Government of Western Australia
Department of Water and Environmental Regulation

Decision Document

Environmental Protection Act 1986, Part V

Proponent: CITIC Pacific Mining Management Pty Ltd

Licence: L8758/2013/1

Registered office:	45 St Georges Terrace PERTH WA 6000
ACN:	119 578 371
Premises address:	Sino Iron Project Desalination Plant and Bulk Loading Facility General Purpose Lease G08/52 MARDIE WA 6714
Issue date:	Thursday, 21 November 2013
Commencement date:	Monday, 25 November 2013
Expiry date:	Sunday, 24 November 2024

Decision

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

Decision Document prepared by:	Sonya Poor Licensing Officer
Decision Document authorised by:	Danielle Eyre Delegated Officer

Contents

1 Purpose of this Document

This decision document explains how DWER has assessed and determined the application and provides a record of DWER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DWER's assessment and decision making under Part V of the *Environmental Protection Act 1986.* Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.

2 Administrative summary

Administrative Details		
Application Type	Works Approval ☐ New Licence ☐ Licence amendment ☒ Works Approval amendment ☐	
Activities that cause the premises to become prescribed premises	**Category number(s)**	**Assessed design capacity**
	54A: Water desalination plant	44 gigalitres per year
	58: Bulk material loading or unloading	252,000 tonnes per day
Application verified Application fee paid	Date: 24/04/2018 Date: 10/05/2018	
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, 822 and 1066 EPA Report No: 1056, 1343 and 1602
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the *Environmental Protection Act 1986*)?	Yes ☐ No ☒ Department of Water consulted Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area Yes ☐ No ☒ If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes ☐ No ☒ If Yes, include details here, e.g. Site is subject to SO_2 requirements of Kwinana EPP.		

3 Executive summary of proposal

CITIC Limited (formerly named CITIC Pacific Limited) is the ultimate owner of Sino Iron Pty Limited (Sino Iron) and Korean Steel Pty Ltd Limited (Korean Steel). Sino Iron and Korean Steel were acquired from Mineralogy Pty Ltd (Mineralogy) and are both parties to the agreement scheduled to the *Iron Ore Processing (Mineralogy Pty. Ltd.) Agreement Act 2002* (as amended). Sino Iron and Korean Steel each hold mining rights and subleases authorising the extraction of a combined two billion tonnes of magnetite ore, from an orebody known as the George Palmer deposit and contained entirely within mining leases m08/123, M08/124 and M08/125.

In 2006, CITIC Limited established CITIC Pacific Mining Management Pty Ltd (Licensee) to manage development and ongoing operation of its iron ore mine and export facilities at Cape Preston collectively referred to as the Sino Iron Project. The Licensee conducts those activities on behalf of Sino Iron and Korean Steel. While Mineralogy remains the holder of the mining tenements on which the Sino Iron Project is based the Licensee is the valid holder of approvals for the purposes of Part V of the *Environmental Protection Act 1986* (EP Act).

The Sino Iron Project is a magnetite mining, processing and export facility and has three Licences in total for its operations:

- Transhipment Facility (L8659/2012/2);
- Desalination Plant (the Plant), Bulk Loading Facility (BLF) and Dewatering Plant (DWP) (this Licence) as shown in Figure 1 and referred to as the 'Premises'; and
- Mine Site (L8308/2008/2).

Location and siting

The Sino Iron Project is located within the Mardie Station pastoral lease and approximately 80 km south-west of Karratha in the Pilbara region of Western Australia. Mardie Station is an active pastoral station producing beef cattle however, the location of the Premises is not used for active pastoral activities.

Premises description

The Licence is regulated for category 54A and 58 activities as defined in Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) and as described below.

Category 54A – the Plant

The Plant is made up of two trains, an east and west train. Each train has a nominal capacity of 22 gigalitres per annum (GL/a), with a combined capacity of 44 GL/a, which is consistent with Ministerial Statement (MS) 635, which approves up to 44 GL/a of desalinated seawater. The Plant's process equipment has been sized to produce 52 GL/a to allow the Plant to recover from breakdowns or other outages. The Plant extracts seawater from the coastal waters of the Indian Ocean off Cape Preston and utilises reverse osmosis (RO) to produce potable water for the Sino Iron Project. Concentrated brine (with a modelled total dissolved solids (TDS) content of approximately 78,820 milligrams per litre (mg/L)) is discharged back to the ocean.

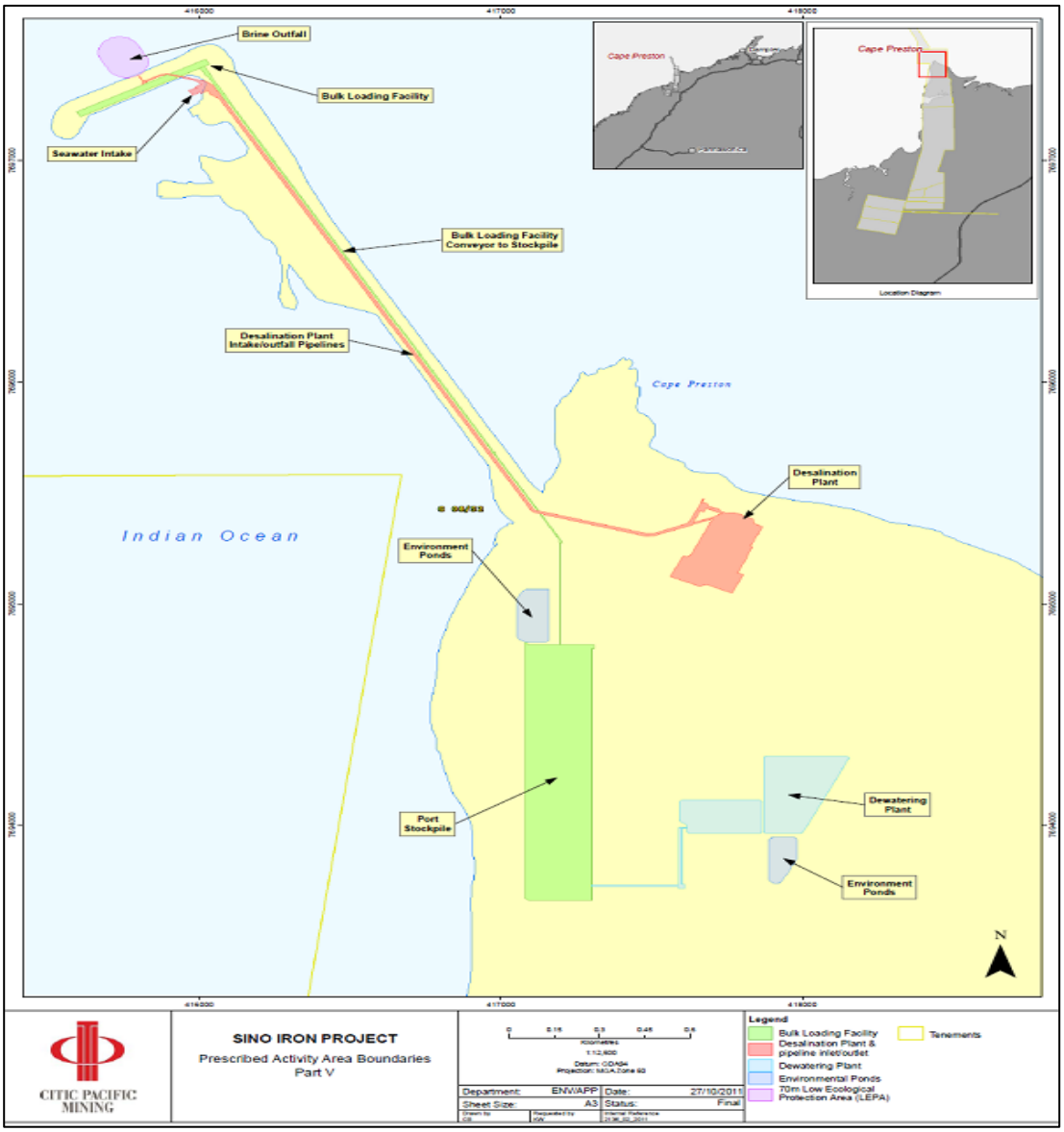

Figure 1: Location of the Premises

Desalination Process Pre-Treatment Process

Seawater is first passed through the pre-treatment filters to remove suspended solids. The pre-treatment process includes: flocculation, lamella settling, and gravity dual media filtration. Flocculation and backwater discharges are routed to the sludge treatment plant for solids removal prior to discharge via the outfall (Figure 2).

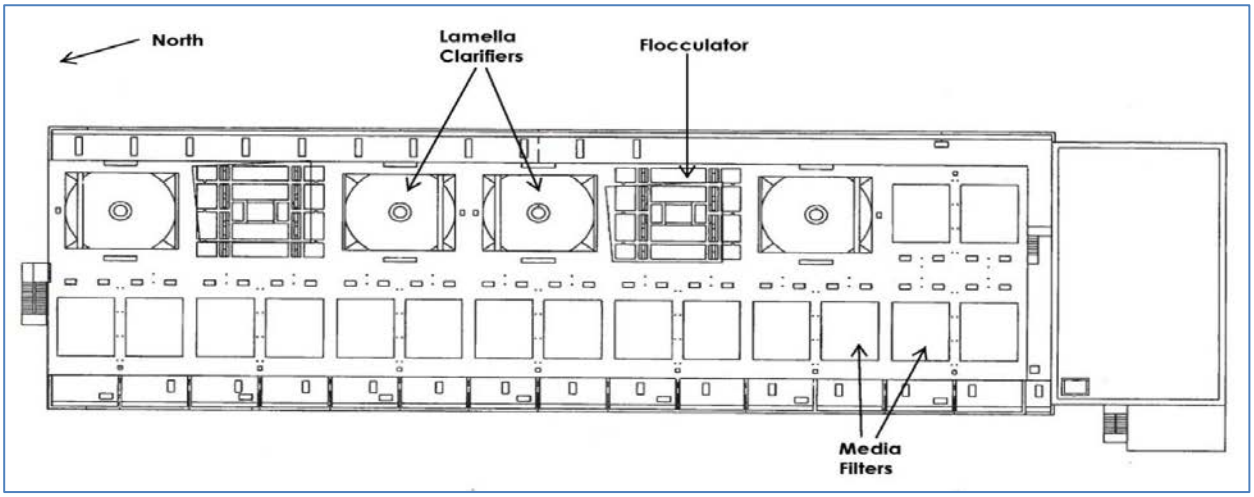

Figure 2: Pre-Treatment Plant Layout

The pre-treatment process includes the following steps:

- Injection of Coagulant – ferric sulfate ($Fe_2[SO_4]_3$) to the seawater feed;
- Flocculation Chambers for the seawater coagulation – flocculation process;
- Lamella Clarifier settlers to remove suspended matter with a specific gravity higher than the raw seawater. This waste is pumped to the sludge treatment system for further treatment and solids removal before being discharged through the outfall diffuser;
- Gravity dual media filters for the filtration of the remaining suspended matter. The backwash from these filters is further treated in the sludge treatment plant and solids removed before being mixed with the RO reject and discharged through the outfall; and
- Cartridge filters for final filtering of the RO system. These vessels protect the RO membranes from the possible passage of sand from the pre-treatment section.

RO Process

The seawater undergoes reverse osmotic separation to produce permeate and concentrated reject. Filtered high pressure seawater is supplied to the RO membrane modules. Fresh water permeates through the membrane for collection and the concentrated reject is discharged to the ocean outfall.

The RO permeate passes to the post treatment system where it is stabilised by adding lime and carbon dioxide. Sodium hypochlorite is added for disinfection and the resulting product passed to a 12 ML storage tank.

Outfall Diffuser Configuration

The outfall diffuser is located in an area of low benthic community species abundance. The area is comprised primarily of barren sandy sediments with small patches of variable density sponge and seawhip garden habitat.

<u>DWP</u>

Following processing through the concentrator (licensed under L8308/2008/2 for the Mine Site), magnetite slurry is pumped via an underground pipeline to the port, approximately 29 kilometres (km)

away, where it is stored in four concentrate storage tanks (capacity of 3,800 cubic metres each). The concentrate is pumped to one of two filtrate thickeners to ensure a solid content of greater than 68% and then to one of seven concentrate filters. The resulting filter cake (concentrate) is transported via overland conveyor to the stockyard. Figure 3 shows a simplified flow diagram of the dewatering process. The wastewater extracted through the DWP is reused in the concentrate process.

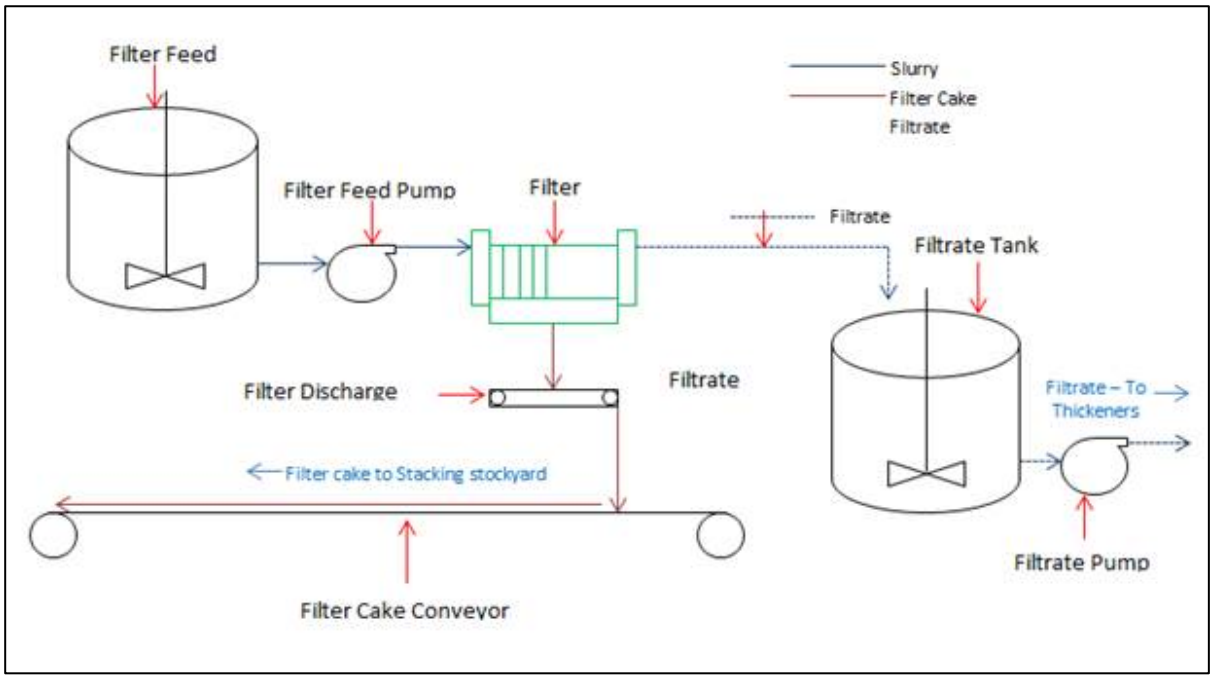

Figure 3: Flow diagram of dewatering process

<u>Category 58 - BLF</u>
The BLF has a maximum design capacity of 252,000 tonnes per day (t/day), with a nominated throughput of 192,000 t/day, of magnetite from stockpiles onto barges, using reclaimers, conveyors and barge loading infrastructure. Figure 4 shows the production process for the Premises.

Ore stockyard
Ore passes as a slurry from the concentrator through to the DWP and is then stored at the stockyard. Further processing produces around 6 million tonnes per annum (Mtpa) of ore pellets with the remainder being stored as ore concentrate.

Ore is deposited on the stockpiles using rail mounted rocker stackers that can be used for concentrate or pellets. Ore is then transferred by a rail mounted bucket wheel reclaimer onto the conveyor which transports the ore to the BLF.

Conveyors and associated infrastructure
The conveyor system of 1,200 metres (m) transfers pellets and concentrate to stackers which stockpile the ore in the stockyard. The concentrate or pellet is then picked up by a reclaimer and transported via a 1,500 m conveyor which runs from the stockyard to a conveyor transfer point. Ore is then transferred onto a second 2,500 m conveyor which runs to the barge loading facility situated at the port. From this point a 450 m wharf conveyor extends along the breakwater to the barge loading facility.

Barge Loading Facility
A rail mounted non-slewing barge loader is installed on the breakwater. The fixed transfer boom of the barge loader conveyor is sized to cover the barge design width from the side of the loading berth. Two barges are able to berth at once and the barge loader is able to travel the full length of the berth.

Barges
The barges are capable of transporting 16,000 tonnes of ore between Cape Preston and the transhipment facility. The transhipment facility (licensed under L8659/2012/2) is located 20 km offshore and within State waters. In the event of unsafe weather conditions, the barges and transhipment facility will return to anchorage in the Dampier port cyclone moorings until operational conditions prevail.

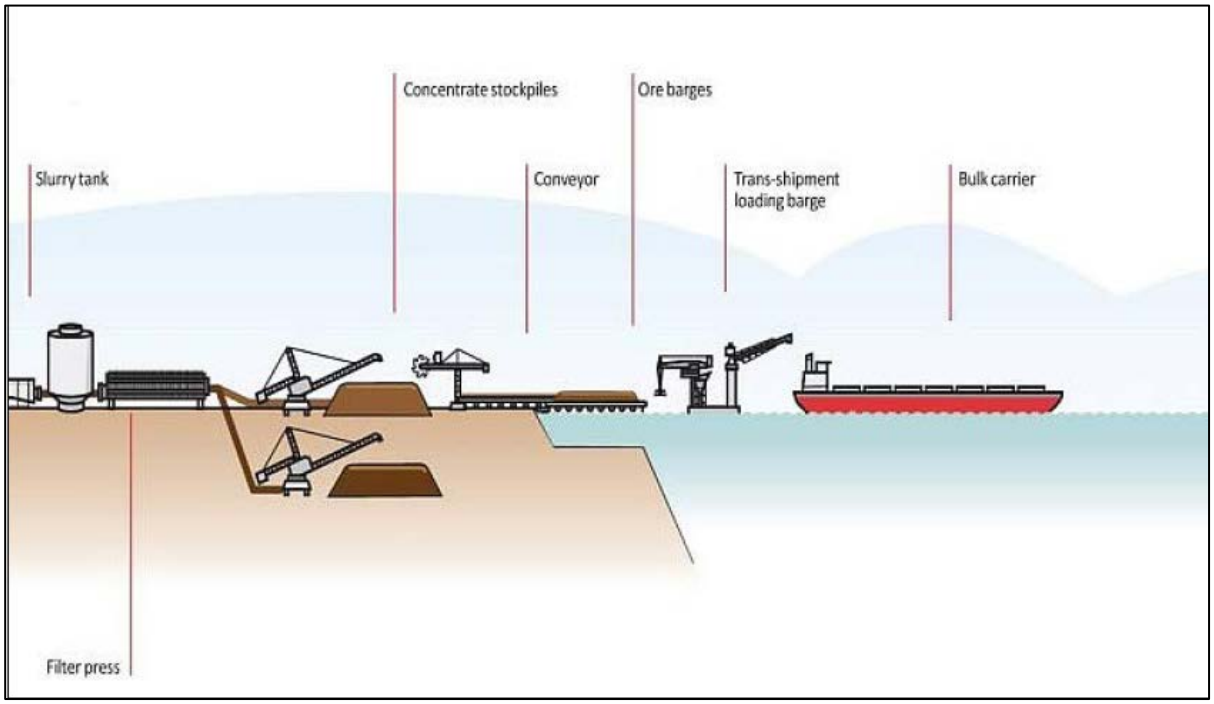

Figure 4: Production process for the Premises

Sensitive land uses
There are no residential premises within the immediate vicinity of the Premises. The workforce for the Sino Iron Project is accommodated at the Eramurra Village and Fortescue Roadhouse Village which are approximately 27 km and 50 km south respectively of the Premises. As these accommodations are operated by the Licensee, they will not be considered a sensitive land use or receptor.

Gnoorea Point (40 Mile) camping area operated by the City of Karratha is located approximately 15 km east of the Premises. The Fortescue River Mouth recreational area (informal campsite not registered by the City of Karratha) is approximately 20 km south-west of the Premises. The Devil Creek Accommodation Village operated by Quadrant Northwest Pty Ltd is located 25 km south-east of the Premises and the Mardie Station homestead is approximately 45 km south-west of the Premises.

Specified Ecosystems
The *Guidance Statement: Environmental Siting* describes specified ecosystems as areas of high conservation value and special significance that may be impacted as a result of activities upon or emissions and discharges from prescribed premises. The specified ecosystems relevant to the Premises are identified below in Table 1.

Table 1: Specified ecosystems

Specified ecosystems	Distance from the Premises*
Department of Biodiversity, Conservation and Attractions – Managed Lands and Waters	The Great Sandy Island Nature Reserve includes Preston Island, which is the location of the BLF. In accordance with condition 15-2 of MS 635, the Licensee has developed a conservation estate management plan to address the effect of the port facility on the conservation values of the Great Sandy Nature Reserve.
RAMSAR wetland	No RAMSAR wetlands are located within or in a 30 km radius of the Premises.
Geomorphic Wetlands	No geomorphic wetlands are located within or in a 30 km radius of the Premises.
Threatened Ecological Communities and Priority Ecological Communities	There are no Threatened Ecological Communities within or in a 30 km radius of the Premises. The Priority 3 Horseflat Land System of the Roebourne Plains is approximately 3 km from the boundary of the Premises.
Declared Rare Flora	No Declared Rare Flora is located within or in a 20 km radius of the Premises.
Biological component	**Distance from the Premises**
Specially Protected under the *Wildlife Conservation Act 1950*	The following are found within the Premises: • Schedule 3 Vulnerable Fauna (reptile); • Schedule 2 Endangered Fauna (mammal) is located within the vicinity of the BLF on Preston Island; and • Schedule 5 Migratory birds protected under an international agreement.
Other relevant ecosystem values	**Distance from the Premises**
Cape Preston marine habitats	Coral-supporting habitat of low to moderate percentage cover occurs as a wide belt along the western side of the Cape Preston platform and gradually thins to a narrow band along the west and north side of Preston Island proximity to the breakwater (refer to Figure 5). This band continues along the slope that passes to the west and north of SW Regnard Island. Most of the habitats in the shallows adjacent to Cape Preston are relatively barren intertidal sand flats or shallow algae dominated pavements. Offshore from Cape Preston, the seabed shelves rapidly descend to depths of greater than 10 m and then to a large basin extending to 17 m depth. The substrate in this area (Fortescue Roads) is a relatively barren silty sand substrate with little macrobiota evident on the surface. In the deeper parts of this basin scattered and, at times, dense patches of *Halophila* sp. seagrass occur. Sparse patches of this species of seagrass were also recorded in small areas west of SW Regnard Island and west of Fortescue Island. Further offshore in waters greater than 22 m depth, the substrate is gravely sand which supports scattered sea whips and fans and occasional large barrel sponges in low abundance (CPM, 2017b).
Marine Fauna (turtles and dugongs)	Four sea turtle species, the Green, Hawksbill, Flatback and Loggerhead Turtle nest or potentially nest on the beaches at Cape Preston within the period from July to April depending on seasonal environmental conditions.

	Marine fauna, appearing in Schedule 1 of the *Wildlife Conservation Act 1950,* listed under the *Environment Protection and Biodiversity Conservation Act 1999* are known to occur in near coastal waters or have been recorded locally. In the Dampier Archipelago/Cape Preston region, small numbers of dugongs (*Dugong dugon*) have been sighted in the shallow, warm waters in bays and between islands, including at East Lewis Island, Cape Preston, Regnard Bay, Nickol Bay and west of Keast Island (W4482 EAR). The seagrass population is found predominantly on the western side of South-West Regnard Island and is situated more than 3.2 km from the BLF (CPM, 2008).

*DWER's GIS dataset

Groundwater and water sources
The distances to groundwater and water sources are shown in Table 2.

Table 2: Groundwater and water sources

Groundwater and water sources	Distance from Premises*	Environmental value
Public Drinking Water Source Area (PDWSA)	No PDWSAs are located within a 30 km radius of the Premises	N/A
Rights in Water and Irrigation Act 1914 (RIWI Act)	The Premises is located within the Proclaimed Pilbara Groundwater and Surface Water Areas	N/A
Groundwater and groundwater salinity	Depth to the watertable over the Sino Iron Project is generally between 4 - 12 m below ground level (mbgl). At the Plant location (16.0 m Australian Height Datum (AHD)), groundwater levels are at an elevation of 3.0 m AHD, or approximately 13 m below the surface (W4482 EAR)	Groundwater salinity (TDS) is 1,000 to 3,000 mg/L which is considered brackish (Salinity status classifications). Groundwater salinity at the Premises is expected to be higher due to the close proximity to the ocean. There is no known environmental value for groundwater at the Premises.

*DWER's GIS dataset

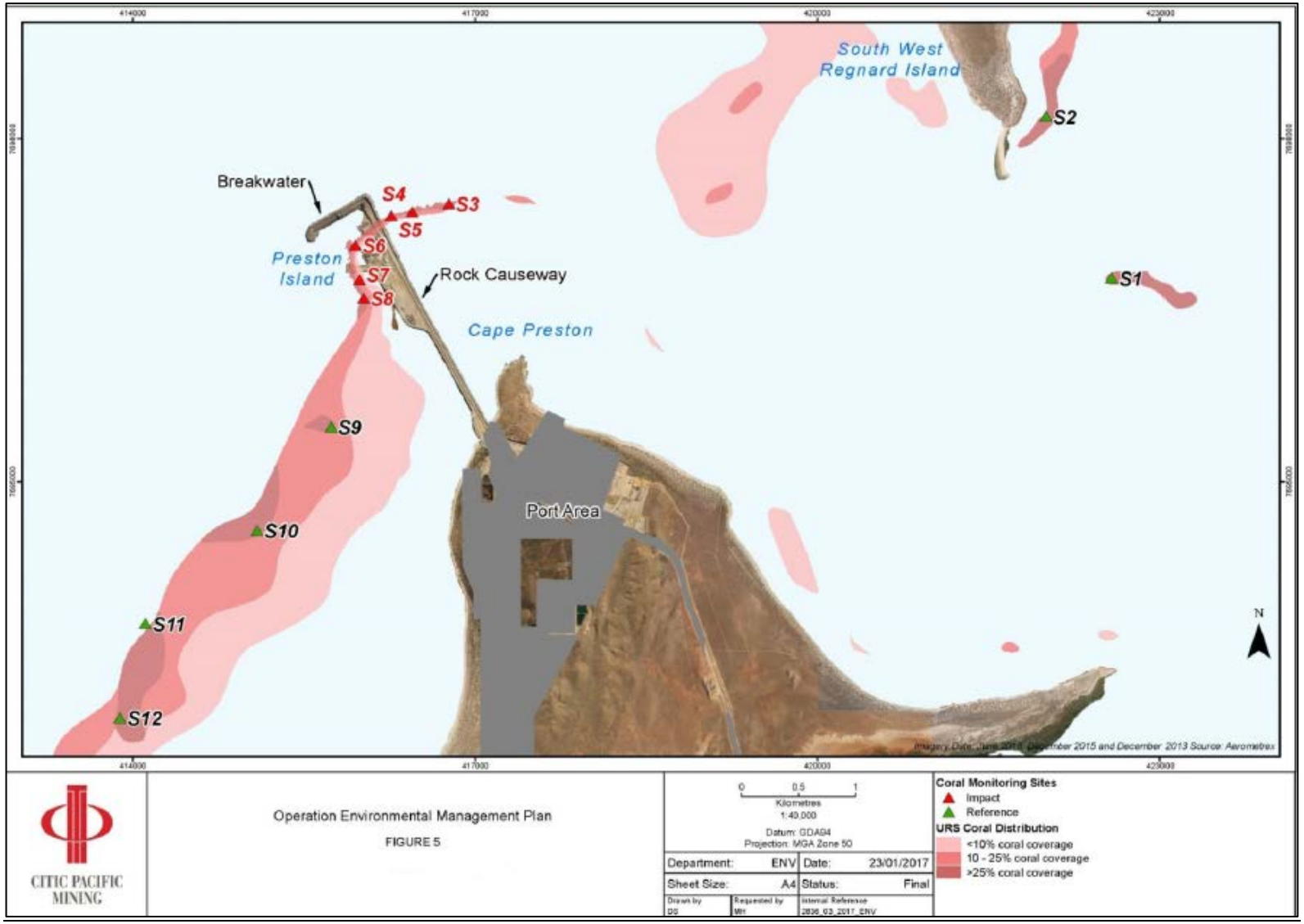

Figure 5: Cape Preston Marine Habitat Map

Part IV of the EP Act

Austeel Pty Ltd submitted a proposal to the Environmental Protection Authority (EPA) to mine iron ore from the George Palmer Orebody and process the ore to create direct-reduced and hot-briquetted iron, build a power station and ship the product from a port to be built at Cape Preston, which developed the Report and Recommendations of the EPA - Bulletin 1056.

Bulletin 1056

The following environmental factors were found to be relevant to the proposal:

- Vegetation communities including declared rare and priority flora; introduced species;
- Terrestrial fauna including specially protected (threatened) fauna and stygofauna;
- Coastal features: mangroves, foreshore, dunes, island shores and seabed;
- Marine fauna including turtles, corals and benthic organisms, and introduced marine organisms;
- Marine water and sediment quality including turbidity;
- Rivers, watercourses, ephemeral streams and flooding;
- Groundwater;
- Oil from spill incidents;
- Gaseous and particulate emissions including greenhouse gases;
- Heritage issues; and
- Recreational values including fishing.

MS 635

MS 635 for the construction and operation of a 95 Mtpa iron ore mine, power station, desalination plant, processing plant (producing pelletised, direct-reduced iron and hot-briquetted iron) and accommodation and port facilities in the Cape Preston area was authorised by the Minister for Environment (Minister) under Part IV of the EP Act on 23 October 2003. Post issuing of MS 635, five changes to the proposal have been approved in accordance with section 45C of the EP Act as outlined in MS 635 Schedule 1, Attachments 1-5.

MS 635 has conditions relating to the following:

- Surface Waters;
- Pit Dewatering and Vegetation Monitoring Plan;
- Marine Management Plan;
- Marine Wastewater Outfall;
- Port Environmental Management Plan;
- Air Emissions;
- Greenhouse Gas Emissions;
- Noise Management Plan;
- Recreational Use Management Plan;
- Compliance Audit and Performance Review;
- Conservation Estate; and
- Decommissioning and Closure Plans.

Report 1343

A subsequent proposal to change condition 8 of MS 635 relating to the Marine Wastewater Outfall was informed by an EPA assessment (Assessment Number 1814), which produced EPA Report 1343.

The EPA considered it appropriate to amend condition 8 of MS 635 to reflect current State and Commonwealth policy. MS 822 was signed by the Minister on 23 December 2009.

MS 822
Condition 8 was amended to specify a Low Ecological Protection Area (LEPA) within 70 m of the wastewater outfall diffuser, located in the port area. A Moderate Ecological Protection Area (MEPA) applies within 250 m of the port infrastructure and a high level of ecological protection beyond that. Condition 7-1 5 was also deleted.

Key finding: Although the above approvals were granted to Mineralogy, proponent title was subsequently transferred to Sino Iron and Korean Steel in 2016, in accordance with WA Supreme Court ruling ([2014] WASC 444).

Report 1602
A proposal to deepen and extend the existing iron ore mine at Cape Preston, with increases in the extent of the tailings storage facilities, waste rock dumps and groundwater discharge from mine dewatering developed the Report and Recommendations of the EPA – Report 1602.

The EPA identified the following key environmental factors:

- Hydrological processes;
- Inland waters environmental quality;
- Marine environmental quality;
- Flora and vegetation;
- Terrestrial fauna;
- Air quality; and
- Terrestrial environmental quality.

The EPA concluded that the proposal may be implemented if carried out in accordance with the conditions and procedures specified in MS 635 and 822 and the additional conditions under MS 1066, which was signed by the Minister on 20 October 2017.

MS 1066
MS 1066 includes the following:

- Condition 16 (Decommissioning and Closure Plans) of MS 635 was replaced with a condition relating to Rehabilitation and decommissioning – mine and borefield. This is to address fibrous materials and management of waste rock and tailings during the rehabilitation and decommissioning of the mine; and
- Inclusion of condition 17 - Amendment of plans, reports, systems or programs. To ensure approved versions of plans, reports, systems or programs required by MS 635 and applicable to the Sino Iron Mine Continuation Proposal are revised, to be consistent with contemporary standards, policies, guidelines and procedures.

Clearing
Clearing is not authorised under L8758/2013/1. MS 1066 authorises a total disturbance area of 10,100 hectares (ha) in development envelope of 22,737 ha for the Sino Iron Project.

Other approvals
Iron Ore Processing (Mineralogy Pty. Ltd.) Agreement Act 2002
The Premises is regulated by the *Iron Ore Processing (Mineralogy Pty. Ltd.) Agreement Act 2002* (Sino Iron and Balmoral Iron are co-proponents whilst Mineralogy is the Principal proponent), which is administered by the Department of Jobs, Tourism, Science and Innovation.

This amendment – July 2018
A licence amendment application (CPM, 2018a) was submitted by the Licensee on 12 April 2018 to include process monitoring for the oil/water separator (OWS) at the Stockyard Wash Down Facility.

During this amendment the following changes have also been made to the Licence:

- Administrative changes;
- Definitions updated;
- Table 1.2.1 updated to specify that Environmental Pond #2 receives treated water from the Stockyard Wash Down Facility;
- Inclusion of condition 3.3.1 for process monitoring of the OWS at the Stockyard Wash Down Facility including a limit of 15 mg/L of total recoverable hydrocarbons;
- Update to condition 4.2.1 for the reporting of condition 3.3.1;
- Update to condition 4.3.1 notification requirements for the limit associated with condition 3.3.1;
- Premises map has been updated;
- Inclusion of PR1 (process monitoring) form; and
- Removal of Part B from form N1.

DWER's assessment and decision making are described in section 4 of this document.

4 Decision table

All applications are assessed in line with the EP Act, the EP Regulations and *Guidance Statements: Decision Making* and *Risk Assessments*. Where other references have been used in making the decision they are detailed in the Decision Document.

DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
Definitions and Standards	1.1.1 to 1.1.4.	Definitions for terms used in the Licence are specified under condition 1.1.1 and 1.1.2. Conditions 1.1.3 and 1.1.4 refers to the references made to Australian or other standards and codes of practice meaning the relevant parts and version of that standard, guideline or code of practice. During the July 2018 amendment the definition for 'OWS' has been included. The definition for 'CEO for the purposes of notification' has been updated.	N/A.
General conditions	N/A.	DWER's assessment and decision making for stormwater management and hydrocarbons and chemicals at the Premises are detailed in Appendix A.	*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. Port EMP. MS 635.

DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
Premises operations	1.2.1 and 1.2.2.	DWER's assessment and decision making for Premises operations are detailed in Appendix B.	Port EMP. MS 635.
Emissions general	2.1.1.	Condition on Licence requiring the Licensee to record and investigate the exceedance of any descriptive or numerical limit.	N/A.
Point source emissions to air including monitoring	N/A.	No point source air emissions are expected from the operation of the Premises.	N/A.
Point source emissions to surface water including monitoring	2.2.1, 2.2.2 and 3.2.1.	No point source emissions to surface water are expected from the BLF and DWP. DWER's assessment and decision making with respect to point source emissions to surface water from the Plant is detailed in Appendix C.	General provisions of the *Environmental Protection Act 1986*. MS 635. MS 822.
Emissions to land including monitoring	N/A.	No emissions to land are generated by the operations at the Premises.	*Environmental Protection (Unauthorised Discharges) Regulations 2004.*
Point source emissions to groundwater including monitoring	N/A.	No point source emissions to groundwater are generated by the operations at the Premises.	General provisions of the *Environmental Protection Act 1986*.
Fugitive emissions	N/A.	No fugitive emissions should be generated from the Plant. DWER's assessment and decision making for fugitive emissions from the BLF are detailed in Appendix D.	General provisions of the *Environmental Protection Act 1986*. MS 635.

DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
Odour	N/A.	No odour emissions are expected to be generated from the operations at the Premises.	General provisions of the *Environmental Protection Act 1986*.
Noise	N/A.	DWER's assessment and decision making for noise emissions are detailed in Appendix E.	General provisions of the *Environmental Protection Act 1986*. MS 635.
Monitoring general	3.1.1 – 3.1.4.	Conditions on Licence to ensure monitoring is carried out in accordance with the relevant standards, at appropriate intervals, submitted to and tested by a National Association of Testing Authorities (NATA) accredited laboratory for analysis and the monitoring equipment is appropriately maintained and calibrated.	AS/NZS 5567.1 and AS/NZS 5667.9.
Monitoring of inputs and outputs	N/A.	No specified conditions relating to the monitoring of inputs and outputs are included in this Licence.	N/A.
Process monitoring	3.3.1	DWER's assessment and decision making for process monitoring is detailed in Appendix F.	General provisions of the *Environmental Protection Act 1986*. *Environmental Protection (Unauthorised Discharges) Regulations 2004.* CPM, 2018a.
Ambient quality monitoring	N/A.	No specified conditions relating to ambient quality monitoring are included in this Licence. The monitoring of ambient air quality is sufficiently regulated by the EPA in accordance with MS 635 and the associated *Operational EMP* and *Dust MP*	MS 635. Operational EMP. Dust MP.

DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
		(refer also to Appendix D). The *Dust MP* includes ambient dust monitoring requirements including operational dust objectives and targets. The Licensee undertakes a complaints based monitoring program in accordance with MS 635 and associated the *Noise MP* (refer also to Appendix E). Ongoing monitoring of the marine environment is undertaken in accordance with MS 635 and associated *Port EMP*. Environmental monitoring includes: sediment quality; coral health; light spill; and invasive marine pests.	Noise MP. Port EMP.
Meteorological monitoring	N/A.	No specified conditions relating to meteorological monitoring are included in this Licence.	N/A.
Improvements	N/A.	No improvement conditions are included in this Licence.	N/A.
Information	4.1.1 – 4.1.3, 4.2.1 - 4.2.3 and 4.3.1.	Conditions on Licence requiring the provision of an Annual Audit Compliance Report and Annual Environmental Report, including monitoring and reporting requirements. Conditions 4.2.3 and 4.3.1 on the Licence for non-annual reporting requirements and notification requirements.	N/A.
Licence duration	N/A.	The Licence expires on Sunday, 24 November 2024.	*Guidance Statement: Licence Duration.* Notice of Amendment of Licence Expiry Dates, 29 April 2016.

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
03/07/2018	Licensee provided with draft licence and decision document for comment	A letter waiving the 21 consultation period was received by the Licensee (CPM, 2018b) on 17 July 2018	N/A.

6 Risk Assessment

Note: This matrix is taken from the Guidance Statement: Risk Assessments

Table 3: Risk Rating Matrix

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

Appendix A

General conditions

Stormwater management

Emission Description

Emission: Potentially contaminated and sediment laden stormwater from operational areas (the Plant, DWP and BLF).

Impact: Contamination of surrounding land and surface water drainage systems. Potential impacts on the marine ecosystem from turbidity, sedimentation and from the addition of nutrients, heavy metals and/or hydrocarbons.

Controls: The following controls have been implemented at the Premises*:*

- Stormwater drainage designed for full site containment of a 1:10 year rainfall event;
- Stockyard area designed with a 1% slope to drain surface water towards collection V drains;
- Subsurface drains within the stockyard and V drains direct stormwater from the ore stockyard to Environmental Pond #2;
- Stormwater from the DWP is directed to Environmental Pond #1;
- Environmental ponds have a combined capacity of 60,000 cubic metres;
- All wharf decks, roadways and parking areas are contained to ensure minimal direct discharge of spills to the sea;
- Drainage areas are fitted with containment sumps/interceptors to traps product spills; and
- In the event of cyclonic rainfall or storm driven waves swamping the wharf decks, the sumps are closed off to prevent overflows.

Risk Assessment

Consequence: The impact from discharges of contaminated and/or sediment laden stormwater could result in minimal on-site impacts. Therefore, the consequence is slight.

Likelihood: Based on the Licensee controls, an environmental impact from the discharge of contaminated and/or sediment laden stormwater will probably not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating of risk for discharges of contaminated and/or sediment laden stormwater to the environment to be **low**.

Regulatory Controls

Runoff including sediment/stormwater runoff is managed by the Licensee in accordance with the *Port Environmental Management Plan* (Port EMP) and *Operational EMP*, implemented under conditions 2-1 and 9-1 3 of MS 635.

Conditions relating to the management of stormwater are not imposed as potential impacts are addressed and managed under the Ministerial approvals issued under Part IV of the EP Act.

The general provisions of the EP Act with respect to the causing of pollution and environmental harm apply, as will the provisions of relevant subsidiary legislation, including the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.

Hydrocarbon and chemicals

Emission Description

Emission: Infiltration of hydrocarbons to soil from hydrocarbon/chemical spills and leaks outside of containment infrastructure.

Impact: Contamination of soil and/or marine environment and potential loss of habitat adjacent to where the spillage occurred.

Controls: The Licensee has implemented the following controls*:*

- Hydrocarbons and chemicals bunded in accordance with Australian Standard 1940:2004 *The storage and handling of flammable and combustible liquids*;
- Critical level alarms on hydrocarbon tank;
- Chemical storage area not located on seasonally inundated land;
- Chemical storage area located outside 1 in 20 year flood plain;
- Spill response material available; and
- Material Safety Data Sheets for all chemicals and hydrocarbons maintained in the central control room.

Risk Assessment

Consequence: The impact from spills and leaks of hydrocarbons at the Premises could result in mid level on-site impacts and low level off-site impacts on a local scale. Therefore, the consequence is moderate.

Likelihood: Based on the Licensee controls and frequent use, an environmental impact from spills and leaks of hydrocarbons/chemicals could occur at some time. Therefore, the likelihood of the consequence is possible.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating of risk for leaks and spills of hydrocarbons/chemicals at the Premises to be **medium**.

Regulatory Controls

Spills including hydrocarbon spills are managed by the Licensee in accordance with the *Port EMP* which includes an Oil Spill Contingency Plan and the *Operational EMP* implemented under conditions 2-1 and 9-1 3 of MS 635.

Specified conditions for the management of hydrocarbons are not imposed, as sufficient regulatory control is currently imposed through approvals issued pursuant to Part IV of the EP Act, as well as the *Dangerous Goods Safety Act 2004* administered by the Department of Mines, Industry Regulation and Safety (DMIRS).

The general provisions of the EP Act with respect to the causing of pollution and environmental harm apply, and discharges of hydrocarbons may be subject to the *Environmental Protection (Unauthorised Discharges) Regulations 2004.*

Appendix B

Premises operation

Spillages of ore
Emission Description
Emission: Spillage of magnetite to land and the marine environment.

Impact: Contamination of surrounding land and deterioration of marine water quality through increased turbidity.

Controls: The BLF has the following controls:
- Weigh points to prevent overloading and spillage;
- Alarms for belt misalignment, slippage and hopper blockages;
- Enclosed overland conveyors (where practical) and ore transfer points;
- Loading boom has a flexible and luffing loading chute fitted with a rubber skirt; and
- Loading boom will not be swung over marine water without a barge being moored in place.

Risk Rating
Consequence: The impact of spillages of ore could result in low level on-site impacts and minimal off-site impacts on a local scale. Therefore, the Delegated considers the consequence to be minor.

Likelihood: Based on the Licensee controls, the spillages of ore could occur at some time. Therefore, the likelihood of the consequence is possible.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating of risk for spillages of ore at the Premises to be **medium**.

Regulatory Controls
Spills including product spills are managed by the Licensee in accordance with the *Port EMP*, currently implemented under condition 9-1 3 of MS 635.

The desalination inlet is also very close to the barge loading area, therefore spillage to the marine environment should be carefully managed to ensure no adverse impacts to the Plant and water quality occur. Condition 1.2.1 of the Licence ensures spillage to the marine environment from ore is minimised.

Environmental Ponds
Emission Description
Emission: Overtopping of the Environmental Ponds.

Impact: Water inundation of area adjacent to the Environmental Ponds.

Controls: The Environmental Ponds have the following controls:
- Lined with high density polyethylene (HDPE) and
- Combined capacity of 60,000 cubic metres.

Risk Assessment
Consequence: The impact of overflows from the Environmental Ponds would result in minimal on-site impacts. Therefore, the consequence is slight.

Likelihood: Based on the Licensee controls overflows from the Environmental Pond will probably not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating of risk of overflows from the Environmental Ponds to be **low**.

Regulatory Controls
Condition 1.2.2 has requirements for the Environmental Ponds including maintaining the HDPE liner and maintaining a freeboard of 0.5 m.

During this amendment – July 2018
Condition 1.2.2 for the material contained within Environmental Pond #2 has been updated to include treated water from the Stockyard Wash Down Facility (refer to Appendix F – process monitoring).

Appendix C

Point source emissions to surface water including monitoring
The Licensee operates the Plant, which is made up of two trains. Concentrated brine is discharged back to the ocean at the north-western end of the port breakwater via a 50 m diffuser at the ocean outfall.

Emission Description
Emission: Discharge of concentrated brine from the Plant to the Indian Ocean.

Impact: Discharges to the ocean from the Plant has the potential to impact the water quality, amenities and biodiversity values of the waters immediately surrounding Cape Preston. The recreational area at the Fortescue River mouth is 26 km away. This is considered distant, however, the area surrounding Cape Preston is a recreational fishing area and scatterings of coral growth occur in the area. The primary discharges are brine (elevated salinity), additives to the Plant and background levels of toxicants (metals) and nutrients that have been concentrated in the brine discharge from the seawater during the RO procedure.

Controls:
- Chemical additives are used to clean the RO membranes and these are collected in a holding tank where they can be neutralised (pH 6 – 8). The composition of the chemicals are analysed, and if proven to be free of pollutants and within the brine composition range, are mixed and discharged with the brine;
- The Licensee does not monitor chemical parameters, however, dosing of chemicals is recorded for process control purposes and discharges are reported to the National Pollutant Inventory;
- Whole Effluent Toxicity (WET) testing is also conducted to determine the toxicity of the brine to marine organisms; and
- The diffuser promotes mixing and dilution of the concentrated brine within the LEPA and MEPA.

Risk Assessment
Consequence: The environmental impact from the discharge of brine to the marine environment would result in low level off-site impacts on a local scale. Therefore, the consequence is moderate.

Likelihood: Based on the location of the ocean outfall to marine habitats, marine fauna, Licensee controls and existing regulation under Part IV of the EP Act, an impact to these specified ecosystems could occur at some time. Therefore, the likelihood of the consequence is possible.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating of risk of discharges of brine to the marine environment to be **medium**.

Regulatory Controls
No additional conditions are imposed on the Licence as sufficient regulatory controls already apply including:
- Condition 2.2.1 which allows brine from the Plant to be discharged to the marine environment via a discharge pipe at the north-western end of the port breakwater;
- Condition 2.2.2 for point source emission limits to ensure that the brine outfall, which has the potential to pose a risk to public health and/or the environment, is closely monitored; and
- Condition 3.2.1 for the continuous monitoring (in-pipe) of brine outflow volume, conductivity, temperature, pH, turbidity, dissolved oxygen and oxygen reduction potential. These

parameters are analysed in-field with probes located at site W1 depicted in Schedule 1 of the Licence and the results are monitored at the Plant control room. Condition 3.2.1 also requires metals and nutrients of ammonia, nitrate-nitrite, reactive phosphorous, cadmium, chromium, cobalt, copper, lead, mercury (inorganic), nickel, silver, vanadium and zinc to be monitored six monthly.

The results of the above monitoring is to be reported in the Annual Environmental Report in accordance with condition 4.2.1 including a comparison against previous monitoring results, Licence limits and any impacts detected as a result of activities on the Premises (condition 4.2.2).

MS 822 condition 8-1 and 8-2 requires the Licensee to maintain MEPA within 250 m from all points of the port structures and a LEPA no greater than 70 m from all points of the diffuser structure. These conditions set limits in relation to the Plant for salinity, toxicant concentrations, dilution (via WET testing), ambient dissolved oxygen, and seasonal temperature at the edge of the LEPA and MEPA, with a comparison against the *ANZECC/ARMCANZ 2000*.

In accordance with MS 822 (condition 8-4) the Licensee is required to ensure that the following conditions are met at the boundary between the LEPA and the MEPA:

1. *The median salinity resulting from discharge at the wastewater diffuser either, (1) does not exceed the 95th percentile of the natural salinity range over the same period; or, (2) does not exceed the median salinity at a suitable reference site by more than 1.2 parts per thousand.*
2. *The 95th percentile of toxicant concentrations meets the 90% species protection levels specified in ANZECC/ARMCANZ 2000.*
3. *The results of WET testing undertaken using a minimum of five species as per ANZECC/ARMCANZ 2000 protocols demonstrate that sufficient dilution is occurring such that a moderate level of ecological protection (90% species protection) is met for at least 95% of wastewater flow and oceanographic conditions.*
4. *The ambient dissolved oxygen in bottom water samples is not below 80% saturation for more than six weeks and never below 60% saturation.*
5. *The median temperature in any season does not exceed the 95th percentile of the natural temperature range over the same period.*

Appendix D

Fugitive emissions

Dust emissions

Emission Description

Emission: Dust emissions from the BLF, predominantly the magnetite stockpiles, reclaimers, conveyors and barge loading infrastructure.

Impact: Deterioration of local air shed, including potential health impacts to nearby residents. Dust emissions can be harmful to human health and the environment. Elevated total suspended particulates (TSP) can impact ambient environmental quality resulting in amenity impacts and can smother vegetation. Particulate matter that is less than 10 (PM_{10}) or 2.5 ($PM_{2.5}$) micrometres in diameter can be drawn deep into the lungs causing human health impacts. The chemical and physical properties of the particles, the size of the particles and the duration of exposure are all factors, which have been linked to human health impacts. Those most at risk are the elderly, children and those with existing ailments.

The distance to the nearest public recreational area is 15 km from the Premises, based on this, fugitive dust emissions should not impact human health. Dust emission however have the potential to impact on surrounding vegetation and possibly sediment loads in marine waters.

Asbestos is naturally occurring in the soil and underlying geology of the Premises and presents a significant risk to the health of people both onsite and off-site if the fibres are disturbed and allowed to contaminate materials or areas where the public may be exposed to them. Onsite occupational health and safety is regulated by DMIRS and WorkSafe WA. Asbestos has previously been encountered at the areas associated with the mining and processing of ore (including the product and tailings).

Controls: The Licensee has implemented the following to manage dust emissions:

- Stockpile orientation north-south perpendicular to prevailing westerly wind;
- Minimising the height and volumes of the stockpiles;
- Stacking and reclaiming predominantly on the downwind side of the stockpile;
- Reduce disturbance on stockpiles by preferentially leaving the first two stockpiles (coated) and stacking and reclaiming the two downwind stockpiles;
- Water suppression on stackers and reclaimers;
- Enclosed conveyors at transfer points;
- Primary and secondary scrapers and return belt V plough on stackers and reclaimers;
- Crusting agent applied to the stockpiles;
- Good housekeeping practices, e.g. cleaning up spilt concentrate as soon as possible;
- Regular cleaning and maintenance of belt scrapers and water suppression;
- Alarms for belt misalignment, slippage and hopper blockage;
- An enclosed headbox, dust curtain at entrance and rubber skirt on the barge loading facility; and
- Mechanical luffing capability on the barge loader.

Fibrous minerals are managed on the Premises in line with the *Fibrous Minerals Management Procedure* and *Fibrous Minerals Management Plan*.

Risk Assessment

Dust emissions

Consequence: There is the potential for dust emissions to the marine environment from the BLF during loading. The fugitive emissions of dust from the BLF during loading would result in minimal off-site impacts on a local scale. Therefore, the consequence is minor.

Likelihood: Based on the Licensee controls and proximity to the marine environment, fugitive dust emission to the marine environment during loading could occur at some time. Therefore, the likelihood of the consequence is possible.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating of risk for fugitive dust emissions from the BLF to the marine environment to be **medium**.

Airborne asbestos
Consequence: The impact of airborne asbestos to public health will result in adverse health effects at a high level. Therefore, the consequence of asbestos to public health is severe.

Likelihood: Based on the distance to the nearest public recreational area (15 km from the Premises), the Licensee's controls and that onsite occupational health and safety is regulated by DMIRS and WorkSafe WA, asbestos impacts to public health from dust emissions from the stockyard will only occur in exceptional circumstances. Therefore, the likelihood of the consequence occurring is rare.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating for the risk on public health associated with asbestos dust to be **high**, but the Licensee's existing *Fibrous Minerals Management Procedure* and *Fibrous Minerals Management Plan* are adequate to regulate the risk associated with fibrous minerals.

<u>Regulatory Controls</u>
No specified conditions relating to fugitive dust emissions (including airborne asbestos) are imposed.

The Licensee has requirements under Part IV of the EP Act (MS 635) for the monitoring of ambient air quality, Department of Health and DMIRS legislation and are required to comply with the following:

- *Guideline on the Management of fibrous minerals in Western Australian mining operations*; and
- *Guidance Note on Public Health Risk Management of Asbestiform Minerals Associated with Mining*.

The following Plans have been developed by the Licensee to meet obligations under MS 635 for dust management and fibrous minerals:

- *Operational EMP* section 6.9; and
- *Dust Operational Management Plan* (Dust MP);
- *Fibrous Minerals Management Procedure*; and
- *Fibrous Minerals Management Plan*.

The Sino Iron Project is currently regulated by DMIRS from a *Mines Safety and Inspection Regulations 1995* perspective due to asbestiform material onsite.

Light emissions

Emission Description

Emission: Light emissions from the Premises including elevated lights from the BLF, stockyards and conveyors.

Impact: Light emissions can attract turtles causing interaction with barges or disorientation of hatchlings during breeding season.

Controls: Lighting at the Premises includes the following controls:

- Lighting shielded/redirected/lowered/recessed to avoid or minimise light spill towards the southern and eastern beaches; and
- Low disruptive colour (yellow and red) and long wavelength (low pressure sodium vapour lights).

Risk Assessment

Consequence: The fugitive light emissions from the Premises could result in low level off-site impacts on a local scale. Therefore, the consequence is moderate.

Likelihood: Based on the Licensee controls including regulation under Part IV of the EP Act, fugitive light emission resulting in an impact to turtles and their nesting beach habitat will probably not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating of risk for fugitive light emissions from the Premises impacting on turtles and their nesting beach habitat to be **medium**.

Regulatory Controls

No specified conditions are imposed relating to fugitive light emissions.

Light spill and the management of light emissions is managed by the Licensee in accordance with the *Port EMP* and *Fauna Management Plan*, implemented under conditions 2-1 and 9-1 3 of MS 635.

Appendix E

Noise

Emission Description

Emission: Noise emissions and vibration generated at the Premises from activities including stockpiling, reclamation, desalination and the bulk loading export phases of operation.

Impact: Noise may impact on fauna and people and can potentially include emotional stress, sleep deprivation, general disruption and hearing being affected.

Controls: Noise attenuation measures have been incorporated at the Premises and include:

- Enclosed conveyors at ore transfer points;
- Routine maintenance on conveyor systems and ore transfer points;
- Enclosed head box on the barge loading facility; and
- Limiting horn blasts and sirens.

Risk Rating:

Consequence: The closest sensitive human receptor to the Premises is Gnoorea Point (40 Mile) camping area located approximately 15 km away. There should be minimal impacts to the amenity of this receptor from noise and vibration.

Mid level on-site impacts and low level off-site impacts at a local scale to fauna could occur from noise and vibrations. Therefore, the consequence is moderate.

Likelihood: Based on the size of the Premises and duration of operation (24 hours per day), an impact to specified ecosystems (Specially Protected and marine fauna) from noise and vibration could occur at some time. Therefore, the likelihood of the consequence is possible.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Risk Rating Matrix (Table 3) determines the overall rating of risk for noise emissions and vibrations to specified ecosystems to be **medium**.

Regulatory Controls:

No specified conditions are imposed relating to noise emissions.

The following Management Plans have been developed by the Licensee to meet obligations under MS 635 for noise management:

- *Operational EMP* section 6.10; and
- *Operational Noise Management Plan* (Noise MP).

Noise is also regulated via the *Environmental Protection (Noise) Regulations 1997* as well as the general provisions of the EP Act with respect to the causing of pollution and environmental harm.

Appendix F

Process monitoring

This amendment – July 2018
The Licensee has constructed a light vehicle and heavy vehicle wash down facility adjacent to the established iron ore concentrate stockyard at the Premises. The Stockyard Wash Down Facility seeks to limit the incidental transport of iron ore concentrate by vehicles beyond the stockyard boundaries.

A Spel Puraceptor, Class 1, full retention OWS (working capacity 3,900 L, maximum flow rate of 2.5 L/sec) services the Stockyard Wash Down Facility before final discharge to an adjacent surface water drain which feeds into Environmental Pond #2.

CPM, 2018a states that the OWS incorporates a high efficiency coalescer unit consisting of a stainless steel mesh frame and oleophilic polypropylene insert. The coalescer unit is mounted in the secondary chamber providing a coalescence process for the separation of smaller globules of light liquid pollutants (to less than 5 parts per million). The unit is fitted with an automatic closure device which closes the separator off automatically once the maximum storage capacity of light liquid pollutants is reached, preventing them passing into the discharge drainage system. The auto closure valve is prior to the second chamber preventing contamination or blockages of the coalescer insert in the event of heavy spills or large amounts of accumulated hydrocarbons.

Regulatory Controls:
Overtopping of Environmental Ponds #1 (stormwater collected from the DWP area) and Environmental Pond #2 (ore stockyards) has been assessed in Appendix B – Environmental Ponds.

Condition 3.3.1 has been added to the Licence and includes a limit of 15 mg/L for total recoverable hydrocarbons. This limit and the provision to monitor the wastewater quarterly should ensure that the environmental risk of discharge (i.e. through overtopping) from Environmental Pond #2 remains low.

References

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3	*Guidance Statement: Decision Making*, Department of Environment Regulation, February 2017	*Guidance Statement: Decision Making*	accessed at www.dwer.wa.gov.au
4	*Guidance Statement: Setting Conditions,* Department of Environment Regulation, October 2015	*Guidance Statement: Setting Conditions*	
5	*Guidance Statement: Environmental Siting*, Department of Environment Regulation, November 2016	*Guidance Statement: Environmental Siting*	
6	*Guidance Statement: Risk Assessments*, Department of Environment Regulation, February 2017	*Guidance Statement: Risk Assessments*	
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	Outfall Condition, EPA R&R No: 1343, 29 October 2009		
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11	Ministerial Statement 822	MS 822	
12	Ministerial Statement 1066	MS 1066	
13	National Water Quality Management Strategy, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand and Conservation Council and Agriculture and Resources Management Council of Australia and New Zealand, 2000	ANZECC/ARMCANZ 2000	accessed at www.environment.gov.au
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20	Sino Iron Project Desalination Plant and Bulk Loading Facility – Stockyard Vehicle Wash	CPM, 2018b	DWER records (A1703844)

	Document title	In text ref	Availability
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21	Sino Iron Project Dust Operational Management Plan, CITIC Pacific Mining, Document No: DR027769, 20 November 2015	Dust MP	DWER records (A1561196)
22	Sino Iron Project Fauna Management Plan, prepared for CITIC Pacific Mining Management Pty Ltd by Strategen, March 2009	Fauna Management Plan	DWER records (A1560555)
23	Sino Iron Project Operational Environmental Management Plan, CITIC Pacific Mining, Document No: DR-029968, 10 April 2013	Operational EMP	DWER records (A1561195)
24	Sino Iron Project Operational Noise Management Plan, CITIC Pacific Mining, Document No: DR028097, 20 November 2012	Noise MP	DWER records (A1561197)