Government of Western Australia
Department of Environment Regulation

Licence

Environmental Protection Act 1986, Part V

Licensee: Pilbara Manganese Pty Ltd

Licence: L6131/1990/13

Registered office: 28 Ventnor Avenue
WEST PERTH WA 6005

ACN: 074 106 577

Premises address: Woodie Woodie Manganese Project
Mining tenements: G45/332, G45/333, G45/334, G45/335, G45/336, G45/37-40, G46/4-5, L46/29, M45/107, M45/429-433, M45/517, M45/600-602, M45/637-641, M45/1218, M46/92-93, M46/108, M46/137, M46/150, M46/161-162, M46/383 and M46/384
MARBLE BAR WA 6760
As depicted in Schedule 1

Issue date: Thursday, 26 September 2013

Commencement date: Tuesday, 1 October 2013

Expiry date: Saturday, 30 September 2028

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	5,000,000 tonnes per annual period
6	Mine dewatering	50,000 tonnes or more per year	55,188,000 tonnes per annual period
54	Sewage facility	100 cubic metres or more per day	150 cubic metres per day
73	Bulk storage of chemicals	1,000 cubic metres in aggregate	2,144 cubic metres in aggregate
89	Putrescible landfill site	More than 20 but less than 5,000 tonnes per year	1,000 tonnes per annual period

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

Date signed: 30 June 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
Pilbara Manganese Pty Ltd (PMPL) own and operate the Woodie Woodie Manganese Project (Woodie Woodie) located approximately 400km south east of the town of Port Hedland in the Pilbara region. The site consists of a number of leases and covers an area of 13,327 hectares.

The site has the capacity to process up to 5,000,000 tonnes of ore per year from a variety of pits at any one time. The mined ore is transported to a centrally located beneficiation plant where it is blended, crushed, screened and washed before being put through a heavy media separation plant. Lump manganese is produced via a drum separator and fines manganese via a cyclone separator.

Tailings from mining operation are piped to one of four in-pit tailings storage facilities. The pits are areas previously mined and range in capacity from 3,800,000 m^3 to 240,000 m^3. Return water is pumped either to the processing plant or process water pond for re-use in processing.

The site undertakes dewatering to enable mining to occur and has the capacity to dewater 55,188,000 tonnes of water per year. The dewatering water is pumped to sedimentation ponds before being discharged to one of three ephemeral creek systems.

Associated infrastructure includes a wastewater treatment plant (WWTP), which services the accommodation and offices buildings and is capable of treating up to 150 m^3 of effluent per day, and a putrescible landfill which is located within a disused pit and is capable of receiving 1,000 tonnes of waste per year.

This Licence was amended in November 2015 as a result of an amendment sought by the Licensee to:

- add an additional sampling point at the extended WWTP irrigation area;
- addition of the Topvar dewatering pipeline and discharge location into Brumby Creek (W5821/2015/1); and
- allow dewatering of a new pit within the Hunter Pit extension project, Hunter SE, through an existing sedimentation pond (Cracker sedimentation pond, W1) which is adjacent to the Hunter pits. The Cracker sedimentation pond is within the same creek system (Muddauthera Creek) as where dewater from Hunter is currently approved for discharge.

Other changes made by DER under the November 2015 amendment include:

- Improvement conditions relating to upgrades to the WWTP and permeability investigations of the bioremediation facility have been met and therefore removed from the Licence during the amendment;
- A new date for completion of the Bioremediation Facility has been agreed and updated; and
- Due to current Departmental reform, a number of changes have been made to the Licence that are justified in the attached Decision Document. These changes include removing targets, whilst retaining limits on a risk basis.

The January 2016 amendment is to add a number of mining tenements to the licence, include the Greensnake landfill constructed under works approval W5832/2015/1 and remove improvement conditions for the bioremediation facility.

The April 2016 amendment is due to the site going into Care & Maintenance. The proponent has requested that the tailings inspections be reduced from daily to weekly when the facilities are inactive. The proponent has also requested that the weather stations at Telfer be used to measure site rainfall and evaporation rather

than the site weather stations, which will be decommissioned (this does not result in an amendment to the licence as the weather stations were not specified in the Licence).

The licences and works approvals issued for the Premises since 1/10/2004 are:

Instrument log		
Instrument	**Issued**	**Description**
L6131/1990/9	1/10/2004	Licence reissue.
L6131/1990/9	28/4/2006	Licence amendment.
L6131/1990/10	28/09/2006	Licence reissue.
W4369/2007/1	20/9/2007	Works approval. In pit tailing storage.
L6131/1990/11	18/9/2008	Licence reissue. Added category 54 and 89 to the licence.
L6131/1990/12	30/9/2010	Licence reissue. Added conditions for WWTP monitoring, landfill management and targets for dewatering monitoring.
L6131/1990/12	29/3/2012	Proponent amendment: Additional conditions for tyre disposal, bioremediation facility management, changes annual period and update monitoring sites.
W5216/2012/1	12/8/2012	Works approval. In pit tailing storage.
L6131/1990/13	26/09/2013	Licence reissue and REFIRE conversion.
L6131/1990/13	30/04/2015	Proponent requested licence amendment.
L6131/1990/13	26/11/2015	Proponent requested licence amendment.
L6131/1990/13	25/02/2016	Licence amended to add tenements, include the Greensnake landfill and remove improvement conditions for the bioremediation facility.
L6131/1990/13	30/06/2016	Licence amended as mine in Care & Maintenance. Reduction of tailings inspections from daily to weekly and converting back to the use of Telfer's weather stations.

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;*

'annual period' means the inclusive period from 1 October until 30 September in the following year;

'ANZECC (2000)' means the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) produced by Australian and New Zealand Environment and Conservation Council and the Agricultural and Resources Management Council of Australia and New Zealand;

'AS/NZS 2031' means the Australian Standard AS/NZS 2031 *Selection of containers and preservation of water samples for microbiological analysis;*

'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 5667.4' means the Australian Standard AS/NZS 5667.4 *Water Quality – Sampling – Guidance on sampling from lakes, natural and man-made;*

'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;*

'AS/NZS 5667.12' means the Australian Standard AS/NZS 5667.12 *Water Quality – Sampling – Guidance on sampling of bottom sediments;*

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

'bioremediation' means the above-ground remediation of soils to reduce the concentrations of hydrocarbons through biodegradation. The process involves the stimulation of bacteria in the soil, which consume hydrocarbons as an energy source, releasing water and carbon dioxide as the ultimate breakdown products. This may include bioaugmentation of microbes to target specific contaminants;

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

'CEO' for the purpose of correspondence means;

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

'clean fill' has the meaning defined in Landfill Definitions;

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

'demolition waste' means materials waste which arise from refurbishment or demolition activities;

'freeboard' means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point;

'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 as amended from time to time;

'Licence' means this Licence numbered L6131/1990/13 and issued under the Act;

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

'**mgbl'** means metres below ground level;

'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;

'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 October to 31 December, 1 January to 31 March in the following year, 1 April to 30 June, 1 July to 30 September;

'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 October to 31 March and 1 April to 30 September in the following year;

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

'TSF' means tailing storage facility; and

'zone of influence' means the area of a receiving environment with the potential to be altered or changed as a result of an emission or discharge.

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 General conditions

1.2.1 The Licensee shall immediately recover, or remove and dispose of spills of environmentally hazardous materials outside an engineered containment system.

1.3 Premises operation

1.3.1 The Licensee shall ensure that all pipelines containing environmentally hazardous materials are either:
(a) equipped with telemetry system and pressure sensors along pipelines to allow the detection of leaks and failures; or
(b) equipped with automatic cut-outs in the event of a pipe failure; or
(c) provided with secondary containment sufficient to contain any spill for a period equal to the time between routine inspections.

1.3.2 The Licensee shall ensure that waste materials are only stored/treated within vessels or compounds provided with the infrastructure detailed in Table 1.3.1.

Table 1.3.1: Containment infrastructure

Containment point reference	Material	Specification
Demon Pit TSF (DePTSF)	Tailings	A minimum total freeboard of 820 mm from the top of the pit crest is maintained at all times
Dartmoor Pit TSF (DaPTSF)		
Malta Pit TSF (MPTSF)		
Area 1 Pit TSF (A1PTSF)		
Process Water Pond	TSF return water and mine dewater	A minimum total freeboard of 500 mm or a 1 in 100 year/72 hour storm event (whichever is greater) from the top of the embankment is maintained at all times. Methods of operation minimise the likelihood of erosions of the embankment by wave action.
Bioremediation Facility	Hydrocarbon contaminated waste	Base and bunding clay lined. Stormwater runoff diverted so as not to flow onto the treatment facility.

1.3.3 The Licensee shall manage each TSF detailed in Table 1.3.1 such that the supernatant pond on the TSF is minimised as far as practicable.

1.3.4 The Licensee shall undertake an annual water balance for each TSF detailed in Table 1.3.1. The water balance shall as a minimum consider the following:
(a) site rainfall;
(b) evaporation;
(c) decant water recovery volumes;
(d) seepage recovery volumes; and
(e) volumes of tailings deposited.

1.3.5 The Licensee shall:
(a) undertake inspection as detailed in Table 1.3.2; and
(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 record of all inspections undertaken.

Table 1.3.2: Inspection of infrastructure		
Scope of inspection	**Type of inspection**	**Frequency of inspection**
Tailings pipelines	Visual integrity and leak assessment	Daily when the facilities are active Weekly when the facilities are inactive
Tailings return water lines		
Embankment freeboards of containment infrastructure listed in Table 1.3.1	Visual to confirm required freeboard capacity is available	

1.3.6 The Licensee shall take all reasonable and practicable measures to ensure groundwater levels within the zone of influence at monitoring bores detailed in Table 3.3.3 and shown in Schedule 1, does not exceed the level specified in Table 1.3.3.

Table 1.3.3: Groundwater level controls		
Parameter	**Limit (mbgl)**	**Averaging Period**
Groundwater	4	Spot Sample

1.3.7 The Licensee shall, when standing water levels rise higher than 6 mbgl, provide the CEO with the following information:

(a) the monitoring bore location;

(b) the root cause analysis for the exceedances; and

(c) a description of remedial measures taken or planned to be taken.

1.3.8 The Licensee shall ensure that where wastes produced on the Premises are not taken offsite for lawful use or disposal, they are managed in accordance with the requirements of Table 1.3.4.

Table 1.3.4: Management of Waste			
Facility	**Waste type**	**Processes**	**Requirements**[1,2]
Kia landfill Greensnake landfill	Clean Fill Putrescible Waste Inert Waste Type 1	Storage and disposal of waste by landfilling	<u>All waste types</u> No more than 1,000 tonnes per year of all waste types cumulatively shall be disposed of by landfilling. Disposal of waste by landfilling shall only take place within the Kia landfill, Greensnake landfill, Tyre Disposal Facility and Homestead Stage 2 Waste Dump shown on the Premises map in Schedule 1. The separation distance between the base of the landfill and the highest groundwater level shall be not less than 3 metres. <u>Tyres (Inert Waste Type 2)</u> Tyres shall only be landfilled within the Tyre Disposal Facility shown on the Premises map in Schedule 1. Tyres shall consist of batches of no more than 1,000 tyres or 40 m^3 of tyre pieces. Batches must be separated from each other by at least 100 mm of soil. <u>Building Waste and Conveyor Belt Landfill[2]</u> No more than 100 tonnes of demolition waste and 600 tonnes of conveyor belts shall be disposed of by landfilling. Disposal of demolition waste and conveyor belts can only take place at Homestead Stage 2 Waste Dump shown on the Premises map in Schedule 1. Conveyor belts shall be batched in volumes of 40 m^3 or less with batches separated by 100 mm or more of soil. The disposal site of demolition waste and conveyor belts must be surveyed and recorded for location and relative level.
Tyre Disposal Facility	Inert Waste Type 2		
Building Waste[3] Landfill	Inert Waste Type 1		
Conveyor Belt Landfill[3]	Inert Waste Type 2		
Wastewater treatment plant	Sewage	Biological, physical and chemical treatment.	No more than 150m^3 per day.

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*.
Note 3: Building waste and conveyor belt landfills are single use facilities located within Homestead Stage 2 Waste Dump.

1.3.9 The Licensee shall manage the landfilling activities to ensure:
(a) waste is placed and compacted to ensure all faces are stable and capable of retaining rehabilitation material; and
(b) rehabilitation of a cell or phase takes place within 6 months after disposal in that cell or phase has been completed.

1.3.10 The Licensee shall ensure that cover is applied and maintained on landfilled wastes in accordance with Table 1.3.5 and that sufficient stockpiles of cover are maintained on site at all times.

Table 1.3.5: Cover requirements[1]

Waste Type	Material	Depth	Timescales
Inert Waste Type 1	No cover required		
Putrescible Waste	Type 1 Inert waste or soil	300mm	Weekly or as soon as practicable after deposit.
Inert Waste Type 2		500mm	As soon as practical following the achievement of final waste levels in the area(s) in which tyres are deposited.

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

1.3.11 The Licensee shall take all reasonable and practical measures to ensure that no wind-blown waste escapes from the Premises and that wind-blown waste is collected on at least a weekly basis and returned to the tipping area.

1.3.12 The Licensee shall manage the irrigation of treated wastewater such that:
(a) no irrigation generated run-off, spray drift or discharge occurs beyond the boundary of the defined irrigation area(s);
(b) treated wastewater is evenly distributed over the irrigation area;
(c) no soil erosion occurs;
(d) irrigation does not occur on land that is waterlogged; and
(e) vegetation cover is maintained over the irrigation area.

2 Emissions

2.1 General

2.1.1 The Licensee shall record and investigate the exceedance of any descriptive or numerical limit specified in any part of section 2 of this Licence.

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	Emission point reference on Map of emission points	Description	Source including abatement
W1	Cracker (CK1)	Discharge to Muddauthera Creek	Sedimentation Pond originating from dewatering at Austin, Big Mack, Lucy Mack, Demon and Hunter SE pits.
W2	Hunter (H2)		Sedimentation Pond originating from dewatering at Hunter pit.
W3	Radio Hill (RH1)		Sedimentation Pond originating from dewatering at Radio Hill pit.
W4	Sardine (SD1)		Sedimentation Pond originating from dewatering at Dhufish pit.
W5	Greensnake (GS1)	Discharge to Warri Warri Creek	Sedimentation Pond originating from dewatering at

			Greensnake pit.
W6	Lox (LX1)		Sedimentation Pond originating from dewatering at Lox pit.
W7	Airport (AP1)	Discharge to Brumby Creek	Sedimentation Pond originating from dewatering at Airport pit.
W8	Chris D (CD1)		Sedimentation Pond originating from dewatering at Chris D pit.
W9	Chutney (CT1)		Sedimentation Pond originating from dewatering at Chutney, Paystar and Chutney West pit.
W10	Homestead (HS1)		Sedimentation Pond originating from dewatering at Homestead pit.
W11	Rhodes (RD)		Sedimentation Pond originating from dewatering at Rhodes pit.
W12	Topvar (TD)		Dewatering from Big Mack pit and the Topvar Hub Dewatering Bores

2.2.2 The Licensee shall not cause or allow point sources emissions to surface water greater than 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
W1- W12	Total Suspended Solids	80 mg/L	Spot sample

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 2.3.1 and identified on the map of emission points and storage locations 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	Emission point reference on Map or emission points	Description	Source including abatement
L1	Storage pond	Pipe from oily water separator into unlined storage pond	Treated wastewater from oil water separator originating from Greensnake workshop and wash down area
L2	Irrigation area	Effluent from accommodation camp wastewater treatment plant to on-site irrigation area	Treated effluent from wastewater treatment plant

2.3.2 The Licensee shall not cause or allow emissions to land greater than the limits listed in Table 2.3.2.

Table 2.3.2: Emissions limits to land			
Emission point reference	**Parameter**	**Limit (including units)**	**Averaging period**
L1	Total Recoverable Hydrocarbon	15 mg/L	Spot sample
L2	Load of Total Nitrogen (TN)	480 kg/ha	Annual
	Load of Total Phosphorus (TP)	120 kg/ha	

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 otherwise indicated in the relevant table;
- (b) all wastewater sampling is conducted in accordance with AS/NZS 5667.10;
- (c) all surface water sampling is conducted in accordance with AS/NZS 5667.4, AS/NZS 5667.6 or AS/NZS 5667.9 as relevant;
- (d) all groundwater sampling is conducted in accordance with AS/NZS 5667.11;
- (e) all sediment sampling is conducted in accordance with AS/NZS 5667.12;
- (f) all microbiological samples are collected and preserved in accordance with AS/NZS 2031; and
- (g) 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 surface water

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 surface water			
Emission point reference	**Parameter**	**Units**	**Frequency**
W1- W12	Volume (cumulative)	m^3	Continuous
	pH[2]	-	Monthly
	Total Dissolved Solids	mg/L	
	Nitrate and Nitrite Nitrogen	mg/L	
	Total Kjeldahl Nitrogen	mg/L	
	Total Nitrogen	mg/L	
	Filterable Reactive Phosphorus	mg/L	
	Total Phosphorus	mg/L	
	Sodium	mg/L	
	Magnesium	mg/L	
	Zinc[1]	mg/L	
	Lead[1]	mg/L	
	Cadmium[1]	mg/L	
	Manganese	mg/L	

Note 1: With adjustments for hardness as per ANZECC (2000) guidelines
Note 2: In-field non-NATA accredited analysis permitted.

3.3 Monitoring of emissions to land

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

Table 3.3.1: Monitoring of emissions to land			
Emission point reference	**Parameter**	**Units**	**Frequency**
L1	Total Recoverable Hydrocarbon	mg/L	Quarterly
L2a or L2b (dependent on disposal pattern)	pH[1]	-	
	Biochemical Oxygen Demand	mg/L	
	Total Suspended Solids	mg/L	
	Total Nitrogen	mg/L	
	Total Phosphorus	mg/L	
	E.coli	cfu/100mL	

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

3.4 Monitoring of inputs and outputs

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

Table 3.4.1: Monitoring of inputs and outputs				
Input/Output	**Parameter**	**Units**	**Averaging Period**	**Frequency**
Treated Wastewater	Volume (cumulative) recycled for on-site irrigation	m^3	Monthly	Continuous
Waste Inputs	Inert Waste Type 1, Inert Waste Type 2, Putrescible Waste, and Clean Fill	Tonnes or m^3	N/A	Each load disposed

3.5 Process monitoring

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: Process monitoring				
Process description	**Parameter**	**Units**	**Averaging Period**	**Frequency**
Tailings deposition	Volume of tailings deposited into each TSF	m^3	Monthly	None specified
	Volume of water recovered from each TSF			

3.6 Ambient environmental quality monitoring

3.6.1 The Licensee shall undertake the monitoring in Tables 3.6.1, 3.6.2, 3.6.3 and 3.6.4 according to the specifications in those tables.

Table 3.6.1: Monitoring of ambient surface water quality				
Monitoring point reference and location	**Parameter**	**Units**	**Averaging period**	**Frequency**
Downstream sites: Muddauthera Creek (MMS) Warri Warri (WWMS) Brumby Creek (BMS)	pH[2]	-	Spot sample	Monthly
	Total Dissolved Solids	mg/L		
	Total Suspended Solids			
	Nitrate and Nitrite Nitrogen			
	Total Kjeldahl Nitrogen			
	Total Nitrogen			
	Filterable Reactive Phosphorus			
	Total Phosphorus			
	Sodium			
	Magnesium			
	Zinc[1]			
	Lead[1]			
	Cadmium[1]			
	Manganese			
Background site: Lower Carawine Gorge Pool (CG1) Tooma Stockyard (TS) Tooncoonaragee Pool (TC1) Oakover Crossing (OC)	pH[2]	-	Spot sample	Monthly (when accessible)
	Total Dissolved Solids	mg/L		
	Total Suspended Solids			
	Nitrate and Nitrite Nitrogen			
	Total Kjeldahl Nitrogen			
	Total Nitrogen			
	Filterable Reactive Phosphorus			
	Total Phosphorus			
	Sodium			
	Magnesium			
	Zinc[1]			
	Lead[1]			
	Cadmium[1]			
	Manganese			
	Chlorophyll-a	µg/L		
	Phaeophytin			

Note 1: With adjustments for hardness as per ANZECC (2000) guidelines
Note 2: In-field non-NATA accredited analysis permitted.

Table 3.6.2: Monitoring of sediment quality				
Monitoring point reference and location	**Parameter**	**Units**	**Averaging period**	**Frequency**
Background site: Lower Carawine Gorge Pool (CG1) Tooma Stockyard (TS) Tooncoonaragee Pool (TC1) Oakover Crossing (OC)	Chlorophyll-a	mg/m^2	Spot sample	Monthly (when accessible)
	Phaeophytin	mg/m^2		

Table 3.6.3: Monitoring of ambient groundwater quality				
Monitoring point reference and location	**Parameter**	**Units**	**Averaging period**	**Frequency**
Demon Pit TSF DEMB01 DEMB02 DEMB04 TSF2 TDMB1 Dartmoor TSF DAPTSFMB01 DAPTSFMB02 Malta TSF MPTSF01	Standing water level	mbgl	Spot sample	Quarterly
	pH[1]	-		
	Total Dissolved Solids	mg/L		
	Total Nitrogen	mg/L		
	Arsenic	mg/L		
	Copper	mg/L		
	Molybdenum	mg/L		
	Selenium	mg/L		
	Uranium	mg/L		
	Hexavalent Chromium	mg/L		

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

Table 3.6.4: Monitoring of vegetation health			
Monitoring point reference and location	**Parameter**	**Averaging period**	**Frequency**
Brumby Creek Crossing (V1) Lower Carawine Pool (V2) Muddauthera Crossing (V3) Running Water Pool (V4) Tooma Stockyards (V5) Warri Warri Creek Crossing (V6)	Visually estimate the average foliage cover of the species *Eucalyptus camaldulensis* and *Melaleucca agentea*	Visual inspection	Six monthly
	Score the health condition of the species *Eucalyptus camaldulensis* and *Melaleucca agentea*		
	General environmental description of the site and record any changes since previous monitoring		
	Take replicate photographs of foliage density and shadow areas beneath trees.		

3.6.2 The Licensee shall take the relevant action in the case of an event in Table 3.6.5.

Table 3.6.5: Management Action			
Monitoring point reference	**Event/action reference**	**Event**	**Management action**
V1 – V6	EA1	20% reduction in the average foliage density from previous monitoring at the same site	Undertake an investigation to determine if the impacts are attributable to dewatering at the premises. Include details of the investigation in the Annual Environmental Report and if attributable to dewatering include an outline of corrective action taken or planned to mitigate adverse environmental impacts and management measures to prevent a recurrence of the event.
	EA2	A 2 point reduction in the health condition from the previous monitoring at the same site.	

Information

4.1 Records

4.1.1 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.

4.1.2 The Licensee shall complete an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the conditions of the Licence, and any previous licence issued under Part V of the Act for the Premises for the previous annual period.

4.1.3 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.

4.2 Reporting

4.2.1 The Licensee shall submit to the CEO an Annual Environmental Report by 30 November each year. The report shall contain the information listed in Table 4.2.1 in the format or form specified in that table.

Table 4.2.1: 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
1.3.4	Water balance	None specified
Table 2.2.2	Monitoring of point source emissions to surface water results – Total Suspended Solids (Limit)	WR1
Table 2.3.2	Total Recoverable Hydrocarbon	LR1
	Loading of Total Nitrogen and Total Phosphorus	LR2
Table 3.2.1	Monitoring of point source emissions to surface water	WR2

	results – pH, Total Dissolved Solids, Nitrate and Nitrite Nitrogen, Total Kjeldahl, Total Nitrogen, Filterable Reactive Phosphorus, Total Phosphorus, Sodium, Magnesium, Zinc, Lead, Cadmium and Manganese	
Table 3.3.1	Monitoring of emissions to land	LR1
Table 3.4.1	Volume (cumulative) recycled for on-site irrigation	LR3
Table 3.4.1	Inert Waste Type 1, Inert Waste Type 2, Putrescible Waste and Clean Fill	None specified
Table 3.5.1	Process Monitoring: volume of tailings deposited and volume of water recovered.	None specified
Table 3.6.1	Downstream sites: pH, Total Suspended Solids, Total Dissolved Solids, Nitrate and Nitrite Nitrogen, Total Kjeldahl, Total Nitrogen, Filterable Reactive Phosphorus, Total Phosphorus, Sodium, Magnesium, Zinc, Lead, Cadmium, Manganese	WR3
	Background sites: pH, Total Suspended Solids, Total Dissolved Solids, Nitrate and Nitrite Nitrogen, Total Kjeldahl, Total Nitrogen, Filterable Reactive Phosphorus, Total Phosphorus, Sodium, Magnesium, Zinc, Lead, Cadmium, Manganese, Chlorophyll-a and Phaeophytin	WR4
Table 3.6.2	Sediment - Chlorophyll-a and Phaeophytin	WR5
Table 3.6.3	Groundwater: Standing water level, pH, Total Dissolved Solids, Total Nitrogen, Arsenic, Molybdenum, Selenium, Uranium, Hexavalent Chromium	GR1
Table 3.6.4	Average foliage, health score and general environmental description	None specified
	Identical photographs of foliage density and shadow areas beneath trees	Photographs
Table 3.6.5	Management actions EA1 and EA2	None specified
4.1.2	Compliance	Annual Audit Compliance Report (AACR)
4.1.3	Complaints summary	None specified

Note 1: Forms are in Schedule 2

4.2.2 The Licensee shall ensure that the Annual Environmental report also contains:
(a) any relevant process, production or operation data recorded under Condition 3.1.3; and
(b) an assessment of the information contained within the report against previous monitoring results and Licence limits.

4.2.3 The Licensee shall submit the information in Table 4.2.2 to the CEO according to the specifications in that table.

Table 4.2.2: 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

4.3 Notification

4.3.1 The Licensee shall ensure that the parameters listed in Table 4.3.1 are notified to the CEO in accordance with the notification requirements of the table.

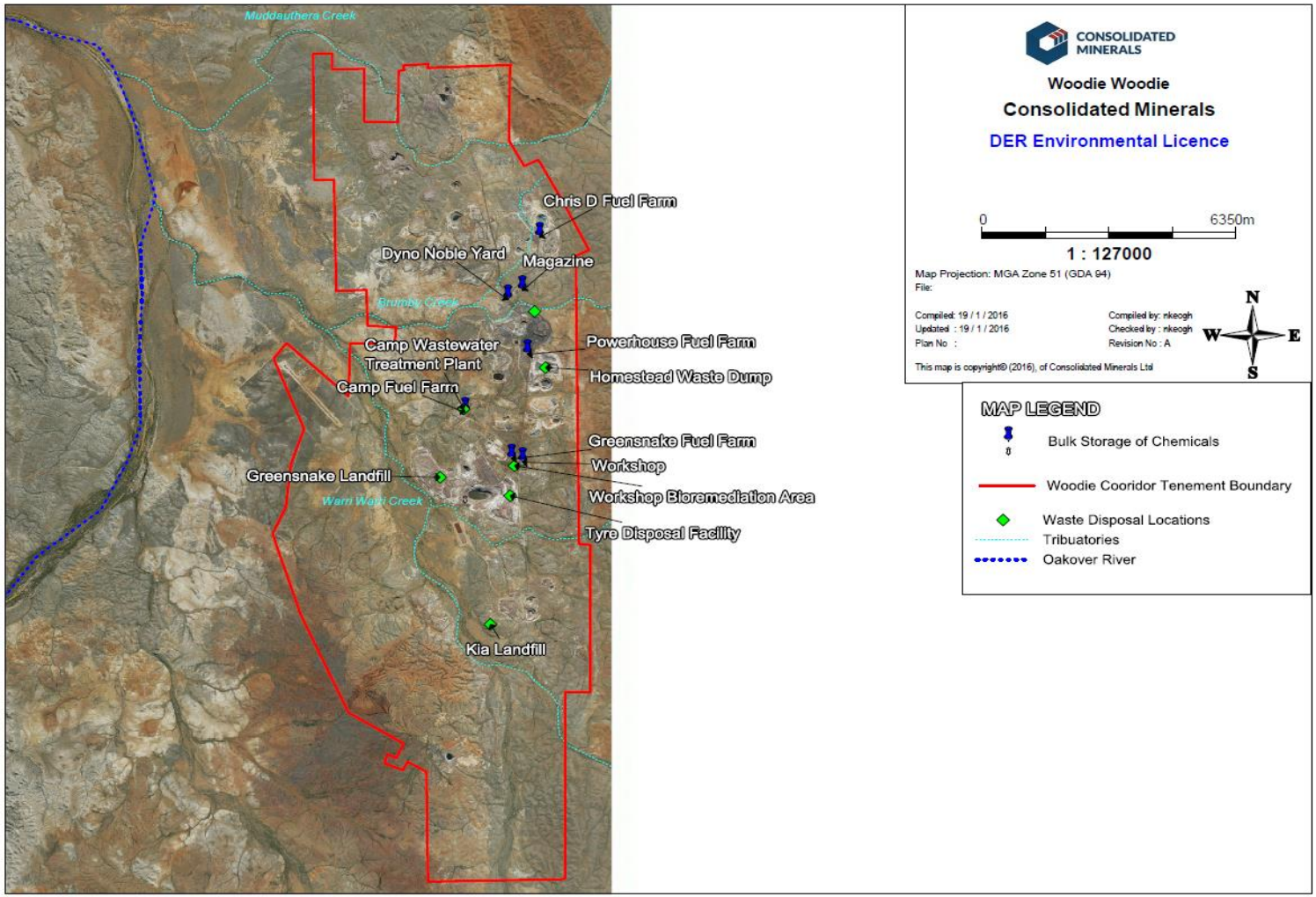
Table 4.3.1: Notification requirements			
Condition or table (if relevant)	**Parameter**	**Notification requirement[1]**	**Format or form[2]**
-	Breach of any limit specified in the Licence	Part A: As soon as practicable but no later than 5pm of the next usual working day.	N1
		Part B: As soon as practicable	
1.3.7	Standing Water Level exceeding 6 mbgl	Within 7 calendar days of becoming aware of Standing Water Levels exceeding 6 mbgl	None specified
3.1.4	Calibration report	As soon as practicable.	None specified
-	Recommencing start-up of operations (after a period of care and maintenance)	At least 90 days prior to recommencing production	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

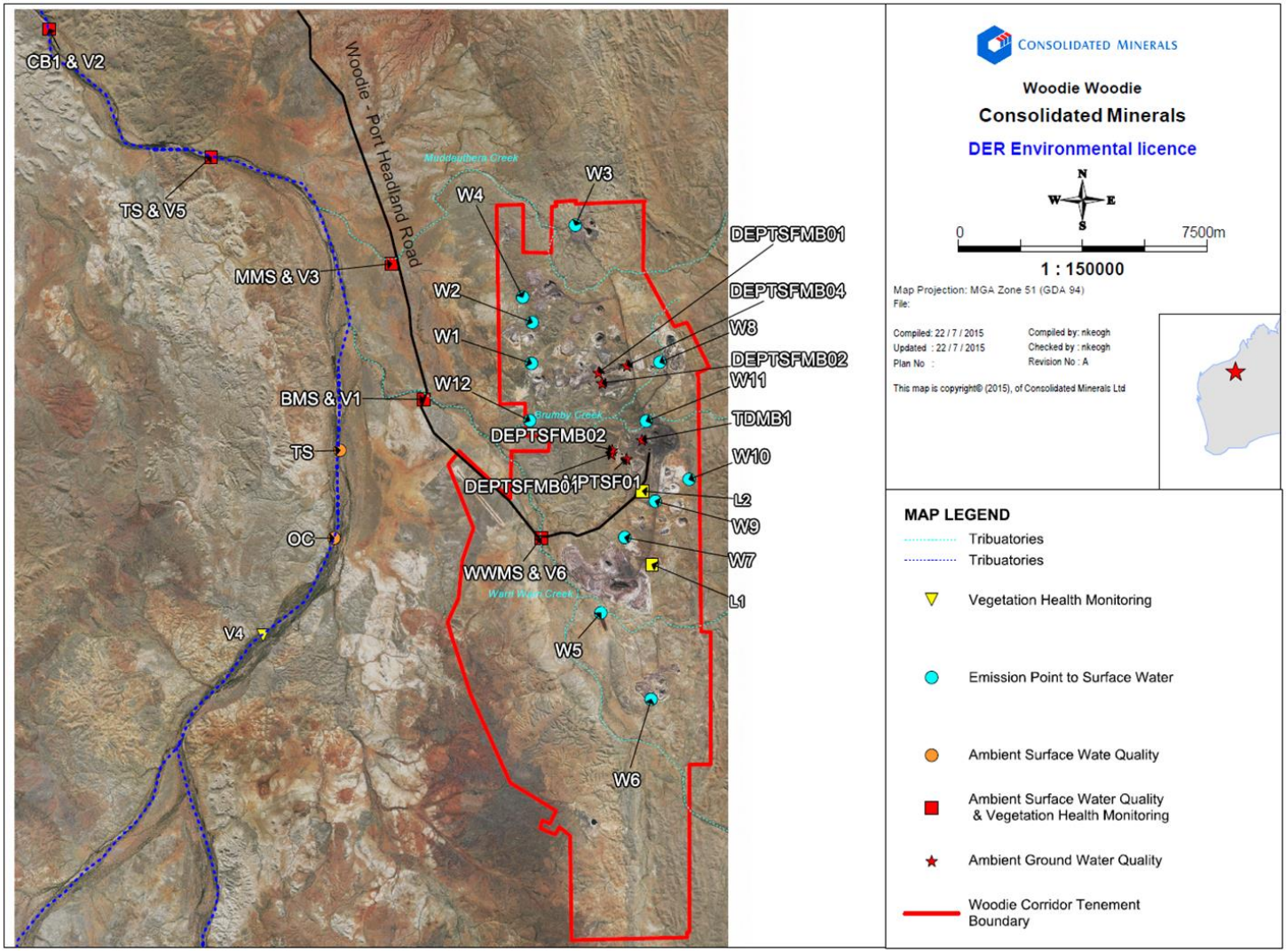
Premises map

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



Map of emission and monitoring locations

The locations of the emission points defined in Table 2.2.1 and 2.3.1 and monitoring locations defined in Table 3.2.1, 3.3.1, 3.6.1, 3.6.2, 3.6.3 and 3.6.4.



The locations of the monitoring points defined in Table 3.3.1 are shown in the map 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.

ANNUAL AUDIT COMPLIANCE REPORT PROFORMA

SECTION A

LICENCE DETAILS

Licence Number:	Licence File Number:
Company Name: Trading as:	ABN:
Reporting period: _____ to _____	

STATEMENT OF COMPLIANCE WITH LICENCE CONDITIONS

1. Were all conditions of the Licence complied with within the reporting period? (please tick the appropriate box)

Yes ☐ Please proceed to Section C

No ☐ Please proceed to Section B

Each page must be initialled by the person(s) who signs Section C of this Annual Audit Compliance Report (AACR).

Initial:

SECTION B
DETAILS OF NON-COMPLIANCE WITH LICENCE CONDITION.

Please use a separate page for each licence condition that was not complied with.

a) Licence condition not complied with:	
b) Date(s) when the non compliance occurred, if applicable:	
c) Was this non compliance reported to DER?:	
☐ Yes ☐ Reported to DER verbally Date _____ ☐ Reported to DER in writing Date _____	☐ No
d) Has DER taken, or finalised any action in relation to the non compliance?:	
e) Summary of particulars of the non compliance, and what was the environmental impact:	
f) If relevant, the precise location where the non compliance occurred (attach map or diagram):	
g) Cause of non compliance:	
h) Action taken, or that will be taken to mitigate any adverse effects of the non compliance:	
i) Action taken or that will be taken to prevent recurrence of the non compliance:	

Each page must be initialled by the person(s) who signs Section C of this AACR

Initial:

SECTION C

SIGNATURE AND CERTIFICATION

This Annual Audit Compliance Report (AACR) must only be signed by a person(s) with legal authority to sign it. The ways in which the AACR must be signed and certified, and the people who may sign the statement, are set out below.

Please tick the box next to the category that describes how this AACR is being signed. If you are uncertain about who is entitled to sign or which category to tick, please contact the licensing officer for your premises.

If the licence holder is		The Annual Audit Compliance Report must be signed and certified:
An individual	□	by the individual licence holder, or
	□	by a person approved in writing by the Chief Executive Officer of the Department of Environment Regulation to sign on the licensee's behalf.
A firm or other unincorporated company	□	by the principal executive officer of the licensee; or
	□	by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation.
A corporation	□	by affixing the common seal of the licensee in accordance with the *Corporations Act 2001*; or
	□	by two directors of the licensee; or
	□	by a director and a company secretary of the licensee, or
	□	if the licensee is a proprietary company that has a sole director who is also the sole company secretary – by that director, or
	□	by the principal executive officer of the licensee; or
	□	by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation.
A public authority (other than a local government)	□	by the principal executive officer of the licensee; or
	□	by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation.
a local government	□	by the chief executive officer of the licensee; or
	□	by affixing the seal of the local government.

It is an offence under section 112 of the *Environmental Protection Act 1986* for a person to give information on this form that to their knowledge is false or misleading in a material particular. There is a maximum penalty of $50,000 for an individual or body corporate.

I/We declare that the information in this annual audit compliance report is correct and not false or misleading in a material particular.

SIGNATURE: _____

NAME:
(printed) _____

POSITION: _____

DATE: _____/_____/_____

SIGNATURE: _____

NAME:
(printed) _____

POSITION: _____

DATE: _____/_____/_____

SEAL (if signing under seal)

Licence: L6131/1990/13 Licensee: Pilbara Manganese Pty Ltd
Form: WR1 Period :
Name: Monitoring of point source emissions to surface water

Form WR1: Monitoring of point source emissions to surface water						
Emission point	**Parameter**	**Limit**	**Result**	**Averaging period**	**Method**	**Sample date & times**
W1 – W12	Total Suspended Solids	80mg/L	m^3/day	Spot Sample		

Signed on behalf of Pilbara Manganese Pty Ltd: …….. Date: …….

Licence: L6131/1990/13 Licensee: Pilbara Manganese Pty Ltd
Form: WR2 Period :
Name: Monitoring of point source emissions to surface water

Form WR2: Monitoring of point source emissions to surface water					
Emission point	**Parameter**	**Result**	**Averaging period**	**Method**	**Sample date & times**
W1 – W12	Volume (cumulative) dewatering water	m^3/day	Continuous		
	pH		Spot sample		
	Total Dissolved Solids	mg/L			
	Nitrate and Nitrite Nitrogen	mg/L			
	Total Kjeldahl Nitrogen	mg/L			
	Total Nitrogen	mg/L			
	Filterable Reactive Phosphorus	mg/L			
	Total Phosphorus	mg/L			
	Sodium	mg/L			
	Magnesium	mg/L			
	Zinc	mg/L			
	Lead	mg/L			
	Cadmium	mg/L			
	Manganese	mg/L			

Signed on behalf of Pilbara Manganese Pty Ltd: …….. Date: …….

Licence: L6131/1990/13 Licensee: Pilbara Manganese Pty Ltd
Form: WR3 Period :
Name: Monitoring of ambient downstream surface water

Form WR3: Monitoring of surface water					
Emission point	**Parameter**	**Result**	**Averaging period**	**Method**	**Sample date & times**
Downstream sites MMS, WWMS and BMS	pH		Spot sample		
	Total Dissolved Solids	mg/L			
	Total Suspended Solids	mg/L			
	Nitrate and Nitrite Nitrogen	mg/L			
	Total Kjeldahl	mg/L			
	Total Nitrogen	mg/L			
	Filterable Reactive Phosphorus	mg/L			
	Total Phosphorus	mg/L			
	Sodium	mg/L			
	Magnesium	mg/L			
	Zinc	mg/L			
	Lead	mg/L			
	Cadmium	mg/L			
	Manganese	mg/L			

Signed on behalf of Pilbara Manganese Pty Ltd: …….. Date: ……

Licence: L6131/1990/13 Licensee: Pilbara Manganese Pty Ltd
Form: WR4 Period :
Name: Monitoring of ambient surface water

Form WR4: Monitoring of surface water					
Emission point	**Parameter**	**Result**	**Averaging period**	**Method**	**Sample date & times**
Background sites CG1 TS TC1 OC	pH		Spot sample		
	Total Dissolved Solids	mg/L			
	Total Suspended Solids	mg/L			
	Nitrate and Nitrite Nitrogen	mg/L			
	Total Kjeldahl	mg/L			
	Total Nitrogen	mg/L			
	Filterable Reactive Phosphorus	mg/L			
	Total Phosphorus	mg/L			
	Sodium	mg/L			
	Magnesium	mg/L			
	Zinc[1]	mg/L			
	Lead[1]	mg/L			
	Cadmium[1]	mg/L			
	Manganese[1]	mg/L			
	Chlorophyll-a	mg/L			
	Phaeophytin	mg/L			

Note1: With adjustment for hardness as per ANZECC (2000) guidelines.

Signed on behalf of Pilbara Manganese Pty Ltd: …….. Date: …….

Licence: L6131/1990/13
Form: WR5
Name: Monitoring of ambient sediment quality

Licensee: Pilbara Manganese Pty Ltd
Period :

Form WR5: Monitoring of sediment quality					
Emission point	**Parameter**	**Result**	**Averaging period**	**Method**	**Sample date & times**
Background sites CG1 TS TC1 OC	Chlorophyll-a	mg/m^2	Spot sample		
	Phaeophytin	mg/m^2			

Signed on behalf of Pilbara Manganese Pty Ltd: …….. Date: …….

Licence: L6131/1990/13 Licensee: Pilbara Manganese Pty Ltd
Form: GR1 Period :
Name: Monitoring of ambient groundwater

Form GR1: Monitoring of groundwater					
Emission point	**Parameter**	**Result**	**Averaging period**	**Method**	**Sample date & times**
Demon Pit TSF DEMB01 DEMB02 DEMB04 **TSF2** TDMB1 **Dartmoor** DAPTSFMB01 and DAPTSFMB02 **Malta** MPTSF01	Standing water level	mbgl	Spot Sample		
	pH				
	Total Dissolved Solids	mg/L			
	Total Nitrogen	mg/L			
	Arsenic	mg/L			
	Copper	mg/L			
	Molybdenum	mg/L			
	Selenium	mg/L			
	Uranium	mg/L			
	Hexavalent Chromium	mg/L			

Signed on behalf of Pilbara Manganese Pty Ltd: …….. Date: …….

Licence: L6131/1990/13
Form: LR1
Name: Monitoring of emissions to land

Licensee: Pilbara Manganese Pty Ltd
Period :

Form LR1: Monitoring of emissions to land						
Emission point	**Parameter**	**Limit**	**Result**	**Averaging period**	**Method**	**Sample date & times**
L1	Total Recoverable Hydrocarbon	15 mg/L	mg/L	Spot sample		

Signed on behalf of Pilbara Manganese Pty Ltd:…….. Date: …….

Licence: L6131/1990/13
Form: LR2
Name: Monitoring of emissions to land

Licensee: Pilbara Manganese Pty Ltd
Period :

Form LR2: Monitoring of emissions to land						
Emission point	**Parameter**	**Limit**	**Result**	**Averaging period**	**Method**	**Sample date & times**
L2	Load of Total Nitrogen (TN)	480 kg/ha/year	kg/ha/year	Annually		
	Load of Total Phosphorus (TP)	120 kg/ha/year	kg/ha/year			

Signed on behalf of Pilbara Manganese Pty Ltd:…….. Date: ……

Licence: L6131/1990/13
Form: LR3
Name: Monitoring of emissions to land

Licensee: Pilbara Manganese Pty Ltd
Period :

Form LR3: Monitoring of emissions to land					
Emission point	**Parameter**	**Result**	**Averaging period**	**Method**	**Sample date & times**
L2	Volume (cumulative) recycled for on-site irrigation	m^3	Monthly		
	pH		Spot sample		
	Biochemical Oxygen Demand	mg/L			
	Total Suspended Solids	mg/L			
	Total Nitrogen	mg/L			
	Total Phosphorus	mg/L			
	E.coli	cfu/100mL			

Signed on behalf of Pilbara Manganese Pty Ltd:…….. Date: …….

Licence: L6131/1990/13 Licensee: Pilbara Manganese 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 Pilbara Manganese Pty Ltd	
Date	

Government of Western Australia
Department of Environment Regulation

Decision Document

Environmental Protection Act 1986, Part V

Proponent: Pilbara Manganese Pty Ltd

Licence: L6131/1990/13

Registered office:	28 Ventnor Avenue WEST PERTH WA 6005
ACN:	074 106 577
Premises address	Woodie Woodie Manganese Project Mining Tenements G45/332, G45/333, G45/334, G45/335, G45/336, 45/37-40, G46/4-5, L46/29, M45/107, M45/429-433, M45/517, M45/600-602, M45/1218, M45/637-641, M46/92-93, M46/108, M46/137, M46/150, M46/161-162, M46/383 and M46/384 MARBLE BAR WA 6760
Issue date:	Thursday, 26 September 2013
Commencement date:	Tuesday, 1 October 2013
Expiry date:	Saturday, 30 September 2028

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 and legal requirements and that the Licence and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by:	Cathy Scheib/Suzy Roworth Licensing Officer
Decision Document authorised by:	Alana Kidd Manager Licensing

Contents

1 Purpose of this Document

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

2 Administrative summary

<table>
<tr><th colspan="3">Administrative details</th></tr>
<tr><td>Application type</td><td colspan="2">Works Approval ☐
New Licence ☐
Licence amendment ☒
Works Approval amendment ☐</td></tr>
<tr><td rowspan="6">Activities that cause the premises to become prescribed premises</td><td>Category number(s)</td><td>Assessed design capacity</td></tr>
<tr><td>05</td><td>5,000,000 tonnes per annual period</td></tr>
<tr><td>06</td><td>55,188,000 tonnes per annual period</td></tr>
<tr><td>54</td><td>150 cubic metres per day</td></tr>
<tr><td>73</td><td>2,144 cubic metres</td></tr>
<tr><td>89</td><td>1,000 tonnes per annual period</td></tr>
<tr><td>Application verified
Application fee paid</td><td colspan="2">Date: N/A
Date: N/A</td></tr>
<tr><td>Works Approval has been complied with
Compliance Certificate received</td><td colspan="2">Yes☒ No☐ N/A☐
Yes☒ (A941586)</td></tr>
<tr><td>Commercial-in-confidence claim</td><td colspan="2">Yes☐ No☒</td></tr>
<tr><td>Commercial-in-confidence claim outcome</td><td colspan="2">N/A</td></tr>
</table>

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

3 Executive summary of proposal and assessment

Pilbara Manganese Pty Ltd (PMPL) own and operate the Woodie Woodie Manganese Project (Woodie Woodie) located approximately 400km south east of the town of Port Hedland in the Pilbara region of Western Australia. The site consists of a number of leases and covers a total area of 13,327 hectares. PMPL is a wholly owned subsidiary of Consolidated Minerals Pty Ltd. The site has been operational since February 1991 when the licence was originally issued.

The site has the capacity to process up to 5,000,000 tonnes of ore per year and ore is mined from a variety of pits at any one time, dependent upon market requirements. The mined ore is transported to the centrally located beneficiation plant where it is blended, crushed, screened and washed before being put through a heavy media separation plant where lump manganese product is produced via a drum separator and fines manganese via a cyclone.

Course and fines waste rock streams are produced, with coarse waste stream stockpiled near the beneficiation plant and tailings being retreated using a screw classifier to remove all remaining manganese material before entering the in-pit tailings storage facility (TSF). Currently PMPL utilise Demon Pit TSF, Dartmoor Pit TSF, Malta Pit TSF and Area 1 Pit TSF for tailings storage.

The site undertakes dewatering to enable mining to occur below the water table and has a capacity to dewater up to 55,188,000 tonnes per year. Some of the water is recycled through the plant and TSF and the remaining dewater is discharged from a sedimentation pond to various discharge points leading to the local creek systems.

A wastewater treatment plant (WWTP) with the capacity to treat up to 150 m^3/day is located at the camp. Increases in the size of the irrigation area have recently been made to ensure soil is not overloaded.

The November 2015 amendment implemented the following changes:

- Addition of a sampling point at the extended WWTP irrigation area;

- Addition of the Topvar dewatering pipeline and discharge location into Brumby Creek which was constructed and authorised under Works Approval W5821/2015/1; and
- Addition of a new pit (Hunter SE) to the dewatering sources, through an existing sedimentation pond (Cracker sedimentation pond, W1) which is adjacent to the new pit. Hunter SE is one of three pits within the Hunter extension project, and the only one of the three requiring dewatering. Discharging of dewater from Hunter is already approved through the emission point W2, but discharging to the Cracker sedimentation pond removes the need to dig a trench to the Hunter sedimentation pond. Both the Cracker and Hunter sedimentation ponds discharge to the Muddauthera Creek system. All dewatering will remain within the approved discharge limit.

The Topvar Discharge Point has been established on Brumby Creek, around 4km downstream of the current Paystar discharge Point. The reason for this location is to avoid recirculation of the groundwater back into the active mining area. The discharge point consists of the pipeline outlet and heaped boulders to spread the impact zone of the discharge and minimize the chance of erosion to the creek beds. Boulder-sized sandstone from the Topvar Pit was used to construct rock armouring, which is approximately 20m in length and 12m in width. In addition, elbows have been placed on the end of the pipeline to reduce water velocity upon exiting the pipeline. Fortnightly water quality analysis has been conducted as per the works approval conditions.

It is expected that approximately 300-600L/s will be pumped to the discharge point. The discharge point will be in operation for approximate 5 years while the Topvar Mining area is active. The Pits that will be mined during this time will be, Topvar, Cracker, Eat and Big Mack. It is expected that the location of the bore will allow for adequate dewatering of all these pits.

January 2016 amendment
An additional five General Purpose tenements were added (G45/332, G45/333, G45/334, G45/335, G45/336) onto the Woodie mining corridor. M45/1218 was also included as this tenement is included within the Hunter operation and looks as if historically it has been missed. The Greensnake landfill has been added as per works approval W5832/2015/1. IR1 was been removed as the Bioremediation Facility has been constructed.

April 2016 amendment
Licensee advised that the site is going into Care & Maintenance. The proponent has requested that the tailings inspections be reduced from daily to weekly when the facilities are inactive. The proponent has also requested that the weather stations at Telfer be used to measure site rainfall and evaporation rather than the site weather stations, which will be decommissioned (this change does not require any amendment to the licence conditions). As part of this amendment, redundant conditions were also removed.

The key emissions associated with the project relate to point source emissions to surface water through the dewatering discharge. Other matters considered relevant to the DER include tailings storage and management, waste management and disposal, and fugitive dust emissions generated through mining operations. The DER considers that the Woodie Woodie operations are acceptable subject to the implementation of management commitments detailed by the licensee and compliance with conditions of licence L6131/1990/13.

4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987* and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
General conditions	L1.2.1	Generic changes have been made to the General Conditions of this Licence as part of Departmental reform and updates to licence templates. These changes include removing conditions referencing the Code of Practice for the Storage and handling of dangerous goods. Woodie Woodie do not store environmentally hazardous materials in bulk, other than those substances covered under their Dangerous Goods Licence. L1.1.5, 1.2.1 and 1.2.3 have been removed as these are not risk based or enforceable and are considered redundant conditions. No other changes have been applied to this section.	General provisions of the *Environmental Protection Act 1986* *Environmental Protection (Unauthorised Discharges) Regulations 2004*
Premises operation	L1.3.1 – 1.3.12	DER's risk assessment and decision making are detailed in Appendix A. <u>Management of Waste</u> Conditions 1.3.7 – 1.3.10 are included in the licence detailing the location, waste type, process limits and specifications for the landfilling of wastes. Condition 1.3.12 has been added to the licence detailing the requirements for the irrigation of treated wastewater from the WWTP. No changes were made to these conditions under the November 2015 amendment. The Greensnake landfill was added during the January 2016 amendment is managed under existing licence conditions. During the April 2016 amendment the frequency of the tailings inspections required in	

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		by condition 1.3.5 have been reduced from daily to weekly. All processing and tailings deposition has ceased and all tailings pipelines have been flushed with clean process water. There may, however, be times when the Fines Plant will be operational for short periods of time, which will result in deposition to the TSF. When this occurs the inspections will revert to daily and this has been stipulated in condition 1.3.5.	
Emissions general	L2.1.1	General emission conditions are included in the Licence as standard. Condition L2.1.1 requires the Licensee to record and investigate the exceedance of any descriptive or numerical limit specified in section 2 of the Licence.	N/A
Point source emissions to air including monitoring	L – no conditions	There are no point source emissions to air associated with this premises and as such no licence conditions are required.	General provisions of the *Environmental Protection Act 1986* *Environmental Protection (Unauthorised Discharges) Regulations 2004*
Point source emissions to surface water including monitoring	L2.2.1 – L2.2.2	Excess dewatering water is discharged to natural drainage lines via 12 discharge points. DER's risk assessment and decision making with respect to these discharges are detailed in Appendix B.	
Point source emissions to groundwater including monitoring	L – no conditions	There are no point source emissions to groundwater associated with this premises and as such no licence conditions are required.	
Emissions to land including monitoring	L2.3.1 – L2.3.2	PMPL operate a wastewater treatment plant from which treated wastewater is discharged to a dedicated irrigation area. DER's risk assessment and decision making with respect to discharges to land are detailed in Appendix C.	
Fugitive emissions	L – no conditions	<u>Emission Description</u> *Emission*: Dust emissions can be generated from mining of manganese ore, materials handling, ore stockpiles, operation of the processing plant (e.g. crushing and screening), and movement of vehicles and open areas. *Impact*: Manganese ore from the premises has been characterised as having a high	*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**
		manganese content with low iron and phosphorus. Prolonged exposure to manganese in occupation settings is associated with neurotoxicity, however there is no clear evidence of neurotoxicity from exposure to lower concentrations of airborne manganese in community settings. Dust containing particles of less than 10 micrometres in diameter has been associated with diminishing lung function and dust in high volumes does interfere with comfort and amenity for the public. Dust also has the potential to smother and impact the health of flora and vegetation. Given the mining operations are extremely isolated with the nearest town (Marble Bar) being located 100 km away and no sensitive premises located within 10km the key receptor has been considered to be vegetation. *Controls*: The Licensee has implemented the following controls: • Regular deployment of water carts; • Water sprays on conveyors; and • Covers on road trains and transfer points. <u>Risk Assessment</u> *Consequence*: Minor *Likelihood*: Rare *Risk Rating*: Low <u>Regulatory Controls</u> PMPL are required to comply with the *Environmental Protection (Unauthorised Discharges) Regulations 2004.* Given this, and the control measures currently being deployed on site, no further regulatory controls are considered necessary. <u>Residual Risk</u> *Consequence*: Minor *Likelihood*: Rare *Risk Rating*: Low	
Odour	L – no conditions	There are no significant odour emissions associated with this premises. As such, no licence conditions are detailed in the licence for odour.	N/A

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
Noise	L – no conditions	Given the extremely isolated nature of the premises with no nearby sensitive premises there are no noise conditions required for this licence. Compliance with the *Environmental Protection (Noise) Regulations 1997* is required.	*Environmental Protection (Noise) Regulations 1997*
Monitoring general	L3.1.1 – 3.1.4	Standard monitoring conditions for the collection, handling and analysis of samples and calibration of monitoring equipment are detailed in the licence. No changes were made under the November 2015 or January 2016 amendment.	N/A
Monitoring of inputs and outputs	L3.4.1	Condition 3.4.1 is included in the licence for monitoring of the cumulative volume of wastewater discharged to the irrigation area and the volume of waste disposed to landfill. No changes were made under the November 2015 or January 2016 amendment.	
Process monitoring	L3.5.1	Condition 3.5.1 requiring process monitoring of tailings deposition to the TSFs is included in the Licence. No changes were made under the November 2015 or January 2016 amendment.	
Ambient quality monitoring	L3.6.1	A risk assessment for point source emissions to surface water and site processes (management of TSF) was undertaken and is detailed through Appendix A and B. Condition 3.6.1 is included on the licence to ensure monitoring at reference and downstream sites occurs and, by comparison of the two, notable impacts to the environment can be detected. Monitoring of surface waters, sediments, groundwater and vegetation health are included.	
Meteorological monitoring	L – no conditions	There is no requirement for meteorological monitoring as part of this licence.	N/A
Improvements	L – no conditions	The improvement condition has been removed from the licence as the Workshop Bioremediation Facility has been completed. Conditions related to the bioremediation facility have however been retained considering the previous risk identified.	Woodie Woodie Mine Site (L6131/1990/13) Improvement Reference IR1 dated 23 December 2015
Information	L4.1.1 – 4.1.3	Standard conditions for records management, reporting and notification are included in the licence. L4.1.1 has however been removed as this condition is considered not	N/A

DECISION TABLE			
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
	L4.2.1 – 4.2.3 L4.3.1	enforceable. The Licensee has notified DER that the site has entered Care & Maintenance. Therefore, a requirement has been added to Table 4.3.1 to ensure that DER is notified when recommencement of operations occur.	
Licence Duration	N/A	The licence has been updated to expire 30 September 2028 in accordance with the *Guidance Statement: Licence duration* and the notice of amendment.	N/A

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
19/11/2015	Licensee sent a copy of draft amended instrument	Pilbara Manganese replied on 20/11/2015 with minor comments.	DER addressed comments in draft and issued Licence.
4/2/2016	Licensee sent a copy of 21 day drafts	Pilbara Manganese waived 21 days 18/2/2016	N/A.
16/06/2016	Licensee sent a draft copy of amended instrument	Completed waiver received.	N/A.

6 Risk Assessment

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

Table 1: Emissions Risk Matrix

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

Appendix A

Emissions Risk Assessment

General Conditions

Operation

Emission Description

Emission: Spillage of hydrocarbons and chemicals following incorrect storage and use onsite.

Impact: Stormwater and soil can be contaminated with hydrocarbon and chemicals and may then enter the environment, which can have an adverse effect on water quality and health of flora and fauna.

Controls: The Licensee has the following controls in place:

- Double skinned tanks or bunding with 110% containment (PC Fuel Farm) for bulk hydrocarbon storage;
- Spill procedures and spill kits;
- Bunding for workshop and bioremediation areas; and
- Water from vehicle wash down is directed to oil/water separator.

Risk Assessment

Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate

Regulatory Controls

The *Environmental Protection (Unauthorised Discharges) Regulations 2004* and general provisions of the Act apply.

Residual Risk

Consequence: Minor
Likelihood: Rare
Risk Rating: Low

Premises Operation

Operation

Emission Description

Emission: Tailings held in TSF's are a waste product from mining and may contain heavy metals and accumulation of soluble salts. Seepage from tailings at TSF's into groundwater may occur over time as tailings are deposited into the facility.

Impact: The average tailings slurry is comprised of 20-35% solids (high water content) and there is moderate permeability of the walls and base of pits used for TSF ranging from 1.16×10^{-6} to 1.16×10^{-4} m/s. Depth to groundwater is approximately 250 m relative level (mRL) with pit depths ranging from 203 m to 245 mRL. One pit (Demon) which is being used as TSF did require dewatering during mining. Analysis of tailings solids and leachate from Camp East TSF in March 2012, indicate minor changes to geochemical properties, especially a re-distribution of soluble salts and associated metals and metalloids upon storage in the TSF. Key observations include:

- Significant accumulation of soluble salts in slime tailings;
- Lower salinity levels in sand tailings;
- Decrease ratio of chloride to sulphate;

- Some alkali-soluble metals: Arsenic; Molybdenum; Selenium; and Uranium, had partially leached from the surface of sand tailings; and
- A small amount of soluble Chromium (in hexavalent form) had accumulated in slime tailings.

Hydrogeological assessment of the in-pit TSF (Chris D, Demon, Homestead, Malta and Dartmoor) undertaken in 2011 concluded that there was very little impact to the groundwater system as a result of deposition of tailings with chemistry within the tailings stream and the groundwater around each of the pits being of similar composition.

Contamination of groundwater and surrounding soil from soluble salts, metals and metalloids may impact the quality of groundwater causing adverse effects to groundwater dependant ecosystems and other water users. Groundwater flow has been modelled to discharge at the Oakover River; a semi-permanent water body.

Controls: The Licensee has outlined the following controls:

- Maximising water return to process plant;
- Installation of monitoring bores to record standing water levels and water quality;
- Maintaining groundwater level greater than 4 m below surface as surrounding vegetation may be adversely affected should groundwater levels reach this level; and
- Remedial actions and notification to DER if groundwater level increases to within 6 m of the surface.

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

Regulatory Controls
Condition 1.3.2 ensures tailings are disposed to authorised containment structures with appropriate specifications. The freeboard has been based on assessments undertaken by the Licensee for In-Pit TSFs Works Approval W5216/2012/1. Condition 1.3.3 is included in the licence detailing that the supernatant ponds are minimised as far as practicable to reduce seepage. Condition 1.3.4 is included in the licence requiring the licensee to undertake an annual water balance for the TSF to determine levels of seepage. Condition 1.3.5 requires the licensee to undertake inspection of the freeboard capacity. Condition 1.3.6 specifies a groundwater level limit of no less than 4 m below ground level to prevent impacts to vegetation and condition 1.3.7 specifies actions to be taken if groundwater levels rise to within 6 m of the ground surface.
Condition 3.6.1 is included in the licence requiring the Licensee to monitor ambient groundwater quality (parameters: SWL, pH, TDS, TN, As, Cu, Mo, Se, U and CrIV) around the TSFs on a quarterly basis, compare results against targets and previous year's results, and report the results through the Annual Environmental Report (AER). Metal/Metalloid triggers were previously set based on Department of Health, 2014, Non-potable Groundwater Use, *Contaminated sites ground and surface water chemical screening guidelines* as no other groundwater users have been identified within 5km of premises. These targets will be incorporated by PMPL into a groundwater and surface water management plan and are no longer specified in the Licence.

Residual Risk
Consequence: Moderate
Likelihood: Rare
Risk Rating: Moderate

Emergency situation
Emission Description

Emission: Tailing effluent and slurries may contain elevated levels of sediments and heavy metals. Spills from pipelines and other infrastructure may result in release of this material into nearby surface water or soils.

Impact: Contamination from heavy metals and sediments into surface water may impact the quality of water causing adverse effects to vegetation and fauna.

Controls: The Licensee has outlined the following controls:

- Pipeline is in a bunded corridor with scour sumps to capture any tails or return water leakage;
- Control room informed immediately if a leak or rupture occurs with emergency line on standby; and
- Pipeline designed and constructed across water courses to consider peak flow event including double corrugated iron sleeve and burial downstream of road.

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

Regulatory Controls
Condition 1.3.1 is included in the Licence requiring pipelines with either automatic cut-outs or secondary containment. Condition 1.3.2 details the minimum freeboard requirements for the TSFs and condition 1.3.5 requires the Licensee to undertake inspections of infrastructure on a weekly basis while the facilities are inactive.

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

Appendix B

Point source emission to surface water

Emission Risk Assessment
Operation

Emission: Dewatering effluent to surface water creeks on site. Dewatering is required to allow for the mining of Manganese at Woodie Woodie. Dewater can contain high levels of suspended solids, nutrients and metals. Dewater is discharged to surface water from sedimentation ponds through 12 emission points located within the premises boundary. The emission points include the Muddauthera Creek (W1-W4), Warri Warri Creek (W5-W6) and Brumby Creek (W7-W12). The locations and frequency of discharge change depending on which pit is being mined. During the November 2015 amendment, the Topvar dewatering point was added following its implementation under Works Approval W5821/2015/1. In addition, a new pit (Hunter SE) was added to the approved dewatering sources, through an existing sedimentation pond (Cracker sedimentation pond, W1) which is adjacent to the new pit. Hunter SE is one of three pits within the Hunter extension project, and the only one of the three requiring dewatering. Discharging of dewater from Hunter is already approved through the emission point W2, but discharging to the Cracker sedimentation pond removes the need to dig a trench to the Hunter sedimentation pond. Both the Cracker and Hunter sedimentation ponds discharge to the Muddauthera Creek system.

Impact: Historical monitoring results from Woodie Woodie (1993-2012) generally indicate that the water quality for dewater discharged is fresh to slightly brackish, neutral to slightly alkaline with a high nitrate/nitrite concentration. Dewater is discharged to ephemeral creeks Muddauthera Creek, Warri Warri Creek and Brumby Creek. These Creeks drain to the Oakover River which is approximately 10km downstream and a semi-permanent water body. Studies undertaken by the Licensee and reported to the DER in 2011 concluded that dewatering water did not affect the quality of water or vegetation of the Oakover River or its tributaries.
High levels of suspended solids, nutrients and some metals can adversely affect flora, fauna, livestock and other water users. Cattle are known to congregate around areas of dewater discharge.

Controls: The Licensee has in place the following controls:

- Dewater is piped to a sedimentation pond to allow suspended solids to settle out, prior to being discharged to watercourses;
- Water quality monitoring is undertaken on a monthly basis (when accessible) for a range of physical and chemical parameters at the point of discharge, downstream and at background sites;
- Vegetation health monitoring is undertaken on a six monthly basis at a number of downstream and background locations;
- All dewatering will remain within the approved discharge limit; and
- Woodie Woodie will develop a groundwater and surface water management plan which incorporates appropriate target levels that, if exceeded, will action investigation and management measures.

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

Regulatory Controls
Water quality monitoring on a monthly and quarterly basis has taken place from 1993 to 2011 with no reported direct impacts to aquatic ecosystems. Based on these monitoring results, site specific limits

and targets were developed, based on 90th and 10th percentile of long term reference data. Where long term reference data was not used, the ANZECC (2000) default trigger values for freshwater ecosystems (95% level of ecosystem protection) were used. The specific trigger levels developed will be adopted into the Woodie Woodie groundwater and surface water management plan, with the developed limits remaining in the Licence.

Condition 2.3.1 is included in the Licence, detailing the location of authorised emission points. Condition 2.2.2 specifies the Total Suspended Solids (TSS) limit that may be discharged to surface water. TSS was set as a limit as it was considered to be the parameter of primary concern for the discharge of dewater. Ambient monitoring for surface waters downstream and at background sites through condition 3.6.1 is also included in the Licence.

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

Appendix C

Emissions to Land

Wastewater treatment plant
The site has a wastewater treatment plant (WWTP) that services the premises accommodation and office facilities. The WWTP consists of ten primary concrete tank modules that contain the anaerobic and aerobic bioreactors, the clarification chamber, the disinfection chamber and the pump out chamber. The design capacity allows for the treatment and disposal of 150 cubic metres per day. The treated effluent from the WWTP is irrigated to the designated irrigation area which is appropriately signed and fenced to ensure no unauthorised access.

Emission Risk Assessment
Operation

Emission: Treated effluent discharged to the environment through sprinklers within an irrigation field.

Impact: Effluent contains high levels of nutrients which can cause eutrophication in water bodies which can impact ecosystem processes and function. A number of ephemeral water bodies are located within the premises boundary. The irrigation of treated wastewater can also encourage excess growth of weeds.

Controls: The Licensee has outlined the following controls:

- Daily inspections of the WWTP and irrigation area;
- Regular maintenance to WWTP, sprinkler heads, fencing and other infrastructure;
- Quarterly monitoring of treated effluent quality targeted in-line with Table 3 below; and
- Nutrient loading below licence limits.

Table 3: WWTP Irrigation Water Quality Criteria

Parameter	Targeted effluent quality	Guideline*	Percentage of guideline
pH	6.5-8.5		
Biochemical Oxygen Demand	30 mg/L	20-30 mg/L	100%
Total Nitrogen	15 mg/L	20-50 mg/L	30%
Total Phosphorus	5 mg/L	6-12 mg/L	42%
Total Suspended Solids	40 mg/L	25-40 mg/L	100%
E.coli	10^5 org/100mL	10^5 – 10^6 org/100mL	10%

*Australian Water Quality Management Strategy "Australian Guidelines for Sewage Systems – Effluent Management" (ANZECC 1997)

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

Regulatory Controls
Conditions 2.3.1, 2.3.2 and 3.3.1 specify the location of the emission points, limits and monitoring required for the WWTP and emissions to land. Effluent quality targets are being incorporated into site-specific procedures by PMPL and are no longer specified in the Licence.

Residual Risk
Consequence: Minor

Likelihood: Rare
Risk Rating: Low

Emission Risk Assessment
Operation

Emission: Hydrocarbon contaminated wash down water from vehicle and machinery wash down facilities.

Impact: Hydrocarbon in wash-down water can be released into soils and water bodies. Contamination of groundwater and surface water, adversely impacting the health of flora and fauna.

Controls: The licensee has outlined the following controls:

- Vehicle wash-downs are undertaken in a wash-down facility with an oil/water separator;
- The oil/water separator drains to a lined clay sediment pond;
- The oil/water separator is routinely monitored and maintained; and
- Monitoring of treated oily water is undertaken quarterly.

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

Regulatory Controls
Condition 2.3.2 specifies a Total Recoverable Hydrocarbon (TRH) limit of 15 mg/L.

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