Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Application for Licence Amendment

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

Licence Number	L4612/1989/11
Licence Holder	BHP Nickel West Pty Ltd
ACN	004 184 598
File Number	2012/006877-1
Premises	Nickel West Leinster Nickel Operations LEINSTER WA 6437 Legal description - Mining tenements ML255SA, M36/4, M36/87, M36/102, M36/103, M36/131, M36/156, M36/230, M36/389, M36/439, L36/93, G36/49, G36/50 and G36/51 As defined by the Premises maps attached to the Revised Licence
Date of Report	5 August 2024
Decision	Revised licence granted

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1. Decision summary

Licence L4612/1989/11 is held by BHP Nickel West Pty Ltd (Licence Holder) for the Nickel West Leinster Nickel Operations (the Premises), located at mining tenements ML255SA, M36/4, M36/87, M36/102, M36/103, M36/131, M36/156, M36/230, M36/389, M36/439, L36/93, G36/49, G36/50 and G36/51.

This Amendment Report documents the assessment of potential risks to the environment from proposed changes to the emissions and discharges during the construction and operation of a category 85 sewage facility at the Premises. As a result of this assessment, Revised Licence L4612/1989/11 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary

On 14 March 2024, the Licence Holder submitted an application to the department to amend Licence L4612/1989/11 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The Licence Holder proposes to increase the production capacity of Category 85 sewage facility from 44 m^3 to 55 m^3, along with decommissioning the existing wastewater treatment plant (WWTP) and constructing a replacement WWTP. The Licence Holder has also proposed a series of administrative amendments relating to groundwater monitoring and WWTP conditions. Further detail on the proposed amendments is provided in this section.

Category 85: Sewage facility

An existing WWTP currently operates at the Premises with a current treatment capacity of 44 m^3/day. However, the Licence Holder proposes to decommission this WWTP and construct, commission and operate a new WWTP with an increased treatment capacity of 55 m^3/day.

The proposed new WWTP will comprise of a Modified Ludzack-Ettinger (MLE) system with raw influent storage tanks, treated effluent storage and a discharge system. Treated wastewater daily discharge rate is 36 m^3/day (or 36 kL/day) during normal operations and 55 m^3/day during peak personnel utilisation periods. A hydraulic loading rate of 70L/person/day has been applied.

The location of the treatment plant is within 20 m away from the existing WWTP and will therefore share a similar risk profile. The existing spray fields are approximately 1 km south of the existing spray WWTP on a rehabilitated tailings facility with a total area of 24,000 m^2. Discharge to the spray field is proposed using the existing discharge pipeline. Treated effluent will be discharged via above ground sprinklers, with flow measured and monitored via a magflow meter on the discharge line acting as a totaliser.

The proposed treated wastewater quality parameters that the new WWTP can achieve are provided in Table 1. Treated effluent discharged from the existing WWTP is currently monitored quarterly in accordance with Condition 34 of the existing licence.

Table 1: Proposed wastewater quality parameters

Description	UOM	Influent – during normal conditions	Influent - during shutdown conditions	Effluent Level C (ANZECC, 1997)
Total Hydraulic Loading2 @ 70L/p/d	m³/day	36.5	55	-
Total Organic Loading	Kg/day	40.7	49.8	-
Peak flow (6 x ADWF 1 hr)	m³/h	9.1	13.8	-
Plant design flow (1 x ADWF)	m³/h	1.5	2.3	-
Biological Oxygen Demand (BOD)	mg/l	1,116	903	<20
Total Suspended Solids (TSS)	Mg/l	<450	<450	<30
Total Nitrates (TN)	Mg/l	<100	<100	<30
Total Phosphates (TP)	Mg/l	<15	<15	<7.5
Sludge produced @ 27°C	Kg/d	-	-	-
E.coli	Cfu/100mL	-	-	<1000
Grit and Grease	Mg/L	<25	<25	-
pH	pH	6.5-8.5	6.5-8.5	-
Wastewater Temperature	°C	15-32	15-32	-

Based on normal operation with an average of 36 kL raw effluent treated per day, the estimated nutrient loading to the 2.4 ha irrigation field is 214.86 kg/ha/year, while the phosphorus loading is calculated to be 53.72 kg/ha/year. Under shutdown conditions at an increased treatment rate of 55 kl/day, nutrient loading rates are calculated to increase to 328.26 kg/ha/year for nitrogen and 82.07 kg/ha year for phosphorus.

No information has been provided on the capacity of the vegetation and soil to uptake or store nutrients in the irrigation field area. Where detailed site-specific studies have not been undertaken, *Water Quality Protection Note 22, 'Irrigation with nutrient-rich wastewater'* (Department of Water 2008) provides indicative maximum nutrient loading rates for fertigation of irrigated waters. The relevant risk category is 'D', for fertigation to fine grained soils with a low risk of eutrophication of surface waters within 500 m. The predicted nutrient loading rates are less than those specified in risk category D.

Administrative changes:

- Removal of Condition 30 (reference to water quality protection note 22)
- Update groundwater monitoring bore figure labelling:
    - Figure 4 – removal of historic bore destroyed in MB08
    - Figure 5 and 6 – change M74, RB01 and RB02 from monitoring bores to recovery bores and inclusion of MB08-B
    - Figure 7 – change incorrect labelling of TSF 3F to Evaporation Ponds
- Update wording of frequency of groundwater monitoring in table 3 and to define the use of new term 'quarterly' in definitions table 8.

This amendment is limited only to changes to Category 85 from the Existing Licence. No changes to the aspects of the existing Licence relating to Category 5, 6, 12, 57 and 64 have been requested by the Licence Holder.

Table 2 below outlines the proposed changes to the existing Licence.

Table 2: Proposed production capacity changes

Category	Current production capacity	Proposed production capacity	Description of proposed amendment
5	3,600,000 tonnes per annual period	N/A	N/A
6	2,500,000 tonnes per annual period	N/A	N/A
12	1,780,000 tonnes per annual period	N/A	N/A
57	500 tyres or less	N/A	N/A
64	20 tonnes or more per annual period	N/A	N/A
85	44m^3 per day	55m^3/day	Increased production capacity, construction and operation of new WWTP

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 2020a).

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 Amendment Report are detailed in Table 3 below. Table 3 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 3: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction of WWTP	Air/windborne	• Use of water carts and water sprays as required • Maintaining wet condition for work surfaces
Operation			

Emission	Sources	Potential pathways	Proposed controls
Odour	WWTP operations	Air/windborne	• Residual water from the proposed WWTP will be sterilized with chlorine within the irrigation tank prior to disposal to the irrigation area. • Probe in recirculation line on irrigation tank will measure dose rates, ensuring correct levels prior to surface irrigation.
Sewage, treated/partially treated wastewater	Containment loss from WWTP from leaks and spills from the anaerobic or aerobic tanks	Direct discharge to land	• Breaking of the open anaerobic or aerobic tanks is not possible due to the gravitational hydraulic design. • Any overflow of the irrigation tank will be contained in the emergency effluent pond.
	Discharge to spray field	Direct discharge	• Additional sprinklers to avoid pooling and improved sprinkler nozzle types. • Recovery trench located immediately downstream of the irrigation area used to collect and recover any liquid matter, resulting from runoff from heavy rainfall events. • Quarterly monitoring of treated effluent discharged. • Sprayfield located on rehabilitated historical tailings area with hydraulic conductivity likely to be in the order of 1 x 10^{-8} m/s or 1 x 10^{-9} m/s. • Groundwater is estimated to be 40 m below ground level. • Effluent is treated to minimum treatment levels recommended for land irrigation (Level C) in Appendix 6 of *'the Guidelines for Australian Guidelines for Sewage Systems – Effluent Management'* (ANZECC,1997).
	Pipeline rupture/leak	runoff	None

3.1.2 Receptors

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

Table 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 2020b)).

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

Human receptors	**Distance from prescribed activity**
Aboriginal sites and heritage places: • PLACE ID: 686 - AGNEW 1 - Mythological, Quarry, Water Source	950 m northwest of the WWTP and 1,150m north of the spray field.
Environmental receptors	**Distance from prescribed activity**
1. Remnant vegetation Priority flora: 2. *Grevillea inconspicua* (priority 4) *3.* *Eremophilia* sp. Leinster (priority 4)	1. Surrounding spray field 2. 760m south-west of WWTP and 140m north of the spray field. *3.* 150m southwest of WWTP area
Underlying groundwater (non-potable purposes): Proclaimed groundwater area - RIWI Goldfields groundwater area. Salinities brackish to saline, TDS: 500 – 1000mg/L. Depth to groundwater ranges from 5m to 10s of meters below ground level. Irrigation area located on rehabilitated historical tailings area. Hydraulic conductivity in this area is likely to be in the order of 1 x 10^{-8} m/s or 1 x 10^{-9} m/s[1].	Groundwater is estimated to be 40 m below ground level at the irrigation spray field[1].
Surface water: Drainage channels are ephemeral in the Goldfields region, responding to rainfall events. Surface water runoff consists of sheet flow rather than major channelized flow and is generally from the west. Surface water dissipates over the plains and ponds in numerous low depressions[1]. 1. Two watercourses near the spray field identified on Geocortex. 2. One watercourse near the WWTP identified on Geocortex.	1. 150m east of the spray field and 180m west of the spray field. 2. 150m north of the proposed WWTP.

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020a) for those emission sources which are proposed to change and considers 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 Licence Holder 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 Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

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

The Revised Licence L4612/1989/11 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. Category 85 activities.

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

Table 5. Risk assessment of potential emissions and discharges from the Premises during construction and operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient ?	Conditions[2] of Licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**				
Construction								
Construction of WWTP	Dust	Air/windborne pathway causing impacts to health and amenity	Surface water (ephemeral drainage lines) Native vegetation including priority flora	Refer to Section 3.1	C = Minor L = Unlikely **Low Risk**	Y	Existing: Condition 4 – minimize dust	N/A
Operation								
Routine WWTP operation	Odour	Air/windborne pathway causing impacts to health and amenity	Users of Aboriginal site 686 AGNEW	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	Existing: Condition 35 – treatment system management	N/A
Containment loss from WWTP and associated pipelines	Sewage, treated or partially treated wastewater	Direct discharge and seepage causing contamination	Surface water lines Native vegetation and priority flora	Refer to Section 3.1	C = Minor L = Unlikely **Low Risk**	N	Existing: Condition 35 – treatment system management Condition 36 – prevent overtopping Added: **Condition 29 – pipeline requirements**	Licence holder proposed no controls for potential leak or rupture of pipelines. Condition 29 has been modified to include the wastewater treatment pipeline to mitigate risk to receptors.
Discharge of effluent to spray field	Treated or partially treated wastewater	Direct discharge and infiltration causing pooling and contamination of soils, vegetation health decline or death	Native vegetation and priority flora	Refer to Section 3.1	C = Minor L = Possible **Medium Risk**	Y	Existing: Condition 31 – prevention of pooling Condition 33 – recovery trench Added: Condition 3 – discharge point	The risk is considered to be medium, based on the potential for failure of the WWTP to adequately treat raw effluent prior to discharge and the risk of organic matter or nutrient build up in soils in the irrigation area.

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient ?	Conditions[2] of Licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
							Condition 30 – quarterly monitoring required at sample point. **Condition 32 – parameter limits for discharging**	In the absence of site-specific studies on appropriate emission limits to land, the Delegated Officer has determined to specify annual nutrient (nitrogen and phosphorus) loading rate limits for effluent discharged to land, based on the maximum recommended rates set in WQPN 22 for fine grained soils with a low risk of eutrophication of surface waters within 500 m (risk category D). Application of these loading rate limits are considered necessary to reduce the risk of impacts to soils and vegetation and should be achievable if the WWTP performs as designed, in consideration of the daily treatment rate of up to 55 kL/day and predicted treated effluent quality.

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

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

4. Consultation

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

Table 6: Consultation

Consultation method	Comments received	Department response
Department of Health advised of amendment in letter dated 10/05/2024.	Comments received 29/05/2024: The disposal of wastewater that is generated on site is required to comply with the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974*. The applicant will be required to submit a formal application to DoH for assessment and approval of the wastewater treatment system. The application should include a site-specific Site and Soil Evaluation (SSE) undertaken by a qualified consultant during the wettest seasonal time of the year as per AS/NZS 1547:2012 to ensure the land application area is located and sized appropriately.	The Delegated Officer notes that DoH approval is required to operate the wastewater treatment system and this is yet to be obtained.
Licence Holder was provided with draft amendment on 24/07/2024	1. Align reporting dates of condition 2 and 61(b) regarding submission of the Annual Audit Compliance Report. 2. Update Table 3 where frequency is specified as 'March, June, September and December' to 'Quarterly' 3. As it is not possible to monitor within the spray field due to health and safety considerations, a sample point is proposed within the WWTP itself prior to transfer to the spray field. No further treatment occurs between the sample point and the discharge point (as per provided figure). Request change to condition 30 table 6 to reference the sample point in WWTP.	1. Deleted condition 61 due to duplication of conditions and reworded condition 2 to the standard condition wording. 2. Updated, noting 'quarterly' sampling events are defined in the licence as 'at least 45 days apart'. 3. Updated monitoring point description and included new figure 11.

5. Conclusion

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

5.1 Summary of amendments

Table 7 provides a summary of the proposed amendments and will act as record of

implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 7: Summary of licence amendments

Condition no.	Proposed amendments
2	Amended to reflect standard condition wording.
3	Modified table to be general rather than specific to tailings. Included discharge point of spray field for treated wastewater
17	Table 3 TSF2 frequency of monitoring changed from specified months to 'quarterly'
29	Inclusion of the spray field pipeline
30	Replacement of old condition to include emissions and discharge monitoring for wastewater treatment plant parameters.
31	Cross referenced the discharge point regarding discharge of treated effluent
32	Replaced redundant condition with nutrient loading rate limits for treated effluent discharge. Altered table numbering thereafter.
33	Changed wording of 'irrigation area' and cross referenced discharge point for consistency
Figure 4,5,6,7	Replaced as per applicant updates to figures
Figure 9	Addition of figure 9 wastewater treatment plant infrastructure and discharge location
60-62	Addition of standard records and reporting conditions as per the new licence template
Definitions	Added quarterly definition to correspond with change to condition 17.

References

1. BHP (2024), BHP Nickel West Leinster Nickel Operations Licence L4612/1989/1 Proposed Wastewater Treatment Plant and Administrative Changes, Western Australia.
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water 2008, Water Quality Protection Note 22 - Irrigation with nutrient-rich wastewater.
4. Department of Water and Environmental Regulation (DWER) 2020a, *Guideline: Risk Assessments*, Perth, Western Australia.
5. Department of Water and Environmental Regulation (DWER) 2020b, *Guideline: Environmental Siting*, Perth, Western Australia.