



Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number W6323/2019/1

Applicant Billabong Gold Pty Ltd

ACN 613 900 922

File Number DER2019/000394

Premises Plutonic Gold Mine
M52/148 and M52/170
MEEKATHARRA WA 6642

Date of Report 5 March 2020

Status of Report Final

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

| Term | Definition |
|-------------------------------|---|
| AACR | Annual Audit Compliance Report |
| ACN | Australian Company Number |
| AER | Annual Environment Report |
| ARI | Annual Recurrence Interval |
| Category/ Categories/ Cat. | Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations |
| CIL | Carbon in Leach |
| CS Act | <i>Contaminated Sites Act 2003 (WA)</i> |
| Decision Report | refers to this document. |
| Delegated Officer | an officer under section 20 of the EP Act. |
| Department | means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act. |
| DWER | Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the <i>Public Sector Management Act 1994</i> and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation. |
| EPA | Environmental Protection Authority |
| EP Act | <i>Environmental Protection Act 1986 (WA)</i> |
| EP Regulations | <i>Environmental Protection Regulations 1987 (WA)</i> |
| EPBC Act | <i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i> |
| Existing Licence | The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review |
| mAHD | Metres Australian height datum |

| | |
|-----------------------|---|
| m ³ | cubic metres |
| Minister | the Minister responsible for the EP Act and associated regulations |
| MS | Ministerial Statement |
| mtpa | million tonnes per annum |
| NEPM | National Environmental Protection Measure |
| Noise Regulations | <i>Environmental Protection (Noise) Regulations 1997 (WA)</i> |
| Occupier | has the same meaning given to that term under the EP Act. |
| PM | Particulate Matter |
| PM ₁₀ | used to describe particulate matter that is smaller than 10 microns (µm) in diameter |
| Prescribed Premises | has the same meaning given to that term under the EP Act. |
| Premises | refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report |
| Primary Activities | as defined in Schedule 2 of the Revised Licence |
| Review | this Licence review |
| Revised Licence | the amended Licence issued under Part V, Division 3 of the EP Act following the finalisation of this Review. |
| Risk Event | As described in <i>Guidance Statement: Risk Assessment</i> |
| RL | Reduced level |
| SWL | Standing Water Level |
| TSF | Tailings Storage Facility |
| UDR | <i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i> |
| µg/m ³ | micrograms per cubic metre |
| µg/L | micrograms per litre |
| Works approval holder | Billabong Gold Pty Ltd |

2. Purpose and scope of assessment

The Applicant has applied for a works approval to construct TSF4 and TSF5 at the Plutonic Gold Mine. Approximately 1.8 Mtpa of tailings is proposed to be deposited into TSF4 and TSF5 over a period of 5 years once operational, resulting in the storage of 9 Mt of tailings.

2.1 Application details

The Application is for a new works approval.

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

| Document/information description | Date received |
|--|-------------------|
| Works Approval Application Supporting Document, Plutonic Gold Mine – Tailings Storage Facility 4 and 5 (M52/148 and M52/170) | 15 July 2019 |
| RE: APPLICANT NOTIFICATION - APPLICATION FOR A WORKS APPROVAL - REQUEST FOR FURTHER INFORMATION | 28 August 2019 |
| RE: APPLICANT NOTIFICATION - APPLICATION FOR A WORKS APPROVAL - REQUEST FOR FURTHER INFORMATION | 26 September 2019 |
| RE: Application for a Works Approval under the <i>Environmental Protection Act 1986</i> – Request for Further Information (DWER Ref: DER2019/000394) | 29 October 2019 |
| RE: APPLICANT NOTIFICATION - APPLICATION FOR A WORKS APPROVAL (W6323/2019/1) - REQUEST FOR FURTHER INFORMATION | 26 January 2020 |
| RE: APPLICANT NOTIFICATION - APPLICATION FOR A WORKS APPROVAL (W6323/2019/1) - REQUEST FOR FURTHER INFORMATION | 4 February 2020 |

3. Background

Plutonic Gold Mine is an existing, operational gold mine. Operations comprise of underground mining and processing of ore and mineralised waste in a CIL plant with deposition of tailings into TSF2 and TSF3.

Due to a reducing surface area and increasing rate-of-rise on the existing TSF2 and TSF3 and the requirement for continual storage of tailings, TSF4 and TSF5 are required to facilitate future management of tailings at the Premises.

Table 3 lists the prescribed premises categories that have been applied for.

Table 3: Prescribed Premises Categories in the Existing Licence

| Classification of Premises | Description | Approved Premises production or design capacity or throughput |
|----------------------------|---|---|
| Category 5 | Processing or beneficiation of metallic or non-metallic ore: premises on which — <ul style="list-style-type: none"> (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam. | 1.8 Mtpa |

4. Overview of Premises

4.1 Operational aspects

The Premises is a current operating gold mine, licensed via Licence L6868/1989/12, with the following categories:

Category 5 Processing or beneficiation of metallic ore;

Category 6 Mine dewatering;

Category 52 Electric power generation;

Category 54 Sewage facility;

Category 57 Used tyre storage (general); and

Category 89 Putrescible landfill site.

During 2018, underground mining continued and Hermes satellite open pit mining operations also commenced in January 2018, contributing to the ore processed at the Premises. A total of 1,613,296 dry tonnes of ore was processed at the Premises during the 2018/2019 reporting period, including 914,317 tonnes from the Plutonic Gold Mine and 698,979 tonnes from the Hermes Project Area.

4.2 Infrastructure

The TSF4 and TSF5 facilities infrastructure, as it relates to Category 5 activities, is detailed in Table 4 and with reference to the Site Plan (attached in the works approval).

Table 4 lists infrastructure associated with each prescribed premises category. The site layout is shown in Figure 1 and the TSF4 and TSF5 design drawings are shown in Figure 2. The design footprint occupies an area of approximately 120ha and the location has been selected based on minimising clearing/disturbance envelope, proximity to mine infrastructure and tenement ownership.

Table 4: TSF4 and TSF5 facilities Category 5 infrastructure

| | Infrastructure | Site Plan Reference |
|---|--|--|
| | Prescribed Activity Category 5 | |
| Deposition of tailings into TSF4 and TSF5 | | |
| 1 | 2 x Paddock Style TSFs constructed using upstream methods | Schedule 1: Maps, Premises map of the works approval |
| 2 | 2.5 m embankment raise as follows: <ul style="list-style-type: none"> ➤ Lift 1 from embankment crest level of RL506.0m to crest level of RL508.5m with a storage capacity of 5,256,339 tonnes; ➤ Lift 2 from embankment crest level of RL508.5m to crest level of RL511.0m with a storage capacity of 8,868,978 tonnes; ➤ Lift 3 from embankment crest level of RL511.0m to crest level of RL513.5m with a storage capacity of 12,4502,312 tonnes; ➤ Lift 4 from embankment crest level of RL513.5m to crest level of RL516.0m with a storage capacity of 15,972,356 tonnes; ➤ Lift 5 from embankment crest level of RL516.0m to crest level 518.5m with a storage capacity of 22,955,982 tonnes; and | Schedule 1: Maps, Premises map of the works approval |

| | Infrastructure | Site Plan Reference |
|----|---|--|
| | <ul style="list-style-type: none"> ➤ Lift 6 from embankment crest level of RL518.5m to crest level 521.0m with a storage capacity of 26,411,001 tonnes | |
| 3 | Tailings spigots placed approximately 20m around the perimeter of TSF4 and TSF5 | Schedule 1: Maps, Premises map of the works approval |
| 4 | Central decant structure in each cell for recirculation of decant water to the Processing Plant via the Water Return Pond | Schedule 1: Maps, Premises map of the works approval |
| 5 | Water Return Pond along TSF4s north-east embankment | Schedule 1: Maps, Premises map of the works approval |
| 6 | Underdrainage lines of approximately 7.8km with a seepage collection sump on the northern side of the facilities and finger drains within a shallow trench to form a drain to collect surface water | Schedule 1: Maps, Premises map of the works approval |
| 7 | Pipelines (located within bunded trenches with sumps and leak detection systems) to transfer tailings from the Processing Plant to TSF4 and TSF5 and decanted water from TSF4 and TSF5 to the Process Water Dam | Schedule 1: Maps, Premises map of the works approval |
| 8 | Nine new groundwater monitoring bores to be installed, with capacity to have pumping systems installed and be recovery bores, downstream of TSF4 and TSF5 | Schedule 1: Maps, Premises map of the works approval |
| 9 | <p>18 vibrating wire piezometers will be installed at or near the base of TSF4 and TSF5 once earthworks are completed</p> <p>Nine additional vibrating wire piezometers will be installed as the tailings level rises and will be installed when the tailings are 2m below the starter embankment crest level and safe access is possible onto a dried tailings beach</p> | Schedule 1: Maps, Premises map of the works approval |
| 10 | Stock fencing around the perimeter of the TSF4 and TSF5 and Water Return Pond | Schedule 1: Maps, Premises map of the works approval |

The areas and storage capacities for TSF4 and TSF5 are shown in Table 5.

Table 5: Areas and Storage Capacities for TSF4 and TSF5

| Stage | RL | Combined surface area | Embankment / Raising height | Layer storage volume | Combined storage volume | | Storage life |
|---------|-------|-----------------------|-----------------------------|----------------------|-------------------------|------------|--------------|
| | mAHD | | | | m ² | m | |
| Starter | 506.0 | 1,039,802 | Varies | 3,754,528 | 3,754,528 | 5,256,339 | 32 |
| 1 | 508.5 | 1,031,485 | 2.5 | 2,580,456 | 6,334,984 | 8,868,978 | 22 |
| 2 | 511.0 | 1,021,594 | 2.5 | 2,558,096 | 8,893,080 | 12,450,312 | 21 |
| 3 | 513.5 | 1,006,264 | 2.5 | 2,515,746 | 11,408,826 | 15,972,356 | 21 |
| 4 | 516.0 | 1,001,861 | 2.5 | 2,502,530 | 13,911,356 | 19,475,898 | 21 |
| 5 | 518.5 | 993,671 | 2.5 | 2,485,774 | 16,397,130 | 22,955,982 | 21 |
| 6 | 521.0 | 988,092 | 2.5 | 2,467,871 | 18,865,001 | 26,411,001 | 21 |

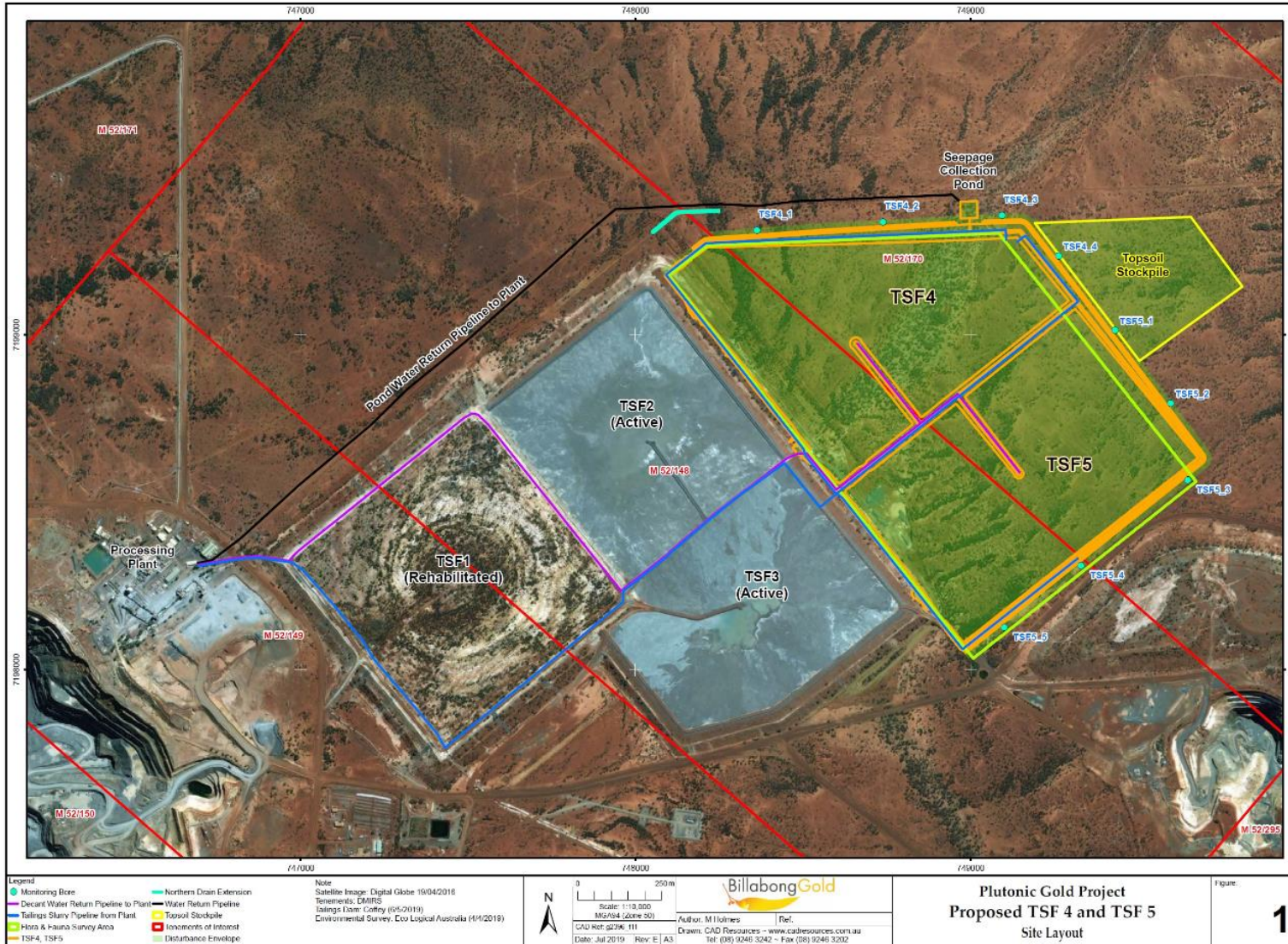


Figure 1: Site Layout Plan – Proposed TSF4 and TSF5 Site Layout

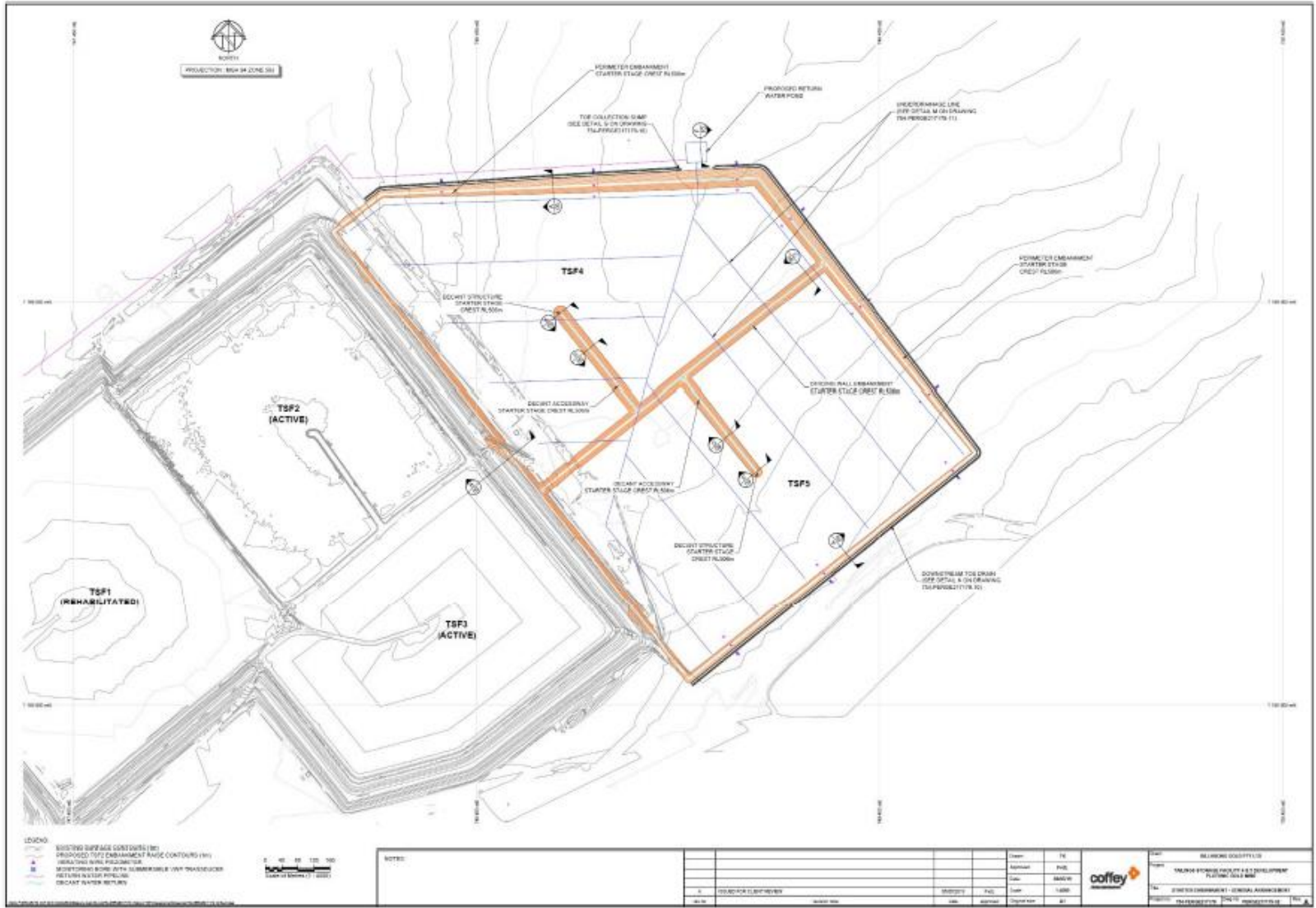


Figure 2: Site Layout Plan – Proposed TSF4 and TSF5 Design Drawings

5. Legislative context

Table 6 summarises approvals relevant to the assessment.

Table 6: Relevant approvals and tenure

| Legislation | Number | Subsidiary | Approval |
|--|------------------------------------|------------------------|---|
| <i>Land Administration Act 1997</i> | M52/148 M52/170 | Billabong Gold Pty Ltd | Mining leases, with proposed post-mining land use low intensity pastoral activities. Billabong Gold own the Three Rivers pastoral lease encompassing the mining leases |
| <i>Rights in Water and Irrigation Act 1914</i> | GWL 151450 | Billabong Gold Pty Ltd | Mine dewatering and water supply bore field activities |
| <i>Dangerous Goods Safety Act 2004</i> | Dangerous Goods Licence DGS 011641 | Billabong Gold Pty Ltd | Issued 31/05/2016 Expiry 28/06/2021 Allows storage of diesel fuel, corrosive liquid, cyanide solution, toxic liquid, refrigerated liquid and compressed oxygens, sodium hydroxide and hydrochloric acid |

5.1 Contaminated sites

TSF 4 and TSF5 documentation was referred to the Principal Hydrogeologist of DWER's Contaminated Sites, with the following key points provided:

- *If left unlined, it is likely that seepage from the two new TSFs would locally contaminate groundwater with elevated concentrations of sulfate, nitrogen compounds, boron, cobalt and zinc;*
- *Groundwater contamination from both the existing and proposed new TSFs has the potential to cause adverse impacts on hyporheic fauna in sediments beneath ephemeral creeks near the mine site, and on local deep-rooted vegetation;*
- *Additional laboratory-based geochemical testing of tailings materials is considered to be unnecessary. This is because the assessment of groundwater contaminated by seepage from the existing TSFs at the mine site is considered to be a better predictor of the impacts of seepage from the proposed new TSFs than any laboratory-based testing procedures; and*
- *Five additional groundwater monitoring locations have been proposed for the new TSFs. It is recommended that two bores are drilled and constructed at each monitoring site: one in the shallow aquifer in regolith, and one constructed in fractured bedrock.*

5.2 Other relevant approvals

5.2.1 Department of Mines, Industry Regulation and Safety (DMIRS)

The Applicant has prepared Mining Proposal REG ID 81643. During the assessment of this works approval, DWER referred the application to DMIRS and then advised that they had no specific comments. DWER's Regional Delivery Water Advice was also involved in this referral to DMIRS.

5.3 Part V of the EP Act

5.3.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

The guidance statements which inform this assessment are:

- *Guidance Statement: Regulatory Principles (July 2015);*
- *Guidance Statement: Setting Conditions (October 2015);*
- *Guidance Statement: Land Use Planning (February 2017);*
- *Guidance Statement: Publication of Annual Audit Compliance Reports (May 2016);*
- *Guidance Statement: Decision Making (June 2019);*
- *Guidance Statement: Risk Assessments (February 2017);* and
- *Guidance Statement: Environmental Siting (November 2016)*

5.3.2 Works approval and licence history

Table 6 summarises the works approval and licence history for the premises.

Table 7: Works approval and licence history

| Instrument | Issued | Nature and extent of works approval, licence or amendment |
|--------------|------------|---|
| W828/1989/1 | 14/07/1992 | Information not documented in online system. |
| W1063/1989/1 | 02/03/1994 | Information not documented in online system. |
| W1099/1989/1 | 30/05/1994 | Information not documented in online system. |
| W1872/1989/1 | 17/03/1997 | Information not documented in online system. |
| W1880/1989/1 | - | Information not documented in online system. |
| W1905/1989/1 | 26/03/1997 | (67) Fuel burning. |
| W2144/1989/1 | 24/11/1997 | (05) Processing or beneficiation of metallic or non-metallic ore. |
| W2829/1989/1 | 01/02/2000 | (05) Processing or beneficiation of metallic or non-metallic ore. |
| W3621/1989/1 | - | Information not documented in online system. |
| W3622/1989/1 | - | Information not documented in online system. |
| W3774/1989/1 | 19/02/2003 | Information not documented in online system. |
| W3776/1989/1 | 16/06/2003 | (05) Processing or beneficiation of metallic or non-metallic ore. |
| W3976/1989/1 | 14/06/2004 | (05) Processing or beneficiation of metallic or non-metallic ore. |
| W4252/1989/1 | 21/06/2006 | Information not documented in online system. |

| | | |
|---------------|------------|--|
| W5030/2011/1 | 27/10/2011 | (05) Processing or beneficiation of metallic or non-metallic ore. |
| W4811/2010/1 | 06/01/2011 | (61) Liquid waste facility. |
| W4836/2010/1 | 28/04/2011 | (05) Processing or beneficiation of metallic or non-metallic ore. |
| W4567/2009/1 | 26/11/2009 | (05) Processing or beneficiation of metallic or non-metallic ore. |
| L6868/1989/12 | 10/12/2015 | Amendment to authorise discharge of water from Laterite Pit. Addition of the wastewater treatment ponds and irrigation area. Category 52 – Electrical Power generation added to replace Category 84. |
| L6868/1989/12 | 10/03/2016 | Licence amendment to add category 57 tyre storage. |
| L6868/1989/12 | 29/09/2016 | Licence amendment for TSF2 and TSF3 lifts. Licence was also transferred from Northern Star Resources Ltd to Billabong Gold Pty Ltd. |
| L6868/1989/12 | 21/04/2017 | Amendment Notice 1 Licence amendment to remove the Standing Water Level (SWL) limit for the TSF bores and to remove the requirement to monitoring Piranha in-pit TSF bores PIRMB1, PIRMB2, PIRMB3 and PIRMB4. The Improvement Program IR1 condition 4.1.1, Table 4.1.1 was also replaced as the management recommendations and commitments were received from the Licensee and have been included as the new IR1. |
| L6868/1989/12 | 31/01/2018 | Amendment Notice 2 Licence amendment to allow the disposal of pit water from Salmon Pit Lake to be discharged to an ephemeral creek-line and removal of ambient groundwater monitoring for historic in-pit TSFs (Callop, Dogfish, Perch, Catfish, Piranha and Trout). |
| W6323/2019/1 | 05/03/2020 | Works approval for two paddock style TSFs, TSF4 and TSF5 with upstream construction methods. |

5.3.3 Compliance inspections and compliance history

The most recent inspection was conducted on 28 June 2016. Minor issues were noted.

The Applicant has declared no non-compliances during 1 January 2019 – 31 December 2019 reporting period in their AACR.

5.3.4 Clearing

The design footprint occupies an area of approximately 120ha, thus requiring the submission of a Native Vegetation Clearing Permit (NVCP) application to the Department of Mines, Industry Regulation and Safety (DMIRS) in addition to the Mining Proposal application.

6. Monitoring data

6.1 Monitoring of ambient groundwater

Quarterly groundwater SWL and quality monitoring is a requirement of the current operating licence. Limits have been set on the licence for SWL, arsenic, copper, nickel and WAD-CN.

Figure 3 shows the existing groundwater monitoring network in the vicinity of TSF1, TSF2 and TSF 3.

The latest groundwater monitoring results for bores at the existing TSFs from November 2019 are shown in Table 8. Only one sampling campaign is provided here, however, quarterly

sampling results are provided in the AER. A comparison of the data is made to the NWQMS, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Livestock drinking water quality as the beneficial use of groundwater is for livestock watering.

Recent water quality data from monitoring bores at the site indicates that seepage from the existing TSFs has also affected local groundwater quality. The most significant changes in water quality are large increases in sulfate and total nitrogen concentrations in bores in the immediate vicinity of the existing TSFs by comparison with their concentrations in bore TD3-7, which is assumed to reflect natural background levels of these chemical constituents. Additionally, monitoring bores near the existing TSFs generally contain elevated concentrations of boron, cobalt and zinc by comparison with levels of these chemical constituents that were monitored in bore TD3-7. These summaries have been based on an assessment of numerous groundwater quality monitoring data, however, due to space limitations, only the November 2019 has been provided in this Decision Report.

Figure 1 shows the locations of the new groundwater monitoring bores to be installed in the vicinity of TSF4 and TSF5.

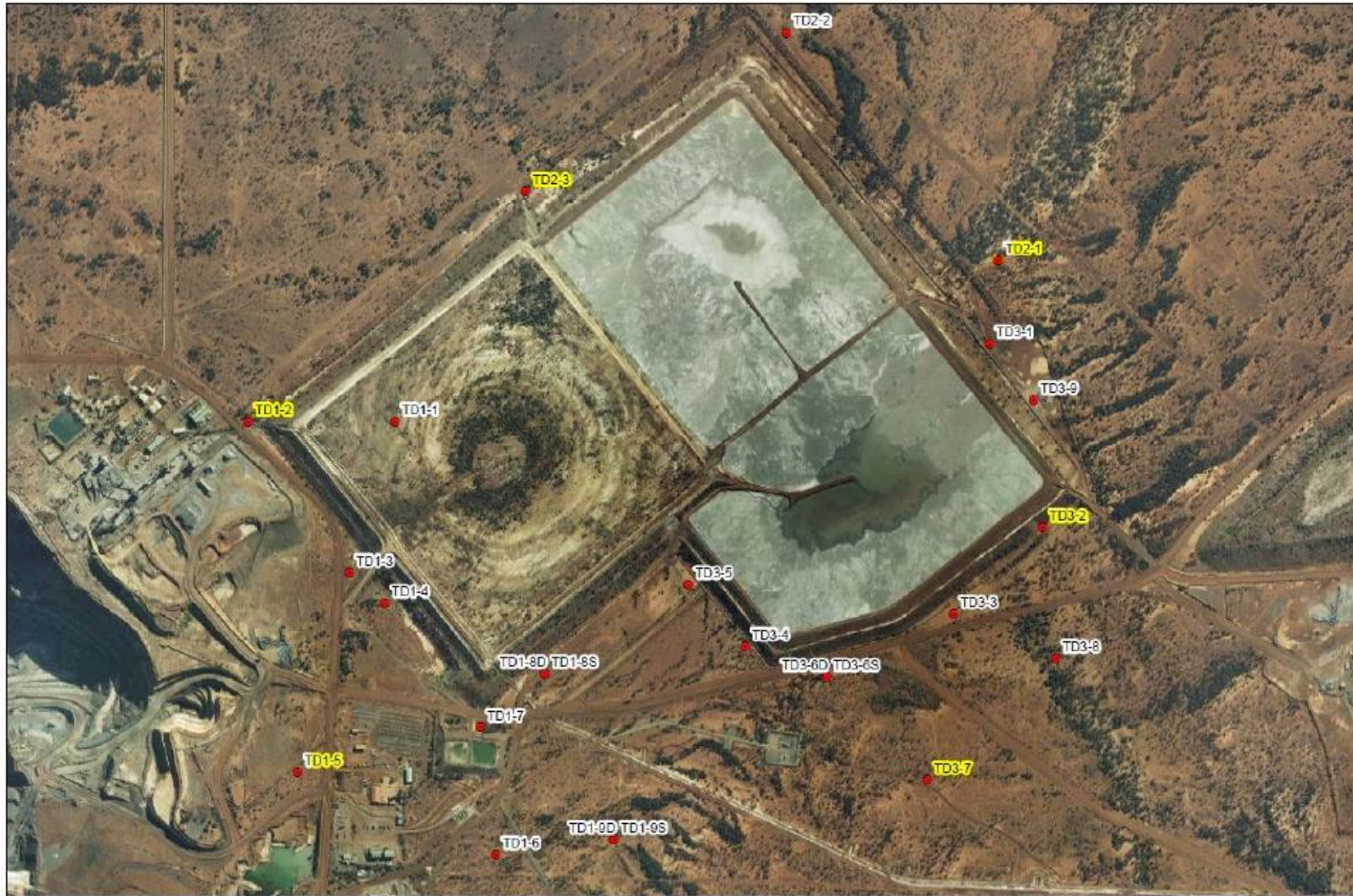


Figure 3: Existing groundwater monitoring network in the vicinity of TSF1, TSF2 and TSF3 (yellow highlighted bores are required monitoring bores on the licence)

Table 8: Groundwater results in the vicinity of the existing TSFs November 2019

| Parameters | DWER Limits | ANZECC/ARMCANZ NWQMS, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Livestock drinking water quality | Bores (samples from Q4 – November 2019) | | | | | |
|------------------|--|--|---|--------|--------|--------|--------|--------|
| | | | TD1-2 | TD1-5 | TD2-1 | TD2-3 | TD3-2 | TD3-7 |
| SWL (mbgl) | >7 for: TD1-2 TD1-5 No limit for: TD2-1 TD2-3 TD3-2 TD3-7 | - | 13.53 | 18.82 | 2.65 | 4.48 | 4.05 | 5.42 |
| pH (pH units) | - | - | 7.86 | 7.45 | 6.58 | 8.31 | 7.09 | 8.14 |
| TDS (mg/L) | - | 4000 | 1520 | 1230 | 1420 | 2690 | 1100 | 336 |
| Sulfate (mg/L) | - | 1000 | 389 | 219 | 257 | 546 | 233 | 42 |
| Aluminium (mg/L) | - | 5 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Antimony (mg/L) | - | - | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Arsenic (mg/L) | <0.5 | 0.5 | 0.038 | 0.001 | <0.001 | 0.01 | 0.002 | <0.001 |
| Boron (mg/L) | - | 5 | - | - | - | - | - | - |
| Calcium (mg/L) | - | 1000 | - | - | - | - | - | - |

| | | | | | | | | |
|-------------------|------|-------|---------|---------|---------|---------|---------|---------|
| Cadmium (mg/L) | - | 0.01 | <0.001 | <0.001 | 0.0006 | <0.001 | <0.001 | <0.001 |
| Chromium (mg/L) | - | 1 | 0.012 | 0.007 | 0.002 | 0.013 | 0.01 | 0.021 |
| Cobalt (mg/L) | - | 1 | 0.007 | 0.024 | 0.09 | 0.208 | 0.026 | <0.001 |
| Copper (mg/L) | <1.0 | 1 | <0.001 | 0.002 | 0.028 | 0.002 | 0.001 | 0.005 |
| Fluoride (mg/L) | - | 2 | 0.2 | 0.1 | <0.1 | 0.2 | <0.1 | 0.2 |
| Iron (mg/L) | - | - | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Lead (mg/L) | - | 0.1 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Magnesium (mg/L) | - | 2000 | - | - | - | - | - | - |
| Manganese (mg/L) | - | - | <0.001 | <0.001 | 0.106 | <0.001 | 0.002 | <0.001 |
| Mercury (mg/L) | - | 0.002 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Molybdenum (mg/L) | - | 0.15 | <0.001 | 0.004 | <0.001 | 0.002 | <0.001 | 0.009 |
| Nickel (mg/L) | <1.0 | 1 | 0.002 | 0.006 | 0.04 | 0.002 | 0.005 | 0.01 |
| Selenium (mg/L) | - | 0.02 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 |
| Thallium (mg/L) | - | - | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |

| | | | | | | | | |
|-------------------|------|--|--------|--------|--------|--------|--------|--------|
| Uranium (mg/L) | - | 0.2 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Zinc (mg/L) | - | 20 | 0.023 | 0.215 | 0.237 | 0.007 | 0.013 | 0.053 |
| WAD-CN (mg/L) | <0.8 | 0.8 (Assessment and management of contaminated sites - Non-potable groundwater use, DoH) | <0.004 | <0.004 | 0.024 | <0.008 | <0.004 | <0.004 |
| Nitrogen (mg/L) | - | 400 | 48.7 | 38.3 | 11.8 | 105 | 42.5 | 2.1 |
| Phosphorus (mg/L) | - | - | 0.06 | <0.01 | <0.01 | 0.04 | 0.06 | <0.01 |

7. Consultation

The works approval application documentation was published on DWER's website on 9 December 2019 and the advertised in The Western Australian newspaper on 2 February 2019.

The draft works approval and Decision Report were provided to the Applicant for comments on 28 February 2020. The Applicant/Licence Holder provided comments on 04 March 2020, which are summarised, along with DWER's response, in Appendix 2.

8. Location and siting

8.1 Siting context

The Premises is located approximately 180km north-east of Meekatharra on the Three Rivers Station, East Gascoyne Region of Western Australia as shown in Figure 4. TSF4 and TSF5 will be located adjacent to the north-eastern sides of both TSF2 and TSF3, on mining tenements M52/148 and M52/170.

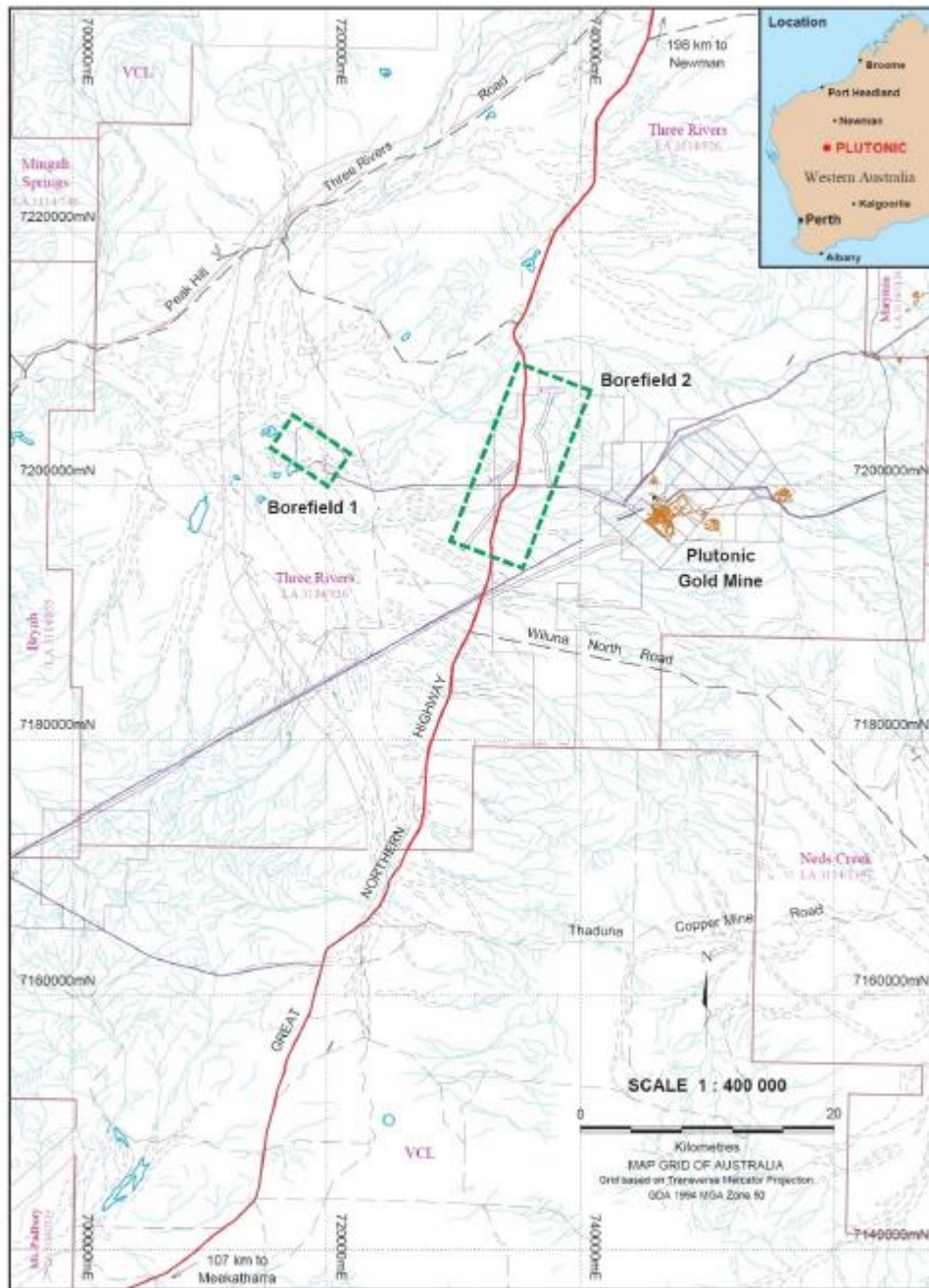


Figure 4: Project Location Map

8.2 Residential and sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 9.

Table 9: Receptors and distance from activity boundary

| Sensitive Land Uses | Distance from Prescribed Activity |
|------------------------------|--|
| Ned's Creek Pastoral Station | Approximately 20 km south-east of the Premises |
| Meekatharra | 180 km to the south-west of the Premises |

8.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises. The distances to specified ecosystems are shown in Table 10. Table 10 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

The table has also been modified to align with the *Guidance Statement: Environmental Siting*.

Table 10: Environmental values

| Environmental Receptors | Distance from the Premises |
|---|---|
| Headwater of tributaries of the Gascoyne River (middle), local creeks (shallow, ephemeral drainage lines) | Onsite, with the Gascoyne River approximately 5 km north of the Premises. |

8.4 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 11.

Table 11: Groundwater and water sources

| Groundwater and water sources | Distance from Premises | Environmental value |
|------------------------------------|--|------------------------------------|
| Public drinking water source areas | Meekatharra is approximately 150 km away | Potable water |
| Major watercourses/waterbodies | Gascoyne River is approximately 5 km north of the Premises | Beneficial use for flora and fauna |
| Groundwater | Regional groundwater level within the alluvial aquifer is approximately 5 mbgl, and ranges from approximately 10 to 30 mbgl for the fractured rock aquifer. Groundwater within the shallow alluvial aquifer is slightly brackish (TDS is approximately 1,500mg/L). Groundwater from the fractured rock aquifer shows a similar hydrochemistry to the alluvial / calcrete aquifer and is fresh to slightly brackish (TDS between 700 and 1,200mg/L). | Pastoral uses |

8.5 Soil type

Table 12 details soil types and characteristics relevant to the assessment.

Table 12: Soil and sub-soil characteristics

| Groundwater and water sources | Distance from Premises | Environmental Value |
|-------------------------------|------------------------|---|
| Soil type classification | Onsite | Soil is typically colluvium / alluvium over laterite (ferricrete) caprock with clayey sand / sandy clay, clayey gravel, sandy clayey gravel and gravelly clayey sand to a depth of 1.1 m. |
| Acid sulfate soil risk | Onsite | Tailings has been classified as non-acid forming |

8.6 Meteorology

The subregion of the Premises area has an arid climate with predominantly winter rainfall in the west, and summer rainfall in the east. The Premises area receives an estimated average annual rainfall of 264 mm and average annual evaporation of 2,423 mm per annum.

9. Risk assessment

9.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

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. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through

Table 13.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 13 and Table 14 below.

Table 13. Identification of emissions, pathway and receptors during construction

| Risk Events | | | | | Continue to detailed risk assessment | Reasoning | |
|--|--|--|---|---------------------------|--------------------------------------|-----------|---|
| Sources/Activities | Potential emissions | Potential receptors | Potential pathway | Potential adverse impacts | | | |
| Construction, mobilisation and positioning of infrastructure | Vehicle movements on unsealed access roads | Noise from machinery engines | Ned's Creek Pastoral Station is approximately 20 south-east of the Premises and Meekatharra is approximately 180 km to the south-west of the Premises | Air / wind dispersion | Health and amenity | No | No receptors nearby. Noise emissions are expected to be minimal and for a temporary duration during the construction of the TSF4 and TSF5. No blasting activities are proposed. |
| | | Dust from machinery driving on open ground | | | Health and amenity | No | No receptors nearby. Dust may be generated by vehicle movements and vegetation clearing. Dust management measures include: <ul style="list-style-type: none"> • Minimising clearing; • Native Vegetation Clearing Permit management actions; |

| Risk Events | | | | | Continue to detailed risk assessment | Reasoning | |
|-----------------------------------|---------------------|---------------------------------------|---|---------------------------|--------------------------------------|--|---|
| Sources/Activities | Potential emissions | Potential receptors | Potential pathway | Potential adverse impacts | | | |
| Construction of new TSF4 and TSF5 | | | | | | <ul style="list-style-type: none"> Topsoil striping and spreading activities restricted during high winds; Vehicle movements confined to defined haul roads and access roads; and Visual inspections and dust levels suppressed by water carts on roadways. | |
| | | Noise from earthmoving | Ned's Creek Pastoral Station is approximately 20 south-east of the Premises and Meekatharra is approximately 180 km to the south-west of the Premises | Air / wind dispersion | Health and amenity | No | No receptors nearby. Noise emissions are expected to be minimal and for a temporary duration during the construction of the TSF4 and TSF5. No blasting activities are proposed. |
| | | Dust from machinery building the TSFs | | | Health and amenity | No | No receptors nearby. Dust may be generated material loading and hauling, stockpiling, grading, bulldozing for the temporary duration of the construction activities. Dust management measures include dust suppression sprays at material loading and hauling areas and dust suppression agents. |

Table 14: Identification of emissions, pathway and receptors during operation

| Risk Events | | | | | Continue to detailed risk assessment | Reasoning | |
|----------------------|---------------------|---------------------|--|---------------------------|---|-----------|--|
| Sources/Activities | Potential emissions | Potential receptors | Potential pathway | Potential adverse impacts | | | |
| TSF4 and TSF5 | Tailings surface | Dust | Ned's Creek Pastoral Station is approximately 20 south-east of the Premises and Meekatharra is approximately 180 km to the | Air / wind dispersion | Health and amenity Potential suppression of photosynthetic and respiratory functions | No | No receptors nearby. Tailings slurry density is at 55% solids by weight and spigots will be rotated around the TSF4 and TSF5 perimeters. Areas rehabilitated when decommissioned. |

| Risk Events | | | | | Continue to detailed risk assessment | Reasoning |
|---|---|---|---------------------------------------|--|--------------------------------------|-----------------|
| Sources/Activities | Potential emissions | Potential receptors | Potential pathway | Potential adverse impacts | | |
| | | south-west of the Premises Vegetation | | | | |
| Tailings pipelines and decant water pipelines | Rupture of pipeline causing tailings discharge to land (elevated sulfate, total nitrogen, boron, cobalt and zinc) | Vegetation and soils adjacent to tailings pipeline alignment and TSF4 and TSF5 | Direct discharge | Soil contamination inhibiting vegetation growth and survival | Yes | See Section 9.4 |
| Overtopping of the TSF4 and TSF5 | Freeboard compromised on the TSF4 and TSF5 or collapse of dam walls resulting in discharge to land | Vegetation and soils adjacent to the TSF4 and TSF5 | Direct discharge | Soil contamination inhibiting vegetation | Yes | |
| Seepage of tailings water through the base and embankments of the TSF4 and TSF5 | Leachate containing elevated levels of sulfate, nitrogen, cobalt, zinc and boron to groundwater | Sulfate, nitrogen, cobalt and zinc have the potential to cause adverse impacts on hyporheic fauna that are likely to be present in sands and gravels that underlie beds of the ephemeral creeks in the area (particularly the creek-line near monitoring bore TD2-1) Concentrations of boron in groundwater near the TSFs are at levels that have the potential to cause harm to deep-rooted vegetation in | Infiltration via soils to groundwater | Groundwater mounding | Yes | See Section 9.5 |
| | | | | Groundwater contamination | Yes | |

| Risk Events | | | | | Continue to detailed risk assessment | Reasoning |
|----------------------------|--|--------------------------------|-------------------|---------------------------|--------------------------------------|-----------------|
| Sources/Activities | Potential emissions | Potential receptors | Potential pathway | Potential adverse impacts | | |
| | | the vicinity of the mine site. | | | | |
| Tailings containment ponds | <i>Elevated WAD cyanide (>50 mg/L) in supernatant</i> | Birds, bats and livestock | Direct contact | Fauna death | Yes | See Section 9.6 |

9.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 15 below.

Table 15: Risk rating matrix

| Likelihood | Consequence | | | | |
|----------------|-------------|--------|----------|---------|---------|
| | Slight | Minor | Moderate | Major | Severe |
| Almost certain | Medium | High | High | Extreme | Extreme |
| Likely | Medium | Medium | High | High | Extreme |
| Possible | Low | Medium | Medium | High | Extreme |
| Unlikely | Low | Medium | Medium | Medium | High |
| Rare | Low | Low | Medium | Medium | High |

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 16 below.

Table 16: Risk criteria table

| Likelihood | | Consequence | | |
|---|--|---|---|---|
| The following criteria has been used to determine the likelihood of the Risk Event occurring. | | The following criteria has been used to determine the consequences of a Risk Event occurring: | | |
| | | Environment | Public health* and amenity (such as air and water quality, noise, and odour) | |
| Almost Certain | The risk event is expected to occur in most circumstances | Severe | <ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite impacts wider scale: mid-level or above Mid to long-term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded | <ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity |
| Likely | The risk event will probably occur in most circumstances | Major | <ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite impacts wider scale: low level Short-term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded | <ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity |
| Possible | The risk event could occur at some time | Moderate | <ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met | <ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity |
| Unlikely | The risk event will probably not occur in most circumstances | Minor | <ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met | <ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity |
| Rare | The risk event may only occur in exceptional circumstances | Slight | <ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met | <ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met |

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

"onsite" means within the Prescribed Premises boundary.

9.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 17 below:

Table 17: Risk treatment table

| Rating of Risk Event | Acceptability | Treatment |
|----------------------|--|---|
| Extreme | Unacceptable. | Risk Event will not be tolerated. DWER may refuse application. |
| High | May be acceptable. Subject to multiple regulatory controls. | Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions. |
| Medium | Acceptable, generally subject to regulatory controls. | Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied. |
| Low | Acceptable, generally not controlled. | Risk Event is acceptable and will generally not be subject to regulatory controls. |

9.4 Risk Assessment – Tailings Pipeline Ruptures and/or Overtopping

9.4.1 Description of Tailings Pipeline Ruptures and/or Overtopping

Tailings is generated from the Processing Plant and will be directed via pipelines to the TSF4 and TSF5. Pipelines have the potential to rupture and the TSFs could overflow or embankments be compromised resulting in discharges to the surrounding environment.

9.4.2 Identification and general characterisation of emission

Tailings will be deposited in the TSF4 and TSF5 at a rate of approximately 1.8 Mtpa for a period of 5 years, equating to 9 Mt of storage.

Geochemical testing of the tailings indicates that the solids can be classified as non-acid forming with trace sulphides and carbonates.

The tailings physical properties are shown in Table 18 and have been derived from TSF2 and TSF3.

Table 18: Tailings Physical Properties

| TSFs | Dry Density | Percent Fines (<75µm) | Moisture Content (%) |
|---------------|-------------|-----------------------|----------------------|
| TSF2 and TSF3 | 1.4 | 63 - 89 | 25.5 – 42.4 |

The tailings chemical properties are shown in Table 19 and have been provided from 2015 and July 2018 – June 2019.

Table 19: Tailings Chemical Properties

| Parameters | Average Value or Range (Data from 2015) | Average Value or Range (data from July 2018 – June 2019) |
|---------------------------------------|---|--|
| Total Dissolved Solids (Return Water) | 1,700 – 2,700 mg/L | 2,380 mg/L – sampling date 12/09/2019 |
| Total Cyanide (Tailings Slurry) | 180 – 220 mg/L | - |
| WAD Cyanide (Tailings Slurry) | 53 – 90 mg/L | 83 – 190 mg/L |
| Total Cyanide (Return Water) | 36 – 91 mg/L | - |
| WAD Cyanide (Return Water) | 17 – 21 mg/L | 28 mg/L – sampling date 12/09/2019 |
| pH (Tailings Slurry) | 8.6 – 9.6 | 10.15 – 10.47 pH units |

The Applicant has stated that the WAD Cyanide drops from 53 - 90 mg/L to 17 – 21 mg/L in the return water due to natural degradation of cyanide by sunlight.

The tailings return water data is shown in Table 20.

Table 20: Concentrations of dissolved metals in tailings return water

| Dissolved metals | Concentrations (mg/L) – sampling date 12/09/2019 |
|------------------|--|
| Aluminium | 0.50 |
| Antimony | 0.219 |
| Arsenic | 6.45 |
| Cadmium | 0.0011 |
| Chromium | 0.007 |
| Cobalt | 0.827 |
| Copper | 10.4 |
| Lead | 0.004 |
| Manganese | 0.038 |
| Molybdenum | 0.024 |
| Nickel | 3.33 |
| Selenium | 0.01 |
| Thallium | <0.001 |
| Uranium | <0.001 |
| Zinc | 0.359 |
| Boron | 0.54 |
| Iron | 1.15 |

Based on groundwater quality monitoring in the vicinity of the existing TSFs, parameters that are elevated are sulfate, total nitrogen, boron, cobalt and zinc, therefore tailings contains elevations of these parameters.

9.4.3 Description of potential adverse impact from the emission

Elevated concentrations of sulfate, nitrogen, cobalt and zinc have the potential to cause adverse impacts on hyporheic fauna that are likely to be present in sands and gravels that underlie beds of the ephemeral creeks in the area (particularly the creek-line near monitoring bore TD2-1). Additionally, concentrations of boron in groundwater near the TSFs are at levels that have the potential to cause harm to deep-rooted vegetation in the vicinity of the mine site.

9.4.4 Criteria for assessment

Relevant water quality criteria include ANZECC/ARMCANZ guidelines for livestock watering and fresh waters, and ASC NEPM for soils and groundwater.

The International Cyanide Management Code: Implementation Guidance recommends a WAD cyanide concentration in tailings and water ponds of 50mg/L. This is considered to be protective of most wildlife and livestock mortality (ICMI, 2018).

9.4.5 Applicant/Licence Holder controls

This assessment has reviewed the controls set out in Table 21 below.

Table 21: Applicant's/Works Approval Holder's proposed controls for Tailings Pipeline Ruptures and/or Overtopping

| Site infrastructure | Description | Operation details |
|--|--|--|
| Pipelines from the Processing Plant, Return Water Pond and Process Water Pond to TSF4 and TSF5 | <p>Bunding of pipelines will allow for the containment of leaks or spillages of the tailings delivery or water return pipelines.</p> <p>The tailings lines from the Processing Plant to TSF4 and TSF5 and the return water lines from the decants to the Process Water Dam will be located inside bunded open trenches (earthen bunds, that are contoured to have any spillage contained within excavated sumps) to contain any spillage of materials resulting from lines which develop leaks or burst during operation.</p> <p>There are three sumps designed to contain leakage along the pipelines corridor.</p> | <p>Based on design throughput rates, the pipelines trenches, with a capacity of 2,500 m³ will contain approximately six hours of slurry at full flow.</p> <p>Tailings lines inspections are conducted on a four hourly basis, including annual thickness testing.</p> <p>Incident reports are to be completed for each spill.</p> <p>Operating Manual</p> |
| | <p>Fitted leak detection system for the tailings and decant return pipelines.</p> <p>Flow sensors are located at the TSFs common manifold of the facility and the pump discharge</p> | <p>In the event of a pipeline failure, there will be a controlled shutdown.</p> <p>The affected pipeline will remain shut down until repaired and the spilled materials collected and/or pumped, as appropriate, and deposited in TSF4 or TSF5.</p> |

| Site infrastructure | Description | Operation details |
|---------------------|---|---|
| | points of the Processing Plant. | |
| | <p>The tailings storage beach will assume the form of a cone at 1% beach slope, with the ability to contain a 1 in 100 year ARI, 72-hour duration rainfall event.</p> <p>The minimum operational freeboard of TSF4 and TSF5 will be 300mm (height between the tailings beach at the embankment and the embankment crest) and the minimum total freeboard will be 500mm (operational freeboard 300mm plus pond and storm freeboard of 200mm)</p> | <p>Water will be continually removed from the facilities such that the minimum freeboard allowance is maintained.</p> <p>Freeboard criteria is in line with DMIRS requirements.</p> |

The design freeboard criteria is summarised in Table 22.

Table 22: TSF4 and TSF5 Freeboard Criteria

| Criteria | Operational Freeboard | Beach Freeboard | 1 in 100 year 72-hr event | Storage Capacity (m ³) |
|----------|-----------------------|-----------------|---------------------------|------------------------------------|
| DMIRS | 0.3m | 0.2m | 0.254m | 0.5m |

9.4.6 Key findings

The Delegated Officer has reviewed the information regarding Tailings Pipeline Ruptures and/or Overtopping and has found:

1. The International Cyanide Management Code: Implementation Guidance WAD cyanide concentration in tailings and water ponds of 50mg/L may not be met.
2. Bunding with trenches/sumps of pipelines will occur with six hours of containment.
3. Leak detection system will be in place, with controlled shutdown until repairs and collection of spilled material has occurred.
4. Appropriate freeboard requirements will be in place.

9.4.7 Consequence

If tailings pipeline ruptures and/or overtopping occurs, then the Delegated Officer has determined that the impact of tailings pipeline ruptures and/or overtopping could have mid level on-site impacts, low level local scale off-site impacts and minimal wider scale off-site impacts. Therefore, the Delegated Officer considers the consequence of tailings pipeline ruptures and/or overtopping to be **moderate**.

9.4.8 Likelihood of Tailings Pipeline Ruptures and/or Overtopping

The Delegated Officer has determined that the likelihood of tailings pipeline ruptures and/or overtopping occurring will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of overtopping and/or overtopping to be **unlikely**.

9.4.9 Overall rating of Tailings Pipeline Ruptures and/or Overtopping

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of tailings pipelines ruptures and/or overtopping is **medium**.

9.5 Risk Assessment – Tailings Seepage

9.5.1 Description of Tailings Seepage

The TSF4 and TSF5 will not have any artificial basal or embankment liners incorporated. Seepage from the TSF4 and TSF5 may locally contaminate groundwater with elevated concentrations of sulfate, nitrogen compounds, boron, cobalt and zinc.

Table 23 shows the permeability of the TSF4 and TSF5.

Table 23: Permeability test results

| Borehole No. | Depth of borehole (m) | Average permeability, k (m/s) | Classifications |
|--------------|-----------------------|-------------------------------|-----------------|
| BH01 | 15 | 1.4E-07 | Low |
| H02 | 15 | 7.1E-07 | Low |
| BH03 | 15 | 5.2E-07 | Low |
| BH04 | 15 | 1.9E-07 | Low |
| BH05 | 15 | 4.4E-07 | Low |
| BH06 | 15 | 1.0E-06 | Low |
| BH07 | 15 | 2.6E-07 | Low |
| BH08 | 15 | 9.6E-07 | Low |

9.5.2 Identification and general characterisation of emission

It is considered likely that a similar pattern of water level and water quality changes would be observed near the two proposed new TSFs if they were to be constructed without an underlying liner. The rate of seepage from TSF4 could be particularly large, as it is proposed that this facility will overlie potentially highly permeable sediments in a creek-line that will be present within the footprint of this structure.

9.5.3 Description of potential adverse impact from the emission

Groundwater contamination caused by seepage from the existing TSFs at the Plutonic site is likely to be localised and is unlikely to significantly affect extractive groundwater use near the site. However, elevated concentrations of sulfate, nitrogen, cobalt and zinc have the potential to cause adverse impacts on hyporheic fauna that are likely to be present in sands and gravels that underlie beds of the ephemeral creeks in the area (particularly the creek-line near monitoring bore TD2-1). Additionally, concentrations of boron in groundwater near the TSFs are at levels that have the potential to cause harm to deep-rooted vegetation in the vicinity of the mine site.

9.5.4 Criteria for assessment

Relevant water quality criteria include ANZECC/ARMCANZ guidelines for livestock watering and fresh waters, and ASC NEPM for soils and groundwater.

The International Cyanide Management Code: Implementation Guidance recommends a WAD cyanide concentration in tailings and water ponds of 50mg/L. This is considered to be protective of most wildlife and livestock mortality (ICMI, 2018).

9.5.5 Applicant/Works Approval Holder controls

This assessment has reviewed the controls set out in Table 24 below.

Table 24: Applicant's/Works Approval Holder's proposed controls for Tailings Seepage

| Site infrastructure | Description | Operation details |
|---------------------|---|--|
| TSF4 and TSF5 | Tailings discharge or spigotting will be carried out such that the water pond is constantly positioned around the decant structure. The pond will be kept as far away as practical from the perimeter containment embankments at all times. | Use of an Operating Manual. Managing (minimising) the size of the water pond to ensure no excess water is retained on the TSF will assist in reducing potential seepage |
| | A decant structure in each cell is incorporated into the design to recover water liberated from the tailings slurry | Recovered water will be pumped from the sump for re-use in the process plant. |
| | Operate with a solids density of 55%, as opposed to 50%. Systems implemented to achieve this include: <ul style="list-style-type: none"> • Increase decant pump size to 38kW to increase water returned to the Process Water Pond • Have extra spares of pumps, hydraulic drives and valves available • Reduced throughput rates from 2 Mtpa to 1.8 Mtpa equating to a reduction in water to the TSFs by 150,000 m³ | Decreases water pumped to the TSFs by 300,000 m ³ /annum |
| | Nine new groundwater monitoring bores to be installed around TSF4 and TSF5 to monitor for SWLs and water quality. These new TSF4 and TSF5 groundwater monitoring will be installed prior to the commissioning of the TSFs. <ul style="list-style-type: none"> • Coordinates: <ul style="list-style-type: none"> ➤ TSF4_1, 748362.75E, 7199311.98N; | Baseline monitoring conducted prior to commissioning of the TSFs. Regular monitoring of groundwater bores and comparison to SWL and possibly water quality limits once baseline levels and quality are established. |

| Site infrastructure | Description | Operation details |
|---------------------|---|--|
| | <ul style="list-style-type: none"> ➤ TSF4_2, 748738.82E, 7199336.88N; ➤ TSF4_3, 749094.61E, 7199355.34N; ➤ TSF4_4, 749263.62E, 7199235.47N; ➤ TSF5_1, 749432.22E, 7199013.48N; ➤ TSF5_2, 749597.98E, 7198795.54N; ➤ TSF5_3, 749649.01E, 7198565.06N; ➤ TSF5_4, 749330.86E, 7198309.59N; and ➤ TSF5_5, 749101.51E, 7198125.36N <p>These monitoring bores around the perimeter of the TSF4 and TSF5 will have the capability to have pumping system installed and utilised as water recovery bores if required.</p> | |
| | <p>Seepage recovery bores are used and set up on an as required basis.</p> | <p>Water reclamation occurs on the western side of the existing TSF2 and TSF3 and involves the removal of water from the interception trench at the base of the TSFs. The TSF4 and TSF5 will have a similar seepage collection system.</p> |
| | <p>18 vibrating wire piezometers will be installed at or near the base of TSF4 and TSF5 once earthworks are completed. The locations are shown in Figure 2.</p> <p>Nine additional vibrating wire piezometers will be installed as the tailings level rises and will be installed when the tailings are 2m below the starter embankment crest level and safe access is possible onto a dried tailings beach</p> | <p>Read and report water levels within the piezometers along the TSF4 and TSF5 embankments.</p> |
| | <p>Seepage will be captured from the base of TSF4 and TSF5 via underdrainage and report to a seepage collection sump on the northern side of the facilities</p> <p>A downstream seepage interception trench is to be constructed in the vicinity of the TSFs and will include the following:</p> <ul style="list-style-type: none"> • Excavate trenches to the cross-sections, grades and elevations | <p>The underdrainage system comprising a finger drain network at the base of both cells has been incorporated into the design to assist with recovery of water from consolidation of tailings and to reduce seepage losses</p> |

| Site infrastructure | Description | Operation details |
|----------------------------|---|---|
| | <p>shown in Figure 2. Each trench is to be excavated so the invert falls in one direction and so that water flow accumulates in the underdrainage and toe drain sumps located along the perimeter embankments on the northern side of TSF4;</p> <ul style="list-style-type: none"> • Nominal depth of excavation is to be 0.5m to facilitate gravity flow; • The underdrainage system comprises of finger drains at the base of the TSF4 and TSF5; • The total length of the underdrainage lines within TSF4 and TSF5 will be 7.8km and will collect water beneath the tailings impoundments and discharge any collected water into the water return pond. | |
| | <p>Finger drains:</p> <ul style="list-style-type: none"> • Formed by the installation of slotted pipes comprising a product described as Megaflo which comes supplied with a geotextile wrap. The Megaflo is surrounded by clean sand or gravel which is wrapped in geotextile, which assists in limiting the ingress of tailings into the finger drains. The sand / gravel is used to provide a larger surface area for the interception and collection of any water recovery. The finger drains are placed in a shallow trench to form a drain to collect surface water. | <p>Water collected in the finger drains will be directed to the Return Water Pond</p> |
| | <p>Return Water Pond will be constructed along TSF4's north-east embankment that is a 50m x 50m square pond lined with HDPE and 2.8m deep.</p> | <p>This will assist with recovery of water from consolidation of tailings and to reduce seepage losses.</p> |
| | <p>Low foundation permeability</p> | <p>Low permeability resulting in better retention of tailings. See Table 23</p> |
| <p>TSF1, TSF2 and TSF3</p> | <p>Existing seepage recovery bores</p> | <p>Any seepage water collected from the existing seepage recovery bores adjacent to the TSF4 and TSF5 will be pumped back into the facilities</p> |

9.5.6 Key findings

The Delegated Officer has reviewed the information regarding Tailings Seepage and has found:

1. Seepage from the two new unlined TSFs will locally contaminate groundwater with elevated concentrations of sulfate, nitrogen compounds, boron, cobalt and zinc.
2. Elevated concentrations of sulfate, nitrogen, cobalt and zinc have the potential to cause adverse impacts on hyporheic fauna that are likely to be present in sands and gravels that underlie beds of the ephemeral creeks in the area. Concentrations of boron in groundwater near the TSFs are at levels that have the potential to cause harm to deep-rooted vegetation in the vicinity of the mine site.
3. The Applicant is not proposing to directly monitor subterranean fauna or deep rooted vegetation, which are the two main sensitive receptors in the vicinity of where seepage may occur.

9.5.7 Consequence

If tailings seepage occurs, then the Delegated Officer has determined that the impact of tailings seepage will have mid level on-site impacts, low level local scale off-site impacts and minimal wider scale off-site impacts to subterranean fauna and/or deep rooted vegetation. The Applicant has not committed to monitoring campaigns for these sensitive receptors. Therefore, the Delegated Officer considers the consequence of tailings seepage to be **moderate**.

9.5.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of tailings seepage occurring will probably occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of tailings seepage to be **likely**.

9.5.9 Overall rating of Tailings Seepage

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of tailings seepage is **high**.

9.6 Risk Assessment – Fauna accessing tailings containing cyanide

9.6.1 Description of tailings

Tailings generated from the Processing Plant will be directed via pipelines to the TSF4 and TSF5 and contain soluble cyanide accessible to birds and other fauna which may have access to the TSFs.

9.6.2 Identification and general characterisation of emission

Thickened tailings (55% solids) will be deposited in the TSF4 and TSF5 at a rate of approximately 1.8 Mtpa for a period of 5 years, equating to 9 Mt of storage.

Tailings deposition will result in ponding of water on the TSFs and within the decant water system and this water will be returned to the Process Water Dam for reuse in the Processing Plant.

The Applicant has stated that the WAD Cyanide drops from 53 - 90 mg/L to 17 – 21 mg/L in the return water due to natural degradation of cyanide by sunlight.

9.6.3 Description of potential adverse impact from the emission

Fauna may be attracted to the TSF and Process Water Dam to consume water. Ingestion/exposure to WAD cyanide can cause delayed mortality in birds (from The International Cyanide Management Code). Fauna surveys of the area identified 16 species of birds.

9.6.4 Criteria for assessment

Relevant water quality criteria include ANZECC/ARMCANZ guidelines for livestock watering and fresh waters, and ASC NEPM for soils and groundwater.

The International Cyanide Management Code: Implementation Guidance recommends a WAD cyanide concentration in tailings and water ponds of 50mg/L. This is considered to be protective of most wildlife and livestock mortality (ICMI, 2018).

9.6.5 Applicant/Works Approval Holder controls

This assessment has reviewed the controls set out in 25 below.

Table 25: Applicant’s/Works Approval Holder’s proposed controls for fauna accessing tailings

| Site infrastructure | Description | Operation details |
|---------------------|---|---|
| TSF4 and TSF5 | The existing Process Water Dam located at the Processing Plant is fenced off to prevent access to fauna. Embankments around the Process Water Dam are vegetation free. | Regular monitoring of the facilities occur on a four hourly basis. |
| | The Applicant has committed to installing a stock fence around the perimeter of the proposed TSF4 and TSF5, including the Return Water Pond. | Regular visual inspections to check fencing integrity |
| | Fauna scaring devices are used at the TSF decant pond location | Air cannons and audible bird scarers |
| | Operate with a solids density of 55%, as opposed to 50%. Systems implemented to achieve this include: <ul style="list-style-type: none"> • Increase decant pump size to 38kW to increase water returned to the Process Water Pond • Have extra spares of pumps, hydraulic drives and valves available • Reduced throughput rates from 2 Mtpa to 1.8 Mtpa equating to a | Decreases water pumped to the TSFs by 300,000 m ³ /annum |

| Site infrastructure | Description | Operation details |
|---------------------|--|--|
| | reduction in water to the TSFs by 150,000 m ³ | |
| | <p>Tailings discharge or spigotting will be carried out such that the water pond is constantly positioned around the decant structure. The pond will be kept as far away as practical from the perimeter containment embankments at all times.</p> <p>A decant structure in each cell is incorporated into the design to recover water liberated from the tailings slurry.</p> | <p>Use of an Operating Manual.</p> <p>Managing (minimising) the size of the water pond to ensure no excess water is retained on the TSF will assist in reducing pond size</p> <p>Recovered water will be pumped from the sump for re-use in the process plant.</p> <p>Decant pond levels are maintained as low as practical to ensure excess water is continually removed.</p> |
| | <p>Return Water Pond will be constructed along TSF4's north-east embankment that is a 50m x 50m square pond lined with HDPE and 2.8m deep.</p> <p>This pond will be fenced.</p> | <p>This will assist with recovery of water from consolidation of tailings and to reduce seepage losses.</p> |

9.6.6 Key findings

The Delegated Officer has reviewed the information regarding fauna accessing tailings and has found:

1. The International Cyanide Management Code: Implementation Guidance WAD cyanide concentration in tailings and water ponds of 50mg/L may not be met
2. The Applicant has proposed an improved water balance, with a higher percentage of solids to reduce the volumes of water available to fauna
3. The Applicant has committed to installing a stock fence around the TSF4 and TSF5, and Return Water Pond.
4. The Applicant has committed to fauna scaring devices (air cannons and audible bird scarers).

9.6.7 Consequence

If fauna access occurs, then the Delegated Officer has determined that the storage of supernatant water containing a cyanide content of 53 - 90 mg/L does not meet the Specific Consequence Criteria for the environment. Therefore, the Delegated Officer considers the consequence to be **major**.

9.6.8 Likelihood of Risk Event

The Delegated Officer has determined that impacts to fauna could occur at some time due to the quality of the wastewater. Therefore, the Delegated Officer considers the likelihood of tailings seepage to be **possible**.

9.6.9 Overall rating of fauna access to tailings

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of fauna access to tailings is **high**.

9.7 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 26 below. Controls are described further in section 11.

Table 26: Risk assessment summary

| | Description of Risk Event | | | Applicant controls | Risk rating | Acceptability with controls (conditions on instrument) |
|----|---|--------------------------------------|---|--|---|--|
| | Emission | Source | Pathway/ Receptor (Impact) | | | |
| 1. | Tailings discharge to land (elevated sulfate, total nitrogen, boron, cobalt and zinc) | Overtopping or pipeline ruptures | Direct discharges | Freeboards maintained Leak detection on pipelines and banded trenches | Moderate consequence Unlikely likelihood Medium Risk | Acceptable subject to proponent controls (pipelines trenches, leak detection) |
| 2. | Tailings seepage (elevated sulfate, total nitrogen, boron, cobalt and zinc) | TSF4 and TSF5 bases and embankments | Infiltration | Permeability Underdrainage Seepage recovery | Moderate consequence Likely High risk | Acceptable subject to proponent controls (baseline ambient groundwater monitoring at new monitoring bores) and minimising water within the TSF4 and TSF5 |
| 3. | Fauna access to tailings with elevated WAD/CN above 50 mg/L | TSF4 and TSF5 and Process Water Pond | Fauna accessing these containment ponds | | Major consequence Possible likelihood High Risk | Acceptable subject to proponent controls (fencing off containment areas and four hourly monitoring) |

10. Regulatory controls

A summary of regulatory controls determined to be appropriate for the Risk Event is set out in Table 27. The risks are set out in the assessment in section 10 and the controls are detailed in this section. DWER will determine controls having regard to the adequacy of controls proposed by the Applicant/Licence Holder. The conditions of the works approval will be set to give effect to the determined regulatory controls.

Table 27: Summary of regulatory controls to be applied

| | | Controls (references are to sections below, setting out details of controls) | | | | |
|--|------------------|---|--|---|-------------------|----------------|
| | | 10.1.1 Pipelines & infrastructure & operations | 10.1.2 Seepage & infrastructure & operations | 10.1.4 Fauna access & infrastructure & operations | 10.1.5 Monitoring | 10.1.6 Reports |
| Risk Items (see risk analysis in section 9) | 9.4 Pipelines | • | | | • | • |
| | 9.5 Seepage | | • | | • | • |
| | 9.6 Fauna access | | | • | • | • |

10.1 Works Approval controls

10.1.1 Tailings Pipeline Ruptures and/or Overtopping

The works approval requires:

- Six embankment lifts of TSF4 and TSF5;
- Tailings lines and return water lines are located inside bunded open trenches, contoured to excavated sumps to contain spillages;
- In the event of a pipeline failure, there will be a controlled shutdown;
- The affected pipeline will remain shut down until repaired and the spilled materials collected and/or pumped, as appropriate, and deposited in TSF4 or TSF5;
- pipelines trenches/sumps must contain approximately six hours of slurry at full flow;
- Fitted leak detection system for the tailings and decant return pipelines with controlled shutdown until repairs are made and spilled materials collected;
- Flow sensors are located at the TSF common manifold of the facility and the pump discharge points of the Processing Plant.
- TSF4 and TSF5 contain a 1 in 100 year ARI, 72-hour duration rainfall event;
- that a minimum operational freeboard of TSF4 and TSF5 will be 300mm (height between the tailings beach at the embankment and the embankment crest) and the minimum total freeboard will be 500mm (operational freeboard 300mm plus pond and storm freeboard of 200mm); and

- Water will be continually removed from the facilities such that the minimum freeboard allowance is maintained.

Grounds: risks associate with tailings pipeline ruptures and/or overtopping have been assessed as medium (section 9.4.9). Requirements are derived from the controls outlined by the Applicant.

Compliance reports are required to be submitted to confirm the infrastructure has been put in place and design commitments met prior to operation.

Any spills or leaks resulting from pipeline integrity failure are required to be reported under s72 of the EP Act.

10.1.2 Tailings Seepage

The works approval requires:

- Low foundation permeability;
- During time limited operations, a solids density of 55% needs to be maintained;
- Spigotting of tailings to around the decant structure, with minimisation of the size of the water pond;
- Tailings discharge or spigotting will be carried out such that the water pond is constantly positioned around the decant structure. The pond will be kept as far away as practical from the perimeter containment embankments at all times;
- Managing (minimising) the size of the water pond to ensure no excess water is retained on the TSF will assist in reducing potential seepage;
- Recovered water will be pumped from the sump for re-use in the process plant;
- Decant pond levels are maintained as low as practical to ensure excess water is continually removed;
- Incorporation of a decant structure, with recovered water reused within the Processing Plant;
- an additional nine groundwater monitoring bores are to be installed in the vicinity of the TSF4 and TSF5, and must be installed, with baseline monitoring collected, prior to the commissioning of the TSFs;
- geophysical testing of the new TSF footprint is undertaken to ensure that bore sites are located on bedrock fractures that are potential groundwater flow-paths in the bedrock aquifer. Two bores are to be drilled and constructed at each monitoring site: one in the shallow aquifer in regolith, and one constructed in fractured bedrock;
- these groundwater monitoring bores must have the capability to have seepage recovered (pumping systems) installed if necessary;
- Limits for SWL and water quality may be implemented following establishment of baseline levels and water quality for the groundwater monitoring bores;
- Installation of 18 vibrating wire piezometers at TSF4 and TSF5. Read and report water levels within the piezometers along the TSF4 and TSF5 embankments.; and
- Installation of downstream seepage interception trench with finger drains and collected water sent to the Water Return Pond.

Grounds: Risks associated with seepage from the TSF4 and TSF5 have been assessed as high (section 9.5.9). The requirements are derived from the controls outlined by the Applicant.

As no specific sensitive receptor monitoring campaigns (subterranean fauna or deep rooted vegetation) have been committed to by the Applicant, the ambient groundwater monitoring results will be used to detect any seepage that may migrate towards these sensitive receptors. The geophysical testing is, therefore, required to ensure that the monitoring bores are correctly installed to obtain results from the potential groundwater flow-paths. Triggers and Limits can be implemented once the groundwater SWL and quality of the new monitoring bores are established.

10.1.3 Fauna accessing tailings containing cyanide

The works approval requires:

- Existing Process Water Dam is fenced off to prevent access to fauna and embankments are vegetation free;
- Installation of a stock fence around the perimeter of the TSF4 and TSF5 including the Return Water Pond;
- Fauna scaring devices implemented (Air cannons and audible bird scarers);
- During time limited operations, a solids density of 55% should be maintained; and
- Minimisation of the water pond to ensure no excess water is retained on the TSF, attracting fauna.

Grounds: Risks associated with fauna gaining access to tailings containing cyanide from the containment ponds have been assessed as high (section 9.6.9). This is due to the cyanide levels in the containment ponds possibly not meeting The International Cyanide Management Code: Implementation Guidance, which recommends a WAD cyanide concentration in tailings and water ponds of 50mg/L. This is considered to be protective of most wildlife and livestock mortality (ICMI, 2018).

10.1.4 Monitoring requirements

The works approval requires the following monitoring regimes:

- tailings lines inspections are conducted on a four hourly basis, including annual thickness testing during commissioning and time limited operations;
- TSFs, and containment ponds/dams to be inspected on a four hourly basis;
- Monthly monitoring of SWL and water quality during commissioning from the TSFs spigot outlet and from the Decant Water to Process Water Pond during commissioning and time limited operations, and comparison to The International Cyanide Management Code: Implementation Guidance, which recommends a WAD cyanide concentration in tailings and water ponds of 50mg/L;
- Quarterly monitoring of ambient groundwater monitoring from the new groundwater monitoring bores in the vicinity of TSF4 and TSF5 and comparison to the ANZECC/ARMCANZ NWQMS, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Livestock drinking water quality.

Grounds: Visual inspections of containment infrastructure and pipelines are required during commissioning and time limited operations and the Applicant is required to keep records of visual monitoring undertaken (but is not required to report this on an annual basis but is required to record the information in their books).

Monitoring of the tailings slurry and decant return water cyanide levels is required with comparison to The International Cyanide Management Code: Implementation Guidance and so that the quality of the wastewater is known in the event of pipeline ruptures or

overtopping.

Monitoring of ambient groundwater is required to determine if seepage issues are present and if recovery bores are required. Comparison to the ANZECC/ARMCANZ NWQMS, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Livestock drinking water quality is required.

10.1.5 Monitoring reports

The works approval requires the following reports be submitted:

- Environmental Compliance Report demonstrating that the infrastructure has been installed as committed to and as per the required Infrastructure and equipment requirements table, with no material defects;
- Critical Containment Infrastructure Report demonstrating that the infrastructure has been installed as committed to and as per the required Infrastructure and equipment requirements table, with no material defects;
- Environmental Commissioning Report providing a summary of the commissioning activities with timeframes, production rates, summary of monitoring results obtained and environmental performance; and
- Time limited operations report providing production rates, tailings deposited, tailings density, water balance, summary of monitoring results obtained and environmental performance.

Grounds: Reporting requirements are necessary for the administration of the works approval, validating ongoing acceptability of the operations and for validation against design criteria.

11. Determination of Works Approval conditions

The conditions in the issued works approval in Attachment 1 have been determined in accordance with the *Guidance Statement: Setting Conditions*.

Table 28 provides a summary of the conditions to be applied to this works approval.

Table 28: Summary of conditions to be applied

| Condition Ref | Grounds |
|--|--|
| Construction phase | |
| Infrastructure and equipment Conditions 1, 2 and 3 | These conditions require that infrastructure is constructed and designed as per the supporting documents and that groundwater monitoring bores are installed. Environmental compliance is a valid, risk-based condition to ensure appropriate linkage between the licence and the EP Act. |
| Environmental compliance critical containment infrastructure report Conditions 4 and 5 | These conditions require a compliance report to be provided following construction completion. Environmental compliance is a valid, risk-based condition to ensure appropriate linkage between the licence and the EP Act. |

| | |
|--|---|
| <p>Baseline ambient groundwater monitoring</p> <p>Conditions 6, 7 and 8</p> | <p>These conditions require that groundwater monitoring is conducted in the nine new groundwater monitoring bores downstream of TSF4 and TSF5 prior to commissioning commencing, with a comparison to ANZECC/ARMCANZ NWQMS, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Livestock drinking water quality.</p> <p>These conditions are valid, risk-based and consistent with the EP Act.</p> |
| <p>Environmental commissioning phase</p> | |
| <p>Environmental commissioning requirements</p> <p>Conditions 9 and 10</p> | <p>These conditions allow commissioning of the infrastructure to occur for 30 days provided that the compliance documentation has been received and endorsed by the CEO within 45 days.</p> <p>These conditions are valid, risk-based and consistent with the EP Act.</p> |
| <p>Monitoring during environmental commissioning</p> <p>Conditions 11, 12, 13 and 14</p> | <p>These conditions require monitoring of WAD-CN in the containment structures and that a commissioning report be provided that includes this data, along with the quarterly groundwater monitoring results downstream of TSF4 and TSF5 and environmental performance of the infrastructure.</p> <p>These conditions are valid, risk-based and consistent with the EP Act.</p> |
| <p>Time limited operations phase</p> | |
| <p>Commencement and duration</p> <p>Condition 15</p> | <p>This condition requires that compliance and commissioning reports have been received prior to time limited operations commencing.</p> <p>These conditions are valid, risk-based and consistent with the EP Act.</p> |
| <p>Time limited operations requirements</p> <p>Conditions 16 and 17</p> | <p>These conditions have operational requirements to be implemented until the operating licence is granted.</p> <p>These conditions are valid, risk-based and consistent with the EP Act.</p> |
| <p>Monitoring during time limited operations</p> <p>Condition 18</p> | <p>This conditions requires that the quarterly groundwater monitoring and the WAD-CN monitoring is conducted during time limited operations.</p> <p>These conditions are valid, risk-based and consistent with the EP Act.</p> |

| | |
|--|--|
| Inspections Conditions 19 and 20 | These conditions require visual monitoring and recording of containment structures and pipelines for integrity. These conditions are valid, risk-based and consistent with the EP Act. |
| Compliance reporting Conditions 21 and 22 | These conditions require a time limited operations report be provided with a summary of the performance of the infrastructure and details on product produced, tailings produced, tailings water content, water balance etc. These conditions are valid, risk-based and consistent with the EP Act. |
| Records and reporting (general) | |
| Conditions 23, 24, 25 and 26 | These conditions have certain requirements for monitoring frequencies, complaints and books. These conditions are valid, risk-based and consistent with the EP Act. |

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the works approvals under the EP Act.

12. Applicant's comments

The Applicant/Licence Holder was provided with the draft Decision Report and draft works approval on 28 February 2020. The Applicant/Licence Holder provided comments on 04 March 2020, which are summarised, along with DWER's response, in Appendix 2.

13. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1).

Based on this assessment, it has been determined that the works approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

ALANA KIDD
MANAGER, RESOURCE INDUSTRIES
Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

| | Document title | In text ref | Availability |
|----|--|---------------|--|
| 1. | Licence L6868/1989/12 – Plutonic Gold Mine | L6868/1989/12 | accessed at www.der.wa.gov.au |
| 2. | DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth. | N/A | accessed at www.dwer.wa.gov.au |
| 3. | DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth. | N/A | |
| 4. | DER, November 2016. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth. | N/A | |
| 5. | DER, June 2019. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth. | N/A | |
| 6. | Email titled “RE: APPLICANT NOTIFICATION - APPLICATION FOR A WORKS APPROVAL - REQUEST FOR FURTHER INFORMATION” dated 28/08/2019 2:53pm and authored by Significant Environmental | N/A | |
| 7. | Email titled “RE: APPLICANT NOTIFICATION - APPLICATION FOR A WORKS APPROVAL - REQUEST FOR FURTHER INFORMATION” dated 26/09/2019 9:50am and authored by Significant Environmental | N/A | DWER records (A1861352) |
| 8. | Email titled “RE: APPLICANT NOTIFICATION - APPLICATION FOR A WORKS APPROVAL - REQUEST FOR FURTHER INFORMATION” dated 29/10/2019 2:51pm and authored by Significant Environmental | N/A | DWER records (A1840982) |
| 9. | Email titled “RE: APPLICANT NOTIFICATION - APPLICATION | N/A | DWER records (A1862470) |

| | | | |
|-----|---|-----|---|
| | FOR A WORKS APPROVAL (W6323/2019/1) - REQUEST FOR FURTHER INFORMATION" dated 26/01/2020 2:51pm and authored by Significant Environmental | | |
| 10. | Email titled "RE: APPLICANT NOTIFICATION - APPLICATION FOR A WORKS APPROVAL (W6323/2019/1) - REQUEST FOR FURTHER INFORMATION" dated 4/02/2020 12:37pm and authored by Significant Environmental | N/A | DWER records (A1864241) |
| 11. | Email titled "RE: APPLICANT NOTIFICATION - W6323/2019/1 - APPLICATION FOR A WORKS APPROVAL - DRAFT INSTRUMENT AND DECISION REPORT" dated 04/03/2020 10:47am and authored by Significant Environmental | N/A | DWER records (A1873395) |
| 12. | ANZECC/ARMCANZ NWQMS, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Livestock drinking water quality | N/A | Accessed at https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000 |

Appendix 2: Summary of Applicant's comments on risk assessment and draft conditions

| Condition | Summary of Applicant/Licence Holder comment | DWER response |
|---|--|-----------------------|
| Condition 1, Table 1 Condition 16, Table 6 | Requested that rather than automatic shutdown if a line leak is detected – there is a preference for a controlled shutdown rather than automatic stopping of tailings pumps. There will be adequate bunds and storage on the pipe corridor if leak occurs. | Updated as requested. |

Attachment 1: Works Approval W6323/2019/1
