



Partial Decision Document

Environmental Protection Act 1986, Part V

Proponent: **BHP Billiton Iron Ore Pty Ltd**

Licence: **L5415/1988/9**

Registered office: Level 1, City Square Brookfield Place
125 St Georges Terrace
PERTH WA 6000

ACN: 008 700 981

Premises address: Wheelarra Hill (Jimblebar) Iron Ore Mine
Tenements L52/109, L52/163, I126948, AM70/266 and ML244SA
NEWMAN WA 6753

Issue date: Thursday, 5 November 2015

Commencement date: Tuesday, 17 November 2015

Expiry date: Saturday, 16 November 2030

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 the Licence and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by: Haley Brunel
Licensing Officer

Decision Document authorised by: Alana Kidd
Manager Licensing – (Resource Industries)



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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	75 million tonnes per annual period
	6	23.5 gigalitres per annual period
	54	120 cubic metres per day
	64	1,580 tonnes per annual period
73	4,000 cubic metres in aggregate	
Application verified	Date: N/A	
Application fee paid	Date: N/A	
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 checked="" type="checkbox"/>	
Commercial-in-confidence claim outcome	N/A	
Is the proposal a Major Resource Project?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Was the proposal referred to the Environmental	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Referral decision No: 978, 1558,



Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?		1796, 1847, 2047 Managed under Part V <input type="checkbox"/> Assessed under Part IV <input checked="" type="checkbox"/>
Is the proposal subject to Ministerial Conditions?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No: 439, 683, 809, 857, 1021 EPA Report No: 840, 1168, 1335, 1371, 1559
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 checked="" type="checkbox"/> No <input type="checkbox"/> Department of Water consulted Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Is the Premises within an Environmental Protection Policy (EPP) Area Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes, include details here, eg Site is subject to SO ₂ requirements of Kwinana EPP.		

3 Executive summary of proposal and assessment

BHP Billiton Iron Ore Pty Ltd (BHP Billiton) operates the Wheelarra Hill (Jimblebar) Iron Ore Mine, approximately 40 kilometres (km) east of Newman in the Pilbara region of Western Australia. The closest sensitive receptor is Sylvania Pastoral Station, which is located approximately 18 km south of the project site and is the closest residence.

BHP Billiton Iron Ore operates crushing, screening and train loading infrastructure at Jimblebar. Iron Ore is sent by rail approximately 450 km to Port Hedland for ship loading and export overseas. Mine dewatering is required to facilitate the mining of ore below the water table. Abstracted water is preferentially used as a water supply for the mining operations. Water in excess of site demand is currently disposed of via reinjection or discharged to Ophthalmia Dam and/or Jimblebar and Copper Creeks.

The Licensee has applied to amend Licence L5415/1988/9 to include an additional surface water discharge point to allow for the contingency discharge of surplus mine dewater from Orebody 31 to a tributary of Jimblebar Creek. The emission point is to provide options for surplus water disposal when reuse or recycle options are not available; and during high rainfall, emergency or maintenance events. The category 6 approved production capacity remains unchanged.

At the time of this amendment, the Orebody 18 and South Jimblebar Managed Aquifer Recharge (MAR) monitoring requirements, premises address and sewage monitoring requirements have also been updated; and DER has also implemented changes to ensure that conditions are valid, enforceable and/or risk-based. Accordingly, conditions considered not to be valid, enforceable and/or risk based have been removed from the Licence.

DER has also considered whether the risk profile of emissions and discharges from the premises has significantly changed since the previous Licence was granted. No significant changes have occurred. DER's assessment and decision making with respect to the changes to the Licence are described in Table 4 of this document.



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
General conditions	Definitions	In accordance with recent administrative changes implemented within the Department, the definition of CEO has been updated and definitions for ‘Annual Audit Compliance Report’ and ‘Department’ included in the Licence.	Guidance Statement <i>Setting conditions</i> (DER, October 2015)
	Conditions 1.1.5, 1.2.1 and 1.2.2 (removed)	<p>Guidance Statement <i>Setting conditions</i> (DER, October 2015) states that conditions imposed on Licences must be valid, enforceable and/or risk based. Noting the requirements of this Guidance Statement, conditions 1.1.5, 1.2.1 and 1.2.2 have been removed from the Licence, explained further below.</p> <p>Previous condition 1.1.5 specified: <i>“The Licensee shall operate and maintain all pollution control and monitoring equipment to the manufacturer’s specifications or any relevant and effective internal management system.”</i></p> <p>This condition is not enforceable as it is not clear or certain in that the pollution control equipment and monitoring equipment required to be operated and maintained is not specified. The requirements to achieve compliance are not clear.</p> <p>Previous condition 1.2.1 specified: <i>“The Licensee shall immediately recover, or remove and dispose of spills of environmentally hazardous materials outside an engineered containment</i></p>	



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		<p><i>system.”</i></p> <p>This condition is not valid as it inconsistently regulates activities below prescribed category thresholds. DER has assessed the risk associated with spills of environmentally hazardous materials to determine if specific regulatory controls are required on the Licence.</p> <p><u>Emission description</u> <i>Emission:</i> Spills of environmentally hazardous materials, including hydrocarbons, detergents and glues/paints, outside of engineered containment systems.</p> <p><i>Impact:</i> Soil contamination, impacts to groundwater and surface water quality, ecosystem disruption, depending on nature and volume of material released to the environment.</p> <p><i>Controls:</i> The Licensee has developed the <i>Jimblebar Hub Water Management Plan</i> to satisfy condition 6 of Ministerial Statement (MS) 683, and conditions 9-2 and 10-1 of MS 857.</p> <p>Under this plan, the Licensee outlines management measures to minimise potential impacts on surface water resources, including removing spills and leaks outside of low permeability compounds for appropriate disposal.</p> <p>Regional groundwater table is typically at least 50 metres below the surface. Groundwater at this depth is unlikely to be impacted by minor spills of environmentally hazardous materials outside of containment areas.</p> <p>Creek systems in the project area are ephemeral, flowing after rainfall events. Impacts to surface water from runoff of contaminated water are unlikely if spills</p>	



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		<p>are attended to quickly.</p> <p>It is the responsibility of the Licensee to ensure compliance with other legislative requirements, including Australian Standard 1940-2004 – The storage and handling of flammable and combustible liquids, which specifies that clean up action needs to be initiated immediately following a leak or spill.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Insignificant <i>Likelihood:</i> Unlikely <i>Risk rating:</i> Low</p> <p><u>Regulatory Controls:</u> The risk associated with spills outside of engineered containment systems is low, therefore no further regulatory controls are being applied to the Licence at this time.</p> <p>The general provisions of the <i>Environmental Protection Act 1986</i> with respect to the causing of pollution and environmental harm apply, as does subsidiary legislation including the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.</p> <p><u>Residual Risk:</u> <i>Consequence:</i> Insignificant <i>Likelihood:</i> Unlikely <i>Risk rating:</i> Low</p> <p>Previous condition 1.2.2 specified: <i>"The Licensee shall:</i> (a) <i>implement all practical measures to prevent stormwater run-of</i></p>	



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		<p><i>becoming contaminated by the activities on the Premises; and</i> <i>(b) treat contaminated or potentially contaminated stormwater as necessary prior to being discharge from the Premises.¹</i> <i>Note 1: The Environmental Protection (Unauthorised Discharges) Regulations 2004 make it an offence to discharge certain materials into the environment"</i></p> <p>This condition is not enforceable as it is not sufficiently clear or certain what stormwater infrastructure is required to be constructed and maintained, or if any specific management actions are required. DER has assessed the risk associated with the discharge of potentially contaminated stormwater to determine if any further regulatory controls are required.</p> <p><u>Emission description</u> <i>Emission:</i> Discharge of potentially contaminated stormwater from operational areas to the environment.</p> <p><i>Impact:</i> Impacts to groundwater and surface water quality, ecosystem disruption.</p> <p><i>Controls:</i> Under the <i>Jimblebar Hub Water Management Plan</i> the Licensee has described key water management aspects for the operations, including treating stormwater that collects in hydrocarbon storage areas to acceptable levels prior to discharge.</p> <p>The Licensee has measures in place to minimise potential impacts on surface water resources which are also outlined in the <i>Jimblebar Hub Water Management Plan</i>, including but not limited to:</p> <ul style="list-style-type: none"> preventing uncontaminated stormwater from entering oily wastewater and wastewater treatment systems through grading and drainage designs; 	



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		<ul style="list-style-type: none"> treated contaminated or potentially contaminated runoff to achieve a TRH concentrations of less than 5 mg/L prior to discharge to the environment; installation of waste management structures at workshops, vehicle washdown bays, refuelling depots and laboratories. Structures may include protective bunding, skimmers, silt traps, fuel and oil traps, drains and sealed collection sumps. Stormwater directed away from landfill area; Appropriate storage of waste materials (lubricants, coolant, hydraulic fluids etc); and Sediment basins, vegetated buffer strips or other effective measures installed and maintained at all off-site stormwater discharge points. <p>Regional groundwater table is typically at least 50 metres below the surface. Creek systems in the project area are ephemeral, flowing after rainfall events.</p> <p><u>Risk Assessment</u> <i>Consequence: Minor</i> <i>Likelihood: Rare</i> <i>Risk rating: Low</i></p> <p><u>Regulatory Controls:</u> Appropriate stormwater management is implemented under the <i>Jimblebar Hub Water Management Plan</i>, required under MS 683 and 857.</p> <p>The site will be subject to DER compliance inspections; including an inspection of stormwater management infrastructure, and an evaluation of the effectiveness of procedures and infrastructure in place to manage stormwater.</p> <p>The general provisions of the <i>Environmental Protection Act 1986</i> with respect</p>	



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		<p>to the causing of pollution and environmental harm apply, as does subsidiary legislation including the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.</p> <p>Due to the low risk and management practices implemented on site, no further regulatory controls are required on the Licence at this time.</p> <p><u>Residual Risk:</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Rare <i>Risk rating:</i> Low</p>	
Premises operation	Condition 1.2.3 (previously 1.3.3)	The tyre disposal requirements outlined in Table 1.2.2 have been removed as these are duplicated requirements outlined in the <i>Environmental Protection Regulations 1987</i> .	Application supporting documentation
Point source emissions to surface water and monitoring	Condition 2.2.1	The Licensee is currently developing the Orebody 31 deposit at Jimblebar. An additional emission point to surface water is being included on the Licence to allow for the ongoing contingency discharge of surplus mine dewater from Orebody 31 to a tributary of Jimblebar creek. DER's assessment and decision making with respect to this point source emission to surface water is detailed in Appendix A.	<p>Orebody 31 Iron Ore Mine Project – Environmental Referral Document, (BHP Billiton Iron Ore Pty Ltd, March 2015)</p> <p>Surplus Water Management Plan – Orebody 31, (Version 1, BHP Billiton Iron Ore Pty Ltd)</p> <p>Eastern Pilbara Water Resource Management Plan (Version 3, BHP Billiton Iron</p>



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Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
			Ore Pty Ltd)
Point source emissions to groundwater and monitoring	Condition 2.3.1 and 3.3.1	<p>Orebody 18 MAR The construction of two reinjection bores to manage surplus water at Orebody 18 was approved under Works Approval W5808/2015/1. The construction and operating requirements related to this MAR program were subsequently integrated into the Licence via a Licence amendment issued 21 April 2016.</p> <p>Injection bore HMG0056P has been converted from a production bore to a reinjection bore and is currently operational. The second production bore, HMG0055P, which was to be converted into reinjection bore, is not suitable as the bore column has failed and is now full with gravel which cannot be flushed. To maintain surplus water management at Orebody 18, the Licensee is substituting HMG0055P for the nearby HMG0054P.</p> <p>Bore HMG0054P is located 1 km west of HMG0055P and is screened in the same Tertiary alluvium and Paraburdoo Dolomite which is better suited for injection compared to the Tertiary alluvium and Marra Manda Iron Formation. The Licensee has advised that in combination with the commissioned reinjection bore HMG0056P, there will be enough capacity to manage small volumes of surplus water from Orebody 18; at a rate of 1 ML/day ranging to 3 ML/day during peak times.</p> <p>Condition 2.3.1 has been updated to replace injection bore HMG0055P with HMG0054P. Condition 3.3.1 specifies the monitoring requirements for point source emissions to surface water and has been updated to reflect the change to the reinjection bores at Orebody 18.</p>	Application supporting documentation
Point source emissions to land and monitoring	Condition 2.4.1 and 3.4.1	<p>Wheelarra Hill Workshop Wastewater Treatment Plant (WWTP) The Wheelarra Hill Workshop WWTP has a design capacity of 8 m³ per day. The WWTP is a sequencing batch reactor type plant which operates the extended aeration mode of the activated sludge process. Treated wastewater</p>	General provisions of the <i>Environmental Protection Act 1986</i>



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		<p>from this facility is discharged to an unlined evaporation pond, which also receives treated water from the Wheelarra oily water separator.</p> <p>Under the Guidance Statement <i>Licensing and works approval process</i> (DER, September 2015), the Wheelarra Hill Workshop WWTP is considered a secondary activity and therefore, not subject to licence conditions.</p> <p>Monitoring results provided in the 2014-2015 Annual Environmental Report for the WWTP indicates that the quality of water discharged to the unlined pond is unlikely to pose a risk to the receiving environment.</p> <p>Condition 2.4.1 has been updated to remove the reference to Wheelarra Hill Workshop WWTP. Condition 3.4.1 has been updated to remove the requirements to monitor parameters associated with the WWTP waste stream, being Biochemical Oxygen Demand, Total Suspended Solids, Total Nitrogen, Total Phosphorus and Faecal Coliforms.</p> <p>It is noted that the general provisions of <i>the Environmental Protection Act 1986</i> with respect to the causing of pollution and environmental harm apply, as does relevant subsidiary legislation including the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.</p>	<p><i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i></p> <p>Guidance Statement <i>Licensing and works approval process</i> (DER, September 2015)</p> <p>Application supporting documentation</p>
Ambient environmental monitoring	Condition 3.5.1	<p>South Jimblebar MAR Monitoring Program</p> <p>The Licensee currently operates a MAR and creek discharge program at South Jimblebar to provide surplus water management options for the South Jimblebar mining area. The program is currently comprised of three operating reinjection bores, and two creek discharge locations to Jimblebar Creek (only one of which has been commissioned).</p> <p>A comprehensive monitoring network of seven monitoring bores provides oversight of potential mounding and hydraulic connectivity. Two of these bores, JBGW0020M and JBGW0064M, have been impacted by a progressing</p>	Application supporting documentation



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		<p>waste dump making them no longer serviceable as monitoring bores.</p> <p>Condition 3.5.1 has been updated to remove monitoring bore JBGW0064M and replace it with JBGW0073M. The replacement bore is situated near reinjection bore JBGW0076P and has long-term records dating back to 2010. Monitoring results from the replacement bore demonstrate that it is appropriately located to identify changes to groundwater levels as a result of reinjection.</p> <p>Monitoring bore JBGW0020M was destroyed in May 2016 as part of a waste dump expansion, so has been replaced with monitoring bore HSJ0169M. The bore is to be located as close as possible to the original location of JBGW0020M. Historical records indicate that water levels in bore JBGW0020M responded primarily to dewatering and showed little response to reinjection.</p> <p>Orebody 18 MAR Monitoring Program The ambient groundwater monitoring requirements have been updated to include an additional monitoring bore to the west of the new injection bore HMG0054P; required to provide a cross sectional view of any mounding or mixing as result of reinjection. Condition 3.5.1 has been updated to include monitoring bore HMG0109M, which will complement the existing monitoring network.</p>	
Information	Condition 4.1.2	Condition 4.1.2 relating to the annual compliance report, has been updated to reflect recent administrative changes implemented within the Department. Table 4.2.1 has also been updated to reflect the removal of the compliance report template from the Licence. The Licensee will be required to access the form on DER's website.	N/A
	Condition 4.3.1	Notification requirements related to the submission of compliance documentation and a commissioning report for Orebody 18 are specified under	



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		condition 4.3.1. These requirements will continue to apply to the works related to Orebody 18, including the replacement of the second reinjection bore.	
Licence duration	-	In accordance with DER's Guidance Statement, <i>Licence Duration</i> , a duration period of 15 years has been previously specified for this Licence.	Guidance Statement, <i>Licence Duration</i> (DER, November 2014)



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
15/09/2016	Proponent sent a copy of draft instrument	<p>Table 1.2.1 – request that the specification in Table 1.2.1 be updated to reflect that the quantity limit applies to the outflow, not the inflow.</p> <p>Table 3.2.1 – request that the frequency for monitoring of FNJV0150 be changed from 'Quarterly' to 'Quarterly (when discharging)', as it may not always be possible to collect a hydrochemistry sample from this discharge location.</p>	<p>Table 1.2.1 has been updated with a note that specifies that the quality limit for the sewage treatment is measured at outflow.</p> <p>Change accepted and Table 3.2.1 has been updated.</p>



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

Point Source Emissions to Surface Water

Orebody 31 – Jimblebar Creek tributary discharge

Orebody 31 has significant dewatering requirements as 70% of the orebody is located below the water table. Water abstracted from dewatering activities is preferentially used as a water supply and supports Orebody 31 mining activities. Water demands are anticipated to range between 0.75 and 3.65 gigalitres per annum (GLpa) depending upon the production activities and climate.

Surplus water management for Orebody 31 has two aspects. The first is ongoing discharge of up to 16.2 GLpa to Ophthalmia Dam and the second is short-term contingency discharge to a tributary of Jimblebar Creek during emergency or high rainfall events when stormwater management may be required. The construction and operation of the Ophthalmia Dam discharge point has been approved by DER under an amendment to Licence L5415/1988/9 issued 21 April 2016.

On 9 September 2015 the Licensee commenced a hydrodynamic trial which involved up to 2.5 GLpa of groundwater being discharged to the tributary of Jimblebar Creek. The main objectives of the trial were to improve the understanding of the required orebody dewatering volumes and assess the capacity of Jimblebar creek to receive surplus mine dewater. DER approval was not required under Part V of the EP Act as the proposed activities were outside of an already prescribed premise and water was not being abstracted for the purpose of mining.

The trial is nearing completion and the Licensee is now seeking to include the creek line emission point on the licence to allow for the ongoing contingency discharge of surplus mine dewater from Orebody 31.

The development of Orebody 31, including the dewatering and discharge of surplus dewatering water to Ophthalmia Dam and Jimblebar Creek, was assessed by the EPA and approved under Ministerial Statement 1021 (MS1021) on 12 November 2015. Clearing associated with the project has been undertaken using Ministerial Statement 1021 and Native Vegetation Clearing Permits CPS 2296/3, CPS 2527/4, CPS 3012/2, CPS 3547/2 and CPS 6834/1 (currently under assessment by the Department of Mines and Petroleum).

The surplus water discharged to Ophthalmia Dam will be managed in accordance with *the Eastern Pilbara Surplus Water Management Plan* (BHPBIO, version 3) and the *Orebody 31 Surplus Water Management Plan* (BHPBIO, version 1.0). The *Eastern Pilbara Surplus Water Management Plan* has been developed to meet conditions 7 and 8 of MS1021, and has been endorsed by the OEPA.

The management of surplus water, as described in these plans is in accordance with the Department of Water Policy 20.09 *Use of Mine Dewatering Surplus*, which stipulates that mine dewatering volumes must first be used for mitigation of environmental impacts and fit-for-purpose onsite activities. Any dewatering volumes that remain after these requirements have been met constitute mine dewatering surplus with options for management as follows:

1. Transfer water to meet operational demands;
2. ReInjection back into an aquifer; and
3. Controlled release to the environment.

DER's assessment of the discharge of surplus mine dewater from Orebody 31 to Jimblebar Creek is detailed below.



Normal operation

Emission description

Emission: Contingency discharge of surplus mine dewater to a tributary of Jimblebar Creek during high rainfall, emergency or maintenance situations. Water discharged will be fresh to marginal, ranging in pH from 7.2 to 8.7 and salinity between 900 to 1800 $\mu\text{S}/\text{cm}$.

The water quality is based on a compilation of water quality sampling from 15 existing production bores as well as ongoing water sampling from the three pumping bores as part of the Orebody 31 hydrodynamic trial. Laboratory results indicate no parameters are outside the site specific water quality thresholds.

Impact: Potential impacts to riparian flora and vegetation from waterlogging of soils due to discharge occurring during natural no-flow conditions. The baseline environmental survey has identified *Acacia citrinoviridis* as a species which could potentially be impacted by ongoing saturation of the root zone.

Potential impacts to downstream water quality. Jimblebar Creek is a major ephemeral tributary of the upper portion of the Fortescue River catchment, which drains into the Fortescue Marsh around 80 km north of Orebody 31.

Creek bed erosion at emission point.

Controls: The Licensee has developed the *Eastern Pilbara Water Resource Management Plan* (BHPBIO, version 3.0) to meet the requirements of conditions 7 of MS1021, which requires BHPBIO to manage the discharge of surplus mine dewater from Orebody 31 in a manner that minimises impacts to the riparian vegetation along Jimblebar Creek.

Under this plan, the Licensee has established the following thresholds:

- dewater discharge extending no further than 16 km from the discharge point under natural no-flow conditions (also been specified under MS1021);
- mine dewater remaining in the main drainage channel of Jimblebar Creek under natural no-flow conditions; and
- undertaking monthly monitoring for pH and total dissolved solids (TDS) at the discharge point, with pH levels between 6 and 9 and TDS to be less than 3,000 mg/L.

The adaptive management hierarchy for Jimblebar Creek focuses on investigation, action and mitigation of potential environmental impacts and exceedances of management thresholds. Exceeding one of the threshold values will activate the adaptive management hierarchy, as described below.

1. Investigation Stage

Investigation is undertaken to evaluate and characterise the change identified. Results may inform future surplus water discharge programs (timing, volume, rate of discharge etc) and management options proposed, should the threshold values be reached.

2. Action Stage

Prepares and implements water management options to avoid potential impact to a receiving receptor or exceedance of threshold values. If reached, the Licensee will initiate an assessment to investigate whether there is a potential for the unpredicted trend to impose a negative impact on the environment, and if so, recommend further adaptive management options, including potential corrective actions.



3. Mitigation Stage

Corrective action is immediately required to prevent unacceptable impact or reverse the trends. Corrective actions to be identified at the Action Stage.

The Licensee will report to the OEPA within 30 days of a management threshold being exceeded, in accordance with the requirements of MS1021.

The Licensee has also committed to at least three months of no discharge outside of natural flow conditions within Jimblebar Creek to minimise the risk to riparian vegetation from the ongoing saturation of their root zone.

Riparian vegetation health will be monitored in order to verify the effectiveness of water management objectives on vegetation health. On-ground monitoring of indicator tree species within Jimblebar Creek will be undertaken 6 months after dewater discharge has occurred under natural no-flow conditions.

Erosion control measures have been implemented to minimise scouring of the creek bed during discharge. The discharge point consists of a single outlet structure with perforations designed to distribute and dissipate energy as the flow discharges to the creek. Rip rap has been placed over and around the outlet structure to further encourage energy dissipation.

Downstream impacts to water quality are unlikely due to the anticipated maximum extent of the wetting front (16 km) and anticipated water quality.

A flow meter has been installed 500 m upstream of the discharge location.

Risk Assessment

Consequence: Moderate

Likelihood: Rare

Risk Rating: Moderate

Regulatory Controls

Ministerial approval for the development of the Orebody 31 Iron Ore Mine was issued under MS1021, published on 12 November 2015.

The report and recommendations of the EPA (Report number 1559, EPA, September 2015) recommended the application of conditions relating to the management of potential impacts to the riparian vegetation along Jimblebar Creek. Condition 7 of approved Ministerial Statement 1021 requires the occupier to prepare a management plan, in consultation with the Department of Water, to manage impacts to riparian vegetation along Jimblebar Creek.

Condition 2.2.1 of the Licence has been updated to authorise the contingency discharge of mine dewater from Orebody 31 to a tributary of Jimblebar Creek.

Condition 3.2.1 has been updated to require flow and water quality monitoring during discharge events.

To avoid regulatory duplication with Part IV of the EP Act, controls relating to vegetation health monitoring have not been applied to the operating Licence. Sufficient regulatory controls are applied via the *Eastern Pilbara Water Resource Management Plan*, which has been developed and implemented under condition 7 of MS1021, and endorsed by the OEPA.

Residual Risk



Consequence: Moderate

Likelihood: Rare

Risk Rating: Moderate

Abnormal or emergency

Emission description

Emission: Discharge of dewatering water to the environment as a result of pipeline rupture

Impact: Impacts to soil and groundwater, vegetation impacted through inundation.

Controls: The water quality from the Orebody 31 aquifer is fresh to marginal, ranging in pH from 7.2 to 8.7 and salinity between 900 to 1800 $\mu\text{S}/\text{cm}$. The water quality is based on a compilation of water quality sampling from 15 existing production bores as well as ongoing water sampling from the three pumping bores as part of the Orebody 31 hydrodynamic trial. Laboratory results to date indicate no parameters are outside the site specific water quality thresholds.

Flowmeters will be located at the start and end of the main transfer pipeline to detect possible leaks between the transfer pump station and discharge point. The majority of the main transfer pipeline will be located adjacent to the main road into Jimblebar, making any leaks easily visible.

Risk Assessment

Consequence: Insignificant

Likelihood: Unlikely

Risk Rating: Low

Regulatory Controls

The risks associated with overtopping of water storage ponds and pipelines rupturing has been assessed as low. No specified conditions relating to the management of this infrastructure has been included in the Licence.

Residual Risk

Consequence: Insignificant

Likelihood: Unlikely

Risk Rating: Low