



Application for Works Approval

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

Works Approval Number W6778/2023/1

Applicant CSBP Limited

ACN 008 668 371

File number DER2023/000006

Premises CSBP Limited
KWINANA BEACH, WA 6167

Legal description

Part of Lot 20 on Diagram 78086, Volume 1918 / Folio 244
and Part of Lot 18 on Plan 17311, Volume 2058 / Folio 310

As defined by the premises map attached to the issued works approval.

Date of report 24 April 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 associated with the proposed upgrade to the Selective Catalytic Reactor at Nitric Acid Ammonium Nitrate Plant 3 at the licensed (L6107/1967/17) CSBP Limited chemical and fertilizer production facility in Kwinana Beach. As a result of this assessment, works approval W6778/2023/1 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 <https://dwer.wa.gov.au/regulatory-documents>.

2.2 Application summary and overview of premises

CSBP Limited (CSBP; the applicant) is a subsidiary company of Wesfarmers Chemicals, Energy & Fertilisers (WesCEF) and holds a licence (L6107/1967/17) for the CSBP Kwinana integrated chemicals and fertilizer manufacturing facility located at part of Lot 20 on Diagram 78086 and Part of Lot 18 on Plan 17311 (the premises), in Kwinana Beach.

The applicant submitted an application for a works approval under Part V Division 3 of the *Environmental Protection Act 1986* (EP Act) on 4 January 2023.

The applicant proposes to install a new tertiary catalyst reactor in the existing Selective Catalyst Reactor (SCR) in Nitric Acid Ammonium Nitrate Plant 3 (NAAN3) at the premises. The SCR treats tail gas from the NAAN3 prior to its discharge to air via the NAAN3 stack to reduce the emission of nitrous oxide (N_2O) to atmosphere. The tertiary catalyst reactor is anticipated to increase the abatement of N_2O from the NAAN3 from 85% to 95%. A summary of the new tertiary abatement process provided by the applicant is shown below in Figure 1.

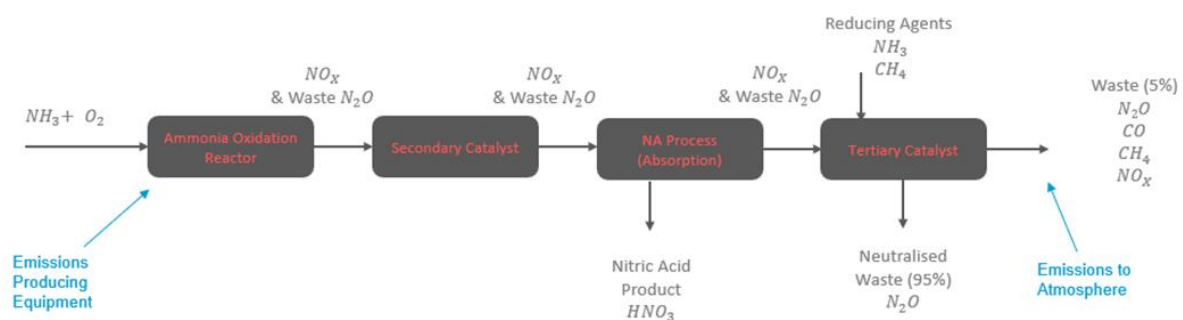


Figure 1: Selective Catalyst Reactor (SCR) proposed process diagram

The premises relates to the category 31 chemical manufacturing with a current production capacity of 3,712,000 tonnes per annum under Schedule 1 of the Environmental Protection Regulations 1987 (EP Regulations) which are defined in works approval W6778/2023/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with the *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W6778/2023/1.

The proposed works involve the replacement of internal baskets within the SCR with the new tertiary abatement catalyst. Beyond the scope of this assessment is the installation of natural gas supply pipework which will act as a reducing agent in the process. The applicant is

proposing to undertake the works during a planned maintenance shutdown of the NAAN3. Following installation the applicant proposes to continue to operate NAAN3 with the new tertiary catalyst reactor under the existing licence L6107/1967/17.

2.3 Part IV of the EP Act

The applicant holds Ministerial Statement 689 (MS689) and Ministerial Statement 875 (MS875). MS875 Condition 1 requires the proponent to implement the proposal as documented and described in schedule 1. The key proposal details outlined in schedule 1 include that a new third nitric acid plant will be designed and constructed to incorporate tertiary N₂O abatement technology.

The delegated officer considers that the proposed works are consistent with the proposal that was assessed by the EPA and subsequently approved under MS875. The licence holder is still required to comply with the greenhouse gas abatement conditions outlined in condition 5 of MS875.

3. Air emissions

3.1 Air emissions profile

Table 1 below details the current NAAN3 stack emission concentrations from the existing SCR prior to the installation of the additional tertiary abatement, and the applicant's anticipated emissions profile following installation of the tertiary abatement. The applicant advised the predicted reduction in N₂O was derived from vendor performance data.

Table 1: NAAN3 existing emissions and predicted emissions with tertiary catalyst reactor

Aspect	Units	Current	With tertiary abatement	Comments
Production	tpa	283,335	283,335	No change (650 tpd with 95% availability)
Tail gas flow	Nm ³ /hr	80,158	80,201	Minor increase due to addition of NH ₃ /NG
NH ₃ addition to SCR	Nm ³ /hr	200	239	Minor increase due to NH ₃ addition
NG addition to SCR	Nm ³ /hr	-	12	Introduction of NG as a reducing agent
N ₂ O at stack	ppm	165	16	Decrease due to tertiary abatement
NO _x at Stack	ppm	50	<1	Decrease due to tertiary abatement
NH ₃ at Stack	ppm	<1	<1	No change
CO at stack	ppm	0	100	Increase due to NG addition as a reducing agent
CH ₄ at stack	ppm	0	100	Increase due to NG addition as a reducing agent
CO ₂ -e emissions	tpa	57,258	6,830	Decrease due to tertiary abatement (after inclusion of CH ₄ emissions)

3.2 Air quality assessment

The applicant undertook a screening assessment in accordance with the department's draft *Guideline: Air Emissions* (DWER 2019). The carbon monoxide (CO) emission rate used in the screening assessment was derived from the expected concentration as per the performance warranty for the tertiary catalyst reactor. The screening assessment indicated that CO concentration is expected to be less than 1.5% of guideline values in the draft *Guideline: Air Emissions* therefore are considered insignificant do not warrant further detailed assessment.

Table 2: NAAN3 stack parameters

Parameter	Emission characteristic	Comment
Stack height	64.5 m	From Attachment 2 of Licence L6107/1967/17
Emission flow rate	26.2 m ³ /s	From Attachment 2 of Licence L6107/1967/17 (normal operations)
CO concentration	115 mg/m ³	Provided by CSBP (100 ppm)
CO emission rate	3.0 g/s	Calculated from CO concentration and emission flow rate
Effective emission height (H _{eff})	30-70 m	Range used to conduct sensitivity analysis to consider presence of large buildings and structures at CSBP Kwinana

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 *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.

4.1 Source-pathways and receptors

4.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during the operation of the tertiary catalyst reactor which have been considered in this decision report are detailed in Table 3. The proposed works will not involve any ground disturbance activities therefore there are not predicted to be any dust emissions associated with construction of the infrastructure and minimal noise emissions are expected. Table 3 below 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
Operation			
Air emissions (NH ₃ , N ₂ O, NO _x , CO, CH ₄)	NAAN3 SCR operation with new tertiary catalyst reactor	Air / windborne pathway	<ul style="list-style-type: none"> The tertiary catalyst reactor will be installed to reduce NAAN3 N₂O emissions. The performance of the SCR, including the tertiary catalyst reactor, will be monitored on plant start-up to verify the emissions reductions are achieved (via existing SCR continuous emission monitoring system (CEMS) in accordance with condition A2(a) of licence L6107/1967/17). Continuous emissions monitoring of NO_x from the NAAN3 stack will continue to be carried out in accordance with licence L6107/1967/17.
Spent catalyst waste (containing heavy metals)		Direct discharge to land and infiltration to groundwater	<ul style="list-style-type: none"> The Iron Zeolite catalyst has a life expectancy of 15 years, and once it is reached the catalyst will be containerised and disposed of to a regulated landfill.

4.1.2 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 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
Medina & Calista residential area	~3 km east of the proposed activity (NAAN3)
East Rockingham residential area	~3.25 km south of the proposed activity (NAAN3)
Industrial premises	Immediately adjacent to premises boundary
Bottle shop	~1.2 km south of the proposed activity (NAAN3)
Environmental receptors	Distance from prescribed activity
Wetlands -Resource Enhancement & Conservation management categories	~ 2 km east of the proposed activity (NAAN3)
Bushforever area	~ 2 km east of the proposed activity (NAAN3)
Threatened and Priority Ecological Communities - Critically endangered (state category) - Priority 3 (state category)	~2.25 km south of the proposed activity (NAAN3) ~ 3 km east of the proposed activity (NAAN3)
Threatened / Priority Flora	~ 1.7 km east of the proposed activity (NAAN3)
Threatened / Priority Fauna - Threatened - Endangered - Priority	~1.5 km east of the proposed activity (NAAN3) ~ From 350 m north of the proposed activity (NAAN3)
Threatened – Vulnerable	~ 1.25 km south of the proposed activity
Cockburn Sound (State Environmental (Cockburn Sound) Policy 2015)	Immediately adjacent to the premises boundary to the west (~450 m from the proposed activity (NAAN3))

4.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and take 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 applicant 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 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 W6778/2023/1 that accompanies this decision report authorises construction only. 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 is required to authorise emissions associated with the ongoing operation of the premises. The existing licence L6107/1967/2017 authorises emissions from the NAAN3 stack, and the proposed works will not alter any emission or discharge points at the premises.

Pollution controls are typically specified on a licence in line with the department's current licencing format. The delegated officer notes that the licence holder can opt to incorporate details of their pollution controls, including the works undertaken in this works approval, in their next licence amendment or in accordance with section 59 of the EP Act the CEO can initiate a licence amendment after the works are complete to incorporate the pollution controls onto L6107/1967/17.

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

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Construction								
Installation of new tertiary catalyst reactor	Noise	Air / windborne pathway causing impacts to health and amenity	Residences from 3 km to the east	N/A	C = <i>Minor</i> L = <i>Rare</i> Low Risk	NA	N/A	<p>The delegated officer noted that the installation of the tertiary catalyst reactor will not involve any ground disturbing activities (therefore dust emissions are not expected to occur), and it will take place during a shutdown of the NAAN3.</p> <p>The delegated officer considers that given the separation to off-site receptors, and the works occurring within a large operating industrial premises, noise associated with installation works is unlikely to be distinguishable from that of the larger premises and impact to off-site human receptors is not reasonably foreseen.</p>
Operation								
NAAN3 SCR operation with new tertiary catalyst reactor	Air emissions (NH ₃ , N ₂ O, NO _x , CO, CH ₄)	Air/windborne pathway causing impacts to health and amenity	Residences from 3 km to the east	Refer to Section 4.1.1	C = <i>Moderate</i> L = <i>Unlikely</i> Medium Risk	Y	Conditions 1, 4, 5, 6.	<p>The delegated officer has determined that the addition of the tertiary catalyst reactor to the SCR does not increase the risk associated with emissions to air assessed for the premises. Further, based on information provided by the applicant it was determined that N₂O and NO_x emissions from the NAAN3 stack are expected to reduce compared to the current secondary abatement technology.</p> <p>While a slight increase in CO is predicted as a result of the installation, CO emissions are considered insignificant when compared with the draft <i>Guideline: Air Emissions</i> recommended guideline value, which is based on relevant published Commonwealth and State criteria</p> <p>The delegated officer notes that the existing L6107/1967/17 licence authorises emissions from the NAAN3 stack and includes appropriate controls for this discharge, including continuous monitoring of NO_x emissions (A2a), a limit for NO_x emissions (A2c) and reporting of monitoring results annually (G2a) and limit exceedances (G3a) which will apply to operation of NAAN3 once the tertiary catalyst reactor is</p>

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
								installed and SCR operation recommences. Environmental commissioning of the SCR post installation of the tertiary catalyst is not required. The applicant proposed to validate predicted NOx reductions when the new tertiary catalyst reactor is operational via the CEMS NOx monitoring. The delegated officer notes this information will be available to the department in the subsequent annual environmental report submission as a requirements of the licence or under s.90 of the EP Act this information may be requested by a department inspector if required. Additional reporting requirements relating to the validation are therefore not required in the works approval.
	Solid waste - spent catalysts (heavy metals)	Direct discharge to land and infiltration to causing contamination of soil, groundwater and the marine environment	Groundwater contamination (3 mbgl) and Cockburn Sound	Refer to Section 4.1.1	C = <i>Minor</i> L = <i>Rare</i> Low Risk	Y	N/A	The delegated officer notes that the applicant indicated that the life expectancy for the catalyst is 15 years and that it will be disposed of to a regulated landfill once completed. The applicant should refer to s 53 of the EP Act to determine whether any authorisations will be required in the future when undertaking replacement/disposal of the catalyst.

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.

5. 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 22 February 2023	None received	N/A
Local Government Authority advised of proposal on 22 February 2023	None received	N/A
Kwinana Industries Council advised of proposal on 22 February 2023	None received	N/A
Applicant was provided with draft documents on 6 April 2023	Comments received 14 April 2023 <ul style="list-style-type: none"> The specification of SCR in Table 1 is too restrictive and suggest adding the words "or a catalyst of similar performance. There is a broken link causing an error message in condition 5(b). 	<ul style="list-style-type: none"> The delegated officer agrees to the change of wording in condition 1 as the intent of the condition is met. The link has been fixed.

6. Decisions

The delegated officer has completed an assessment of the application and determined to grant a works approval. The works approval will be subject to conditions consistent with the risk assessment outcomes and generally reflective of the applicant's proposed controls as they were considered reasonable and adequate to manage the risk of unacceptable impacts.

The delegated officer's decision considered the following:

- the nature of the proposed works is the addition of a tertiary catalyst reactor within the existing SCR at NAAN3;
- the addition of the tertiary catalyst reactor is expected to change the profile of air emissions by reducing NOx emissions, and minimally increasing CH₄ and CO emissions;
- conditions can be included on a works approval to ensure the works are constructed as proposed;
- the existing air emissions authorisations and controls on licence L6107/1967/17 for the premises, including for continuous NOx emission monitoring from the NAAN3 stack, NOx limits, annual reporting of monitoring results and limit exceedance reporting, will apply once the tertiary catalyst reactor is installed and operating; and
- the performance of the tertiary catalyst abatement can be confirmed by the department through review of annual environmental report data or via a request for the information.

As noted in section 4.2, subject to completion of the works in compliance with the works approval the applicant has the ability to operate the works in accordance with the conditions of existing licence L6107/1967/17 as no changes to emission or discharge points will occur. The applicant is able to incorporate details of the pollution controls installed under this works approval in a future licence amendment or the CEO can initiate a licence amendment to incorporate the pollution controls onto L6107/1967/17 if required in future.

7. 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. CSBP Limited, Application and supporting documents, Perth, Western Australia.
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2019, *Draft Guideline: Air Emissions*, Perth, Western Australia.
4. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
5. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.