

Environmental Licence

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT

Environmental Protection Act 1986

LICENCE

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

NAME OF OCCUPIER:

Alcoa World Alumina Australia

ADDRESS OF OCCUPIER:

PO Box 84
Waroona WA 6215

NAME AND LOCATION OF PREMISES:

Wagerup Alumina Refinery
Willowdale Road, off South West Highway
Waroona WA 6215

Environmental Protection Regulations 1987

CLASSIFICATION(S) OF PREMISES:

Category 46 - Bauxite Refining
Category 52 - Electric Power Generation
Category 64 - Putrescible Landfill Site

COMMENCEMENT DATE OF LICENCE: Friday, 13 August 2004

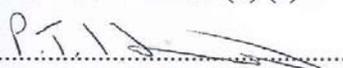
EXPIRY DATE OF LICENCE: Friday, 12 August 2005

CONDITIONS OF LICENCE:

As described and attached:

DEFINITIONS

GENERAL CONDITION(S) (9)
AIR POLLUTION CONTROL CONDITION(S) (19)
SOLID WASTE CONTROL CONDITION(S) (4)
WATER POLLUTION CONTROL CONDITION(S) (5)
NOISE CONDITION(S) (3)


.....
Officer delegated under Section 20
of the *Environmental Protection Act 1986*

Date of Issue: Thursday, 12 August 2004

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

CONDITIONS OF LICENCE

SECTION 1: DEFINITIONS

In these conditions of licence, unless inconsistent with the text or subject matter:

"advise" means advise in writing (letter, facsimile or e-mail) from time to time;

"aggregate calciner VOC emissions" means the sum of calciner VOC emissions calculated in accordance with Table 6 of Appendix A for the purposes of condition A2(a);

"approved" means approved in writing from time to time;

"approval" means approval in writing from time to time;

"AWN" means the report "Environmental Audit: Alcoa World Alumina Australia Wagerup Refinery" April 2002 - May 2003, Report No: D64 Final Report Date of Issue: 19/05/2003

"AS" means Australian Standard;

"calciner low volume stack" means Calciner 1-3 vacuum pump and hydrate filter hoods;

"calciner VOC emissions" means the combined emissions of Acetaldehyde, Acetone, 2-butanone, Formaldehyde and Benzene which are monitored in accordance with Table 6 of Appendix A and condition A10(b);

"CEO" means Director, Environmental Management Division of the Department of Environment for and on behalf of the Chief Executive Officer as delegated under Section 20 of the *Environmental Protection Act 1986*;

"dark smoke" means that, if compared with a chart known as the Australian Miniature Smoke Chart (AS 3543 1989), the smoke would appear darker than shade 1 on that chart;

"DOE" means Department of Environment;

"CEO", "Director" and "Department of Environment" for the purpose of correspondence means -

Regional Manager, Kwinana Peel Region
Department of Environment
PO Box 454
KWINANA WA 6966

Telephone: 9419 5500
Facsimile: 9419 5897

"ESP" means Electrostatic Precipitator;

"Inspector" means an Inspector appointed under the *Environmental Protection Act 1986*;

"L_{A1}" means level which, measured as an L_{A Slow} value, is exceeded for 1 percent of a 6-minute sample period;

"L_{A10}" means level which, measured as an L_{A Slow} value, is exceeded for 10 percent of a 6-minute sample period;

"L_{A90}" means level which, measured as an L_{A Slow} value, is exceeded for 90 percent of a 6-minute sample period;

"L_{A95}" means level which, measured as an L_{A Slow} value, is exceeded for 95 percent of a 6-minute sample period;

"L_{A99}" means level which, measured as an L_{A Slow} value, is exceeded for 99 percent of a 6-minute sample period;

"L_{A Slow}" means the reading in decibels (dB) obtained using the "A" frequency-weighting characteristic and the "S" time-weighting characteristic as specified in AS 1259.1-1990 with sound level measuring equipment that complies with the requirements of Schedule 4 of the *Environmental Protection (Noise) Regulations 1997*.

"limit" means maximum emission level allowable under this licence;

"licensee" means Alcoa World Alumina Australia Pty Ltd;

"mg/L" means milligrams per litre;

"mg/m³" means milligrams per cubic metre;

"NATA" means National Association of Testing Authorities;

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

“NO” means nitrogen oxide;

“NO₂” means nitrogen dioxide;

“NO_x” means oxides of nitrogen;

“normal operating conditions” (relative to stack emissions sampling) means any operation of a particular process excluding start up and shut down conditions;

“OU/sec” means odour units per second;

"odour sensitive premises" means any land or building that is used as a residence, guest house, hotel, motel, caravan park, school, church, hospital, or as an office or consulting rooms, where such office or consulting rooms are not located in an industrial area.

“premises” means land as depicted in Appendix B;

"partial failure of an ESP" is defined as loss of a full zone of an ESP;

“PM₁₀” means particulate fraction 10 microns or less (equivalent aerodynamic diameter);

“PM_{2.5}” means particulate fraction 2.5 microns or less (equivalent aerodynamic diameter);

“RDA” means residue disposal area(s) on the premises, located to the west of South West Highway and depicted as Residue Storage Area in Appendix B;

“refinery” means the main refining and processing area(s) on the premises, located to the east of South West Highway;

“SO₂” means sulphur dioxide.

“start-up” being the period when plant or equipment is brought from inactivity to normal operating conditions;

“shut-down” being the period when plant or equipment brought from normal operating conditions to inactivity;

“target” means a goal to be achieved and is not considered to be a limit;

“TEOM” means Tapered Element Oscillating Microbalance;

“TSP” means total suspended particulates;

“upset” being an unplanned deviation from normal operating conditions;

"TDS" means Total Dissolved Solids;

"μg/m³" means micrograms per cubic metre;

"μS/cm" means micro Siemens per centimetre;

"USEPA" means United States Environment Protection Agency;

“Wagerup Tripartite Group” means the body established to advise the Department of Environment on the Alcoa Wagerup refinery licence;

END OF SECTION

SECTION 2: GENERAL CONDITIONS

The licensee shall take the following measures for the purpose of minimizing the likelihood of pollution occurring as a result of any activity conducted or proposed to be conducted in any part of the Premises:

PERSONS IN CHARGE TO HAVE ACCESS TO CONDITIONS

G1(a) The licensee shall ensure that any person left in charge of the premises is informed of the conditions in this licence and has access at all times to this licence or copies thereof.

G1(b) The licensee shall ensure that any person who performs tasks on the premises is informed of all of the conditions in this licence that relate to the tasks which that person is performing.

END OF SECTION

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

[SECTION 3: REPORTING AND RECORD KEEPING REQUIREMENTS](#)

The licensee shall take the following measure for the purpose of supplying the CEO with information relating to the characteristics, volume and effects of the waste being or to be discharged from the Premises to the environment:

MONITORING PROGRAM - ANNUAL REPORT

- G2 The licensee shall provide to the CEO, three copies of an annual report (one electronic) containing data required by the conditions of this licence. The report shall contain data collected from **1 January to 31 December** and shall be provided by **1 April** the following year.
- (i) The report shall include, but not be limited to, an assessment of the data against any limits set in this licence and data from previous years' monitoring. It shall identify any data exceeding those limits and provide information on why the exceedance occurred (if known) and action taken by the licensee to prevent recurrence of such exceedances.
 - (ii) The licensee shall list any monitoring methods used to collect and analyse data required by any condition of this licence to demonstrate they comply with the methods specified in this licence.
 - (iii) The licensee shall report the total amount of alumina produced at the refinery over the reporting periods and the average daily amount of alumina production (averaged over a month) from the refinery over the reporting period in the six monthly reports (measured by a weightometer as alumina leaves the calciners).
 - (iv) The report shall include an analysis of complaints including; but not limited to, total number of complaints and number of complainants and the percentage distribution of complainants against total complaints, monthly complaints profiles and a summary of any correlations identified between complaints data and meteorological conditions/process variables.
 - (v) The report shall include unavailability of continuous monitoring equipment required under this licence in excess of availability targets as specified in conditions G8(d), A11(iii), W3(e) and N1(c).
 - (vi) The report shall include progress of the implementation of the CSIRO Wagerup Air Quality Review Programme Outline as specified in conditions A19(a) and A19(b).
 - (vii) The report shall include progress of the Alcoa World Alumina.Australia-Wagerup Refinery Oxalate Management Strategy as specified in condition S4.

MONITORING PROGRAM – SIX-MONTHLY REPORT

- G3 The licensee shall provide to the CEO three copies of a six-monthly report (one electronic) containing all data required by conditions A13(b), A14(c), A15(b) and N2. **The six monthly report shall contain data collected from 1 January to 30 June and shall be provided within 30 days from the end of that period.**
- (i) The report shall include, but not be limited to, a comparison of the data against any limits set in this licence.
 - (ii) The licensee shall list any monitoring methods used to collect and analyse data required by any condition of this licence to demonstrate they comply with the methods specified in this licence.
 - (iii) The licensee shall report the total amount of alumina produced at the refinery over the reporting periods and the average daily amount of alumina production (averaged over a month) from the refinery over the reporting periods (measured by a weightometer as alumina leaves the calciners).

MONITORING PROGRAM – INTERIM NOISE REPORT

- G4 The licensee shall by 1 November 2004 provide the CEO three copies of a report (one electronic) in the format required by condition N2 that incorporates historical data from January 2003 up to and including 30 June 2004.

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

MONITORING PROGRAM - COMPLAINTS REPORTING

- G5(a) The licensee shall maintain database(s) to record the following information (if known or provided) of complaints received at the premises concerning the environmental impact of the activities undertaken at the premises:
- (i) Name and address of the complainants;
 - (ii) Whether the complainant moved to the area pre or post 1 July 2002,
 - (iii) Date and time of complaint;
 - (iv) General description of the nature of the complaint;
 - (v) Wind direction, wind speed and temperature at the time of the complaint; and
 - (vi) Action taken in response to the complaint;
 - (vii) Whether the complainant(s) reported any adverse health effects; and
 - (viii) Description of exceptional plant operating conditions at time of complaint.
- G5(b) The licensee shall, every month, provide the CEO with (as a hard copy and in an electronic format) and publish in a newspaper local to the Yarloop community, a monthly summary of the complaints data received by the licensee in the preceding month in accordance with condition G5(a). The summary should include the number, date and type of complaint (both daily and total) and number of complainants, but exclude the name and address of the complainant(s).
- G5(c) The licensee shall make available to an Inspector on request, information collected in accordance with condition G5(a) excluding the name and address of the complainant(s), but providing the general location of the complainant (eg North Yarloop, Hamel, x km east of premises) to assist in complaint data assessment.

MONITORING PROGRAM - EXCEEDANCE REPORTING

- G6(a) *The licensee shall advise the CEO, as soon as practicable, when it becomes aware of an exceedance of any measurement which indicates that any discharge limit specified in A16, W3(c), A1(a) and A2(a) has been exceeded.***
- G6(b) In the event of a discharge limit exceedance reported under condition G6(a), the licensee shall also provide written advice to the CEO within 24 hours of its staff becoming aware of the exceedance. The report shall include:
- (i) the date, time and probable reason for the exceedance;
 - (ii) an estimate of the period over which the limit was or is likely to be exceeded; and
 - (iii) an estimate of the extent of the discharge over that period and indication of known or potential environmental impacts.
- G6(c) The licensee shall provide a full report on its investigations into any discharge limit exceedance reported under condition G6(a) within seven days of it becoming aware of the exceedance, and it shall include, but not be limited to:
- (i) the date, time and reason for the exceedance;
 - (ii) the period over which the exceedance occurred;
 - (iii) the nature, cause and extent of the discharge over that period and potential or known environmental consequences;
 - (iv) corrective action taken or planned to mitigate adverse environmental consequences; and
 - (v) corrective action taken or planned to prevent a recurrence of the exceedance.

INCIDENT REPORTING

- G7 The licensee shall notify the CEO as soon as practicable of any unplanned occasion when any pollution control equipment at the premises malfunctions or ceases to operate which has the potential to significantly impact on the environment.

METEOROLOGICAL STATION

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

- G8(a) The licensee shall use and maintain the meteorological station (adjacent to Bancell Road) as shown in Appendix B to continuously measure wind speed and direction and air temperature at the premises. The devices shall:
- (i) comply with AS 2923-1987 Ambient Air – Guide for Measurement of Horizontal Wind for Air Quality Applications, as appropriate and where practicable;
 - (ii) contain sensitive accurate sensors (as specified in AS 2923-1987);
 - (iii) contain wind speed and direction sensors located at least 10 metres above the ground;
 - (iv) either provide instantaneous data about wind speed and direction on a paper chart, or provide six minute averages in electronic format; and
- G8(b) The licensee shall retain data acquired in G8(a) for a minimum period of three months.
- G8(c) In circumstances where the devices referred to in condition G8(a) are not fully operational for more than a period of 24 hours, the licensee shall advise the CEO as soon as practicable.
- G8(d) The licensee shall use and maintain the meteorological monitoring station referred to in condition G8(a) so as to provide reliable data on each meteorological parameter as required under G8(a) for a target of greater than 90 percent of the time over a calendar year, based on six minute averages over a calendar year.
- G8(e) The licensee shall make available data collected in accordance with condition G8(a) to an Inspector, on request.
- G8(f) The licensee shall undertake an annual internal audit of the meteorological monitoring system referred to in condition G8(a) to assess its compliance with AS 2923-1987, and report these findings in the annual report.

INVESTIGATION REPORTS

- G9 The licensee shall provide the CEO reports on audits and studies of the following specified kinds listed in Table 1, by the date specified in Table 1:

Table 1: Reporting: Investigation Reports

Audit and Studies from 03/04 licence	Date to be Provided
5C filter air stacks: provide evidence works have been completed.	30 September 2004
AWN finding 13.2.3.3: USEPA Method 18, complete action as outlined in audit submission made on 30 Sept 2003.	30 September 2004
AWN finding 13.1.5.6 & 13.2.5.8: Cooling Tower VOC monitoring report, complete action as outlined in audit submission made on 30 Sept 2003.	31 December 2004
Building 48: Provide evidence works have been completed.	30 November 2004

END OF SECTION

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

SECTION 4: AIR POLLUTION CONTROL - GENERAL MEASURES FOR THE PURPOSE OF MINIMISING POLLUTION

The licensee shall take the following measures for the purpose of minimizing the likelihood of pollution occurring as a result of any activity conducted or proposed to be conducted in any part of the Premises and the licensee shall, at its own expense, provide the following specified monitoring equipment of the types specified in the following conditions:

LICENSED PRODUCTION

A1(a) The licensee shall ensure that the refinery is operated in the following manner:

- (i) Production of alumina during the period of the licence shall not exceed 2.35 million tonnes; and
- (ii) Daily production of alumina shall not exceed 7400 tonnes

All production figures shall be measured by weightometer as alumina leaves the calciner.

A1(b) The licensee shall provide a report to the CEO showing compliance with condition A1(a)(i)-(ii) or A2(c)(i)-(ii) as applicable by 19 August 2005.

CALCINER EMISSIONS MANAGEMENT

A2(a) The licensee shall ensure that the calciners are operated in the following manner:

- i) aggregate calciner VOC emissions shall not exceed 30400 kg during the period of the licence;
- ii) aggregate calciner VOC emissions shall not exceed 7450 kg during the first 90 days of the licence
- iii) aggregate calciner VOC emissions shall not exceed 14900 kg during the first 180 days of the licence; and
- iv) aggregate calciner VOC emissions shall not exceed 22350 kg during the first 270 days of the licence

For the purposes of conditions A2(a)(i)-(iv) aggregate calciner VOC emissions shall be determined in accordance with Table 6 in Appendix A and be based on the results of the monitoring program conducted pursuant to the requirements of condition A14.

A2(b)(i) The licensee shall provide a report showing compliance with conditions A2(a)(i)-(iv) and condition A1(a)(ii) to the CEO within 1 week of the end of the periods set out in each of the conditions A2(a)(i)-(iv), including independent peer review and audit of all data and calculations necessary for the purpose of showing compliance.

(ii) The licensee shall report to the Wagerup Tripartite Group on a monthly basis its performance to achieve compliance with conditions A2(b)(i)-(iv) and A1(a)(ii).

A2(c) Notwithstanding the requirements of condition A1(a)(i) and where the licensee demonstrates to the written satisfaction of the CEO compliance with condition A2(a)(ii), the licensee shall ensure that the refinery is operated in the following manner:

- i) Production of alumina shall not exceed 2.5 million tonnes during the licence period; and
- ii) Daily production of alumina shall not exceed 7400 tonnes.

All production figures shall be measured by weightometer as alumina leaves the calciner.

STACKS - EXHAUST GAS EXIT VELOCITY

A3 The licensee shall ensure that a minimum operational exhaust gas exit velocity of 12 metres per second is maintained for any exhaust stack(s) required to be monitored under conditions A13(a), A14(a) and A15(a).

DUST CONTROL

A4 The licensee shall ensure that no visible dust generated from the bauxite milling, storage, transfer or refining

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

process crosses the boundary of the premises.

DUST CONTROL - ALUMINA LOADING FACILITY

- A5(a) Subject to condition A5(b), the licensee shall use high pressure water sprays to wash spilt alumina from alumina rail carriages prior to the train leaving the premises.
- A5(b) In the event of a breakdown of the high pressure water sprays referred to in condition A5(a), the licensee shall vacuum spilt alumina from alumina rail carriages prior to the train leaving the premises.

DUST CONTROL – RDA UPGRADE PROGRAM

- A6(a) The licensee shall by 1 November 2004, provide a report to the CEO that identifies best practice sprinkler systems for dust suppression including sprinkler spacing and height, sprinkler head design and throw and water supply specifications taking into account known wind patterns and velocities. The report shall include a review of the licensee's current RDA sprinkler systems design and capability against the established best practice design identified in the above report.
- A6(b) The licensee shall provide by 1 November 2004 a works upgrade program for the RDA sprinkler system to achieve compliance with best practice design as required by condition A6(a).

CONDENSER – CONDENSABLE/NON-CONDENSABLE EMISSIONS

- A7 The licensee shall ensure that gases and vapour emitted from the digesters and flash tanks under maintenance at the refinery are passed through a condenser (unless the condenser is under maintenance) and:
- (i) condensate extracted by the condenser is directed to the lower dam at the refinery for oxidation and/or the condensate is directed to the Lakewater circuit at the refinery and/or used as process waters at the refinery; and
 - (ii) gases and vapour not extracted by the condenser are directed to the air feed of the boilers within the powerhouse at the refinery for incineration, unless maintenance is being undertaken on the air feed line to the boilers.

POLLUTION CONTROL EQUIPMENT – LIQUOR BURNING FACILITY

- A8 The licensee shall only operate the liquor burning facility if the electrostatic precipitator, catalytic thermal oxidiser and de-humidifier are all operating.

INVESTIGATION PROGRAMMES

- A9 The licensee shall conduct the following program detailed in column 1 of Table 2 by the completion date in column 2 of Table 2:

Table 2: Sampling and Investigation Programs

Sampling and Investigations Required	Completion Date
AWN condition 13.1.5.3: Preparation and completion of cooling lake and residue disposal areas sampling program.	31 December 2004, or other time as approved by the Director
AWN condition 13.1.5.3: Outcomes report for cooling lake and residue disposal areas sampling program.	31 March 2005

END OF SECTION

SECTION 5: MONITORING REQUIREMENTS

The licensee shall, at its own expense, carry out the following specified monitoring program for the purpose of supplying the CEO with information relating to the characteristics, volume and effects of the waste being or to be discharged from the Premises to the environment:

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

STACK SAMPLING REQUIREMENTS

- A10(a) The licensee shall ensure that sampling required under conditions A13(a), A14(a), A14(b) and A15(a) is undertaken in accordance with AS 4323.1-1995 Stationery Source Emissions Method 1, where practicable.
- A10(b) The licensee shall engage a company(s) with current NATA accreditation to undertake sampling and analysis required under conditions A13(a), A14(a), A14(b) and A15(a) for the parameters specified in Table 2, 3 and 4 of Appendix A, unless an alternative company is approved by the CEO.

MONITORING PROGRAM – RDA DUST

- A11 The licensee shall operate a dust monitoring program to measure dust levels generated from the RDA's. The dust monitoring program will incorporate the following features:
- (i) use TEOM's, or high volume samplers that meet AS 3580.9.3-2003 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulates (TSP) – High volume sampler gravimetric method,
 - (ii) have monitors (designated RN, BRW, RE, RW and RNW) located in positions identified in Appendix B in accordance with AS 2922-1987 Ambient air - Guide for the siting of sampling units,
 - (iii) run continuously (with a target of 95% availability for each calendar year for each monitor), and
 - (iv) where high volume samplers are used, renew filter papers daily.

MONITORING PROGRAM – RDA CHEMICAL DUST ANALYSIS

- A12 The licensee shall have analysed, the filter paper from at least one of the high volume samplers from the dust monitoring program (located downwind at the time of sampling), that can be demonstrated to be representative of dust emissions from the RDA's in accordance with Table 1 of Appendix A.

MONITORING PROGRAM - HEAT RECOVERY STEAM GENERATOR (HRSG) AND BOILERS

- A13(a) The licensee shall monitor the HRSG stack and boiler stack(s) for the parameters specified in Table 2 of Appendix A of this licence at the intervals specified in Table 2 of Appendix A, during normal operating conditions.
- A13(b) The licensee shall provide the CEO with a report of the results of the monitoring program specified under condition A13(a) comprising concentrations of the parameters specified in Table 2 of Appendix A and calculated the mass emissions of the parameters specified in Table 2 of Appendix A using measured flow rates at the time of sampling of the parameter, and include the operational range for each operational parameter.
- A13(c) The licensee shall ensure that the emission of dark smoke from any stack does not continue for greater than a period of four minutes in aggregate in any one hour period unless the licensee has approval from the CEO for such longer periods of time.
- A13(d) The licensee shall ensure that the emission of dark smoke from any stack does not continue for greater than a period of 20 minutes in aggregate in any 24 hour period unless the licensee has approval from the CEO for such longer periods of time.
- A13(e) The licensee shall monitor and record in a log book, observations of the colour and duration of stack emissions using the Australian Miniature Smoke Chart (AS 3543 - 1989) during an event described in condition A13(c) or if the power house is running on fuel oil or diesel. These observations shall be recorded at times when assessing compliance with condition A13(c) and in response to any complaints being received regarding dark smoke emissions.

MONITORING PROGRAM - CALCINERS

- A14(a) The licensee shall conduct a monitoring program which measures the parameters specified in Table 3 of Appendix A at the intervals specified in Table 3 of Appendix A of the calciner 1, 2, 3 and 4 stacks during normal operating conditions.
- A14(b) The licensee shall conduct a monitoring program which measures the parameters specified in Table 3 of Appendix A at the intervals specified in Table 3 of Appendix A of the calciner low volume stack during normal

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

operating conditions.

- A14(c) The licensee shall provide the CEO with a report of the results of the monitoring program specified under conditions A14(a) and (b) comprising concentrations of the parameters specified in Table 3 of Appendix A and calculated the mass emissions of the parameters specified in Table 3 of Appendix A using measured flow rates at the time of sampling of the parameter, and include the operational range for each operational parameter.
- A14(d) The licensee shall maintain and continuously operate a dust concentration meter and log the indicative dust concentration of gases exiting each calciner stack at the premises (correlated and operated in accordance with the approved dust concentration strategy). Records of this log and copies of correlation documents shall be made available to the CEO, on request.

MONITORING PROGRAM - LIQUOR BURNING FACILITY (LBF)

- A15(a) The licensee shall conduct a monitoring program which measures the parameters specified in Table 4 of Appendix A at the intervals specified in Table 4 of Appendix A of the LBF stack during normal operating conditions.
- A15(b) The licensee shall provide the CEO with a report of the results of the monitoring program specified under condition A15(a) comprising concentrations of the parameters specified in Table 4 of Appendix A and calculated the mass emissions of the parameters specified in Table 4 of Appendix A using measured flow rates at the time of sampling of the parameter, and include the operational range for each operational parameter.

END OF SECTION

SECTION 6: AIR POLLUTION CONTROL - EMISSIONS LIMITS

The licensee shall take the following measures for the purpose of minimizing the likelihood of pollution occurring as a result of any activity conducted or proposed to be conducted in any part of the Premises:

AIR EMISSIONS – LIMITS

- A16 Subject to condition A17, the licensee shall not exceed any limit for an emission source as specified in Table 3.

Table 3: Licence Limits

Emission Source(s)	Parameter	Licence Limit
RDA	TSP	200 µg/m ³ (for 95% of the time and never exceeding 260 µg/m ³ (24 hour average) [background corrected])
Calciners 1, 2, 3 and 4 as individual emission points	Particulates	80mg/ m ³ *×
	NOx	350 mg/ m ³ *
LBF	Particulates	80mg/ m ³ *×
	CO	1000mg/ m ³ *×
Boilers when fired on gas (average over boilers 1, 2 and 3)	CO	1000mg/m ³
	NOx	350mg/ m ³ *
GT/HRSG stacks	CO	1000mg/m ³

* expressed dry at 0 degrees Celsius and 1.0 atmosphere (101.325 kilopascals)

× the addition of diluting gases shall not be used to achieve compliance with emissions limits

CALCINERS – START-UP/SHUT DOWN AND ESP FAILURE

- A17 The licensee is exempt from compliance with the calciner particulate limit specified in Table 3 of condition A16 in the events specified in Table 5 of Appendix A, if the licensee's response is in accordance with the corresponding actions to be taken described in Table 5 of Appendix A for each event.

CALCINERS – REQUIREMENT TO SHUT DOWN

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

- A18(a) The licensee shall shut-down feed to calciner 1, 2, 3 or 4 if the dust concentration meter for that calciner records a dust concentration that exceeds the equivalent of the calciner particulate limit specified in Table 3 of condition A16 for more than 60 minutes and not recommence feed to that calciner until the cause of the high dust concentration is rectified.
- A18(b) In the event of a partial failure of a calciner ESP continuing for more than 60 minutes, the licensee shall immediately shut off the feed to the calciner experiencing the partial failure of the ESP and not recommence feed to the calciner until the ESP is fully restored.
- A18(c) In the event of a complete failure of a calciner ESP continuing for more than 10 minutes, the licensee shall:
- (i) immediately shut off the feed to the calciner experiencing the failure, if the failure has not been at least partially remedied within that time, and not recommence feed to the calciner until the ESP is fully restored, or
 - (ii) manage the failure in accordance with condition A18(b), if the failure has been at least partially remedied within that time.

IMPLEMENTATION PROGRAM FOR FUTURE INVESTIGATIONS

- A19(a) The licensee shall implement the programme outline titled "CSIRO Wagerup Air Quality Review Programme Outline" received on 12 August 2004 for the investigation and measurement of Residue Disposal Area (RDA) emissions that is consistent with recommendations 5, 6 and 7 of the CSIRO Wagerup Air Quality Review (report C/0936) undertaken by the CSIRO and dated May 2004, in accordance with timeframes and milestones to be developed in consultation with the Wagerup Tripartite Group.
- A19(b) The licensee shall implement the programme outline titled "CSIRO Wagerup Air Quality Review Programme Outline" received on 12 August 2004 consistent with recommendations 1 to 4 and 8 to 18 of the Wagerup Air Quality Review (report C/0936) undertaken by the CSIRO and dated May 2004, in accordance with timeframes and milestones to be developed in consultation with the Wagerup Tripartite Group.

END OF SECTION

SECTION 7: WATER POLLUTION CONTROL CONDITIONS

The licensee shall take the following measures for the purpose of minimizing the likelihood of pollution occurring as a result of any activity conducted or proposed to be conducted in any part of the Premises:

INSTALLATION OF DRAINAGE BELOW RESIDUE DISPOSAL DAM

- W1 The licensee shall maintain low permeability (10^{-9} metres per second) base and embankment seals and gravity base drainage systems on RDA's to minimise seepage and collect leachate.

CONTAINMENT OF CONTAMINATED OR POTENTIALLY CONTAMINATED WATERS

- W2 The licensee shall minimise the release of contaminated water to the environment by providing containment systems to capture any spillages and minimise contact of process liquors to the ground.
The licensee shall, at its own expense, carry out the following specified monitoring programme for the purpose of supplying the CEO with information relating to the characteristics, volume and effects of waste being or to be discharged from the Premises to the environment:

WATER QUALITY MONITORING AND CRITERIA

- W3(a) The licensee shall collect representative water samples at the frequencies specified in Table 4 from surface point 12 (SP12) depicted in Appendix B, and have them analysed for the parameters specified in Table 4. The licensee shall present the results of the analysis in the annual report.

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

Table 4: SP12 Water Quality Monitoring

Parameter	Frequency	Guideline
pH	Monthly when flowing	5.0 – 9.5
Electrical Conductivity (or equivalent TDS measurement)		Less than 2000 µS/cm
Nephelometric Turbidity units		no criteria set
Aluminium	6-monthly (during April – May , October – November)	5.0 mg/L
Arsenic		0.5 mg/L
Mercury		0.002 mg/L
Selenium		0.02 mg/L
Vanadium		0.1 mg/L
Manganese		1.0 mg/L
Molybdenum		0.15 mg/L
Uranium		0.2 mg/L

Note: Guideline for metals are taken from the livestock watering guidelines given in the Australian Water Quality Guidelines for Fresh and Marine Waters - ANZECC November 2000

- W3(b) Where analysis of a sample collected in accordance with condition W3(a) measures a pH and an electrical conductivity (or equivalent TDS measurement) above the guideline specified in Table 4, the licensee shall also analyse the same sample for sodium, chloride and alkalinity (as calcium carbonate) and calculate the sodium:chloride ratio.
- W3(c) The licensee shall manage activities at the premises to ensure that its activities are not responsible for water samples collected and analysed in accordance with condition W3(a) and (b) to exceed the limits specified in Table 5.

Table 5: SP12 Water Quality Monitoring

Parameter	Frequency	Limit
Sodium:chloride ratio, alkalinity	In circumstances where both pH and EC are in excess of the guideline in Table 3	sodium:chloride ratio no greater than 0.8 as well as alkalinity no greater than 50 mg/L as Calcium Carbonate.

- W3(d) The licensee shall operate and maintain a flow metering device to measure the cumulative volume of stream flow (in cubic metres per month) at surface water station SP12 depicted at Appendix B. The licensee shall provide results on flow monitoring in the annual report.
- W3(e) The licensee shall maintain the flow metering device referred to in condition W3(d) so as to provide reliable data for a target of greater than 90 percent of the total time when the stream is flowing, over a calendar year.
- W3(f) The licensee shall collect representative water samples from the groundwater monitoring bores (1G, 1W, 2G, 2W, 8G, 11G, 23G, 23W, 25G, 25W, 78G, 79G) depicted in Appendix B and have them analysed for the parameters and at the frequency specified in Table 6. The licensee shall present the results of the analysis in the annual report.

Table 6: Groundwater Quality Monitoring

Parameter	Frequency
pH, Electrical Conductivity (or equivalent TDS measurement), alkalinity, sodium:chloride ratio, Standing Water Level, Uranium	6 - monthly

- W3(g) When any sample collected and analysed in accordance with condition W3(f) exceeds the guideline value for that parameter listed in Table 4 of condition W3(a), the licensee shall advise the CEO as soon as practicable.
- W3(h) The licensee shall advise the CEO within 14 days of any surface water monitoring location described in condition W3(a) or groundwater monitoring bore described in condition W3(f) that is de-commissioned or rendered unusable.

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

GENERAL MONITORING REQUIREMENTS

- W4(a) The licensee shall collect all water samples in accordance with the relevant part of Australian Standard 5667-1998, unless an alternative method is approved by the CEO.
- W4(b) The licensee shall submit all water samples to a laboratory with current NATA accreditation for the specified parameters for analysis in accordance with the current "Standard Methods for Examination of Water and Wastewater-APHA-AWWA-WEF", unless an alternative analysis method is approved by the CEO.
- W4(c) The licensee shall keep the original laboratory analysis reports (or copies thereof) on record, and shall provide copies of these reports to an Inspector on request.

INVESTIGATION OF LIQUID CHEMICAL STORAGE

- W5 The licensee shall conduct an environmental risk assessment study of the alumina production process vessels and liquid chemical storage facilities and liquid chemical containment facilities at the premises and shall provide the CEO reports of the following specified kinds, by the date specified:
- (a) Report to be provided by 30 September 2004 that shall include but not be limited to;
- (i) Method(s) and procedures the licensee used to assess, calculate and assign risk category,
 - (ii) Risk category assigned to each facility, and incorporating;
 - An examination of previous spill history,
 - An analysis of overflow onto unsealed surfaces, and
 - An address of groundwater quality outcomes;
 - (iii) Draft works upgrade program.
- (b) For those facilities assigned "medium" and "high" risk in (a), a report to be provided by 31 December 2004 that contains;
- (i) An assessment against AS1940-1993,
 - (ii) Assessment of the permeability of the base and walls measured in meters per second per second,
 - (iii) An assessment of containment capacity, expressed as percentage (%) of the volume of the largest storage vessel or inter-connected system, and total volume of vessels stored in the compound,
 - (iv) An assessment whether the facilities are graded to a low point or include a sump to allow recovery of liquid;
 - (v) An assessment whether the capacity of the facilities is able to be maintained at all times (eg. regular inspection and pumping of trapped uncontaminated rain water).
- The assessment required by (b) shall be undertaken by an independent suitably qualified person(s).
- (c) The licensee shall develop a final works program in consultation with the Wagerup Tripartite Group.

END OF SECTION

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

SECTION 8: SOLID WASTE CONTROL CONDITIONS

The licensee shall take the following measures for the purpose of minimizing the likelihood of pollution occurring as a result of any activity conducted or proposed to be conducted in any part of the Premises:

WASTE ACCEPTANCE

- S1(a) The licensee shall dispose of the following types of waste(s) to the RDA's (depicted in Appendix B), that have been generated at the premises, the licensee's Willowdale Minesite and Bunbury Rail Terminal and Port Loading Facility:
- (i) waste meeting acceptance criteria specified for Class II landfills in the document produced by the Department of Environmental Protection, titled "Landfill Waste Classifications and Waste Definitions 1996 (as amended)", or hydrocarbon contaminated wastes;
 - (ii) wastes generated from alumina production and associated activities, excluding:
 - (a) elemental mercury collected as a waste stream,
 - (b) spent liquor burner CTO catalyst,
 - (c) asbestos materials,
 - (d) packaged laboratory chemical waste, and
 - (e) clinical waste.

WASTE MANAGEMENT

- S2(a) The licensee shall accept and bury waste referred to in condition S1(a)(i) by:
- (i) placing the waste in a defined trench or within an area enclosed by earthen bunds; and
 - (ii) covering the waste with clean fill, residue or sand (or other similar material) on a weekly basis.
- S2(b) The licensee shall not burn or allow the burning of waste referred to in condition S1(a) on the premises, unless prior approval has been granted by the CEO.

STORAGE OF OXALATE

- S3(a) The licensee shall store oxalate separated from the process stream either within a tank or tanks at the refinery, within the approved oxalate storage area located in the RDA's, or in other areas as approved by the CEO,
- S3(b) The licensee shall ensure that oxalate is in a moist state when discharged into the approved oxalate storage area located in the RDA's, and
- S3(c) The licensee shall ensure that oxalate discharged into the approved oxalate storage area is maintained underwater within 12 hours of being discharged.

IMPLEMENTATION PROGRAM FOR OXALATE DISPOSAL

- S4 The licensee shall report progress on the implementation of the program titled "Alcoa World Alumina.Australia-Wagerup Refinery Oxalate Management Strategy, August 2004" in the annual report required by condition G2.

END OF SECTION

SECTION 9: NOISE CONTROL CONDITIONS - MONITORING PROGRAM

- N1(a) The licensee shall conduct a monitoring program at the locations specified in Table 7 of Appendix A, that measures the parameters specified in Table 7 of Appendix A, at the intervals specified in Table 7 of Appendix A.

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

- N1(b) The licensee shall retain all data and measurements required under N1(a) as one-hour average values calculated from consecutive six-minute data. Data from the monitoring program shall be provided to the Director on a computer readable magnetic medium in the annual report required by condition G2.
- N1(c) The licensee shall maintain the sound level measurement devices referred to in condition N1(a) so as to provide reliable data on each measurement parameter for a target of greater than 95 percent of the time, based on the total number of six-minute data sampling periods over a calendar year.
- N1(d) The licensee shall:
- (i) Ensure that the sound level measuring instrument required by condition N1(a) is calibrated in accordance with Clause 3 of Schedule 4 of the *Environmental Protection (Noise) Regulations 1997*,
 - (ii) Conduct field calibration checks in accordance with Clause 4 of Schedule 4 of the *Environmental Protection (Noise) Regulations 1997*,
 - (iii) Position the sound level measuring instrument microphone(s) in accordance with Regulation 20 of the *Environmental Protection (Noise) Regulations 1997*.

MONITORING PROGRAM - NOISE REPORTING

- N2 The licensee shall provide the Director with a report of the results of the monitoring program specified under condition N1(a) comprising;
- (i) Graphical representation of 6-minute data for the two fixed monitoring locations, including L_{A1} , L_{A10} , L_{A90} , L_{A95} and L_{A99} sound levels, together with meteorological data and production rate, for five (5) days that are representative of conditions conducive to noise propagation from the refinery to the monitoring positions;
 - (ii) Histograms for each fixed monitoring location showing number of 6-minute L_{A10} and L_{A95} sound levels falling within bands of 1dB(A). This shall be plotted over the range 40 to 60dB(A), for each quarter of the year;
 - (iii) Histograms as specified in (ii) above, showing only the numbers of L_{A10} and L_{A95} sound levels recorded at the monitoring locations specified in Table 7 below (refer also Appendix A, Table 7) when the wind speed was between 0.5m/s and 3m/s and blowing from the wind directions specified in Table 7;

Table 7: Wind direction for histograms

Location	Wind Direction
North of Refinery	90 degree arc from 315 to 45 degrees;
South of Refinery	90 degree arc from 135 to 225 degrees.

- (iv) The licensee shall provide independent verification undertaken by a suitably qualified person(s) that the report meets the requirements of conditions N1(a) and N1(d).

NOISE FEASIBILITY STUDY

- N3(a) The licensee shall by 12 November 2004, or other date as approved by the Director, submit to the CEO the scope of works for a feasibility study that will address the following;
- (i) The development of a program for ongoing update and validation of the noise model, and including consideration of any noise contribution associated with production levels;
 - (ii) The establishment of noise monitoring points that are representative of noise received at dwellings within the premises environs, and where the contribution of noise emissions from the premises can be determined

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

- (iii) The development of a program to monitor the noise contribution from the refinery including when received at the noise monitoring points identified in N3(a)(ii), covering noise emissions under normal operating conditions, unusual on-site activities, plant operating conditions and production levels, and a range of atmospheric conditions.”
 - (iv) The development of a complaints response protocol which includes the following investigations;
 - (i) Determination of actual noise levels at an appropriate noise monitor or from field measurements
 - (ii) Assessment of compliance with a relevant standard or guideline
 - (iii) Where elevated noise levels or exceedance of guidelines has been established, an analysis of factors likely to have influenced the level of noise received.
 - (iv) If elevated noise levels are confirmed action taken to reduce noise levels or actions to be taken to prevent a recurrence of the circumstances which led to this elevated noise event
 - (v) Timely feedback mechanism to inform the complainant of the outcome of the investigation into the complaint including actions to minimise recurrence,
 - (v) The development of a community accessible database or information transfer system which provides continuous on-line (including internet) real time monitoring system,
 - (vi) The report shall contain a works program including timeframes for implementation of the feasibility study.
- N3(b) The licensee shall, following the written approval of the Director, conduct the feasibility study in condition N3(a).
- N3(c) The licensee shall by 1 April 2005, provide to the Director the report on the feasibility study.

END OF SECTION

END OF LICENCE CONDITIONS

SEVERANCE

It is the intent of these licence conditions that they shall operate so that, if a condition or part of a condition is beyond my power 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 my power to impose and are not otherwise *ultra vires* or invalid.

.....
Officer delegated under Section 20
of the *Environmental Protection Act 1986*

Date of Issue: Thursday, 12 August 2004

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

APPENDIX A

Table 1: Monitoring Program - RDA Dust

Analysis	Parameters to be measured	Frequency	Analytical Method	Units
Filter paper from at least 1 high volume sampler around the RDA's (24 hour sample)	<ul style="list-style-type: none"> aluminium, arsenic, boron, barium, cadmium, cobalt, chromium, copper, mercury, molybdenum, nickel, lead, vanadium, zinc, gallium, thallium, selenium, lithium, beryllium, alkalinity and pH. analysis to be performed of filter paper blanks for each filter paper batch and reported together with any results. 	4 samples taken between October 2004 and March 2005, where; <ul style="list-style-type: none"> dust concentration is greater than 100ug/m³ (background corrected), otherwise samples taken subject to approval of Director. 	Metals method (NATA certified) plus Alkalinity, pH methods (NATA certified)	ug/m ³

Table 2: Monitoring Program – HRSG and Boilers

Emissions Testing	Parameters to be measured	Frequency	Units	Method
HRSG stacks; and Boilers (1, 2, & 3), whilst fired on natural gas	NO	3 – monthly	mg/m ³	USEPA Modified Method 7E
	NO ₂		mg/m ³	USEPA Modified Method 7E
	NO _x		mg/m ³	USEPA Modified Method 7E
	CO		mg/m ³	USEPA Modified Method 10
	fuel feed rate over the duration of the test		m ³ /hr	N/A
	steam output over the duration of the test		tonnes/hr	N/A
	Stack velocity		m/sec	USEPA Method 2
	Stack flow rate		m ³ /min	USEPA Method 2
	Confirm if non-condensables are flowing to boilers 2 or 3		n/a	Conformation ID fan operating and log book entry
Boilers 2 & 3, fired on diesel (when operating for one month or greater)	NO	The number of tests shall be adequate to define the relationship between- <ul style="list-style-type: none"> mass discharge rate for NO; and mass discharge rate for NO₂; and steam output over the range of ambient 	mg/m ³	USEPA Modified Method 7E
	NO ₂		mg/m ³	USEPA Modified Method 7E
	NO _x		mg/m ³	USEPA Modified Method 7E
	SO ₂		mg/m ³	USEPA Modified Method 6C

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

	CO	temperatures that may reasonably be expected to occur over the course of one year.	mg/m ³	USEPA Method 10	Modified
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WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

Table 3: Monitoring Program - Calciners

Emissions Testing	Parameters to be measured	Frequency	Units	Method
Exit gases from: Calciner 1; Calciner 2; Calciner 3; and Calciner 4.	Particulates	2 – monthly	mg/m ³	USEPA Method 5 or method 17
	NOx		mg/m ³	USEPA Modified Method 7E
	SOx		mg/m ³	USEPA Modified Method 6C
	CO		mg/m ³	USEPA Modified Method 10
	Acetaldehyde		mg/m ³	USEPA MMT05
	Acetone		mg/m ³	USEPA MMT05
	2-butanone		mg/m ³	USEPA MMT05
	Formaldehyde		mg/m ³	USEPA MMT05
	Benzene		mg/m ³	USEPA M18 tube
	Odour Concentration		OU/m ³	AS 4323.3 (2001)
	Stack flow rate		m ³ /min	USEPA Method 2
	Stack velocity		m/sec	USEPA Method 2
	Gas flow rate		Daily average rate	m ³ /min
	Calciner furnace temp.	Daily average temp	°C	N/A
Low Volume Stack (Calciner 1-3 Vacuum pump and dorco hoods)	NOx	2 - monthly	mg/m ³	USEPA Modified Method 7E
	SOx		mg/m ³	USEPA Modified Method 6C
	CO		mg/m ³	USEPA Modified Method 10
	Acetaldehyde		mg/m ³	USEPA MMT05
	Acetone		mg/m ³	USEPA MMT05
	2-butanone		mg/m ³	USEPA MMT05
	Formaldehyde		mg/m ³	USEPA MMT05
	Benzene		mg/m ³	USEPA M18 tube
	Odour concentration		OU/m ³	AS 4323.3 (2001)
	Stack flow rate		m ³ /min	USEPA Method 2

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

Table 4: Monitoring Program - Liquor Burning Facility

Emissions Testing	Parameters to be measured	Frequency	Units	Method
Exit gases from the LBF chimney stack	Particulates	3 – monthly	g/m ³	USEPA Method 5 or 17
	CO		g/m ³	USEPA Modified Method 10
	NOx		g/m ³	USEPA Modified Method 7E
	SOx		g/m ³	USEPA Modified Method 6C
	Acetaldehyde		mg/m ³	USEPA MMTO5
	Acetone		mg/m ³	USEPA MMTO5
	2-butanone		mg/m ³	USEPA MMTO5
	Formaldehyde		mg/m ³	USEPA MMTO5
	Benzene		mg/m ³	USEPA M18 tube
	Odour concentration		OU/m ³	AS 4323.3 (2001)
	Temperature		°C	USEPA Method 2
	Stack velocity		M/sec	USEPA Method 2
	Stack flow rate		m ³ /min	USEPA Method 2
	Dryer feed rate	Daily average	m ³ /hr	N/A
	Kiln pressure	Daily average	KPa	N/A
CTO pressure drop	Daily average	KPa	N/A	

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

Table 5: Exemption Events

Section	Event Title	Action to be Taken	Comments
(i)	Calciner start up	All practicable measures to minimise the discharge of particulate matter into the environment	AS3814-2002: Industrial and commercial gas-fired appliances, requires that ESP's and associated vessels be purged with at least 5 air changes before starting any combustion process associated with an ESP as a safety requirement to avoid potential explosion caused by sparking within the ESP.
(ii)	Calciner shut down	All practicable measures to minimise the discharge of particulate matter into the environment.	When shutting calciners down, the efficiency of the ESP is reduced due to unstable operating conditions caused by the reduction of the gas/products and air flows.
(iii)	Calciner partial failure of ESP.	In the event of a partial failure of an ESP continuing for more than 60 minutes feed shall be immediately shut off and not resumed until the ESP is fully restored.	
(iv)	Calciner complete failure of ESP.	In the event of a complete failure of an ESP, operation of the associated calciners may continue for not more than 10 minutes following which: (a) If the failure has not been at least partially remedied within that time, feed shall be shut off and not be resumed until the ESP is fully restored, or (b) If the failure has been partially remedied within that time, operations may continue in accordance with section (iii).	
(v)	dust concentration meter correlation	Prior approval from the CEO	
(vi)	dust concentration meter above limit	If the dust concentration meter for calciner 1, 2, 3 or 4 records a dust concentration that exceeds the equivalent of the calciner TSP limit specified in Table 2 of condition A14 for more than 60 minutes, immediately cease feed to that calciner and not recommence feed until the problem has been rectified.	

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

Table 6: Calciner Emissions Management

Aggregate calciner VOC emissions are calculated by summing the daily calciner VOC emissions from each of calciner 1,2,3 & 4 and from the low vol vents, then multiplying the sum by the relevant number of days for A2(a)(i)-(iv)		
Where individual calciner VOC emissions are calculated in accordance with the Column 3 below:- Note: "ADT" is Average Daily Throughput of alumina for each calciner as applicable.		
Column 1	Column 2	Column 3
Calciner	Historic quarterly average VOC emissions in grams per tonne of daily throughput (2002 -2004 ie 8 quarters)	Daily Calciner VOC emissions (Cal x emissions)
1	10.50	Calciner 1 ADT multiplied 10.50
2	10.22	Calciner 2 ADT multiplied by 10.22
3	22.20	Calciner 3ADT multiplied by 22.20
4	10.16	Calciner 4 ADT multiplied by 10.16
Low Vol Vents	1.81	Low Vol Vents ADT multiplied by 1.81

Table 7: Monitoring Program – Sound Level Measurement

Location	Parameters to be measured	Interval	Units	Method
South of Refinery: Bancell Road, and North of Refinery: Refinery Access Road, or other location(s) as approved by the CEO	L _{A1} , L _{A10} , L _{A90} , L _{A95} , L _{A99}	Continuous 6 minute data	dB _L _{ASlow}	Sound level measurement equipment to comply with Regulation 22 of <i>Environmental Protection (Noise) Regulations 1997</i> .

END OF APPENDIX A

WESTERN AUSTRALIA
DEPARTMENT OF ENVIRONMENT
Environmental Protection Act 1986

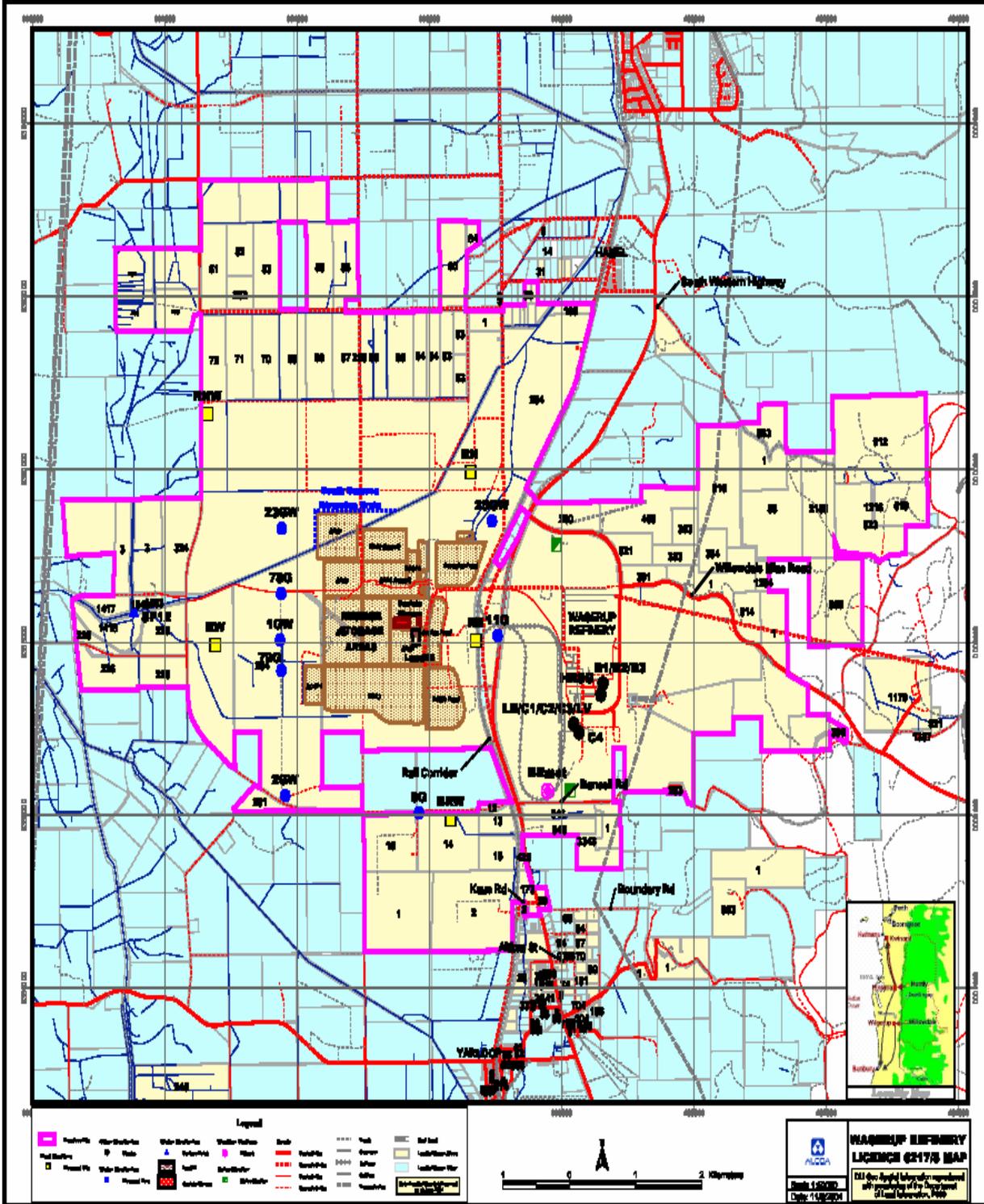
LICENCE NUMBER: 6217/8

FILE NUMBER: L80/83

Licence issue date: Thursday, 12 August

APPENDIX B

Premises location and licence monitoring stations



END OF APPENDIX B