



Application for Licence Amendment

Part V Division 3 of the *Environmental Protection Act 1986*

Licence Number	L5960/1983/11
Licence Holder	South32 Worsley Alumina Pty Ltd
ACN	008 905 155
File Number	2011/005367
Premises	Boddington Bauxite Mine Pinjarra-Williams Road, Marradong WA 6390 Legal description - Being Marradong and Saddleback Mining Operation as depicted in Schedule 1.
Date of Report	03 March 2023
Proposed Decision	Revised licence granted

**A/Manager, Resource Industries
Regulatory Services**

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

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1. Decision summary

The Delegated Officer has determined to make amendments to Licence L5960/1983/11. The amendments are administrative in nature therefore they do not alter the risk profile of the Premises, providing that activities, emissions and receptors as stated in existing approvals remain unchanged.

This Amendment Report documents the amendments made pursuant to section 59 and 59(B) of the *Environmental Protection Act 1986* (EP Act).

The decision report for the Existing licence will remain on the department's website for future reference and will act as a record of the department's decision making.

2. Scope of assessment

2.1 Regulatory framework

In amending the licence, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

2.2 Application summary

Licence L5960/1983/11 is held by South32 Worsley Alumina Pty Ltd (licence holder) for the Boddington Bauxite Mine (the Premises), located at Pinjarra-Williams Road, Marradong WA 6390.

On 10 August 2022, the licence holder submitted an application to the department to amend Licence L5960/1983/11 under section 59B of the *Environmental Protection Act 1986* (EP Act). The Licence Holder is proposing to amend the location of the ambient air quality monitor AQ4 to improve compliance with Australian Standard *AS/NZS 3580.1.1 Methods for sampling and analysis of ambient air— Guide to siting air monitoring equipment*. This proposal follows the licence holder identifying that the monitoring location for AQ4 is impacted by mining activities due to the expansion of the mining footprint at the premises. The proposed new location of monitor AQ4 is approximately 950m to the east of the previous location and is depicted in figure 3 of the amended licence. Furthermore, the licence holder is proposing to replace the current tapered element oscillating microbalance (TEOM) analyser at AQ4 with an E-sampler monitor due to the unavailability of mains power at the proposed new location. The delegated officer notes that prior to this amendment being sought the TEOM analyser at AQ4 has already been decommissioned and an E-sampler has been installed at the newly proposed AQ4 location.

The Premises relates to category 5 activities and the assessed production/design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) is defined in existing Licence L5960/1983/11.

2.2.1 Overview of ambient air monitoring network

The monitoring controls on the issued licence are designed to monitor emissions from prescribed and non-prescribed activities, the latter of which are regulated by other authorities including the Department of Mines Industry Regulation and Safety (DMIRS). Data obtained from monitoring alone cannot currently distinguish the source of dust emissions (either prescribed or non-prescribed activities) at the premises although the delegated officer notes the issued licence only acts in regulating emissions from prescribed activities.

Fugitive dust emissions are generated at the premises from a variety of activities relating to category 5 including; crushing and materials handling, transfer of ore into crushers, and loading of crushed material onto overland conveyors. Particulate matter (PM₁₀) is continuously monitored at four locations within and outside of the prescribed premises boundary as seen in figure 3 of

the issued licence. Previously, licence amendments have been granted to relocate these monitors due to changes in operations and to improve siting requirements. Ambient air quality monitor AQ1 and AQ4 are within the Marradong mining area, monitor AQ1 is positioned between the premises and Boddington townsite and acts as a receptor monitor to ensure dust emissions from the premises are not affecting the Boddington townsite by collecting downwind air quality data from the premises. The licence holder identified that monitor AQ4 serves no purpose as a boundary monitor due to the lack of sensitive receptors to the east although, the department's review found that data collected at AQ4 collects upwind background data that is necessary to support data collected at monitor AQ1. Historically monitors at AQ1 and AQ4 have been tapered element oscillating microbalance (TEOM) analysers while E-samplers were used at the AQ2 and AQ3 locations. As noted above previous to this amendment being sought the licence holder decommissioned the TEOM at the AQ4 location and installed an E-sampler at the newly proposed location.

2.2.2 Summary of the previous licence amendment

A previous amendment relating to ambient air quality at the premises was granted on 22 February 2021, the likelihood for dust emissions to impact sensitive receptors was determined to be 'possible' with a 'moderate' consequence resulting in a 'medium' risk rating for category 5 related dust-generating activities at the premises.

At this time the licence was amended to include meteorological monitoring to assist in the identification of dust sources and to understand the meteorological conditions that pose a higher risk to receptors.

One of the comments made by the licence holder after receiving the draft licence during the 21-day consultation stage of the previous amendment was that E-samplers needed to be used at locations AQ1 and AQ4 when the TEOM monitors are down for long periods of maintenance and so the licence holder requested this method be included within the specifications of Table 5: Ambient air quality monitoring. Subsequently, Table 5 was updated to authorise the use of E-samplers when required.

Additionally, dust composition sampling was conditioned to enable the department to make more informed decisions for future dust emission risk assessments. A Dust sampling program and analysis was conducted and subsequently a report was submitted to the department on 5 October 2021. A compliance demonstrated letter was issued on 11 November 2022, as it was determined that the plan satisfied the requirements of the licence condition.

2.2.3 Previous investigation into dust exceedances and complaints

As part of this assessment, the department has reviewed the dust monitoring data reported through the Annual Environment Report (AER) as well as notification requirements and complaints received by the department regarding premises activities relating to dust.

For the past annual period, the licence holder reported 25 ambient air quality monitoring target exceedances ($PM_{10} > 50 \mu g/m^3$) all originating from AQ4. During this period six complaints in relation to dust were also received by the department and subsequently investigated.

The licence holder was contacted by the department's compliance and enforcement branch as a part of an investigation into the dust exceedances, and it was ascertained that there were several factors contributing to elevated dust emissions observed at the premises. Changes in operations at the premises have resulted in mining activity being completed near AQ4 (within 700m), this mining within the outer regions of the premises has also resulted in increased haul distances. These changes to mining operations combined with the summer climate and water restrictions (put in place by the licence holder to appease additional commitments in Ministerial Statement MS 719) have contributed to these exceedances. These changes relate to unprescribed mining activities indicating that prescribed activities are not the source of elevated dust emissions observed.

All complaints received by the department were residents of Boddington townsite which is located northeast of the premises and not near monitoring location AQ4. Air quality monitor AQ1 is positioned between the premises boundary and the Boddington town and is used to measure potential dust emissions from the premises affecting the townsite. No exceedances of AQ1 were recorded for the last annual period indicating that South32 Worsley was in compliance with licence conditions. It has been determined that exceedances for dust at air quality monitor AQ4 are unrelated to complaints received due to the distance between Boddington townsite and AQ4. Any further complaints received by the department will continue to be investigated.

The outcome of this investigation into the dust exceedances was that the source of dust could not be confirmed due to the nature of operations at the premises and only low environmental and amenity impacts had been identified. The department's compliance and enforcement branch deemed the licence holder's current dust suppression measures adequate and will continue to monitor compliance with licence conditions.

2.3 Part IV of the EP Act

The Premises is also subject to commitments within Ministerial Statement MS 719, issued under Part IV of the EP Act. The Ministerial Statement approves a mining rate of up to 4.7 Mtpa. Part of the ministerial commitments act to regulate dust impacts from bauxite mining activities so that the amenity of nearby residences is protected, this is achieved through a Dust Management Plan inclusive of dust suppression and monitoring commitments.

3. Assessment

3.1 Technical review of existing monitoring data

As part of this assessment, the department has conducted a in depth review of the ambient air quality monitoring network and raw data obtained by the licence holder for the past annual period for all four ambient air quality monitors on the licence. This assessment was conducted in order to assess if; the new location of the AQ4 air quality monitor is appropriate for the premises operations, if an E-sampler at this location is acceptable and to review the quality of data being collected and reported.

3.1.1 Review of new location of ambient air quality monitor AQ4

The assessment is limited to a review of whether the new location of AQ4 is appropriate for premises operations. After reviewing the supplied South32 Boddington Bauxite Mine Stagbouer siting report, prepared by MAXY Engineering, which outlines all requirements of the siting standard AS/NSZ 3580.1.1, the department considers the new proposed location of AQ4 to comply with the licence requirements.

Therefore, the proposal to change the location of ambient air quality monitor AQ4 is not considered to significantly impact the ongoing monitoring of potential dust impacts from prescribed activities and monitor AQ4 will continue to act as a background monitor. It is noted that the proposed changes are required to improve siting location issues as mining activities advance closer to the air quality monitor.

3.1.2 Review of the use of an E-sampler at location AQ4

As discussed in section 2.2.2 the previous amendment for the licence was amended to allow the use of E-samplers at all locations when required. It is noted that the differences between the two methods of ambient air analysis E-samplers and TEOM analysers (that comply with AS/NZS 3580.9.8) was not risk assessed at the time of the last licence amendment and that the circumstances of when E-samplers could be used has not been clearly defined within the licence. At the time of the last licence amendment the air quality monitors at the AQ1 and AQ4

locations were TEOM monitors while air monitors at AQ2 and AQ3 were E-samplers (however as previously mentioned South32 has replaced the TEOM monitor at AQ4 with an E-sampler and has shifted AQ4 to the proposed new location prior to this amendment being sought).

Upon internal review of the differences between the two methods of ambient air analysis, it was ascertained that data from the differing methods are not directly comparable for the purpose of upwind and downwind mine-site monitoring. Furthermore, the E-sampler could produce data of lower quality. As the intended purpose of an air quality monitor at AQ4 is to give background data to support data obtained at AQ4 the use of an E-sampler is not endorsed by the department. E-samplers are often used for indicative analysis and are not recommended for regulatory compliance monitoring that is protecting sensitive receptors.

Therefore, specified action conditions have been included within the amended licence to require the licence holder to replace the current E-sampler at AQ4 with a monitor capable of an approved method of ambient air monitoring. Approved methods include the currently approved TEOM monitor (AS/NZS 3580.9.8) or a beta attenuation monitor (BAM, AS/NZS 3580.9.11). The BAM monitor will produce data that will be comparable with that of the TEOM analyser at AQ1 and solar options are available which is a limitation of the TEOM analyser. This change is required prior to summer of 2023 as this is a high-risk period for dust emissions. E-samplers are only permitted temporarily during periods of maintenance at the AQ1 and AQ4 locations but are acceptable at the AQ2 and AQ3 locations due to the lack of nearby sensitive receptors. Conditions have been modified to indicate this.

3.1.3 Review of data reliability

A technical review of the data obtained as a part of this investigation found that air quality monitors at both AQ1 and AQ4 locations had low data availability. For AQ1 there was no data recorded from 01 July to 27 October 2022 and from 21 May to 15 June 2022, within the past AER gaps in data were attributed to instrument faults. Each monitor had multiple reported instrument faults for the annual period and there was an unacceptable amount of invalid data points. A previous review conducted by the department's compliance and enforcement branch described in section 2.2.3 concluded that low amenity impacts had been identified from the exceedances at AQ4 and complaints due to the fact no exceedances were recorded at AQ1. This demonstrates the departments reliance on air quality monitors for decision making and it is expected that this data is available and reliable, upon further review it cannot be confirmed that there were no target exceedances at the AQ1 location in the past annual period. Given the close proximity to Boddington town-site it is pertinent that monitor AQ1 collects consistently reliable data.

Therefore, the Australian standard AS/NZS 3580.19 *Methods for sampling and analysis of ambient air: Method 19 Ambient air quality data validation and reporting* has been conditioned in the licence as a requirement for all ambient air monitoring data. Conditioning this standard will ensure data is adequately reviewed and validated and a comprehensive statement of conformance will be required to be submitted to the department annually as a part of the licence holders AER.

3.1.4 Key findings

The Delegated Officer has reviewed the information regarding the technical review and has found:

1. The newly proposed location is appropriate for ambient air monitoring background concentrations upwind of the premises and complies with standard AS/NZS3580.1.1
2. The use of an E-sampler at location AQ4 may result in reduced data quality and this method is not recommended for regulatory compliance. Specified action

conditions have been included to replace the current E-sampler at AQ4.

3. Low data availability was recorded at monitoring locations AQ1 and AQ4, although no exceedances at AQ1 were recorded for the last annual period low data availability could have contributed to this.

4. Consultation

The Licence Holder was provided with the draft Amendment Report on 7 February 2023. On 3 March 2023 the Licence Holder accepted all proposed changes.

5. Conclusion

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

5.1 Summary of amendments

Table 1 below provides a summary of the proposed amendments and will act as a record of implemented changes. All proposed changes have been incorporated into the Revised licence as part of the amendment process.

Table 1: Summary of licence amendments

Condition no.	Proposed amendments
4	Amended to ensure ambient air data is validated in accordance to AS/NZS 3580.19.
9	Inclusion of frequency column to be continuous.
9	Changes to the wording surrounding method of ambient air quality monitoring and where e-samplers are appropriate.
16	Inclusion of a statement of method conformance as described in AS 3589.19.2020 within the AER.
19	Inclusion of specified action to replace the ambient air monitor at AQ4 location with a monitor that complies with Australian standard AS/NZS 3580.9.11 or AS/NZS 3580.9.7.
20	Standard condition on compliance reporting of specified actions.
21	Standard condition on what compliance report for condition 20 must include.
10 and 18	Deletion of redundant conditions as Sampling and Analysis Plan for dust composition sampling was submitted to the department on 5 October 2021. A review of the plan was undertaken by the department and a compliance demonstrated letter was issued on 11 November 2022.
Schedule 1: Maps	Figure 3: Map of ambient air quality monitoring points updated to reflect the new location of AQ4.

Condition no.	Proposed amendments
Conditions 10 and onwards	Administrative change to the numbering of conditions due to the deletion of the conditions outlined above.
3, 9, & 12	Administrative change to update references of Licensee to licence holder.