Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Application for Licence Amendment

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

Licence Number	L7337/1998/10
Licence Holder	Alinta Energy Transmission (Roy Hill) Pty Ltd
ACN	159 279 857
File Number	DER2013/001074
Premises	Newman Power Station Newman WA 6753 Legal description – Lot 555 on Deposited Plan 400578
Date of Report	7 August 2020
Proposed Decision	Intent to grant revised licence

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1. Decision summary

Licence L7337/1998/10 is held by Alinta Energy Transmission (Roy Hill) Pty Ltd (Licence Holder) for the Newman Power Station (the Premises), located at Lot 555 on Deposited Plan 400578.

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 operation of the Premises resulting from installation of new power generating equipment. As a result of this assessment, revised licence L7337/1998/10 has been granted.

The revised licence issued as a result of this amendment application consolidates and supersedes the existing Licence previously granted in relation to the Premises. The revised licence has been granted in a new format with existing conditions being transferred, but not reassessed, to the new format (refer to Table 13 or summary of changes).

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 https://www.der.wa.gov.au.

2.2 Overview of Premises

The Newman Power Station (NPS) is situated within the East Pilbara Region of Western Australia, approximately 2km north-west of the town of Newman in the Shire of the East Pilbara. The NPS is operated by Alinta Energy Transmission (Roy Hill) Pty Ltd (trading as Alinta Energy) (Alinta) under *Environmental Protection Act 1986* Licence L7337/1998/10 for the Prescribed Premises Category 52: Electric power generation. Currently the Premises has a power generation capacity of 132 MWe.

The Premises comprises three GE Power Frame 6B and one Trent Rolls Royce Combined Cycle Gas Turbines (CCGTs) which are normally operated on natural gas, but have auxiliary diesel generator backups. Each of the GE CCGTs has a 7.25m high exhaust stack, and the Trent CCGT a 25m high exhaust stack. The stack locations are shown in Figures accompanying Licence L7337/1998/10 and in Figure 1 below; they are identified as Stacks A1-A4 respectively.

Existing auxiliary infrastructure includes:

- Four local gas skids and associated ancillary enclosures and equipment.
- 35 MW lithium battery storage system.
- 1,220,000 L of diesel comprising of two 610,000 L tanks within a bunded area.
- Oily water gravity separator for treatment of hydrocarbon contaminated wastewater arising from the spillage, leakage and seepage of hydrocarbons associated with accidents, breakdowns or malfunctions from power generation equipment including generators, fuel tanks, transformers and fuel piping.
- A shallow clay lined evaporation pond for the holding and evaporation of treated wastewater.
- Perimeter fencing and individual compound fencing.

BHP's 198 MWe Yarnima Power Station (YPS) is located immediately adjacent to the NPS.

The YPS operates under *Environmental Protection Act 1986* Licence L8803/2013/1. BHP is currently seeking an amendment to this licence, to install diesel generators with a generating capacity of approximately 24MW and associated stacks, to enable provision of additional operational power supply during shut downs and maintenance activities at the YPS.

2.3 Application summary

On 24 March 2020 the Licence Holder submitted an application to the department to amend Licence L7337/1998/10 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act).

This amendment is limited only to changes to Category 52 activities. It does not require an alteration to the Premises boundary. Table 1 outlines the proposed changes to the existing Licence.

Table 1: Proposed design capacity changes

Category	Current design capacity	Proposed design capacity	Description of proposed amendment
52	132 MWe	192 MWe	Installation of 14 new Jenbacher gas-fired reciprocating engines (4.28 MWe each de-rated capacity, totalling 60 MWe) and auxiliary components

The Licence Holder proposes to construct and install an additional 14 gas turbines (see Table 2) to achieve the proposed increase in design capacity. These works will be undertaken within the Premises boundary on an area of vacant land. The works will utilise the Premises' existing stormwater management system. Existing infrastructure at the Premises in addition to proposed new infrastructure to be assessed under this amendment application is detailed in Table 2.

The Licence Holder as advised that the dispatch of the expanded power station will be constrained due to operational requirements, such that there will always be one of the existing gas turbines off-line. Therefore, the dispatchable electricity generation capacity of the expanded power station will 162 MWe. The air emissions modelling that the Licence Holder has provided to support the proposed amendment (ETA 2020), has not considered a scenario where the Premises is operated at the proposed design capacity. Therefore, this assessment is based on emissions and discharges from the power station operating at a maximum generating capacity of 162 MWe.

Table 2: Newman Power Station Category 52 infrastructure

Infrastructure and equipment	Construction and installation specifications	Infrastructure location (see Figure 1)
Existing infrastructure		
Three GE Frame 6 turbine units, with auxiliary diesel generator backup		Existing Gas Turbine Area
Rolls Royce Trent 60 turbine		
One black start diesel generator		
Fuel Farm containing two 610,000L diesel storage tanks		Fuel Farm
An oily water system		Existing Oily Water Treatment System
Evaporation pond - clay lined		Evaporation pond
New infrastructure		
14 Jenbacher gas powered reciprocating engines each with a de-rated capacity limited to 4.28 MWe		Within the new engine halls
Two new engine halls each to have a concrete hard stand base and be approximately 10-12m tall		To the east of the existing turbines
14 exhaust stacks, with silencers, each attached to a Jenbacher engine (14m in height)		To the east of the existing turbines
14 x 1,000L lube oil tanks, each attached to a Jenbacher engine		Within the new engine halls
40,000L common lube oil tank		
An oily water system: All gas turbine enclosures, fuel and oil pumps and proposed hydrocarbon related infrastructure will be housed on impermeable hard stand floor on and engine hall and drain to the oily water treatment system.		
Auxiliary components including an 11kV switch room, coupling transformers, switchgear, a control room, 66 kV step-up transformer, cabling, pumps, waste and clean oil storage and emergency/safety features		

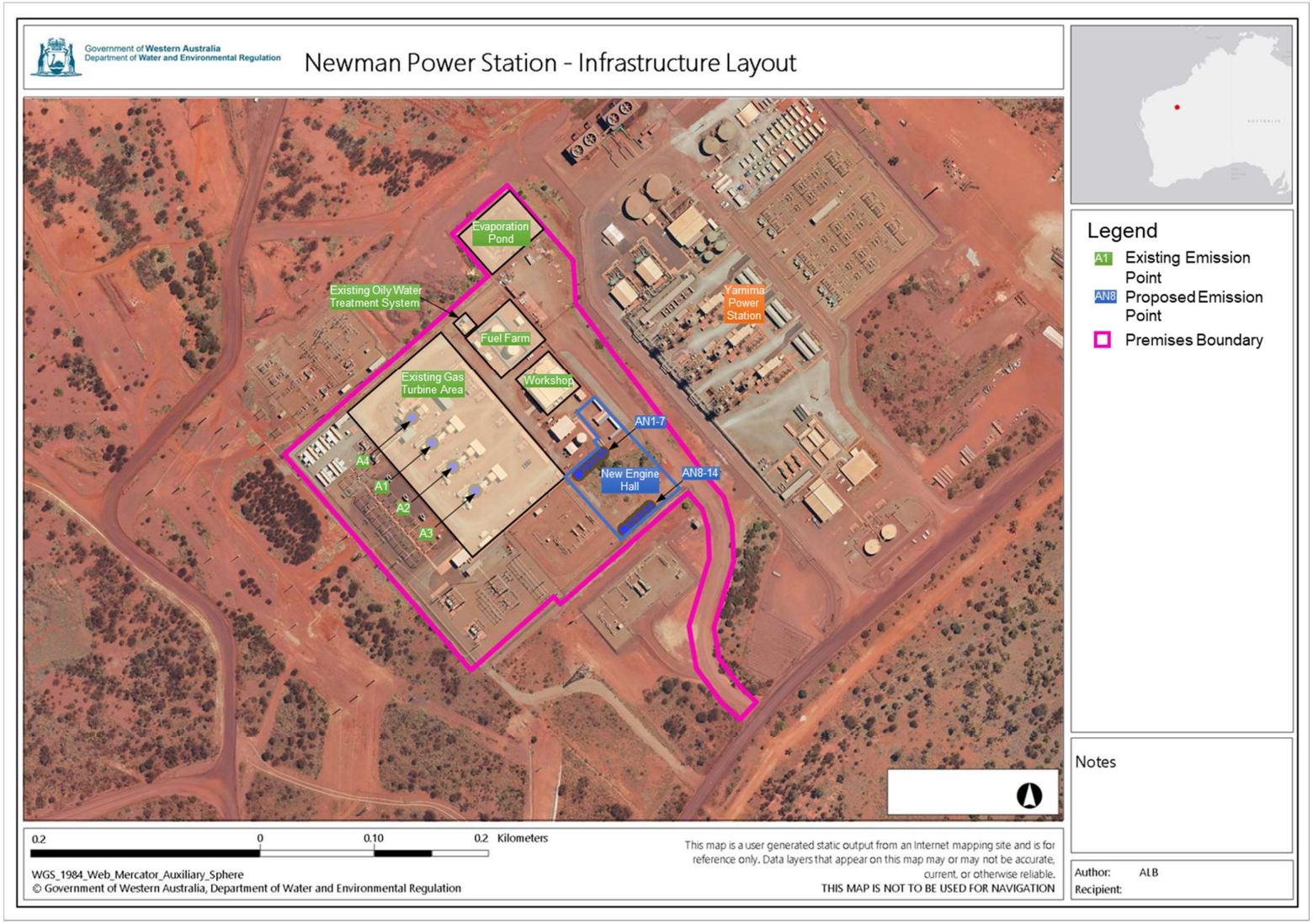

Figure 1: Newman Power Station expansion proposal

Licence: L7337/1998/10

3. Summary of supporting information

The Licence Holder provided various items of supporting information, this section provides a summary to the information that the Delegated Officer has relied upon to make a decision on the licence amendment application.

3.1 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 additional 14 engines (ETA 2020). Due to the close proximity of Yarnima Power Station (YPS), another source of combustion emissions to air from the operation of gas-fired power generation turbines, cumulative emissions from the YPS were included within the predictive emissions modelling submitted.

3.1.1 Relevant emissions

The Licence Holder contends that Newman Power Station is expected to emit a number of products of combustion, including oxides of nitrogen (NOx), particles, sulfur dioxide (SO_2) and carbon monoxide (CO), but that previous assessments have shown the estimated pollutant concentrations to be relatively insignificant in terms of potential environmental impact, with the exception of potential NOx emissions. he Delegated Officer has therefore determined that emissions of particulate matter (PM), SO_2 and CO from electricity generation using natural gas, does not present a risk to the environment and human health, but that NOx emissions do present a risk.

3.1.2 Modelled scenarios

The Licence Holder's modelling considered the five operating scenarios presented in Table 3, three of which represent the cumulative impacts of the operation of the Newman and Yarnima Power Stations (Scenarios 3 – 5).

Table 3: Air quality modelling scenarios

No.	Scenario
1	Existing: NPS station (132 MW) in isolation of other airshed emission sources
2	Proposed: Incorporating the proposed changes to the NPS station
3	Cumulative: Existing NPS plus YPS (standard operating conditions)
4	Cumulative: Future NPS plus BHP YPS (standard operating conditions)
5	Future: NPS plus BHP YPS (All turbines and diesel generators operating)

3.1.3 NO_x:NO_2 conversion ratio

The amount of NO_2 in the exhaust stream as it is released from the stack of a gas turbine generator is typically in the order of 5-10% of total emitted NOx. However, following release, a portion of the emitted NOx changes through complex photochemical reactions with atmospheric ozone (O_3), to form NO_2. The Licence Holder used an empirical NOx/NO_2 relationship to convert predicted NOx concentrations to NO_2.This relationship is based on data obtained from the hourly NO_2 and NOx measurement data from the Port Hedland Industries Council monitoring station located at South Hedland, and is reproduced in Figure 2.

The Delegated Officer recognises that suitable data is not available for the Newman townsite, and that South Hedland experiences similar climatic conditions to Newman. However, the lack of location specific data for use in determining an empirical relationship, introduces an element of uncertainty to the assessment process.

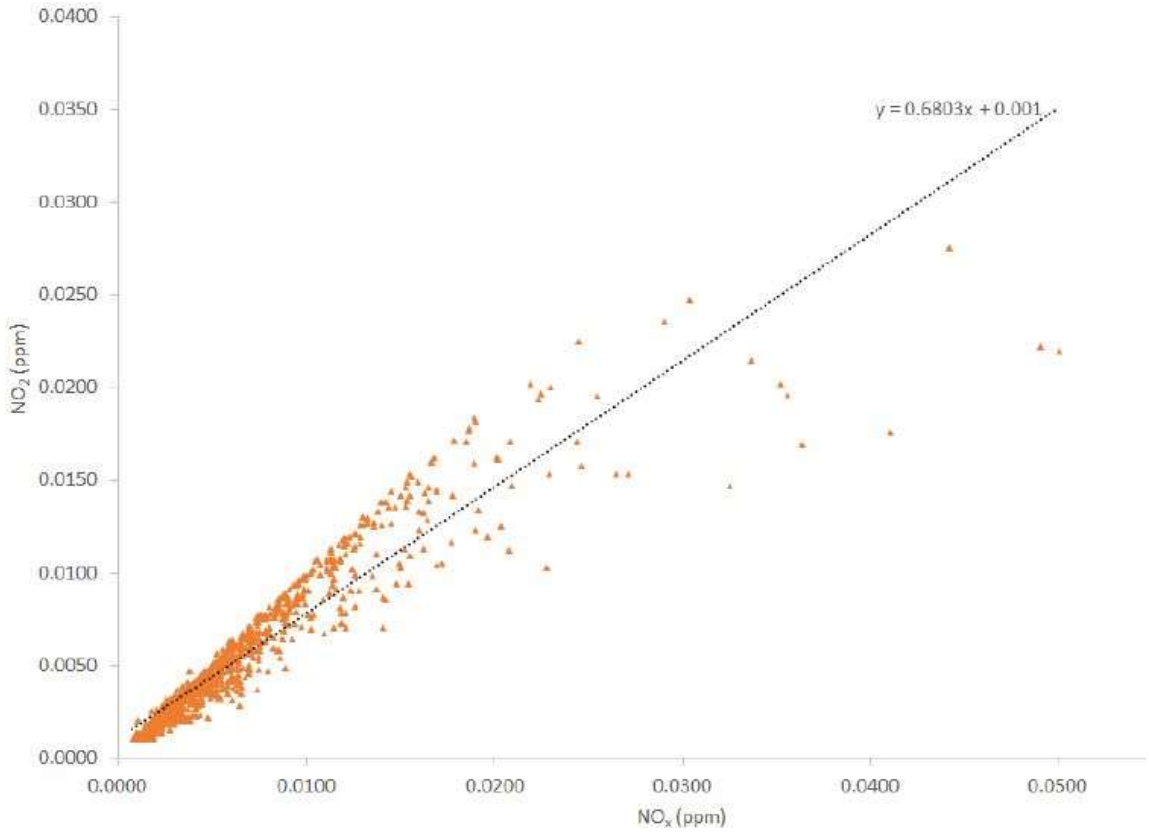

Figure 2: Ratio of measured NOx and NO_2 at South Hedland

The linear regression equation presented in Figure 2 (y=0.6803x+0.001) was utilised to convert NOx to NO_2 for the 99.9 percentile and lower model results. To convert the maximum predicted concentration of NOx to NO_2 a NOX:NO_2 ratio of 0.439 was utilised, which appears to the Delegated Office to be the ratio between the maximum measured level of NOx (~0.05ppm) and the corresponding level of NO_2 (~0.022ppm), as presented in Figure 2.

The Delegated Officer has observed that there is a significant degree of scatter in the measurement points presented in Figure 2 above NOx levels of 0.03ppm, such that a linear relationship is in doubt. It is also apparent that for the third highest measured level of NOx the 0.439 ratio provides a significant underestimation of the corresponding NO_2 level.

The Delegated Officer sought advice on this matter from the Department's Air Quality Branch (AQB). The advice received was that the conversion ratio applied to this assessment, and also a similar assessment of the adjacent Yarnima Power Station, is not conservative, and could be leading to underestimations of ground level concentrations of NO_2.

The Delegate Officer has concluded that the Licence Holder's chosen conversion ratios introduce significant uncertainty to the predicted ground level NO_2 concentrations.

3.1.4 Modelled NO_2 emissions

The Licence Holder's modelling used the NO_2 emission rates shown in Table 4.

Table 4: Modelled NO_2 emission rates

Scenario	Stack ID	NO_2 Emission Rate (g/s)
Newman PS - Existing	A1	18.8[1]
	A2	18.3[1]
	A3	19.0[1]
	A4	30.3[1]
Newman PS - Proposed	AN1-AN14	0.924[2]
Yarnima PS - Existing	B1-B3	4.9[3]
Yarnima – Proposed diesel generators	1-15	4.5[3]

Note 1: Obtained from detailed data on fuel usage and electricity generation
Note 2: Obtained from the Jenbacher's quoted figure of 190mg/Nm^3
Note 3: Data provided by BHP, the operator of Yarnima Power Station, and are for each individual turbine/generator

Operation on diesel fuel

The exisiting three Frame 6 gas turbines at the Premises are dual-fuel turbines capable of operating on both gas and diesel. The Premises includes a fuel farm housing two 610,000L diesel tanks should operation on diesel fuel be required. The Licence Holder has not provided any emissions data for the operation of the turbines on diesel, however, has indicated that operation on diesel will only occur under emergency situations when the gas supply to the Premises is interrupted or to allow maintenance and performance checks (estimated to be less than 100 hours per year).

3.1.5 Predicted ground level concentrations

The Licence Holder modelled ground level concentrations (GLC) of NO_2 for each of the scenarios listed in Table 3, at three locations that are representative of sensitive receptors within the Newman townsite; R1 (Newman Centre), R2 (Newman East) and R3 (Newman West).

The modelled GLCs are compared to the 1-hour and Annual Average ambient NO_2 standards stated in the National Environmental Protection Measure (NEPM) for Ambient Air Quality (NEPC, 2016). These standards are based on the protection of human health, and the Delegated Officer accepts that these are appropriate to this assessment.

The Licence Holder's modelled GLCs, for each scenario, at the nearest residential receptor, are summarised in Table 5; the relevant NEPM standard is in brackets. The Delegated Officer has observed that the coordinates for the receptor R3 (the nearest residential receptor) in the Calpuff modelling input file provided by the Licence Holder to support the modelling results

does not correspond to the location of the nearest residential receptor provided in the modelling report (ETA 2020) (Figure 3). The Delegated Officer has thus concluded that there is significant uncertainty as to whether the predicted NO_2 concentrations are representative of GLCs at the nearest residential receptor.

Table 5: Predicted GLCs at Receptor R3 (Newman West)

Scenario	Predicted NO_2 concentration (µg/m^3)	
	Maximum 1-hour average (246 µg/m^3) [1]	**Annual average (62 µg/m^3) [1]**
1. Newman PS existing	34.4	0.20
2. Newman PS proposed	48.9	0.29
3. Newman and Yarnima PS existing	46.0	0.21
4. Newman PS proposed and Yarnima PS existing	58.3	0.35
5. Newman PS proposed and Yarnima PS proposed [2]	205.2 [3]	N/A [4]

Note 1: at 0 Degrees Celius
Note 2: This scenario assumes the proposed Yarnima PS diesel generators are operational.
Note 3: This figure is the 2nd highest 1-hour average, meaning that the maximum value exceeded the standard; NEPM allows for one such exceedance per year.
Note 4: The primary purpose of the diesel generators is to provide back-up power during the turbine maintenance shutdowns; hence they do not operate thoroughout the year.

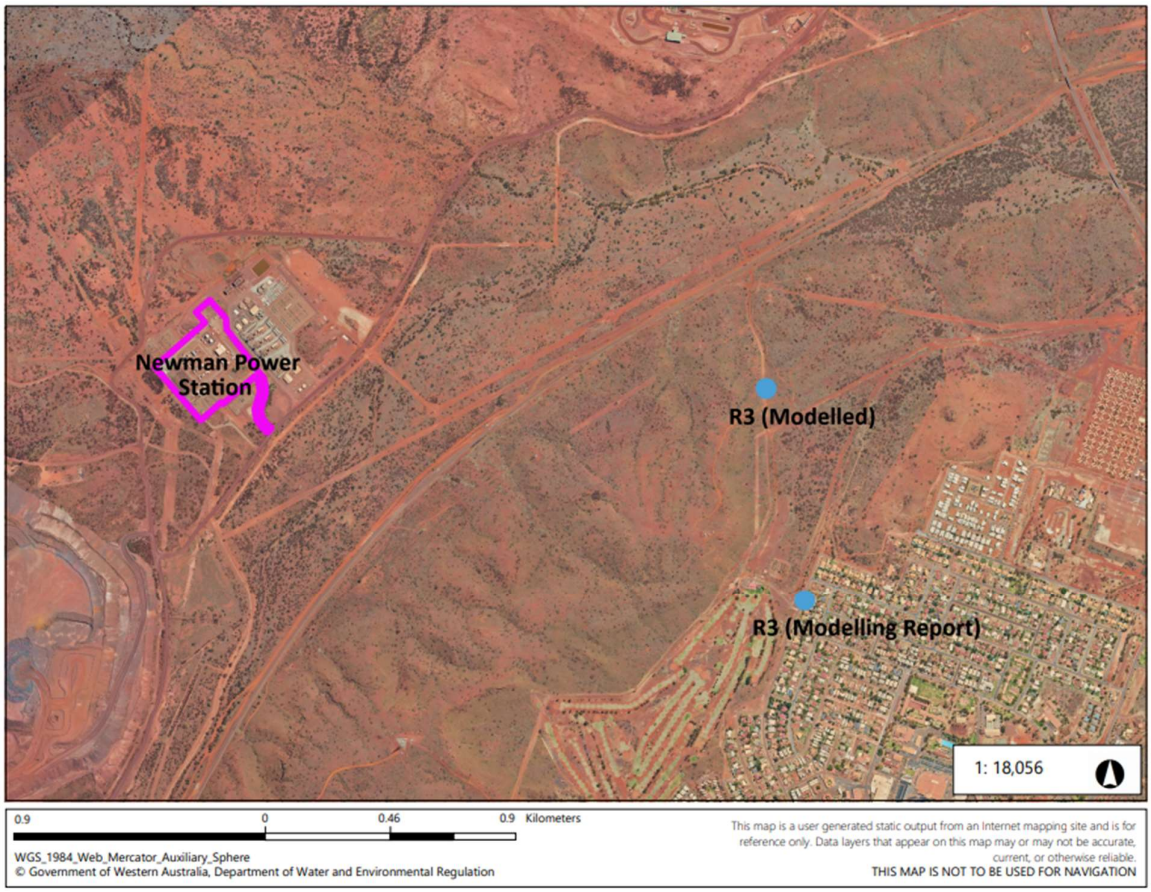

Figure 3: Modelled sensitive receptor vs receptor location in the modelling report (ETA 2020)

3.2 Wastewater discharge

3.2.1 Existing system

Stormwater run-off from the operational areas of the Premises is channelled to seven discharge points, from which it flows into BHP's mining tenure. The management of these discharge points is subject to a service agreement between the Licence Holder and BHP.

Stormwater that falls within bunded hydrocarbon storage areas has the potential to become contaminated. Hence, the discharge from these areas are directed to a proprietary oily water treatment system, and not the above mentioned discharge points.

The treated water from the oily water treatment system is discharged to an evaporation pond located within the Premises. The pond is sized such that a freeboard[1] of 500mm is maintained at all times. The pond is clay lined to prevent it from acting as a soakaway although the permeability, and therefore the effectiveness of the liner, is unknown. The discharge to the pond is currently via a licensed discharge point (emission point reference W1), that is monitored for Total Recoverable Hydrocarbons, with a target level of 30mg/L. The monitoring results for annual reporting period July 2018 to June 2019 are presented in Table 6.

Table 6: Monitoring of discharge to evaporation pond (W1)

Sample Date	Total Recoverable Hydrocarbons – Emission Limit 30 mg/L				
	>C10 - C16 Fraction (mg/L)	>C16 - C34 Fraction (mg/L)	>C34 - C40 Fraction (mg/L)	>C10 - C40 Fraction (sum) (mg/L)	>C10 - C16 Fraction minus Naphthalene (F2) (mg/L)
19/07/2018	<0.1	<0.1	<0.1	<0.1	<0.1
16/08/2018	0.18	0.3	<0.1	0.48	-
18/09/2018	<0.1	<0.1	<0.1	<0.1	<0.1
19/10/2018	0.18	0.21	<0.1	0.39	-
22/11/2018	<0.1	<0.1	<0.1	<0.1	<0.1
11/12/2018	0.17	0.34	<0.1	0.51	-
22/01/2019	0.18	<0.1	<0.1	0.18	0.18
19/02/2019	<0.1	<0.1	<0.1	<0.1	<0.1
19/03/2019	<0.1	<0.1	<0.1	<0.1	<0.1
16/04/2019	<0.1	<0.1	<0.1	<0.1	<0.1
16/05/2019	<0.1	<0.1	<0.1	<0.1	<0.1
18/06/2019	<0.1	<0.1	<0.1	<0.1	<0.1

[1] Freeboard is the vertical distance between the crest of the embankment surrounding the pond and the water surface.

3.2.2 Proposed expansion

The proposed 14 engines and auxiliary equipment, with the exception of the exhaust stacks, will be located within enclosed engine halls, which will have impermeable concrete hardstand bases. Stormwater run-off from the roof structures will be channelled to the points that discharge to BHP's tenure. Any water or spills that accumulate on the hardstand bases within the engine halls will drain to a proprietary oily water treatment system to be located within an engine hall. The treated discharge water from the oily water treatment system will discharge to the evaporation pond.

3.3 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
Planning and Development Act 2005	P013/19	Development Approval to construct the engine halls and install the 14 gas engines.
Dangerous Goods Safety Act 2004	DGS015396	Licence to store dangerous goods such as compressed gas, lithium ion batteries and diesel on the Premises.
EP Act (Part IV)	N/A	Although the total theoretical generating capacity of the power station will be 192MWe, the Applicant has indicated that operation will be limited to 162MWe. The net increase of greenhouse gas emissions from the expansion under the proposed operating scenario (i.e. limited to 162MWe) is estimated to be <100,000 tonnes carbon dioxide equivalent (tCO_2e) and therefore the Applicant does not consider the proposal to be a significant proposal requiring referral under Part IV of the EP Act. Operation of the power station is limited to 162MWe under the Licence to guarantee emissions from this proposal are below the threshold for referral under Part IV of the EP Act.

4. 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.

4.1 Source-pathways and receptors

4.1.1 Emissions and controls

The key emissions and associated actual or likely pathways during premises operation, which have been considered in this Amendment Report are detailed in Table 8. Table 8 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 8: Licence Holder controls (from Application)

Emission	Sources	Potential pathways	Proposed controls
Dust	Dust emissions may be generated during construction and installation of additional infrastructure	None	Dust suppression, as required. Construction duration is limited. The Premises is 2km from the nearest sensitive receptor in the Newman townsite, and there are low hills screening the Premises from the townsite. Therefore, there is no viable pathway.
Noise	Construction and earthwork activities. Noise from the operation of the engines.	None	Construction duration is limited The Premises is 2km from the nearest sensitive receptor in the Newman townsite, and there are low hills screening the Premises from the townsite. Therefore, there is no viable pathway.
Emissions to air (NOx, CO, SO_2, PM and VOCs)	14 reciprocating gas engines	Air/windborne pathway	Engines will be operated and maintained in accordance with manufacturer's specifications to ensure minimal discharge of NOx. Monitoring of NOx and CO. Operation will be limited to 162 MWe.

Emission	Sources	Potential pathways	Proposed controls
Discharge to land or water (hydrocarbons)	Spillage, leakage and seepage of hydrocarbons associated with accidents, breakdowns or malfunctions from power generation equipment including generators, fuel tanks, transformers and fuel piping.	Direct discharge, land overflow, contaminated stormwater runoff or infiltration Seepage/overtopping of the evaporation pond	Use of oily water treatment systems, with a monitored discharge point. All equipment is located on areas of hardstanding that drain to the oily water treatment system. Applicant to confirm Waste oil collected from the oily water system is disposed of through a licensed disposal facility. Spill kits are available at various locations within the Premises. All hydrocarbons are/will be stored in accordance with *AS 1940 The storage of flammable and combustible liquids*. The evaporation pond is clay lined (permeability unknown) and maintains a freeboard of 500 mm.

4.1.2 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 9 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)). The locations of the human receptors listed in Table 9 are shown in Figure 4.

Table 9: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Closest residential receptors	~2.1km to the south west of the Premises
Fortescue Golf Club, clubhouse	~1.9km to the south west of the Premises
Fortescue Golf Club, fairways	~1.8km to the south west of the Premises
Environmental receptors	**Distance from prescribed activity**
Priority 1, Public Drinking Water Source Area (PDWSA)	Beneath the premises, depth to groundwater is 17 mbgl
Fortescue River	270m to the south west of the Premises

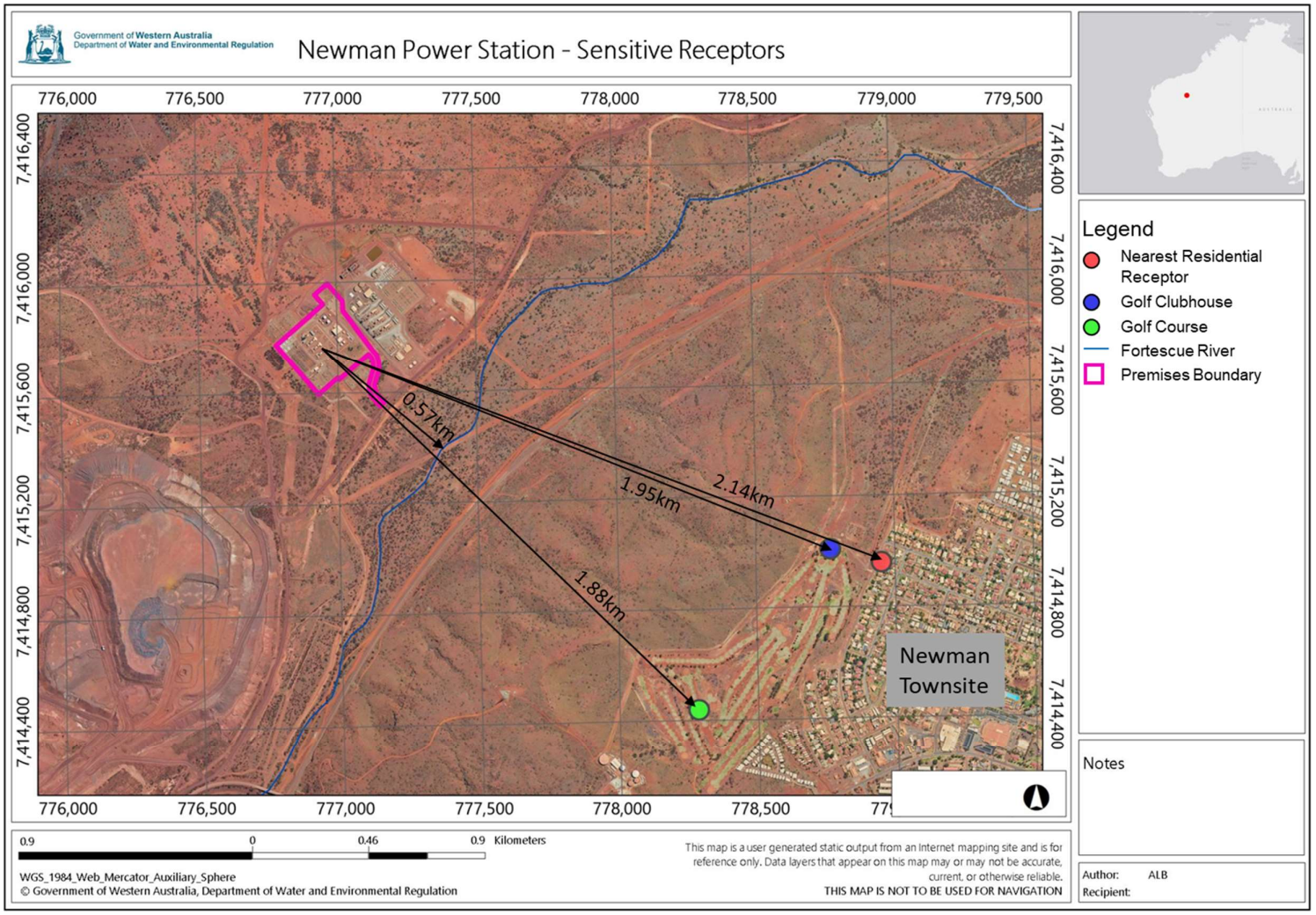

Figure 4: Distance to sensitive receptors

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4.2 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 4.1. 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 4.1), 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 10.

The revised licence L7337/1998/10 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. electrical power generation.

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

Table 10. Risk assessment of potential emissions and discharges from the Premises during operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**				
Operation								
Burning natural gas to generate electricity	NOx	Air/windborne pathway causing impacts to health and amenity	Residences 2.1km to the south west Patrons of the golf club ~1.9km to the south west	Refer to Section 4.1.1	C = Moderate L = Possible Medium Risk	N	**Conditions 1 to 10, 11, 12, 13, 20 and 24**	See Section 4.34.3
Accidental release associated with loss of containment of primary of secondary infrastructure including liners, bunds, pipes and valves,	Hydrocarbons (lube oil)	Direct discharge, land overflow, contaminated stormwater runoff or infiltration causing health impacts (via drinking water) and ecological impacts to groundwater, surface water (Fortescue River), soil and vegetation.	Premises in Priority 1 PDWSA - groundwater 17 mbgl Fortescue River 270m to the south west	Refer to Section 4.1.1	**Major spill** C = Major L = Rare Medium Risk **Minor spill** C = Minor L = Rare Low Risk	Y	**Conditions**	The Delegated Officer notes the presence of a Priority 1 PDWSA beneath the Premises and the potential for impact should containment infrastructure fail resulting in a release of contaminants to the environment. To ensure that an appropriate level of risk is maintained, Applicant controls relating to containment (i.e. bunding and freeboard) have been applied. Noting that the permeability of the clay lined Evaporation Pond is unknown, the Delegated Officer considers there to be a potential risk of contamination from seepage. Existing conditions relating to the monitoring of discharges to the Evaporation Pond and limiting the hydrocarbon content of wastewater are considered appropriate for mitigating the potential risk of seepage from the Evaporation Pond. It should be noted that the limit for hydrocarbons has been revised to align with contemporary water quality guidance relating to oily water systems (DoW, 2006)
Seepage from the evaporation pond	Hydrocarbon contaminated wastewater				C = Moderate L = Rare Medium Risk			
Overtopping of the evaporation pond								

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.

4.3 Detailed risk assessment - emissions to air

4.3.1 Description of potential adverse impact from the emission

The cumulative emissions concentrations of NO_2 from the proposed expanded Newman and Yarnima Power Stations can be transported by an airborne pathway to sensitive receptors in the Newman townsite, causing adverse effects to health and amenity.

Short-term exposure to NO_2 has been linked to increases in cardiovascular and respiratory mortality. Recent evidence has strengthened the association with hospital admissions and emergency department visits for respiratory disease including all respiratory causes, asthma and chronic obstructive pulmonary disease. Studies of children with asthma show associations between NO_2 and reductions in lung function, increases in cough, night-time asthma and school absenteeism. An increase in symptoms in asthmatic children and increases in airway inflammation and hyper-responsiveness have also been observed. Short-term exposure to NO_2 levels currently experienced in Australian cities has been associated with these health outcomes.

Air emissions modelling predicted ground level concentrations for NOx (considered to be the most significant pollutant). Modelling predicted that cumulative emissions from the upgraded Newman Power Station, when operating in tandem with the upgraded Yarnima Power Station, would result in a maximum 1 hour ground level concentration of NOx at the nearest residential receptor of 205.2 µg/m^3 (83% of the NEPM criteria) (section 3.1.5). However, as discussed in sections 3.1.3 and 3.1.5 there some uncertainties in the modelling which may result in modelled NOx ground level concentrations being underestimated.

4.3.2 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 11: 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

The National Environment Protection Council (NEPC) is a national council of Commonwealth, State and Territory Ministers. It is acknowledged that in December 2018 the Environment Ministers signalled their intention to vary the Ambient Air Quality NEPM standard for NO_2 based on the latest scientific understanding of the health risks arising from these pollutants. The NEPC published an impact statement and draft varied NO_2 standards in May 2019.

4.3.3 Consequence

The Delegated Officer has determined that the consequence of NOx emissions to air impacting on public health 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.

4.3.4 Likelihood of risk event

Licence Holder's air quality modelling assessment (ETA 2020) acknowledges that there is uncertainty in the predicted ground level concentrations, and that this is mitigated through the application of conservative assumptions that should lead to over, rather than under-predictions. To consider the cumulative effects of NO_2 emissions, the air quality assessment presents a worse-case scenario (scenario 5), in which all three gas turbines at the Yarnima Power Station are operated together with the proposed diesel generators. The Delegated Officer recognises that this scenario is unlikely to arise as the diesel generators are proposed to be used only when a turbine is off-line for maintenance.

In counterpoint to the Licence Holder's stated conservative approach, the Delegated Officer has identified that there are two additional uncertainties that need to be considered alongside the conclusions of the air quality assessment, see Sections 3.1.3 and 3.1.5 above. These uncertainties all indicate that the assessment has potentially underestimated the ground level concentrations of NO_2 in the Newman townsite.

The Delegated Officer has therefore determined, with reference to *Guidance Statement: Risk Assessments* (DER 2017), that the likelihood of cumulative emissions of NO_2 breaching the NEPM 1-hour standard for NO_2 is **Possible**.

4.3.5 Overall risk rating

The overall risk rating of cumulative emissions to air from the operation of expanded Newman Power Station is **Medium** and acceptable subject to regulatory controls.

5. Controls

The Delegated Officer considers the following conditions are sufficient for managing the risk associated with cumulative emissions to air from the operation of the expanded Newman Power Station:

- Works conditions 1 to 11 will be included on the revised licence to allow construction and commissioning of the 14 engines and will include specifications for stack heights. 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 the Department to enable an assessment of the environmental performance of the engines once operational.
- An operational requirement (condition 12) will be included on the revised licence to limit the operation of the power station to three gas turbines once thermal electricity generation exceeds 132 MWe. This ensures that the dispatchable electricity generation is limited to 162 MWe to reflect the assumed capacity in the Licence Holder's air quality modelling assessment.
- An operational requirement (condition 12) will be included on the revised licence to limit the operation of the Frame 6 turbines on diesel fuel in non-emergency situations and black-start generator to 100 hours per year.

6. Additional amendments

The to address the uncertainties associated with the lack of location specific data to determine a NOx:NO_2 ratio (see Section 3.1.3), the Delegated Officer considers a form of emissions monitoring which is capable of capturing worst case emissions from the premises is required to supplement the existing annual stack testing, which only provides a snapshot of emissions. Therefore, a condition has been added to the revised licence to require a Predictive Emission

Monitoring System (PEMS) to be operated across all generators on the Premises.

Licence Holder will be required to maintain the annual stack testing of NOx emissions from the gas generators to confirm that emissions continue to remain acceptable and meet design criteria emission rates and limits imposed on the Licence.

The following conditions have been added to the revised licence to allow for design, instalment and monitoring requirements for the PEMS:

- Condition 1 provides for the installation of the PEMS in accordance with requirements specified in that condition's Table 1;
- Condition 24 specifies the PEMS averaging period for emissions;
- Condition 27 specifies that PEMS is regularly operated, maintained and calibrated in accordance with US EPA Performance Specification 16; and
- Condition 28 requires the submission of a comparison report.

Wastewater discharge

As discussed in Table 10, the Delegated Officer determined that risks associated with discharges of contaminated wastewater and spills of hydrocarbons can be adequately mitigated through existing conditions and the application of infrastructure controls. Condition 12 specifies infrastructure controls to be maintained.

7. Consultation

Table 12 provides a summary of the consultation undertaken by the department.

Table 12: Consultation

Consultation method	Comments received	Department response
Shire of East Pilbara advised of proposal (19 May 2020)	The Shire of East Pilbara has no objections to this proposal. Development Approval has been granted (P013/19)	N/A
BHP, the operator of the adjacent Yarnima advised of proposal (19 May 2020)	None received	N/A

8. Conclusion

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

8.1 Summary of amendments

Table 13 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the revised licence as part of the amendment process.

Table 13: Summary of licence amendments

Existing Licence condition	Revised Licence condition	Description
	1 to 11	Works Conditions 1 to 11 have been added authorising the construction and commissioning of the 14 proposed gas engines and auxiliary infrastructure including 14 new exhaust stacks (AN1-AN14). Condition 1 also includes the requirement to install a PEMS across all generators.
1.2.1 to 1.2.5	-	These conditions have been removed from the Licence as they are a duplication of legislation and therefore not required.
1.3.1 – 1.3.4	12	Infrastructure and Equipment (operation) Condition 12 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. This condition replaces conditions 1.3.1 to 1.3.4 The condition also limits the non-emergency operation of the backup diesel generators to 100 hours per year.
2.1.1	-	This condition has been removed.
2.2.1 – 2.2.4	13 to 16	Point source emissions to air Specified point source emissions to air and emission limits have been transferred to the Revised Licence as condition 13 and 14. The conditions have been updated to include new infrastructure
2.5.1	17 and 18	Point source emissions to land Specified point source emissions to air and emission limits have been transferred to the Revised Licence as condition 13 and 14.
3.1.1, 3.1.2 and 3.2.4	19, 20 and 26	Replaced with conditions 17 and 23
3.1.3 to 3.1.5	21 to 23	Replaced with conditions 18, 19 and 20
3.2.1	24, 25, 27 and 28	Conditions of the Revised Licence relating to monitoring of points source emissions to air have been replaced and updated to include requirements for PEMS monitoring.
3.2.2	29	Replaced with condition 26
3.2.3	-	This condition has been deleted
3.5.1	30 and 31	Conditions of the Revised Licence relating to monitoring of emissions to land have been replaced and updated.
5.1.1 to 5.1.4, 5.2.1, 5.2.3, and 5.3.1	32 to 38	Reporting conditions have been replaced and updated in the Revised Licence. Conditions require the submission of a comparison of PEMS data against the emissions rate data provided in the Licence Holder's air quality assessment (ETA 2020), a "previous submission".

References

1. AS 1940:2017, The storage and handling of flammable and combustible liquids
2. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
3. DER 2017, *Guidance Statement: Risk Assessments*, Perth, Western Australia.
4. DER 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
5. Department of Water (DoW) 2006, *Water Quality Protection Note 68: Mechanical equipment washdown*, Perth Western Australia
6. ETA 2020, Alinta Energy Newman Power Station Air Quality Assessment, Final Report, Version 3, Environmental Technologies and Analytics, June 2020.
7. NEPC 2016, National Environmental Protection Measure (NEPM) for Ambient Air Quality, Department of the Environment, February 2016.
8. NEPC 2019, Draft Variation to the National Environment Protection (Ambient Air Quality) Measure for sulfur dioxide, nitrogen dioxide and ozone, Impact Statement, National Environment Protection Council, May 2019.
9. Northstar 2020, Advice Notes 20.1050.M1V3 and 20.1093.M1V3, Northstar Air Quality, February 2020.
10. USEPA RICE rule, National Emission Standard for Hazardous Air Pollutants (NESHAP) for Reciprocating Internal Combustion Engines (RICE) – 40 Code of Federal Regulations Part 63, Subpart ZZZZ, United States Environmental Protection Authority, available from https://www.epa.gov/stationary-engines/understanding-stationary-engines-rules

Appendix 1: Summary of Licence Holder's comments on risk assessment and draft conditions

Condition	Summary of Licence Holder's comment	Department's response
1 (Table 1, Row 2)	The Applicant requested that the condition be amended from "Each with a de-rated capacity limited to 4.28 MWe" to "Each with a nominal capacity of 4.40MWe" as the nominal capacity of each engine is 4.40 MWe. When considered as a whole, the power station output is 58.72 MWe. This would equate to 4.28 MWe per engine after subtracting the station auxiliary losses. It is more accurate to identify nominal, or nameplate, capacity.	Accepted noting that electricity available for dispatch to the electricity grid is 4.28 MWe per engine.
1 (Table 1, Row 2)	The Applicant requested that the term "approximately" be included to describe stack height and diameter to allow flexibility in design as this may change slightly at final construction.	Condition amended to specify that stack heights shall be "at least" 14m above the finished floor level to allow some deviation from design while maintaining a minimum stack height of 14m which is the basis of air emissions modelling and the assessment of risk. Similarly, an allowance of ±10% has been included for the stack diameter.
1 (Table 1, Row 3)	The Applicant requested that the term "approximately" be included to describe the capacity of proposed oil storage tanks noting that final design may slightly vary.	The condition has been amended to include an allowance of ±10% for the lube oil tanks attached to each Jenbacher engine and specify that the Common lube oil tank shall not be more than 40,000L. The Delegated Officer has considered that these amendments are minor in nature and do not alter the environmental risk noting that all oil storage will include primary and secondary containment regardless of size.
1 (Table 1, Rows 3 and 4)	The Applicant confirmed that the Common lube oil storage tank and oily water treatment system will not be located in the engine halls and requested reference to the location in the last column be amended accordingly.	Accepted and amended as requested.

Condition	Summary of Licence Holder's comment	Department's response
12 (Table 6, Row 1)	The Applicant confirmed that the GE Frame 6 turbines do not have auxiliary diesel generator back-up although the Frame 6 turbines are capable of running on both gas and diesel should the gas supply be interrupted. The Applicant advised that the Frame 6 turbines are run on diesel for a short period (<100 hours) each year for maintenance and performance checks to confirm that diesel operating system is still functioning in the event it is required under emergency conditions.	The Delegated Officer notes this information and that the likelihood of operation on diesel will only occur in extreme circumstances (i.e. when the gas supply is interrupted). Operation of the Frame 6 turbines on diesel has been limited to 100 hours per year to allow for maintenance checks unless in an emergency situation which is defined as "an unplanned interruption to the supply of natural gas to the Premises".
	The Applicant requested that the condition be amended to refer to "thermal electricity generation" as opposed to "dispatchable electricity generation" and include "When thermal electricity generation from the facility exceeds 132MWe, no more than 3 gas turbines may be in operation". The specification of "thermal" has been included to avoid a scenario where the 35MW battery at the site causes the electricity dispatch to exceed the 132 MW and 162 MW limits, as the battery emits no NO_x and no CO_2	Noted and accepted. Altered wording does not change the intent of the condition which is to ensure that power generation does not exceed that which formed the basis of air emissions modelling.
12 (Table 6, Tow 4)	The Applicant confirmed that there are no back-up diesel generators on the Premises although there is one black start generator which is the first generator to start in the even the entire system is shut down ("system black"). The first of the Frame 6 turbines can only start with the assistance of this diesel generator. It is run for approximately 1 hour per month as part of routine maintenance.	The Delegated Officer notes this information and that the likelihood of operation of the back-up diesel generator will only occur in black-start conditions and will only operate for a short period until the gas turbines have restarted. Operation of the black-start diesel generator has been limited to 100 hours per year to allow for maintenance checks. The Schedule 1 map has been updated accordingly.
12 (Table 6, Row 5)	The Applicant requested the removal of the requirement for gas skids to drain to an oily water treatment system.	The Delegated Officer notes that the risk of hydrocarbon contamination from the gas skids is low as no hydrocarbons are used in this area. As such, this requirement has been removed and Row 5 of Table 6 deleted.
12 (Table 6, Row 6)	The Applicant confirmed that the existing fuel storage tanks on the Premises are 610,000L each not 500,000L as previously stated.	Information updated noting the pollution control has not been altered.
12 (Table 6, Row 8)	The Applicant advised that the existing Evaporation Pond is clay lined however permeability of the liner is unknown and therefore	Noting that the Evaporation Pond is clay lined, and assuming that the liner could achieve a permeability of 10^{-9}m/s, the Delegated Officer had proposed the

Condition	Summary of Licence Holder's comment	Department's response
	requested the removal to permeability specifications in Condition 12.	removal of conditions relating to the discharge and monitoring of wastewater discharged to the Evaporation Pond as source/receptor pathway could not be established and therefore the risk of contamination was not considered to exist. Noting that the permeability of the liner cannot be confirmed, the Delegated Officer considers there to be a potential risk of contamination associated with the leeching of contaminated water discharged to the Evaporation Pond though the base of the Pond. As such, the Delegated Officer has elected to reinstate previous conditions relating to monitoring and reporting the discharge to the Evaporation Pond.
13 (Table 7, Row 4)	Removal of reference to back-up diesel generators.	Reference to back-up diesel generators removed and replaced with reference to the black-start diesel generator.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)					
Application type					
Works approval	☐				
Licence	☐	Relevant works approval number:		None	☐
		Has the works approval been complied with?		Yes ☐ No ☐	
		Has time limited operations under the works approval demonstrated acceptable operations?		Yes ☐ No ☐ N/A ☐	
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?		Yes ☐ No ☐	
		Date Report received:			
Renewal	☐	Current licence number:			
Amendment to works approval	☐	Current works approval number:			
Amendment to licence	☒	Current licence number:	L7337 – Newman Power Station		
		Relevant works approval number:		N/A	☒
Registration	☐	Current works approval number:		None	☐
Date application received		24 March 2020			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Alinta Energy Transmission (Roy Hill) Pty Ltd			
Premises name		Newman Power Station			
Premises location		Lot 555 on Deposited Plan 400578			
Local Government Authority		Shire of East Pilbara			
Application documents					
HPCM file reference number:		DER2013/001074-1			
Key application documents (additional to application form):		*Air Quality Impact Assessment* *Commissioning Plan*			

Scope of application/assessment	
Summary of proposed activities or changes to existing operations.	Licence amendment The addition of 14 new Jenbacher gas-fired reciprocating engines (4.28 MWe each de-rated capacity, totalling 60 MWe) will increase the maximum design capacity to 192 MW under Category 52.

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 52: Electric power generation	132 MWe	*Additional 60 MWe of generating capacity.*

Legislative context and other approvals		
Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: EPA Report No:
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 ☐	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 ☐	Approval: P013/19 Expiry date: 8/9/2021 If N/A explain why?
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☐ No ☒	CPS No: N/A Exemption applies.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☐ No ☒	Application reference No: Licence/permit No: Licence / permit not required.

Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☐ No ☒	Name: N/A Type: Has Regulatory Services (Water) been consulted? Yes ☐ No ☐ N/A ☒ Regional office:
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☒ No ☐	Name: Newman Drinking Water Reserve Priority: P1 Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☒ No ☐ N/A ☐
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 ☐	*Dangerous Goods Safety Act 2004*
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 *Contaminated Sites Act 2003*?	Yes ☒ No ☐	Classification: contaminated – remediation required (C–RR) Date of classification: 29/10/2012