



Decision Document

Environmental Protection Act 1986, Part V

Proponent: **BHP Billiton Nickel West Pty Ltd**

Licence: **L5533/1976/11**

Registered office: 125 St Georges Tce
PERTH WA 6000

ACN: 004 184 598

Premises address: Kambalda Nickel Concentrator
Durkin Road
Mining Tenements ML15/149, ML15/150, lease agreement over part of Lot 13 on DP49832-K173678L, easement over part of Lot 13 on DP49832-K173679E and lease agreement over portion of M26/317 KAMBALDA WA 6442

Issue date: Thursday, 03 October 2013

Commencement date: Saturday, 05 October 2013

Expiry date: Thursday, 04 October 2018

Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER) has decided to issue an amended licence. DER considers that in reaching this decision, it has taken into account all relevant considerations and legal requirements and that the Licence and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by: Cristina Angel
Licensing Officer

Decision Document authorised by: Jonathan Bailes
Delegated Officer



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1 Purpose of this Document

This decision document explains how DER has assessed and determined the application and provides a record of DER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER's assessment and decision making under Part V of the *Environmental Protection Act 1986*. Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.



2 Administrative summary

Administrative details		
Application type	Works Approval <input type="checkbox"/>	New Licence <input type="checkbox"/>
	Licence amendment <input checked="" type="checkbox"/>	Works Approval amendment <input type="checkbox"/>
Activities that cause the premises to become prescribed premises	Category number(s)	Assessed design capacity
	5	50,000 tonnes or more per year
Application verified	Date: N/A	
Application fee paid	Date:	
Works Approval has been complied with	Yes <input type="checkbox"/>	No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
Compliance Certificate received	Yes <input type="checkbox"/>	No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
Commercial-in-confidence claim	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Commercial-in-confidence claim outcome		
Is the proposal a Major Resource Project?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Is the proposal subject to Ministerial Conditions?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i>)?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i>)?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Is the Premises within an Environmental Protection Policy (EPP) Area	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Is the Premises subject to any EPP requirements?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>



3 Executive summary of proposal and assessment

BHP Billiton Nickel West Pty Ltd operate the Kambalda Nickel Concentrator (KNC) located 1.5km east of Kambalda, approximately 60km south of Kalgoorlie. Nickel ore is supplied to the KNC premises from third-party mines in the Kambalda Widgiemootha area. The site produces 35,000 to 40,000 tonnes of nickel-in-concentrate per year with an average 12-15% of nickel from approximately 1.4 million tonnes of ore that contains 2 to 3% nickel. The nickel concentrate is then sent via rail to the Kalgoorlie Nickel Smelter where nickel-in-matte is produced with an average nickel concentration of approximately 68% nickel.

The premises is situated in an arid region of Australia and the long-term rainfall for the area is approximately 265mm with average monthly rainfall ranging from 14-30mm. Between late December and March, the area can be subject to sub-tropical depressions or decaying cyclones from the north which can cause intense periods of high rainfall and flooding. These storm events can generate large volumes of stormwater runoff over short periods of time. The premises is also situated on the western edge of Lake Lefroy, a salt lake which rarely contains water. The lake bed lies at 289m AHD and the catchment for the lake includes land up to 380m AHD and extends to include the KNC premises and land approximately 2km west of the site boundary.

At the KNC premises clean stormwater (water diverted around the premises), dirty stormwater (stormwater from within the premises), and process return water from the tailing storage facility all collect in the same water storage facility, the Return Water Dam (RWD). Built in the 1970's, the RWD is unlined and was constructed using compacted clay core overlain by gravel. The capacity of the dam is not adequate to contain process water and stormwater from the total catchment area of 160ha during high rainfall storm events. Between 2010 and 2015, there were a number of overflow events from the RWD. During 2016 KNC developed and submitted a Corrective Action Plan (CAP) to address the issue of water from the RWD overflowing to the environment. The CAP provides a number of recommendations, and this Licence amendment is sought by the Licensee to implement these changes and alter the management of stormwater and process water at the premises.

The proposed changes include diverting stormwater around the premises through the creation of a stormwater diversion channel along the northern boundary of the premises. This will reduce the stormwater catchment area from 160Ha to 56Ha. Stormwater from this area will no longer drain into the premises and instead will drain towards Lake Lefroy.

Return water from the Tailings Storage Facilities (TSFs) will no longer be stored in the unlined RWD and will be directed towards an existing lined dam, the 'Cons 2 Dam'. The 'Cons 2 Dam' was previously used to impound wet concentrate during 2008 when the Kalgoorlie Nickel Smelter was shut down for maintenance for an extended period. However, since 2010 it has remained unused. The capacity of this dam is 15,000m³, and it is not designed to overflow. Surplus process water will no longer be diverted to the RWD and will be directed to the 'Cons 2 Dam'. The existing RWD will remain as a stormwater runoff dam for the 56ha hardstand processing plant area. On this basis, it still has the ability to receive contaminated runoff.

Other changes to this Licence include the removal of the salinity limit for discharge water into the leach drain for wash down water from the Surface Mobile Equipment (SME) wash down facility and the Light Vehicle (LV) wash down facility. An amendment to the premises boundary to include land which contains return water lines and tailings deposit lines is also included. This land is owned by Independence Group, and the Licensee has legal access via an easement. Water monitoring 'Surface Location 1' has also been amended to remove the requirement to monitor Standing Water Level (SWL) as this location is a seepage recovery pond not a groundwater bore. Additional administrative changes have also been made to reflect changes implemented within DER.



4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987*, and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision, they are detailed in the decision document.

DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Definitions	NA	Definitions have been updated to remove the reference to terminology associated with deleted conditions and to reflect administrative changes implemented within DER. A definition for HDPE has been included as this term is used in the Licence and is not clearly defined within the licence. A definition for the ANZECC and ARMCANZ 2000 Guidelines is also provided.	
Dust – General Requirement	5 & 7(iii)	<p>Management of fugitive dust from the premises has not significantly changed since the previous licence was issued. However, in accordance with administrative changes implemented within DER, the generic fugitive dust condition has been removed from the licence.</p> <p><u>Emission description</u> <i>Emission:</i> Fugitive dust emissions generated during operation from vehicle movements, cleared areas, stockpiles, conveyors, crushing activities, and the TSFs. Dust will contain soluble nickel and other metals which are toxic at high concentrations. Construction activities including earthworks have the potential to generate dust.</p> <p><i>Impact:</i> Dust and nickel emissions can be harmful to human health and the environment. Elevated total suspended particulates (TSP) can impact on vegetation by smothering and through abrasion. Particulate matter less than 10 microns in diameter can be inhaled deep into the lungs creating human health impacts. Nickel is required by many organisms. However, it is known to be highly toxic once a threshold value is reached. As Lake Lefroy is usually dry and hypersaline when it contains water, it is unlikely that nickel compounds will impact on biota.</p>	<p><i>Environmental Protection Act 1986</i></p> <p><i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i></p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><i>Controls:</i> Use of water carts, sprinklers on conveyors, stockpiles and crushing equipment, and ongoing supervision by site personnel with the early identification of any potential dust issues. The deposition method of tailings discharge using a spigot at irregular intervals and locations across the TSF, which assist in reducing dust generation during operation of the TSFs. Crusting on the surface of the TSFs occurs naturally following drying of the tailings and serves to reduce fugitive emissions.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Possible <i>Risk Rating:</i> Moderate</p> <p><u>Regulatory Controls</u> Conditions 6 and 7 require the Licensee to undertake dust suppression activities on the nickel concentrate conveyors, transfer points, discharge points, and crushers. General provisions of the <i>Environmental Protection Act 1986</i> and the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> also apply. On this basis, generic licence condition 5 and part of licence condition 7(iii) have been removed.</p> <p><u>Residual Risk</u> <i>Consequence:</i> Moderate <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Moderate</p>	
Hazardous Chemical Storage	21 & 23	<p>Condition 21 from the previous licence version has been removed from the licence in accordance with administrative changes implemented within DER. It is the occupier's responsibility to ensure that they comply with the relevant legislative requirements for secondary activities such as the storage and handling of environmentally hazardous materials. Condition 23 of the previous licence has been removed from the licence as the discharge of compounds or solutions of cyanide, chromium, cadmium, lead, arsenic, mercury, nickel, zinc or copper to the environment is prohibited by regulation</p>	<p>DER website at: www.der.wa.gov.au</p> <p>Section 72 of the <i>Environmental Protection Act 1986</i></p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		3 of the <i>Environmental Protection (Unauthorised Discharge) Regulations 2004</i> . Furthermore, the Licensee is required to report any incident which has caused, is causing, or may cause pollution under section 72 of the <i>Environmental Protection Act 1986</i> .	<i>Environmental Protection (Unauthorised Discharge) Regulations 2004</i>
Discharge to Land	25	<p>Licence condition 25 has been amended to remove the requirement for discharge water to land to meet a salinity limit of 1800µS/cm. During commissioning of the wash equipment, it was determined that ambient groundwater salinity levels are in excess of this value.</p> <p><u>Emission description</u> <i>Emission:</i> Treated wastewater from vehicle wash areas discharged to land via leach drains in an already disturbed area. <i>Impact:</i> Treated wastewater will be highly saline but less saline than ambient groundwater levels. The salinity poses a risk to soil quality and will impact on the ability of vegetation root growth within the discharge impact zone over the long term. <i>Controls:</i> The leach drains are located in disturbed, designated areas away from vegetation. It is unlikely revegetation will be established in these areas.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Insignificant <i>Likelihood:</i> Possible <i>Risk rating:</i> Low</p> <p><u>Regulatory Controls</u> No limit is considered necessary for salinity levels in the wastewater discharge to land. The Licensee is not required to continue to monitor salinity in the leach drain discharge.</p> <p><u>Residual Risk</u> <i>Consequence:</i> Insignificant</p>	



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<i>Likelihood:</i> Possible <i>Risk rating:</i> Low	
Water Monitoring programme	26	Licence condition 26 has been amended to remove the requirement to monitor surface water location for SWL at "Surface Location Attachment 1". Surface Location Attachment 1 is a tailings seepage recovery pond and not a bore, and is therefore not suitable for measuring SWL. Water collected in this pond is generated from any seepage or incidental runoff from the TSF walls and pumped back into the TSF. Table 3 has been updated to remove the requirement to measure SWL at this location.	
Works-Water Management Improvement	32 - 37	Refer to Appendix A for DER's risk assessment of the proposed change to premises operation.	



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
24 June 2016	Proponent sent a copy of draft instrument	–	–
13 July 2016	The Licensee submitted comments on the proposed amendments	The Licensee provided various editorial comments. Suggested minor changes to the wording of condition 24 and condition 36 were recommended.	Editorial comments were accepted, including the inclusion of new maps to clarify the premises boundary, the location of the new water management dams, and to show monitoring locations. Conditions 24 and 36 have been updated.



6 Risk Assessment

Note: This matrix is taken from the DER Corporate Policy Statement No. 07 - Operational Risk Management

Table 1: Emissions Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High



Appendix A

Works - Water Management Improvement

Historic water management practices at the premises have not been adequate to contain contaminated water during high rainfall storm events. Significant volumes of stormwater runoff flow are generated from the 160ha catchment area, both inside and outside the premises boundary that currently feed into the RWD. The RWD is an unlined dam and has a capacity of 13,722m³. The RWD is also the repository for contaminated tailings return water and process water. Between 2010 and 2015 there were eight overflow events from the RWD following high rainfall, which discharged to the Lake Lefroy catchment. As demonstrated by the data contained in Table 1 below, the capacity of the RWD is insufficient to contain the volume of water it receives and is currently likely to overflow every 1 in 2 Average Recurrence Interval (ARI), 72-hour rainfall event, which is estimated to generate 18,000m³ of runoff. The Licensee is proposing to improve this situation by creating a diversion channel outside of the premises boundary to restrict the stormwater catchment area flowing into the RWD to approximately 56ha. The predicted volumes of stormwater generated from this smaller catchment area are significantly reduced but indicate overflow from the RWD is still possible to occur approximately every five years. This does not consider water that may already be contained within the RWD, including tailings and process return water.

Table 1: Proposed Storm-Water Runoff

ARI	Current stormwater runoff (m ³)	Proposed Stormwater runoff (m ³)
1:1	8400	7700
1:2	18000	12000
1:5	35100	19000
1:10	50000	25000
1:20	70000	34000
1:50	89800	42000
1:100	120000	54000

To improve the containment capacity of water at the site, a currently unused dam, the Cons 2 Dam, has been identified as a suitable storage facility for containing contaminated process and tailings return water. The Licensee is proposing to direct any excess process water, and tailings return water to this HDPE lined dam. The Cons 2 Dam has a capacity of 15,000m³ and will be used so that uncontrolled stormwater runoff will not be diverted into it. This dam will be able to receive excess water from the RWD during future storm events. This will significantly improve the quality of the water stored in the RWD, should it overflow following a high rainfall storm event.

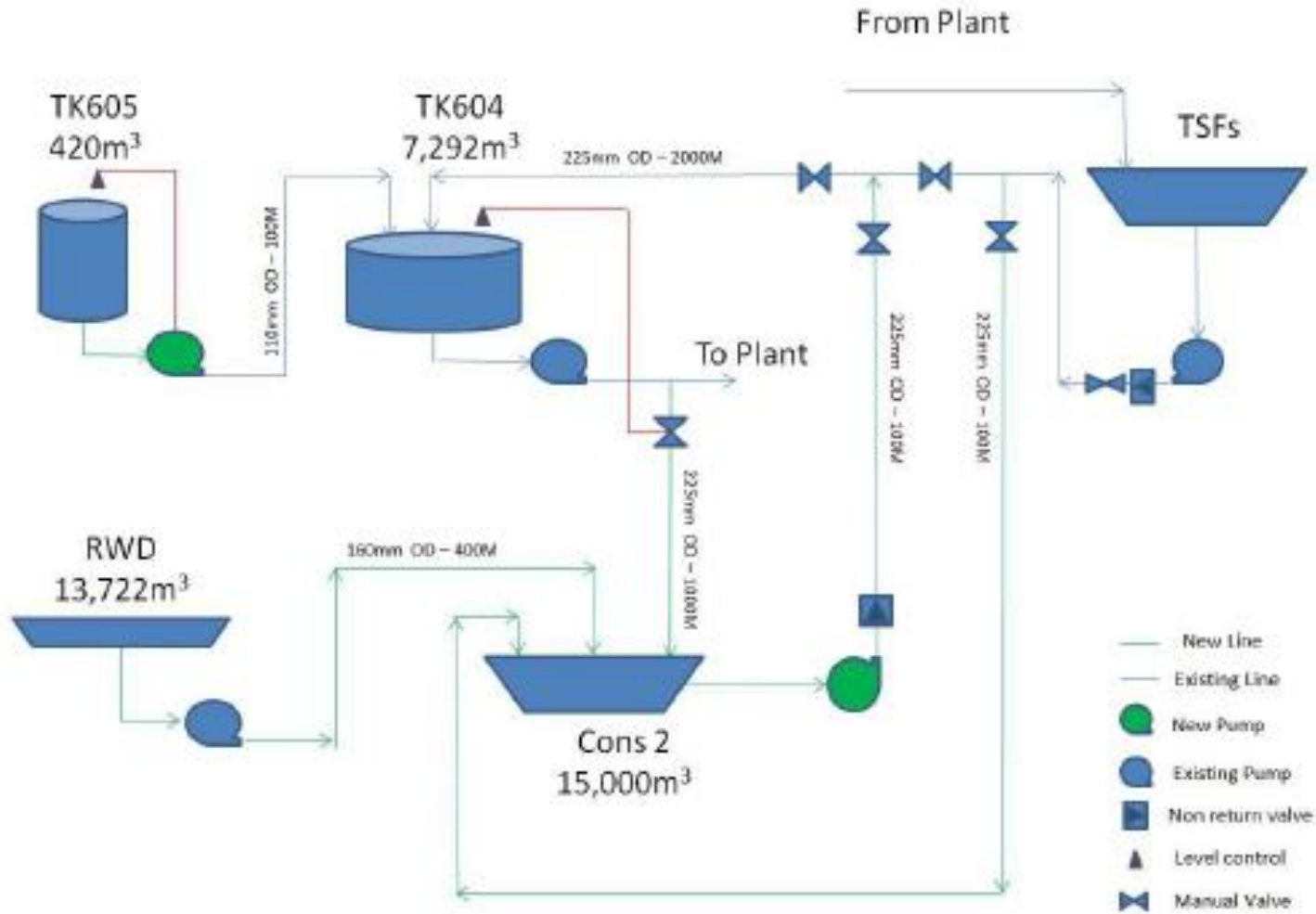
The Licensee proposes to make infrastructure changes to enable the Cons 2 Dam to become operational for the management of water. These are:

- Diversion of the tailing return water pipeline from the current RWD into the Cons 2 Dam;
- Repurpose of the existing RWD pump, to pump water from the RWD into the Cons 2 Dam;
- Installation of a new pump at the Cons 2 Dam to direct process water from the Cons 2 Dam to the concentrator for re-use.

Excess process water currently overflows from tank TK605 to the RWD. Overflow will now be diverted to a process water tank (TK604) which then feeds into the Cons 2 Dam. The proposed works involve the installation of pumps, valves and process water and tailings return lines. A schematic of the proposed changes is provided in Figure 1.



Figure 1: NKC Revised Return Water Management Operating Strategy





The Licensee intends to manage stormwater generated from significant rainfall events by maintaining a capacity of 8500m³ within the RWD and by pumping up to 12,000m³ of water from the Cons 2 Dam back into the process. On this basis, the Licensee expects to be able to store approximately 20,500m³ of potentially contaminated stormwater at any one time between the Cons 2 Dam and the RWD. On the basis of the information provided in this application, the RWD is expected to overflow to the Lake Lefroy catchment area approximately once every five years. The quality of the water is expected to be significantly improved as it will not consist solely of process or tailings return water. The risk of any residual contamination from the overflow of the RWD will be addressed by requiring the company to develop appropriate discharge criteria through the development of a Stormwater Discharge Management Plan.

Stormwater Discharge Management Plan

Emission: Discharge of process water and tailings return water to the environment due to overtopping of the Cons 2 dam, failure of the Cons 2 Dam walls, and seepage through the base of the dam. Discharge of contaminated water from the RWD to the environment.

Impact: Contamination of surrounding land and infiltration of contaminated water into groundwater. Runoff contaminated with metals entering Lake Lefroy through surface and groundwater flow. Potential long-term bioavailability of chemical contaminants to organisms within Lake Lefroy. The discharge of contaminated water leaving the premises may be conveyed over time to Lake Lefroy, which is a salt lake environment with seasonal wet and dry periods. The total load of contaminants received by the Lake is considered an appropriate factor to consider, as some of the metal and metalloid products may remain in a biologically available form for an extended period of time, potentially impacting organisms that inhabit the lake environment.

Controls: Existing management measures include the HDPE lining of the Cons 2 Dam, the containment infrastructure of the TK604 and TK605 tanks, the visual inspections of tailings and return water delivery lines one to three times daily depending on site operations, the maintenance of a minimum 300mm freeboard on storage facilities containing contaminated materials, and the bunding and secondary containment of pipelines and transfer lines, including catch pits at low points. System telemetry is also used to monitor pressure along pipelines to help detect leaks and failures.

Risk Assessment

Consequence: Major

Likelihood: Possible

Risk rating: High

Regulatory Controls:

Condition 34 requires the Licensee to submit a compliance document post completion of the water management improvement works to verify that the works were completed in accordance with the amendment application supporting information.

Condition 35 has been added to the Licence to ensure that the current RWD is converted to a dedicated stormwater storage dam decreasing the likelihood of discharge of contaminated water to the Lake Lefroy catchment area. The completion of these works by 31 August 2016 will enable the risk of future overflow events to the environment to be reduced prior to the commencement of the peak rainfall event season of the summer of 2016/2017.

Condition 36 has been included in the Licence requiring the submission of a Stormwater Discharge Management Plan (SWDMP) by 31 October 2016, prior to the onset of the high rainfall season. The site, as it is currently configured, may not be able to contain the discharge of potentially contaminated stormwater from the site during rainfall events greater than 1 in 5 ARI 72-hour events. The last significant discharge event occurred in 2015. A sediment toxicity assessment is also required to ensure that guideline values are developed that provide an appropriate level of protection of any sensitive receptors that inhabit the lake.



Condition 37 specifies the requirements for the development of site-specific discharge criteria for contaminants based on background concentrations and measures of protection for biological receptors within Lake Lefroy, based on the toxicity assessment methodology contained within the ANZECC and ARMCANZ 2000 Guidelines.

Risk Assessment

Consequence: Major

Likelihood: Possible

Risk rating: High