises with the new back-up diesel generators required during maintenance activities. Due to the close proximity of Newman Power Station, another source of combustion emissions to air from the operation of gas-fired power generation turbines, cumulative emissions from this site were included within the predictive emissions modelling submitted as part of the Licence amendment application.

The Delegated Officer notes that the Licence Holder had originally proposed to install 15 Caterpillar diesel engines in lieu of the 24 Cummins QSK50 engines and as such the modelling is based on installation of 15 Caterpillar engines. The Licence Holder has since

advised that the Caterpillar engines are no longer available and subsequently elected an alternative make/model (Cummins QSK50). A review of emissions specifications for the new Cummins engines indicates that modelling undertaken using emissions data for the Caterpillar engines is relatively conservative and has therefore been deemed suitable for the basis of this risk assessment.

Five scenarios were modelled using local meteorological data and included manufacturer's specification emission data from the infrastructure situated on the adjacent Newman Power Station. The USEPA 'CALPUFF' model was selected to undertake predictive emissions modelling focusing on sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and particulates as PM_{10}. Emissions of carbon monoxide (CO) were demonstrated to be relatively insignificant in terms of potential impact in the original licence application and associated modelling, and as such were not assessed further in the current predictive emissions modelling. The five scenarios modelled for this licence amendment are as follows:

Table 4: Yarnima Power Station – modelled scenarios incorporating operation of new back-up generators

Scenario	Operating conditions
1	Existing - normal operations: • 3 x CCGT's on natural gas (with HRSG) under full load.
2	Existing - startup operations: • startup of 3 x CCGT's on natural gas (no HRSG); and • operation of three black start generators.
3	Existing - emergency operating scenario: • 3 x CCGT's operating at full load on diesel (with HSRG).
4	Proposed - maintenance scenario: • operation of 2 x CCGT's on natural gas under full load (with HSRG); and • operation of all 15 x caterpillar back up diesel generator referenced on 'low emissions performance' specifications.
5	Not Proposed – (alternative) maintenance scenario: • operation of 2 x CCGT's on natural gas (with HSRG) under full load; and • operation of all 15 x caterpillar back up diesel generator referenced on 'low fuel consumption' performance specifications.

There is limited available baseline ambient air emissions data for the Newman townsite, however PM_{10} monitoring concentrations are available from the Licence Holder's network of PM_{10} monitoring stations around the Newman town site and nearby mining operations. PM_{10} monitoring data from the BHP Background 2 monitor for 2010 were utilised as the background concentration (30µg/m^3 over a 24 hour averaging period).

The relevant assessment criteria used to evaluate the predicted emissions includes the NEPM Ambient Air Quality criteria. The objective of applying the NEPM Ambient Air Quality criteria as a standard when assessing key pollutants from power generation equipment is to protect the nearest sensitive receptors from potential health and amenity impacts from air pollutants.

DWER's assessment has determined that the Licence Holder's predictive air impact assessment:

- shows the modelled cumulative Ground Level Concentrations (GLCs) for NO_2, PM_{10} and SO_2 at the nearest sensitive receptors to be relatively low under normal operating conditions, during startup operations and existing emergency operations (scenario 1 – 3) and are likely to comply with the NEPM Ambient Air Quality criteria for all averaging periods; and
- shows the highest GLCs of predicted emissions to occur under Scenarios 4 and 5 for

NOx as NO_2 at sensitive receptors, with modelled NO_2 GLCs being in excess of the NEPM Ambient Air Quality criteria under extended periods of gas supply interruptions or at times during planned maintenance of the CCGT's.

Figure 1 shows the various sensitive receptor locations that were used in the Licence Holder's predictive air emissions assessment, where R1 is the Newman town monitor, R2 is east of Newman, R3 is the Newman township boundary and R4 is the nearest residence to the Premises (within Newman residential area).

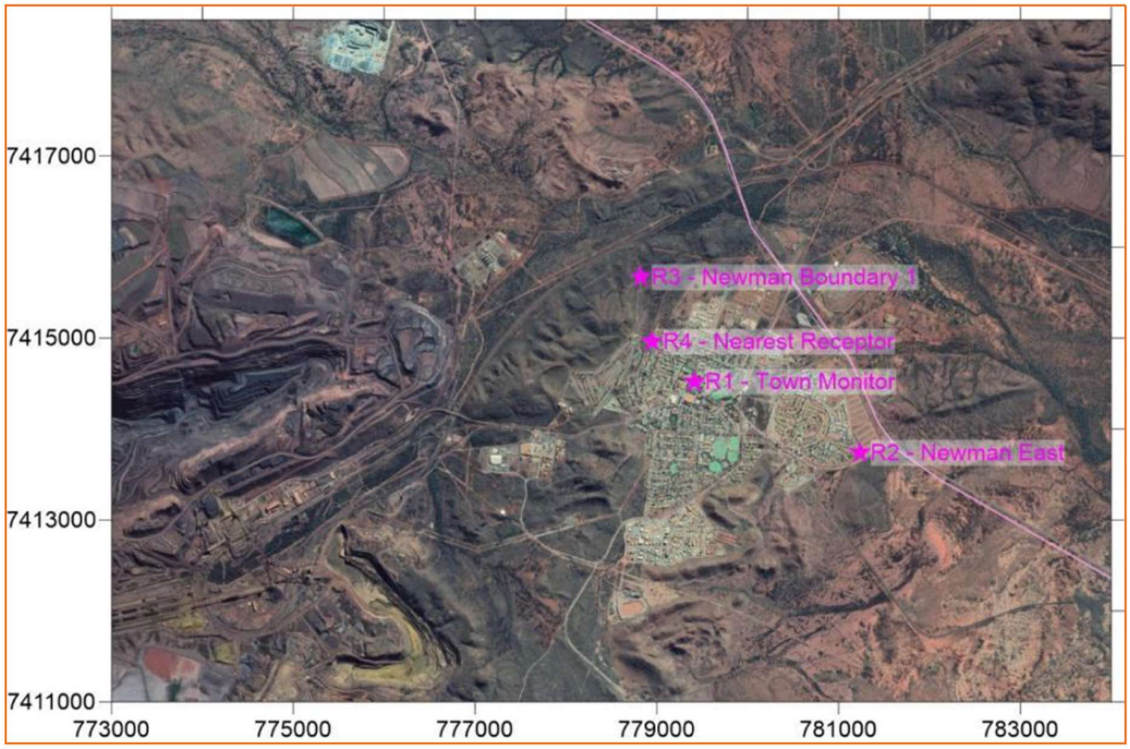

Figure 2: Sensitive receptor locations used in the Licence Holder's predictive air emissions assessment

Scenarios 1 – 3 are existing operations which have already been subject to risk assessment through the original Licence application and assessment for the Premises. Therefore, further assessment of these scenarios is not required.

Under scenarios 4 and 5, the Licence Holder considers the installation and operation of additional diesel generators to supplement electricity generation and allow for maintenance of the CCGTs. This has the potential to generate emissions (dust and noise) during the construction period, and air emissions during operations, which may result in exceedances of the NEPM Ambient Air Quality criteria. Such operations are considered by the Delegated Officer to present a potential change to the risk profile of emissions to air from the Premises.

Potential emissions during the construction period have therefore been assessed in Table 10 of this Amendment Report. Although the Licence Holder has committed to not operating the plant under scenario 5 emissions during operations, all possible operating configurations have been reviewed in this Amendment Report in accordance with DWER's published Regulatory Framework. However, the Risk Assessment of potential emissions from the Premises has only included the proposed Scenario 4 in Table 11 and section 12.2.

Sections 6.4.1 and 6.4.2 below summarise the Licence Holder's predictive air impact assessment for operations during scenarios 4 and 5.

6.4.1 Maintenance Scenario 4

Table 5 compares the predicted maximum GLCs for NO_2, PM_{10} and SO_2 at the most affected receptor with the relevant NEPM Ambient Air Quality criteria when the Premises is operating under scenario 4 (maintenance operating scenario representing 'low emissions performance' specification). Table 5 shows the maximum predicted emissions from the Premises in isolation as concentrations compared to the NEPM criteria, as well as cumulative (Premises operations plus emissions from surrounding sources such as Newman Power Station) concentrations (where relevant). Concentration values are also given as a percentage of the NEPM criteria.

Table 5: Predicted maximum receptor GLCs in comparison with NEPM criteria (Scenario 4)

Pollutant	Averaging period	Ambient Air Quality NEPM Criteria (µg/m³)	Maximum predicted conc. at receptors (µg/m³) from Premises only operations	Maximum of criteria (%) excluding background	Maximum predicted cumulative conc. at receptors (µg/m³)	Maximum of criteria (%) including background
NO_2	1 hour[1]	246	251[2]	102%	251[2]	102%
PM_{10}	24 hour[1]	50	0.83[2]	1.7%	30.83[2,3]	61.7%
SO_2	1 hour[1]	571	0.25	0.04%	n/a[4]	n/a

1. Only the NEPM 1 hour average for NO_2, 24 hour average for PM_{10} and 1 hour average for SO_2 concentrations were modelled as scenario 4 is limited to occurring during maintenance periods only (not under normal operating conditions all year round).
2. Modelled concentration at Receptor R3 (Newman Boundary). DWER Notes that R3 was identified by the Licence Holder as a sensitive receptor and although no residential premises exist in this location it is at a similar distance to the premises as the Fortescue Golf Club and as such is a legitimate consideration for this assessment.
3. Premises operations + Background. Assumed background PM_{10} concentrations of 30µg/m3 (24-hour average).
4. There are no other significant SO_2 sources in the area and background SO_2 levels in the region are assumed negligible.
5. Red font indicates exceedance with the NEPM criteria.

The Licence Holders predictive air impact assessment also found:

- with regard to the exceedance of the 1 hour NO_2 criteria under scenario 4, the highest concentrations of NO_2 at the receptor occurs under meteorological conditions that comprise gentle westerly winds ($\leq$ 4m/s) under relatively low mixing heights;
- the predicted cumulative 1-hour NO_2 GLC at receptor R4 is 82% of the assessment criterion;
- the predicted cumulative 1-hour NO_2 GLC at receptors R1 and R2 are below the assessment criterion (50% or less);
- the predicted PM_{10} GLC from the Premises under the maintenance operating scenario representing 'low emissions performance' are insignificant compared to the background concentrations; and
- the predicted SO_2 1-hour GLCs (Premises only) are significantly below the assessment criterion at all receptors (0.04% or less).

6.4.2 Maintenance Scenario 5

Table 6 compares the predicted maximum GLCs for NO_2, PM_{10} and SO_2 at the most affected receptor with the relevant NEPM Ambient Air Quality when the Premises is operating under scenario 5 (maintenance operating scenario representing 'low fuel consumption performance'

specification). Table 6 shows the maximum predicted emissions from the Premises in isolation as concentrations compared to the NEPM criteria, as well as cumulative (Premises operations plus emissions from surrounding sources such as Newman Power Station) concentrations (where relevant). Concentration values are also given as a percentage of the NEPM criteria.

Table 6: Predicted maximum receptor GLCs in comparison with NEPM criteria (Scenario 5)

Pollutant	Averaging period	Ambient Air Quality NEPM Criteria (µg/m³)[1]	Maximum predicted incremental conc. at receptors (µg/m³)	Maximum of criteria (%) excluding background	Maximum predicted cumulative conc. at receptors (µg/m³)	Maximum of criteria (%) including background
NO_2	1 hour[1]	246	385[2]	156%	385[2]	156%
			311[3]	126%	311[3]	126%
PM_{10}	24 hour[1]	50	0.52[2]	1.04%	30.52[2,4]	61%
SO_2	1 hour[1]	571	0.25[2]	0.04%	n/a[5]	n/a

1. Only the NEPM 1 hour average for NO_2, 24 hour average for PM_{10} and 1 hour average for SO_2 concentrations were modelled as scenario 5 is limited to occurring during maintenance periods only (not under normal operating conditions all year round).
2. Concentration at Receptor R3 (Newman Boundary).
3. Concentration at Receptor R4 (nearest receptor).
4. Premises operations + Background. Assumed background PM_{10} concentrations of 30µg/m3 (24-hour average).
5. There are no other significant SO_2 sources in the area and background SO_2 levels in the region are assumed negligible.
6. Red font indicates exceedance with the NEPM criteria.

The Licence Holder's predictive air impact assessment also found:

- the predicted cumulative 1-hour maximum NO_2 GLCs at receptors R1 and R2 are below the assessment criterion (77% or less);
- the predicted PM_{10} 24-hour GLCs (Premises only) are well below the assessment criteria (1% or less);
- the predicted cumulative PM_{10} 24-hour GLCs are also below the 24-hour assessment criterion (61% or less), and almost entirely attributed to the background concentration of PM_{10} applied in this assessment;
- the predicted PM_{10} GLCs from the Premises under the Maintenance operating scenario representing 'low fuel consumption performance' are insignificant compared to the background concentrations; and
- the predicted SO_2 1-hour GLCs (Premises only) are significantly below the assessment criterion at all receptors (0.04% or less).

6.4.3 Summary of predictive air emission modelling

DWER's air quality experts have reviewed the predictive air emission data and the conclusions drawn from the model and determined that the predictions are reasonable based on the assumed point source emission and meteorological input data.

The Licence Holder has advised of the intention to undertake air emissions stack testing during commissioning of the new generators to validate the predicted impacts from air emissions (Tetris, 2019). Should the stack test emission flow rates and concentration rates for each point source be significantly different to the assumed data, then the predictions against

air quality assessment criteria at the nearest residential sensitive receptors may need to be reviewed.

6.5 Other approvals

The Licence Holder has provided the following information relating to other approvals as outlined in Table 7.

Table 7: Relevant approvals

Legislation	Number	Approval
Dangerous Goods Safety Act 2004	DGS021866	The storage and handling of Dangerous Goods will be subject to Dangerous Goods Licence. The Premises will construct 2 x 800kL tanks for the storage of diesel.

7 Part V of the EP Act

7.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

The guidance statements which inform this assessment are outlined in Appendix 1.

8 Consultation

The following stakeholders were contacted to seek comment on the proposal to amend Licence L8980/2016/1:

- Alinta Energy Transmission (Roy Hill) Pty Ltd (Newman Power Station) was consulted on 8 August 2018. No comments were received;
- The Shire of East Pilbara was consulted on 8 August 2018. No comments were received; and
- A copy of the draft Amendment Report and Licence were provided to the Licence Holder for comment on 17 November 2019. The Licence Holder provided a response on 23 January 2020 and further correspondence on 20 May 2020. A revised draft Amendment Report and Revised Licence was provided to the Licence Holder for comment on 26 May 2020. The Licence Holder provided a response to the revised drafts on 12 June 2020. Comments received from the Licence Holder in relation to the first and second drafts are summarised in Appendix 2.

9 Location and receptors

Table 8 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 8: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Newman town site	2km south east of the Premises

Table 9 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 9: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Whaleback Creek	Ephemeral creek located approximately 200m south east of the Premises and is a main tributary of the Fortescue River
Newman Water Reserve Priority 1 Public Drinking Water Source Area (PDWSA) proclaimed under the *Country Areas Water Supply Act 1947*	The Premises is located within the Newman Water Reserve, a P1 PDWSA. Groundwater is located approximately 20m below ground level (bgl).
Hamersley – Fractured Rock Aquifer proclaimed under the *Rights in Water and Irrigation Act 1914*	

10 Pathways

10.1 Air

Prevailing wind patterns can provide a direct pathway for transmission of combustion emissions to air, so the prevailing wind patterns that may carry these emissions to sensitive receptors have been considered. The closest Bureau of Meteorology (BoM) weather station which records wind frequency data is Newman Aero (BoM site 007176). Prevailing winds are from the east and north east in the mornings, and from the east and north in the afternoons (Figure 3). These pathways have been considered in the risk assessment table in Section 11.

In terms of the location of the Premises, prevailing wind patterns generally move away from sensitive residential areas (located 2km east) so may provide some reduction to the transmission of air emissions to receptors. However, at times of low westerly winds (particularly in the afternoons) there is the potential that emissions from the Premises may move over residential areas.

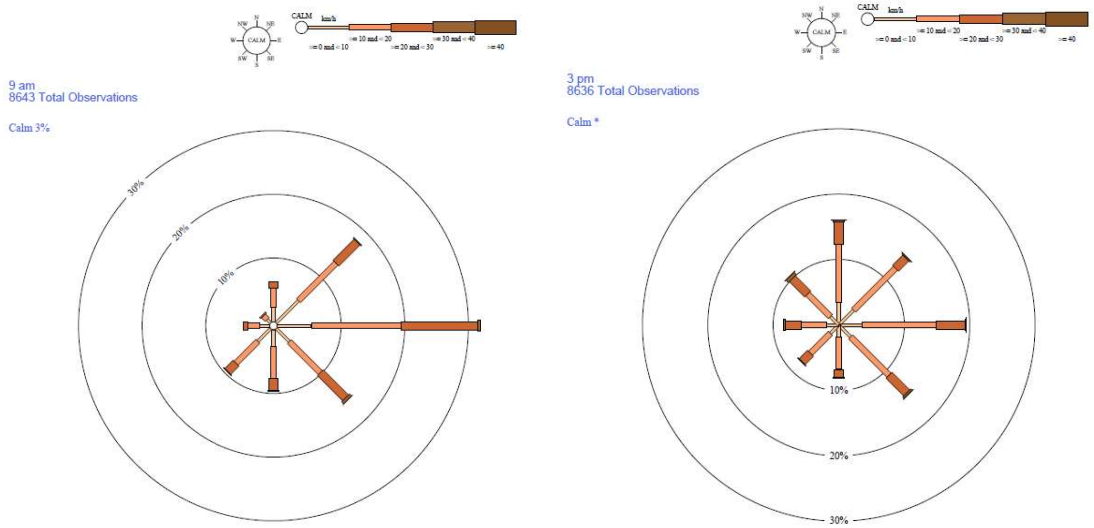

Figure 3: Annual wind rose for 9am and 3pm at Newman Airport.

Source: Bureau of Meteorology website www.bom.wa.gov.au

It is important to note that these wind roses show historical wind speed and wind direction data for the Newman Airport weather station and should not be used to predict future data.

11 Risk assessment

Tables 10 and 11 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 10: Risk assessment for proposed amendments during construction

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Category 52: Power generation	Installation of 24 x backup power generation units	**Noise** associated with construction work	Residential receptors 2km south east	No Pathway					The Delegated Officer considers that construction works are very slight in scale, of very short duration and the distance between the construction activities and receptors are too great for any impacts to occur. No regulatory controls required.
		Fugitive dust associated with vehicle movements	Residential receptors 2km south east Deposition onto stomata of plants impacting on photosynthesis and respiratory function						

Table 11: Risk assessment for proposed amendments during operation

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Category 52: Power generation	Storage and use of diesel fuel for operation of 24 x backup diesel generators	***Accidental release***: associated with loss of containment of primary of secondary infrastructure including liners, bunds, pipes and valves,	Soil, vegetation and ephemeral surface 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.	Direct discharge; Land overflow Contaminated stormwater runoff Infiltration	Soil and vegetation inundation. Vegetation death Contamination of Fortescue River Loss of beneficial use of drinking water	Major	Rare	Medium	See Section 12.1 below for detailed risk assessment
Category 52: Power generation	Operation of 24 backup diesel generators	***Odour:*** associated with effluent treatment and disposal	Residential receptors 2km south east of Premises	*No Pathway*					The Delegated Officer considers that the distance between the Premises and receptors is sufficiently large such that no impacts will occur
		Noise: from the operation of 24 x diesel generators in addition to two gas turbines	Residential receptors 2km south east of Premises	*No Pathway*					The Delegated Officer considers that the distance between the Premises and receptors is sufficiently large such that no impacts will occur. The EP Noise Regulations apply during operations

Category 52: Power generation	Operation of 24 back up diesel generators	***Air emissions:*** NO_2 SO_2 PM_{10} from the combustion of diesel fuel	Nearby town site of Newman 2km south east of the Premises	Air/ wind dispersion	Exceedances of the NO_2 NEPM Ambient Air Quality at sensitive receptors over an annual period Potential impacts to health of receptors in the town of Newman	Moderate	Unlikely	Medium	See Section 12.2 below for detailed risk assessment

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)

12 Decision

12.1 Risk assessment: Storage and use of diesel - accidental release

12.1.1 Description of potential adverse impact from the emission

There is potential for the discharge of diesel to the environment through tank rupture or failure of liners, bunding, pumps, pipes and valves. Transfer operations (filling of bulk storage tanks) may also result in accidental release of diesel to the environment.

Release of significant volumes of diesel may cause vegetation and faunal death through contact with soft tissues via absorption or ingestion. Overland flow may enter the nearby ephemeral Whaleback Creek and cause impact to riparian vegetation and fauna dependent on the greater Fortescue River ecosystem. Seepage into soil will cause soil contamination and infiltration may impact on the beneficial use of groundwater, which is a Priority 1 drinking water resource for the town of Newman.

12.1.2 Criteria for assessment

The relevant land and groundwater criteria for discharges is the *Australian Water Quality Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ, 2000), and the *National Environmental Protection (Assessment of Site Contamination) Measure* (NEPC, 2013) for soil and groundwater.

The *Newman Water Reserve drinking water source protection review*, (Department of Water, 2014) notes that the power stations within Newman are considered a Non-conforming existing landuse, and recommends that chemical storage facilities in the water reserve adhere to the following Department of Water's mining and mineral processing guidelines and the Water Quality Protection Notes (WQPNs):

- *WQPN 10: Contaminant spills – emergency response*;
- *WQPN 20: General and heavy industry near sensitive waters;*
- *WQPN 65: Toxic and hazardous substances – storage and use;* and
- *WQPN 83: Infrastructure corridors near sensitive water resources*.

12.1.3 Licence Holder controls

The primary control mechanisms for managing accidental release of diesel from the storage tanks is the critical containment infrastructure of the tanks and secondary containment mechanisms. The Licence Holder has advised that the diesel storage tanks have been constructed in accordance with *AS1940:2004 The storage and handling of flammable and combustible liquids* and have integrated secondary containment to comply with the standard AS1940:2004 and that Dangerous Goods Licence DGS021866 also applies. Spill kits are positioned adjacent to fuel storage areas in case of minor spills or leaks from pipes and valves.

12.1.4 Consequence

The Delegated officer has considered the location of the diesel storage tanks within a Priority 1 PDWSA, the possibility of breach of containment of the diesel storage tanks and determined that the consequence of loss of containment is **major** with the potential for high level onsite impacts and mid-level off site impacts.

12.1.5 Likelihood of Risk Event

The Delegated Officer notes that the diesel storage tanks have been constructed in accordance with the AS1940:2004, with secondary containment controls. As such, the Delegated Officer considers the likelihood of large scale containment breaches is **rare** and may only occur in exceptional circumstances.

12.1.6 Overall rating of Storage and use of diesel - accidental release

The overall risk rating of accidental breach of containment and release of diesel to the environment is **medium** and acceptable subject to regulatory controls.

12.1.7 Controls

The Delegated Officer considers the following conditions are sufficient for managing the risks associated with accidental breach of containment and release of diesel to the environment:

- Condition 7 (Infrastructure and Equipment) will be included on the Licence specifying the requirement for the operation and containment controls of the diesel storage tanks to comply with AS 1940:2004 .

12.2 Risk assessment: Emissions to air from operation of back up diesel generators

12.2.1 Description of potential adverse impact from the emission

Point source emissions to air from the power station occurs through the existing emission points of the CCGTs and less frequently from the black start diesel generators. The Licence Holder is proposing to operate an additional 24 x 1.03MW (de-rated Capacity Cummins QSK50 back-up diesel generators, which will operate for up to 400 hours per year to allow for maintenance activities on the rest of the power station.

For operation of the back-up diesel generators, the Licence Holder conducted air emissions modelling which predicted the combustion gases of most significance will include oxides of nitrogen (NOx) (see section 6.4). NOx emissions to air from combustion sources are mainly in the form of nitric oxide (NO) and nitrogen dioxide (NO_2). The modelling showed that when operating under scenario 4, there is a potential for elevated NO_2 GLCs to be experienced at all sensitive receptors, and there is potential for exceedance of the NO_2 1-hourly NEPM criteria of 246 µg/m^3 at receptor location R3, where the highest modelled NO_2 concentration was 251 µg/m^3 (102% of the NEPM Ambient Air Quality criteria).

The Delegated Officer notes that R3 was identified by the Licence Holder as a sensitive receptor and although no residential premises exist in this location, it is at a similar distance to the premises as the Fortescue Golf Club and as such is a legitimate consideration for this assessment.

The Licence Holders predictive air impact assessment found that the 1 hour NO_2 criteria under scenario 4 is most likely to occur under meteorological conditions that comprise gentle westerly winds ($\leq$ 4m/s) under relatively low mixing heights. As seen in Figure 3, westerly winds occur for around 10% of the time in Newman, particularly in the afternoons.

Short term exposure to increased levels of NOx may cause respiratory problems, particularly for people for with asthma. NO_2 can affect humans both directly and indirectly; directly, by irritation that leads to an inflammatory reaction in the lungs, and indirectly by affecting the immune system. At higher concentrations it can contribute to illness (morbidity) and mortality of especially sensitive sub groups, such as children, asthmatics and people with chronic lung disease such as chronic bronchitis.

Oxides of nitrogen can react with VOCs in the presence of sunlight to form photochemical smog. NO_2 will dissolve in water to form nitrates and nitric acid.

12.2.2 Criteria for assessment

The NEPM sets ambient air quality standards for CO, NO_2 and SO_2 for the protection of human health and well-being. These standards are outlined in Table 12.

Table 12: NEPM ambient air quality standards for CO, NO_2 and SO_2

Pollutant	Maximum concentration standard	Averaging period	Maximum allowable exceedances
CO	9 ppm	8-hour	1 day a year
NO_2	0.12 ppm	1-hour	1 day a year
	0.03 ppm	1-year	None
SO_2	0.2 ppm	1-hour	1 day a year
	0.08 ppm	24-hour	1 day a year
	0.02 ppm	1-year	None

12.2.3 Licence Holder Controls

The Licence Holder has committed to using the back-up diesel generators for no more than 400 hours per year.

The purpose of the emergency back up generators (Cummins KTA50) is to provide supplementary power should one or more of the Cummins QSK50 generators fail. As such, they are not expected to run under normal operating scenarios. The generations will be physically disconnected from via circuit breakers and hard stops in the control system and should the situation arise where they are required to operate, dispatchable electricity will continue to be limited to 24MW.

The Licence Holder proposes to validate this control mechanism by undertaking annual stack monitoring to confirm the emission rates comply with manufacturer specifications.

12.2.4 Consequence

As outlined in section 6.4, modelled emissions from the Premises under scenario 4 includes operation of 2 x CCGT's on natural gas under full load (with HSRG) and operation of all 15 x caterpillar back up diesel generators referenced on 'low emissions performance' specifications, in addition to cumulative contributions from Newman Power Station under normal operating conditions. Noting the change in the type of diesel engines proposed, the Delegated Officer considers that modelling is relatively conservative.

The Delegated Officer has determined that the consequence of NOx emissions to air impacting on public health during this scenario is **moderate** with the potential for low level adverse health impacts and specific health consequence criteria (NEPM Ambient Air Quality) at risk of not being met.

12.2.5 Likelihood of Risk Event

The Delegated Office has considered that if the back-up diesel generators are used for no more than 400 hours per year, and they are not used during unfavourable meteorological conditions (during gentle westerly winds of $\leq$ 4m/s and when there are low mixing height conditions), the likelihood of the risk event occurring is **unlikely** and will probably not occur in most circumstances.

12.2.6 Overall rating of emissions to air from use of back-up diesel generators

The overall risk rating of emissions to air from the operation of back-up diesel generators is **medium** and acceptable subject to regulatory controls.

13 Controls

The Delegated Officer considers the following conditions are sufficient for managing the risks associated with operation of back-up diesel generators:

- Works conditions 1 - 6 will be included on the Revised Licence to allow construction of the 24 back-up diesel generators and will include specifications for stack heights and that they must be connected to the existing Premises bulk diesel fuel supply. Standard conditions have been added to the Licence detailing requirements and duration of commissioning. The Licence Holder will be required to submit construction compliance documentation and also a commissioning report to DWER to enable an assessment of the environmental performance of the diesel generators once operational.
- Operational requirements (Condition 7) will be included on the Revised Licence to:
    - authorise the operation of the 24 new back-up diesel generators during maintenance shutdown periods for servicing the SGT-800 Siemens turbines only (GTGs 1 – 3);
    - limit the operating hours of the back-up Cummins QSK50 diesel generators to no more than 400 hours per year (~17 days per year);
    - limit the dispatchable electricity generation of the back up generators to 24MWe; and
    - limit the operating hours of the Cummins KTA50 diesel generators to periods when operating in maintenance mode and only if one or more of the Cummins QSK50 engines fails; and
- Condition 21 has been added to the Revised Licence to:
    - require the Licence Holder to perform process monitoring of the back-up diesel generators (Cummins QSK50) for generator run time, fuel flow rates, electricity generated and percentage load. This will allow an assessment of the performance of the operation of diesel generators to ensure compliance with conditions of the Revised Licence; and
    - require the Licence Holder to monitor the run time of the Cummins KTA50 engines to verify operating hours.

14 Additional amendments

The Delegated Officer has considered the Licence Holders request to substitute CEMS with annual stack testing. The gas turbines will be operated at variable loading rates dependent on the energy and configuration requirements (maintenance) including low loading rates where the NOx emission rates can be up to three times the rate of high load operating conditions.

The predictive air emissions modeling shows that NOx emissions are at risk of exceeding the assigned criteria when operating under maintenance scenarios, and the Delegated Officer considers a form of monitoring which is capable of detecting and adjusting the current plant operating configuration, based on emissions output and local weather conditions, is more suitable for the protection of public health in the long term. The use of CEMS or PEMS also allows the site to adapt to additional and potential future cumulative air emissions sources in the air shed.

PEMS is considered more suitable to annual stack testing which is very unlikely to capture

worst case emissions from the premises as stack testing only provides a snapshot of emission rates.

The Delegated Officer concedes that there may be some cost and reliability issues with the operation of CEMS and provides for replacement of CEMS with PEMS.

In addition to operating a CEMS or PEMS system across all generators on the Premises, the Licence Holder will be required to maintain the annual stack testing of NOx emissions from the gas generators to confirm that emission under normal operating conditions continue to remain acceptable and meet design criteria emission rates and limits imposed on the licence.

Another suitable alternative method for ensuring compliance with the NO_2 NEPM criteria that may be considered by the Licence Holder is ambient air monitoring of NO_2 GLCs within the town of Newman. Utilising ambient air monitors allows trigger levels or alert levels to be set so that immediate action can be initiated if a trigger level is exceeded, ensuring compliance with NEPM criteria is maintained at all times. The Delegated Officer notes similar expansions planned for the adjacent Newman Power Station and recommends that serious consideration of this monitoring methodology is given by the Licence Holder to ensure protection of public health can be appropriately demonstrated.

Notwithstanding the above recommendation, at this point in time the Delegated Officer has elected to amend the LIcence to allow for the substitution of CEMS with a PEMS unit under the Works conditions and emissions to air monitoring conditions have been updated where relevant to include the ability to monitor emissions using a PEMS system (as an alternative to CEMS). Should the Licence Holder opt to install the PEMS unit, the Licence Holder will need to demonstrate that the PEMS data is substantially equivalent to the CEMS data under variable operating conditions prior to decommissioning of the CEMS system. CEMS data is required to be collected and operated concurrently with any new PEMS unit for a period of no less than six months to demonstrate that PEMS results are equivalent to CEMS readings.

The following conditions have been added to the Revised Licence to allow for design, installment and monitoring requirements for the PEMS:

- Condition 1 provides for the installation of the optional PEMS in accordance with requirements specified in Table 1;
- Condition 9 specifies the averaging period for emissions from any PEMS; and
- Condition 15 allows for PEMS emissions monitoring from the GTG's as an alternative to CEMS.

The Delegated Officer has included category 73 on the Revised Licence for the bulk diesel tanks that are operated on the Premises.

15 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.

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

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the licence under the EP Act. Future review of licence controls may be triggered should cumulative pollutant air emissions within the Newman airshed continue to increase and present an unacceptable risk to public health.

16 Summary of amendments

The amended Licence has been issued in a new format with additional standard conditions applied where required and amendments to / additional conditions in accordance with the revised risk assessment. Existing conditions not related to the subject of this amendment have been transferred, but not reassessed, to the new format. Where appropriate, some conditions have been removed, which are no longer standard conditions under DWERs published Regulatory Framework, such as those relating to recovery of spills and management of stormwater on the Premises. These types of emissions can be managed under the general provisions of the EP Act and / or the EP (Unauthorised Discharges) Regulations and as such are not required.

Table 13 provides a detailed description of amendments made to the conditions of the Revised Licence.

Table 13: Conversion map for Revised Licence

Existing Licence condition	Revised Licence condition	Description
1.1.3 – 1.1.5 and 1.2.1 – 1.2.3	-	These conditions have been removed from the Licence as they are a duplication of legislation and therefore not required.
-	1 – 6	Works These conditions have been added to the Revised Licence to authorise construction of new infrastructure as per application (24 x new back-up diesel generators, 4 emergency back up generators and PEMS)
-	7	Infrastructure and Equipment Condition 7 of the Revised Licence specifies infrastructure and equipment that must be maintained in good working order and operated in accordance with the corresponding operational requirements.
2.2.1	8	Emission to air points This condition has been transferred to the Revised Licence as Condition 8.
2.2.2	9	Point source emissions limits to air This condition has been transferred to the Revised Licence as condition 9.
3.1.1 – 3.1.5	10 - 14	General monitoring These conditions have been transferred to the Revised Licence as Conditions 10 - 14
3.2.1	15	Monitoring of point source emissions to air This condition has been transferred to the Revised Licence as condition 15. The ability to use PEMS has been added to this condition.
3.2.2 and 3.2.3	16 and 17	NATA accreditation and CEMS Code These conditions have been transferred to the Revised Licence as Conditions 16 and 17.
-	18 and 19	PEMS PS 16 and continuous monitoring availability These are new conditions added to the Revised Licence as part of the authorization to use the alternative monitoring system PEMS
-	21	Process monitoring of back-up diesel generators This is a new condition added to the Revised Licence to ensure appropriate records are kept of the nature of operations of the back-up diesel generators.
4.1.1	22 and 23	Information: records Existing Licence condition 4.1.1 has been transferred to Revised Licence conditions 21 and 22 (Books).

Existing Licence condition	Revised Licence condition	Description
4.1.2	-	Awareness of conditions of Licence This is no longer a standard condition under DWER's published Regulatory Framework and is therefore not required.
4.1.3	25 (a) and (b)	Annual Audit Compliance Report Existing Licence condition 4.1.3 has been transferred to Revised Licence condition 24(a) and (b).
4.1.4	24	Complaints management system Existing Licence condition 25 has been transferred to Revised Licence condition 24.
4.2.1 and 4.2.2	25(c)	Annual Environmental Report Existing Licence conditions 4.2.1 and 4.2.2 have been transferred to Revised Licence condition 24(c).
4.2.3	20	CEMS / PEMS results available on request Existing Licence condition 4.2.3 has been transferred to Revised Licence condition 20. The ability to use PEMS has been added to this condition.
Schedule 1: Maps	Schedule 1: Maps	Premises maps have been updated to reflect Premises layout, and authorised discharge point location
Schedule 2: Reporting and notification forms	Schedule 2: Forms	Reporting and notification forms on Schedule 2 of the Existing Licence have been transferred to Schedule 2 of the Revised Licence. Relative Accuracy Test Assessment (RATA) Form 2 has been added to the Licence to enable recording of PEMS RATA. Notification Form N1 has been updated to include the requirement to also report breaches of operational requirements specified in Revised Licence Condition 7.

Caron Goodbourn
MANAGER, PROCESS INDUSTRIES

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

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L8803/2013/1 – Yarnima Power Station	L8803/2013/1	accessed at www.dwer.wa.gov.au
2	Licence application and supporting document		DWER records (A1667105)
3	Further information received to support the application		DWER records (A1693603 & A1699381)
5	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.		accessed at www.dwer.wa.gov.au
6	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.		
7	DER, August 2016. *Guidance Statement: Licence duration.* Department of Environment Regulation, Perth.		
8	DER, February 2017. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.		
9	DWER, June 2019. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.		
10	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC & ARMCANZ) (2000). *Australian Water Quality Guidelines for Fresh and Marine Water Quality*	ANZECC & ARMCANZ 2000	Accessed at: http://www.agriculture.gov.au/SiteCollectionDocuments/water/nwqmsguidelines-4-vol1.pdf
11	National Environmental Protection (Assessment of Site Contamination) Measure (2013)	NEPC, 2013	Accessed at: http://nepc.gov.au/nepms/assessment-site-contamination
12	*National Environment Protection (Ambient Air Quality) Measure* (Ambient Air Quality NEPM)	NEPC, 2015	Accessed at: http://nepc.gov.au/nepms
13	*Protection of the Environment Operations (Clean Air) Regulation 2010* (NSW)	Clean Air Regulation	Accessed at: http://nepc.gov.au/nepms/ambient-air-quality
14	*EPA's Air Quality Rules for reciprocating Internal Combustiona Engines and their Application to Combined Heat and Power* (United States Environmental Protection Authority)	USEPA, 2015	Accessed at: https://www.epa.gov/sites/production/files/2015-07/documents/epas_air_quality_rules_for_reciprocating_internal_combustion_engines_rice_and_their_application_to_combined_heat_and_power.pdf

Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Report and draft amended Licence on 27 November 2019 for review and comment. The Licence Holder responded on 23 January 2020 and provided further correspondence on the comments are detailed in the table below. The draft revised Amendment Report and Licence was again referred to the Licence Holder on 26 May 2020; comments received are detailed in the Table below.

Condition	Summary of Licence Holder comments (23/1/2020)	DWER response
Prescribed premises category description	The Licence Holder has requested the inclusion of Category 73: Bulk Storage of chemicals for the 2 x 800KL diesel storage tanks.	Delegated Officer has included this category for the bulk diesel tanks as requested by the Licence Holder. The diesel storage is related to the primary activity and may be included as infrastructure under the primary activity, or as a secondary activity.
Licence History	Licence Holder requested CEMS be replaced by Annual stack monitoring not PEMS.	The Delegated Officer does not consider the removal of CEMS to be suitable to monitor and manage the risks of exceedances of the NO_2 NEPM as detailed in Section 6 of this report. The Delegated Officer acknowledges the concerns raised by BHPBIO in relation to cost and maintenance time required of a CEMS. On this basis the Delegated Officer has amended the Licence to allow for the option for CEMS to be replaced by PEMS.
	The 15 x back-up diesel generators (to provide an additional 24MWe) standby power to prevent the grid being lost in the even a GTG fails during maintenance of the third GTG at the premises.	The inclusion of 24MW back-up diesel generators are considered “additional” to the sites overall energy generating capacity and as such the Delegated Officer has conducted an assessment of potential emissions from this infrastructure.
Condition 1 Table 1	Licence Holder advised that it is not possible to show the location of the Predictive Emissions Monitoring System as it is not a specific monitoring unit.	This change is made to the Licence.
Condition 5, Table	Licence Holder advised that it is not possible to be more specific as to the locations of the 15 back up diesel generators than the polygons	The Delegated Officer has reviewed the proposed location of the back-up diesel generators and considers

2, Row 1; Condition 8 Table 4 and Condition 21	provided in Schedule 1, Figure 2 as the exact orientation of each generator will not be determined at this stage.	this an acceptable location. An updated map can be provided post construction.
Condition 7	Licence Holder requests the removal of the Condition requiring the15 x 1.6MW Caterpillar 3516B back-up diesel generators to cease operating during westerly winds of <4m/s	The Delegated Officer notes that the exceedances of the NEPM are considered highest at R3 which is a similar distance to the premises as another sensitive receptor and is within the town limit so is considered a suitable consideration. The predicted cumulative 1-hour NO_2 GLC at receptor R4 is 82% of the NEPM criterion which is not considered conservative and does not include a safe margin for error or potential cumulative future emissions from other sources. The Delegated Officer has therefore retained this condition on the licence.
Condition 8 Table 4	The Licence Holder has advised that D1-D3 black start diesel generator stacks 1 – 3 are not emergency generators. They are required to start the GTGs and wishes them not to be included as emission point sources.	The Delegated Officer has removed the term referencing the black start generators as emergency generators, however as they are emission points they will remain on the Licence Condition 8 table 4.
Condition 15 Table 6; Condition 17; Condition 18; Condition 19, Condition 20 and Condition 25 Table 8	Licence Holder requested reference to CEMS and PEMS be removed from these conditions.	The Delegated Officer does not consider the removal of CEMS to be suitable to monitor and manage the risks of exceedences of the NO_2 NEPM as detailed in Section 6 of this report. The Delegated Officer acknowledges the concerns raised by BHPBIO in relation to cost and maintenance time required of a CEMS. On this basis, the Delegated Officer has amended the Licence to allow for the option for CEMS to be replaced by PEMS.
Condition	**Summary of Licence Holder comments (20/5/2020) relating to unresolved matters**	**DWER response**
Licence History – further information to clarify likely reasons for historical	Licence Holder advised: • there are limitations to the accuracy of CEMS data during abnormal operating conditions (such as start-up and shutdown), and during the auto calibrations of the CEMS	Noted by the Delegated Officer and included in section 6.1 of Amendment Report.

exceedances of NO_2 emission limits identified by current CEMS	analyser; • at times, abnormal operating conditions are unavoidable and must occur to ensure reliable power supply to Newman township; • the OEM of the gas turbines (Siemens) does not provide NOx emission guarantee at loads below 50% of rated capacity; and • all stack emission tests done on three gas turbines at Yarnima have always met the NOx limits during normal operating conditions.	
Amendment Report Section 12.2	Licence Holder disagrees with the risk rating being high [in relation to operation of the back-up diesel generators]. Licence Holder noted inconsistent risk ratings in draft Amendment Report and does not agree with consequence and likelihood ratings.	The Delegated Officer has revised risk rating based on Licence Holders' commitment to only operate back-up diesel generators in 'low emission performance mode'. Table 12 and Section 12.2 has been updated to reflect revised risk rating.
Potential future cumulative emissions in town of Newman (raised as a concern by DWER)	The Licence Holder advised that updated modelling provided in support of the licence amendment application modelled the existing facilities (BHP and Alinta) under four operating scenarios based on reasonably foreseeable information relating to the two premises. The scenario of 5 GTG's and the existing Alinta (Newman) power station as modelled by BHP and the model provided to the EPA as part of the referral of Yarnima Stage 2. This model showed no significant impacts to the town of Newman. Licence Holder advised the production of NO_2 is limited by the availability of O_3. Based on other studies in the Pilbara once ~30% of the NEPM value is reached available O_3 has been used and no further production of NO_2 can occur, making it impossible for NEPM values to be reached.	The Delegated Officer notes the reasons provided for the scenarios modelled and agrees the scenarios relate to foreseeable emissions profiles from the premises at the time of modelling. Since receiving the modelling report by BHP, DWER has received an application for a significant expansion at the Newman Power Station adjacent to the Premises. DWER will review and assess the cumulative modelling associated with that application noting that there may be potential for combined emissions from both the Newman and Yarnima Power Station to exceed the NEPM (Ambient Air Quality) criteria for NOx under certain operating configurations during particular meteorological conditions. Should this be the case there may be a requirement for a review of potential cumulative emissions and operating configurations from both premises. With regard to the reference to the O_3 limiting method of estimating NO_2 emissions, the Delegated Officer notes this information and advises that this method was not

		presented as part of the original amendment application and therefore was not considered in the draft risk assessment. The Delegated Officer has reviewed the modelled predictions as submitted and the Licence Holder's proposed controls to determine the risk assessment outcomes detailed in section 12.2.
	Licence Holder requested all references to Scenario 5 be removed from the decision report other than to reference BHPs commitment to not running this scenario.	The Delegated Officer has retained the reference to Scenario 5 in section 6.4 of the Amendment Report as this is a plausible operating scenario for the back-up diesel generators. The Delegated Officer however notes that the Licence Holder has committed to not operating the back-up diesel generators under Scenario 5 and as such, has not included this scenario in the risk assessment of emissions during operations in Section 12.2. In accordance with DWER's *Guidance Statement: Risk Assessments*, where a Licence Holder's proposed controls lower the risk event, those controls may be included as regulatory controls on a granted instrument.
Condition	**Summary of Licence Holder comments (12 June 2020)**	**DWER response**
Condition 7	Licence Holder requested the removal of the requirement to "cease operation of generators during westerly winds of <4m/s". The Licence Holder reiterated that the generators are to provide backup power while one of the existing gas turbines is undergoing maintenance. As the gensets are required to provide emergency power in the case of one of the remaining turbines failing, the Licence Holder considers having to turn off the generators if the wind speed falls poses a significant risk to the grid. The Licence Holder indicated that without the emergency gensets operating, a turbine failure could result in a loss of power to the entirety of the Town of Newman and all BHP Pilbara mining operations, accommodation camps, water supply infrastructure, etc. The Licence Holder stated that they will endeavor not to undertake maintenance activates during low westerly winds however once turbine maintenance has commenced, the turbine will need remain off line for the 6 day maintenance period.	Noting that this requirement may have implications on regional power supply, and that modelling is relatively conservative, the condition has been removed.
Conditions 1, 7	The Licence Holder advised that the type of diesel generator proposed	Emissions data was provided for the revised diesel

and 8	for installation (Caterpillar 3516B) is no longer available and proposes to install 24 Cummins QSK50 diesel engines in their replacement. The new engines will have a de-rated capacity of 1.03MW each (total 24.72MW) although dispatch will be limited to 24MW. The Licence Holder also proposes to install an additional 4 emergency backup diesel generators (Cummins KTA50) with a de-rated capacity of 0.693MW to supply emergency power should one or more of the Cummins QSK50 engines fail. The emergency backup generators will be physically disconnected via circuit breakers and hard stops in the control system. Should the situation arise where one of or more of the KTA50 gensets be required to replace a QSK50 genset, dispatch will continue to be limited to 24MW as above.	engines and noted that emissions would be comparable to those originally proposed. The Delegated Officer therefore considers that modelling submitted appropriately captures the updated design.