Licence

Licence number	L4504/1981/17
Licence holder	South32 Worsley Alumina Pty Ltd
ACN	008 905 155
Registered business address	Gastaldo Road ALLANSON WA 6225
DWER file Number	DER2017/001998-1
Duration	01/10/2015 to 30/09/2024
Date of amendment	24/05/2023
Premises details	Worsley Alumina Refinery Gastaldo Road ALLANSON WA 6225 Lease No 3116/7574 being Wellington Locations 5314 – 5317 on Plan 220209 As defined in Schedule 1

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed production / design capacity**
Category 46: Bauxite refining	4.7 million tonnes per annual period assessed production capacity
Category 52: Electric power generation	260 Mega Watts per annual period design capacity
Category 53: Flyash disposal	110,000 tonnes per annual period assessed production capacity
Category 54: Sewage facility	270 cubic metres per day design capacity
Category 61: Liquid waste facility	100 tonnes per annual period assessed production capacity
Category 63: Class I Inert landfill site	15,000 tonnes per annual period assessed production capacity
Category 89: Putrescible landfill site	500 tonnes per annual period assessed production capacity

This Licence granted to the licence holder, subject to the following conditions, on 24 May 2023 by:

Caron Goodbourn

Digitally signed by Caron Goodbourn
Date: 2023.05.24 14:06:54 +08'00'

Manager, Process Industries
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Contents

Introduction

This Introduction is not part of the licence conditions.

DWER's industry licensing role

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

DWER has responsibilities under Part V of the *Environmental Protection Act 1986* (the Act) for the licensing of prescribed premises. Through this process DWER regulates to prevent, control and abate pollution and environmental harm to conserve and protect the environment. DWER 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

South32 Worsley Alumina Pty Ltd (the Licence Holder) operates the Worsley Alumina Refinery located approximately 15 kilometres (km) north-west of Collie on the Darling Plateau within the Augustus (minor) and Brunswick (major) river water catchments and the Collie (minor) and Bunbury (major) airsheds. The refinery is principally surrounded by State forest with some broadscale farming properties, including isolated farmhouses. The nearest residence is approximately 7km from the refinery boundary, and the nearest urban location is Allanson approximately 11km south of the refinery.

Construction of the refinery commenced in 1980, and the first alumina was produced in April 1984. The key legislative framework over the premises is the *Alumina Refinery (Worsley) Agreement Act 1973* (as amended) (the Agreement Act) and Ministerial Statement 719 (as amended) issued under Part IV of the *Environmental Protection Act 1986* (EP Act).

The refinery turns crushed bauxite into calcined alumina via the Bayer process. The extended

Bayer process used at Worsley has the following key elements;

- Grinding – Bauxite is delivered to the refinery via overland conveyor from the Boddington Bauxite operations. It then passes through a crushing/grinding circuit;
- Digestion – Crushed/ground bauxite is mixed with caustic at high temperature and pressure liberating odorous volatile organic compounds;
- Clarification – Washing, settlement and filtration of digested liquor (and diversion of “red mud” to Bauxite Residue Disposal Areas (BRDAs));
- Precipitation/Seed Preparation – The clarified liquor is cooled and seeded with precipitation of hydrated alumina crystals;
- Liquor Burning – Liquor and oxalate streams are passed through a high-temperature furnace to remove dissolved organic material and destroy oxalate;
- Calcination – Dehydration of hydrated alumina in high-temperature furnace to produce calcined alumina (a fine white powder); and
- Bauxite Residue Drying Area – Residual sand and mud (bauxite residue) from the process is pumped as an alkaline slurry to the residue drying area where excess caustic and liquor is collected and recycled through the process. Sodium oxalate which cannot be treated by the Liquor Burner is also stored in the bauxite residue drying areas and Solar Evaporation Ponds (SEPs) that have been converted into temporary oxalate storage dams.

The final calcined alumina product is stored on site before transport via rail to the Port of Bunbury for export.

The alumina refining process produces point source and broad scale gaseous and particulate emissions. Point source air emissions occur from digestion, calcination, liquor burning and power generating activities through 12 key stacks. Emissions of significance from the point sources include carbon monoxide, nitrogen oxides, sulfur dioxide, particulates, Volatile Organic Compounds (VOCs), mercury and greenhouse gases. Pollution control equipment has been installed at the majority of the point sources. Equipment installed includes Electrostatic Precipitators (ESP), Regenerative Thermal Oxidiser (RTO’s), wet scrubber, baghouses and low NOx burners. The Licence Holder maintains an air emissions inventory and commissioned a “Health Risk & Toxicological Assessment – Worsley Expansion Emissions” (Toxikos, April 2005) to predict the air emission impact as a result of increasing production to 4.7 million tonnes per year.

Fugitive particulate emissions and contaminated water and slurry are other emissions of significance for the premises. Fugitive particulate sources include bauxite grinding, bauxite and coal handling and stockpiles, hydrate stockpiles, rail loading and BRDAs. The BRDAs are the most significant of these sources as they cover the majority of the cleared area of the premises. The Licence Holder operates two high-volume dust samplers near the premises boundary to monitor particulate emissions in accordance with requirements of Ministerial Statement 719.

Storage of contaminated waste slurry in BRDAs and contaminated surface runoff present a ground and surface water contamination risk. This risk is managed through operating a closed water circuit with all contaminated water directed to a central storage area (Refinery Catchment Lake, RCL) and uncontaminated water directed to a separate temporary storage area (Fresh Water Lake, FWL) away from production areas. The BRDAs have low permeability clay liners with two under drainage systems which separate uncontaminated groundwater beneath the BRDA from potentially contaminated seepage via a network of underflow collection pipes. The under drainage systems are separated by a clay drainage blanket. Seepage is directed to downstream pipehead dams where it is collected and returned to the process via the RCL. The uncontaminated groundwater is collected, monitored and if contamination is not detected it is directed into the FWL. Regular groundwater monitoring is undertaken across the premises, including below the BRDAs, to detect contamination, seepage and changes in water quality in accordance with a Water Resources Management Plan required by Ministerial Statement 719.

In addition to alumina refining and power generation, other activities occurring on the premises include flyash disposal, the operation of a landfill, liquid waste disposal and sewage treatment.

The premises is currently in the process of converting power generated within Boilers 1, 2 and 3 from coal fired to gas fired boilers over a period commencing from 2023-2029. Multi Fuel Cogeneration Power Plant units 5 and 6 will continue to operate on a mix of biomass and coal. Flyash is generated from coal-fired power generation with captured flyash being disposed within specified areas of the BRDA's. The site landfill has also been established on a decommissioned BRDA. The landfill accepts inert and putrescible wastes generated on the site for disposal. The landfill also has a wet dump area which can accept wastewater generated off-site from pressure testing of refurbished tube heaters from the digestion part of the process. The landfill is equipped with an extensive leachate recovery system. Domestic grey water and sewage generated on the premises is directed to a Sequential Batch Reactor (SBR) waste water treatment plant with treatment via an extended aeration, activated sludge process. Treated water is discharged to the RCL for reuse in the Refinery.

The Bayer alumina refining process generates waste sodium oxalate. Sodium oxalate cake has historically been buried in trench pits within consolidated, trafficable parts of the BRDA. In 2014, the areas suitable for sodium oxalate disposal within the BRDA reached capacity. Subsequently, SEP1, SEP 2A, SEP3 and SEP4 have been converted into temporary sodium oxalate storage facilities. The storage of sodium oxalate in the SEPs is considered as a short to medium term disposal option for the Licence Holder, while a more sustainable disposal option is developed.

The licences and works approvals issued for the Premises since 28/09/2006 are:

Instrument log table		
Instrument	**Issued**	**Description**
L4504/1981/10	28/09/2006	Licence re-issue
L4504/1981/11	27/09/2007	Licence re-issue. Throughput increased to 3.7 million tonnes per annum.
W4430/2008/1	14/08/2008	Works approval to allow construction of MCF Boiler 5
W4432/2008/1	14/08/2008	Works approval to allow construction of MCF Boiler 6, Calciner 6 and increase capacity to 4.7 million tonnes per year.
L4504/1981/12	25/09/2008	Licence re-issue
L4504/1981/13	24/09/2009	Licence re-issue
L4504/1981/14	24/09/2010	Licence re-issue
L4504/1981/15	29/09/2011	Licence re-issue

L4504/1981/15	24/08/2012	Proponent amendment to increase production to 4.7 million tonnes per annum and allow operation of Boiler Unit 5 and Calciner 6.
L4504/1981/16	20/09/2012	Licence re-issue
L4504/1981/16	27/11/2014	Amendment to include improvement conditions.
L4504/1981/16	15/01/2015	Amendment to change Calciner 6 targets, remove Boiler 5 and convert to REFIRE format including a review of existing conditions.
L4504/1981/16	16/04/2015	Amendment to remove the requirement to monitor CO using CEMS on emission point A4 and replace with monitoring of RTO bed temperature as an indicator of VOC destruction.
L4504/1981/17	24/09/2015	Licence reissue and amendment to change the occupier name to South32 Worsley Alumina Pty Ltd, extend reporting due date, add category 61 liquid waste facility and administrative changes.
L4504/1981/17	29/04/2016	DWER initiated amendment to extend the licence duration 30/09/2024 in accordance with *Guidance Statement on Licence Duration (November 2014)*.
L4504/1981/17	04/08/2016	Amendment Notice 1: Licence amended to include Minister's Appeal Determination (Appeal no: 80 of 2015) and extend the compliance date of Condition 4.1.1, table 4.1.1 (IR2) until the 30 November 2016.
L4504/1981/17	11/11/2016	Licence amended to include Boiler 5 and Boiler 6 and remove ambient SO_2 monitoring stations Willis and 303. This amendment was done within the licence no amendment notices issued.
L4504/1981/17	28/07/2017	Amendment Notice 2: approval to construct and operate an additional process water storage dam – water body 1. Conditions 1.2.8 to 1.2.13 added in the licence. IR conditions IR2 and IR3 were removed from the licence. Also some administrative corrections conducted.
L4504/1981/17	16/10/2017	Amendment Notice 3: • Construction of an oxalate tipping area (tip plate) on the banks of SEP1; • Installation of a oxalate slurry hopper to receive the oxalate cake, sprinklers, an agitator, electrical infrastructure, pumps and a floating slurry release line into SEP1; • A pontoon pump for recovery of water and a delivery line from SEP 1 into the hopper (via sprinkler system) • Conditions 1.2.14 to 1.2.18 were added in the licence.
L4504/1981/17	10/03/2020	Amendment to include the two B&W Type "D" package boilers as prime energy generation units, incorporate the newly installed CEMS monitoring for Boilers 1-3. Also includes a DWER initiated licence amendment to consolidate separately issued amendment notices 1 to 3 into the licence.
L4504/1981/17	25/06/2020	Amendment to include the construction and operation of a sodium oxalate storage facility at SEP4 and to remove the requirement to monitor ambient SO_2. The amendment also includes a DWER initiated amendment to consolidate separately issued amendments into the licence.
L4504/1981/17	09/11/2020	CEO initiated amendment to correct typographical errors in condition 2.2.2.

L4504/1981/17	27/01/2022	CEO initiated amendment to: • update the actual fly ash deposition production capacity on the front page of the Licence to reflect the actual deposition rate from 65,000 tonnes per annum to 1000,000 tonnes per annum; • inclusion of fly ash as a waste in Condition 1.2.3 Table 1.2.2 Waste processing; • correct typographical errors in condition 4.2.1, 4.2.2 and 4.2.3; and • consolidation and clarification of existing reporting requirements
L4504/1981/17	03/03/2023	Amendment application to convert SEP 2A into a sodium oxalate storage facility.
L4504/1981/17	24/05/2023	Amendment to convert the burners, ignitors and associated infrastructure from coal to natural gas for Boilers 1, 2 and 3 in Facility 110.

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;*

'AACR' means Annual Audit Compliance Report, a report in a format approved by the CEO as presented by the Licence Holder or as specified by the CEO from time to time and published on the Department's website and a copy of the AACR form is accessible from the DWER website;

'Annual Period' means the inclusive period from 1 July until 30 June in the following year;

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

'AS 3580.14' means the Australian Standard AS *3580.14* Methods for sampling and analysis of ambient air - Meteorological monitoring for ambient air quality monitoring applications;

'AS 4323.1' means the Australian Standard AS4323.1 *Stationary Source Emissions Method 1: Selection of sampling positions;*

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

'Biomass fuel' means fuel derived from untreated wood waste sourced from pine plantations or native forest;

'BRDA' means Bauxite Residue Disposal Area;

'CEMS' means continuous emissions monitoring system;

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

'CEO' means Chief Executive Officer of the Department of Water and Environmental Regulation;

'CEO' for the purpose of correspondence means:

Chief Executive Officer
Department Administering the *Environmental Protection Act 1986*
Locked Bag 10
JOONDALUP DC WA 6027

Telephone: (08) 6364 6666
Email: info@dwer.wa.gov.au

'Clean Fill' has the meaning defined in *Landfill Waste Classification and Waste Definitions 1996* published by DEC and as amended from time to time;

‘controlled waste’ has the definition in Environmental Protection (Controlled Waste) Regulations 2004;

‘Department’ means the department established under s.35 of the Public Sector Management Act 1984 and designated as responsible for the administration of Division 3 Part V of the *Environmental Protection Act 1986*;

‘DWER’ means Department of Water and Environmental Regulation;

‘Environmental Compliance Report’ means a report to satisfy the CEO that the conditioned infrastructure and equipment has been constructed and installed in accordance with the licence;

‘GCL’ means a geosynthetic clay liner made of two layers of woven fabric like material with bentonite clay in the middle;

‘HDPE’ means High Density Polyethylene which is a plastic liner made from petroleum that has ultraviolet and chemical resistant properties;

‘Inert Waste Type 1’ has the meaning defined in Landfill Waste Classification and Waste Definitions 1996 published by the CEO and as amended from time to time;

’Inert Waste Type 2‘ has the meaning defined in Landfill Waste Classification and Waste Definitions 1996 published by the CEO and as amended from time to time;

‘Licence’ means this Licence numbered L4504/1981/17 and issued under the Act;

‘Licensee’ means the person or organisation named as the Licence Holder on page 1 of the Licence;

‘Chemical/Electrical Engineer’ means a person who:

(a) holds a tertiary qualification in chemical/electrical engineering; and
(b) has a minimum of ten years of experience working in the area of natural gas combustion; and
(c) holds membership of the Institute of Engineers Australia,

or is otherwise approved by the CEO to act in this capacity.

‘NATA’ means the National Association of Testing Authorities, Australia;

‘NATA accredited’ means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis;

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

‘oxalate’ means sodium oxalate cake, a mix of caustic liquor and sodium oxalate derived from the refinery process;

‘PM’ means total particulate matter including both solid fragments of material and minuscule droplets of liquid;

‘PM_{10}’ means particles with an aerodynamic diameter of less or equal to 10 µm;

‘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 Waste’ means the organic component of the waste stream which can be decomposed by microbial action and become putrid and likely to cause obnoxious odours

and attract (scavenging) birds or animals; putrescible waste includes food wastes or wastes of animal or vegetable origin;

'PVC' means Polyvinyl Chloride and is used to describe a plasticised and flexible, waterproof engineered geomembrane liner that was first developed in the 1950's.

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

'quarter' means a three-month period of the year from 1 January to 31 March, 1 April to 30 June, 1 July to 30 September or 1 October to 31 December;

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

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

'Schedule 3' means Schedule 3 of this Licence unless otherwise stated;

'SEP, SEP2, SEP3 and SEP4' means solar evaporation pond 1, solar evaporation pond 2, solar evaporation pond 3 and solar evaporation pond 4 as shown in Schedule 1: Map of premises and containment infrastructure;

'shut-down' means the period when plant or equipment is brought from normal operating conditions to inactivity;

'stack test' means a discrete set of samples taken over a representative period at normal operating conditions;

'start-up' means the period when plant or equipment is brought from inactivity to normal operating conditions;

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

'SW-846 Method 0011' means the promulgated Test Method SW-846/ 0011 – Sampling for Selected Aldehyde and Ketone Emissions from Stationary Sources;

'USEPA' means United States (of America) Environmental Protection Agency;

'USEPA Method 5' means the promulgated Test Method 5 - Determination of Particulate Matter Emissions from Stationary Sources;

'USEPA Method 6C' means the promulgated Test Method 6C – Determination of Sulfur Dioxide Emissions from Stationary Sources (Instrumental Analyzer Procedure);

'USEPA Method 7E' means the promulgated Test Method 7E – Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure);

'USEPA Method 10' means the promulgated Test Method 10 – Determination of Carbon Monoxide Emissions from Stationary Sources;

'USEPA Method 17' means the promulgated Test Method 17- Determination of Particulate Matter Emissions from Stationary Sources;

'USEPA Method 18' means the promulgated Test Method 18 – Measurement of Gaseous Organic Compound Emissions by Gas Chromatography;

'USEPA Method 26' means the promulgated Test Method 26 – Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources, Non-Isokinetic Method;

'USEPA Method 26A' means the promulgated Test Method 26A – Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources, Isokinetic Method

'USEPA Method 29' means the promulgated Test Method 29 – Determination of Metals Emissions from Stationary Sources;

'USEPA Method 201A' means the promulgated Test Method 201A – Determination of PM10 Emissions (Constant Sampling Rate Procedure);

'usual working day' means 0800 – 1700 hours, Monday to Friday excluding public holidays in Western Australia; and

'waste' has the meaning defined in the *Environmental Protection Act 1986*.

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 only accept waste onto the Premises if:

(a) it is of a type listed in Table 1.2.1;
(b) the quantity accepted is below any quantity limit listed in Table 1.2.1; and
(c) it meets any specification listed in Table 1.2.1.

Table 1.2.1: Waste acceptance

Waste	Waste Code	Specification[1]	Quantity limit
Industrial Wash Water		Liquid waste received from pressure testing of Worsley Alumina Refinery digestion heaters and associated vehicle wash down only	100 tonnes per annual period in total
Car and truck wash waters	L100		
Industrial wash waters contaminated with controlled waste	L150		

Note 1: Additional requirements for the acceptance of controlled waste are set out in the Environmental Protection (Controlled Waste) Regulations 2004.

1.2.2 The Licensee shall ensure that where waste does not meet the waste acceptance criteria set out in conditions 1.2.1 it is removed from the Premises by the delivery vehicle or, where that is not possible, the Licensee shall contact the CEO to agree on a course of action in relation to the waste.

1.2.3 The Licensee shall ensure that wastes accepted into the landfill and wastewater treatment plant are only subjected to the processes set out in Table 1.2.2 and in accordance with any process limits described in that Table.

Table 1.2.2: Waste processing		
Waste type	**Process**	**Process limits[1,2]**
Bauxite Residue	Disposal in BRDA's.	N/A
Fly Ash	Disposal in BRDA's	110,000 tonnes per annual period
Oxalate	Oxalate disposal in BRDAs to be covered with bauxite residue immediately following disposal. Oxalate disposal in SEP1, SEP 2A, SEP3 and SEP4 to be submerged in water immediately following disposal.	N/A
Inert Waste Type 1	Handling and disposal of waste by landfilling Disposal of waste by landfilling shall only take place within the landfill cells within BRDA 3.	15,000 tonnes per annual period
Inert Waste Type 2		
Clean Fill		
Wastes generated from alumina production and associated activities. Excludes: (i) Elemental mercury (ii) Asbestos materials (iii) Packaged laboratory chemical wastes; and (iv) Clinical wastes		
Putrescible Waste		500 tonnes per annual period
Sewage	Sequence Batch Reactor (SBR) Treated wastewater to be disposed to the Refinery Catchment Lake only.	270 cubic metres per day
Controlled liquid wastes as specified in Table 1.2.1	Receipt, handling and landfilling. Liquid waste is discharged to a "wet dump area" within BRDA 3.	100 tonnes per annual period

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

1.2.4 The Licensee shall ensure that waste material is only stored and/or treated within vessels or compounds provided with the infrastructure detailed in Table 1.2.3 and as identified on the Map of premises and containment infrastructure in Schedule 1.

Table 1.2.3: Containment infrastructure		
Reference and location on Map of premises and containment infrastructure	**Material**	**Requirements**
BRDA 1, 2, 3, 4, 4X and 5	Bauxite residue, oxalate and controlled liquid waste	Low permeability clay lined with liquor collection system installed (pipework and decant) to transport liquor to PHDs. Groundwater underflow collection pipes to collect groundwater and relieve pressure on liners and allow detection of any residue liquor. Groundwater is transported to the PHDs.
Fresh Water Lake (FWL)	Uncontaminated surface water and groundwater from within the refinery lease.	None.
Pipehead Dams (PHDs)	NVPHD – residue liquor from BRDAs 1,2,3,4 & 4X SVPHD – residue liquor from BRDA 5	Low permeability clay lined with a chemical grout curtain installed below the earth embankment to prevent downstream migration of high pH residue liquor. Depressurisation bores located upstream to ensure groundwater is directed to bores and not lower parts of the catchment.
Refinery Catchment Lake (RCL)	Recirculated process cooling water from Refinery, residue liquor from PHD's and outflow from Sequence Batch Reactor	Low permeability clay lined.
Sewage sludge vessels	Sewage sludge	Enclosed tanks which return sludge leachate to the start of the Sequence Batch Reactor process.
Solar Evaporation Pond (SEP) 1, 4 and 2A	Oxalate	• HDPE liner with a permeability of 10^{-9} m/s and slotted underflow pipes to collect groundwater which may impact on the base of the liners. • a minimum top embankment freeboard of 500 mm is maintained at all times • conduct periodic assessment of permeability of the composite HDPE/GCL liner; and • undertake remedial action/repairs as required to the liner and underdrainage system.
SEP3	Oxalate	• PVC lined with a permeability of 10^{-9} m/s;

Table 1.2.3: Containment infrastructure		
Reference and location on Map of premises and containment infrastructure	**Material**	**Requirements**
		• a minimum top embankment freeboard of 500 mm is maintained at all times • conduct periodic assessment of permeability of the PVC liner • undertake remedial action/repairs to the liner as required
Water Body 1	Process water and decant water balancing pond	• HDPE lined with a permeability of 10^{-9} m/s and slotted underflow pipes to collect groundwater and seepage which may impact on the base of the liners. • conduct periodic integrity test of permeability of the composite HDPE/GCL liner • undertake remedial action/repairs to the liner and underdrainage system as required; and • a minimum top embankment freeboard of 500 mm is maintained at all times.

1.2.5 The Licensee shall manage the landfilling activities to ensure:

(a) Waste is placed in a defined trench within the defined landfill cell within BRDA 3;
(b) Waste is covered with clean fill, bauxite residue, sand or other similar material on a minimum weekly basis; and
(c) A register of waste disposed of to landfill cells is maintained.

1.2.6 The Licensee shall store oxalate in a manner which ensures it remains moist or maintained underwater or beneath a full surface cover that ensures dust is not generated from oxalate storage.

1.2.7 The Licensee shall ensure that the total quantity of alumina produced does not exceed 4,700,000 tonnes per annual period.

1.2.8 The Licensee shall:

(a) Construct/ install the infrastructure and/or equipment;
(b) in accordance with the corresponding design and construction / installation requirements;
(c) at the corresponding infrastructure location;
(d) within the corresponding timeframe, and
(e) as set out in Table 1.2.8.

Table 1.2.8: Design and construction / installation requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location	Timeframe
1.	Stage 1 Boiler 3 (A3)	Remove existing coal burners and gas igniters Retrofit eight gas burners that are: Tangentially fired with air/gas mixing nozzles for low NOx generation and have a titling mechanism	A3 in Map of emissions Points in Schedule 1	December 2023
2.	Stage 2 Boiler 1 (A1)		A1 in Map of emissions Points in Schedule 1	December 2024
3.	Stage 3 Boiler 2 (A2)		A2 in Map of emissions Points in Schedule 1	December 2029

1.2.9 The licence holder must within 60 calendar days of an item of infrastructure or equipment required by condition 1.2.8 being constructed and/or installed:

(a) undertake an audit of their compliance with the requirements of condition 1.2.8; and
(b) prepare and submit to the CEO an Environmental Compliance Report on that compliance.

1.2.10 The Environmental Compliance Report required by condition 1.2.9, must include as a minimum the following:

(a) certification by an independent Chemical/Electrical Engineer that the component(s) thereof, as specified in condition 1.2.8, have been constructed in accordance with the relevant requirements specified in condition 1.2.8;
(b) as constructed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in condition 1.2.8; and
(c) be signed by a person authorised to represent the licence holder and contains the printed name and position of that person.

2 Emissions

2.1 General

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

2.2 Point source emissions to air

2.2.1 The Licensee shall ensure that where waste is emitted to air 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 air

Emission point reference and location on Map of emission points	Emission Point	Emission point height (m)	Source, including any abatement
A1	Boiler Flue 1	76	Coal Fired Power Station Boiler Unit 1 via Electrostatic Precipitator; or Gas-fired boilers with low NOx burners (tangentially fired, mixed air/gas low NOx nozzle with a tilting mechanism)
A2	Boiler Flue 2		Coal Fired Power Station Boiler Unit 2 via Electrostatic Precipitator; or Gas-fired boilers with low NOx burners (tangentially fired, mixed air/gas low NOx nozzle with a tilting mechanism)
A3	Boiler Flue 3		Coal Fired Power Station Boiler Unit 3 via Electrostatic Precipitator; or Gas-fired boilers with low NOx burners (tangentially fired, mixed air/gas low NOx nozzle with a tilting mechanism)
A4	Digestion (RTO) Stack	40	Digestion Unit 1 and 2 via RTO
A5	Calciner Stack 1	40	Calciner 1 via Electrostatic Precipitator
A6	Calciner Stack 2	40	Calciner 2 via Electrostatic Precipitator
A7	Calciner Stack 3	40	Calciner 3 via Electrostatic Precipitator
A8	Calciner Stack 4	40	Calciner 4 via Electrostatic Precipitator
A9	Calciner Stack 5	40	Calciner 5 via Electrostatic Precipitator
A10	Calciner Stack 6	60	Calciner 6 via Baghouse
A11	Liquor Burner (RTO) Stack	105	Liquor Burner Facility via Baghouse, wet scrubber and RTO
A12	Cogeneration Plant Stack	55	Gas-Fired Cogeneration Plant with Low NOx Burners
A13	MFC Boiler Flue 5	90	Multi Fuel Cogeneration Power Plant Boiler Unit 5, via baghouse. Maximum biomass fuel use of 30% (thermal substitution)
A14	MFC Boiler Flue 6		Multi Fuel Cogeneration Power Plant Boiler Unit 6, via baghouse. Maximum biomass fuel use of 30%

Table 2.2.1: Emission points to air			
Emission point reference and location on Map of emission points	**Emission Point**	**Emission point height (m)**	**Source, including any abatement**
			(thermal substitution)
A15	Packaged Boiler 4	17.6	Babcock and Wilcox Type D Package Boiler
A16	Packaged Boiler 5	17.6	Babcock and Wilcox Type D Package Boiler

2.2.2 The Licensee shall target point source emissions to air at or below the levels specified in Table 2.2.2.

Table 2.2.2: Point source emission targets to air			
Emission point ref	**Parameter**	**Target (including units)[1,2,3]**	**Averaging period**
A1 – A3	Carbon Monoxide	88 mg/m^3	CEMS (60 minute average)
	Nitrogen Oxides	990 mg/m^3	
	Sulphur Dioxide	2200 mg/m^3	
	PM	150 mg/m^3	CEMS (60 minute average)
	Fluoride	4.8 mg/m^3	Stack test (60 minute average)
	PM	150 mg/m^3	Stack test and CEMS (60 minute average)
A4	Carbon Monoxide	100 mg/m^3	Stack test (30 minute average)
	Benzene	3.5 mg/m^3	Stack test (30 minute average)
	Mercury	67.2 mg/m^3	Stack test (60 minute average)
	Acetaldehyde	7.0 mg/m^3	
	Formaldehyde	6.3 mg/m^3	
A5 – A8	Carbon Monoxide	330 mg/m^3	Stack test (30 minute average)
	Nitrogen Oxides	220 mg/m^3	
	Benzene	2 mg/m^3	
	Acetaldehyde	14.4 mg/m^3	Stack test (60 minute average)
	Formaldehyde	11.5 mg/m^3	
	PM	250 mg/m^3	Stack test and CEMS (60 minute average)
A9	Carbon Monoxide	330 mg/m^3	Stack test (30 minute average)
	Nitrogen Oxides	220 mg/m^3	
	Benzene	2 mg/m^3	
	Acetaldehyde	14.4 mg/m^3	Stack test (60 minute average)
	Formaldehyde	11.5 mg/m^3	
	PM	150 mg/m^3	Stack test and CEMS (60 minute average)
A10	Carbon Monoxide	120 mg/m^3	Stack test (30 minute average)
	Nitrogen Oxides	220 mg/m^3	
	Benzene	2 mg/m^3	
	Acetaldehyde	14.4 mg/m^3	Stack test (60 minute average)
	Formaldehyde	11.5 mg/m^3	
	PM	80 mg/m^3	Stack test and CEMS (60 minute average)
A11	Carbon Monoxide	100 mg/m^3	Stack test (30 minute average) and CEMS (60 minute average)
	Nitrogen Oxides	245 mg/m^3	Stack test (30 minute average)
	Benzene	3.5 mg/m^3	
	Acetaldehyde	7 mg/m^3	Stack test (60 minute average)
	Formaldehyde	6.3 mg/m^3	
A12	Nitrogen Oxides	70mg/m^3	Stack test (30 minute average)
A13 – A14	Carbon Monoxide	100 mg/m^3	

Table 2.2.2: Point source emission targets to air			
Emission point ref	**Parameter**	**Target (including units)[1,2,3]**	**Averaging period**
	Nitrogen Oxides	500 mg/m^3	Stack test and CEMS (60 minute average)
	Sulphur Dioxide	600 mg/m^3	
	Fluoride	2.0 mg/m^3	Stack test (60 minute average)
	PM	80 mg/m^3	Stack test and CEMS (60 minute average)
A15 – A16	Carbon Monoxide	125mg/m^3	Stack test (30 minute average)
	Nitrogen Oxides	350mg/m^3	
	Volatile Organic Compounds	40 mg/m^3	

Note 1: All units are referenced to STP dry

Note 2: Concentration units for A1-A3; A13-A14 are referenced to 7% O_2. Concentration units for A5-A9 are referenced to 6% O_2. Concentration unit for A10 is referenced to 9% O_2. Concentration unit for A12 is referenced to 15% O_2. Concentration units for A15-A16 is referenced to 3% O_2. When continuous oxygen correction is not available and for parameters requiring CEMS, targets shall not be achieved by the addition of dilution gases

Note 3: All targets apply during normal operating conditions

2.2.3 The Licensee shall take the specified management action in the case of an event in Table 2.2.3.

Table 2.2.3: Management actions			
Emission point reference	**Event/ action reference**	**Event**	**Management action**
A1 – A3 A5 – A11 A13 – A14	EA1a	Parameters monitored by CEMS exceed the target specified in Table 2.2.2	The Licensee shall submit a quarterly summary of environmental controls for an emission point that triggers EA1a or EA1b and include: (a) An analysis of the root cause(s) and contributing factors of the target exceedances; and (b) Short and long term corrective actions taken or planned to prevent reoccurrence of the exceedances, including timelines for implementation;
A1 – A16	EA1b	Parameters monitored by stack tests exceed the target specified in Table 2.2.2	
A1 – A3 A5 – A10 A13 – A14	EA2	USEPA Performance Specification 11 CEMS correlation via manual stack sampling causes an exceedance of particulates target.	The Licensee shall notify the CEO in writing 7 days prior to the commencement of the annual CEMS calibration curve correlation.
A4	EA4	Digestion Unit 1 (RTO60) or 2 (RTO70) average RTO bed temperature falls below target temperature in Table 2.2.4.	The Licensee shall initiate shut down of the digestor RTO unit.
A11	EA3	Online instrumentation identifies the failure of 3 or more baghouse cells.	The Licensee shall immediately initiate shut down of the Liquor Burner.

2.2.4 The Licensee shall take all practical measures to ensure that the process control parameters in Table 2.2.4 comply with the requirements specified in that table.

Table 2.2.4.: Process controls for emissions to air		
Parameter	**Target**	**Averaging period**
Digestion Unit 1 (RTO60) and 2 (RTO70) average RTO bed temperature	700 °C or greater	Continuous

3 Monitoring

3.1 General monitoring

3.1.1 The Licensee shall ensure that all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured.

3.1.2 The Licensee shall ensure that:

(a) quarterly monitoring is undertaken at least 45 days apart;
(b) biannual monitoring is undertaken at least 5 months apart; and
(c) annual monitoring is undertaken at least 9 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 and the requirements of the Licence and any relevant Australian standard.

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

3.2 Monitoring of point source emissions to air

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

Table 3.2.1: Monitoring of point source emissions to air					
Emission point reference	**Parameter**	**Units[1, 3]**	**Averaging period**	**Frequency[2]**	**Method**
A4 – A11 A15 – A16	Carbon monoxide	mg/m^3 g/s	Stack test (minimum 30 minute average)	Quarterly	USEPA Method 10
A1-A3 A11 A13 – A14			CEMS (60 minute average)	Continuous	CEMS
A5 – A11 A15 – A16	Nitrogen oxides		Stack test (minimum 30 minute average)	Quarterly	USEPA Method 7E
A12				Biannual	
A1 – A3 A13 – A14			CEMS (60 minute average)	Continuous	CEMS
A1 – A3 A13 – A14	Sulfur dioxide		CEMS (60 minute average)	Continuous	CEMS
A1 – A3 A5 – A10	PM10		Stack test (minimum 60	Annual	USEPA Method 201A

Table 3.2.1: Monitoring of point source emissions to air					
Emission point reference	**Parameter**	**Units[1, 3]**	**Averaging period**	**Frequency [2]**	**Method**
			minute average)		
A1 – A3 A5 – A10 A13 – A14	PM		Stack test (minimum 60 minute average)	Annual	USEPA Method 5, 17 or 201A
			CEMS (60 minute average	Continuous[4]	CEMS via suitable annual correlation of referenced particulates
A1 – A3 A13 – A14	Fluoride		Stack test (minimum 60 minute average)	Annual	USEPA Method 26 or 26A
A4 – A11	Benzene		Stack test (minimum 30 minute average)	Quarterly	USEPA Method 18
A4	Mercury		Stack test (minimum 60 minute average)	Quarterly	USEPA Method 29
A1 – A3 A5 – A10 A13 – A14	Metals – As, Be, Cd, Co, Cr, Cu, Hg, Mn, Ni, Pb, Zn			Annual	
A4 – A11	Acetaldehyde & Formaldehyde		Stack test (minimum 60 minute average)	Quarterly	USEPA SW846 Method 0011
A1 – A11 A13 – A16	Total Volatile Organic Compounds		Stack test (minimum 30 minute average)	Annual	USEPA Method 18

Note 1: All units are referenced to STP dry.

Note 2: Monitoring shall be undertaken to reflect normal operating conditions and any limits or conditions on inputs or production.

Note 3: Concentration units for A1-A3 and A13-A14 are referenced to 7% O_2. Concentration units for A5-A9 are referenced to 6% O_2. Concentration unit for A10 is referenced to 9% O_2. Concentration unit for A12 is referenced to 15% O_2. When continuous oxygen correction is not available and for parameters requiring CEMS, targets shall not be achieved by the addition of dilution gases.

Note 4: Continuous monitoring is required once CEMS are installed and operational in accordance with the CEMS Code.

3.2.2 The Licensee shall ensure that sampling required under Condition 3.2.1 of the Licence is undertaken at sampling locations in accordance with the AS 4323.1 or relevant part of the CEMS Code.

3.2.3 The Licensee shall ensure that all non-continuous sampling and analysis undertaken pursuant to condition 3.2.1 is undertaken by a holder of NATA accreditation for the relevant methods of sampling and analysis.

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

3.3 Process monitoring

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

Table 3.3.1: Process monitoring					
Monitoring point reference	**Process description**	**Parameter**	**Units**	**Frequency**	**Method**
Digestion RTO60: Bed Htr A Bed Htr B Centre	VOC destruction	Temperature	°C	Continuous	None specified
Digestion RTO70: Bed Htr A Bed Htr B Centre					

3.4 Meteorological monitoring

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

Table 3.5.1: Meteorological monitoring				
Monitoring point reference and location on Map of ambient air emission monitoring sites	**Parameter**	**Units**	**Height**	**Method**
RMS	Wind speed	m/s	10 m	AS 3580.14
	Wind direction	Degrees		
	Wind direction standard deviation			
	Air temperature	°C	2 m	
	Relative humidity	%		
	Solar radiation	W/m^2	Not specified	

3.4.2 The Licensee shall ensure that the monitoring equipment is operated and calibrated in accordance with the required methodology and is maintained so as to provide valid data for greater than 90% of the measurement intervals in every calendar month, and greater than 95% of the measurement intervals over any 12 consecutive calendar months.

3.5 Monitoring of inputs and outputs

3.5.1 The Licensee shall undertake the monitoring in Table 3.6.1 according to the specifications in that table.

Table 3.6.1: Monitoring of inputs and outputs			
Input/ Output	**Parameter**	**Units**	**Frequency**
Coal	Sulfur content	% by weight	Every train wagon on delivery
Alumina	Production rates	tonnes	Annually
			Daily during stack test monitoring carried out in accordance with Table 3.2.1
Biomass	Thermal substitution of biomass (emission points A13 and A14)	%	Monthly

4 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 must submit to the CEO by 30 September after the end of the annual period, an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the Conditions in the Licence for the 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 September after the end of the annual period. The report shall contain the information listed in Table 5.2.1 in the format or form specified in that table.

Table 4.2.1: Annual Environmental Report

Condition or table	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
4.1.3	Complaints summary	None specified
1.2.5	Plan of the location of landfill cells used during the annual reporting period	Map
	Production summary of the quantity of alumina refined during the annual period	None specified
1.2.3	Summary of entries into the waste register including the total volume of each waste type	Table
3.3.1	Summary of Digestor RTO bed temperature monitoring for each unit over the annual period	None specified
Table 3.2.1	Results of quarterly, biannual and annual stack testing	Table and/or graph
	Summary of CEMS data	
	Trend analysis of results for both CEMS and stack test data for each emission point reference	Table and/or graph with descriptive explanation where the targets specified in Table 2.2.2 are exceeded for that emission reference point

Table 4.2.1: Annual Environmental Report		
Condition or table	**Parameter**	**Format or form[1]**
	Summary of specified management actions for each emission point reference over the previous 3 years commencing from the 2021-2022 annual reporting period	None specified
3.2.4	Relative Accuracy Test Audit (RATA) conducted at least once per annual period and in accordance with the CEMS Code	RATA1
Table 3.6.1	Summary of results for each parameter over the annual period.	None specified
	Average daily coal sulphur content for five days preceding stack test monitoring carried out in accordance with Table 3.2.1(emission points A1to A3)	Table and/or graph
	Biomass substitution during stack test monitoring carried out in accordance with Table 3.2.1 (emission points A13 and A14)	Table and/or graph

4.2.2 The Licensee shall ensure that the Annual Environmental Report also contains an assessment of the information contained within the report against previous monitoring results and Licence limits and/or targets.

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	**Parameter**	**Reporting period**	**Reporting date**	**Format or form[1]**
Tables 2.2.2 and 2.2.4	Exceedance of any descriptive or numerical target	Quarterly	Within 35 days of the end of the quarter	ET1 and Quarterly monitoring Report
2.2.3	Specified management actions	Quarterly	Not more than 35 days after the end of the quarter in which the Licensee identified that an exceedance occurred.	Quarterly monitoring report
-	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

Note 1: Forms are in Schedule 2

4.2.4 The Licensee shall ensure that results from CEMS are made available on request as tabulated data and time series graphs including:

(a) times and dates;
(b) unavailability of abatement;
(c) target or limit exceedances; and
(d) an assessment of the information contained within the report against previous submissions and Licence limits and/or targets.

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	**Parameter**	**Notification requirement[1]**	**Format or form[2]**
3.1.4	Calibration report	As soon as practicable.	None specified
	Breach of any limit specified in the Licence	Part A: As soon as practicable, but no later than 5pm on the next usual working day. Part B: Within 7 working days of becoming aware of the exceedance.	N1

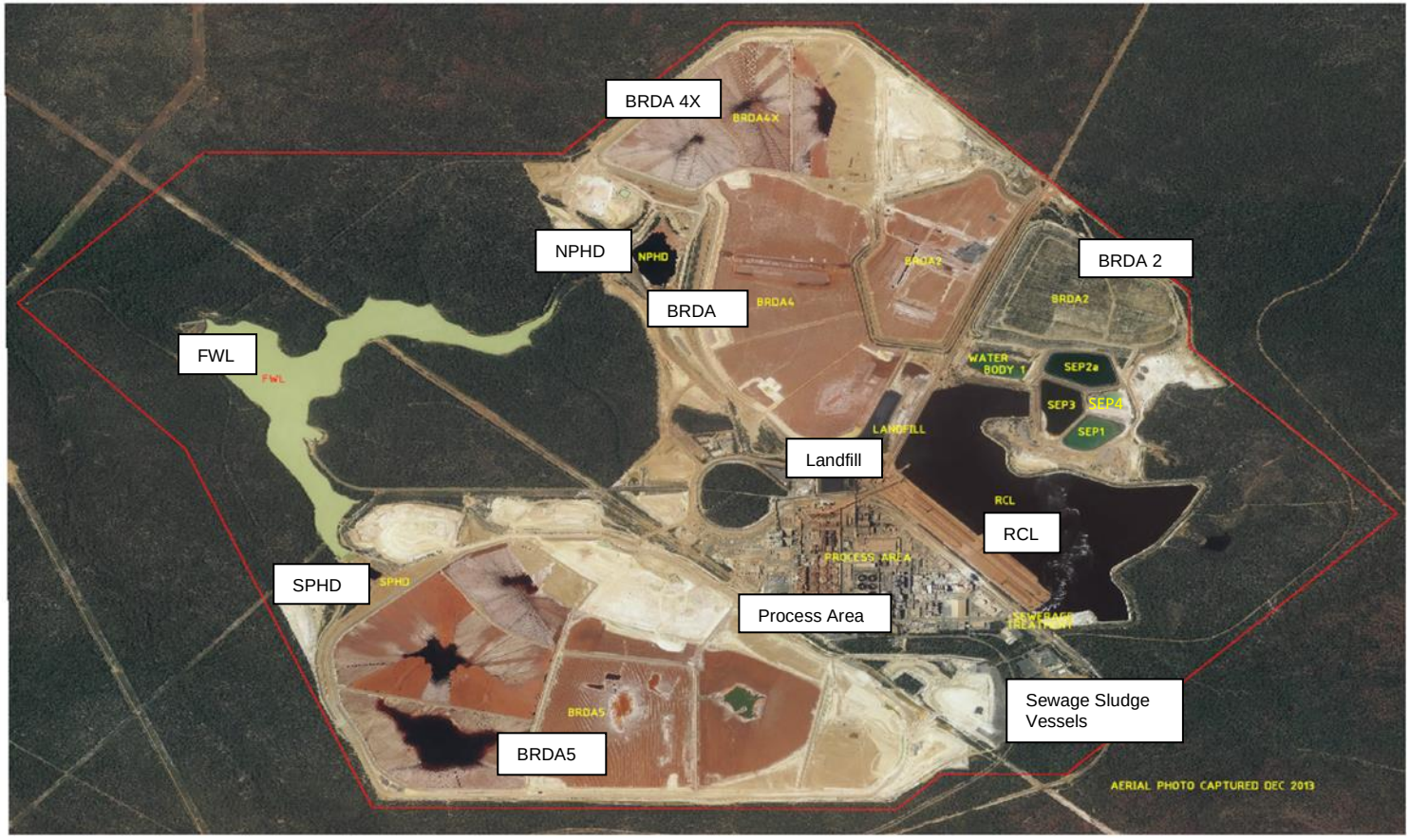
Note 1: Forms are in Schedule 2

(f)

Schedule 1: Maps

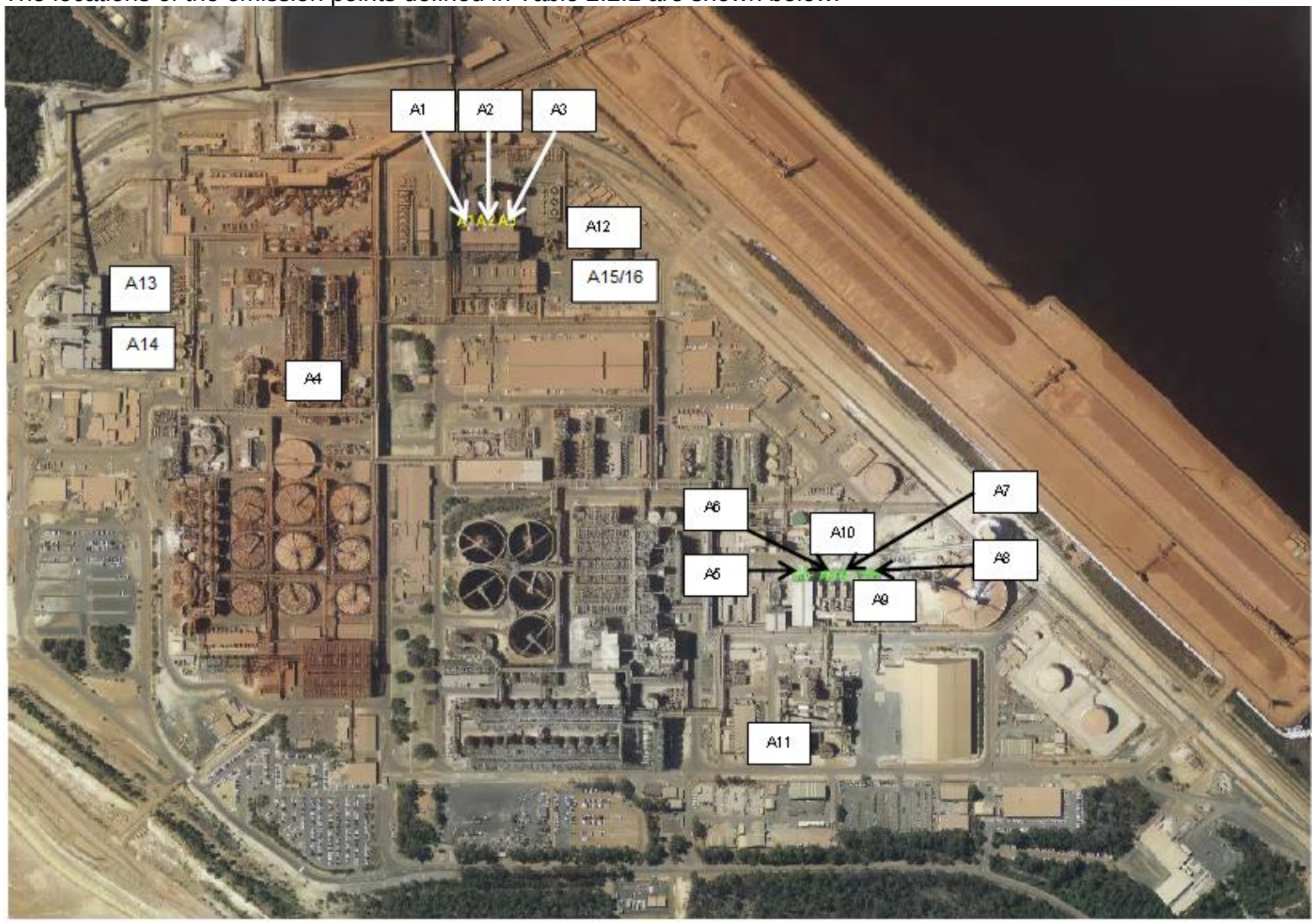
Premises map

The Premises are shown in the map below. The red line depicts the Premises boundary. The locations of the containment infrastructure identified in Table 1.2.3 are shown below.



Map of emission points (emission to air)

The locations of the emission points defined in Table 2.2.1 are shown below.



Map of ambient air emission monitoring sites

The locations of the emission points defined in Table 3.5.1 are shown below

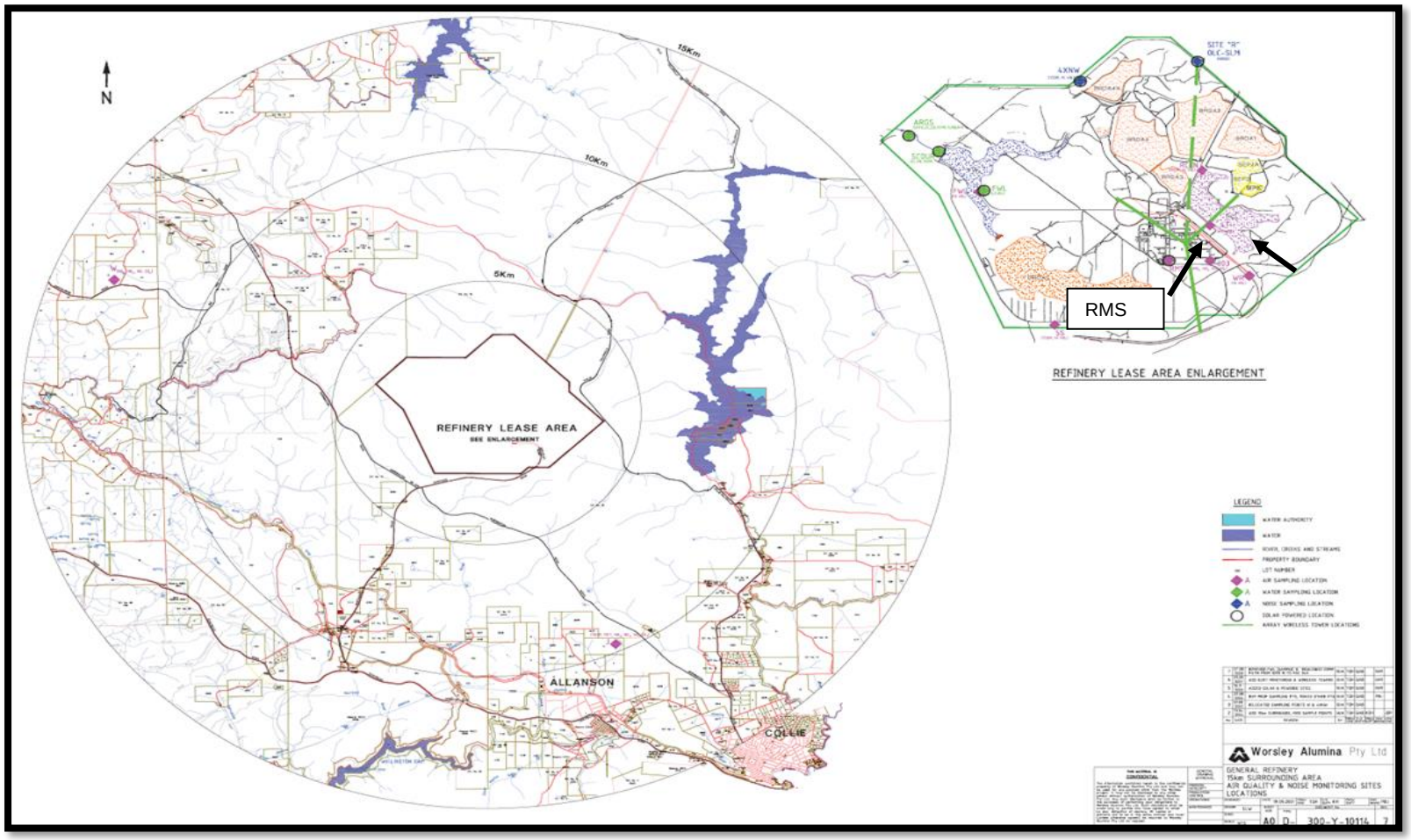


Figure 1: Map for the location of the hopper in relation to Solar Evaporation Pond 4

Water Body 1 Location

Location of Water Body 1 in relation to the premises and lease boundary.

Source: Worsley Alumina RCL Extension application letter (S32 WAPL, 2017a)

Schedule 2: Notification & forms

Licence: L4504/1981/17 Licensee: South32 Worsley Alumina Pty Ltd

Form: RATA1 Period:

Name: Monitoring of CEMS Performance

Form AR2: RATA							
Emission point	**Parameter**	**Reference Method**	**Run**	**Sample date & times**	**Reference Result**	**CEMS Result**	**Unit**
A12	Carbon Monoxide	USEPA Method 10	1				
			2				
			3				
			4				
			5				
			6				
			7				
			8				
			9				
			10				
			11				
			12				
Relative Accuracy							%
Bias							%

Signed on behalf of South32 Worsley Alumina Pty Ltd: ……..

Date: ……..

Forms: ET1

Licence: L4504/1981/17 Licensee: South32 Worsley Alumina Pty Ltd

Form: ET1 Period:

Name: Target exceedances

Form ET1: Target exceedances
Please provide an analysis of the target exceedances for the quarter, including but not limited to: (a) the emission point (b) the date and time of the exceedance and period over which the exceedance occurred (c) the root cause analysis for the exceedances; (d) any common or contributory factors including but not limited to fuel, mass emissions, gas flow rates, inlet & exit temperature, abatement status; (e) a description of remedial measures taken or planned to be taken, including those taken to prevent recurrence of the exceedances; (f) complaints received that may have been caused by this exceedance; and (g) for those exceedances that may have caused complaints, meteorological details: temperature, wind speed and wind direction, humidity.

Signed on behalf of South32 Worsley Alumina Pty Ltd: ……..

Date: ……

Form: N1

Licence: L4504/1981/17 Licensee: South32 Worsley Alumina 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: BHP Billiton South32 Worsley Alumina Pty Ltd	
Date	