Decision Report



Part V Division 3 of the Environmental Protection Act 1986

Works approval number	W6788/2023/1
Works approval holder	BHP Nickel West Pty Ltd
ACN	004 184 598
Registered business address	125 St Georges Terrace PERTH WA 6000
DWER file number	DER2023/000156
Premises	BHP Nickel West Kwinana Nickel Refinery Baldivis Facility
	Lot 100 on Deposited Plan 423540 and Lot 820 on Deposited Plan 77252
	KWINANA BEACH WA 6167
	Certificate of Title Volume 2958 Folio 292
	As defined by the premises maps in Schedule 1 of the works approval.

Date of report	20 June 2023
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Proposed Decision Works approval granted

MANAGER, PROCESS INDUSTRIES REGULATORY SERVICES

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

Table of Contents

1.	Decis	ion summary	1
2.	Scope	e of assessment	1
	2.1	Regulatory framework	1
	2.2	Application summary and overview of premises	1
		2.2.1 Chloride brine storage tanks	1
		2.2.2 Quality assurance and monitoring	3
		2.2.3 Clearing matters	3
3.	Risk a	assessment	3
	3.1	Source-pathways and receptors	3
		3.1.1 Emissions and controls	3
		3.1.2 Receptors	5
	3.2	Risk ratings	6
4.	Cons	ultation	9
5.	Concl	lusion	9
Refe	rences	S	9
		1: Summary of applicant's comments on risk assessment and draft	0
Арр	endix 2	2: Application validation summary12	2
Table	е 1: Тур	bical liquor assay to be stored in CBS tanks	2
Table	e 2: Pro	posed applicant controls	3
Table	e 3: Ser	nsitive human and environmental receptors and distance from prescribed activity.	5
		k assessment of potential emissions and discharges from the premises during , commissioning and operation	7
Table	• 5: Cor	nsultation	9

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 the premises. As a result of this assessment, works approval W6788/2023/1 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

On 2 March 2023, 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 for two Chloride Brine Storage tanks (CBS) at the premises. The premises is approximately 4 km south-west of Rockingham and is split over two facilities, the Kwinana Nickel Refinery and the Baldivis Facility. The premises is situated over the boundary of two local government authorities, City of Kwinana and City of Rockingham.

The premises relates to the Category 44: Metal smelting or refining however there is no proposed changes to throughput. The CBS tanks are necessary to sustain current production rates and is not related to any potential future increase in production. 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 W6788/2023/1.

The Baldivis Facility accepts waste process liquor from the Refinery for storage and evaporation. Wastewater from the Refinery is transported to the Baldivis Facility via a series of pipelines for storage in the staging pond or one of three evaporation ponds. The primary liner of the evaporation cells at the Baldivis facility will be approaching it's end of life in 2024. With all three evaporation cells nearing capacity, this application is intended to provide a temporary, alternative storage facility to hold the volume of liquor currently contained within one evaporation cell, approximately 100 ML, to enable one cell to be emptied and subsequently relined.

The applicant is seeking regulatory approval for the construction and use of two CBS tanks of 40 ML and 70 ML capacity, as well as supporting infrastructure at the premises. These two tanks will allow liquor from the Baldivis Facility evaporation cell to be pumped into these tanks, through existing pipelines for storage during the relining process.

2.2.1 Chloride brine storage tanks

The applicant has provided detailed documentation of the proposed works, which are outlined below.

The two tanks will be constructed at the northern end of the premises. The 40 ML tank will be 82 m internal diameter and the 70 ML tank will be 109 m internal diameter, both will have a wall height of 8 m. The tanks will be constructed on a pad of compacted limestone. In addition to the new CBS tanks, two new leak detection pits will also be installed. These tanks will each have a recovery pump and flow totaliser that will keep the respective tank empty. An access platform will be constructed between the two tanks to allow inspection access to the tanks and the leak

detection inspection pits. The tanks will be constructed by similar methodology and QA/QC procedures as the two existing 12.5 ML and 2.5 ML CBS tanks approved under the July 2019 amendment of L8437/2010/3.

The tank walls will be prefabricated off site and contain the primary and secondary liners with a leak detection system and lined as follows:

Floor lining system:

- A primary liner of 1mm fortified polyolefin alloy;
- Electrically conductive geotextile (to enable testing of fusion welded joints during installation);
- Geonet flow / drainage layer (for leak detection system);
- Secondary liner 1mm fortified polyolefin alloy; and
- Geosynthetic Clay Liner (GCL) underlying whole tank.

Wall lining system:

- A primary liner of 1mm fortified polyolefin alloy;
- Electrically conductive geotextile (to enable testing of fusion welded joints during installation);
- Secondary liner 1mm fortified polyolefin alloy; and
- Electrically conductive geotextile (to enable testing of fusion welded joints during installation and to protect secondary liner from abrasion against concrete walls).

The CBS tanks have been designed with a freeboard of 655 mm, in accordance with the Water Quality Protection Note (WQPN) 26 - Liners for containing pollutants, using synthetic membranes. This freeboard is calculated to contain a rainfall resulting from a 1 in 20 (5%) annual exceedance probability rainfall event and the 90th percentile wet season, after allowance for any evaporative water loss and the effects of any water reuse recovery system.

The existing pipelines from the water treatment plant will be modified to allow the transfer of chloride brine to the new tanks from the Baldivis evaporation ponds as well as concentrate from the water treatment plant. The same pipelines will also be used to return liquors from the new tanks to the Baldivis evaporation ponds.

Analytical results from a sample of the liquor to be sent to the tanks is outlined in Table 1. Following the requirement to store liquors from the Baldivis evaporation ponds, the CBS tanks will be repurposed to act as a holding tank for reverse osmosis water from the water treatment plant.

Property	Minimum	Maximum
Chloride Content (mg/L)	5,540	11,843
Nickel Content (mg/L)	491	594
Cobalt Content (mg/L)	138	315
Copper Content (mg/L)	26	49
Ammonia as N Content (mg/L)	31,133	40,600
Total Suspended Solids (mg/L)	6	7
рН	5.01	6.08
Temperature (°C)	Ambient	Ambient

Table 1: Typical liquor assay to be stored in CBS tanks

2.2.2 Quality assurance and monitoring

Quality assurance and compliance auditing is to occur at each stage of construction with contractors on site to for each stage including earthworks, construction of tanks and installation of the liner, with a Quality Assurance Inspector overseeing all stages of the project. Monitoring, testing and inspection will be carried out including leak detection testing of the liner which will confirm the integrity of the primary and secondary liner as well as monitoring to confirm the welding/bonding methods are in accordance with liner specification.

Groundwater monitoring is currently conducted on a 6 monthly basis at six locations within and adjacent to the CBS tank project area. Three monitoring locations will be removed as part of the CBS tanks project. The applicant has committed to undertaking an assessment of the coverage of the existing groundwater monitoring network within the existing licenced premises area to determine if there is a requirement for reinstallation of these groundwater bores. Ground Water Licence 95474 will be updated to reflect this change as required.

2.2.3 Clearing matters

The Licence Holder applied for a clearing permit with the department for the required clearing. The clearing permit was issued on 26 May 2022 (Clearing Permit Number 9105/1) for the purpose of facilitating processing, maintenance, providing access to and associated facilities development within Kwinana and associated pipelines and maintenance for access and bores within the Baldivis areas. The permit covers the entirety of the Nickel West Kwinana premises and outlines conditions for the management of vegetation and fauna, including restrictions for areas within TEC patches and fauna habitat.

3. 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.

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 2 below. Table 2 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Vehicle and machinery movements, earthworks etc. due	Air / windborne pathway	Implementation of the Dust Management Plan for Effluent Storage Facility Construction
Noise	to construction		Location due to the premises being located:

Table 2: Proposed applicant controls

Works Approval: W6788/2023/1

Emission	Sources	Potential pathways	Proposed controls
			within heavy industrial area; and
			 2.3km north-west of the closest residential property
Hydrocarbon spills	From contractor plant and equipment during construction	Seepage to soil and groundwater	Immediate removal of spilled material, contaminated material disposed of to an approved location
Operation			
Odour	Due to Ammonia present in the stored liquors	Air / windborne pathway Prevailing wind directions:	If complaints are made to the premises, appropriate stakeholder consultation will be undertaken and if necessary, the following treatments may be implemented:
		 Morning - east and north/south- easterly Afternoon - southwest and westerly (DWER 2020) 	 Dilution with raw/process if space is available in the storage tanks. Treating with sulphuric acid to neutralise odours if acid dosing skid may be sourced and installed. Cover the surface of the storage tank(s) with HDPE "shade balls" to prevent the escape of odours. Storage of reverse osmosis (RO) water from the water treatment plant which has no odour.
Process liquor spills	Breach of containment via loss of liner integrity, overtopping or pipeline failure causing discharge to lands	Overland runoff into surface waters Seepage to soil and groundwater	Installation and monitoring of leak detection system including two leak detection pits with level switch and remote alarm system. Installation of five-layer liner system as detailed in section 2.2.1. Regular inspection and maintenance program, including integrity of HDPE pipework. Real time level monitoring and controls with alarms. Maintenance of 655mm freeboard at all times via level indicators and field operator inspections. Transfer points, supply pumps and pipe valves at the plant end of the pipeline are bunded. Where pipelines are not bunded they will be fitted with automatic cut offs and alarmed. Recovery pumps will be located in a bunded area between the two tanks.

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 3 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 3: Sensitive human and environmental receptors and distance from prescribed	
activity	

Human receptors	Distance from prescribed activity	
Wells Park	840 m west of proposed CBS tank location	
Chesterfield Inn (heritage listed site)	1.95 km south-east of proposed CBS tank location	
Short term accommodation in East Rockingham	2.5 km south-east of proposed CBS tank location	
Closest residential receptor (Rockingham)	3.1 km south-east of proposed CBS tank location	
Residents in Kwinana	3.2 km east of proposed CBS tank location	
Environmental receptors	Distance from prescribed activity	
Cockburn Sound - Premises is located within the State Environmental (Cockburn Sound) Policy 2015 area	~ 500 m to the west	
Cockburn Groundwater Area, Safety Bay Sand: Aeolian and beach lime sand.	Depth to groundwater 3 mBGL (1.00 mAHD)	
Threatened Ecological Communities - "Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain"	Within Prescribed Premises boundary. Vegetation is characterised as degraded to completely degraded quality and is considered	
Threatened fauna- Black Cockatoo and Carnabys Cockatoo	highly disturbed. Vegetation previously assessed via application for clearing permit (Refer to section 2.2.3)	

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 4

Works approval W6788/2023/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 4 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

An amendment to the premises licence (L8437/2010/3) will be required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises. 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 4: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation

Risk events							
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Justification for additional regulatory controls
Construction							
	Dust	Air / windborne	Residences 3.1 km south from the premises	Residences 3.1 km L south from the M premises. M Amenities 840m C west of the premises C 3.1.1 M Groundwater at 3 C mBGL L	C = Minor L = Possible Medium Risk	Y	Dust emissions as a result of construction activities for the CBS tanks are not expected to be significant.
Construction of CBS facility	Noise	impacts to health and amenity	Amenities 840m		C = Minor L = Possible Medium Risk	Y	Noise emissions as a result of construction activities for the CBS tanks are not expected to be significant.
	Hydrocarbon spills	Seepage of hydrocarbons, contaminating soil and groundwater			C = Minor L = Possible Medium Risk	Y	No additional regulatory controls proposed. The Environmental Protection (Unauthorised Discharges) Regulations 2004 apply
Commissioning and time-limit	ed-operations op	erations					
Ammonia present in the stored material	Odour	Air/windborne pathway causing impacts to health and amenity	Residences 3.1 km south from the premises. Amenities 840m west of the premises		C = Slight L = Unlikely Low Risk	Y	No additional regulatory controls proposed.
Breach of containment causing discharge to land via overflow or failure of tanks and piping.	Chloride brine and	Overland runoff.	Vegetation within Prescribed Premises boundary and habitat for threatened fauna. Groundwater at 3 mBGL	Refer to Section 3.1.1	C = Moderate L = Unlikely Medium Risk	Y	The Delegated Officer considers that the controls proposed to manage the risks associated with the transfer and storage of chloride brine
Breach of containment causing discharge to land via tank overtopping	contaminated stormwater	Seepage of, contaminated water to soil and groundwater			C = Moderate L = Unlikely Medium Risk	Y	are generally sufficient and have been included as controls within the Works Approval.

Works Approval: W6788/2023/1

Risk events			Risk rating ¹				
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	Applicant controls sufficient?	Justification for additional regulatory controls
Seepage of chloride brine from tanks or piping infrastructure		Seepage of, contaminated water to soil and groundwater			C = Moderate L = Unlikely Medium Risk	Y	

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

Works Approval: W6788/2023/1

IR-T13 Decision report template (short) v3.0 (May 2021)

4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

Table 5: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 28 March 2023	None received	N/A
Local Government Authority (City of Rockingham) advised of proposal on 28 March 2023	None received	N/A
Local Government Authority (City of Kwinana) advised of proposal on 28 March 2023	None received	N/A
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal 28 March 2023	Response received from DMIRS 22 May 2023 notifying that a review of the approved safety report for the facility has been conducted and concluded no amendment is required. No additional concerns were raised.	N/A
Applicant was provided with draft documents on 26 May 2023	Response received from applicant 9 June 2023. Refer to Appendix 1.	Refer to Appendix 1.

5. 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.

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

Condition	Summary of applicant's comment	Department's response
Wording throughout licence.	The applicant requests that wording be changed throughout the instrument from Effluent Storage Tanks (EST) to Chloride Brine Storage (CBS) Tanks to more accurately reflect the use of the tanks and the project name that has changed since the submission of the works approval.	The Delegated Officer accepts the changes as a minor revision to wording and the proposed wording is adequate for the purpose.
Cover Page	The applicant requests that the address of the premises be changed as Lot 89 on DP411084 (certificate of title attached) has recently been updated and is now Lot 100 on DP 423540. The applicant also requests the inclusion of the Baldivis premise into the premise details as a pipeline will be installed at the Baldivis facility.	The Delegated Officer accepts the changes, and the works approval has been updated accordingly.
Table 1: Design and construction / installation requirements	The applicant requests changes to wording in the table and that LLDPE be replaced with fortified polyolefin alloy. The fortified polyolefin alloy that is proposed is essentially an LLDPE liner with additional stabilisers, which provides it greater resistance against ultraviolet light and chemical degradation. Fortified polyolefin alloy will achieve the same specifications as a LLDPE liner and no change to the construction specification or QA/QC procedure is required.	The Delegated Officer accepts the changes, and the works approval has been updated accordingly.
	The applicant requests that wording relating to the length of the proposed pipelines be changed to include 'approximately' to will allow for minor variations in the length of the pipeline if required.	The Delegated Officer accepts the changes as a minor revision to wording and the proposed wording is adequate for the purpose.
Table 2: Fortified polyolefin alloy liner requirements	The applicant requests changes to wording in the Fortified polyolefin alloy liner requirements from Oxidative Induction Time (OIT) to with Standard Oxidative Induction Time (S-OIT).	
Environmental Compliance Report submission	The applicant requests changes to wording in the fortified polyolefin alloy liner requirements to remove reference to Standard OIT from "Standard OIT and High Pressure OIT" as this is an error with the current CQA Plan which will be amended by Nickel West prior to construction.	

Condition	Summary of applicant's comment	Department's response	
Environmental Compliance Report submission	The applicant requests that the timeframe for the submission of the Environmental Compliance Report be changed from 30 days to 60 days to ensure the required supporting material is available to submit the required reports.	The Delegated Officer has agreed to increase the timeframe from 30 days to 60 days, noting that time limited operations must not commence until the report is submitted according to the conditions of the licence.	
Commencement of time limited operations	The applicant requests that the condition be changed to reference condition 6 rather than condition 4.	The error is noted and has been amended.	
Table 6: Infrastructure and equipment requirements	The applicant requests that wording relating to the freeboard height be changed to include 'at least".	The Delegated Officer accepts the changes as a minor revision to wording and the proposed wording is adequate for the purpose.	
during time limited operations	The applicant requests that wording relating to weekly inspections of pipelines be changed to reflect only those listed in Condition 1.		
	The applicant advised that any buried pipelines referred to in this application are already existing and to either remove reference to the buried pipelines in the licence or refer to them as 'existing'.		
Time limited operations compliance reporting	The applicant requests that the timeframe for the submission of the time limited operations report be changed from 30 days to 60 days to ensure the required supporting material is available to submit the required reports.	The Delegated Officer has agreed to increase the timeframe from 30 days to 60 days.	
Definitions	The applicant has requested the definitions table be updated with Chloride Brine Storage (CBS Tanks).	The Delegated Officer accepts the changes, and the works approval has been updated accordingly.	
Schedule 1	The applicant has requested PDF error be corrected.	The error is noted and has been amended.	

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY						
Application type						
Works approval	\boxtimes					
Date application received		02/03/2023				
Applicant and Premises details	l					
Applicant name/s (full legal name/s)		BHP Nickel West Pty Ltd				
Premises name		BHP Nickel West Kwinana Nickel Refinery				
Premises location		Lot 89 on Deposited Plan 411084 Patterson Road, Kwinana Beach				
		City of Kwinana				
Local Government Authority		The premises are located within both the City of Kwinana and the City of Rockingham, but the works itself will be within the City of Kwinana.				
Application documents						
HPCM file reference number:		DER2018/001042-8~92				
Key application documents (additional to application form):		Construction Dust Management Plan Commissioning Plan Process Flow Diagram Quality Assurance Plan Design Summary Report Effluent Storage Tanks Supplementary Information				
Scope of application/assessment						
Summary of proposed activities or changes existing operations.	Construction of a new CBS Facility					
Category number/s (activities that cause th	e prer	nises to become prescribed pre	mis	es)		
Table 1: Prescribed premises categories						
		essed production or design acity		Proposed changes to the production or design capacity (amendments only)		
Category 44: Metal smelting or refining: premises on which metal ore, metal ore concentrate or metal waste is smelted, fused, roasted, refined or processed		000 tonnes per annum of Nickel al		N/A		
Legislative context and other approvals						
Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?		Yes 🗆 No 🛛	ap re	inisterial Statement 377 primarily oplies to Baldivis facility and not elevant to this project which is oposed for the Refinery location.		
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?		Yes 🗆 No 🛛	N/A			
Has the proposal been referred and/or assessed under the EPBC Act?		Yes 🗆 No 🛛	N/	N/A		

Has the applicant demonstrated occupancy (proof of occupier status)?	Yes 🛛 No 🗆	Certificate of title ⊠
Has the applicant obtained all relevant planning approvals?	Yes □ No ⊠ N/A □	Development Application for the enabling works associated with the CBS tanks (DA10512). A further development application will be applied for to cover the entity of the proposed works
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes 🛛 No 🗆	CPS No: 9105
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes 🗆 No 🛛	N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes 🗆 No 🛛	N/A
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes 🛛 No 🖾	N/A
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes 🗆 No 🗵	N/A
Is the Premises subject to any other Acts or subsidiary regulations (e.g. Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx)	Yes ⊠ No □	DGS000169 Licence to store Dangerous Goods at the Refinery. Site is classed as a Major Hazard Facility
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ⊠ No □	Kwinana EPP Not an SO ₂ contributor
Is the Premises subject to any EPP requirements?	Yes 🛛 No 🗆	Within Area A but not a contributor of SO ₂
Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i> ?	Yes 🛛 No 🗆	Classification: Contaminated - remediation required Date of classification: 31 August 2018