Government of Western Australia
Department of Environment Regulation

Decision Document

Environmental Protection Act 1986, Part V

Proponent: Big Bell Gold Operations Pty Ltd

Licence: L8934/2015/1

Registered office:	Level 3, 123 Adelaide Terrace EAST PERTH WA 6004
ACN:	090 642 809
Premises address:	Central Murchison Gold Project – Big Bell Mining Tenements M20/17, M20/99, M20/192, L20/21 and L20/40 CUE WA 6640
Issue date:	Thursday, 3 March 2016
Commencement date:	Monday, 7 March 2016
Expiry date:	Friday, 6 March 2026

Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER), has decided to issue a licence. DER considers that in reaching this decision, it has taken into account all relevant considerations and that 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)

Contents

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 ☐ New Licence ☐ Licence amendment ☒ Works Approval amendment ☐	
Activities that cause the premises to become prescribed premises	**Category number(s)**	**Assessed design capacity**
	6	3,500,000 tonnes per annual period (discharged)
Application verified Application fee paid	Date: 4 December 2015 Date: 22 December 2015	
Works Approval has been complied with Compliance Certificate received	Yes☒ No☐ N/A☐ Yes☒ No☐ N/A☐	
Commercial-in-confidence claim	Yes☐ No☒	
Commercial-in-confidence claim outcome	N/A	
Is the proposal a Major Resource Project?	Yes☐ No☒	
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986*?	Yes☐ No☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐

Is the proposal subject to Ministerial Conditions?	Yes☐ No☒	Ministerial statement No: EPA Report No:
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the *Environmental Protection Act 1986*)?	Yes☐ No☐ Department of Water consulted Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area Yes☐ No☒ If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes☐ No☒ If Yes, include details here, eg Site is subject to SO_2 requirements of Kwinana EPP.		

3 Executive summary of proposal and assessment

The Central Murchison Gold Project (CMGP) is owned by Westgold Resources Limited and is operated by its wholly owned subsidiary Big Bell Gold Operations Pty Ltd (BBGO). The CMGP consists of three project areas; Big Bell, Day Dawn and Cuddingwarra. At this stage, BBGO have developed the Big Bell and Day Dawn project areas.

This Licence is for the Big Bell project area. The Day Dawn project area operations is subject to a separate Licence, L8907/2015/1.

The CMGP has been assessed as prescribed premises category 6, under Schedule 1 of the *Environmental Protection Regulations 1987*. Category 6 is defined as 'Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore'. Ore mined from Big Bell is processed at the companie's Bluebird Gold Mine processing plant, operating under Licence L4496/1988/1.

BBGO undertakes dewatering of the projects open pits (Big Bell, Fender and Shocker/1600) and underground voids, utilising abstracted water for mining purposes and dust suppression on site. A maximum of 4.3 gigalitres (GL) will be abstracted per year. Dewatering water in excess of site requirements is discharged to Lake Austin, located approximately 24 kilometres (km) to the south of the project area.

It is anticipated that in the first year of dewatering, being 2016, up to 1 GL of dewatering effluent will be discharged to Lake Austin. This will increase to 2.8 GL per year for the following two years, after which discharge to Lake Austin is anticipated to cease. The approved design capacity on the Licence is consistent with Works Approval W5357/2013/1, which assessed and approved construction of the Big Bell dewatering operations.

Lake Austin is an ephemeral system located approximately 15 km south of Cue. The total surface area of the lake is approximately 773 km^2, and excluding the numerous islands equates to about 444 km^2. The lake is bisected by the Great Northern Highway, with a small gravel causeway across the western section. A portion of land situated along the northern flank of the lake is managed by the Department of Parks and Wildlife (former Lakeside pastoral lease), and is set aside for conservation purposes.

An aquatic assessment of Lake Austin was undertaken by Outback Ecology in 2011. During the aquatic assessment the Lake was flooded and provided an opportunity to obtain water quality data. Salinities of the surface waters ranged from 14,200 mg/L total dissolved solids (TDS) (hyposaline) to 250,000 mg/L (hypersaline) TDS. The major constituent ions were sodium (Na) and chloride (Cl). Concentrations of most metals and trace elements were below detection, with copper being the exception, exceeding the ANZECC value for marine waters (0.008 mg/L) at six of the seven sites. TDS in groundwater at Lake Austin is greater than 200,000 mg/L.

Groundwater was sampled from the Big Bell main shaft in 2012, at depths of 100 m, 150 m, 200 m, 250 m, and 300 m below the shaft collar. The analyses showed that the water in the underground workings is saline, ranging from 9,600 mg/L TDS at 100 m to 15,100 mg/L TDS at 250 m.

Big Bell pit and underground dewatering takes place from existing voids without the need to install dedicated dewatering bores. The first 3,000 megalitres (ML) of dewatering down to 250 metres below ground surface is undertaken using a pair of electric submersible pumps, suspended within the old haulage shaft. Each pump is capable of a peak flow of 8.0 ML/day with a 6.5 ML/day average over the project. Water is pumped through a 315 millimetre (mm) outer diameter high density polyethylene (HDPE) pipeline to the Shocker and 1600 pits. Water from the Fender pit is also directed to the Shocker and 1600 pits. The Shocker and 1600N pits are used for water storage with the water level maintained at 10 metres below ground surface.

The water pumped into the Shocker and 1600N pits is then pumped to a 7.5 mm HDPE lined transfer dam with a permeability of 2×10^{-10} metres per second. The dam has a capacity of 8,910 m^3 and provides a retention time of 32 hours at 6.5 ML/day. The transfer dam measures 90 m long by 33 m in width and 3 m in depth. The purpose of the transfer dam is to allow suspended solids to settle prior to the final discharge to Lake Austin.

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	N/A	Emission Description *Emission: S*tormwater contaminated with hydrocarbons from hydrocarbon storage areas. *Impact:* Contamination of surrounding land and surface water drainage systems. Potential impacts on ecology of surface water from the addition of hydrocarbons. *Controls:* Approximately 10,000 litres of diesel is stored on site to run the dewatering pumps. The 10,000 litre fuel tank is self bunded and all dewatering pumps are appropriately bunded. A hydrocarbon spill kit is stored in the vicinity of the pumps. The Licensee undertakes the transport, storage and handling of hydrocarbons and other hazardous materials in accordance with relevant industry guidelines and standards. Risk Assessment *Consequence*: Insignificant *Likelihood:* Unlikely *Risk Rating:* Low	Application supporting documentation General provisions of the *Environmental Protection Act 1986* *Environmental Protection (Unauthorised Discharges) Regulations 2004*

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		Regulatory Controls The discharge of contaminated stormwater from the premises has been assessed as a low risk, therefore no specified conditions relating to the management of stormwater have been applied to the Licence. The general provisions of the *Environmental Protection Act 1986* with respect to the causing of pollution and environmental harm apply, as well as subsidiary legislation including the *Environmental Protection (Unauthorised Discharges) Regulations 2004.* It is the occupiers responsibility to ensure they comply with relevant legislative requirements for the storage and handling of environmentally hazardous materials. Under the point source emissions to surface water conditions specified in condition 3.2.1 the Licensee is required to sample for total recoverable hydrocarbons in water discharged to Lake Austin and a limit of 15 mg/L has been applied. Exceedances of this limit will be reported to DER in accordance with the reporting requirements of this Licence. Residual Risk *Consequence*: Insignificant *Likelihood:* Unlikely *Risk Rating:* Low	
Premises operation	L1.2.1 to L1.2.5	The DER's assessment and decision making with respect to the management of the dewatering pipelines and containment infrastructure are detailed in Appendix A.	Application supporting documentation General provisions of the *Environmental Protection Act 1986*

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
			Environmental Protection (Unauthorised Discharges) Regulations 2004
Emissions general	L2.1.1	Descriptive limits will be set through conditions of the licence and therefore condition regarding recording and investigation of exceedances of limits has been included.	N/A
Point source emissions to air including monitoring	N/A	There are no significant point source air emissions associated with the project. No specified conditions relating to air emission or the monitoring of such emissions have been applied to the Licence.	N/A
Point source emissions to surface water including monitoring	L2.2.1 to L2.2.3	DER's assessment and decision making with respect to the discharge of dewatering water to Lake Austin is detailed in Appendix B.	Application supporting documentation General provisions of the *Environmental Protection Act 1986* *Environmental Protection (Unauthorised Discharges) Regulations 2004*
Point source emissions to groundwater including monitoring		Condition 2.3.1 is included in the Licence to identify the location of the dewatering discharge into the Shocker and 1600N pits. Condition 3.3.1 is included in the Licence to ensure the dewatering effluent water discharge into Shocker and 1600N pits is sampled and analyaed for particular parameters while dewatering is occurring.	Application supporting documentation General provisions of the *Environmental Protection Act 1986*

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		The Shocker pit in 2011 had a TDS of 5,100 mg/L and the 1600N pit had a TDS of 9,200 mg/L. In 2011 the Fender and Big Bell pits, from which water will be abstracted and directed to the Shocker and 1600N pits for storage, had a TDS of 5,100 mg/L and 13,000 mg/L respectively. Dewatering water is to be stored in the Shocker and 1600N pit prior to being directed to the transfer dam. Condition 3.3.1 has been applied to the Licence and requires the monitoring of volumes and quality of water discharged to the pit. The requirement to monitor for Total Recoverable Hydrocarbons has been included as there is potential for water discharge to be contaminated from the use of hydrocarbons in the underground mining operations.	*Environmental Protection (Unauthorised Discharges) Regulations 2004*
Emissions to land including monitoring	N/A	There are no point source emissions to land associated with the project. No specified conditions relating to emissions to land or the monitoring of such emissions have been applied to the Licence.	General provisions of the *Environmental Protection Act 1986* *Environmental Protection (Unauthorised Discharges) Regulations 2004*
Fugitive emissions	N/A	*Emission:* Dust emissions generated from the use of heavy machinery and vehicle movements. *Impact:* Deterioration of the local air shed, impacts to amenity. Dust emissions can be harmful to human health and the environment. Elevated total suspended particulates (TSP) can impact ambient environmental quality resulting in amenity impacts and can smother vegetation.	General provisions of the *Environmental Protection Act 1986* Application supporting documentation

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		Controls: The nearest sensitive receptor is located approximately 5 km to the north of the site. The Licensee utilises water carts on the roads, open pits, parking bays and equipment areas. Vehicle speeds are restricted on unsealed surfaces. Processing of ore will not be undertaken at the premises. <u>Risk Assessment</u> *Consequence*: Insignificant *Likelihood:* Possible *Risk Rating:* Low <u>Regulatory Controls</u> No specified conditions relating to the management of fugitive dust emissions have been applied to the Licence. The general provisions of the *Environmental Protection Act 1986* with respect to the causing of pollution and environmental harm will apply. <u>Residual Risk</u> *Consequence*: Minor *Likelihood:* Rare *Risk Rating:* Low	
Odour		There are no significant odour emissions associated with the project. No specified conditions relating to odour emissions have been applied to the Licence.	General provisions of the *Environmental Protection Act 1986*

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
Noise		There are no significant noise emissions associated with the project. No specified conditions relating to noise emissions have been applied to the Licence.	General provisions of the *Environmental Protection Act 1986* *Environmental Protection (Noise) Regulations 1997*
Monitoring general	L3.1.1 to 3.1.4	General monitoring conditions have been included in the Licence to ensure monitoring is carried out in accordance with relevant standards.	Australian Standard AS/NZS 5667.1 – Water Quality – Sampling – Guidance on the Design of sampling programs, sampling techniques and the preservation and handling of samples Australian Standard AS/NZS 5667.11 – Water Quality – Sampling – Guidance on the sampling of groundwaters Standard Methods for Examination of Water and Wastewater, American Public Health Association – American Water Works Association – Water Environment Federation
Ambient quality monitoring	N/A	The monitoring of ambient environmental conditions (eg. vegetation, groundwater, surface water etc) is not considered necessary due to the mine dewatering discharge being a temporary requirement.	General provisions of the *Environmental Protection Act 1986*

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		The appropriate location and design of the discharge point will minimise impacts to the environment. Under the Licence, monitoring of the discharge to Lake Austin is required and results are reported to DER in the Annual Environmental Report for assessment. Further consideration will be given to the implementation of ambient monitoring if mine dewatering activities at the Project are extended past 2018.	*Environmental Protection (Unauthorised Discharges) Regulations 2004*
Information		Administrative conditions including keeping of records, reporting and notification requirements have been included in the Licence.	
Licence Duration	N/A	The Licensee has advised that the mining tenements for the operations expire in 2026. In accordance with the Guidance Statement *Licence Duration,* the Licence has been issued for a period of 10 years.	Guidance Statement, *Licence Duration* (DER, November 2014)

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
4/01/2016	Application advertised in West Australian (or other relevant newspaper)	No comments received	-
23/02/2016	Proponent sent a copy of draft instrument	No comments received	-

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

Reuse of dewatering water for dust suppression

Emission Description

Emission: Use of brackish to saline dewatering water on site for dust suppression.

Impact: Contamination of surface water, groundwater and soil. Vegetation stress due to exposure to elevated concentrations of dissolved solids.

Controls: The water used for dust suppression is expected to be brackish to saline. The following measures have been implemented to prevent and monitor for impacts on vegetation:

- Roads bunded where necessary to prevent saline water runoff into the surrounding environment;
- Runoff from roads directed to drainage sumps where necessary; and
- Operators of water trucks are informed of the potential environmental impacts of saline water through inductions and training.

Risk Assessment

Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate

Regulatory Controls

Condition 1.3.2 has been applied to the Licence to ensure that the use of dewatering water for dust suppression is appropriately managed to minimise damage to surrounding vegetation.

The general provisions of the *Environmental Protection Act 1986* with respect to the causing of pollution and environmental harm will apply.

Residual Risk

Consequence: Minor
Likelihood: Rare
Risk Rating: Low

Dewatering pipelines

Emission Description

Emission: Ruptured dewatering pipelines resulting in the discharge of hypersaline dewatering water (total dissolved solids of up to 20,000 mg/L) to the environment.

Impact: Contamination of surface water, groundwater and soil. Vegetation stress due to exposure to elevated concentrations of dissolved solids.

Controls: The pipeline conveying the dewatering water to Lake Austin for discharge is a 355 mm outer diameter HDPE that is 24.3 km in length.

Sections of the pipe have either been buried or bunded and all pipes have been constructed and installed to Australian Standards and the Plastics Industry Pipe Association Guidelines. The pipeline route mainly follows routes which have been previously cleared or are highly disturbed.

Telemetry has been fitted to the pipeline and there is the capability for pumps to be automatically shut off, if required.

The Licensee undertakes visual inspections of pipes once per 12 hour shift, which includes assessing the health of riparian vegetation where it is in close proximity to the pipelines.

Risk Assessment
Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate

Regulatory Controls
Condition 1.3.4 has been applied to the Licence and requires that all pipelines containing dewatering effluent are either equipped with telemetry, automatic cut-outs or provided with secondary containment.

Condition 1.3.5 has been applied to the Licence and requires daily visual inspections of the dewatering discharge pipelines to identify any leaks and/or maintenance requirements.

Residual Risk
Consequence: Minor
Likelihood: Rare
Risk Rating: Low

Containment infrastructure
Emission: Overtopping of water storage and transfer dam or infiltration of stored water, discharging hypersaline water to the environment

Impact: Contamination of surface water, groundwater and soil. Vegetation stress due to exposure to elevated concentrations of dissolved and suspended solids.

Controls: The water level in the Shocker and 1600N pits is maintained at 10 mbs.

The transfer dam, used to settle out suspended solids, is equipped with level sensors to prevent overtopping. During operations a freeboard of at least 300 mm is maintained. The transfer dam is lined with a HDPE liner. Daily visual inspections of the water storage infrastructure is undertaken to monitor freeboard and identity maintenance requirements.

Risk Assessment
Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate

Regulatory Controls
Condition 1.3.1 has been applied to the Licence and specifies the freeboard to be maintained on the dewatering effluent storage infrastructure and the permeability of the transfer dam.

Condition 1.3.5 has been applied to the Licence and requires daily visual inspections of the dewatering discharge pipelines to identify any leaks and/or maintenance requirements.

Residual Risk
Consequence: Minor
Likelihood: Rare
Risk Rating: Low

Appendix B

Emission: Discharge of hypersaline (up to 20,000 mg/L) mine dewatering effluent to Lake Austin.

During 2016, being the first year of dewatering, approximately 1 GL is proposed to be discharged to Lake Austin. Discharge to Lake Austin for both the second and third year is expected to be 2.8 GL. After the third year of dewatering is anticipated that no further discharge to Lake Austin will occur as the mine dewater will be required for process water on site.

The water balance for the Big Bell Project area is provided in Figure 1 below.

Water Quality	Water Output	2016 (in ML)	2017 (in ML)	2018 (in ML)
Mine Dewatering (after settling)	Lake Austin	1,000	2,800	2,800
	Surface mining processes	50	50	100
	Dust suppression	50	50	200
	Underground mining operations	50	50	200
Total Water Output		**1,150**	**2,980**	**3,300**

Figure 1. Big Bell Project area water balance

Impact: Increased metal, salt, nutrient and solid loads in the aquatic habitat, impacting aquatic biota, including water birds, invertebrates and algae.

Accumulation of salt on the lake bed and subsequent dissolution and dispersion of this salt load throughput the lake. Impacts on riparian and fringing vegetation communities, altering distribution/zonation of some species.

Erosion of the lake bed at the discharge point.

Controls: The dewatering discharge point will be located approximately 900 m onto the surface of the salt lake, avoiding the lake edges and surrounding creek lines to minimise impacts on riparian vegetation, shallow and fringing habitats. When mining was last operational in the Project area, the north-western part of Lake Austin was selected as a suitable discharge point due to its highly mineralised surface and halophytic fringing vegetation. Flow is directed towards deeper parts of the basin to prevent backflow of saline water into creek lines and tributaries, further minimising potential impacts to riparian vegetation. The outfall has been fitted with flow diffusers to minimise effects of scouring and erosion on the lake bed.

It is anticipated that in total, up to 133,800 tonnes of salt may be added to Lake Austin from the Big Bell discharge. The north-west corner of Lake Austin is the deepest part of the basin and water will be mostly localised, and restricted to the vicinity of the discharge outfall. During dry conditions, the discharge water evaporates rapidly, leaving a shallow pool (less than 5 cm deep) which covers an area of between 1 km^2 and 4 km^2. This is equivalent to less than one percent of the total lake area of 222 km^2, or less than four per cent of the area of the north west corner.

In wet conditions the discharge area will increase, however due to the effects of dilution, will not impede on the natural balance of the system. Natural runoff has been shown to meander around the discharge outfall and collect further to the east. Estimated water volumes into the system during a 1 in 2 year rainfall event are 32 gigalitres (72 mm) and a 1 in 100 year rainfall event are 74 gigalitres (166 mm). The addition of up to 2.8 gigalitres from Big Bell is minimal in comparison. The Licensee

has committed to diverting discharge water to available mine pits during the first month of a complete flood event to maintain natural environmental salinity levels.

The 2011 aquatic ecology assessment found that past dewatering onto the lake has had no detectable impact on lake ecology and the anticipated water quality of the discharge water is generally within the range of natural variation recorded across the lake (Outback Ecology, January 2012).

The assessment report found that provided steps are taken to direct the dewatering discharge away from sensitive areas, the risk associated with the recommencement of dewatering discharge at Lake Austin is considered to be low.

It is anticipated that discharge to Lake Austin will be required for up to three years, after which dewatering volumes from the mine pits and underground will be used as process water and for dust suppression on site. Any disturbance associated with the dewatering discharge will be minor, localised and temporary, avoiding any long-term ecological impacts. The Licensee has taken appropriate measures to direct the discharge water away from sensitive areas and manage the discharge to avoid erosion at the discharge point.

The Licensee has indicated that comprehensive biological monitoring will be addressed through the closure plan. The extensive baseline information which is available will be used to formulate closure criteria to assess the health of aquatic communities, riparian vegetation and water quality.

Risk Assessment
Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate

Regulatory Controls
Condition 2.2.1 has been applied to the Licence and identifies the Lake Austin discharge point. The Licensee is required to monitor the volume and quality of point source emissions to surface water under condition 3.2.1. With the use of equipment and the storage of hydrocarbons underground, there is the potential for contamination of Lake Austin. Therefore the requirement of quarterly sampling of Total Recoverable Hydrocarbons has been included in condition 3.2.1 and a limit of 15 mg/L has been set. The results of this monitoring will be reported to DER in the Annual Environmental Report for assessment.

Condition 2.2.2 has been included in the Licence and requires the Licensee to minimise erosion and scouring at the discharge location and to reduce the likelihood of surface ponding.

Limits on the volume of dewatering effluent discharged to Lake Austin have been imposed through condition 2.2.2.

Residual Risk
Consequence: Minor
Likelihood: Rare
Risk Rating: Low

References
'Westgold Resources Limited Central Murchison Gold Project – Aquatic Assessment of Lake Austin', Outback Ecology Services (January 2012)