



Application for Works Approval

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

Works Approval Number W6796/2023/1

Applicant Australian Nickel Investments Pty Ltd

ACN 111 599 323

File number DER2023/000166

Premises Cosmos Nickel Operations
Goldfields Highway
SIR SAMUEL WA 6437

Legal description -
Mining tenements M36/371

Date of report 13 September 2023

Decision Works approval granted

Amine Fisher

A/Manager Process Industries

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of additional power generation infrastructure at the existing power station located at the Cosmos Nickel Operations (the premises). As a result of this assessment, works approval W6796/2023/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at [DWER Regulatory documents | Western Australian Government \(www.wa.gov.au\)](https://www.wa.gov.au/government/publications/dwer-regulatory-documents).

2.2 Application summary

On 2 March 2023, the Australian Nickel Investments Pty Ltd (the applicant) submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works, commissioning and time limited operations relating to the expansion of the existing power station at the Cosmos Nickel Operations. The expansion includes addition of six diesel generators at the premises which operates under Licence L7404/1999/9. The premises is approximately 41 km south-east of Leinster.

The current Cosmos power station consists of 11 dual fuel (diesel/natural gas) engine generators being Cummins 11kV KTA 50-G3 850 kW and one diesel fuel engine generator being a Cummins 2,000 KW QSK78 with a combined maximum generating capacity of 12.5 MW. The expansion will include the installation of six additional Cummins QSK78 diesel generators which when operational will bring the total maximum generating capacity to 24.5 MW. The proposal also includes expansion of the existing powerhouse building to house the six additional generators and will include space for future expansion if required.

The expanded powerhouse building will feature a fabricated high air flow steel engine hall which includes exhaust and air intake systems and cooling systems. The powerhouse building will be installed on a fully bunded concrete hardstand with a services trench which drains into an oily water separator at the existing power station. The layout of the existing power station and proposed expansion is illustrated in Schedule 1 of the issued works approval. Native vegetation clearing of <0.1 hectares will be required for the proposed expansion. The clearing is authorised by clearing permit CPS 7914/3 held by the applicant, therefore is not within the scope of the application.

The Cosmos power station was previously expanded in 2022 under works approval W6571/2021/1. This expansion included the installation of three reciprocating dual fuel engine generators and one continuous diesel fuel engine generator. Natural gas for the dual fuel generators is sourced from the Cosmos lateral gas pipeline while diesel is sourced from the Cosmos diesel storage facility that regularly receives diesel deliveries. The existing diesel storage facility and lubrication storage infrastructure will provide supply to the expansion.

The applicant advised that the power station expansion is an interim power solution for the Cosmos Nickel Operation, as a bridge to a life of mine hybrid renewable power station (solar, wind and battery energy storage system). A decarbonisation strategy for the Cosmos Project has been developed with the intention that the Cosmos Nickel Operation will transition to 80% renewables penetration by 2026.

The works approval premises relates to Category 52: Electrical power generation and the assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6796/2023/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W6796/2023/1.

2.3 Air quality impact assessment

The department requested the applicant to undertake an air quality impact assessment to inform the risk assessment of air quality impacts on the basis that the nearest receptor (Bellevue Gold accommodation camp) would be approximately 2.2 km from the power station, and a screening assessment based predicted emission rates determined air emissions were not insignificant.

An initial round of modelling predicted maximum ground level concentrations (GLC) of nitrogen dioxide (NO_x) at 129% of the 1-hour *National Environmental Protection (Ambient Air Quality) Measure* (NEPM) at the nearest sensitive receptor standard and for 99% of 1-hour NEPM standard for sulfur dioxide (SO₂) at the accommodation camp. The modelling considered a worst case scenario with 18 generators operating and emission rates for the generators based on operating less efficiently at low loads.

The applicant submitted a revised modelling and air quality assessment which took into the proposed operational philosophy of operating the generators at maximum capacity when required, and activation/deactivation based on specific power requirements to avoid operation at less efficient low loads. Additionally, the number of generators operating was reduced to 14 for the revised model. This was based upon development of a power demand model to determine the number and type of generators required to meet demand over the mine site upgrade. The model showed a maximum of 14 generators are likely to operate at any one time. Table 1 shows the expected operation of generators over time. The worst case predicted GLCs based on the revised modelling at the nearest receptor (Bellevue Gold accommodation camp) are summarised in

Table 2 with comparison to relevant NEPM criteria.

Table 1: Predicted generator requirements

Generator	Number of generators operational											
	Jul 23	Aug 23	Sept 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun to Dec 24
KTA50	7	10	11	11	3	3	4	6	8	7	7	8
QSK78	0	0	0	0	6	6	6	6	6	6	6	6
Total Max	7	10	11	11	9	9	10	12	14	13	13	14

Table 2: Predicted GLC for Each Pollutant at Bellevue Accommodation Camp

Pollutant	Averaging period	NEPM Criteria ($\mu\text{g}/\text{m}^3$)	Maximum predicted GLC in isolation ($\mu\text{g}/\text{m}^3$)	% of criteria in isolation	Background concentration ($\mu\text{g}/\text{m}^3$)	Maximum predicted cumulative GLC	% of criteria cumulative
CO	1 hour	30,000	273.86	1%	114.06	387.91	1%
	8 hour	10,310	138.09	1%	90.76	228.85	2%
NO ₂	1 hour	151	143.09	95%	0.88	143.97	95%
	Annual	28	8.96	32%	0.60	9.56	34%
TPM as PM _{2.5}	24 hour	25	0.44	2%	11.88	12.32	49%
	Annual	8	0.05	1%	9.32	9.37	117%
SO ₂	1 hour	262	36.92	14%	0.10	37.02	14%
	24 hour	52	6.44	12%	0.09	6.54	13%
	Annual	52	0.46	1%	0.10	0.74	1%

Total Particulate Matter (TPM as PM_{2.5})

Cumulative GLC are predicted to be less than 50% of the 1-hour average PM_{2.5} NEPM criteria. Cumulative assessment predicts GLC will exceed the annual PM_{2.5} NEPM criteria however it is noted that background levels in isolation exceed the criteria, and the contribution of the emissions from the power station is insignificant (<1%).

Nitrogen Dioxide (NO₂)

The maximum GLC is predicted to be 144 $\mu\text{g}/\text{m}^3$ or 95% of the 1-hour average NO₂ NEPM criteria. GLC are predicted to be well within the annual NO₂ NEPM criteria, at 34% of the criteria.

Due to the maximum predicted GLC closely approaching the NEPM criteria additional analysis was completed for the predicted 99.9th, 99.5th and 99th percentile 1-hour average GLC which were 135 $\mu\text{g}/\text{m}^3$ (89%), 112 $\mu\text{g}/\text{m}^3$ (74%) and 107 $\mu\text{g}/\text{m}^3$ (71%) respectively. This indicates that the frequency of the absolute maximum predicted value occurring is relatively low.

Sulphur Dioxide (SO₂)

Cumulative predicted GLC for SO₂ for all averaging periods were less than 15% of the relevant criteria. It is also expected that SO₂ levels will drop with the greater use of the QSK78 generators in the future.

DWER Technical Review

DWER reviewed the revised air quality modelling and found it appropriate and consistent with the department's *Air quality guidance note* (2006) therefore is suitable to inform the assessment of air quality impact. No issues were identified with:

- emissions and secondary pollutants;
- emission estimates;
- contour plots;

- cumulative impacts;
- models used;
- meteorological data; or,
- scenarios

To aid the analysis the department conducted its own AERMOD dispersion modelling scenario with an assumption that all 18 generators were running. This results in an approximate 10% increase in the predicted maximum 1-hour NO₂ GLC which is sufficient to push the 1-hour NO₂ over the NEPM criteria.

3. Risk assessment

The department assesses the risk of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

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

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this decision report are detailed in Table 3 below. Table 3 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 3: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Installation of six new diesel power generators and associated equipment including vehicle movements	Air / windborne pathway	<ul style="list-style-type: none"> • No specific controls proposed.
Noise			
Operation			
Noise	Commissioning and operation of new power generators	Air / windborne pathway	<ul style="list-style-type: none"> • No specific controls proposed • Generators and diesel engines will be maintained and serviced on a regular basis according to manufacturer's specifications to minimise emissions; • Low sulphur diesel will be used in equipment and generators. • A maximum of 14 generators operating at any one time.
Air emissions (CO, NO _x , SO ₂ , CO ₂ , Particulate matter)			

Emission	Sources	Potential pathways	Proposed controls
			<ul style="list-style-type: none"> The operational philosophy will be to operate generators at maximum capacity when required, and activation/deactivation based on specific power requirements to avoid operation at less efficient low loads where possible. Confirmation emission testing during commissioning to confirm generators operating within expected emission ranges (+-25%).
Hydrocarbons (containment breach)		Infiltration	<ul style="list-style-type: none"> Power generators will be installed within an expanded powerhouse that has a services trench which drains into an oily water separator.
Contaminated stormwater		Overland runoff potentially causing ecosystem disturbance or impacting surface water	<ul style="list-style-type: none"> The expanded powerhouse building will have a concrete hardstand that is fully bunded, and drains to the services trench. Soil contaminated by hydrocarbons will be treated in-situ, at the bioremediation pad or transported offsite to a controlled waste licensed facility for treatment.

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 4 and Figure 1 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

Table 4: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Bellevue Gold accommodation camp	Approximately 2.2 km southwest of the Power station.
Yakabindie Pastoral Station (Homestead)	Approximately 4.5 km northwest of the powerstation.
Environmental receptors	Distance from prescribed activity
Environmentally Sensitive Areas	Wanjarri Wildlife Sanctuary is located 14 km northeast of the power station.
Priority Flora	<i>Grevillea inconspicua</i> (P4) located approximately 9km northwest of power station.

Priority Fauna	<p><i>Dasyercus blythi</i> (brush-tailed mulgara) (P4) has been recorded (2004) 8.6km northeast of the power station.</p> <p><i>Kwonkan moriartii</i> (Moriarty's trapdoor spider) (P2) has been recorded (1962) 11.2 km north of the power station.</p>
TECs/PECs	<p>The power station is located adjacent to (within the 500m buffer) Priority 1 Ecological Community - Violet Range – Violet Range (Perseverance Greenstone) Banded Ironstone Formation (BIF). A Level 1 flora survey conducted by PEK environmental (2017) identified that the four vegetation communities comprising this PEC are unlikely to be found within the prescribed premises boundary, as the survey area is located on colluvial sheet wash plains, sheet wash deposits and alluvial floodplains and is situated to the east of the Violet Range. In addition, no areas of BIF have been mapped within the Project area.</p> <p>Yakabindi Calcrete PEC (P1) is located 3.3 km west of the power station.</p> <p>Lake Miranda East Calcrete PEC (P1) is located 3.5 km southeast of the power station.</p>
DBCA Legislated Tenure – Nature Reserve	10 km northeast of the premises boundary – Wanjarri Nature Reserve
Surface hydrology	<p>3.81 km south of premises boundary – Lake Miranda</p> <p>Surface water drainage is generally to the south towards Lake Miranda.</p> <p>Yakabindie borefield located 10 km east of the power station.</p>

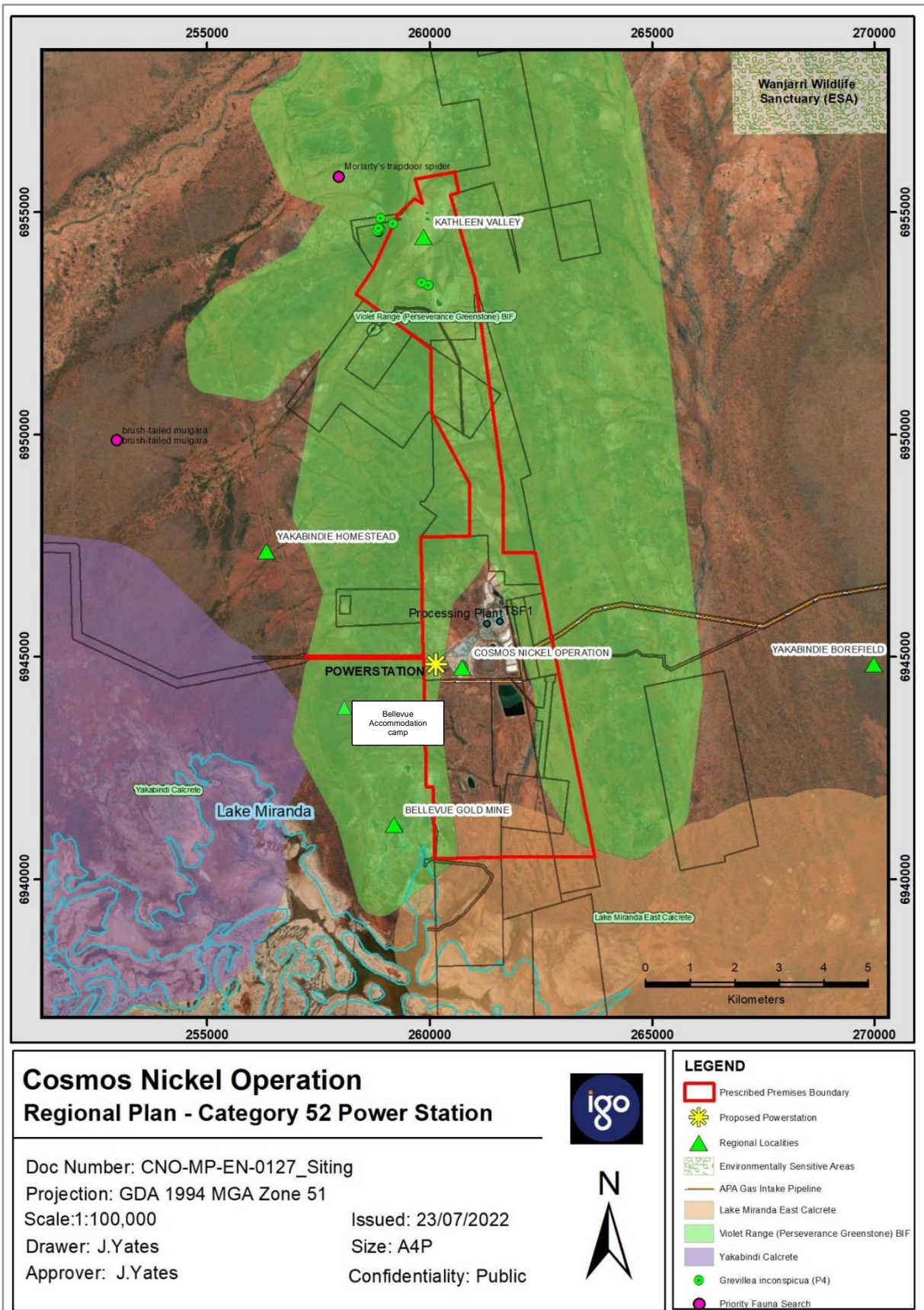


Figure 1: Distance to Sensitive Receptors

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

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

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 5.

Works approval W6796/2023/1 that accompanies this decision report authorises construction, commissioning and time-limited operations. The conditions in the issued works approval, as outlined in Table 5 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence amendment to L7404/1999/9 is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the expanded power station. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence application.

Table 5: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ^{2,3} of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Construction								
Installation of 6 new diesel power generators and associated equipment including vehicle movements (reversing beepers)	Dust	Air / windborne pathway causing impacts to health and amenity	Bellvue Gold accommodation camp ~ 2.2km southwest. Yakabindie Pastoral Station (Homestead) located approx. 5 km away.	None	C = Slight L = Possible Low risk	NA	NA	The delegated officer considers that given the nature of the works and the separation distance to the nearest receptor there is a low risk of noise and dust emissions impacting public health.
	Noise							
Commissioning and Time Limited Operations								
Commissioning and operation of power generators	Noise	Air / windborne pathway causing impacts to health and amenity	Bellvue Gold accommodation camp ~ 2.2km southwest. Yakabindie Pastoral Station (Homestead) located approx. 5 km away.	None	C = Slight L = Possible Low Risk	NA	NA	Delegated Officer considers that given the premises is located in a sparsely populated area, mining and related activities already occurring on the premises, and there being a separation distance of over 2 km to the nearest public receptor there is a low risk of impacting public amenity therefore specific controls relating to noise are not required. The applicant is required to comply with relevant provisions in the Environmental Protection (Noise) Regulations 1997.
	Air emissions (CO, NO _x , SO ₂ , CO ₂ , Particulate)	Air / windborne pathway causing						

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions of works approval ^{2,3}	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
	matter)	impacts to health and amenity			Medium Risk			determined it necessary to restrict operation of generators to no more than 14 at any one time to ensure NO ₂ emissions from the power station don't give rise to exceedance of NEPM at the nearest receptor. In addition, monitoring of the generators is considered necessary during the environmental commissioning and time limited operation phases to verify that generator emissions are consistent with modelling inputs. Requirements have therefore been included in the works approval for Australian Standard monitoring ports on the generator stacks to facilitate stack tests. Generator specifications and stack heights aligning with those proposed and being the basis for modelling have also been specified in the works approval.
	Hydrocarbon and contaminated stormwater spills/leak/release	Direct discharge to land potentially resulting in land contamination and potential seepage to groundwater causing contamination Overland	Immediate surrounding vegetation and soils on the premises. PEC Violet Range (P1) – within 500 m buffer west of power station	Refer to Section 3.1	C = Minor L = Unlikely Medium Risk	Y	Condition 1	The Delegated Officer considers that the risk of contamination arising from hydrocarbon or contaminated water spills/leaks/releases is adequately mitigated by the proposed infrastructure which includes the generators being housed within a building, with a concrete bunded floor, designed to drain to an oily water separator at the existing power station.

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ^{2,3} of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
		runoff via stormwater flow potentially causing ecosystem impact						

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

Note 3: Conditions 2-6, 11-15 and 19 to 23 are all department imposed conditions required for compliance reporting, authorising environmental commissioning and time limited operation and associated emissions, and general complaint and record keeping requirements

4. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

Table 6: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 27 April 2023	None received	NA
Local Government Authority advised of proposal on 1 May 2023	None received	NA
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal on 1 May 2023	DMIRS responded on 7 June 2023 and advised that the Cosmos Mining Proposal (registration ID 114110) is currently under assessment and includes the proposal to expand the existing power station and to increase the total generating capacity to 28.5MW. DMIRS concluded that the works approval application appears to be consistent with their own assessment	The delegated officer noted the comments.
Applicant was provided with draft documents on 8 September 2023	The applicant responded with clarifications and revised premises maps and requested waiver of the remaining comment period on 11 September 2023	Clarifications were incorporated into the final instrument and decision report.

5. Decision

Based on the assessment in this decision report, the delegated officer has determined the proposal to expand the Cosmos Nickel Operations Power Station maximum from 12.5 MW to 24.5 MW generating capacity does not pose an unacceptable risk to human health or the environment. This determination is based upon:

- a maximum of six additional Cummins QSK78 2,000 KW diesel generators being installed in a banded powerhouse with drainage and containment to prevent loss of containment to the environment.
- air quality modelling indicating NEPM ambient air quality criteria can be complied with when a total of 14 generators are in operation; and
- power demand modelling indicating a maximum of 14 generators are expected to operate at any one time.

The applicant's infrastructure and operational controls are considered critical to maintaining an acceptable level of risk of public health and environmental impacts and in accordance with the Guidance Statement: Setting Conditions (DER 2015) have been imposed on the works approval as infrastructure controls for construction, and operational controls for commissioning and time limited operation.

The delegated officer determined to apply additional controls to verify that emissions from the installed generators align with assumptions in air quality modelling to confirm there is no elevated risk of ambient air quality impacts from NO₂ emissions. These include:

- installation of Australian Standard sampling ports on the generator stacks,
- monitoring of operational parameters and NO_x during environmental commissioning and time limited operations; and
- a limit of 14 generators in operational at any one time.

A licence amendment will be required to authorise ongoing operation of the constructed infrastructure. Licence conditions will not be finalised until the department assesses the amendment application. The department will consider information reported in the Environmental Compliance Report, and if available the Time Limited Operations report, in assessing the application to determine any changes to the assessed emissions risk profile and the need for ongoing monitoring requirements. Conditions will be imposed to ensure day-to-day operations do not pose an unacceptable risk of impacts to on and off-site receptors.

Works Approval W6796/2023/1 that accompanies this report authorises construction, environmental commissioning and time limited operations only.

6. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. IGO 2023, *Application for Works Approval - Category 52 – Cosmos Power Plant Expansion to 28.5MW*, Perth, Western Australia
5. Emissions Assessments 2023 *Cosmos Nickel Diesel Generator Emission Modeling*, Perth Western Australia