Government of Western Australia
Department of Environment Regulation

Licence

Environmental Protection Act 1986, Part V

Licensee: CITIC Pacific Mining Management Pty Ltd

Licence: L8308/2008/2

Registered office: 45 St Georges Terrace
PERTH WA 6000

ACN: 119 578 371

Premises address: Sino Iron Project Mine Site
Mining Tenements M08/123, M08/124, M08/125, M08/264, M08/265, M08/266, G08/54 and L08/126
MARDIE WA 6714
As depicted in Schedule 1

Issue date: Friday, 30 May 2014

Commencement date: Sunday, 1 June 2014

Expiry date: Monday, 31 May 2021

Prescribed premises category
Schedule 1 of the *Environmental Protection Regulations 1987*

Category number	Category description	Category production or design capacity	Approved Premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes or more per year	Primary Crushers (1, 2, 3 and 4) 85,400,000 tonnes per annual period Concentrators (Mill Lines 1, 2, 3, 4, 5 and 6) 85,400,000 tonnes per annual period (producing 27,600,000 tonnes per annual period) Tailings Storage Facility (Stage 1) 35,800,000 tonnes per annual period
6	Mine dewatering discharge	50,000 tonnes or more per year	2,000,000 tonnes per annual period (2 gigalitres per annual period)
12	Screening, etc. of material	50,000 tonnes or more per year	2,700,000 tonnes per annual period
52	Electric power generation	20 megawatts or more in	480 megawatts

		aggregate (using natural gas)	
54	Sewage facility	100 cubic metres or more per day	1,060 cubic metres per day
57	Used tyre storage (general)	100 tyres or more	No more than 500 tyres
64	Class ll putrescible landfill site	20 tonnes or more per year	Landfill Facility - 15,000 tonnes per annual period (excluding Clean Fill used for cover material) Waste Rock Landforms – 1,000 tonnes of tyres
73	Bulk storage of chemicals, etc	1,000 cubic metres in aggregate	4,800 cubic metres in aggregate

Conditions
This Licence is subject to the conditions set out in the attached pages.

Date signed: 24 November 2016

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Alana Kidd
Manager Licensing – Resource Industries
Officer delegated under section 20
of the *Environmental Protection Act 1986*

Contents

Introduction

This Introduction is not part of the Licence conditions.

DER's industry licensing role
The Department of Environment Regulation (DER) is a government department for the state of Western Australia in the portfolio of the Minister for Environment. DER's purpose is to advise on and implement strategies for a healthy environment for the benefit of all current and future Western Australians.

DER has responsibilities under Part V of the *Environmental Protection Act 1986* (the Act) for the licensing of prescribed premises. Through this process DER regulates to prevent, control and abate pollution and environmental harm to conserve and protect the environment. DER also monitors and audits compliance with works approvals and licence conditions, takes enforcement action as appropriate and develops and implements licensing and industry regulation policy.

Licence requirements
This Licence is issued under Part V of the Act. Conditions contained within the Licence relate to the prevention, reduction or control of emissions and discharges to the environment and to the monitoring and reporting of them.

Where other statutory instruments impose obligations on the Premises/Licensee the intention is not to replicate them in the licence conditions. You should therefore ensure that you are aware of all your statutory obligations under the Act and any other statutory instrument. Legislation can be accessed through the State Law Publisher website using the following link:
http://www.slp.wa.gov.au/legislation/statutes.nsf/default.html

For your Premises relevant statutory instruments include but are not limited to obligations under the:

- *Environmental Protection (Unauthorised Discharges) Regulations 2004* – these Regulations make it an offence to discharge certain materials such as contaminated stormwater into the environment other than in the circumstances set out in the Regulations.

- *Environmental Protection (Controlled Waste) Regulations 2004* - these Regulations place obligations on you if you produce, accept, transport or dispose of controlled waste.

- *Environmental Protection (Noise) Regulations 1997* – these Regulations require noise emissions from the Premises to comply with the assigned noise levels set out in the Regulations.

You must comply with your licence. Non-compliance with your licence is an offence and strict penalties exist for those who do not comply.

Licence holders are also reminded of the requirements of section 53 of the Act which places restrictions on making certain changes to prescribed premises unless the changes are in accordance with a works approval, licence, closure notice or environmental protection notice.

Licence fees
If you have a licence that is issued for more than one year, you are required to pay an annual licence fee prior to the anniversary date of issue of your licence. Non payment of annual licence fees will result in your licence ceasing to have effect meaning that it will no longer be valid and you will need to apply for a new licence for your Premises.

Ministerial conditions
If your Premises has been assessed under Part IV of the Act you may have had conditions imposed by the Minister for Environment. You are required to comply with any conditions imposed by the Minister.

Premises description and Licence summary
Category 5
CITIC Pacific Mining Management Pty Ltd (the Licensee) operates the Primary Crushing Facility (PCF), which consists of four crushing units (Primary Crusher (PC) 1 to PC4 and Concentrator, which consists of six mill lines (ML) (ML1 to ML6) to process magnetite ore. The entire PCF and Concentrator consists of Run of Mine (ROM) stockpiles, four PCs, six MLs, crushed ore stockpile, associated conveyors and transfer stations.

Stage 1 (includes Stage 1 and Stage 1B) of the Tailings Storage Facility (TSF), has been constructed and commissioned. The TSF allows for the disposal of tailings waste from the processing of magnetite ore. Stage 2 (lifts 1 to 3) of the TSF are planned for construction in the future.

Category 6
The Licensee is proposing to construct mine dewatering infrastructure to allow discharge of approximately 2 gigalitres (GL) of excess mine dewatering water per year to the Fortescue River mouth.

Category 12
The Licensee has three mobile crushing and screening plants (MCSPs) constructed under W5593/2014/1 to process non-magnetite rock material within the project boundaries. The total capacity of the MCSPs is 2.7 million tonnes per annum (Mtpa).

Category 52
The power station supplies electrical power to the mine, port and supporting infrastructure of the Sino Iron Project. The gas fuelled power station receives natural gas from a branched connection off the Dampier to Bunbury Gas Pipeline. The power station consists of six combined cycle gas turbine power generators with heat recovery steam generators and steam turbines (3 turbine units each with a design capacity of 146 megawatts (MW)), and one open cycle gas turbine (design capacity 42 MW).

Category 54
The 123 Camp wastewater treatment plant (WWTP) treats normal domestic wastewater (i.e. from toilet, bathroom and kitchen facilities) from the accommodation village and has a capacity of 1,000 cubic metres (m^3) per day (m^3/day). The treated sewage is then irrigated onto a specific area of land. The facility will be decommissioned once the permanent accommodation village and WWTP have been constructed. A 60 m^3/day Biomax WWTP, to accommodate personnel working within the process plant is also operated by the Licensee. The treated wastewater from the Biomax WWTP is stored in the existing high density polyethylene (HDPE) lined process water dam onsite prior to recirculating it in the hoppers and mills of the process plant.

Category 57
All used tyres are assessed by the Licensee to determine whether they can continue in use or if they should be disposed. Where used tyres are deemed to be suitable for continued use they may wait up to six months before they are put back into service. Less than 500 tyres may be stored at the designated tyre laydown area at any one time.

Category 64
The Class II putrescible landfill site services the accommodation sector of the mine, as well as receiving non-recyclable waste from construction activities. Due to a rapid and significant increase in construction activities over the 2014-2015 period, coupled with a review by the Licensee of waste estimating practices a disposal limit of 15,000 tonnes (excluding clean fill used for cover material) is deemed appropriate.

The Licensee currently disposes of tyres in accordance with the CITIC Pacific Mining, *Tyre Disposal Procedure* (DR023646). Waste tyres not suitable for reuse are typically placed at the base of an active waste rock landform within the approved mine footprint in batches of less than 100 whole tyres and buried in accordance with Part 6 of the *Environmental Protection Regulations 1987*.

Category 73
The Sino Iron Project has a 4,800 m^3 capacity fuel farm onsite. The fuel farm comprises two vertical, cone down, diesel fuel storage tanks made of steel. The fuel farm was constructed in 2010.

This Licence is the result of an amendment sought by the Licensee to include category 6 mine dewatering infrastructure onto the licence, following EPA approval of the discharge via a s45C on the 31 August 2016.

The licences and works approvals issued for the Premises since 31 January 2008 are:

Instrument log		
Instrument	**Issued**	**Description**
W4401/2007/1	31/01/2008	Works Approval for the Accommodation Village WWTP.
W4393/2007/1	15/05/2008	Works Approval for the Power Station.
W4421/2008/1	19/06/2008	Works Approval for PCs and a Class III landfill (This was not constructed).
W4447/2008/1	11/09/2008	Works Approval for Concentrators and TSF.
W4511/2008/1	28/05/2009	Works Approval for the landfill.
L8308/2008/1	28/05/2009	Licence issued for the Accommodation Village WWTP (W4401/2007/1).
W4545/2009/1	15/10/2009	Works Approval for a WWTP (This was not constructed).
W4393/2007/1	25/02/2010	Works Approval amended to change units in G2(b) from mg/m^3 to ppmv.
W4819/2010/1	27/01/2011	Works Approval for the relocation of the Accommodation Village WWTP.
W4393/2007/1	12/05/2011	Works Approval expiry date extended from 18 May 2011 to 18 May 2014.
W5005/2011/1	21/07/2011	Works Approval W4421/2008/1 was to be amended to modify the production capacity of PCs and include commissioning conditions.
L8308/2008/1	18/08/2011	Licence amended to include category 73 and update landfill and WWTP conditions and Environmental Assessment Report (EAR).
W4447/2008/1	12/09/2011	Works Approval was amended to modify the production capacity of the Concentrators and include commissioning conditions.
W5273/2012/1	06/12/2012	Works Approval for the Biomax WWTP.
W4447/2008/1	09/05/2013	Works Approval was amended to extend the expiry date.

L8308/2008/1	23/01/2014	Licence amendment to include the operation of PC1 and PC2 (W5005/2011/1), ML1 (W4447/2008/1) and the Biomax WWTP (W5273/2012/1).
L8308/2008/2	30/05/2014	Licence reissued and Power Station included.
W5593/2014/1	17/07/2014	Works Approval for the MCSPs.
L8308/2008/2	24/03/2016	Licence amended to increase the design capacity of category 5 (inclusion of PC3, PC4, ML2 to ML4 and TSF Stage 1) and category 64, inclusion of categories 12 and 57 and expansion of the premises boundary.
L8308/2008/2	28/07/2016	Licence amended to increase the design capacity of category 5 (inclusion of ML5 and 6).
L8308/2008/2	24/11/2016	Licence amended to include category 6 mine dewatering discharge for 2GL discharge.

Severance

It is the intent of these Licence conditions that they shall operate so that, if a condition or a part of a condition is beyond the power of this Licence to impose, or is otherwise *ultra vires* or invalid, that condition or part of a condition shall be severed and the remainder of these conditions shall nevertheless be valid to the extent that they are within the power of this Licence to impose and are not otherwise *ultra vires* or invalid.

END OF INTRODUCTION

Licence conditions

1 General

1.1 Interpretation

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

1.1.2 For the purposes of this Licence, unless the contrary intention appears:

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

'Anniversary Date' means 30 June of each year;

'Annual Audit Compliance Report' means a report in a format approved by the CEO as presented by the Licensee or as specified by the CEO from time to time and published on the Department's website;

'Annual Period' means a 12 month period commencing from 1 July until 30 June in the following year;

'ANZECC' means Australian and New Zealand Environment Conservation Council;

'asbestos' means the asbestiform variety of mineral silicates belonging to the serpentine or amphibole groups of rock-forming minerals and includes actinolite, amosite, anthophyllite, chrysolite, crocidolite, tremolite and any mixture containing 2 or more of those;

'asbestos fibres' has the meaning defined in the Guidelines for Assessment, Remediation and Management of Asbestos Contaminated Sites, Western Australia, (DOH, 2009);

'AS/NZS 5667.1' means the Australian Standard AS/NZS 5667.1 *Water Quality – Sampling – Guidance of the Design of sampling programs, sampling techniques and the preservation and handling of samples;*

'AS/NZS 5667.6' means the Australian Standard AS/NZS 5667.6 *Water Quality – Sampling – Guidance on sampling of rivers and streams;*

'AS/NZS 5667.10' means the Australian Standard AS/NZS 5667.10 *Water Quality – Sampling – Guidance on sampling of waste waters;*

'AS/NZS 5667.11' means the Australian Standard AS/NZS 5667.11 *Water Quality – Sampling – Guidance on sampling of groundwaters;*

'averaging period' means the time over which a limit is measured or a monitoring result is obtained;

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

'CEO' for the purposes of notification means:
Chief Executive Officer
Department Div.3 Pt.V EP Act
Locked Bag 33 Cloisters Square
Perth WA 6850
info@der.wa.gov.au

'CEMS' means continuous emissions monitoring system;

'CEMS Code' means the current version of the Continuous Emission Monitoring System (CEMS) Code for Stationary Source Air Emissions, Department of Environment & Conservation, Government of Western Australia;

'cfu/100mL' means colony forming units per 100 millilitres;

'Clean Fill' has the meaning defined in Landfill Definitions;

'Contaminated Solid Waste' has the meaning defined in Landfill Definitions;

'controlled waste' has the definition in *Environmental Protection (Controlled Waste) Regulations 2004*;

'Department' means the department established under s.35 of the Public Sector Management Act and designated as responsible for the administration of Division 3 Part V of the *Environmental Protection Act 1986*;

'Inert Waste Type 1' has the meaning defined in Landfill Definitions;

'Inert Waste Type 2' has the meaning defined in Landfill Definitions;

'Landfill Definitions' means the document titled "Landfill Waste Classification and Waste Definitions 1996" published by the Chief Executive Officer of the Department of Environment and Conservation as amended from time to time;

'Licence' means this Licence numbered L8308/2008/2 and issued under the Act;

'Licensee' means the person or organisation named as Licensee on page 1 of the Licence;

'**measurement locations'** means tidal data collected from the CITIC Tug Pen and CITIC Warf and Bureau of Meteorology site Steamboat Island;

'mbgl' means metres below ground level;

'mRL' means metres Reduced Level;

'operational freeboard' means the vertical height between the lowest elevation of the dam wall and the tailings beach immediately inside the dam wall;

'µS/cm' means micoSiemens per centimetre;

'mV' means millivolts;

'NATA' means the National Association of Testing Authorities, Australia;
'NATA accredited' means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis;

'normal operating conditions' means any operation of a particular process (including abatement equipment) excluding start-up, shut-down and upset conditions, in relation to stack sampling or monitoring;

'OWS' means oily water separator;

'ppmv' means parts per million by volume;

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

'Putrescible' has the meaning defined in Landfill Definitions;

'quarterly' means the 4 inclusive periods from 1 July to 30 September, 1 October to 31 December and in the following year, 1 January to 31 March and 1 April to 30 June;

'rehabilitation' means the completion of the engineering of a landfill cell and includes capping and/or final cover;

'Schedule 1' means Schedule 1 of this Licence unless otherwise stated;

'Schedule 2' means Schedule 2 of this Licence unless otherwise stated;

'six monthly' means the 2 inclusive periods from 1 July to 31 December and 1 January to 30 June in the following year;

'Special Waste Type 1' has the meaning defined in Landfill Definitions;

'Special Waste Type 2' has the meaning defined in Landfill Definitions;

'spot sample' means a discrete sample representative at the time and place at which the sample is taken;

'STP dry' means standard temperature and pressure (0^{o}Celsius and 101.325 kilopascals respectively), dry;

'TSF' means Tailings Storage Facility;

'TSF Stage 1' means the TSF Stage 1 and TSF Stage 1B assessed under W4447/2008/1;

'turbine unit' means two gas turbine generators with two heat recovery steam generators and a steam turbine attached and any associated equipment; and

'WWTP' means wastewater treatment plant.

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

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

1.2 Premises operation

1.2.1 The Licensee shall record and investigate the exceedance of any descriptive or numerical limit in this section.

1.2.2 The Licensee shall ensure that where waste produced on the Premises are not taken off-site for lawful use or disposal, they are managed according to the requirements in Table 1.2.1.

Table 1.2.1 Management of waste

Facility as depicted in Schedule 1	Waste type	Management Strategy	Requirements[1,2]
Camp 123 WWTP and WWTP	Sewage	Biological, physical and chemical treatment	Camp 123 WWTP - 1,000 m^3/day Biomax WWTP – 60 m^3/day

Landfill Facility	Inert Waste Type 1	Receipt, handling and disposal of waste by landfilling	<u>All waste types</u> No more than 15,000 tonnes per annual period of all waste types (excluding clean fill used for cover material) cumulatively shall be disposed of by landfilling. Disposal of waste by landfilling shall only take place within the Landfill Facility shown on the Premises Map in Schedule 1. Waste shall be placed in a defined trench or within an area enclosed by earthen windrows. The active landfill area is managed such that at no time does landfilling result in an exposed face exceeding 2 m in vertical height. The separation distance between the base of the landfill and the highest groundwater level shall not be less than 3 m. Maintain a minimum distance of at least 100 m between the previously filled areas of the landfill and the active tipping area and any surface water body. A fence or other physical barrier shall be maintained around the active landfill area which is an effective barrier to cattle, horses and stock. Undertake fortnightly inspections of the landfill fence or other physical barrier and ensure any damage to the fence is repaired within one working day of its discovery. Ensure that wind-blown waste is contained within the boundary of the landfill and that wind-blown waste is returned to the tipping area on at least a monthly basis. Ensure that no waste is burnt on the Premises. Ensure that any unauthorised fire at the Landfill Facility is promptly extinguished. <u>Non-greenwaste</u> Tipping area is restricted to a maximum linear length of 30 m. <u>Special Waste Type 1</u> Only to be disposed of into a designated asbestos disposal area within the landfill. Not to be deposited within 2 m of the final tipping surface of the landfill. No works shall be carried out on the landfill that could lead to a release of asbestos fibres.
	Inert Waste Type 2 (plastic only)		
	Special Waste Type 1 (cement bonded asbestos. No fibrous asbestos shall be accepted)		
	Special Waste Type 2 (waste consisting of certain types of biomedical waste which are regarded as hazardous but which, with the use of specific management techniques may be disposed of safely)		
	Clean Fill		
	Contaminated Solid Waste (must meet the acceptance criteria for Class II landfills)		
	Putrescible Waste		
	Other wastes (must comply with Class II criteria in the Landfill Definitions)		

			Special Waste Type 1 and Special Waste Type 2 Material containing asbestos or clinical waste is disposed of at the Landfill Facility under the personal supervision of the Licensee or the personal supervision of a person nominated by the Licensee.
Landfill Facility and Waste Rock Landforms	Inert Waste Type 2 (tyres only)	Receipt, handling and disposal of waste by landfilling	Tyres (Inert Waste Type 2)[1] No more than 1,000 tonnes of tyres shall be disposed of by landfilling. Tyres shall only be landfilled within the Landfill Facility and Waste Rock Landforms shown on the Premises map in Schedule 1. Tyres shall consist of batches of less than 100 whole tyres. Batches must be separated from each other by at least 100 mm of soil. The location of where tyres are buried will be surveyed and the latitude and longitude recorded.
Used Tyre Laydown Area	Inert Waste Type 2 (Used tyres)	Storage	Tyres shall only be stored within the Used Tyre Laydown Area shown on the Premises map in Schedule 1. Shall only store a maximum of 500 tyres at any time.

Note 1: Requirements for landfilling tyres are set out in Part 6 of the *Environmental Protection Regulations 1987*.
Note 2: Additional requirements for the acceptance and landfilling of controlled waste (including asbestos and tyres) are set out in the *Environmental Protection (Controlled Waste) Regulations 2004*.

1.2.3 The Licensee shall ensure that cover is applied and maintained on landfilled wastes in accordance with Table 1.2.2 and that sufficient stockpiles of cover are maintained on site at all times.

Table 1.2.2 Cover requirements[1]

Waste Type	Material	Depth	Timescales
Inert Waste Type 1	No cover required.		
Inert Waste Type 2	Inert Waste Type 1 or soil	100 mm	By the end of the working day in which the waste was deposited. Plastic waste with the potential to become windblown shall be covered as soon as practicable after deposit.
Special Waste Type 1		300 mm	As soon as practicable after deposit and prior to compaction.
		300 mm	By the end of the working day in which the asbestos waste was deposited.
Special Waste Type 2		300 mm	As soon as practicable after deposit and prior to compaction.
Putrescible Waste		300 mm	Fortnightly.

Note 1: Additional requirements for the covering of tyres are set out in Part 6 of the *Environmental Protection Regulations 1987.*

1.2.4 The Licensee shall manage the landfilling activities to ensure:
(a) waste is levelled and compacted as soon as practicable after it is discharged;
(b) waste is placed and compacted to ensure all faces are stable and capable of retaining rehabilitation material; and

(c) rehabilitation of a cell or phase takes place within 6 months after disposal in that cell or phase has been completed.

1.2.5 The Licensee shall ensure that:
(a) a supply of water, cover material and means of distribution of the water and cover material are available at all times to extinguish any fire on the premises;
(b) there is a stockpile of sufficient cover material to allow waste to be covered in accordance with condition 1.2.3 of this licence and to cover waste in the event of a fire;
(c) waste is totally covered, so that no waste is left exposed;
(d) except where trenches are used, waste is initially spread in layers not more than 500 mm thickness prior to being compacted with a minimum of 5 passes with the dedicated machine; and
(e) waste is covered with a final soil cover of at least 1 metre.

1.2.6 The Licensee shall ensure that standard vehicle refuelling activities occur only on designated refuelling areas at the Premises.

1.2.7 The Licensee shall ensure that sumps and bunds on the Premises are maintained at all times and emptied prior to heavy rain or cyclonic weather.

1.2.8 The Licensee shall ensure that waste material is only stored and/or treated within vessels or compounds provided with the infrastructure detailed in Table 1.2.3.

Table 1.2.3: Containment infrastructure

Containment cell or dam number(s) as depicted in Schedule 1	Material	Infrastructure requirements
TSF Stage 1	Tailings and decant water	880 ha facility to a maximum height of 32.8mRL (TSF Stage 1) and 28.8mRL (TSF Stage 1B). Tailings to be deposited from multiple discharge locations around the perimeter of the TSF. Maintain an operational freeboard of 0.3 m.
Process Water Dam	Process water, return water from the TSF thickeners and treated wastewater from the Biomax WWTP	Lined process water dam, which will store process water, return water from the TSF and treated wastewater from the Biomax WWTP prior to reuse (i.e. within the hoppers and mills).
TSF Seepage Drains	Seepage water temporarily stored in drains prior to being pumped to the concentrator plant for reuse in processing	A series of finger drains (that will eventually be located underneath the future TSF Stage 2 embankment) will collect any potential seepage from TSF Stage 1.
Camp 123 Turkey's nest	Mine dewatering water	Lined with High Density Polyethylene Liner to meet a permeability of <10-9 m/s. Maintain an operational freeboard of 0.5 m.

1.2.9 The Licensee shall prevent dust generation from the surface of the TSF.

1.2.10 The Licensee shall:
(a) undertake inspections as detailed in Table 1.2.4;
(b) where any inspection identifies that an appropriate level of environmental protection is not being maintained, take corrective action to mitigate adverse environmental consequences as soon as practicable; and
(c) maintain a record of all inspections undertaken.

Table 1.2.4: Inspection of infrastructure		
Scope of inspection	**Type of inspection**	**Frequency of inspection**
Decant return water pipeline	Visual integrity	Daily while operational
Mine dewatering water pipeline	Visual integrity	Daily while operational

1.2.11 The Licensee shall ensure that all pipelines containing tailings or tailings thickener overflow return water are operated with:
(a) telemetry and process alarm; and
(b) adequate diversion containment.

1.2.12 The Licensee shall undertake an annual water balance for the TSF. The water balance shall as a minimum consider the following:
(a) site rainfall;
(b) evaporation;
(c) combined decant water and seepage water recovery volumes; and
(d) volumes of tailings deposited.

1.2.13 The Licensee shall ensure the limits specified in Table 1.2.5 are not exceeded.

Table 1.2.5: Production or design capacity limits		
Category[1]	**Category description**[1]	**Premises production or design capacity limit**
5	Processing or beneficiation of metallic or non-metallic ore	Primary Crusher (1 to 4) - 85,400,000 tonnes per annual period Mill Line (1 to 6) - 85,400,000 tonnes per annual period (producing 27,600,000 tonnes per annual period) TSF Stage 1 - 35,800,000 tonnes per annual period
6	Mine dewatering discharge	2,000,000 tonnes per annual period
12	Screening, etc. of material	2,700,000 tonnes per annual period
52	Electrical power generation	480 megawatts
73	Bulk storage of chemicals, etc.	4,800 cubic metres in aggregate

Note 1: *Environmental Protection Regulations 1987,* Schedule 1.

2 Emissions

2.1 Point source emissions to air

2.1.1 The Licensee shall ensure that where waste is emitted to air from the emission points 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 Licence.

Table 2.1.1: Emission points to air			
Emission point reference and location on Map of emission points	**Emission Point and source**	**Emission point height (m)**	**Source, including any abatement**
GT1-B	GT1 – Bypass Stack	29.85 m	Siemens gas turbine SGT-800
GT1	GT1 – Main Stack	30.0 m	Dual pressure heat recovery steam generator
GT2-B	GT2 – Bypass Stack	29.85 m	Siemens gas turbine SGT-800
GT2	GT2 – Main Stack	30.0 m	Dual pressure heat recovery steam generator
GT3-B	GT3 – Bypass Stack	29.85 m	Siemens gas turbine SGT-800
GT3	GT3 – Main Stack	30.0 m	Dual pressure heat recovery steam

			generator
GT4-B	GT4 – Bypass Stack	29.85 m	Siemens gas turbine SGT-800
GT4	GT4 – Main Stack	30.0 m	Dual pressure heat recovery steam generator
GT5-B	GT5 – Bypass Stack	29.85 m	Siemens gas turbine SGT-800
GT5	GT5 – Main Stack	30.0 m	Dual pressure heat recovery steam generator
GT6-B	GT6 – Bypass Stack	29.85 m	Siemens gas turbine SGT-800
GT6	GT6 – Main Stack	30.0 m	Dual pressure heat recovery steam generator
GT7	GT7 – Main Stack	29.85 m	Siemens gas turbine SGT-800

2.2 Point source emissions to surface water

2.2.1 The Licensee shall ensure that where waste is emitted to surface water from the emission points in Table 2.2.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.

Table 2.2.1: Emission points to surface water

Emission point reference and location on Map of emission points	Description	Source including abatement
FR2	Discharge pipe to Fortescue River Mouth	Mine dewatering water discharged through a diffuser: (a) the diffuser shall be submerged beneath the water; (b) the diffuser shall be at least 10 m from the Fortescue River embankment; (c) the diffuser length shall be 21 m with ports 1.5 m apart, orientated downstream; and (d) the pipeline shall be equipped with a pressure monitoring system.

2.2.2 The Licensee shall not cause or allow point source emissions to surface water that do not meet the limits listed in Table 2.2.2.

Table 2.2.2: Point source emission limits to surface water

Emission point reference	Parameter	Limit (including units)	Averaging period
FR2	pH[1]	6-9 pH units	Spot sample
	Temperature[1]	<65 ^{o}C	
	Total Dissolved Solids[1]	<70,000 mg/L	
	Nitrate	<50 mg/L	
	Cadmium	<0.1485 mg/L	
	Chromium (VI)	<0.1188 mg/L	
	Cobalt	<0.027 mg/L	
	Copper	<0.0351 mg/L	
	Lead	<0.1188 mg/L	
	Mercury	<0.0108 mg/L	
	Nickel	<1.89 mg/L	
	Silver	<0.0378 mg/L	
	Vanadium	<2.7 mg/L	
	Zinc	<0.405 mg/L	
	Total Recoverable Hydrocarbons	<15 mg/L	

Note 1: In-field non-NATA accredited analysis permitted.

2.2.3 The Licensee shall ensure that the discharge of mine dewatering water according to Table 2.2.1 only occurs on outgoing tides and according to daily tidal analyses from measurement locations under the following conditions:
(a) Discharge shall only commence 30 minutes after the turning of the tide from incoming to outgoing; and
(b) Discharge shall cease 1 hour prior to the turning of the tide from outgoing to incoming.

2.2.4 The Licensee shall not discharge mine dewatering water through the diffuser at FR2 until after the submission of compliance documentation required under condition 5.3.1.

2.3 Emissions to land

2.3.1 The Licensee shall ensure that where waste is emitted to land from the emission points in Table 2.2.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.

Table 2.3.1: Emissions to land

Emission point reference and location on Map of emission points	Description	Source including abatement
123 Camp Spray Irrigation Area	Treated effluent is disposed of to a 5.2 ha and 9.4 ha irrigation area	Treated effluent from the sewage treatment plant

3 Monitoring

3.1 General monitoring

3.1.1 The Licensee shall ensure that:
(a) all water samples are collected and preserved in accordance with AS/NZS 5667.1, unless indicated otherwise in the relevant table;
(b) all wastewater sampling is conducted in accordance with AS/NZS 5667.10;
(c) all groundwater sampling is conducted in accordance with AS/NZS 5667.11; and
(d) all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured unless indicated otherwise in the relevant table.

3.1.2 The Licensee shall ensure that:
(a) monthly monitoring is undertaken at least 15 days apart;
(b) quarterly monitoring is undertaken at least 45 days apart; and
(c) six monthly monitoring is undertaken at least 5 months apart.

3.1.3 The Licensee shall ensure that all monitoring equipment used on the Premises to comply with the conditions of this Licence is calibrated in accordance with the manufacturer's specifications.

3.1.4 The Licensee shall, where the requirements for calibration cannot be practicably met, or a discrepancy exists in the interpretation of the requirements, bring these issues to the attention of the CEO accompanied with a report comprising details of any modifications to the methods.

3.2 Monitoring of point source emissions to air

3.2.1 The Licensee shall undertake the monitoring in Table 3.2.1 according to the specifications in that table.

Table 3.2.1: Monitoring of point source emissions to air					
Emission point reference	**Parameter**	**Units**[1]	**Averaging period**	**Frequency**[2]	**Method**
GT7 - Operations	Nitrogen oxides	ppmv	10 minutes	Continuous	CEMS
	Carbon monoxide				

Note 1: All units are referenced to STP dry at 15% O_2
Note 2: Monitoring shall be undertaken to reflect normal operating conditions and any limits or conditions on inputs or production.

3.2.2 The Licensee shall ensure that sampling required under condition 3.2.1 of the Licence is undertaken at sampling locations in compliance with the relevant part of the CEMS Code.

3.2.3 For any parameter in Table 3.2.1 requiring continuous monitoring, the Licensee shall ensure that the CEMS is operated, maintained and calibrated in accordance with the CEMS Code.

3.3 Monitoring of point source emissions to surface water

3.3.1 The Licensee shall record the commencement and cessation date and time for each discharge of mine dewatering water against local tidal data from the measurement locations.

3.3.2 The Licensee shall undertake the monitoring in Table 3.3.1 according to the specifications in that table.

Table 3.3.1: Monitoring of point source emissions to surface water				
Emission point reference	**Parameter**	**Units**	**Frequency**	**Method**
FR2 – monitoring conducted in-pipe from a sampling tap	Volumetric flow rate	m^3/day	Daily	AS/NZS 5667.6
	pH[1]	pH units	Monthly	AS/NZS 5667.1
	Temperature[1]	^oC		
	Dissolved Oxygen[1]	mg/L		
	Electrical Conductivity[1]	µS/cm		
	Total Dissolved Solids	mg/L		
	Total Suspended Solids	mg/L		
	Total Nitrogen	mg/L		
	Bioavailable Nitrogen	mg/L		
	Nitrate	mg/L		
	Ammonia	mg/L		
	Total Phosphorus	mg/L		
	Bioavailable Phosphorus	mg/L		
	Bioavailable Organic Carbon	mg/L		
	Chlorophyll a	mg/L		
	Aluminium	mg/L		
	Arsenic	mg/L		
	Boron	mg/L		
	Cadmium	mg/L		
	Chromium (III)	mg/L		
	Chromium (VI)	mg/L		
	Cobalt	mg/L		
	Copper	mg/L		
	Iron	mg/L		
	Lead	mg/L		
	Mercury	mg/L		
	Manganese	mg/L		
	Nickel	mg/L		
	Selenium	mg/L		

	Silver	mg/L		
	Strontium	mg/L		
	Vanadium	mg/L		
	Zinc	mg/L		
	Total Recoverable Hydrocarbons	mg/L		
Camp 123 Turkey's nest	pH[1]	pH units	Monthly	AS/NZS 5667.1
	Temperature[1]	^{o}C		
	Dissolved Oxygen[1]	mg/L		
	Electrical Conductivity[1]	µS/cm		
	Total Dissolved Solids	mg/L		
	Total Suspended Solids	mg/L		
	Total Nitrogen	mg/L		
	Bioavailable Nitrogen	mg/L		
	Nitrate	mg/L		
	Ammonia	mg/L		
	Total Phosphorus	mg/L		
	Bioavailable Phosphorus	mg/L		
	Bioavailable Organic Carbon	mg/L		
	Chlorophyll a	mg/L		
	Aluminium	mg/L		
	Arsenic	mg/L		
	Boron	mg/L		
	Cadmium	mg/L		
	Chromium (III)	mg/L		
	Chromium (VI)	mg/L		
	Cobalt	mg/L		
	Copper	mg/L		
	Iron	mg/L		
	Lead	mg/L		
	Mercury	mg/L		
	Manganese	mg/L		
	Nickel	mg/L		
	Selenium	mg/L		
	Silver	mg/L		
	Strontium	mg/L		
	Vanadium	mg/L		
	Zinc	mg/L		
	Total Recoverable Hydrocarbons	mg/L		

Note 1: In-field non-NATA accredited analysis permitted.

3.4 Monitoring of emissions to land

3.4.1 The Licensee shall undertake the monitoring in Table 3.4.1 according to the specifications in that table.

Table 3.4.1: Monitoring of emissions to land

Emission point reference	Parameter	Units	Frequency
Camp 123 WWTP	pH[1]		Quarterly
	Biochemical Oxygen Demand	mg/L	
	Total Suspended Solids	mg/L	
	E.coli	cfu/100mL	
	Total Nitrogen	mg/L	
	Total Phosphorus	mg/L	

Note 1: In-field non-NATA accredited analysis permitted.

3.5 Monitoring of inputs and outputs

3.5.1 The Licensee shall undertake the monitoring in Table 3.5.1 according to the specifications in that table.

Table 3.5.1: Monitoring of inputs and outputs

Input/Output	Parameter	Units	Averaging period	Frequency
Waste Inputs	Inert Waste Type 1, Inert Waste Type 2, Special Waste Type 1, Special Waste Type 2, Clean Fill, Putrescible Waste, Contaminated Solid Waste and Other wastes	Tonnes (where a weighbridge is present); or m^3 (where no weighbridge is present)	N/A	Monthly Estimate

3.6 Process monitoring

3.6.1 The Licensee shall undertake the monitoring in Table 3.6.1 according to the specifications in that table and record and investigate results that do not meet any limit specified.

Table 3.6.1: Process monitoring

Monitoring point reference as depicted in Schedule 1	Process description	Parameter	Limit	Units	Frequency	Method
OWS1	Final effluent tank OWS1 (Heavy Mobile Equipment Workshop) used for dust suppression onsite	Total Recoverable Hydrocarbons	15	mg/L	Quarterly where wastewater is available	None specified
OWS2	Final effluent tank OWS2 (Bulk Fuel Farm) used for dust suppression onsite	Total Recoverable Hydrocarbons	15	mg/L		
OWS3	Final effluent tank OWS3 (Supply Base) used for dust suppression onsite	Total Recoverable Hydrocarbons	15	mg/L		
WWTP	Final treated effluent tank of the Biomax WWTP Treated effluent is stored in the process water dam, prior to recirculating it in the process plant for use in the hoppers and mills	pH[1]	-		Quarterly	
		Biochemical Oxygen Demand	-	mg/L		
		Total Suspended Solids	-	mg/L		
		E.coli	-	cfu/100 mL		
		Total Nitrogen	-	mg/L		
		Total Phosphorus	-	mg/L		
TSF Stage 1	-	Combined decant water and seepage water recovery volumes	-	m^3	Cumulative monthly total	None specified
	-	Volume of tailings deposited	-	m^3		

Note 1: In-field non-NATA accredited analysis permitted.

3.7 Ambient environmental quality monitoring

3.7.1 The Licensee shall undertake the monitoring in Table 3.7.1, Table 3.7.2 and Table 3.7.3 according to the specifications in that table.

Table 3.7.1: Monitoring of ambient groundwater quality

Monitoring point reference and location as depicted in Schedule 1	Parameter	Units	Averaging period	Frequency
09NC565 10NC585 (Control) 09NC564 09NC566	pH[1]		Spot sample	Six monthly
	Total Nitrogen	mg/L		
	Total Phosphorus	mg/L		
	Total Dissolved Solids	mg/L		
	Lead	mg/L		
	Mercury	mg/L		
	Copper	mg/L		
	Chromium (hexavalent)	mg/L		
	Arsenic	mg/L		
	Nickel	mg/L		
	Zinc	mg/L		
	Cadmium	mg/L		
	Total Recoverable Hydrocarbons	mg/L		
	Standing Water Level[2]	Mbgl		
TSF_001 BH08-06 (09DD598) BH08-07 (09DD599) BH08-08 (09DD600) BH08-09 (09DD602) TSF_002 BH08-16 (09DD604) 07WB002 (07NC256)	Standing Water Level[2]	Mbgl	Spot sample	Monthly
	Oxidation Reduction Potential[1]	mV	Spot sample	Quarterly
	pH[1]			
	Dissolved Oxygen[1]	mg/L		
	Temperature[1]	°C		
	Electrical Conductivity[1]	µS/cm		
	Total Dissolved Solids	mg/L		
	Total Sulfur	mg/L		
	Calcium	mg/L		
	Sodium	mg/L		
	Total Alkalinity	mg/L		
	Chloride	mg/L		
	Magnesium	mg/L		
	Potassium	mg/L		
	Sulfate (SO_4^{2-})	mg/L		
	Bicarbonate (HCO_3^-)	mg/L		
	Carbonate (CO_3^{2-})	mg/L		
	Aluminium	mg/L	Spot sample	Six monthly
	Lead	mg/L		
	Mercury	mg/L		
	Copper	mg/L		
	Chromium (hexavalent)	mg/L		
	Nickel	mg/L		
	Zinc	mg/L		
	Cadmium	mg/L		
	Cobalt	mg/L		
	Iron	mg/L		
	Manganese	mg/L		

Note 1: In-field non-NATA accredited analysis permitted.
Note 2: Standing water level should be determined prior to collection of other water samples.

Table 3.7.2: Monitoring of ambient surface water quality				
Monitoring point reference and location as depicted in Schedule 1	**Parameter**	**Units**	**Averaging period**	**Frequency**
FR1 (1 km downstream of discharge point) FR2 (discharge point) FR3 (1 km upstream of discharge point) FR4 (18 m upstream of discharge point) FR5 (18 m downstream of discharge point)	pH[1]	pH units	Spot sample	Monthly during discharge to obtain dilution data for a 12 month period from the date of submission of the compliance documentation for the mine dewatering discharge infrastructure required by Condition 5.3.1.
	Temperature[1]	°C		
	Dissolved Oxygen[1]	mg/L		
	Electrical Conductivity[1]	µS/cm		
	Total Dissolved Solids	mg/L		
	Total Suspended Solids	mg/L		
	Total Nitrogen	mg/L		
	Bioavailable Nitrogen	mg/L		
	Nitrate	mg/L		
	Ammonia	mg/L		
	Total Phosphorus	mg/L		
	Bioavailable Phosphorus	mg/L		
	Bioavailable Organic Carbon	mg/L		
	Chlorophyll a	mg/L		
	Aluminium	mg/L		
	Arsenic	mg/L		
	Boron	mg/L		
	Cadmium	mg/L		
	Chromium (III)	mg/L		
	Chromium (VI)	mg/L		
	Cobalt	mg/L		
	Copper	mg/L		
	Iron	mg/L		
	Lead	mg/L		
	Mercury	mg/L		
	Manganese	mg/L		
	Nickel	mg/L		
	Selenium	mg/L		
	Silver	mg/L		
	Strontium	mg/L		
	Vanadium	mg/L		
	Zinc	mg/L		
	Total Recoverable Hydrocarbons	mg/L		

Note 1: In-field non-NATA accredited analysis permitted.

Table 3.7.3: Monitoring of ambient mangrove health			
Monitoring point reference and location as depicted in Schedule 1	**Parameter**	**Averaging period**	**Frequency**
FR2 (discharge point)	Visually estimate the average foliage cover	Visual inspection	Annually
	Score the health condition		
	General environmental description of the site and record any changes since previous monitoring		
	Take replicate photographs of foliage density and shadow areas beneath trees.		

4 Improvements

4.1 Improvement program

4.1.1 The Licensee shall complete the improvements in Table 4.1.1 by the date of completion in Table 4.1.1.

Table 4.1.1: Improvement program		
Improvement reference	**Improvement**[1]	**Date of completion**
IR1	The Licensee shall certify that the point source air emission levels from each turbine unit of the Power Station for oxides of nitrogen (NO_x) and carbon monoxide (CO) of <25 ppmv and <50 ppmv, respectively, have been met at full load.	31 December 2016

Note 1: All units are referenced to STP dry at 15% O_2

5 Information

5.1 Records

5.1.1 All information and records required by the Licence shall:
- (a) be legible;
- (b) if amended, be amended in such a way that the original and subsequent amendments remain legible or are capable of retrieval;
- (c) except for records listed in 5.1.1(d) be retained for at least 6 years from the date the records were made or until the expiry of the Licence or any subsequent licence; and
- (d) for those following records, be retained until the expiry of the Licence and any subsequent licence:
  - (i) off-site environmental effects; or
  - (ii) matters which affect the condition of the land or waters.

5.1.2 The Licensee must submit to the CEO within 120 days after the Anniversary Date, an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the Conditions in this Licence for the Annual Period.

5.1.3 The Licensee shall implement a complaints management system that as a minimum records the number and details of complaints received concerning the environmental impact of the activities undertaken at the Premises and any action taken in response to the complaint.

5.2 Reporting

5.2.1 The Licensee shall submit to the CEO an Annual Environmental Report within 120 calendar days after the end of the Anniversary Date. The report shall contain the information listed in Table 5.2.1 in the format or form specified in that table.

Table 5.2.1: Annual Environmental Report		
Condition or table (if relevant)	**Parameter**	**Format or form**[1]
-	Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken	None specified
Table 3.3.1	Volumetric flow rate, pH, Temperature, Dissolved Oxygen, Electrical Conductivity, Total Dissolved Solids, Total Suspended Solids, Total Nitrogen, Bioavailable Nitrogen, Nitrate, Ammonia, Total Phosphorus, Bioavailable Phosphorus, Bioavailable Organic Carbon, Chlorophyll a, Aluminium, Arsenic, Boron, Cadmium, Chromium (III), Chromium (VI), Cobalt, Copper, Iron Mercury, Lead, Manganese, Nickel, Selenium,	WR1

	Strontium, Zinc, Total Recoverable Hydrocarbons	
Table 3.4.1	pH, Biochemical Oxygen Demand, Total Suspended Solids, *E.coli*, Total Nitrogen and Total Phosphorus	LR1
Table 3.5.1	Inert Waste Type 1, Inert Waste Type 2, Special Waste Type 1, Special Waste Type 2, Clean Fill, Putrescible Waste, Contaminated Solid Waste and Other wastes	None specified
Table 3.6.1	pH, Biochemical Oxygen Demand, Total Suspended Solids, *E.coli*, Total Nitrogen, Total Phosphorus, Total Recoverable Hydrocarbons, Combined decant water and seepage water recovery volumes and volume of tailings deposited	None specified
Table 3.7.1	pH, Total Nitrogen, Total Phosphorus, Total Dissolved Solids, Lead, Mercury, Copper, Chromium (hexavalent), Arsenic, Nickel, Zinc, Cadmium, Total Recoverable Hydrocarbons, Standing Water Level, Oxidation Reduction Potential, Dissolved Oxygen, Temperature, Electrical Conductivity, Total Sulfur, Calcium, Sodium, Total Alkalinity, Chloride, Magnesium, Potassium, Sulfate (SO_4^{2-}), Bicarbonate (HCO_3^-), Carbonate (CO_3^{2-}), Aluminium, Cobalt, Iron and Manganese	None specified
Table 3.7.2	pH, Temperature, Dissolved Oxygen, Electrical Conductivity, Total Dissolved Solids, Total Suspended Solids, Total Nitrogen, Bioavailable Nitrogen, Nitrate, Ammonia, Total Phosphorus, Bioavailable Phosphorus, Bioavailable Organic Carbon, Chlorophyll a, Aluminium, Arsenic, Boron, Cadmium, Chromium (III), Chromium (VI), Cobalt, Copper, Iron, Mercury, Lead, Manganese, Nickel, Selenium, Strontium, Zinc, Total Recoverable Hydrocarbons A comparison of the data obtained against baseline results shall be provided.	None specified
Table 3.7.3	Visually estimate the average foliage cover Score the health condition General environmental description of the site and record any changes since previous monitoring Take replicate photographs of foliage density and shadow areas beneath trees.	None specified
1.2.12	Annual water balance for the TSF	None specified
3.3.1	Discharge commencement and cessation date and times recorded, along with tidal data from measurement locations.	None specified
5.1.2	Compliance	Compliance Report
5.1.3	Complaints summary	None specified

Note 1: Forms are in Schedule 2

5.2.2 The Licensee shall ensure that the Annual Environmental Report also contains an assessment of the information contained within the report against previous monitoring results, Licence limits and any impacts detected as a result of activities on the Premises.

5.2.3 The Licensee shall submit the information in Table 5.2.2 to the CEO according to the specifications in that table.

Table 5.2.2: Non-annual reporting requirements

Condition or table (if relevant)	Parameter	Reporting period	Reporting date (after end of the reporting period)	Format or form
-	Copies of original monitoring reports submitted to the Licensee by third parties	Not Applicable	Within 14 days of the CEOs request	As received by the Licensee from third parties
3.7.1 (Table 3.7.2)	Monthly monitoring of ambient surface water quality during discharge to obtain dilution data and to verify dilution modelling, including a comparison against the initial modelling.	12 month period from the date of submission of the compliance documentation for the mine dewatering discharge infrastructure required by Condition 5.3.1.	Within 3 months of completion of the 12 months monitoring period.	N/A.

5.2.4 The Licensee shall ensure that results from CEMS are reported in the Annual Environmental Report as tabulated data and time series graphs including:
(a) times and dates; and
(b) an assessment of the information contained within the report against previous monitoring results and/or background data.

5.3 Notification

5.3.1 The Licensee shall ensure that the parameters listed in Table 5.3.1 are notified to the CEO in accordance with the notification requirements of the table.

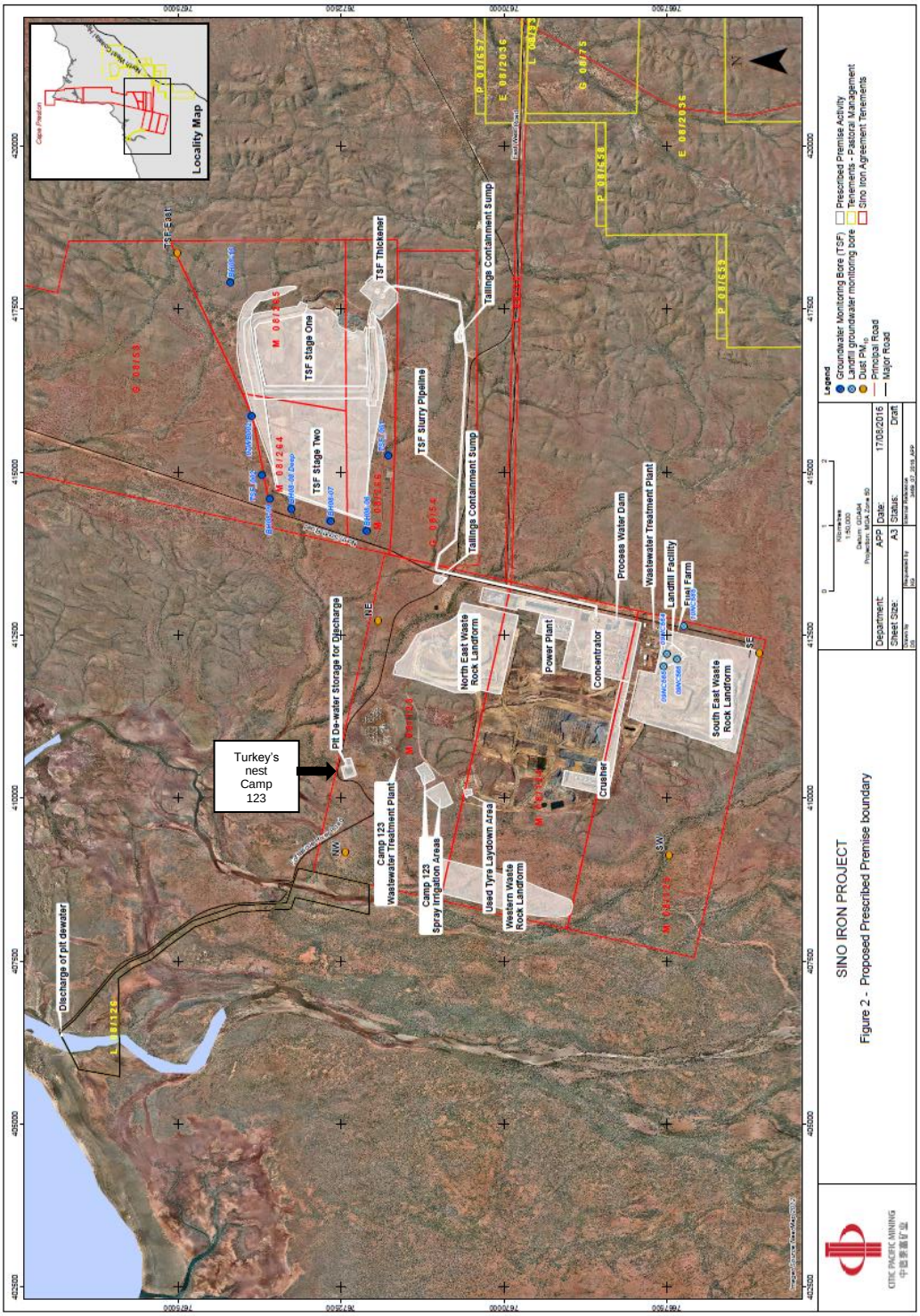
Table 5.3.1: Notification requirements

Condition or table (if relevant)	Parameter	Notification requirement[1]	Format or form[2]
-	Unauthorised fire at the Landfill Facility	Within 14 days of unauthorised fire	ET1
1.2.1 1.2.13 2.2.2	Breach of any limit specified in the Licence	Part A: As soon as practicable but no later than 5pm of the next usual working day. Part B: As soon as practicable	N1
3.1.3	Calibration report	As soon as practicable	None specified
2.2.4	The Licensee shall submit a compliance document to the CEO, following construction of the mine dewatering discharge infrastructure. The compliance document shall: a) certify that the works were constructed in accordance with the specifications in Table 2.2.1; and b) be signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the company.	Within 7 days of the completion of construction	None specified

Note 1: Notification requirements in the licence shall not negate the requirement to comply with s72 of the Act
Note 2: Forms are in Schedule 2

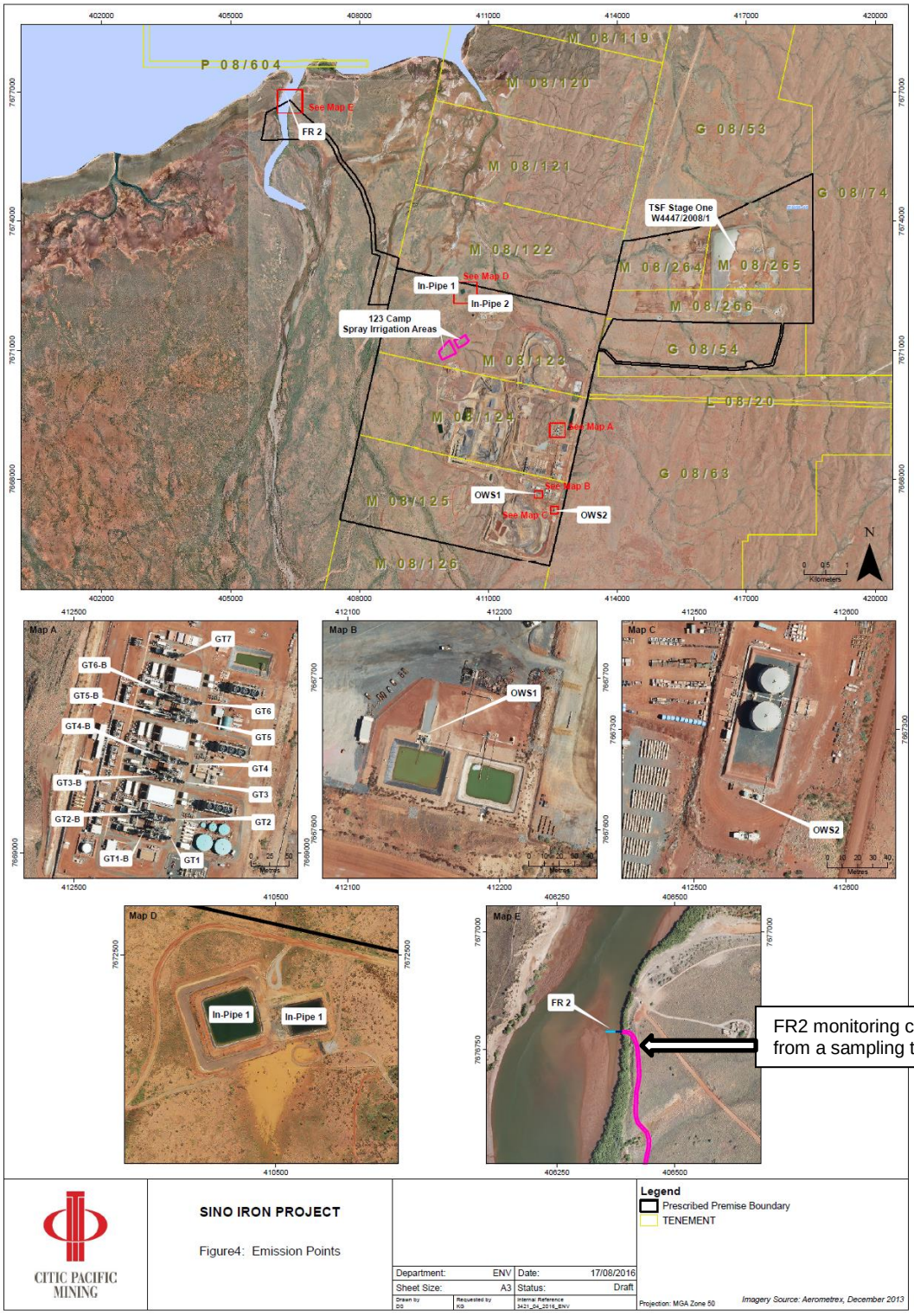
Schedule 1: Maps

Premises map, map of containment infrastructure and map of monitoring locations
The Premises is shown in the map below. The black line depicts the Premises boundary.
The location of the containment infrastructure defined in Table 1.2.3 is shown below.
The location of the monitoring points defined in Tables 3.5.1, 3.7.1 are shown below.

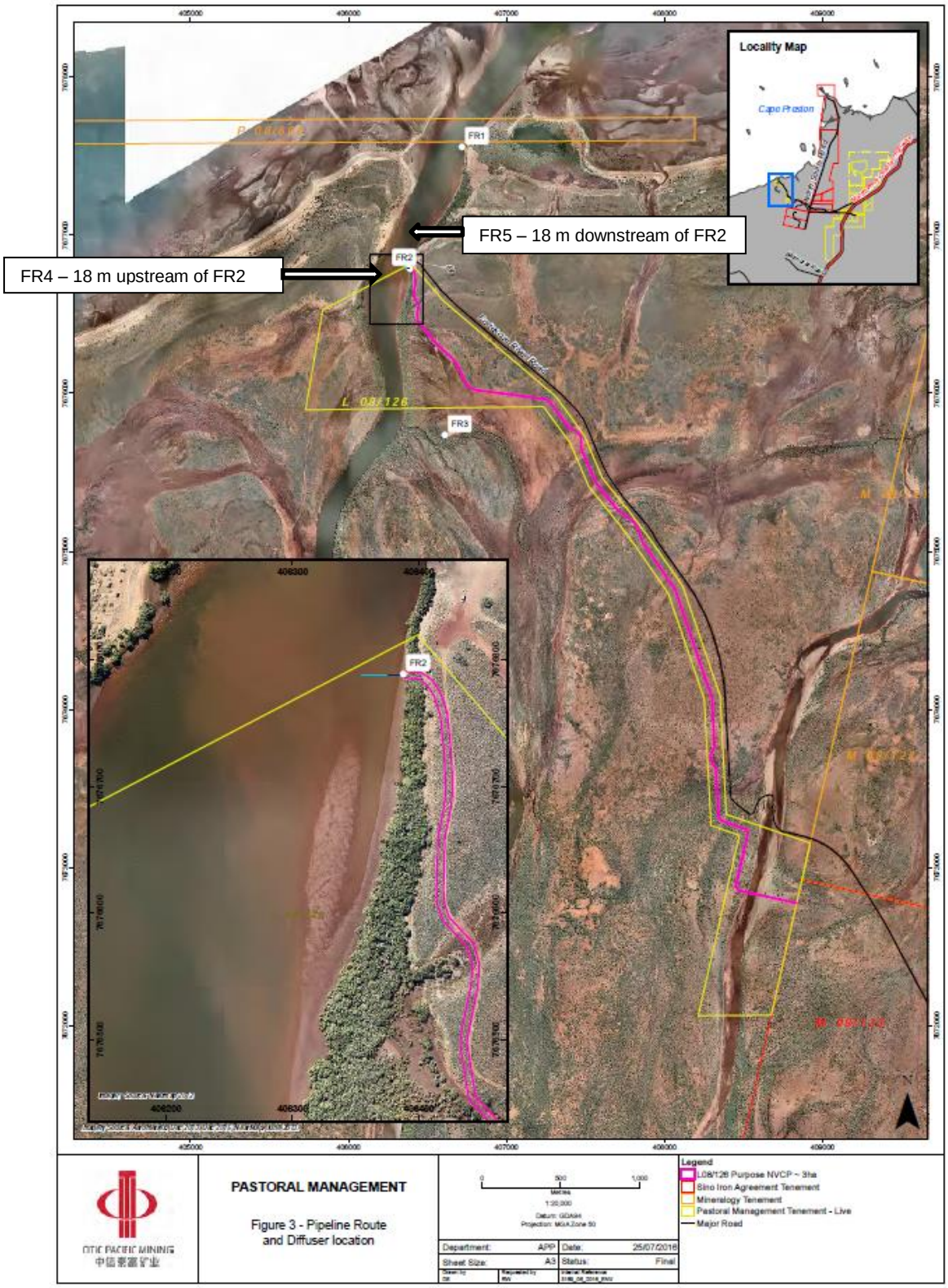


Map of emission and monitoring points

The locations of the emission points defined in Tables 2.1.1, 2.2.1 and 2.3.1 are shown below. The locations of the monitoring points defined in Tables 3.3.1, 3.4.1, 3.6.1 and 3.7.3 are shown below.



The locations of the monitoring points defined in Table 3.7.2 are shown below.



Schedule 2: Reporting & notification forms

These forms are provided for the proponent to report monitoring and other data required by the Licence. They can be requested in an electronic format.

Licence: L8308/2008/2
Form: WR1
Name: Monitoring of point source emissions to surface water

Licensee: CITIC Pacific Mining Management Pty Ltd
Period :

Form WR1: Monitoring of point source emissions to surface water					
Emission point	**Parameter**	**Result[1]**	**Averaging period**	**Method**	**Sample date & times**
2 – monitoring conducted in-pipe from a sampling tap	Volumetric flow rate	m^3/day			
	pH[1]	pH units			
	Temperature[1]	^oC	Spot sample		
	Dissolved Oxygen[1]	mg/L	Spot sample		
	Electrical Conductivity	µS/cm	Spot sample		
	Total Dissolved Solids	mg/L	Spot sample		
	Total Suspended Solids	mg/L	Spot sample		
	Total Nitrogen	mg/L	Spot sample		
	Bioavailable Nitrogen	mg/L	Spot sample		
	Nitrate	mg/L	Spot sample		
	Ammonia	mg/L	Spot sample		
	Total Phosphorus	mg/L	Spot sample		
	Bioavailable Phosphorus	mg/L	Spot sample		
	Bioavailable Organic Carbon	mg/L	Spot sample		

	Chlorophyll a	mg/L	Spot sample		
	Aluminium	mg/L	Spot sample		
	Arsenic	mg/L	Spot sample		
	Boron	mg/L	Spot sample		
	Cadmium	mg/L	Spot sample		
	Chromium (III)	mg/L	Spot sample		
	Chromium (VI)	mg/L	Spot sample		
	Cobalt	mg/L	Spot sample		
	Copper	mg/L	Spot sample		
	Iron	mg/L	Spot sample		
	Lead	mg/L	Spot sample		
	Mercury	mg/L	Spot sample		
	Manganese	mg/L	Spot sample		
	Nickel	mg/L	Spot sample		
	Selenium	mg/L	Spot sample		
	Silver	mg/L	Spot sample		
	Strontium	mg/L	Spot sample		
	Vanadium	mg/L	Spot sample		
	Zinc	mg/L	Spot sample		
	Total Recoverable Hydrocarbons	mg/L	Spot sample		
			Spot sample		

Note 1: In-field non-NATA accredited analysis permitted.

Signed on behalf of CITIC Pacific Mining Management Pty Ltd: …….. Date: …….

Licence: L8308/2008/2
Form: LR1
Name: Monitoring of emissions to land

Licensee: CITIC Pacific Mining Management Pty Ltd
Period:

Form LR1: Monitoring of emissions to land					
Emission point	**Parameter**	**Result**	**Averaging period**	**Method**	**Sample date & times**
Camp 123 WWTP	pH	pH units	Spot sample		
	Biochemical Oxygen Demand	mg/L			
	Total Suspended Solids	mg/L			
	E.coli	cfu/100mL			
	Total Nitrogen	mg/L			
	Total Phosphorus	mg/L			

Signed on behalf of CITIC Pacific Mining Management Pty Ltd: …….. Date: …….

Licence: L8308/2008/2
Form: ET1
Name: Unauthorised Fire

Licensee: CITIC Pacific Mining Management Pty Ltd
Period:

Form ET1: Unauthorised Fire
Please provide details of unauthorised fire on the premises, including but not limited to: (a) details of the date, time and location of the fire; (b) the time the fire was declared safe by the Fire Control Officer for the premises; (c) the cause, or suspected cause, of the fire; and (d) a description of the measures taken or planned to be taken, to prevent recurrence of the unauthorised fires.

Signed on behalf of CITIC Pacific Mining Management Pty Ltd: …….. Date: …….

Licence: L8308/2008/2 Licensee: CITIC Pacific Mining Management Pty Ltd
Form: N1 Date of breach:

Notification of detection of the breach of a limit.

These pages outline the information that the operator must provide.
Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

Part A

Licence Number	
Name of operator	
Location of Premises	
Time and date of the detection	

Notification requirements for the breach of a limit	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Part B

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident.	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission.	
The dates of any previous N1 notifications for the Premises in the preceding 24 months.	

Name	
Post	
Signature on behalf of CITIC Pacific Mining Management Pty Ltd	
Date	

Government of Western Australia
Department of Environment Regulation

Decision Document

Environmental Protection Act 1986, Part V

Proponent: **CITIC Pacific Mining Management Pty Ltd**

Licence: **L8308/2008/2**

Registered office:	45 St Georges Terrace PERTH WA 6000
ACN:	119 578 371
Premises address:	Sino Iron Project Mine Site Mining Tenements M08/123, M08/124, M08/125, M08/264, M08/265, M08/266, G08/54 and L08/126 MARDIE WA 6714
Issue date:	Friday, 30 May 2014
Commencement date:	Sunday, 1 June 2014
Expiry date:	Monday, 31 May 2021

Decision

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

Decision Document prepared by:	Suzy Roworth Licensing Officer
Decision Document authorised by:	Alana Kidd 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* (the Act). Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.

2 Administrative summary

Administrative details		
Application type	Works Approval ☐ New Licence ☐ Licence amendment ☒ Works Approval amendment ☐	
Activities that cause the premises to become prescribed premises	**Category number(s)**	**Assessed design capacity**
	5	Primary Crushers (1 to 4) 85,400,000 tonnes per annual period Concentrators (Mill Lines 1 to 6) 85,400,000 tonnes per annual period (producing 27,600,000 tonnes per annual period) Tailing Storage Facility (Stage 1) 35,800,000 tonnes per annual period
	6	2,000,000 tonnes per annual period (2 gigalitres (GL))
	12	2,700,000 tonnes per annual period
	52	480 megawatts
	54	1,060 cubic metres per day
	57	Less than 500 tyres
	64	Landfill Facility - 15,000 tonnes per annual period (excluding Clean Fill used for cover material)

		Waste Rock Landforms – 1,000 tonnes of tyres
	73	4,800 cubic metres in aggregate
Application verified Application fee paid	Date: N/A Date: N/A	
Works Approval has been complied with Compliance Certificate received	Yes☒ No☐ N/A☐ Yes☒ No☐ N/A☐	
Commercial-in-confidence claim	Yes☐ No☒	
Commercial-in-confidence claim outcome	N/A	
Is the proposal a Major Resource Project?	Yes☒ No☐	
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986*?	Yes☒ No☐	Referral decision No: Managed under Part V ☒ Assessed under Part IV ☐
Is the proposal subject to Ministerial Conditions?	Yes☒ No☐	Ministerial statement No: 635 and 822 EPA Report No: 1056 and 1343
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the *Environmental Protection Act 1986*)?	Yes☐ No☒ Department of Water consulted Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area Yes☐ No☒		
Is the Premises subject to any EPP requirements? Yes☐ No☒		

3 Executive summary of proposal and assessment

CITIC Pacific Mining Management Pty Ltd (the Licensee) operates a magnetite iron ore mining, processing and export facility (Sino Iron Project) near Cape Preston in the Pilbara region of Western Australia. The Sino Iron Project is located approximately 80 km south-west of Karratha, approximately 10 km from the North West Coastal Highway, 4 km from the Fortescue River and more than 30 metres (m) from any ephemeral creeks. The Sino Iron Project Mine Site is wholly located on the Mardie Pastoral Lease owned by Pastoral Management Pty Ltd, a related company to the Licensee.

Due to excess water in the existing mining pit, CITIC require approval to discharge up to 2 gigalitres (GL) of mine dewatering discharge to the lower Fortescue River estuary. Pit dewatered groundwater will first be stored in turkey's nest ponds for reuse onsite. Excess water will then be campaign discharged via a pipeline extending to the discharge location via a diffuser and only on outgoing tides.

The Office of the Environmental Protection Authority (OEPA) approved a section 45C to Ministerial Statement 635 on 31 August 2016 to allow the proponent to discharge 2 GL of mine dewatering water to the Fortescue River mouth. The OEPA concluded that the discharge to the Fortescue River is acceptable, and can be appropriately managed under Part V of the *Environmental Protection Act 1986*.

During this amendment the following changes have been made to the licence:

- Assessment of construction and operation, for the inclusion of mine dewatering, category 6 for the discharge of approximately 2,000,000 kL (2 GL) of excess water to the Fortescue River mouth.

Where conditions have been modified in the existing Licence these have been justified in Section 4.

4 Decision table

All applications are assessed in line with the Act, 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	1.1.1 – 1.1.4.	No modifications have been made to these conditions during the licence amendment.	General provisions of the *Environmental Protection Act 1986*. *Environmental Protection (Unauthorised Discharges) Regulations 2004.* *Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007*. Australian Standard 1940-2004 the Storage and Handling of Flammable and Combustible Liquids. Code of Practice for the Storage and handling of dangerous goods.
Premises operation	L1.2.1 – L1.2.13.	Refer to Appendix A for the detailed assessment of the mine dewatering discharge to the Fortescue River. Condition 1.2.8 (Table 1.2.3) was modified during the amendment to include	General provisions of the *Environmental Protection Act 1986*.

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		the 123 turkey's nest pond in the containment infrastructure, as this had previously not been included. Camp 123 turkey's nest will store the dewatering water prior to be it being discharged to the Fortescue River Mouth. Condition 1.2.10 (Table 1.2.4) was updated to include daily inspections of the mine dewatering pipeline. Condition 1.2.11 was originally updated to include the mine dewatering discharge water. However, as the dewatering pipeline will have a pressure monitoring system with SMS alert in the event of a drop in pressure and the discharge will cease immediately, this requirement was deemed not necessary and was removed. Condition 1.2.13 (Table 1.2.5) was amended to add the category 6 capacity as a limit.	
Point source emissions to air including monitoring	L2.1.1, L3.2.1, L3.2.2 and L3.2.3.	These conditions were not modified during this amendment.	General provisions of the *Environmental Protection Act 1986*.
Emissions to surface water including monitoring	L2.2.1, L2.2.2 and L3.3.1.	The assessment is outlined in Appendix A. The mine dewatering infrastructure is to be constructed under this amendment. Construction specifications for the mine dewatering discharge infrastructure have been applied to the licence through Condition 2.2.1 (Table 2.2.1). Surface water conditions were included on the licence during the amendment to include the mine dewatering discharge to the Fortescue River mouth to specify the discharge location. Limits have been set based on worst case modelled concentrations for temperature, total dissolved solids, nitrate, cadmium, chromium (VI), cobalt, copper, lead, mercury, nickel, silver, vanadium and zinc. Total recoverable	General provisions of the *Environmental Protection Act 1986*. *Environmental Protection (Unauthorised Discharges) Regulations 2004.*

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		hydrocarbons have also been included. Condition 2.2.3 was included to ensure that mine dewatering water is only discharged on outgoing tides and that details of the discharge are recorded. Condition 2.2.4 was included for category 6 operations to ensure compliance documentation is submitted before the mine dewatering infrastructure is operated in accordance with the licence conditions.	
Emissions to land including monitoring	L2.3.1 and L3.4.1.	These conditions were not modified during the amendment.	General provisions of the *Environmental Protection Act 1986*. *Environmental Protection (Unauthorised Discharges) Regulations 2004.*
Fugitive emissions	N/A	Dust emissions during construction are discussed in Appendix B.	General provisions of the *Environmental Protection Act 1986*.
Monitoring general	L3.1.1 – L3.1.4.	These conditions were not modified during the amendment.	N/A.
Monitoring of inputs and outputs	L3.5.1.	These conditions were not modified during the amendment.	Sino Iron Project Landfill Waste Estimation Procedure (DR036488), CITIC Pacific Mining Management Pty Ltd, 7 April 2015.
Process monitoring	L3.6.1.	These conditions were not modified during the amendment.	General provisions of the *Environmental Protection Act 1986*. *Environmental Protection (Unauthorised Discharges)*

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
			Regulations 2004.
Ambient quality monitoring	L3.7.1	An ambient monitoring suite of nutrients and metals has been included onto the licence with the requirement to monitor monthly during the discharge of mine dewatering water to the Fortescue River mouth for a period of 12 months to verify the modelling. Mangrove health monitoring is also required. This is discussed in Appendix A.	General provisions of the *Environmental Protection Act 1986*.
Improvements	L4.1.1.	These conditions were not modified during the amendment.	N/A.
Information	L5.1.1 – L5.1.3, L5.2.1 – L5.2.4 and L5.3.1.	Additional monitoring requirements including a comparison of the ambient surface water monitoring data obtained against baseline results has been included in Table 5.2.1. Table 5.3.1 has been updated as the Licensee is required to submit a compliance document following construction of the mine dewatering discharge infrastructure specified in Condition 2.2.1, which will ensure DER is advised on the commencement of discharges.	N/A.
Licence duration	N/A	The expiry date was not modified during the licence amendment.	N/A.

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
16/09/2016	21 day draft documents provided	The following main comments were raised by the proponent: • A request to remove the mine dewatering water discharge pipeline from Condition 1.2.11 (requiring telemetry / diversion containment) as the proponent has stated this is not an environmentally hazardous substance.	DER removed this from the condition as the proponent has other management measures in place, such as daily inspections while the pipeline is operational and it is equipped with a pressure monitoring system.

Date	Event	Comments received/Notes	How comments were taken into consideration
		• A request to remove Condition 2.2.1, which lists the construction requirements for the mine dewatering water infrastructure as the proponent has stated that potential modifications could result in a licence amendment.	DER has not removed this condition and if there are minor modifications then these may be able to be declared in the compliance documentation. This is also what was assessed under Part IV of the *Environmental Protection Act 1986*.
		• Request for FR2 to be relabelled.	DER has relabelled FR2 specifically in the monitoring section stating that this is in-pipe.
		• A request to remove the requirement to discharge with a tidal flow rate of greater than 0.1 metre per second as the proponent will be using tidal data collected at Cape Preston to determine this.	DER has included the requirement to monitor this according to the tidal data collected at Cape Preston.
		• A request to remove the requirement to measure volumetric flow rate from Condition 3.3.1 in L/s.	DER has removed this requirement and the proponent will be required to measure this in m^3/day. As there will only be a discharge on an ebbing tide this should provide adequate information of the volume discharged over the 2-4 hour period.
		• A request to restrict monitoring of Camp 123 Turkey's nest to infield parameters only.	DER has not removed this requirement. Infield parameters will be monitored at FR2. The purpose of monitoring at Camp 123 Turkey's nest is to have confirmation that the dewatered water is of suitable quality, meeting the stipulated limits, prior to discharge to the Fortescue River Mouth.
16/09/2016	21 day draft documents provided to Department of Mines and Petroleum	The proposed dewatering pipeline and discharge point are located within	L08/126 added to Premises Address.

Date	Event	Comments received/Notes	How comments were taken into consideration
		miscellaneous licence L08/126 which is not stated in the Premises Address	
16/09/2016	21 day draft documents provided to Department of Water	Satisfied that the draft conditions are appropriate to monitor and manage impacts as a result of the discharge to the Fortescue River Mouth.	N/A.
20/10/2016	Second 21 day draft provided to Licensee with minor updates.	The following main comments were raised by the proponent: • A request to remove Turkeys Nest 1 and 2 from the containment infrastructure. • A request to remove the requirement to discharge with a tidal flow rate of greater than 0.1 metre per second as the proponent will be using tidal data collected at Cape Preston to determine this. • A request to restrict monitoring of Camp 123 Turkey's nest to infield parameters only. • A request to add "or as approved by the CEO" to the ambient reporting requirement due date.	DER has not removed this requirement. These ponds may store dewatering water onsite so should meet the containment conditions. DER has not removed this requirement. Infield parameters will be monitored at FR2. The purpose of monitoring at Camp 123 Turkey's nest is to have confirmation that the dewatered water is of suitable quality, meeting the stipulated limits, prior to discharge to the Fortescue River Mouth. This allows the proponent the opportunity to do this. DER cannot allow an approval within an approval and has instead extended the due date to three months for the ambient reporting to allow sufficient time for submission.

Date	Event	Comments received/Notes	How comments were taken into consideration
9/11/2016		Further to the request to remove the flow rate, the proponent submitted a Mine Pit Water Discharge to the Fortescue Rivermouth Procedure dated 8/11/2016, to outline the procedure to be used to achieve adequate dilutions, rather than measuring tidal flow.	DER has updated this decision document and licence conditions (2.2.3) to include the proponent's specific procedures to be followed to ensure adequate dilution occurs. Condition 2.2.3 was updated as follows: The Licensee shall ensure that the discharge of mine dewatering water according to Table 2.2.1 only occurs on outgoing tides and according to daily tidal analyses from local measurement locations under the following conditions: (a) Discharge shall only commence 30 minutes after the turning of the tide from incoming to outgoing; (b) Discharge shall cease 1 hour prior to the turning of the tide from outgoing to incoming; and (c) Discharge commencement and cessation date and time shall be recorded daily against tidal data. Table 5.2.1 was also updated to include data as above in the annual report.
22/11/2016	Third 21 day draft provided to Licensee with minor updates	CITIC confirmed that Turkey nests 1 and 2 are not used at all in the dewatering process.	DER removed all reference to Turkey nests 1 and 2 in the Licence and Decision Document.

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

Mine dewatering discharge to Fortescue River Mouth

The proponent abstracts groundwater from within the mining sumps to allow the mining of ore below the water table.

Mine dewatering water is reused where possible in the following activities onsite:

- Dust suppression of haul roads;
- Dust suppression during dumping of waste rock when constructing tailings walls or waste rock dump profiles;
- Dust suppression of excavation mine operations;
- General storage within turkey's nests ponds; and
- Pumping to the tailings storage facility for dust suppression with recapture via the decant return water.

Following reuse onsite there is an excess of 2 GL/annum of mine dewatering water that requires disposal. An options analysis was conducted and the following options were not selected, with the reasons provided below:

- Discharge to Du Boulay Creek –the tidal influence is not as great as the Fortescue River and, therefore, the discharge water would not mix as effectively. This would increase the risk of impacts to the mangroves and fish, and also for potential algal blooms;
- Discharge to the ocean by mixing the mine dewatering water with the desalination plant brine and disposing of via the current outfall –there would be a potential to exceed the current approved discharge volumes;
- Evaporation pond – this would require an area of 160 ha and the land available is required for the mine pit, storage of waste rock or processing infrastructure; and
- Aquifer reinjection – the accessible aquifers nearby the mine are of low permeability and would not facilitate reinjection effectively.

The mine dewatering water will be abstracted from a series of in pit sumps and pumped to turkeys nest ponds for temporary storage, prior to discharge via a pipeline to the discharge point approximately 1.25 km from the Fortescue River mouth. The discharge will be synchronised with the ebbing tides to ensure maximum mixing and minimise upstream migration of the water. The Fortescue River mouth is approximately 100 m wide and 4 – 6 m deep, varying with the tide, at the discharge point.

The proponent will be abstracting groundwater from within the mining pit, which may contain historical contamination of nitrates from mine explosives, however, a recent analysis shows that this may be naturally occurring and there is no evidence that nitrates are from blasting emulsion used in the mine area. An abstraction bore field outside of the mine pit (to avoid nitrate contamination) is not effective for dewatering purposes as the mine geology is of a low permeability, resulting in a low hydraulic connection.

The Camp 123 turkey's nest is lined with High Density Polyethylene (HDPE). The Camp 123 turkey's nest pond will be the final stage storage reservoir prior to the water being piped to the Fortescue River mouth.

Modelling was conducted in 2013 for the purpose of selecting a discharge site within the Fortescue River with the least environmental impact. The predictive simulations of the plumes were used to qualitatively inform the mixing, dilution and flushing of the creek system by the local tidal phases.

A comparison of the mine dewatering discharge quality to that of the ANZECC 2000 guidelines and the baseline Fortescue River is provided in Table 1.

Emission Description – Pipeline rupture
Emission: Mine dewatering water may be discharged to the terrestrial environment in the event of a pipeline failure.

Impact: Vegetation impacted with saline water and water with elevated metals, pH and temperature.

Controls: The pipeline that will carry the water from the Camp 123 turkey's nest ponds will be inspected daily and will be equipped with a pressure monitoring system. An alert will be sent to a nominated mobile phone if a loss in pressure is detected if a leak or rupture is verified, the pipeline will be immediately shutdown. The vegetation in the majority of the area where the pipeline is to be installed is of very poor condition.

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

Regulatory Controls
Condition 1.2.10 has been updated to include the mine dewatering pipeline to the daily inspection regime. Condition 2.2.1 includes a requirement for the pipeline to be constructed with a pressure monitoring system.

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

Emission Description – Discharge to Fortescue River Mouth
Emission: Hypersaline mine dewatering water, potentially also containing elevated levels of nitrate and metals (boron, copper, nickel and zinc) discharged to the Fortescue River mouth. There could also be the potential for this water to contain hydrocarbons and have a pH, temperature or dissolved oxygen that varies from the receiving waters. It should be noted that salinity of the pit water will vary in salinity as it will increase over time due to mining in the proximity to the seawater saline wedge.

Impact: There is potential for mangroves and fish to be impacted. Mine hypersaline dewatering water can cause stratification in still waters which can result in deoxygenated water causing fish kills. Elevated levels of nitrate can contribute to algal blooms which also can result in water deoxygenation. Increased water temperature and pH also have the potential to affect the dissolved oxygen in the water and can also impact on the health of fish, crabs, birds, turtles and mangroves. Animals such as bottom dwelling fish and crabs are often unlikely to move from affected areas and often die in unfavourable conditions. Metals can accumulate in sediments and filter feeders, and can be biomagnified through the foodweb.

Controls: The proponent is proposing to discharge the excess mine dewatering water approximately 1.25 km from the Fortescue River mouth where the river is tidally influenced. This location was selected to ensure that mixing is optimum. A diffuser will be used that will be offset 10 m from the bank of the river.

CITIC analysed tidal data between two local tidal measurement locations; CITIC Tug Pen and CITIC MOF Wharf against Steamboat Island (Bureau of Meteorology site) showing good correlation. To ensure discharge occurs only on outgoing tides and ceases before the turn of the tide to prevent discharge returning upstream, CITIC will ensure the following:

- Discharges will commence 30 minutes after the turning of the tide from incoming to outgoing; and
- Discharges will cease 1 hour prior to the turning of the tide to allow 1 hour flushing with upstream water before the incoming tide.

For each discharge event the following will be recorded:

Tidal data (tide height peak in metres) and date/time
CITIC Tug Pen
CITIC MOF Wharf
BoM Steamboat Island

Discharge time (dd/mm/yy hr:min)
Discharge commencement date and time
Discharge cessation data and time

Flow rate
Daily flow rate (m^3/day)

Table 1: Comparison of groundwater quality with Fortescue River and ANZECC (2000) Guidelines

	ANZECC (2000) Guidelines (Tropical Australia)				Fortescue River Baseline †		In-pit groundwater (pit dewater)		Comparison of groundwater quality to ANZECC (2000) and Fortescue River Baseline
	Tropical Australian Marine Inshore	Marine (99% protection level)	Marine (95% protection level)	Marine (80% protection level)	Range	Average	April - 13 (flow weighted average)	June - 15 (flow weighted average)	
Inorganics									
TDS (mg/L)					36,400 – 42,200	39,808	30,500	20,831	Consistent with the interface between the marine environment and freshwater inputs NOTE: salinity will increase however, refer to model on dilutions
TSS (NTU)	2 – 200				<5 – 118	18	5	<5	Less than Fortescue River
pH	8.0 – 8.4				7.89 – 8.07	8.00	NA	7.6	Less than Fortescue River
Nutrients (mg/L)									
Ammonia		0.5	0.91	1.7	<0.01 – 0.09	0.035	0.6	0.5	Better than 95% species protection level prior to dilution. Potentially slightly higher than the Fortescue River
Nitrate	0.008	0.017 *	0.7*	17*	<0.01 – 0.06	0.02	34.5	12.8	Potential to Exceed the 80% protection level without management. Higher than the Fortescue River
Total nitrogen	0.1				<0.01 – 0.4	0.02	31.1	15.6	Higher than the Fortescue River
Metals (mg/L)									
Boron		0.09*	0.37*	1.3*	3.81 – 5.04	4.44	-	0.75	Better than 80% species protection prior to dilution. Less than Fortescue River
Copper		0.0003	0.0013	0.008	<0.001-0.015	0.003	0.004	0.0031	Better than 80% species protection level prior to dilution Approximately equivalent to average Fortescue River Quality
Nickel		0.007	0.07	0.56	<0.001 – 0.012	0.001	0.006	0.001	Better than 80% species protection level prior to dilution Approximately equivalent to average Fortescue River Quality
Zinc		0.007	0.015	0.043	<0.005 – 0.006	<0.005	0.021	0.005	Better than 80% species protection level prior to dilution Approximately equivalent to average Fortescue River Quality

* ANZECC Freshwater Guideline † Based on 11 monthly sampling events up to October 2015

Note: The flow weighted data for June 2015 also included sampling for other metals, including Cadmium, Chromium (VI), Lead and Mercury which were all below the limit of detection and have not been included.

The diffuser will maximise mixing as it will have 14 ports for discharge at 1.5 m spacing (total length 21 m) and it will be orientated downstream. Tides in the Pilbara region typically range by several metres which should ensure adequate water movement and mixing.

Ambient monitoring has been proposed by the proponent to be conducted for nutrients and metals on a monthly basis during the discharge at the following locations:

- FR1 - 1 km downstream of discharge point;
- FR2 – at the discharge point; and
- FR3 - 1 km upstream of discharge point.

The known mining host rocks and dissolved metal groundwater testing to date indicate that there are no significant metals of concern in the groundwater associated with the Sino Iron project. However, for the purpose of assessing potential impacts of the discharge, a comprehensive suite of metals has been provided in the monitoring suite including the metals that have been detected in the sampling. Dissolved metal concentrations will be tested as this is considered to be a better indicator of bioavailable metal concentration (ANZECC & ARMCANZ, 2000).

The nutrient suite has been derived based on the historical data and consideration of ANZECC & ARMCANZ (2000) guidance for physical and chemical stressors for tropical Australia for slightly disturbed ecosystems. In addition to this, an assessment of the bioavailable fractions is recommended to allow assessment of the fraction of the chemical in the water that organisms can take up, enabling a better assessment of the risk.

The selection of nutrients and metals to be monitored was based on the following documentation:

- ANZECC & ARMCANZ, 2000. Australian and New Zealand Guidelines for Fresh and Marine Water Quality;
- EPA, 2015. EAG 15 Environmental Assessment Guideline for Protecting the Quality of Western Australia's Marine Environment; and
- Wenziker, McAlpine, Apte and Masini, 2006. North West Shelf Joint Environmental Management Study Background quality for coastal marine waters of the North West Shelf, Western Australia.

The pit water and riverine environment is phosphorus limiting. Total phosphorus measured in the pit water samples indicated levels below the detection limit of 0.1 mg/L and in the Fortescue River mouth ranging between 0.14 – 0.17 mg/L so in the absence of phosphorus there would be negligible potential for algal growth and algal blooms are not expected to occur. Highly turbid water within the Fortescue River mouth would also limit algal growth. Mangroves are generally nitrate tolerant, as are the local fish in the area (mullet, barramundi, mangrove jack, sea perch and threadfin salmon). A mangrove health assessment (tree height, biomass and density, and satellite mapping imagery comparison) and sediment quality will be conducted annually.

Water temperature and pH are not expected to change and the elevated salinity of the abstracted groundwater indicates that it can dissolve approximately 96% of the oxygen in the receiving water.

Discharged groundwater is expected to meet the ANZECC (2000) 80% species protection levels for metal concentrations at the end of pipe and is comparable with the Fortescue River water quality.

Modelling
Modelling of the diffuser design was conducted with a worst case scenario whereby the following parameters were considered:

- Salinity was 70,000mg/L TDS, more than double the actual salinity levels;

- Temperature was a 30^{o}C elevation to account for heating in delivery pipelines. The highest summer temperature estimate for the discharge was combined with the lower background temperature during winter to result in a very conservative estimate;
- Low flow river conditions of 0.1 m/s at neap tides at the discharge point; and
- High flow river conditions of 0.25 m/s at the discharge point.

In order to meet the criteria for salinity it was found that 27 dilutions should occur within 10 m of the discharge under worst case scenario where salinity is 70,000 mg/L TDS, and for temperature 14 dilutions are required. The model identified that under low flow conditions 41.5 dilutions can occur within 3 m of the diffuser and under high flow conditions 100 dilutions can occur within 10 m of the diffuser. The diffuser should allow dilution within 10-20 m of the discharge point.

Risk Assessment
Consequence: Moderate
Likelihood: Possible
Risk Rating: Moderate

Regulatory Controls
Condition 2.2.1 requires the discharge to occur at the location modelled, and using the diffuser structure to achieve the required dilution.

Condition 2.2.2 sets limits based on the worst case modelled concentrations for temperature, total dissolved solids, nitrate, cadmium, chromium (VI), cobalt, copper, lead, mercury, nickel, silver, vanadium and zinc. Total recoverable hydrocarbons have also been included to address the risk of hydrocarbon contamination originating in the mine pit sumps. The nitrate limit was originally set at 100 mg/L, however, the OEPA recommended that this be modified to nearer the upper limit average for in-pit groundwater recorded (34.5mg/L) and set the limit at 50 mg/L. DER has taken a precautionary approach and set the limit at 50 mg/L for nitrate.

Condition 2.2.3 was included to ensure that mine dewatering water is only discharged on outgoing tides and that details of the discharge are recorded.

Condition 3.3.2 requires monitoring at a location along the pipeline so that temperature is accurate, along with other parameters. Results will not be obtained until after the discharge. However, monitoring will also be conducted at the Camp 123 turkey's nest ponds so that the Licence Holder has the opportunity to obtain and assess results prior to the discharge.

Condition 3.7.1 requires ambient monitoring of discharge conditions including nutrients and metals during the discharge for a 12 month period to verify the modelling. DER has included two additional ambient monitoring locations, FR4 and FR5 that are located 18 m from the discharge point (edge of the mixing zone). Condition 5.2.1 requires a comparison of the data obtained prior to discharge versus during the discharge to be provided as part of the AER. This will enable the modelling to be verified. Following this 12 month period and verification report provided to DER, the requirement for this ambient monitoring will be reassessed.

Mangrove health monitoring is also required by Table 3.7.3 of Condition 3.7.1.

Condition 5.2.3 (Table 5.2.2) requires a report to be submitted following the 12 months of ambient surface water monitoring to verify the modelling.

Residual Risk

Consequence: Moderate
Likelihood: Unlikely
Risk Rating: Moderate

Emission Description – Discharge to Fortescue River Mouth on incoming tide due to malfunction or human error

Emission: Mine dewatering water containing elevated levels of salinity, nitrate and some metals (boron, copper, nickel and zinc) will be discharged to the Fortescue River mouth.
Impact: There is potential for mangroves and fish to be impacted if the mine dewatering water, which may be hotter, is more saline and contains elevated levels of nitrate and some metals, does not adequately mix with the water in the receiving environment. An incoming tide will also cause these receptors to be exposed to the discharge for a longer period.

Controls: The proponent has an internal procedure to manage this event. The internal procedure requires the following:

- Discharge will cease;
- Monitoring will be conducted within the river at the designated monitoring locations at the discharge point, upstream and downstream of the discharge point (FR1, FR2 and FR3) to determine if impact to the river has occurred as a consequence of the error/malfunction. This will be undertaken using electrical conductivity as the indicator parameter in comparison with baseline data which will provide an indication of the extent that mixing has occurred;
- If impact has occurred discharge will remain ceased until sufficient outgoing tidal changes have occurred to reduce the impact. Monitoring will continue until the monitored impact has reduced;
- Discharge will only recommence after the impact has reduced; and
- A report outlining the cause of the error/malfunction and all the data collection methods and results will be documented.

Risk Assessment
Consequence: Major
Likelihood: Likely
Risk Rating: High

Regulatory Controls
Condition 2.2.3 requires the proponent to only discharge excess mine dewatering water on an outgoing tide to maximise the opportunity for mixing and so that the diffuser structure functions to effectively dilute the plume. Details of the discharge are also required to be recorded.

Residual Risk
Consequence: Moderate
Likelihood: Unlikely
Risk Rating: Moderate

Emission Description – Overtopping of the turkey's nest pond
Emission: Mine dewatering water may be discharged to the environment in the event of overtopping or seepage of the turkeys nest ponds.

Impact: Degradation of soils as the water quality is saline.

Controls: The turkey's nest pond is in the location of the mine pit within areas that have already been stripped or topsoil. This will allow any potential overtopping to be contained within the mining area where no vegetation is present. A freeboard of 0.5 m will be maintained on the Camp 123 turkey's nest pond. This is greater than the 100 year 72 hour Average Recurrence Interval to manage rare rainfall events and prevent overtopping.

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

Regulatory Controls
Condition 1.2.8 has a requirement to maintain an operational freeboard of 0.5 metre on the turkey's nest pond.

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

Emission Description – Seepage from the turkey's nests
Emission: Mine dewatering water may infiltrate to soils and groundwater if the lining is compromised.

Impact: Degradation of soils as the water quality is saline and is elevated in nitrates from mine explosives in the pit.

Controls: The turkey's nest is lined with a High Density Polyethylene liner so seepage is not expected. If seepage were to occur, the pond is located within the mining pit dewatering cone of depression and any seepage should be recaptured.

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

Regulatory Controls
Condition 1.2.8 specifies the Camp 123 turkey's nest as containment infrastructure with a High Density Polyethylene liner.

Residual Risk
Consequence: Insignificant
Likelihood: Unlikely
Risk Rating: Low

Appendix B

Dust emissions from construction of the mine dewatering discharge pipeline

The Sino Iron Project Mine Site has encountered asbestos, which is contaminating the area and materials involved with the mining and processing of ore (including the product and tailings) and has the potential to become airborne through these activities. This material could contain asbestiform material. Examination of the tailings has indicated the presence of both riebeckite and crocidolite particles. Fibrous riebeckite in various forms has been identified in the deposit and it is possible other amphiboles and serpentine asbestiform minerals also are present albeit at a lower concentration.

Naturally occurring asbestiform material that has not been disturbed does not constitute a contaminated site as defined under the *Contaminated Sites Act 2003* (CS Act), but through the extraction of ore and processing of ore deposits, it has the potential to trigger the CS Act if asbestiform minerals happen to be present.

The Department of Health (DoH), Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, May 2009 applies a general regulatory investigation criterion of 0.01% weight for weight (w/w) asbestos for fibrous asbestos.
The Licensee has stated that concentrations of asbestos in the Tailings Storage Facility are under detectable levels.

Emission Description – Dust during construction
Emission: Dust emissions have the potential to be generated during the excavation and construction of the pipeline to the Fortescue River mouth.

Impact:
Asbestos is naturally occurring in the soil of this prescribed premises and presents a significant risk to the health of people both onsite and off-site when disturbed. Asbestos has been identified as the causal agent in many lung diseases including cancers and often as a result of relatively low exposure. Exposure to the environment will not break down asbestos and any asbestos left onsite will continue to present a risk into the future. Public health risk arises if the fibres contaminate materials or areas where the public may be exposed to them.

Controls: The Licensee has implemented onsite controls to manage the risks to its workers. These controls include the use of masks in designated areas. Onsite activities affecting mining employees at the Sino Iron Project is currently regulated by the Department of Mines and Petroleum (DMP) from a *Mines Safety and Inspection Regulations 1995* perspective due to asbestiform material onsite.

DMP require that all mine sites develop strategies to manage the risk associated with the fibrous minerals either proven or likely to be present on site. The Licensee has developed the following:

- Sino Iron Project, *Fibrous Minerals Management Procedure*, CITIC Pacific Mining (DR012984); and
- Sino Iron Project, CPM *Fibrous Minerals Management Plan*, CITIC Pacific Mining (DR030318) (FMMP).

As fibrous minerals in the context for the Sino Iron Project is primarily a workplace health issue with fibrous minerals regulated by DMP, these documents have been previously reviewed by the DMP. The Licensee continues to liaise with DMP on related issues.

The FMMP provides guidance for the management of fibrous minerals relating to mining and processing operations. The FMMP ensures that all operational procedures within the mine are addressed in accordance with the *Mines Safety and Inspection Regulations 1995* and DMP's Guideline on the *Management of fibrous minerals in Western Australian mining operations* (2015).

Construction is for a limited duration of time and the proposed activities are not expected to disturb material that has the potential to contain fibrous materials.

Risk Assessment
Consequence: Moderate
Likelihood: Possible
Risk Rating: Moderate

Regulatory Controls
The Licensee is required to comply with the following:

- DMP's Guideline on the *Management of fibrous minerals in Western Australian mining operations* (2015); and
- DoH *Guidance Note on Public Health Risk Management of Asbestiform Minerals Associated with Mining (*2013).

Fibrous minerals management and controls shall be consistent with the following key Western Australian legislation:

- *Occupational Safety and Health Act 1984*;
- *Occupational Safety and Health Regulations 1996*;
- *Mines Safety and Inspection Act 1994* – (covering areas designated as a minesite);
- *Mines Safety and Inspection Regulations 1995*;
- *Health Act 1911*;
- *Health (Asbestos) Regulations 1992*;
- *Environmental Protection (Controlled Waste) Regulations 2004*; and
- *Contaminated Sites Act 2003*.

The monitoring of ambient air quality can be sufficiently regulated by the Environmental Protection Authority (EPA) in accordance with Ministerial Statement (MS) 635. The Licensee developed the Operational Environmental Management Plan, which was endorsed by the EPA on the 13 August 2014 in accordance with MS 635 Condition 2-1, Schedule 2, Commitment 2. The Sino Iron Project Dust Operational Management Plan, CITIC Pacific Mining, DR027769 (ODMP) was included in its entirety as an appendix to the OEMP to specifically address MS 635 Condition 2-1, Schedule 2, Commitment 2, Item 9 (dust and noise). The Operational Dust Management Plan includes ambient dust monitoring requirements including operational dust objectives and targets.

Residual Risk
Consequence: Moderate
Likelihood: Unlikely
Risk Rating: Moderate