Decision Report

Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number	W6378/2020/1
Applicant	Contract Power Australia Pty Ltd
ACN	081 583 258
File Number	DER2020/000141
Premises	Esperance Gas-fired Power Station 121 Harbour Road CHADWICK WA 6450 Legal description - Part of Lot 502 on Plan 413859 As defined by the coordinates in Schedule 1 of the Works Approval
Date of Report	11 September 2020
Status of Report	Final

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1. Definitions of terms and acronyms

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

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
Category	Category of Prescribed Premises as set out in Schedule 1 of the EP Regulations
Decision Report	refers to this document.
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.
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
MWe	electricity generated in megawatts
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
Risk Event	As described in *Guidance Statement: Risk Assessment*
$\mu g/m^3$	micrograms per cubic metre

2. Purpose and scope of assessment

Contract Power Australia Pty Ltd (the Applicant) applied for a works approval on 20 March 2020, to construct, commission and operate the Esperance Gas-fired Power Station, within Lot 502 on Plan 413859, Harbour Road, Chadwick (the Premises).

The Premises will comprise of eleven 2 MWe gas generators (total 22 MWe), three 1 MWe emergency diesel generators and two 2 MWe battery energy storage systems (BESS).

The use of natural gas as the primary source of electric power generation meets the definition of Prescribed Premises Category 52 under the EP Regulations.

This Decision Report describes the emissions and discharges associated with the construction, and operation of the Premises and does not assess any emissions or discharges associated with other facilities within Lot 502 on Plan 413859.

This Decision Report documents the Delegated Officer's risk assessment of emissions and discharges and determination of the application consistent with DWER's *Guidance Statement: Risk Assessment* (DER 2017) and *Guideline: Decision Making* (DWER 2019).

2.1 Application details

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
W6378/2020/1 Application including supporting documents	20 March 2020
Email titled: *APPLICANT NOTIFICATION - W6378/2020/1 Esperance Gas-Fired Power Station - WORKS APPROVAL APPLICATION* including the following attachments: • Letter - *Noise Impact Assessment* dated 29 July 2020 • *Noise Impact Assessment, Gas-fired Power Station – Esperance, Western Australia (Rev 2)*	29 July 2020
Email titled: *APPLICANT NOTIFICATION - W6378/2020/1 Esperance Gas-Fired Power Station - WORKS APPROVAL APPLICATION* including the following attachments: • Letter - *Air Quality Impact Assessment* dated 31 July 2020 • *Air Quality Impact Assessment, Gas-fired Power Station – Esperance, Western Australia (Rev 1)*	31 July 2020

3. Background

The Applicant is proposing to construct and operate the Esperance Power Project, which consists of a gas power station, and a solar and wind renewable energy farm at separate locations in Esperance. The Premises is located at the current site of the Horizon Power Depot. Existing infrastructure will be demolished and the site cleared prior to construction of the Premises infrastructure commencing.

Table 3 lists the prescribed premises category that has been applied for.

Table 3: Prescribed Premises Category in the Works Approval

Classification of Premises	Description	Approved Premises production or design capacity or throughput
Category 52	Electric power generation: premises (other than premises within category 53 or an emergency or standby power generation plant) on which electrical power is generated using a fuel.	22 MWe in aggregate

4. Overview of Premises

4.1 Construction

Construction will occur over a maximum of four months and will require up to 30 construction staff. The following activities will occur during construction:

- site and services survey;
- excavation and installation of buried services;
- final trim and buildup of the site;
- concrete works;
- electricity generation equipment installation;
- renewable generation equipment installation;
- office and workshop facility installation; and
- gas pipe inspections.

4.2 Commissioning

Commissioning will occur over three months following the completion of construction. Commissioning activities will include the following activities:

- pre-commissioning testing;
- load testing each gas generator and diesel generator separately;
- load testing all generators combined;
- commissioning the BESS; and
- noise and air quality emissions validation monitoring.

4.3 Operational aspects

Under normal operating conditions, the Applicant will operate nine of the 11 gas generators with one gas generator on standby or backup and one gas generator under maintenance. The Premises will operate 24 hours a day, seven days a week and will supply a maximum of 18 MWe of electricity to the town of Esperance. The power station is not connected to a grid and as such, the output will only be the demand from the town of Esperance at that time and will fluctuate over time with the needs of the town.

Under emergency operating conditions (when the gas supply is interrupted) the Applicant will operate three diesel generators, 24 hours a day and 7 days a week to provide limited power generation for essential services such as the Esperance hospital. Emergency operating conditions are estimated to be approximately 50 hours per year.

The Applicant has requested time limited operations under the works approval for a period of four months.

4.3.1 Gas generators

Eleven 2 MWe gas generators will be installed on a concrete pad on the premises. The gas generators will be housed individually in acoustic containers with exhaust silencers to control noise emissions and will have an exhaust stack 8.6m above ground level for the discharge of air emissions.

Gas will be supplied via pipeline from a neighboring facility.

4.3.2 Diesel generators

Three 1 MWe diesel generators will be installed for use only as back-up electricity generation in emergency situations, if the gas supply is interrupted or there is a failure of gas supply. The generators will be operated for one hour each month, or up to approximately 50 hours per year to ensure they are fully functioning.

The diesel generators will be housed individually in acoustic containers with exhaust silencers to control noise emissions.

Diesel will be stored onsite in a 70 kL self-bunded tank.

Emergency standby or backup generators do not meet the definition of category 52: Electric power generation under the EP Regulations and therefore do not require assessment under this Decision Report. As the Applicant has included the emergency standby generators in their application, emissions and discharges from the infrastructure have been considered so the infrastructure can be included as authorised discharge points on the premises.

4.3.3 Stormwater management

Potentially contaminated stormwater will be collected from the concrete pads and bunded areas to be treated in an oil water separator to less than 5 mg/L of total recoverable hydrocarbons and then a SPEL puraceptor unit. Once treated, water will be discharged into stormwater drainage where it will evaporate and infiltrate. Residual hydrocarbons recovered by the oil water separator will be collected by a licensed waste contractor and disposed of offsite.

Uncontaminated stormwater will be directed via grade variation to a series of swales located along

4.4 Infrastructure

The facility infrastructure, as it relates to Category 52 activities, is detailed in Table 4 and with reference to the Premises Layout (attached in the Issued Works Approval).

Table 4: Esperance Gas Fired Power Station facility Category 52 infrastructure

	Infrastructure	Site Plan Reference
Prescribed Activity Category 52		
Electric Power Generation		
1.	11 x 2 MWe gas generators •Cummins Model C2000 N5CD or similar •each with a 100 L makeup oil tank attached •each housed in an acoustic container with an exhaust silencer	W6378/2020/1 Schedule 1: Maps Figure 1 : A1 to A11

	Infrastructure	Site Plan Reference
	•each with a stack no less than 8.6 m above ground level	
2.	3 x 1 MWe emergency diesel generators •Cummins Model KTA50-G3 or similar •each housed in an acoustic container with an exhaust silencer •exhaust stack no less than 3.3 m high	W6378/2020/1 Schedule 1: Maps Figure 1 : D1 to D3
3.	2 x 2 MWe Battery Energy Storage System	NA
4.	70 kL self-bunded diesel tank	W6378/2020/1 Schedule 1: Maps Figure 1 : Self Bunded Diesel Tank
5.	10 kL self-bunded waste oil tank	W6378/2020/1 Schedule 1: Maps Figure 1 : Self Bunded W/Oil Tank
6.	Bunded and covered hydrocarbon storage area containing no more than eight 1000 L intermediate bulk containers	W6378/2020/1 Schedule 1: Maps Figure 1 : Covered and Bunded Hydrocarbon Store
7.	Oil water separator system Ultraspin OS35 a to treat water to <5 mg/L total recoverable hydrocarbons and discharges to SPEL Puraceptor	W6378/2020/1 Schedule 1: Maps Figure 1 : Ultraspin Oily Water Separator and SPEL Puraceptor
8.	Stormwater leach drain 12 m long	W6378/2020/1 Schedule 1: Maps Figure 1 : Leach Drain

Other infrastructure which will be constructed on the premises which is not within the scope of category 52 activities includes transformers, switchrooms, workshop, stores, office and battery energy storage systems.

4.5 Exclusions to the assessment

Potential emissions and discharges associated with the decommissioning and demolition of the existing Horizon Power depot have been excluded from the scope of this assessment as this activity is not directly related to the prescribed premises category

5. Legislative context

5.1 Part V of the EP Act

5.1.1 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.

6. Modelling data

6.1 Air Quality Impact Assessment

Golder Associates Pty Ltd (Golder) supplied an Air Quality Impact Assessment (AQIA) with the application and submitted a revised Air Quality Impact Assessment (AQIA) in July 2020 .

In the AQIA, Golder considered emissions of nitrogen dioxide (NO_2), carbon monoxide (CO), formaldehyde (HCHO) and particulate matter that is smaller than 10 microns (µm) in diameter (PM_{10}) from the Premises under two scenarios:

- Scenario one: operation of nine gas generators operating 24 hours a day, seven days a week at 100% load.
- Scenario two: operation of three emergency diesel generators operating 24 hours a day, seven days a week at 100% load.

The AQIA considered generator emissions alone and cumulatively. The AQIA used the 75th percentiles of the 2016, 2017 and 2018 monitoring data from Albany (PM_{10}) and South Lake (NO_2 and CO) as the background concentrations. Albany and South Lake were used as proxies for the Esperance region as there are no publicly available records of NO_2, CO or PM_{10} air concentrations.

Golder modelled the ambient air quality at the following seven receptors. Ground level concentrations for receptor 6 and receptor 7 were not reported as they correspond to industrial receptors rather than sensitive receptors.

Table 5: Modelled air quality sensitive receptors

Receptor ID	Description	Distance from Premises (m)
1	Residential area – Brazier Street	780 m southeast
2	Esperance Hospital	1100 m southeast
3	Residential area – Symons Street	790 m south-southwest
4	Residential area – Kalgoorlie Streett	900 m south-southwest
5	Caravan Park – Norseman Avenue	1600 m east
6	Industrial building	80 m north-east
7	Industrial building	130 m south-east

Modelled ground level concentrations (GLCs) of the target pollutants were compared with the standards for pollutants in the National Environmental Protection (Ambient Air) Measure (NEPM) and the National Environmental Protection (Ambient Air) Measure (NEPM (Air Toxics).

The model results indicated that the predicted GLCs associated with emissions from the Premises will comply with the relevant criteria at all sensitive receptors under Scenario one and two when assessed individually and cumulatively with background concentrations. In most cases, the emissions from the Premises make up a small proportion of the cumulative emissions, with existing background concentrations being significantly higher.

A summary of the model results for Scenario one are provided in Table 6. The modelled results for Scenario two are similar, although slightly higher than, Scenario one.

Table 6: Scenario 1 – predicted NO_2, CO, PM_{10} and HCHO results at sensitive receptors

Contaminant	Averaging period	Sensitive receptor	Maximum GLC (µg/m³)	Background (µg/m³)	Cumulative GLC (µg/m³)	Criteria (µg/m³)[1]	% criteria
NO_2	1 hour	1	13	40	53	226	23.4
		2	11		51		22.5
		3	14		54		23.8
		4	13		53		23.4
		5	11		51		22.5
	Annual	1	0.28	29	29	56	51.8
		2	0.17		29		51.8
		3	0.19		29		51.8
		4	0.34		29		51.8
		5	0.074		29		51.8
CO	8 hour	1	110	530	640	10,310	6.2
		2	72		600		5.8
		3	na		na		na
		4	100		640		6.2
		5	41		570		5.5
PM_{10}	24 hour	1	1.6	20	22	50	44
		2	0.96		21		42
		3	0.79		21		42
		4	1.1		21		42
		5	0.37		20		40
	Annual	1	0.077	16	16	25	64
		2	0.046		16		64
		3	0.053		16		64
		4	0.092		16		64
		5	0.02		16		64
HCHO	1 hour	1	16	1	17	98[2]	17.3
		2	14		15		15.3
		3	17		18		18.4
		4	16		17		17.3
		5	14		15		15.3

Note 1: At ambient conditions (25°C, 101.325kPA).

Note 2: The one hour criteria was derived from NEPM Air Toxics 24 hour monitoring investigation levels

6.1.1 Review of the Air Quality Impact Assessment

The AQIA was reviewed by the Air Quality Services branch at DWER. The review concluded that the inputs, assumptions and conclusions of the AQIA are reasonable and that the modelling represents conservative predictions of air quality.

6.2 Noise Impact Assessment

Golder prepared a Noise Impact Assessment (NIA) in March 2020. The NIA was provided in the application for this works approval.

The NIA used the CadnaA model to predict noise emissions from the premises using the following assumptions:

- temperature 10 °C;
- 70% humidity;
- 3 m/s wind speed in the direction of receptors;
- no use of noise attenuation equipment such as barriers, buildings or foliage; and
- ground absorption coefficient of 0.

Two scenarios were modelled:

- Scenario one: nine gas generators running 24 hours a day, seven days a week at 100 % capacity.
- Scenario two: three diesel generators running 24 hours a day, seven days a week at 100 % capacity.

Scenario two results will not be discussed here as the emissions and discharges from the emergency diesel generators are not assessed.

The NIA considered the noise emissions cumulatively with existing background noise. Background noise was based on noise monitoring results for the Port of Esperance for the 2016/2017 year. The model identified seven receptors as listed in Table 7 .

Table 7: Modelled noise sensitive receptors

Receptor ID	Description	Distance from Premises
1	Residential area – Brazier Street	780 m southeast
2	Esperance Hospital	1100 m southeast
3	Residential area – Symons Street	790 m south-southwest
4	Residential area – Kalgoorlie Street	900 m south-southwest
5	Caravan Park – Norseman Avenue	1600 m east
6	Industrial building	80 m north
7	Industrial building	130 m southeast

Model results were compared with the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations). As the Premises will operate 24 hours per day, the Premises must comply with the lowest applicable assigned level (i.e. assigned levels applicable at night).

Results indicated noise received by receptors would comply with the Noise Regulations under both operating scenarios. It is noted that the criteria may be at risk of being exceeded at receptors two and three under Scenario one.

The model results indicated noise received at sensitive receptors in Scenario two are reflective of Scenario one. A summary of results is presented in Table 8.

Table 8: Predicted noise levels (dB(A)) when nine gas generators are operating

Receptor	Background noise level L_{A90} dB(A)	Maximum predicted noise level from Premises dB(A)	Resultant noise level dB(A)	Noise criteria (Assigned level) L_{A10} dB(A)
1	33	31	38	42
2		28	36	38
3		27	36	37
4		29	36	42
5		20	34	39
6		51	56	65
7		50	56	65

6.2.1 Review of the Noise Impact Assessment

The NIA was reviewed by the Environmental Noise branch at DWER. The reviewed concluded the methodology of the NIA appeared to be mostly correct, however noted that the sound power level for the generator set may have been misinterpreted and significantly underestimated the specified sound pressure level of 85 dB(A) at 1 m for the gas –fired generator set and 83 dB(A) at 1 m for the diesel-fired generator set refer to a location 1 m from the generator enclosure's surface, not the geometric center of the generator. The use of spherical propagation for calculating sound power level from sound pressure level at a set distance is only applicable when the source can be treated as a point source at 1 m distance from them.

Due to the risk that noise levels may have been underestimated, it was recommended that the Applicant conduct a noise verification study during commissioning, and that noise mitigation measures be implemented if the verification study identifies non-compliance with the assigned noise levels.

7. Consultation

The Shire of Esperance was contacted on 7 April 2020 to seek comment on the proposed works approval W6378/2020/1. No comments were provided.

The application was advertised online via DWER's website on 3 April 2020. No comments were received.

8. Location and siting

8.1 Siting context

The Premises is in Chadwick, an industrial suburb in the Shire of Esperance. The lot is zoned for infrastructure services and the surrounding area is zoned for general industry and reserves. The surrounding industry include a freight depot, fertiliser supplier and a trailer manufacturer.

8.2 Residential and sensitive receptors

The distances to residential and sensitive receptors are detailed in Table 9.

Table 9: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Esperance residential suburb	735 m south east of the Premises boundary
Nulsen residential suburb	750 m south west of the Premises boundary

8.3 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 10.

Table 10: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental value
Esperance water reserve	Generally located to the south west of the premises. At is closest points the boundary of the proclaimed area is 110 m west (cross gradient) and around 500m south (down gradient) of the premises. Contaminated sites investigations undertaken in the surrounding area indicate groundwater flow to be south, south-east (Golder 2020).	Public drinking water source area proclaimed under the *Country Areas Water Supply Act 1947*. Groundwater is drawn from a shallow unconfined aquifer which is highly vulnerable to contamination, as the only drinking water source for Esperance (DoW 2007).
Rights in Water and Irrigation Act 1914 Esperance Groundwater Area	Covers the premises Regional water table varies from over 20 m below ground level to 2 m below ground level (based on information within works approval application W6378/2020/1). Contaminated sites investigations undertaken in the surrounding area indicate groundwater flow to be south, south-east (Golder 2020). There are no known active wells located within 1km of Premises and no bores on site.	Groundwater area covers an area 350 km^2 including townships and farming land.

8.4 Meteorology

8.4.1 Wind direction and strength

The average morning (9 am) wind speed in summer is 19.4 km/h and is predominately from the south east. The afternoon (3 pm) wind speed in summer is shown to increase by 10 km/h to approximately 29 km/h also prevailing from the south east. In the winter months, morning and afternoon wind speeds stay around 20 km/h and are predominately from the west to northwest directions (BoM 2020).

8.4.2 Rainfall and temperature

Esperance experiences a Mediterranean type climate characterised by warm, dry summers and cool, wet winters. The mean winter rainfall is 85.6 mm per month, more than twice the mean monthly rainfall during summer months (23 mm) (BoM 2020).

9. Risk assessment

9.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

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. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 11 and Table 12.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 11 and Table 12 below.

Table 11. Identification of emissions, pathway and receptors during construction

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Construction, mobilisation and positioning of infrastructure	Earthworks	Noise	Residential suburbs (735 m SE and 750 m SW).	Air / wind dispersion	Amenity impacts.	No	Noise Regulations apply at all times
		Dust	Residential suburbs (735 m SE and 750 m SW).	Air / wind dispersion	Public health and amenity impacts.	No	Applicant controls are sufficient: (water carts, avoid dusty work on windy days, routine visual checks and complaints management system). Short term nature of construction works.

Table 12: Identification of emissions, pathway and receptors during operation

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Operation of gas generators	Operation of gas generators	Air emissions (NO_2, CO, PM_{10} and HCHO)	Residential suburbs (735 m SE and 750 m SW).	Air / wind dispersion	Public health and amenity impacts.	Yes	Refer to section 9.4
		Noise	Residential suburbs (735 m SE and 750 m SW).	Air / wind dispersion	Public health and amenity impacts.	Yes	Refer to section 9.5
Operation of diesel generators	Operation of diesel generators	Air emissions (NO_2, CO, SO_2 and PM_{10})	Residential suburbs (735 m SE and 750 m SW).	Air / wind dispersion	Public health and amenity impacts.	No	Applicant controls restrict use to approximately 50 hours per year for maintenance and upkeep or for backup when there is interruption to gas supply. Modelling of the emissions to air indicates no material change to the risk profile when compared with gas generation.
		Noise	Residential suburbs (735 m SE and 750 m SW).	Air / wind dispersion	Public health and amenity impacts.	No	Diesel generators will be constructed within acoustic containers with exhaust silencers to minimise noise. Applicant controls restrict use to approximately 50 hours per year for maintenance and upkeep or for backup when there is interruption to gas supply. Noise modelling indicates no material change to the risk profile when compared with gas generation.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Bulk storage of chemicals	Bulk storage of hydrocarbons (waste oil and diesel)	Breach of bulk storage of hydrocarbons (waste oil and diesel)	Public Drinking Water Source Areas (500 m south and down gradient). Esperance Groundwater area covers the Premises, but there are no known active bores within 1000 m of the premises. Depth to groundwater likely to be >2 m.	Direct discharge and infiltration through soil.	Groundwater contamination.	No	There is sufficient separation distance between the down gradient receptor and premises for the risk to the receptor to be low. Applicant controls are sufficient to minimise the likelihood of discharge to land occurring: (self bunded tanks, hydrocarbon containment area is covered and bunded in accordance with AS 1940.)
		Potentially contaminated stormwater	Public Drinking Water Source Areas (500 m south and down gradient). Esperance Groundwater area covers the Premises, but there are no known active bores within 1000 m of the premises. Depth to groundwater likely to be >2 m.	Direct discharge and infiltration through soil.	Groundwater contamination.	No	There is sufficient separation distance between the down gradient receptor and premises for the risk to the receptor to be low. Applicant controls are sufficient to minimise the likelihood of discharge or contaminated water to land: (self bunded tanks, hydrocarbon containment area is bunded also, potentially contaminated stormwater is treated in oil water separator before release). A limit of 5 mg/L total recoverable hydrocarbons will be placed on oil water separator discharge points, to ensure the quality of water discharged to land, with monitoring requirements to verify performance of the treatment system.

9.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 13 below.

Table 13: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 14 below.

Table 14: Risk criteria table

Likelihood		**Consequence**		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		**The following criteria has been used to determine the consequences of a Risk Event occurring:**		
			Environment	**Public health* and amenity (such as air and water quality, noise, and odour)**
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite impacts wider scale:** mid-level or above • Mid to long-term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite impacts wider scale**: low level • Short-term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

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

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

"onsite" means within the Prescribed Premises boundary.

9.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 15 below:

Table 15: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

9.4 Risk Assessment – Air emissions resulting in public health and amenity impacts

9.4.1 Description of air emissions resulting in public health and amenity impacts

Emissions of NO_2, CO, PM_{10} and HCHO from operation of the gas generators being released into the air and causing an adverse health impact to people outside the Premises.

9.4.2 Identification and general characterisation of emission

Natural gas will be combusted as the fuel source in gas generators. Operation of the gas generators will be frequent as they will be used as the primary power source. As modelled in the AQIA, gas combustion will primarily produce CO, NO_2, PM_{10} and HCHO. Emission rates per generator are presented in Table 16.

Table 16: Pollutant emission rates

Pollutant	Emission rates (g/s)
CO	1.33
NO_2	0.114
PM_{10}	0.031
HCHO	0.142

9.4.3 Description of potential adverse impact from the emission

NO_2

Short term exposure to increased levels of NO_2 may cause respiratory problems, particularly for people with existing respiratory diseases such as asthma.

NO_2 can also react with volatile organic compounds in the presence of sunlight to form photochemical smog and will dissolve in water to form nitrates and nitric acid.

CO

Exposure to CO at high concentrations for short periods may affect the amount of oxygen in the blood stream resulting in vital organs such as the brain, nervous tissues and heart not functioning properly. Common symptoms of exposure to high concentration of CO include fatigue, loss of concentration and dizziness. Children and babies are at greatest risk, as they are small and their organs are still developing.

PM_{10}

Fugitive dust emissions have the potential to impact human health and amenity. Dust exposure health risks are determined by particulate size, chemical composition of the particulates, mass concentration of the airborne particulates and duration of exposure.

In general terms, long-term repeated exposure to dust is more detrimental than sporadic short-term exposure.

Particulate matter greater in size than 10 µm is generally associated with nuisance or amenity impacts with a lower potential for health impacts as particles are typically trapped in the noise, mouth or throat. Smaller size particulate matter less than 10 µm in size typically pose a greater health risk due to the potential for it to be drawn deeper into the lungs.

Fugitive dust can cause nuisance or amenity impacts. Amenity values can be highly subjective and while dust has the potential to interfere with the convenience and comfort of people's lives, people have different levels of perception or tolerance for matters that impact amenity. Dust may also cause unreasonable amenity impacts if it results in excessive dust deposition settling on surfaces often causing soiling and discolouration, for example on fabrics (such as washing or house rooves).

HCHO

The critical human health effects related to acute exposure to formaldehyde are irritation of the eyes and upper respiratory tract. There is also some evidence formaldehyde exposure may cause cancers in humans and animals.

9.4.4 Criteria for assessment

Ambient air quality standards for NO_2, CO and PM_{10} in the NEPM are considered appropriate and summarised in Table 17.

Table 17: NEPM ambient air quality standards

Pollutant	Averaging period	Maximum concentration standard	Maximum allowable exceedances
Carbon monoxide	8 hours	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour	0.12 ppm	1 day a year
	1 year	0.03 ppm	None
Particles as PM_{10}	1 day	50 µg/m^3	None
	1 year	25 µg/m^3	None
Particles as $PM_{2.5}$	1 day	25 µg/m^3	None
	1 year	8 µg/m^3	None

Air toxics monitoring investigation levels for HCHO in the NEPM (Air Toxics) are considered appropriate and summarized in Table 18.

Table 18: NEPM (Air Toxics) air toxics monitoring investigation levels

Pollutant	Averaging period	Monitoring investigation level
HCHO	24 hours[1]	0.04 ppm

Note 1: For the purposes of this ensure monitoring over a 24 hour period is to be conducted from midnight to midnight.

9.4.5 Applicant controls

This assessment has reviewed the Applicant controls set out in Table 19 below.

Table 19: Applicant's proposed controls for air emissions resulting in public health impacts.

Site infrastructure	Description	Operation details
Controls for CO, NO_2 and PM_{10}		
Gas generators	Eleven gas generators with a maximum combined supply capacity of 22 MWe. Selection of modern contemporary generators with high efficiency and low emissions profile.	Only nine generators will be operating at any time (except during maintenance, start up or shut down activities). Implementation of the manufacturers recommended maintenance schedule. Stacks are 8.6 m tall and 0.56 m in diameter with a velocity of 25 m/s. Air monitoring will be completed after generator start-up to confirm design parameters in modelling are correct and to obtain a baseline. Noise monitoring will be completed after generator start-up to confirm design parameters in modelling are correct and to obtain a baseline.

9.4.6 Consequence of air emissions resulting in public health and amenity impacts

Considering the information above, including the review of the AQIA and Applicant controls, the Delegated Officer has determined the consequence of emissions to air as follows:

NO_2:

NO_2 emissions from the gas generators will meet the NEPM 1 hour and annual standards when considered separately and cumulatively with existing background concentrations.

The Delegated Officer has therefore determined the consequence of NO_2 impacting on the health of receptors as **slight**.

CO:

CO emissions from the gas generators will meet the NEPM 8 hour standard when considered separately and cumulatively with existing background concentrations.

The Delegated Officer has therefore determined the consequence of CO impacting on the health of receptors as **slight**.

PM_{10}:

PM_{10} emissions from the gas generators are likely to meet the NEPM 24 hour and annual standard when considered separately and cumulatively with existing background concentrations.

The Delegated Officer has therefore determined the consequence of PM_{10} impacting on the health of receptors as **slight**.

HCHO:

HCHO emissions from the gas generators will meet the NEPM (Air Toxics) 1 hour monitoring investigation level when considered separately and cumulatively with existing background concentrations.

The Delegated Officer has therefore determined the consequence of HCHO impacting on the health of receptors as **slight**.

9.4.7 Likelihood of air emissions resulting in public health and amenity impacts

Considering the information above, including the review of the AQIA and Applicant controls, the Delegated Officer has determined the likelihood of emissions to air as follows:

NO_2:

NO_2 emissions from the gas generators may only exceed the NEPM 1 hour and annual standards in exceptional circumstances.

The Delegated Officer has therefore determined the likelihood of NO_2 impacting on the health of receptors as **rare**.

CO:

CO emissions from the gas generators may only exceed the NEPM 8 hour standard in exceptional circumstances.

The Delegated Officer has therefore determined the likelihood of CO impacting on the health of receptors as **rare**.

PM_{10}:

PM_{10} emissions from the gas generators may only exceed the NEPM 24 hour and annual standards in exceptional circumstances.

The Delegated Officer has therefore determined the likelihood of PM_{10} impacting on the health of receptors as **rare**.

HCHO:

HCHO emissions from the gas generators may only exceed the NEPM (Air Toxics) 1 hour and annual standards in exceptional circumstances.

The Delegated Officer has therefore determined the likelihood of HCHO impacting on the health of receptors as **rare**.

9.4.8 Overall rating of air emissions resulting in public health and amenity impacts

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix Table 13 and determined that the overall rating emissions to air as follows:

NO_2:

The Delegated Officer determined the consequence of NO_2 impacting the health of receptors as slight and the likelihood a of NO_2 emissions exceeding the NEPM as rare.

The Delegated Officer has therefore determined the overall risk rating of NO_2 emissions to air impacting on the health of receptors as **low**.

CO:

The Delegated Officer determined the consequence of CO impacting the health of receptors as slight and the likelihood a of CO emissions exceeding the NEPM as rare.

The Delegated Officer has therefore determined the overall risk rating of CO emissions to air impacting on the health of receptors as **low**.

PM_{10}:

The Delegated Officer determined the consequence of PM_{10} impacting the health of receptors as slight and the likelihood a of PM_{10} emissions exceeding the NEPM as rare.

The Delegated Officer has therefore determined the overall risk rating of PM_{10} emissions to air impacting on the health of receptors as **low**.

HCHO:

The Delegated Officer determined the consequence of HCHO impacting the health of receptors as slight and the likelihood a of HCHO emissions exceeding the NEPM (Air Toxics) as rare.

The Delegated Officer has therefore determined the overall risk rating of HCHO emissions to air impacting on the health of receptors as **low**.

9.5 Risk Assessment – noise emissions resulting in amenity impacts for residents

9.5.1 Description of noise emissions resulting in amenity impacts for residents

Noise is emitted from the Premises as a result of the operation of gas and diesel generators. Noise from the Premises may impact the amenity of people living in nearby residential suburbs.

9.5.2 Identification and general characterisation of emission

Noise emissions will be generated from the use of gas generators to produce electrical power. Gas generators will be operated 24 hours a day, 365 days a year as they will be used as the primary power source.

9.5.3 Description of potential adverse impact from the emission

Potential adverse impacts from noise emissions include degradation of local comfort and amenity in the residential suburbs of Esperance and Nulsen.

9.5.4 Criteria for assessment

The relevant criteria for assessing noise emissions are the Noise Regulations. Noise Regulation 7 outlines the prescribed standard for noise emissions at any Premises or public space. Noise Regulation 8 specifies assigned level of noise that must not be exceeded for a range of Premises at certain times of the day.

9.5.5 Applicant controls

This assessment has reviewed the Applicant's controls set out in Table 20 below.

Table 20: Applicant's proposed controls for noise emissions resulting in amenity impacts.

Site infrastructure	Description	Operation details
Controls for Noise		
Gas generators	Eleven gas generators with a maximum combined supply capacity of 22 MWe	Each gas generator will be stored in an individual, enclosed acoustic container. The container is fitted with exhaust silencers to give a resulted sound pressure of 85 dB(A) at 1 m.

9.5.6 Consequence

Noting that a review of the NIA identified that noise levels may have been underestimated (refer to section 6.2.1), the Delegated Officer has determined that noise emissions from the Premises when combined with existing background are at risk of exceeding the Noise Regulations. Therefore, the Delegated Officer considers the consequence of noise emissions to be **moderate**.

9.5.7 Likelihood of risk event

The Delegated Officer has determined that noise emissions exceeding the assigned level received at a sensitive receptor will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of noise emissions exceeding the Noise Regulations to be **unlikely**.

9.5.8 Overall impact rating of noise emissions to air resulting in public amenity impacts

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix Table 13 and determined that the overall rating of noise emissions to air resulting in public amenity impacts as **medium**.

9.6 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 21 below. Controls are described further in section 11.

Table 21: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
1.	NO_2, CO, PM_{10} and HCHO	Operation of gas generators	Air/wind to sensitive receptor causing health and amenity impacts	Gas generators will be modern generators with high efficiency and low emissions profile.	Slight consequence Rare likelihood **Low Risk**	Acceptable subject to regulatory controls
2.	Noise	Operation of gas and diesel generators	Air/wind to sensitive receptor causing amenity impacts	Each gas generator will be stored in an individual, enclosed acoustic container. The container is fitted with exhaust silencers.	Moderate consequence Unlikely likelihood **Medium risk**	Acceptable subject to regulatory controls

10. Regulatory controls

A summary of regulatory controls determined to be appropriate for the Risk Event is set out in Table 22. The risks are set out in the assessment in section 9 and the controls are detailed in this section. DWER will determine controls having regard to the adequacy of controls proposed by the Applicant. The conditions of the Works Approval will be set to give effect to the determined regulatory controls.

Table 22: Summary of regulatory controls to be applied

		10.1.1 Infrastructure and equipment	10.1.2 Infrastructure and equipment	10.1.3 Infrastructure and equipment	10.1.4 Time limited operations	10.1.5 Monitoring	10.1.6 Reports
Risk Items (see risk analysis in section 9)	1. Air emissions from operations	●			●	●	●
	2. Noise from infrastructure and operations	●			●	●	●
	3. Potentially contaminated stormwater		●		●	●	●
	4. Hydrocarbon storage			●	●		●

10.1 Works Approval controls

10.1.1 Air quality and noise infrastructure and equipment

The generators are required to be installed in accordance with the application documents, particularly in regard to:

- siting,
- number and capacity of generators,
- stack heights and
- noise emission controls.

10.1.2 Stormwater infrastructure and equipment

Stormwater drains to be constructed and an oil water separator will be installed for stormwater management at the power station are included as required infrastructure in the Works Approval.

10.1.3 Hydrocarbon storage infrastructure and equipment

Hydrocarbon storage area to be constructed with covering and bunding in accordance with AS 1940 will be included as required infrastructure in the Works Approval.

10.1.4 Time limited operations

Time limited operation of the power station is permitted under the Works Approval for a period of 180 calendar days subject to conditions.

Noise verification will be required during time limited operations pursuant to Environmental Noise Branch's review of the NIA to confirm compliance with the Noise Regulations.

Operation of the power station will be limited to nine gas generators to ensure the electricity generation is limited to reflect the assumed capacity in the AQIA and NIA.

10.1.5 Monitoring

Once off air quality monitoring for NO_x, CO and HCHO is required during time limited operations under the Works Approval to verify the accuracy of emission rates used for modelling predictions.

Monitoring of the oil water separator discharge is required during time limited operations phases to confirm the ability of the system to comply with the total recoverable hydrocarbon limit.

10.1.6 Reporting

An Environmental Compliance Report must be submitted to the CEO 30 days after construction is complete. A report is also required to be submitted within 60 days of the completion of time limited operations containing results of monitoring undertaken in accordance with the Works Approval.

10.2 Licence controls

The following controls will be considered as conditions on the future Licence to manage the risk of emissions during operation of the Premises. Finalisation of Licence controls/conditions is subject to the Applicant's compliance with the conditions of the Works Approval, assessment of the Licence application, and any additional information that becomes available to further inform the risk assessment.

10.2.1 Prescribed Premises details

The Licence will detail the approved Prescribed Premises boundary and the Prescribed Premises category, including approved designed capacities for relevant infrastructure. A treated stormwater discharge limit of 5 mg/L total petroleum hydrocarbons will be applied in line with the design specification of the oily water separator. Ongoing air quality and wastewater monitoring will be considered.

10.2.2 Reporting

The Licence will require the submission of an Annual Audit Compliance Report and Annual Environmental Report.

11. Determination of Works Approval conditions

The conditions in the issued Works Approval in Attachment 1 have been determined in accordance with the *Guidance Statement: Setting Conditions*.

The *Guidance Statement: Licence Duration* has been applied and the issued Works Approval expires in 5 years from date of issue.

Table 23 provides a summary of the conditions to be applied to this works approval.

Table 23: Summary of conditions to be applied

Condition Ref	Grounds
Infrastructure and Equipment Condition 1	These conditions are valid, risk-based and contain appropriate controls.
Environmental Compliance Condition 2 and 3	Environmental compliance is a valid, risk-based condition to ensure appropriate linkage between the Works Approval and the EP Act.
Time limited operations Condition 4 to 18	These conditions are valid, risk-based and consistent with the EP Act.
Information 19 to 21	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

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 works approval under the EP Act.

12. Applicant's comments

The Applicant was provided with the draft Decision Report and draft Works Approval on 4 September 2020. The Applicant provided comments which are summarised, along with DWER's response, in Appendix 2.

13. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1).

Based on this assessment, it has been determined that the Works Approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Amine Fisher
A/Manager, Process Industries
Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	BoM, April 2020. *Climate Statistics for Australia Summary Statistics Esperance*. Bureau of Meteorology, Canberra.	BoM 2020	accessed at www.bom.gov.au
2.	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	DER 2015a	accessed at www.dwer.wa.gov.au
3.	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER 2015b	
4.	DER, November 2016. *Guidance Statement: Environmental Siting*. Department of Environment Regulation, Perth.	DER 2016	
5.	DER, February 2017. *Guidance Statement: Land Use Planning.* Department of Environment Regulation, Perth.	DER 2017a	
6.	DER, February 2017. *Guidance Statement: Risk Assessments.* Department of Environment Regulation, Perth.	DER 2017b	
7.	DoW, May 2007. *Esperance Groundwater Management Plan*. Department of Water, Perth.	DoW 2007	
8.	DWER, June 2019. *Guideline: Decision Making.* Department of Water and Environmental Regulation, Perth.	DWER 2019a	
9.	DWER, June 2019. *Guideline: Industry Regulation Guide to Licensing.* Department of Water and Environmental Regulation, Perth.	DWER 2019b	
10.	DWER, October 2019. *Draft Guideline: Air Emissions.* Department of Water and Environmental Regulation, Perth.	DWER 2019c	
11.	EPA, New South Wales 2016. *Approved methods for the modelling and assessment of air pollutants in New South Wales*, Department of Environment and Conservation, Sydney.	NSW EPA 2016	Accessed at www.epa.nsw.gov.au
12.	Golder, 2020. *Air Quality Impact Assessment Gas-fired Power Station – Esperance, Western Australia*, Golder Associates Pty Ltd, Richmond.	AQIA	DWER records A1919039
13.	Golder, 2020. *Noise Impact Assessment Gas-fired Power Station – Esperance, Western Australia*, Golder Associates Pty Ltd, Richmond.	NIA	DWER records A1918136

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of Applicant comment	DWER response
Condition 1, Table 1	Applicant provided information requested by DWER	Information has been included in the works approval
Condition 6, Table 2	Applicant requested condition read as "Gas generator output not to exceed 18 MWe." or "No more than nine generators in operation in steady state at one time".	In order to clarify requirements DWER has updated the condition to "No more than nine generators operating at one time excluding during start up, shut down and maintenance activities"
Condition 7, Table 3	Applicant provided information requested by DWER	Information has been included in the works approval
Schedule 1	Applicant provided information requested by DWER	Information has been included in the works approval

Attachment 1: Issued Works Approval