Government of Western Australia
Department of Environment Regulation

# Works Approval

## *Environmental Protection Act 1986,* Part V

## Works Approval Holder: Roy Hill Iron Ore Pty Ltd

## Works Approval Number: W5067/2011/1

**Registered office:** 5 Whitham Road
PERTH AIRPORT WA 6105

**ACN:** 123 722 038

**Premises address:** Roy Hill Iron Ore Mine
Mine Process Plant and Tailings Storage Facility
M46/518 and M46/519
NEWMAN WA 6753
As depicted in Schedule 1

**Issue date:** Thursday, 7 June 2012

**Commencement date:** Monday, 11 June 2012

**Expiry date:** Saturday, 10 June 2017

The following category/s from the *Environmental Protection Regulations 1987* cause this Premises to be a prescribed premises for the purposes of the *Environmental Protection Act 1986*:

| Category number | Category description | Category production or design capacity | Premises production or design capacity |
|---|---|---|---|
| 5 | Processing or beneficiation of metallic or non-metallic ore: premises on which –<br>(a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed;<br>(b) tailings from metallic or non-metallic ore are reprocessed; or<br>(c) tailings or residue from metallic or non-metallic ore are discharged into containment cell or dam | 50 000 tonnes or more per year | 55,000,000 tonnes per annual period |

**Conditions**
This Works Approval is subject to the conditions set out in the attached pages.

Date signed: 25 February 2016
.....
**Alana Kidd**
**Manager Licensing - Resource Industries**
Officer delegated under section 20
of the *Environmental Protection Act 1986*

# Works Approval Conditions

# 1 General

### 1.1 Interpretation

1.1.1 In the Works Approval, definitions from the *Environmental Protection Act 1986* apply unless the contrary intention appears.

1.1.2 In the Works Approval, unless the contrary intention appears:

**'Act'** means the *Environmental Protection Act 1986;*

**'annual period'** means the inclusive period from 1 April until 31 March in the following year;

**'CEO'** means the Chief Executive Officer of the Department of Environment Regulation*;*

**'CEO'** for the purpose of correspondence means:

Chief Executive Officer
Department Administering the Environmental Protection Act 1986
Locked Bag 33
CLOISTERS SQUARE WA 6850
Email: info@der.wa.gov.au;

**'Commissioning'** means the process of operation and testing that verifies the works and all relevant systems, plant, machinery and equipment have been installed and are performing in accordance with the design specification set out in the works approval application;

**'Premises'** means the area defined in the Premises Map in Schedule 1 and listed as the Premises address on page 1 of the Works Approval;

**'Schedule 1'** means Schedule 1 of this Works Approval unless otherwise stated;

**'Stage 1'** means construction of the TSF Cell 1 to Crest RL of 436m;

**'TSF'** means Tailings Storage Facility;

**'Works Approval'** means this Works Approval numbered W5067/2011/1 and issued under the Act; and

**'Works Approval Holder'** means the person or organisation named as the Works Approval Holder on page 1 of the Works Approval.

1.1.3 Any reference to an Australian or other standard in the Works Approval means the relevant parts of the standard in force from time to time during the term of this Works Approval.

1.1.4 Any reference to a guideline or code of practice in the Works Approval means the current version of the guideline or code of practice in force from time to time, and shall include any amendments or replacements to that guidelines or code of practice made during the term of this Works Approval.

### 1.2 General conditions

1.2.1 The Works Approval Holder shall construct the works in accordance with the documentation detailed in Table 1.2.1:

| Table 1.2.1: Construction Requirements[1] | | |
|---|---|---|
| **Document** | **Parts** | **Date of Document** |
| Application to Amend Works Approval W5067/2011/1 for the Tailings Storage Facility and Mine Process Plant, Roy Hill Iron Ore Pty Ltd, Roy Hill | All | 20 September 2013 |
| Works Approval Application Form | All | 13 September 2011 |
| Works Approval W5607/2011/1 Amendment Evaporators Additional Information (OP-APP-00021) | All | 7 October 2015 |
| Re: Amendment to Works Approval W5067/2011/1, Roy Hill Iron Ore (OP-LET-00161) | All | 22 December 2015 |

Note 1: Where the details and commitments of the documents listed in condition 1.2.1 are inconsistent with any other condition of this works approval, the conditions of this works approval shall prevail.

1.2.2 The Works Approval Holder shall commission the Mine Process Plant and TSF Stage 1 until the 10 August 2016.

# 2 Emissions

2.1.1 The Works Approval Holder shall ensure that where waste is emitted to land from the emission point in Table 2.1.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Works Approval.

| Table 2.1.1: Emissions to land | | |
|---|---|---|
| **Emission point reference and location on Map of emission points** | **Description** | **Source including abatement** |
| Tailings Storage Facility | Tailings piped from the Residue Thickener and discharged into the TSF via spigots | Tailings from the Mine Process Plant |

# 3 Information

### 3.1 Reporting

3.1.1 The Works Approval Holder shall submit a commissioning report for the Mine Process Plant and TSF Stage 1, to the CEO within 3 months of the completion of commissioning.

3.1.2 The Works Approval Holder shall ensure the report includes:
(a) a summary of the environmental performance of the Mine Process Plant and TSF Stage 1 as installed, against the design specification set out in the Works Approval application;
(b) a review of performance against the Works Approval conditions; and
(c) where they have not been met, measures proposed to meet the design specification and/or Works Approval conditions, together with timescales for implementing the proposed measures.

### 3.2 Notification

3.2.1 The Works Approval Holder shall ensure that the parameters listed in Table 3.2.1 are notified to the CEO and are in accordance with the notification requirements of the table.

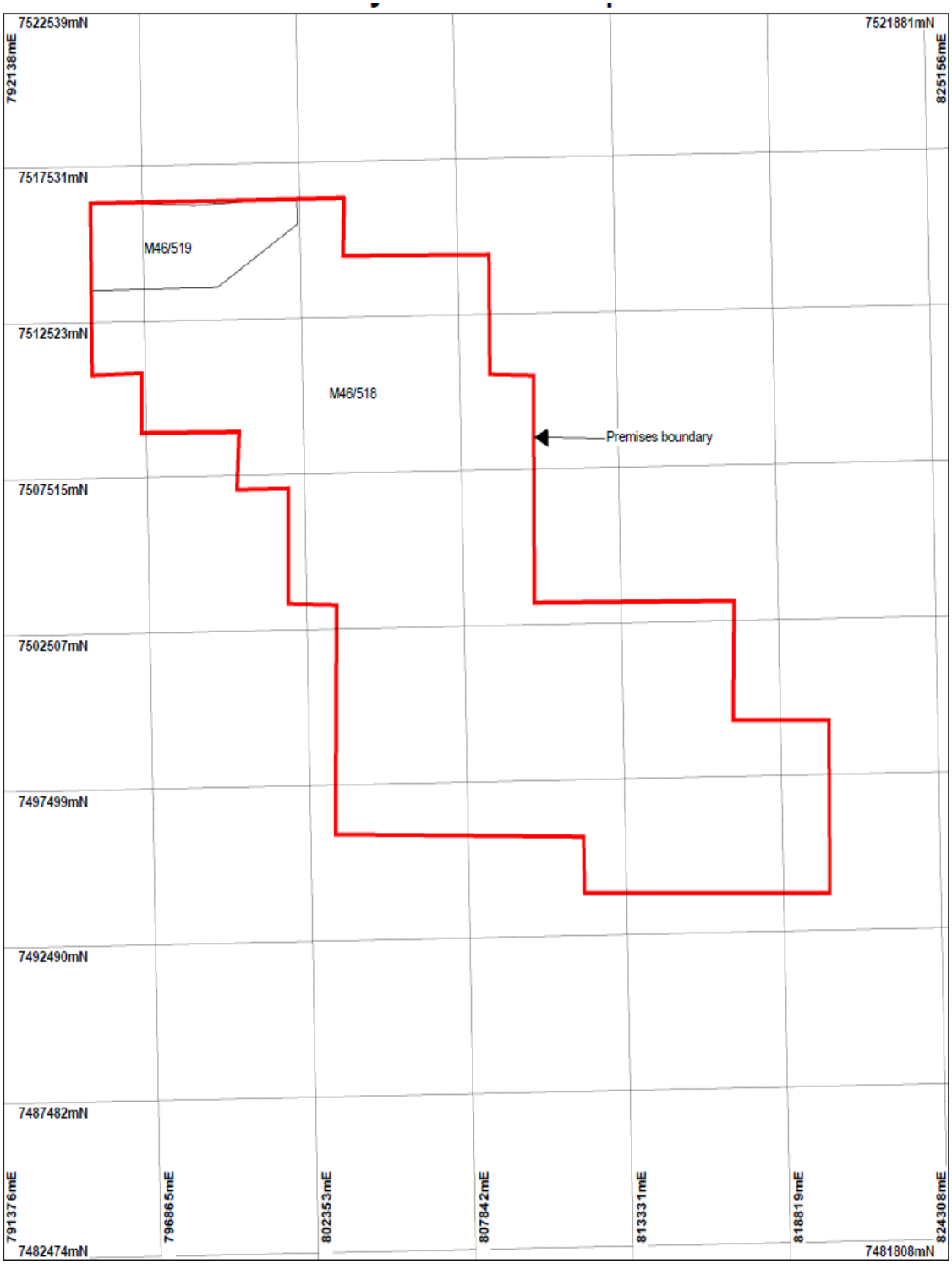
**Table 3.2.1: Notification requirements**

| Condition or table (if relevant) | Parameter | Notification requirement | Format or form |
|---|---|---|---|
| 1.2.2 | Completion of commissioning | 7 days after completion | None specified |

# Schedule 1: Maps

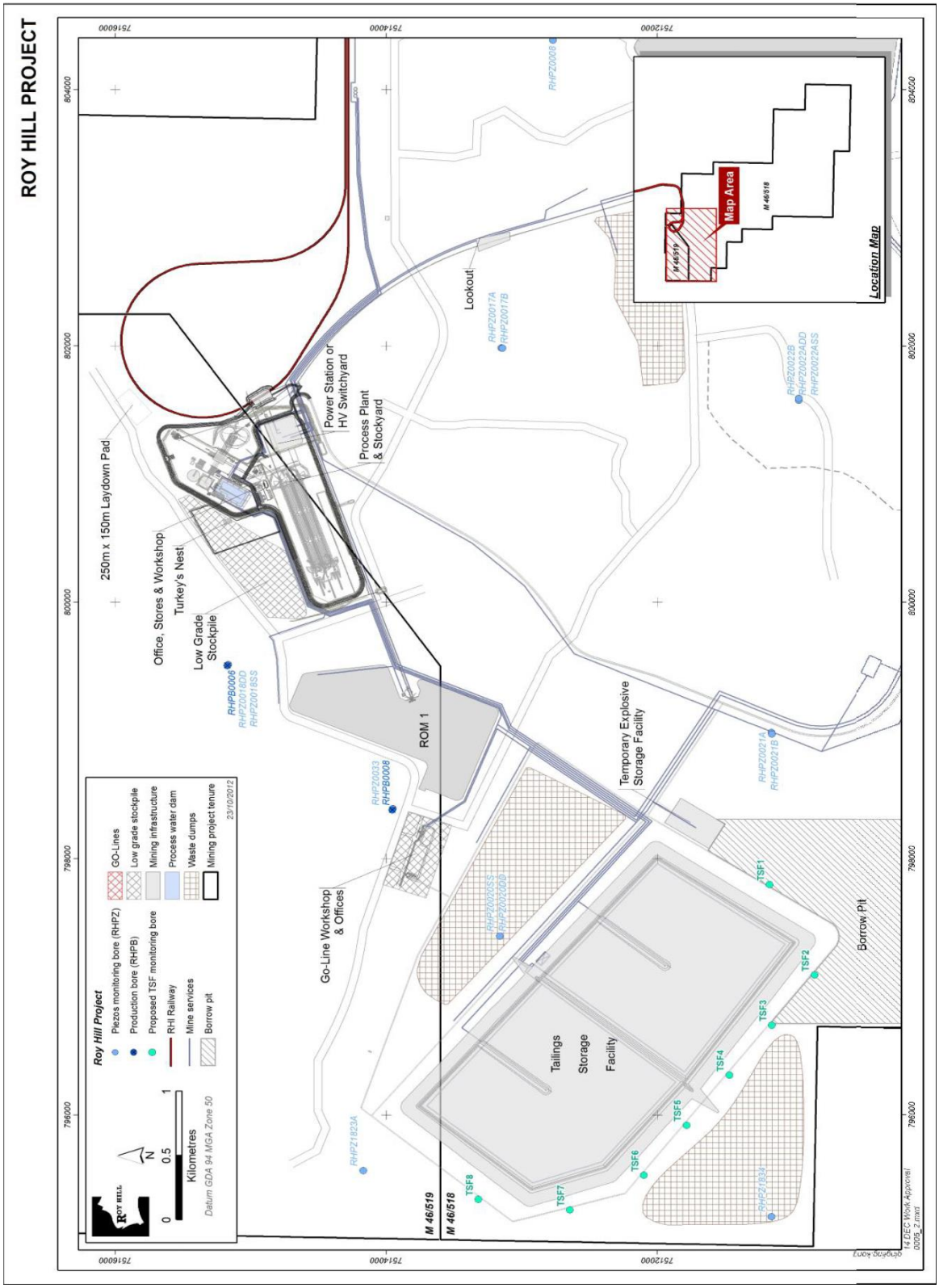
### Premises map

The Premises is shown in the map below. The red line depicts the Premises boundary.



**Map of emission points**

The location of the emission point defined in Table 2.1.1 is shown below.



Government of Western Australia
Department of Environment Regulation

# Decision Document

## *Environmental Protection Act 1986,* Part V

## Proponent: Roy Hill Iron Ore Pty Ltd

## Works Approval: W5067/2011/1

| | |
|---|---|
| **Registered office:** | 5 Whitham Road<br>PERTH AIRPORT WA 6105 |
| **ACN:** | 123 722 038 |
| **Premises address:** | Roy Hill Iron Ore Mine<br>Mine Process Plant and Tailings Storage Facility<br>M46/518 and M46/519<br>NEWMAN WA 6753 |
| **Issue date:** | Thursday, 7 June 2012 |
| **Commencement date:** | Monday, 11 June 2012 |
| **Expiry date:** | Saturday, 10 June 2017 |

**Decision**

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

| | |
|---|---|
| Decision Document prepared by: | Sonya Poor<br>Licensing Officer |
| Decision Document authorised by: | Alana Kidd<br>Delegated Officer |

# 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 ☐<br>New Licence ☐<br>Licence amendment ☐<br>Works Approval amendment ☒ | |
| Activities that cause the premises to become prescribed premises | **Category number(s)** | **Assessed design capacity** |
| | 5 | 55,000,000 tonnes per annual period |
| Application verified<br>Application fee paid | Date: N/A<br>Date: N/A | |
| Works Approval has been complied with<br>Compliance Certificate received | Yes☐ No☐ N/A☒<br>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:<br>Managed under Part V ☐<br>Assessed under Part IV ☒ |
| Is the proposal subject to Ministerial Conditions? | Yes☒ No☐ | Ministerial statement No: 824, 829, 902, 979 and 980 |

| | | |
|---|---|---|
| | | EPA Report No: 1342, 1345, 1439, 1519 and 1520 |
| 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☒<br>Department of Water consulted Yes ☐ No ☒ | |
| Is the Premises within an Environmental Protection Policy (EPP) Area Yes☐ No☒<br>If Yes include details of which EPP(s) here. | | |
| Is the Premises subject to any EPP requirements? Yes☐ No☒<br>If Yes, include details here, eg Site is subject to $SO_2$ requirements of Kwinana EPP. | | |

# 3 Executive summary of proposal and assessment

Roy Hill Iron Ore Pty Ltd (RHIO) is developing the Roy Hill Iron Ore Mine in the Pilbara region of Western Australia. The mine will feature a Mine Process Plant (MPP) capable of producing 55 million tonnes per annum (Mtpa) of iron ore (wet weight), which will be transported via rail to Port Hedland for export. Processing infrastructure will include a desanding plant with rejects discharged to a dedicated Tailings Storage Facility (TSF).

RHIO currently holds works approval W5067/2011/1, which allows construction of the MPP and TSF. Under this works approval, RHIO proposed to reuse decant water from the TSF in the MPP. Recent investigations have indicated that reusing the decant water will increase the chloride concentration in the ore to above target concentrations. RHIO recently sought to enhance the quality of the shipped ore product by reducing chloride concentrations. RHIO has investigated various options for reuse or disposal of decant water including dust suppression, aquifer pit storage, aquifer re-injection and controlled release of water. Due to the quality and quantity of the decant water produced, evaporation of the excess water was identified as the preferred disposal option. RHIO is proposing to install evaporators on the central causeway of the TSF to accelerate evaporation of the excess decant water.

RHIO has applied for an amendment to W5067/2011/1 to extend the commissioning period and expiry date and for the installation of the evaporators on the causeway of the TSF.

During this amendment the following changes have been made to the works approval:

- Registered address has been updated;
- The ACN has been updated to reflect the Works Approval Holder – Roy Hill Iron Ore Pty Ltd rather than Roy Hill Infrastructure Pty Ltd;
- Expiry date has been extended from 10 June 2016 until 10 June 2017;
- Updated to reflect Departmental reform as published on DER's website under "Administrative changes implemented within the Department of Environment Regulation" www.der.wa.gov.au;
- Updated to reflect version 2.9 (v2.9) works approval template;
- Definitions have been updated;
- Inclusion of the P4 amendment application and supporting documentation in Table 1.2.1;
- Removal of previous condition 1.2.2;
- Change to the commissioning period for condition 1.2.2;
- Inclusion of the TSF emission point in condition 2.1.1;
- Removal of previous condition 4.1.1;

- Removal of previous conditions 5.1.1 and 5.1.2;
- Removal of commencement of commissioning notification requirement in Table 3.2.1; and
- Inclusion of map of emission points in Schedule 1.

RHIO currently holds an existing licence (L8621/2011/1) for the Roy Hill Iron Ore Mine under the *Environmental Protection Act 1986* for category 12, 54, 57 and 64 activities. This licence will need to be amended to include category 5 and associated conditions prior to the operation of the MPP and TSF.

Where conditions have been amended in the existing works approval or changes made to the original decision document these have been justified in Section 4.

# 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** | W1.2.1 and W1.2.2. | **Construction**<br>Previous condition W1.2.2 has been removed. Only minor amounts of hydrocarbons will be stored onsite to support the construction of the MPP.<br><br>The commissioning period for the MPP and TSF expires on 10 February 2016. Previous condition W1.2.3 allowed a four month commissioning period, which RHIO have stated is insufficient to complete commissioning of the MPP and TSF. RHIO is proposing to install evaporators as a disposal method for the decant water in the TSF (refer to Appendix A). Construction and commissioning of the evaporators is scheduled for May to July 2016. Given the overlapping commissioning periods of the MPP, TSF and evaporators, condition W1.2.2 has been extended until 10 August 2016. | Re: Amendment to Works Approval W5067/2011/1, Roy Hill Iron Ore (OP-LET-00161), 22 December 2015.<br><br>Works Approval application supporting documentation. |
| | N/A. | **Operation**<br>Hydrocarbons are to be stored in accordance with the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007* and Australian Standards 1940-2004 The Storage and Handling of Flammable and Combustible Liquids.<br><br>No conditions relating to the storage of environmentally hazardous materials are required to be added to the licence as this can be sufficiently regulated by the above Regulations and Australian Standards. | |
| **Premises** | N/A. | DER's assessment and decision making are detailed in Appendix A. | Re: Amendment to Works |

| DECISION TABLE | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number W = Works Approval L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| **operation** | | | Approval W5067/2011/1, Roy Hill Iron Ore (OP-LET-00161), 22 December 2015.<br><br>Works Approval W5607/2011/1 Amendment Evaporators Additional Information (OP-APP-00021), 7 October 2015. |
| **Emissions to land including monitoring** | W2.1.1.<br><br>Licence conditions. | **Construction**<br>During commissioning of the MPP, tailings will be discharged to the TSF Stage 1. Condition W2.1.1 has been added to the works approval for the TSF emission point to land. Refer also to Appendix A.<br><br>**Operation**<br>Conditions will be added to the licence for the operation of the TSF including containment infrastructure and inspection requirements, freeboard and annual water balance conditions. | Works Approval application supporting documentation. |
| **Improvements** | N/A. | Previous condition W4.1.1 has been removed. The Commissioning Plan and Groundwater Monitoring Plan for the MPP and TSF Stage 1 were received by DER on 12 May 2015. | Roy Hill, Mine Process Plant, Tailings & Decant Pipelines and Tailings Storage Facility Commissioning Environmental Management Plan for Works Approval W5067/2011/1 (OP-PLN- |

| DECISION TABLE | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number W = Works Approval L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| | | | 00078), 24 April 2015.<br><br>Roy Hill Tailings Storage Facility Groundwater Monitoring Plan (OP-PLN-00002), 30 April 2015. |
| **Information** | W3.1.1, W3.1.2 and W3.2.1. | The definitions for Stages 2 to 16 have been removed as these Stages have been assessed under the existing works approval (refer to Appendix A for the TSF).<br><br>Previous conditions W5.1.1 and W5.1.2 have been removed. The final compliance documentation for the MPP and TSF Stage 1 was received by DER on 9 December 2015. DER does not require a compliance document for each subsequent lift (Stages 2 to 16).<br><br>The requirement to notify DER at the commencement of commissioning of the MPP and TSF Stage 1 has been removed from Table 3.2.1. RHIO have already notified DER of this. | N/A. |
| **Works Approval Duration** | N/A. | The current expiry date for the works approval is 10 June 2016. During this amendment the expiry date has changed to 10 June 2017. This is due to the extension of the commissioning period in condition W1.2.2. | N/A. |

# 5 Advertisement and consultation table

| Date | Event | Comments received/Notes | How comments were taken into consideration |
|---|---|---|---|
| 11/02/2016 | Proponent sent a copy of draft instrument | Signed waiver form received 19/02/2016.<br>No comments received. | N/A |

# 6 Risk Assessment

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

## Table 2: 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

**Premises operation**

TSF

Tailings will be generated as part of iron ore beneficiation in the MPP. A conventional thickener will increase the solids content in the tailings to approximately 55% before the tailings will be pumped into the TSF. The TSF was designed as a two cell paddock style facility formed by perimeter and dividing embankments. The tailings will be delivered via a twin pipeline and discharged into the TSF from the perimeter and the dividing embankments to form beaches sloping towards the cell centres. Excess water will be recovered by a pumped central decant structure in each TSF cell.

Under the existing works approval there will be 8 perimeter embankment lifts required throughout the 10 year life of the TSF as shown in Table 1. Each stage includes the construction, deposition and drying out of tailings in both dams.

**Table 1: TSF construction summary**

| Stage | Cell | Crest RL (m) | Tailings Storage Volume (Mt) | | Estimated Life (months) |
|---|---|---|---|---|---|
| | | | Cell 1 | Cell 2 | |
| 1A | 1 | 436 | 8.83 | | 17.4 |
| 1B | 2 | 436 | | 8.92 | 8.9 |
| 2A | 1 | 439 | 16.85 | | 7.5 |
| 2B | 2 | 439 | | 16.56 | 6.9 |
| 3A | 1 | 442 | 27.97 | | 7.3 |
| 3B | 2 | 442 | | 24.22 | 6.9 |
| 4A | 1 | 445 | 31.19 | | 7.4 |
| 4B | 2 | 445 | | 32.21 | 7.2 |
| 5A | 1 | 448 | 41.61 | | 7.6 |
| 5B | 2 | 448 | | 40.07 | 7.1 |
| 6A | 1 | 451 | 50.02 | | 7.6 |
| 6B | 2 | 451 | | 48.08 | 7.2 |
| 7A | 1 | 454 | 58.56 | | 7.7 |
| 7B | 2 | 454 | | 56.20 | 7.3 |
| 8A | 1 | 456 | 64.58 | | 5.4 |
| 8B | 2 | 456 | | 61.73 | 5 |

Regulatory Controls

Conditions will be added to the existing licence for the TSF including containment infrastructure and inspection requirements, freeboard and annual water balance conditions.

Evaporators

Under the existing works approval W5067/2011/1, RHIO proposed to reuse decant water from the TSF in the MPP. Recent investigations have indicated that reusing the decant water will increase the chloride concentration in the ore to above target concentrations. RHIO investigated various options for reuse or disposal of decant water. Evaporation of the excess water was identified as the preferred disposal option.

RHIO is proposing to install seven modular Minetek 400/200 evaporator units at 50 metre intervals along the central causeway of the active cell of the TSF to accelerate evaporation of the excess decant water. Other support infrastructure to be installed includes two suction pumps, weather station, Programmable Logic Control (PLC) system – housed within a sea container, high density polyethylene (HDPE) piping and power via a generator located on the causeway. The decant return

system will remain in place. The evaporators will utilise the existing decant pumps and the additional pumps to feed water to the evaporators.

The evaporators simulate favourable conditions to accelerate the evaporation process. Evaporation is influenced by the ambient air temperature, relative humidity and size and velocity of the water droplet to be evaporated. The evaporation process can be accelerated with increasing air flow and increasing water flow, which increases the exposure of the droplets to the evaporation drivers of the ambient air (temperature and low humidity).

The design capacity of the seven evaporators is 630 cubic metres ($m^3$) per hour ($m^3$/hour) (5,518,800 $m^3$ per year ($m^3$/year)). The MPP water demand estimated the operational volume of water to be directed from the TSF (decant water return) to be 184 $m^3$/hour (1,611,840 $m^3$/year) and it is anticipated to vary due to ore blend. The volume of decant return water is approximately 11% of the total water discharged to the TSF after natural evaporation rates are considered. The 184 $m^3$/hour of decant water takes into account this estimated water rate return ad includes water contributions from annualised rainfall. The TSF is not designed as a water storage facility. When conditions are not optimal or during a rain event, there may be scenarios that require all seven evaporators to operate at an increased rate to dispose of any accumulated water to maintain the TSF operational freeboard of 300 millimetres.

The module design of the system allows for individual units to be operational or in standby, determined by the prevailing weather conditions, volumes of water to be disposed of and to allow for equipment maintenance. The individual evaporators will be manually operated and shutdown by the TSF operators.

When weather conditions, including high humidity, rainfall, wind speed and excess spray drift occur the number of operational evaporators will be reduced and/or the evaporators will be shutdown and decant water will be returned to the process plant via the return decant water pipeline.

Regulatory Controls

No conditions are required to be added to the works approval or licence for the evaporators.