



Amendment Report

Licence Number L4504/1981/17

Licence Holder South32 Worsley Alumina Pty Ltd

ACN 008 905 155

File Number: DER2017/001998

Premises
Worsley Alumina Refinery
Gastaldo Road,
ALLANSON WA 6225

Legal description –

Lease No 3116/7574 being Wellington Locations 5314-5317 on Deposited Plan 220209

Date of Report 9 March 2020

1. Definitions and interpretation

Definitions

In this Amendment Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
Amendment Report	refers to this document
AS 4156.6 – 2000	Australian Standard AS 4156.6 – 2000: Determination of Dust/moisture Relationship for Coal.
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEMS	means continuous emissions monitoring system
CEO	means Chief Executive Officer.
CO	means carbon monoxide
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986</i> (WA)
EP Regulations	<i>Environmental Protection Regulations 1987</i> (WA)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Amendment
Licence Holder	South32 Worsley Alumina Pty Ltd
mtpa	million tonnes per annum
MW	means megawatt units of power
NEPM	National Environmental Protection Measure
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997</i> (WA)
NOx	means oxides of nitrogen
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Report applies, as specified at the front of this Amendment Report.

Revised Licence	the amended Licence issued under Part V, Division 3 of the EP Act, with changes that correspond to the assessment outlined in this Amendment Report.
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>
VOC	means volatile organic compounds

2. Application details

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend Licence L4504/1981/17 granted to South32 Worsley Alumina Pty Ltd (the Licence Holder) for its Worsley Alumina Refinery facility. This amendment is given under *section 59B(9)* of the EP Act upon the initiative of an Officer Delegated under section 20 of the EP Act.

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Worsley Alumina Refinery Licence amendment application form and includes the supporting information: <ul style="list-style-type: none"> Stack testing summary for emission points A4-A11 Updated map of emissions sources Commissioning data reports for Boilers 4 & 5 4 x CEMS Verification reports form Boilers 1-3 	3 October 2019 (DWER document reference: DWERDT208328)
Further Information on the original package Boilers	13 November 2019 (DWER document reference: A1843066)
Further information to support the application which includes: <ul style="list-style-type: none"> Package boiler specifications sheet Map of nearest sensitive receptors; NPI Worsley Alumina Refinery emissions report 18/19 Worsley Alumina File Note on inferred stack emissions Commissioning data reports for Boilers 4 & 5 South32 Worsley Alumina Refinery Air Quality Assessment for proposed production Increase to 5.1mtpa (January 2018). 	4 December 2019 (DWER document reference:A1852933)
Further information to support the application including: <ul style="list-style-type: none"> Package Boiler Plume dispersion report; and Plume dispersion. 	25 November 2019 (DWER document reference:A1853391)
Further information to support application including: <ul style="list-style-type: none"> Clarification that benzene monitoring to remain on Licence 	14 January 2020 (DWER document reference:A1858532)
Further information to support the application	17 February 2020

The guidance statements that have informed the assessment and decision outlined in this Amendment Report are listed in Appendix 1.

2.1. Purpose and scope of assessment

The Licence Holder has initiated this amendment to operating Licence L4504/1981/17 and the following changes were requested:

1. Inclusion of two existing gas fired Babcock and Wilcox Type D package boilers onto the Licence as new point sources for the air discharge of emissions (new emission points A15 & A16);
2. Alteration of the use of the Babcock and Wilcox Type D package boilers from back-up electrical power generation sources to prime energy generation units for refinery operations;
3. Inclusion of the newly installed Continuous Emissions Monitoring Systems (CEMS) for Boilers 1-3 onto the Licence (emission points A1, A2 & A3) and removal of the requirement to undertake quarterly stack testing at these locations accordingly;
4. Removal of the requirement to undertake quarterly stack testing for acetaldehyde, formaldehyde, benzene and mercury (where relevant) on emission points A4, A5, A6, A7, A8, A9 A10 & A11 (digestion RTO stack, calciner stacks 1-6 and the liquor burner stack); and
5. Removal of the requirement to undertake ambient SO₂ monitoring from the Licence and the deletion of the conditions and reference to monitoring station "J" from the Licence.

The assessment of this application has been undertaken in accordance with DWER's published Regulatory Framework (as specified in Schedule 1 of this report). This decision report includes the use of the existing Babcock and Wilcox Type D package gas fired boilers from back up to prime loading electricity generators. With this change the boilers will be included as point sources of air emissions within the Licence and air monitoring controls for these emission sources are included. The decision report also incorporates a partial assessment of the Licence Holders proposed changes to other air monitoring conditions as specified above. The Delegated Officers decision on these requests is reviewed within the context of the overall risk of air emissions from the premises on the health and amenity of nearby sensitive receptors.

The Delegated Officer has allowed Points 1-3 above to be included through this amendment however the removal of quarterly stack tests for acetaldehyde, formaldehyde and mercury (point 4 from above) and for the removal of SO₂ monitoring station J from the Licence (point 5 from above) will be made under a separate Licence amendment application to allow for expedition assessment of this application (at the request of the Licence Holder).

The Delegated Officer notes inclusion of the Nebraska package boilers as prime energy generation units (rather than for back-up power units) may cause a marginal change to the air emissions profile of the premises as it will limit coal fired power generation .

This amendment also includes a CEO initiated an amendment to the type and style of

the licence during July 2019 and issued a revised licence consolidating changes made under Amendment Notices issued between 2016 to 2019 (as detailed in the instrument log below), where relevant. The obligations of the Licensee have not changed in making this amendment. During the consolidation of this amendment; DWER has not undertaken any additional risk assessment of the Premises

3. Premises Information

Premises Background

The Licence Holder operates a bauxite refinery using the Bayer alumina refining process where ore sourced from the nearby Boddington Bauxite Mine (L5960/1983/11) is transported 51km via conveyor belt to the Worsley Alumina Refinery. The bauxite ore is broken down through mechanical grinding, heating and mixing with liquid sodium hydroxide to release alumina to solution. The alumina rich solution is subject to a precipitation process and alumina hydrate crystals are separated, washed and calcined at high temperatures to generate 99% pure alumina, which is then exported off site through Bunbury Port.

The refining process is energy intensive and the current application includes a request to add two energy generation units as prime loading energy units. Dispersion modelling for the site was submitted under an operating scenario of higher throughput capacity and using coal fired generation units was submitted and indicated there was a low risk impacts to the nearest sensitive receptors from air emissions.

Infrastructure

The amendment includes the inclusion of two existing Babcock and Wilcox Type D package boilers from back-up energy use to prime loading generation units. CEMS monitoring units are also included on existing Boilers 1-3 as shown in Table 3 below.

Table 3: Infrastructure added under this amendment under Category 52 electric power generation

	Infrastructure	Site Plan Reference Schedule 1, Maps – Premises Map
Prescribed Activity Category 52		
Bauxite refining has high energy generation requirements. The site operates a number of infrastructure as prime load generators that includes: three coal fired boilers (Boilers 1-3); two Multi-fuel generation boilers (Boilers 5-6) and the addition of the two existing Babcock and Wilcox Type D gas fired package boilers (Boiler 6-7) as specified below		
1.	Two Babcock and Wilcox Type D Gas fired package boilers with an energy generating capacity of 103.4MW each (each boiler contains two units of 51.7MW capacity each)	A15-A16
2.	Protea P2000 Multigas Analyser CEMS units located on boiler stack flue 1-3	A1- A3

4. Other approvals

The two Babcock and Wilcox Type D package Boilers have existed on the site since 2003. They were not previously included as emission point sources on the Licence as they were used for emergency back-up purposes only. No works were required for the inclusion of these boilers onto the Licence.

5. Licensing History

Table 5 provides the licensing history for L4504/1981/17.

Table 4: Licence amendments

Instrument	Issued	Amendment
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 <i>Guidance Statement on Licence Duration (November 2014)</i> .
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: <ul style="list-style-type: none"> Construct 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 Babcock and Wilcox 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 in the licence (as detailed above in the instrument log).

6. Location and receptors

Table 5 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 5: Receptors and distance from prescribed premises

Residential and sensitive premises	Distance from the Boundary of the Premises
Single Rural Dwellings:	No rural dwelling within 5 km of the boundary of the premises.
Township of Allanson	Allanson is approximately 11km south of the boundary of the premises.

7. Risk assessment

Table 7 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Table 7 identifies whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 5: Risk assessment for proposed amendments during operation

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities	Potential emissions	Potential receptors, No Papathway and impact	Applicant controls					
Cat 52: Electric Power generation.	Air emissions CO, NOx and VOCs	Air/windborne pathway causing impacts to health and amenity of closest human receptor is approximately 7.5km north west of the premises.	None	Slight	Unlikely	Low	Air emissions from the use of the two Babcock and Wilcox Type D package boilers is anticipated to marginally increase air emission from the premises under 80% of operating conditions (with one boiler operating at 25% or greater loading rate 24hours/day) causing a total increase of 0.65% NOx emissions from the premises. Operating throughputs above this is expected to reduce overall emissions as the boilers will begin to substitute coal powered energy.	The Babcock and Wilcox Type D Package Boilers have been included as emission point to air sources A15 and A16 and updates to the following conditions have been made: conditions 2.2.1 ; Table 2.2.2; Table 2.2.3 Condition 3.2.1 These are further explain in the Decision section of the report below
	Noise		None		Rare		The closest human receptors are considered too far away from the premises for impacts from noise emissions to occur from the Babcock and Wilcox Type D package boilers. The Environmental Protection (Noise) Regulations 1997 apply.	

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)

8. Decision

The use of the package boilers will change from predominantly back up-generators to allow for their use as prime energy production generators as required (points 1-2 above). There is expected to increase the energy generation capacity of the site by 7% as a result of this. A marginal increase in overall annual site CO₂ and NO_x emissions may occur under the worst case emissions operating scenario where only one generator operates continuously at 25% loading (up to an approximate 1.2% increase in CO₂ and 0.65% increase in NO₂ over the annual operating period). Increased reliance on the package boilers from back up purposes to prime energy generators is otherwise expected to create an associated decrease in overall site air emissions as natural gas combustion byproduct gases are significantly less when compared with coal combustion byproduct gases.

On this basis the Delegated Officer considers there to be negligible offsite impacts as a consequence of off-site emissions at the nearest sensitive receptors, however as in the context of cumulative overall site emissions minimal impacts may occur on a local scale, the consequence is considered **slight**. The Likelihood offsite impacts occurring as a result of the operation of the two package boilers operating at 25% loading for 80% of the time is considered **rare**. And therefore the Delegated Officer Considers the overall risk as **low** but suitable for regulation in the context of overall site emissions.

The Delegated Officer has proposed changes to the Licence in this context and these are detailed in Table 10.

Following an amendment to Licence L4504/1981/16 on 27 November 2014 the premises was required to install CEMS on Boilers 1-3. The CEMS equipment is now installed and will replace the quarterly stack monitoring for these air emission point sources. The Delegated Officer reviewed this change in the context of the overall risk to air emissions from the premises during the time of the 2014 amendment and therefore the change is considered administrative and not subject to a risk assessment under the current amendment.

Other changes to the Licence are a result of consolidation of Amendment Notices and are considered an administrative changes (such as the removal of former improvement conditions 4.1.1 and 4.1.2 that have been complied with) and are therefore excluded from Table 10 of this report. The full Amendment Notices are attached to this Decision Report.

8.1. Summary of amendments

Table 10 provides a summary of the amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Amended Licence as part of the amendment process.

Table 10: Summary of amendments

Condition No.	Proposed amendments
2.2.1	The Babcock and Wilcox Type D Package Boilers have been included as emission point to air (A15 and A16) in conditions 2.2.1 The Name of the MRC Boilers have been renamed as the Licence Holder requested emission point A13 and A15 to be references as boiler 5. The amendment is to reference A13 and MFC boiler 5.
2.2.2	Table 2.2.2 has been updated to require stack testing of the Babcock and Wilcox Type D boilers to be undertaken to demonstrate performance in accordance with the manufacturers specifications for VOC, NOx and CO (targets applied); The condition has also been amended to remove the requirement for Boilers 1-2 (A1-A3 within the Table) to undertake stack testing as the CEMS units have been successfully installed and calibrated.
2.2.3	Table 2.2.3 has been updated to include emissions point A5 and A16 to require investigation and management actions if exceedences of emission targets occur; and
3.2.1	Condition 3.2.1 has been updated to specify the sampling methods and parameters required to be adhered to for the air monitoring required to be undertaken in accordance with condition 2.2.2 for both the Babcock and Wilcox Type D Package Boilers and the newly installed CEMS units.

For this Licence amendment, DWER has consolidated past Amendment Notices such that the amended Licence will include the changes that were authorised under the four Amendment Notices issued between 4 August 2016 and 16 October 2017. The Amended Licence has been issued in a new format with existing conditions being transferred, but not reassessed, to the new format. Therefore, the numbering, wording and format of existing conditions may have changed, but the intent remains the same. These collaborated Amendments are not detailed, in **Error! Reference source not found.**¹⁰ above, but are included in Appendix 3 of this Report in full.

9. Licence Holder's comments

The Licence Holder was provided with the draft amended Licence and amendment report on the 21 February 2020. DWER received comments relating to typographical errors within the documents and a request to remove improvement condition requiring the submission of a final Air Emissions Inventory Report for the Worsely Alumina Refinery by 30 March 2018 as the report has been received by DWER (Envall, 2018).

10. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Licence amendment will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Caron Goodbourn
MANAGER PROCESS INDUSTRIES
INDUSTRY REGULATION

An officer delegated by the CEO under section 20 of the EP Act

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L4504/1981/17	L44504/1981/17	accessed at www.dwer.wa.gov.au
2	Licence Amendment application and supporting documentation	NA	DWER Records: <ul style="list-style-type: none"> • DWERDT208328 • A1843066 • A1852933 • 1853391 • A1858532 • A1869394
3	DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	NA	accessed at www.dwer.wa.gov.au
4	DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.		
5	DER, November 2016. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.		
6	DER, November 2016. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.		
7	DWER, June 2019. <i>Industry Regulation Guide to Licensing</i> , Department of Water and Environmental Regulation, Perth.		
8	Comments on 21 day draft Licence- email correspondence from Craig Kimpton Environmental Supervisor of Worsley Alumina Refinery Received dates: 24 February 2020;28 February 2020 and 9 March 2020	NA	DWER Records: <ul style="list-style-type: none"> • A1870874; • A1874367 and • A1874374
9	<i>South32 Worsley Alumina Refinery Air Quality Assessment for Proposed Production Increase to 5.1 Mtpa</i> , Envall Environmental Alliances Pty Ltd January 2018.	Envall, 2018	DWER Record A1874578

Appendix 3: Consolidated Amendment Notices 1 to 3