



# Decision Report

## Review of Existing Licence

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

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<b>Licence Number</b>	L6217/1983/15
<b>Licence holder</b>	Alcoa of Australia Limited
<b>ACN</b>	004 879 298
<b>File number</b>	2012/007237-7
<b>Premises</b>	Wagerup Alumina Refinery 184 Willowdale Road WAGERUP WA 6215
	Legal description – Lot 1031 on Plan 255274, Lots 700 and 703 on Plan 59305, Lots 11, 12 and 16 on Plan 202652, Lot 846 on Plan 251130, Lots 15 and 16 on Diagram 78210, Lot 279 on Plan 253786, Lots 400 and 401 on Plan 300751, Lots 217, 225, 226, 227, 228, 231, 232, 233, 234, 238 on Plan 233039, Lot 294 on Plan 215144, Part of Lot 203 on Plan 20529, Lots 53, 54, 55, 56 and 57 on Plan 222558, Lot 156 on Plan 116083, Lots 267, 1417 and 1418 on Plan 157705, Lot 1208 on Plan 104726, Lot 296 on Plan 215147, Lots 12 and 13 on Diagram 59237, Lot 1583 on Plan 211217, Lot 387 on Plan 101039, Lot 1546 on Plan 168342, Lot 390 on Plan 156002, Lot 202 on Diagram 63803, Lots 88 and 89 on Plan 22686, Lot 1254 on Plan 143719, Lot 160 on Plan 120100, Lots 93, 94, 98, 145, 146, 945 on Plan 232779, Lots 600, 601 and 602 on Plan 300749, Lots 1 and 2 on Diagram 26416, Part of Lot 1300 on Plan 144687, Lot 1 on Diagram 55531, Lot 201 on Diagram 63804, Lot 351 on Plan 246088, Lot 363 on Plan 246091, Lot 621 on Plan 253766, Lot 514 on Plan 109077, Lot 3343 on Plan 253789, Lot 883 on Plan 253788, Lot 3 on Diagram 25032, Lot 701 on Plan 300752, Lot 260 on Plan 257221, Lots 8, 9 and 10 on Diagram 87877, Lots 1 and 2 on Diagram 53224, Lot 72 on Plan 132033, Lots 68, 69, 70 and 71 on Plan 232807, Lots 410 on Plan 102461, Lots 65 and 67 on Plan 228592, Lot 4238 on Plan 251501, Lot 343 on Plan 143524, Lots 489 and 492 on Plan 254420, Lot 1 on Plan 11067, Lot 324 on Plan 100500, Lot 15 on Diagram 59238, Lot 269 on Plan 160884, Lot 468 on Plan 105331, Lot 14 on Diagram 59240, Lot 353 on Plan 232758, Lot 1 on Diagram 14273, Lot 500 on Plan 54466, Lots 500 and 501 on Plan 300750, Lot 354 on Plan 246090, Lot 855 on Plan 137859, Lot 916 on Plan 253793, Lots 1 and 2 on Diagram 18220, Lot 327 on Plan 100512, and Lot 206 on Plan 424949 as depicted in Schedule 1 of the licence.
<b>Date of report</b>	13 March 2026
<b>Decision</b>	Licence granted

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## 1. Decision summary

Licence L6217/1983/15 is held by Alcoa of Australia Limited (licence holder) for the Wagerup Alumina Refinery (the premises), located approximately 120 km south of Perth and 7.5 km south of the town of Waroona in Western Australia.

The Department of Water and Environmental Regulation (the department; DWER) initiated a review of licence L6217/1983/15 following the implementation of the department's risk based regulatory framework and the Minister for Environment's determination on an appeal in objection to the amendment of licence L6217/1983/15 that was made on 20 February 2018.

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges within the scope of the review during the operation of the premises. As a result of this assessment, a revised version of licence L6217/1983/15 has been granted.

## 2. Scope of assessment

### 2.1 Regulatory framework

In completing the assessment documented in this decision report, the department has considered and given due regard to its regulatory framework and relevant policy documents which are available at [www.wa.gov.au/service/building-utilities-and-essential-services/integrated-essential-services/dwer-regulatory-documents](http://www.wa.gov.au/service/building-utilities-and-essential-services/integrated-essential-services/dwer-regulatory-documents).

### 2.2 Risk review summary and scope

On 7 February 2017, the department notified the licence holder that it would be reviewing licence L6217/1983/15 (L6217) for the Wagerup Alumina Refinery premises located at Willowdale Road, Waroona. The intent of the review was to:

- undertake a full risk-based review in accordance with the department's risk based regulatory framework to ensure that the regulatory controls on the licence are appropriate and risk based; and
- address outcomes of Appeal number 143 of 2015 in the Minister for Environment's 20 February 2018 appeal determination.

The department has determined to complete the review of licence L6217 in stages. The following matters will be addressed in this decision report (Stage 1):

- review the risk profile of fugitive dust and ensure conditions remain commensurate with risk;
- consider the risk of mercury emissions to air;
- conversion of the licence to the current format and modernise conditions; and
- administrative and reporting updates.

Additional matters that the department proposes to address in the next stage of the review (Stage 2) include, but are not limited to:

- a review of the risk profile of air emissions and Volatile Organic Compounds (VOCs); and
- consideration of the risk to groundwater and surface water and review monitoring requirements.

#### 2.2.1 Beyond scope

No changes to the existing approved premises production capacities have been considered in this decision report, or authorised in the revised licence. Current assessed production capacities have been included on the front page of the licence.

Noise emissions are not within the scope of assessment as operational noise emissions from the

premises are separately regulated by a noise approval under regulation 17 of the Environmental Protection (Noise) Regulations 1997 (Noise Regulations).

### 3. Premises overview

The premises was established under the *Alumina Refinery (Wagerup) Agreement and Acts Amendment Act 1978* (State Agreement) and commenced operations in 1984 refining bauxite ore into aluminium oxide (alumina). The premises is classified as prescribed under Category 46 (Bauxite refining), Category 52 (Electric power generation), Category 64 (Class II or III putrescible landfill site), and Category 67 (Fuel burning) of the Environmental Protection Regulations 1987 (EP Regulations).

The premises has two distinct operational areas which are the refinery (with the bauxite storage and handling area just north of the refinery) and the residue storage area (RSA).

#### 3.1 Bauxite storage/handling and Refinery (information provided by licence holder)

The refinery is supplied with bauxite ore via an overland conveyor from Aloca's Willowdale mine (operating under L6465/1989/10). The bauxite is deposited in stockpiles at the bauxite storage and handling area where it is then reclaimed and conveyed to storage bins before being transferred to the grinding mills.

The refinery uses the Bayer process to refine alumina from bauxite ore, involving the following main steps:

1. Digestion: bauxite is milled to sand sized particles then mixed with a hot concentrated sodium hydroxide (caustic soda) solution, producing a bauxite slurry, to dissolve available alumina into solution.
2. Clarification: undissolved ore solids are settled out using large clarification vessels (mud thickeners), leaving alumina rich "green" liquor. The bauxite solids are then passed through mud washers using water to recover the caustic to enable it to return to the recycled caustic liquor circuit. The washed solids (process residue) are pumped to the residue storage area.
3. Precipitation: hot "green" liquor is cooled from approximately 100°C to 60-75°C then seeded with small crystals of alumina hydrate causing alumina hydrate to crystallise. Liquor and hydrate are separated, and the crystals sized. Suitably sized crystals are removed with undersize crystals returned to the process as seed crystals. Spent liquor (produced during classification, thickening and filtration processes) is recycled to the digestion process.
4. Calcination: sized hydrate is washed and dried, then heated to approximately 1,000°C to remove chemically bonded water leaving aluminium oxide (alumina). Electrostatic precipitators on each calciner help to reduce particulate emissions.

The refinery has two main elemental mercury removal systems at the Digestion and Evaporation facilities which condense gases, containing volatilised mercury, from some of the hottest parts of the Bayer liquor circuit. Some mercury condenses into its liquid elemental form which is collected in pots that are emptied on a monthly basis, along with the Mercury Treatment Facility final tank drain pipe.

Sodium polysulfide is added in the vacuum seal water at Digestion and Evaporation in an attempt to capture any elemental mercury in the non-condensable gas stream to a soluble complex form. The mercury bonds with the high sulfur containing material and is dissolved into the condensate stream, which is then transported to the Mercury Treatment Facility.

At the Mercury Treatment Facility solutions are added to convert soluble mercury to solid mercury sulfide (copper solution) and to assist in binding the formed mercury sulfide (iron solution). This converted mercury is a stable solid form, similar to the form it came in with the bauxite, and will ultimately exit to the residue storage area.

In addition to removal at digestion and evaporation mercury is also removed from the oxalate stream (Oxalate Removal facility). Polysulfide is added to the oxalate seed stream that feeds the oxalate crystalliser. This combines with mercury in the liquor to form a stable complex to minimise mercury

binding to the oxalate cake and directing the mercury to downstream mercury capture processes.

The remaining gaseous mercury compounds, within the non-condensable gases, are released through vents and stacks.

### 3.2 Residue Storage Area (information provided by licence holder)

The residue storage area consists of infrastructure as described in Table 1 for the management of solid and liquid wastes produced on the premises. The residue storage area also provides the ability to collect, store and recycle water through the refinery water circuit.

**Table 1: Overview of residue storage area components**

Residue storage area component(s)	Description																		
RSA2, RSA3, RSA4, RSA5, RSA6, RSA7, RSA8 and RSA9	<p>Solar drying storage areas for residue mud.</p> <table border="1"> <thead> <tr> <th>RSA #</th> <th>Lining type</th> </tr> </thead> <tbody> <tr> <td>RSA2</td> <td>Clay</td> </tr> <tr> <td>RSA3</td> <td>Clay</td> </tr> <tr> <td>RSA4</td> <td>Clay</td> </tr> <tr> <td>RSA5</td> <td>Clay</td> </tr> <tr> <td>RSA6</td> <td>Composite clay and PVC</td> </tr> <tr> <td>RSA7</td> <td>Composite clay and HDPE</td> </tr> <tr> <td>RSA8</td> <td>Composite clay and HDPE</td> </tr> <tr> <td>RSA9</td> <td>Composite clay and HDPE</td> </tr> </tbody> </table> <p>Each RSA has an intended design height of 74 m AHD as detailed in the Long Term Residue Management Strategy (Alcoa 2020). These RSAs are active and have not been capped or covered at this stage. Note: RSA1 is clay lined and no longer utilised for residue deposition. It is currently the site of the spent liquor pond, oxalate ponds and landfills.</p>	RSA #	Lining type	RSA2	Clay	RSA3	Clay	RSA4	Clay	RSA5	Clay	RSA6	Composite clay and PVC	RSA7	Composite clay and HDPE	RSA8	Composite clay and HDPE	RSA9	Composite clay and HDPE
RSA #	Lining type																		
RSA2	Clay																		
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RSA7	Composite clay and HDPE																		
RSA8	Composite clay and HDPE																		
RSA9	Composite clay and HDPE																		
Run-off Water Storage (ROWS) Pond and Spillway	<p>Collects surface runoff water and provides bulk storage of water for process requirements. Provides make up cooling water to the cooling pond. Accommodates surges in the total water volume in the overall residue area as evaporation and rainfall vary throughout the year. Composite clay and HDPE lined water storage pond with an approximate capacity of 3,960 ML.</p>																		
Run-off collection ponds (ROCP): ROCP2, ROCP3	<p>Collection and storage of residue leachate and rainfall infiltration from RSA base drainage systems pending transfer to the ROWS pond. ROCP 2 and ROCP3 are both composite clay and HDPE lined water storage ponds with an approximate capacity of 180 and 500 ML respectively. Note: ROCP1 is no longer being used to capture run-off and is currently in the final stages of being capped.</p>																		
Cooling pond	<p>Cooling of refinery process liquor. The majority of rainfall runoff from the refinery, RSAs and process water ponds is transferred to the Cooling Pond (or ROWS) during winter for use as make-up water for the refinery in summer. Composite sandy clay and PVC lined water storage pond with an approximate capacity of 1,100 ML.</p>																		
Oxalate pond 1, Oxalate pond 2 and Oxalate pond 3	<p>Storage of submerged oxalate. Oxalate is directed to the oxalate kiln, while operating, operating conditions and the oxalate ponds provide backup or emergency storage during periods when the oxalate kiln or biox facility is not operating. Oxalate ponds 1 to 3 were constructed within the existing footprint of RSA1 which consists of a single clay liner. They have approximate capacities of 7.8 ML, 85 ML and 116 ML.</p>																		
Sand lake	<p>Storage of excess red sand separated from the residue waste stream pending reuse in construction activities such as RSA embankment lifts.</p>																		
Spent liquor pond	<p>Receives liquor removed from site oxalate when the kiln or biox facility is unavailable for processing. To maintain appropriate water levels, water from DP1 is transferred to the pond to</p>																		

Residue storage area component(s)	Description
	ensure oxalate is stored correctly. This pond was constructed within the existing footprint of RSA1 which consists of a single clay liner. The pond is a HDPE lined storage pond with an approximate capacity of 170 ML.
Landfill (Class II)	Burial of Class II wastes generated from the refinery and residue area including certain non-recyclable non-process wastes. Certain waste may also be accepted for burial from other Alcoa premises specified in the existing licence.
Landfill (Process Waste)	For the disposal of wastes generated from alumina production and associated activities, including bauxite residue, oxalate, waste bauxite, alumina and hydrate, and scale (any solid material from process circuits or tanks that contain caustic). Wastes may also be accepted from other premises specified in the licence.
Super thickener	The red mud fraction of residue is pumped to a thickener vessel where it is further thickened using flocculants to produce a high-density underflow slurry of around 50% weight by weight of solids.
Detention Pond (DP)1 and DP2	DP1 receives water inputs from Yalup Brook (Black Tom), Harvey Main Drain and Harvey Water purchased water. DP2 receives transfers from DP1, and the Lower Dam water which consists of stormwater from the Bauxite Storage and Handling Area, and excess condensate from the refinery. DP1 and DP2 are used to store water for use in the dust suppression sprinkler network and to provide make up for the alkali liquor circuit during summer. DP1 comprises an in-situ compacted material with an approximate storage capacity of 1,700 ML. DP2 comprises an in-situ compacted material with HDPE lined embankments, and an approximate storage capacity of 1,900 ML.
Duck Pond (Freshwater Lake)	Collection and storage of harvested surface water and provides a flow path for water purchased from Harvey Water.

Residue produced consists of caustic-insoluble components, predominantly oxides of iron and silicon that have passed through the Bayer process unaltered with residual quantities of caustic soda not recovered in the residue washing stage.

Residue tailings are separated according to a size fraction through the refining process. The coarse sand fraction referred to as “red sand” makes up approximately 37% of residue and is used in internal residue area construction activities such as embankment uplifts or otherwise stockpiled in storage areas (Alcoa 2020). A finer silt fraction referred to as “red mud” makes up approximately 63% of residue and is thickened using flocculants and discharged into residue drying areas (RSAs) for solar drying (Alcoa 2020). The red mud slurry is placed in RSAs in layers and allowed to dry through mechanical turning using bulldozers or amphirols, and the final dry density of the tailings is approximately 70% solid material (Alcoa 2020).

## 4. Appeals

A third party appeal was lodged on the amendment of licence L6217/1983/15 granted 30 October 2015 to extend the duration of the licence and to authorise an increase in production of the refinery from 2.65 million tonnes per annum (Mtpa) to 2.85 Mtpa. The outcome of appeal number 143 of 2015 was determined by the Minister for Environment on 20 February 2018.

The Minister for Environment allowed the appeal in part and requested the department to:

1. Ensure the identified uncertainties in respect to VOC emissions, particularly in relation to low-elevation sources, are considered as part of the review currently underway.
2. Review the nature and scale of particulate emissions from the premises generally; and PM<sub>2.5</sub> in particular.
3. Consider the implications of the apparent increase in mercury emissions shown in recent NPI data.
4. Amend condition W2 to ensure that no contaminated water is released to the environment from the premises, consistent with the commitment already contained in the licence holder’s Long

## Term Residue Management Strategy.

As discussed in section 2, this report addresses points 2 and 3 noting that point 4 has been addressed in the revised licence. Point 1 will be addressed in the next stage of the review. The minister's determination, as it relates to dust and mercury will be discussed in more detail in sections 0 and 8.1 of this report.

## 5. Part IV of the EP Act

Ministerial Statements (MS) 728, 1069 and 1157 have been granted under Part IV of the EP Act and authorise the construction and operation of the Wagerup Alumina Refinery to a maximum production capacity of 4.7 million tonnes per annum and its associated bauxite mining, as documented in Schedule 1 of MS 728. The expansion to 4.7 Mtpa is subject to implementation conditions in MS 728, 1069 and 1157, including best practice emissions management requirements to offset and reduce emissions.

During the assessment that resulted in MS 728, the proponent (Alcoa World Alumina Australia) considered a single stage expansion for the refinery to 4.7 Mtpa. However, due to market conditions not facilitating this approach to production growth, the proponent proposed increasing refinery production in smaller increments. Conditions within MS 728 were amended through MS 1157 to reflect incremental production increases, initially up to 3.3 Mtpa. As a result, some conditions in the ministerial statements, such as 8-1A and 9-1A will not be triggered until production increases above 3.3 Mtpa.

Conditions relevant to the assessment outlined in this decision report include condition 13-4 (of MS 728) that requires the proponent to implement a Long Term Residue Management Strategy. The delegated officer has reviewed this strategy and notes the following proposed mitigation strategies for dust:

- embankments are planted with native vegetation or covered with aggregate or mulch;
- weekly field inspections and surveys are carried out to check effectiveness of dust controls;
- regularly turning over the mud in the drying area, leaving wet mud on the surface;
- sprinkler system is operated in response to daily weather forecasts and residue area conditions and feedback from continuous dust monitors around the residue area;
- internal alarms are triggered in the event of dust levels rising above internal targets, with sprinklers operated in response; and
- regularly review dust management processes and practices with the objective of continuously improving dust containment at the residue areas.

While the department assesses applications under Part V of the EP Act according to its risk-based regulatory framework, it seeks to ensure its decision making for the premises is not inconsistent with the broader objectives and principles of MS 728, 1069 and 1157.

### 5.1 Health risk assessment – 2020

Alcoa provided a Health Risk Assessment (HRA) as part of their assessment information for a s46 request to the EPA to facilitate a production increase to 3.3 Mtpa. EPA Report 1691 (November 2020) states that "The HRA concluded that the predicted ground level concentrations from baseline emissions and expanded emissions would not result in adverse health impacts, chronic health impacts or increased cancer risk to the Wagerup community. The Department of Health reviewed the HRA and verified the findings. A peer review of the HRA was also undertaken, concluding that it was *"prudent, conservative and health protective."*

A copy of EPA Report 1691 and the HRA, along with other documents submitted by Alcoa, are available on the EPA's website <https://www.epa.wa.gov.au/proposals/wagerup-alumina-refinery-production-maximum-capacity-47-million-tonnes-annum-and-1>.

The HRA as it relates to mercury will be discussed in more detail in section 8.5 of this report.

## 6. Complaints history

The department undertook a review of complaints that were received by the department linked to the premises over a 10-year period (2014 through 2024). A total of 436 complaints were reported to the department relating to the premises during this time. Of these, 11 were related to dust emissions from the premises, with the last dust related complaint reported in 2019.

**Table 2: Historical dust complaints related to Alcoa's Wagerup Alumina Refinery 2014-2024**

Year	2014	2015	2016	2017	2018	2019	2020 – 2024
Number of dust related complaints	2	2	0	1	0	3	0

## 7. Dust

Dust is particulate matter (PM) comprising very small solid particles of earth, organic matter, manufactured products or waste matter which may become airborne by natural forces (such as wind) and/or by mechanical processes (such as grinding, milling, conveying or stockpiling).

Dust emissions can have adverse impacts on human health. These health impacts can be both short term (acute) and long-term (chronic). Dust emissions can also have impacts on vegetation, soil and water quality, as well as amenity and social surroundings.

The characteristics of the dust emitted (including particle size, composition and colour) will influence the potential health or amenity impacts.

Fine dust particles (i.e. in PM<sub>10</sub> and PM<sub>2.5</sub> size ranges<sup>1</sup>) that are readily inhaled are associated with a range of chronic or acute (e.g. eye or breathing irritation) health effects.

Note 1: PM<sub>10</sub> and PM<sub>2.5</sub> means particles with an aerodynamic diameter of less or equal to 10 micrometres (µm) and 2.5 µm respectively.

Total suspended particulate matter (TSP) is usually defined as particles with an aerodynamic diameter less than 50 µm (sometimes including particles up to 100 µm). While TSP does include both PM<sub>10</sub> and PM<sub>2.5</sub> fractions, it is not considered to be a contemporary measure of the potential health risk posed by airborne dust, but rather is more of what is often termed “nuisance dust”, causing amenity impacts by settling on surfaces and causing soiling and discolouration.

The composition and morphology of the dust is also important; for example, when it contains toxic materials such as metals or asbestos that can be inhaled or ingested. Reduced visibility is another effect of airborne particles.

Table 3 below show relevant criteria for assessing health impacts for PM<sub>10</sub>, PM<sub>2.5</sub> and deposited dust which is based on the National Environment Protection Council (NEPC)'s *National Environment Protection (Ambient Air Quality) Measure (NEPM)* (NEPC 2021) and NSW Environment Protection Authority's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA 2022).

**Table 3: Criteria for dust**

Pollutant	Criteria	Impact
PM <sub>10</sub>	50 µg/m <sup>3</sup> (24 hour average)	Health
	25 µg/m <sup>3</sup> (1 year average)	
PM <sub>2.5</sub>	25 µg/m <sup>3</sup> (24 hour average)	Health
	8 µg/m <sup>3</sup> (1 year average)	
Deposited dust	4 g/m <sup>2</sup> /30 days (maximum)	Amenity
	2 g/m <sup>2</sup> /30 days (above background)	

## 7.1 Appeal

In appeal number 143 of 2015 determined by the Minister for Environment (see section 4), the Minister requested that the department review the nature and scale of particulate emissions from the premises generally, and PM<sub>2.5</sub> in particular, as part of its review of licence L6217/1983/15.

## 7.2 NPI emissions

The licence holder reports emission estimations for the premises to the National Pollutant Inventory (NPI) on an annual basis (available at <https://www.dcceew.gov.au/environment/protection/npi>). Table 4 shows the annual fugitive particulates data reported to the NPI for the reporting periods referred to in the appeal, in addition to data available since the Ministers Appeal determination. The department notes that reported emissions are based on calculations and don't represent measured data.

**Table 4: NPI reporting data for fugitive dust emissions**

Fugitive particulates (kg/year)	NPI reporting period											
	2012 / 2013	2013 / 2014	2014 / 2015	2015 / 2016	2016 / 2017	2017 / 2018	2018 / 2019	2019 / 2020	2020 / 2021	2021 / 2022	2022 / 2023	2023 / 2024
PM <sub>10</sub>	260,000	260,000	300,000	280,000	210,000	240,000	300,000	270,000	330,000	410,000	280,000	470,000
PM <sub>2.5</sub>	820	710	1,400	1,100	1,200	1,200	1,700	1,400	3,900	4,000	3,900	3,800

## 7.3 Existing licence conditions for management of dust emissions

The existing licence contains the following conditions related to ambient dust management:

- Condition A4 – requires spilt alumina be removed from alumina rail carriages prior to the train leaving the premises.
- Condition A20 – requires dust monitoring of residue storage areas using Tapered Element Oscillating Microbalance (TEOM)'s or high volume samplers at the specified locations that run continuously (95% availability); and where high volume samplers are used filter papers are renewed daily.
- Condition A21 – requires chemical dust analysis of the filter paper from at least one of the high volume samplers if dust concentration is greater than 100 µg/m<sup>3</sup> (4 samples taken between October and March).
- Condition A27 – specifies a TSP (daily average, background corrected) limit of 200 µg/m<sup>3</sup> for not more than 18 days during the annual period and a limit of 260 µg/m<sup>3</sup> to never be exceeded.

## 7.4 Annual Environmental Reports

The licence holder reported no exceedances of the TSP limits set by condition A27 from 2018 to 2021 and during 2023 and 2024, reporting no monitoring results over 200 µg/m<sup>3</sup>. The availability of the high-volume samplers was also reported to be above the 95% requirement in condition A20.

No chemical dust analysis of filter paper was undertaken between 2018-2020 as no samples recorded concentrations greater than the specified 100 µg/m<sup>3</sup> (between October and March) (condition A21).

In 2021, 2022, 2023 and 2024 there were two, four, two and three samples respectively recorded with concentrations greater than 100 µg/m<sup>3</sup> (during October to March), and a chemical analysis was undertaken of the filter papers as per existing licence condition A21. The sample on 25 January 2022 recorded a background corrected dust concentration of 311 µg/m<sup>3</sup> TSP, exceeding the limits specified in existing condition A27.

The licence holder investigated the source of the recorded samples exceeding 100 µg/m<sup>3</sup> and identified the causes to be:

- in 2021 – extreme weather and a regional bushfire;

- in 2022 – localised events caused by cattle immediately adjacent to the dust monitor;
- in 2023 – emissions from the residue storage area or refinery operations that were caused by extreme easterly winds impacting upon one of the monitors;
- in 2024 – emissions from the residue storage area or refinery operations and were caused by extreme easterly winds.

The department has compared the calculated results provided by the licence holder for the analysis of samples  $>100 \mu\text{g}/\text{m}^3$  to the relevant departmental draft Guideline: Air emissions (DWER 2019). Data indicated that metals, where air quality guideline values are available, were detected at levels below the guidelines, except for aluminium in December 2024 that marginally exceeded the guideline ( $10.084 \mu\text{g}/\text{m}^3$  result compared to guideline of  $10 \mu\text{g}/\text{m}^3$ ). Of the metals analysed, aluminium was detected at the highest concentrations, reflecting the premises operations; however, except for December 2024, it was also present at levels below the guideline.

## 7.5 Existing dust monitoring

The licence holder provided the Wagerup Residue Storage Area Dust Monitoring Network Review report (dated July 2023 and prepared by Katestone Environmental Pty Ltd) which reviews the current dust monitoring network around the residue storage areas (RSA) to determine the effectiveness of the network in quantifying dust emissions from the RSAs and provide recommendations for network improvements.

The licence holder's dust monitoring network currently includes the following monitoring equipment, both voluntary and monitoring currently required in licence L6217/1983/15:

- Five Beta Attenuation Mass (BAM) monitors monitoring TSP;
- One BAM monitor monitoring  $\text{PM}_{10}$ ;
- Five High Volume Air Samplers (HVAS) monitoring TSP; and
- One HVAS monitoring  $\text{PM}_{10}$ .

Two meteorological monitoring stations are also located at the premises.

It is noted that BAM monitors are real time continuous whereas HVAS filters are replaced once daily, giving a 24-hour average.

## 7.6 Fugitive dust emissions at the premises

The department has reviewed information provided by the licence holder in response to departmental requests for information on fugitive dust emissions from the premises, which included the Wagerup Residue Storage Area Dust Monitoring Network Review report (Katestone 2023), and several operational procedures.

The department notes the following key points from the information provided:

- The Bancell Rd West Meteorological station provides suitable meteorological data for analysis of dust impacts related to the RSA and should be maintained.
- The existing licence conditions require monitoring of TSP at a number of locations and assessment of the results against a licence limit that was based on the United States Environmental Protection Agency's (US EPA) (now revoked) primary standard for TSP.
- $\text{PM}_{10}$  is a more relevant parameter to determine health effects.
- Monitors used to monitor  $\text{PM}_{10}$  can provide continuous monitoring at 1-hour time resolution (or less) that is compliant with Australian Standards.
- The 24-hour limit for  $\text{PM}_{2.5}$  is 50% of that for  $\text{PM}_{10}$  (NEPC 2021), therefore, if the  $\text{PM}_{2.5}$  fraction of  $\text{PM}_{10}$  that is emitted is less than 50%, then  $\text{PM}_{10}$  is the more sensitive pollutant.
- The USEPA AP-42 Compilation of Air Pollutant Emissions Factors (USEPA 1998) is used to estimate emissions from industrial sources. USEPA 1998 is supported by the Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive dust Emission Factors

(Midwest Research Institute 2006), which recommends a “*PM<sub>2.5</sub>/PM<sub>10</sub> ratio in the range of 0.1 to 0.15 for typical uncontrolled fugitive dust sources*”, which include emissions from unpaved roads, aggregate handling and storage piles, industrial wind erosion and open area wind erosion, and therefore, covers the dust generation sources at the residue storage area.

- The results of HVAS monitoring of TSP, PM<sub>10</sub> and PM<sub>2.5</sub> undertaken adjacent to RSA 5 from July 2021 to February 2022 show the average PM<sub>2.5</sub>/PM<sub>10</sub> ratio over this period was 0.47.
- Average PM<sub>2.5</sub>/PM<sub>10</sub> ratios of 0.34 and 0.26 were measured at the residue south west and residue west monitoring sites respectively, through monitoring undertaken to inform the Residue Area Fugitive Emission Estimates and Model Validations report.
- Samples of residue mud were found to be approximately 42% PM<sub>10</sub> and 23% PM<sub>2.5</sub> suggesting that the PM<sub>2.5</sub>/PM<sub>10</sub> ratio from the residue storage area could be approximately 55%; however, this does not align with the ambient particulate matter sampling which suggests a ratio below 50%.
- Recommend updating the ambient dust monitoring network at the residue storage area to monitor, and set limits for, PM<sub>10</sub> rather than TSP using BAM or TEOM monitors. Benefits include availability of real-time data via telemetry, rather than 24-hour data due to daily filter changes of the HVAS monitors.
- In response to the Katestone 2023 review, the licence holder has proposed a draft residue ambient dust monitoring network upgrade plan which includes:
  - Installation of 2 new PM<sub>10</sub> BAM monitors;
  - Relocation of 3 existing TSP BAM monitors and convert to PM<sub>10</sub> monitoring;
  - Convert existing TSP BAM monitor to PM<sub>10</sub>;
  - Convert 5 existing HVAS monitors to PM<sub>10</sub> BAM monitors;
  - Retain one HVAS and convert for PM<sub>10</sub> monitoring.

*The department understands that an upgrade to the communication network will also occur to accommodate the additional monitors.*

- Recommend operating a single PM<sub>2.5</sub> monitor co-located with one of the PM<sub>10</sub> monitors so that the PM<sub>2.5</sub>/PM<sub>10</sub> ratio can be monitored. This monitor should be close to the RSAs and frequently downwind, such as RSA7 or Residue South West (in their new proposed locations).
- It is acknowledged that monitoring of PM<sub>10</sub>, rather than TSP, will miss the contribution of the dust generated by the RSAs greater in size than PM<sub>10</sub> and therefore switches focus from nuisance to health effects. However, PM<sub>10</sub> levels are likely to be indicative of TSP concentrations and provided appropriate trigger levels are set, dust nuisance effects are not expected to become more likely.
- May be beneficial to monitor PM<sub>10</sub> around the RSAs alongside TSP to determine the relationship between TSP and PM<sub>10</sub> prior to implementing a network of monitors for PM<sub>10</sub> only.

The department notes that the exiting TSP limit in the licence is based on ambient air quality limits in the Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992.

The department has taken the above information into consideration for the risk assessment of potential dust emissions at the premises (see section 11).

## 8. Mercury

Mercury is present in soils and rocks, including bauxite. Bauxite contains approximately 0.02 – 1.5 mg/kg of mercury (Amano et al 2020), with the licence holder stating that Western Australia bauxite is approximately 45 ppb.

Due to the amount of bauxite processed in the refinery (Bayer process), mercury can accumulate in the resulting Bayer liquor, aluminium hydrate and oxalate (Amano et al 2020).

Inorganic mercury compounds produced are converted into elemental mercury at temperatures higher than 700 to 800°C, because they become thermally unstable at such higher temperatures (Amano et

al 2020). This makes mercury susceptible to being present in process exhaust gases, especially in high temperature environments in digestion, evaporation and calcination (Alcoa 2022). Studies from Alcoa Bayer refineries show mercury emissions into air from the refineries are almost 100% elemental mercury (Amano et al 2020).

Other studies have found that there is substantial difference in mercury concentration depending on the source of bauxite (Amano et al 2020). Mercury emissions into air and mercury loss to residual bauxite demonstrate that release of mercury can vary significantly from plant to plant (Amano et al 2020).

The licence holder has provided information that shows that at the premises mercury is emitted to air (including calcination), collected in liquid form, and retained within the residue. The licence holder has stated that “polysulfide dosing has been effective – mercury no longer adheres to oxalate solids” (Alcoa 2022). The department understands that while the licence holder’s information show a significant decrease in mercury emissions in the oxalate belt filter cake, mercury is not completely eliminated.

In general, all three forms of mercury (elemental, inorganic and organic) have the potential to cause adverse health effects at sufficiently high doses. The main exposure route is through inhalation of mercury contaminated vapour, ingestion, and dermal contact during the production process. Prolonged exposure may cause skin sensitisation; central nervous system, peripheral nervous system and kidneys may be impaired due to chronic exposure (Amano et al 2020).

## 8.1 Appeal

In appeal number 143 of 2015 determined by the Minister for Environment (see section 4), the Minister considered that the department had adequately assessed emission types including mercury with the information that was available at the time the decision to amend the licence was made. However, the Minister noted the Appeals Convenor’s advice that since the licence was issued, NPI data show that although mercury emissions are generally the lowest of the four alumina refineries operating in Western Australia, there has been an apparent increase in mercury emissions over the last two reporting periods (2014/15 and 2015/16). For completeness, the Minister requested the department to consider the apparent increase in mercury emissions as part of its review of licence L6217/1983/15.

### 8.1.1 NPI emissions

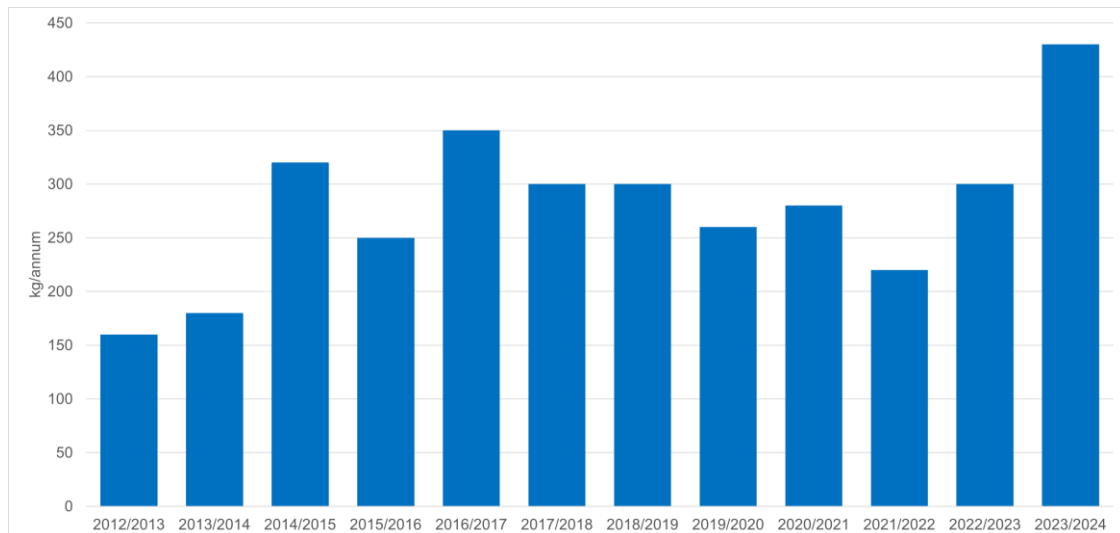
The licence holder reports emission estimations for the premises to the NPI on an annual basis. NPI mass balance calculations for mercury emissions consider the inputs of mercury into the refinery being bauxite, and the known outputs in the form of solids and collected liquid mercury. The difference between the mercury inputs and known outputs are assumed to be mercury emitted to air.

Figure 1 shows the total mercury and compounds emissions reported to the NPI from the 2012-2013 to 2023-2024 reporting periods.

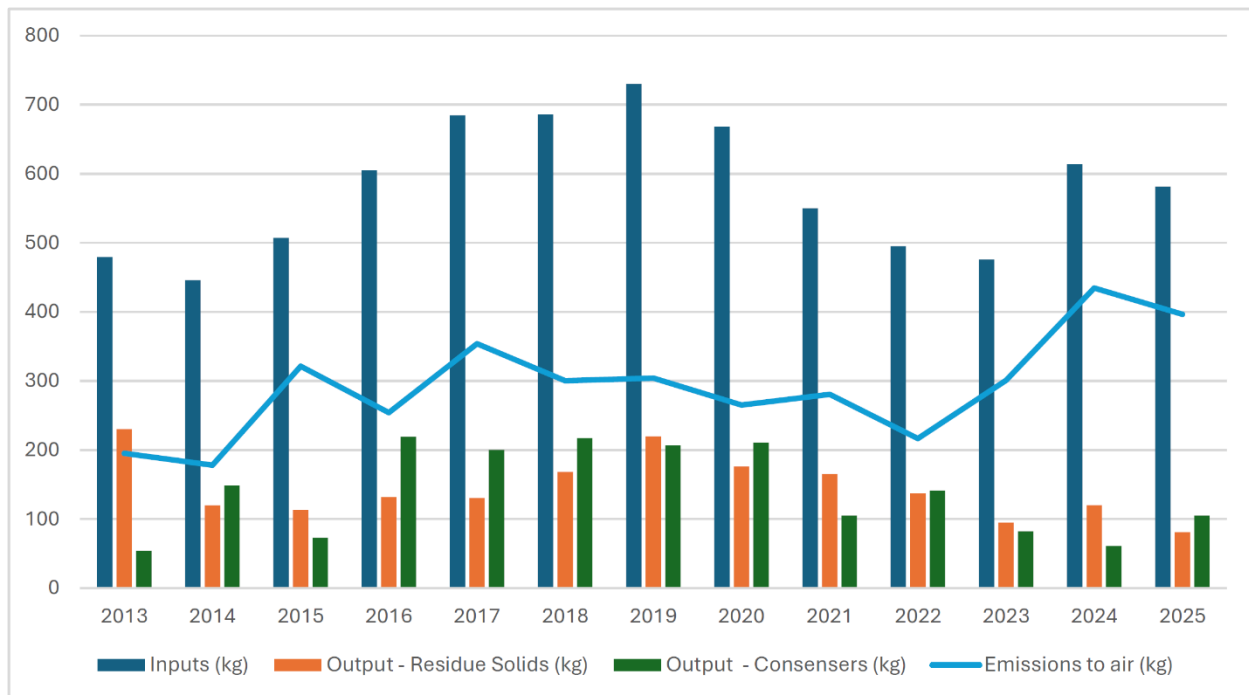
Figure 2, provided by the licence holder, shows total mercury inputs, outputs and mercury emissions to air for 2013 to 2025. The graph shows that mercury outputs have generally correlated with mercury levels in the bauxite.

The licence holder has noted that improvements in elemental mercury recovery during the 2024-2025 reporting period were attributed in part to the following improvement actions:

- Locking recovery valves, tagging valves, and bagging drain ends in the area of the mercury collections to minimise accidental release/spills.
- Auditing of the waste contractors’ performance in relation to mercury removal and disposal practices and subsequent process improvements and enhanced waste tracking.

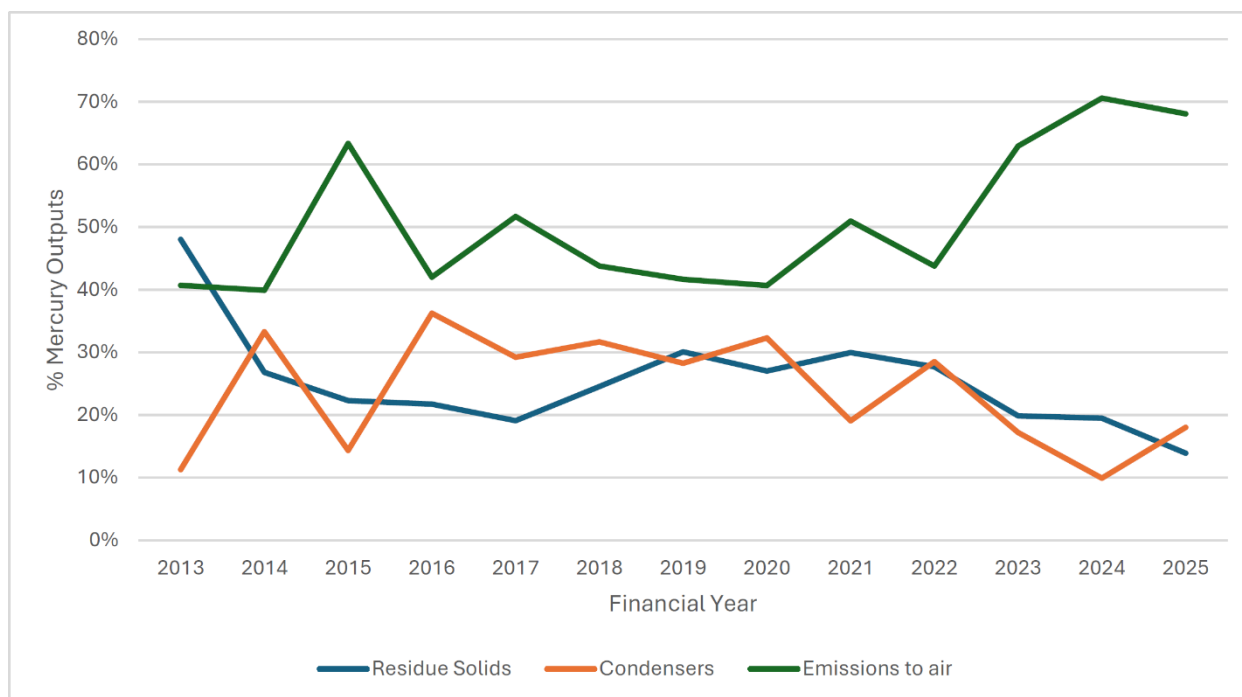


**Figure 1: Wagerup Alumina Refinery NPI total emissions for mercury and compounds (kg/annum)<sup>1</sup>**  
 Note 1: The licence holder has reported a very small ( $\leq 0.0024$  kg) amount of mercury and compounds to land each year within these reporting periods. The total mercury and compounds emissions are shown in Figure 1 which essentially equates to mercury and compounds emissions to air. No mercury and compounds emissions to water have been reported.



**Figure 2: Total mercury in main refinery inputs (bauxite) and outputs (solids/residue and condensers) and mercury emissions to air**

Figure 3, provided by the licence holder, shows the proportion of mercury outputs for 2013 to 2025. The licence holder stated that the graph shows that the proportion of each mercury output has remained reasonably steady. Mercury emissions to air remain at approximately 40-50% of total mercury output, except for 2015, and 2023 to 2025. It is noted that the licence holder has also stated that the refinery mercury system has a fixed efficiency for capturing and recovering mercury.



**Figure 3: Proportion of mercury outputs**

The department notes that the data appears to indicate that the performance of the condensers has decreased and mercury emissions to air have increased from 2022 to 2025. The licence holder has provided information regarding this apparent trend which is discussed in section 8.4.

## 8.2 Existing licence conditions for monitoring and management of mercury emissions

The licence holder currently manages mercury emissions from the premises via the following main methods:

- polysulfide dosing to the oxalate seed stream that feeds the oxalate crystalliser to inhibit mercury adsorption onto oxalate. The mercury is directed to downstream mercury capture processes.
- condense and retrieve mercury in liquid form from gas streams at digestion and evaporation;
- addition of sodium polysulfide to capture any elemental mercury in the non-condensable gas stream to a soluble complex form. A copper solution is added to convert the mercury into a stable solid form which will be directed to the residue storage area.

The existing licence condition A26 requires the licence holder to conduct:

- quarterly monitoring of the amount (ppb) of mercury in the oxalate belt filter cake;
- continuous monitoring of the sulfide dosing rate (L/hr) at the oxalate polysulfide dosing pump (Oxalate Removal facility);
- continuous monitoring of the temperature (°C) of the digester and evaporation mercury vapour condenser exit gases.

The licence holder must undertake mercury control system management actions (condition A13) in the event the following parameters are not met (condition A12):

- mercury (as measured dry) must be  $\leq 1000$  ppb within the oxalate belt filter cake;
- oxalate polysulfide dosing pump must maintain a 7-day average of  $\geq 6$  L/hr; and
- digester and evaporation vapour condenser exit gases must have an annual average of  $\leq 35^\circ\text{C}$ .

The management actions in response to higher concentrations of mercury in the oxalate belt filter cake and lower levels of polysulfide dosing are centered around increasing the sulfide dosing rate

above 6 L/hr (conditions A13). Condition A15(d) also specifies that if the oxalate polysulfide dosing pump is offline for more than 72 consecutive hours during operation of the oxalate kiln the licence holder must cease feed to the oxalate kiln.

The management actions in response to higher digestion and evaporation vapour condenser exit gases include for the licence holder to submit an action plan to reduce the annual average exit temperature to the department and implement the plan. Monthly and annual average exit gas temperatures are also to be included in the annual report (condition G1).

### 8.3 Annual Environmental Reports

The existing licence requires that the licence holder provides an Annual Environmental Report by 1 April each year. The delegated officer has reviewed the information in the reports as it relates to mercury conditions for the past seven annual periods (2018 – 2024). As outlined in section 0, the existing licence conditions that relate to mercury control are conditions A12, A13, A15(d) and A26. Instances where the mercury control system management actions (condition A13) were required to be implemented are outlined in Table 5.

**Table 5: Reported triggers of existing condition A12 during 2018 to 2024 annual periods**

<b>Mercury control system management action trigger:</b>	<b>Mercury within oxalate belt filter cake to be ≤1000 ppb</b> (Required to be monitored quarterly; however, licence holder monitors weekly)	<b>Oxalate polysulfide dosing pump rate to be ≥6 L/hr (7-day average)</b>	<b>Digester and evaporation vapour condenser exit gases to be ≤35°C (annual average)</b>
2018	Not triggered	Not triggered	Not triggered
2019	Exceeded on five occasions (weeks) which contributed to one quarter exceeding the response level	Not triggered	Not triggered
2020	Exceeded on three occasions (weeks) which did not contribute to any quarters exceeding the response level	Not triggered	Not triggered
2021	Not triggered	Triggered on one occasion (week 22/10/2021)	Not triggered
2022	Not triggered	Triggered on three occasions (weeks 12/02.2022, 26/11/2022, 3/12/2022)	Not triggered
2023	Not triggered	Not triggered	Not triggered
2024	Not triggered	Not triggered	Not triggered

Condition A15(d) was not triggered during reporting periods 2018 to 2024 as there were no reported occasions in which the polysulfide dosing system was offline for more than 72 consecutive hours during normal oxalate kiln operations.

### 8.4 Mercury flows at the premises

The department has reviewed information provided by the licence holder in response to a departmental request for information on mercury emissions from the premises, which included the report *Estimated Mercury Flows in Wagerup in October 2019* by Fairwater Enterprises Pty Ltd.

The department notes the following key points from the information provided:

- The input of mercury to the plant, almost all derived from bauxite, has risen considerably (almost doubled from 2001-2007 period to 2019).
- The mercury control technology introduced in 2012 has greatly increased the physical collection of mercury in the Evaporation facility and has minimised it from the oxalate solids. Mercury emissions in the gases coming from evaporation prior to the installation of condensers have also been controlled.
- Overall mercury emissions to air have nevertheless risen significantly. The report indicates

that 2019 estimates that at least 280 kg pa is currently being released to atmosphere compared to an estimate of 155 kg pa for the 2001-2007 period. Further information provided by the licence holder indicates that at least 390 kg pa was released to atmosphere in 2024 and 2025.

- The primary driver of rising mercury air emissions is the increase in bauxite mercury concentration.
- Mercury content in the bauxite differs with different mining regions within Willowdale mine.
- The mercury control strategy for the premises involves polysulfide addition to the oxalate precipitation stream together with the downstream mercury capture equipment. While this is effective at reducing mercury on the oxalate cake, mercury dissolved in the liquor is less susceptible to volatilisation and may bypass post-digestion condensation traps.
- Excess polysulfide in the liquor circuit may dissolve more of the mercury in feed bauxite which may reduce the relative amount of mercury discharged to the residue storage area.
- To minimise mercury emissions to air, reducing the levels of sulfide within the main liquor stream may lower the amount of circulating mercury and increase the amount of mercury being contained.

The department also reviewed additional information provided by the licence holder in response to a request for an explanation for the apparent decreased performance of the condensers and increased mercury emissions to air from 2022 to 2025. The department notes the following key points from the information provided:

- Between 2022 and 2025 the performance of the B30 condensers has declined due to external corrosion of the condenser tubes on the shell side (cooling water side). Investigations into the corrosion have indicated it is likely linked to the cooling water supply and microbial activity.
- As corrosion products accumulate on the external tube surfaces it restricts cooling water flow, reducing heat transfer efficiency and therefore limiting the condenser's ability to cool non-condensable gases effectively. This results in the potential for increased mercury emissions to air during this period.
- Despite retubing efforts, condensers have shown rapid deterioration indicating a systemic corrosion problem rather than isolated failures.
- Actions taken to understand and reduce corrosion include metallurgical testing, expert reviews, cooling tower improvements and a material upgrade investigation. (See section 11.1.1 for further information on licence holder actions.)
- Although mercury emissions have increased from 2022 to 2025, they remain below the emissions rates modelled and assessed and present a low risk to the environment and human health. (See sections 5.1 and 8.5 for further information on the HRA.)

From the above, and information provided as shown in sections 8.1.1 and 8.3, the department understands:

- that the concentration of mercury in the air emissions generally follows fluctuations of mercury in the incoming bauxite;
- changing the polysulfide dosing rate relative to the fluctuating mercury levels in the bauxite may enable more mercury to be captured through the existing systems;
- there is a trend that decreasing condenser performance in 2022 to 2025 has potentially resulted in increased mercury emissions to air for this period; and
- the licence holder is undertaking actions to understand and reduce corrosion in the condensers, therefore, improving performance with the aim to reduce mercury emissions to air.

## 8.5 HRA

The HRA (Katestone 2020) considered the acute, chronic and carcinogenic risk for target substances including mercury. The licence holder reported that the HRA used peak mercury emissions of 681 kg per annum, which assumes all sources emit the highest level of mercury simultaneously; and an

average of 294 kg per annum (Alcoa 2023a). The delegated officer notes that the highest total mercury emissions for the last 11 NPI reporting periods are 430 kg/annum during the 2023/2024 reporting period (see Figure 1).

The HRA concluded that the assessment of both acute and chronic risk shows that the risk to all receptors due to atmospheric emissions from the premises, including mercury, for both the base case (alumina production of 2.85 Mtpa) and expansion case (3.3 Mtpa) is low (Katestone 2020; Alcoa 2023a). The report also states that the quantitative risk indicators should be considered as over-estimates of potential health risks associated with emissions from the premises (Katestone 2020).

The licence holder advised that based on a sensitivity analysis of the results of the HRA that the ground level concentration (GLC) of mercury could be multiplied by a factor of nearly 20 before relative exposure limits approach a health risk (Alcoa 2023a).

## **9. Administrative updates**

### **9.1 Air emissions methods – ketones and aldehydes**

The existing licence conditions require the licence holder to use the USEPA Modified Method TO-5 (MMTO5), or other modified method approved by the CEO of the department, for the sampling of aldehydes and ketones at the calciners, liquor burning facility and oxalate kiln. The delegated officer understands that the current USEPA MMTO5 sampling is via method ETC 390 which is an in-house method developed by Ektimo Pty Ltd and NATA (The National Association of Testing Authorities) accredited to its Melbourne laboratory.

On 26 August 2021 the licence holder requested to utilise a second method, USEPA SW-846 Test Method 0011 (Method 0011), in addition to USEPA MMTO5/ETC 390. Reasoning included allowing flexibility in the supply of external stack testing services.

The department assessed the licence holder's request and sent correspondence, dated 4 October 2021, stating that the department does not object to the optional use of Method 0011 in place of MMTO5 / ETC 390. The department noted the consideration of nitrogen dioxide levels and measures to prevent interference in aldehyde and ketone detection.

The department also stated that the licence holder should clearly document the specific method used to sample aldehydes and ketones when reporting data within the annual reports, include a comparative analysis of any results obtained using Method 0011 and outline any implemented measures to prevent potential nitrogen dioxide interference. In the event any anomalies in results using Method 0011 are identified, the licence holder should notify the department, including any planned actions.

The licence will be updated to include the department's previous decision to allow the addition of the alternative monitoring method.

On 30 June 2022 the licence holder requested to utilise a minor variation (anisokinetic sampling) to the previously requested Method 0011 for the Calciner 1-3 low volume vent stack. The variation is required due to the low velocity of the emissions in the stack, with Method 0011 otherwise being followed. Additionally, the licence holder requested flow velocity of this stack to be measured at an upstream port and analytes to be measured at the downstream port, consistent with the measurement setup for ETC 390.

Due to the high moisture content in some of the stacks, the licence holder also requested, following advice from a stack emissions testing specialist, to use two impingers at the front of the sample train to act as a condensate dropout prior to the reagent when using Method 0011 to test for aldehydes and ketones on the calciner, LBF and oxalate kiln RTO stacks. This is to reduce the level of dilution of the reagent and improve the accuracy of results in the sampling.

The department assessed the licence holder's requests and sent correspondence, dated 6 July 2022, stating that, based on the advice given by the independent stack emission testing specialist, the minor

variations were reasonable and will be formalised through a licence amendment at the next available opportunity.

The licence will be updated to include the department’s previous decision to allow the minor variation to the monitoring for the calciner LVV stack and the addition of the preparation step prior to monitoring of high moisture content stacks.

## 9.2 Complaints reporting

As part of this amendment the department has updated the format of the licence. The format change has not changed the licence holder’s obligations, apart from changes as identified through the risk assessment (section 11). The amendments to the licence are detailed in sections 12.3 and 13.1.

With respect to complaints reporting, the existing licence requires the licence holder to:

- maintain a database(s) of complaints received and make information available to an inspector upon request (existing conditions G4(a) and G4(c)).
- provide a monthly summary of complaints data to the department and publish in the local newspaper (existing condition G4(b)).

The delegated officer considers that these requirements not aligned with current departmental guidelines *Guidance Statement: Setting Conditions* (DWER 2015) and *Guideline: Risk assessments* (DWER 2017) and are not commensurate with the risk profile of the premises. Therefore, the delegated officer has replaced these existing conditions with the current standard administrative condition relating to the management of complaints. The updated condition requires that the licence holder records certain information about complaints received regarding alleged emissions from the premises. Additionally, the licence holder will continue to be required to note meteorological conditions (e.g. wind speed and direction) for the date and time of which any complaint relates. This will enable the licence holder to investigate if there is potential for activities on the premises to be impacting the complainant. The licence holder will continue to be required to provide this information in the annual report.

Alternatively, the public can make reports directly to the department via its Environment Watch service so they can be recorded and managed in accordance with the Department’s Compliance and Enforcement Policy (DWER 2021).

## 10. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

**Table 6: Consultation**

Consultation method	Comments received	Department response
Local Government Authorities (Shire of Waroona and Shire of Harvey) advised of licence review on 16 November 2017.	No response received.	N/A
Department of Health (DoH) advised of licence review on 16 November 2017.		
Department of Jobs, Tourism, Science and Innovation (DJTSI) advised of licence review on 16 November 2017		

Consultation method	Comments received	Department response
<p>Department of Planning, Lands and Heritage (DPLH) advised of licence review on 16 November 2017.</p>	<p>Comments were received on 21 November 2017.</p> <p>DPLH advocates for the continuation of current protections for residents, including the monthly reporting of complaints.</p>	<p>The department determined to remove the complaints condition from the licence that required monthly publishing in the local newspaper and to the department with justification provided in section 9.2.</p> <p>Complaints are still required to be recorded and summarised annually as part of the records and reporting conditions. Additionally, the department can request this information outside of annual reporting as per relevant licence conditions.</p>
<p>Ten (10) Community Consultative Network (CCN) Members were advised of the licence review on 16 November 2017.</p> <p>A briefing session was held with the CCN members on 22 June 2018.</p>	<p>No response received.</p>	<p>N/A</p> <p>The briefing session outlined the scope of the licence review and the department's risk assessment process.</p>
<p>Community Alliance for Positive Solutions (CAPS) was advised of the licence review on 28 February 2017.</p> <p>Briefing sessions were held on 11 August 2022 and 21 April 2023.</p> <p>CAPS provided with a licence review scope update on 2 November 2023.</p> <p>Briefing session was held on 5 December 2025</p>	<p>Comments on the licence review are dated 7 June 2017, 15 December 2017 and 24 December 2021.</p> <p>A summary of CAPS comments has been provided in Appendix 2.</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>	<p>See Appendix 2 for departmental response.</p> <p>CAPS were presented with the licence review scope, objectives and progress with the department capturing key concerns from CAPS.</p> <p>CAPS were advised of the staged approach to the licence review, which included a summary of matters to be addressed in Stage 1.</p> <p>CAPS were presented with Stage 1 licence review outcomes, which included a summary of expected fugitive dust, mercury, administrative and reporting amendments.</p>
<p>Licence holder was provided with draft documents on 28 May 2025</p>	<p>Comments were received on 25 July 2025 and 26 September 2025.</p> <p>The licence holder confirmed / clarified information that was requested in the draft documents, including:</p> <ul style="list-style-type: none"> <li>• Prescribed premises boundary</li> <li>• Prescribed premises production capacities</li> <li>• Location of site infrastructure and equipment</li> <li>• Location of authorised discharge points</li> <li>• Information on residue storage area components</li> <li>• Dust controls for storage and handling of alumina</li> <li>• Provided most recent NPI mercury trends and output data.</li> </ul> <p>Further comments received by the licence holder are summarised in Appendix 1, Table 11.</p>	<p>This information has been updated in the licence and decision report.</p> <p>Additional infrastructure has been added based on descriptions provided by the licence holder.</p> <p>The department's response to these comments are detailed in Appendix 1, Table 11.</p>

Consultation method	Comments received	Department response
Licence holder was provided with updated draft documents on 23 October 2025	<p>Comments were received on 28 November 2025.</p> <p>The licence holder clarified infrastructure that comprises the Lakewater circuit.</p> <p>The licence holder provided further information on mercury emissions.</p> <p>The licence holder provided updated maps of monitoring locations.</p> <p>Minor amendment to wording of ambient air quality monitoring conditions to refer to location rather than station.</p> <p>Further comments received by the licence holder are summarised in Appendix 1, Table 12.</p>	<p>Definition for Lakewater circuit has been added to the licence.</p> <p>The department has considered the additional information and updated relevant sections of the decision document and licence, which includes updating the risk assessment.</p> <p>These have been used to update the maps in the licence and relevant conditions have been updated to refer to relevant monitor locations.</p> <p>This has been updated in the relevant conditions.</p> <p>The department's response to these comments are detailed in Appendix 1, Table 12.</p>
Licence holder was provided with further updated draft documents on 16 December 2025	Comments were received on 9 January 2026 and are summarised in Appendix 1, Table 13.	The department's response to these comments are detailed in Appendix 1, Table 13.

## 11. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the Guideline: Risk assessments (DWER 2020).

To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

### 11.1 Source-pathways and receptors

#### 11.1.1 Emissions and controls

The key emissions and associated actual or likely pathway associated with mercury and dust emissions during premises operation which have been considered in this decision report are detailed in Table 7. Table 7 also details licence holder existing control measures, or control measures proposed by the licence holder to assist in controlling these emissions, where necessary, and control measures already applied through the conditions of the existing licence relevant to the emission.

**Table 7: Emission pathways, sources and relevant controls**

Emission	Sources	Potential pathways	Proposed and existing controls
<b>Operation</b>			
Fugitive dust	<p>Bauxite ore and storage handling</p> <p>Residue Storage Area (RSA)</p> <p>Storage and handling of</p>	Air / wind dispersion causing impacts to public health and/or amenity.	<ul style="list-style-type: none"> <li>Daily Visual Management (DVM) System provides detailed site specific 1-day, 3-day and 7-day forecasts which are reviewed every shift (12 hours).</li> <li>For the bauxite stockpile and reclaiming area: during October to April, review weather report (wind speed and direction) to determine bauxite stockpile area dust rating and perform actions (dependent on rating). Actions include dust suppression (wetting of stockpiles</li> </ul>

Emission	Sources	Potential pathways	Proposed and existing controls
	alumina product and lime reagent		<p>and some roadways) and minimum two hourly inspections.</p> <ul style="list-style-type: none"> <li>• Visual inspection of bauxite stockpile occurs every shift (12 hours).</li> <li>• A trial BAM PM<sub>10</sub> dust monitor was installed and has been operational since 6 February 2024 to monitor the bauxite handling area for an initial 12-month period. The licence holder engaged a consultant in May 2025 to undertake a third-party review of the monitoring data and if required determine appropriate monitoring limits.</li> <li>• Covers and sprinklers on parts of conveyors.</li> <li>• Weekly dust control meetings held at each residue area.</li> <li>• Tracking the “age” of mud within each RSA.</li> <li>• Daily field inspections of residue storage areas.</li> <li>• Use of dust suppressants or turning over of mud in RSAs that have not had fresh mud poured in more than 6 months.</li> <li>• Development of dust management plans for specific activities, such as any work resulting in open area of more than 0.1 ha (1,000 m<sup>2</sup>), sand/spoil/fill stockpiles, mechanical works in RSAs greater than 1 ha, RSAs that have not had fresh mud poured for 6 months, landfill areas and isolation or modification of sprinkler systems.</li> <li>• Operation of fixed sprinkler system for mud drying beds – operated in response to daily weather forecasts, residue area conditions and results of continuous dust monitoring network. At least 95% availability, 1.5 m above the mud surface, coverage of 100% of each area, and must be available at end of the shift immediately prior to a high or extreme forecast.</li> <li>• Surfaces within the whole residue storage area, except active mud deposition areas, are surveyed weekly. No more than 5 ha of surfaces, excluding active mud deposition areas, with no surface treatment for soil type A and soil type B.</li> <li>• Internal alarms triggered by exceedance of licence holder internal TSP target of 90 µg/m<sup>3</sup> (background corrected on a rolling 24 hour average as measured by the EBAM dust monitors) at the RSA prompts an investigation.</li> <li>• Any exceedances recorded by dust monitors, or following a community complaint, incident is recorded and investigated.</li> <li>• Residue Ambient Dust Monitoring Network Upgrade plan includes: <ul style="list-style-type: none"> <li>○ installation of new continuous BAM monitors capable of monitoring PM<sub>10</sub>;</li> <li>○ retention of one HVAS monitor, converted to PM<sub>10</sub>, to allow for additional analysis; and</li> <li>○ installation of new and relocation of existing monitors to target sensitive receptors.</li> </ul> </li> <li>• Rail carriages are inspected for spilt alumina prior to leaving the train loader. Spilt alumina is removed via a combination of washdown or mechanical means.</li> <li>• Vacuum clean up systems are also available within the alumina storage and loading buildings to recover any spilt alumina.</li> </ul>

Emission	Sources	Potential pathways	Proposed and existing controls
Mercury	Digestion Evaporation Mercury treatment facility Oxalate Removal Oxalate storage ponds	Air / wind dispersion causing impacts to public health.	<ul style="list-style-type: none"> <li>• Elemental mercury removal systems at the Digestion and Evaporation facilities to condense gases, containing volatilised mercury, to liquid elemental form (condensers).</li> <li>• Completed work to understand and reduce corrosion in the B30 condensers, which includes: <ul style="list-style-type: none"> <li>○ Metallurgical testing – external analysis of corroded tubes by third party.</li> <li>○ Expert reviews – internal and external corrosion specialists concluded microbial corrosion is occurring and recommended upgrading tube material to a high pitting-resistant alloy.</li> <li>○ Cooling tower improvements – upgraded chemical dosing controller and installed debris screens to optimise tower performance.</li> </ul> </li> <li>• Proposing further actions to understand and reduce corrosion in the condensers, which includes: <ul style="list-style-type: none"> <li>○ Trial retubing a condenser with high pitting-resistant alloy (2205 Duplex Stainless Steel) tubes to improve corrosion resistance. While this steel has lower thermal conductivity than mild steel, its higher corrosion resistance is expected to deliver higher average cooling performance over time. Implementation of this is expected to take approximately 20 weeks.</li> <li>○ Conduct a post-retubing performance review to confirm the extent of the correlation between condenser efficiency and mercury emissions.</li> <li>○ Continue enhanced sampling and monitoring under the Mercury Program.</li> </ul> </li> <li>• Planning/proposing to replace the existing mercury collection pot design at digestion with one similar to that of the evaporation mercury collection pot design. It is thought the smaller collection point at digestion is potentially limiting the amount of liquid elemental mercury collected.</li> <li>• Addition of sodium polysulfide to capture any elemental mercury in the non-condensable gas stream. The condensate stream, containing soluble mercury complex, is transported to the Mercury Treatment Facility.</li> <li>• Mercury Treatment Facility to convert mercury to a stable solid form which ultimately exits to the residue storage area.</li> <li>• Polysulfide added to the oxalate seed stream (Oxalate Removal) that feeds the oxalate crystalliser, minimising mercury from binding to the oxalate cake. This reduces the amount of mercury emitted to air from the oxalate kiln.</li> <li>• Licence holder has commenced weekly monitoring of mercury concentrations in key process streams to more closely understand mercury deportment throughout the refinery.</li> <li>• Internal weekly monitoring of oxalate belt filter cake.</li> <li>• A vapour collection tank with a mercury collection pot at the bottom is being installed at the bauxite slurry tanks (25A tanks) in accordance with the requirements of works approval W6607/2021/1.</li> <li>• Internal Mercury Management Plan.</li> <li>• Oxalate stored in tanks or oxalate storage ponds.</li> <li>• Oxalate in moist state when discharged to oxalate storage ponds. It is then kept moist or beneath a full surface cover to minimise dust.</li> </ul>

### 11.1.2 Receptors

In accordance with the Guideline: Risk Assessments (DWER 2020), the delegated officer has excluded the licence holder’s employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 8 provides a summary of potential human and environmental receptors that may be impacted by mercury and dust emissions during operation of the prescribed premises (Guideline: Environmental siting (DWER 2020)). Only those receptors which may be impacted as a result of emission sources and pathways identified in Table 7 have been included.

**Table 8: Sensitive human and environmental receptors and distance from prescribed activity**

Human receptors	Distance from prescribed activity
Private residences	Closest privately owned residential premises is located approximately 950 m NW of bauxite storage and handling area, 1.4 km E of residue storage area and 1.5 km NW of refinery. Approximately 30 privately owned residential premises located approximately 1.8 to 5.6 km, 2.3 to 5.8 km and 2.7 to 7.5 km NNW to NNE of the bauxite storage and handling area, residue storage area and refinery respectively. Approximately 20 privately owned residential premises (not including townsites) located approximately 2.7 to 6.3 km, 2.9 to 6.2 km and 4.3 to 8.1 km S to SW of the refinery, residue storage area and bauxite storage area and handling area respectively. Approximately 4 privately owned residential premises located approximately 4.3 to 5 km W of the residue storage area, and 8.3 to 9.4 km W of the refinery and bauxite storage and handling area.
Wagerup Townsite	Two privately owned properties (one with a residence), one private company owned property, with the rest of the properties owned by the licence holder or State of Western Australia. Located approximately 1.7 to 3.2 km S of the refinery, 2.6 to 4.5 km SE of the residue storage area and 3.5 to 5 km S of the bauxite storage and handling area.
Yarloop Townsite	Located approximately 3.2 to 5 km SSW of the refinery, 3.8 to 5.6 km SSE of the residue storage area and 5 to 6.9 km SSW of the bauxite storage and handling area.
Hamel Townsite	Located approximately 3.4 to 4.3 km N of bauxite storage and handling area, 3.5 to 4.6 km NE of residue storage area, and 4.2 to 5 km N of refinery.
Hamel Extension	Zoned as Rural 2 – Irrigated Agriculture, with majority of lots being approximately 5 acres. Located 2.2 to 3.2 km NNE of the residue storage area, 3.2 to 4.3 km N of bauxite storage and handling area and 4 to 5 km N of refinery.
Waroona Townsite	Located approximately 5.3 to 7.4 km NE of the residue storage area, 5.4 to 7.6 km NNE of bauxite storage and handling area and 6.3 to 8.5 km NNE of refinery.

## 11.2 Risk ratings

Risk ratings have been assessed in accordance with the Guideline: Risk assessments (DWER 2020) for mercury and dust emission sources and take into account potential source-pathway and receptor linkages as identified in section 11.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the licence holder has proposed mitigation measures/controls or there are relevant controls within the existing licence (as detailed in section 11.1), these have been considered when determining the final risk rating. Where the delegated officer considers the licence holder’s controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the licence holder’s controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 9.

Revised licence L6217/1983/15 that accompanies this decision report authorises emissions associated with the operation of the premises. The conditions in the revised licence have been determined in accordance with Guidance Statement: Setting Conditions (DER 2015).

**Table 9: Risk assessment of potential dust and mercury emissions and discharges from the premises during operation**

Risk events				Risk rating <sup>1</sup>	Reasoning	Conditions of licence
Sources / activities	Potential emission	Potential pathways, receptors and impact	Licence holder controls	C = consequence L = likelihood		
Bauxite ore storage and handling	Fugitive dust from stockpiles, reclaimers, stackers, conveyors and vehicle movements	Air / windborne pathway causing impacts to health and amenity. The closest residential premises is located 950m NW, with other residences located from 1.8 km N, 4.3 km SW and 8.3 km W. The closest townsite (Hamel extension) is located approximately 3.2 km N.	See section 11.1.1	C = Minor L = Unlikely <b>Medium Risk</b>	A trial BAM PM <sub>10</sub> dust monitor was installed and has been operational since February 2024 by the licence holder to monitor dust at the bauxite storage and handling area for an initial 12-month period, and to subsequently review the risk to sensitive receptors. The delegated officer notes that the licence holder proposes to relocate this BAM PM <sub>10</sub> monitor following a recommendation in the <i>Bauxite Handling Area Fugitive Dust Monitoring Data Assessment</i> (Katestone 2025) (see Appendix 1, Table 12). The delegated officer has determined that the current dust monitoring network, which does not currently include the licence holder's BAM PM <sub>10</sub> monitor mentioned above, does not provide adequate coverage for the bauxite storage and handling area which is a potential significant source of dust and closer than the RSAs to some individual sensitive receptors (NE and E of the RSAs). The delegated officer has therefore determined to include the dust monitor as part of the network of monitors on the licence. As for residue storage area monitoring, see below for response level and associated management actions, and monitoring equipment availability reasoning. Monitors will be required to be operated and calibrated to manufacturer's specifications similar to other monitoring equipment on the premises. Additionally, as the licence holder controls have been considered in determining the risk of fugitive dust emissions from the bauxite storage and handling area, the delegated officer has determined to include them on the licence to ensure the risk is minimised.	<b>Additional regulatory controls</b> Condition 1: Visual inspections of bauxite storage and handling area at least every 12 hours to identify potential dust sources and assess adequacy of dust control measures. Condition 1: Implement weather forecasting system, determine daily dust risk rating (based on predicted wind speed and direction). Condition 1: Perform more frequent visual inspections and implement dust control measures for moderate, high and extreme dust risk ratings. Condition 1: Availability and use of a water truck for dust suppression activities and operating of existing dust suppression infrastructure (conveyor covers and sprinklers). Condition 10: Monitoring equipment to be operated and calibrated in accordance with manufacturer's specifications. Condition 12: Availability of monitoring equipment. Condition 21: monitoring PM <sub>10</sub> approximately 800 m NW of the bauxite storage and handling area. Condition 22: Monitors to be sited in accordance with relevant Australian Standard. Condition 21 and 23: PM <sub>10</sub> response level and associated management actions.
Alumina product storage and handling	Fugitive dust	Air / windborne pathway causing impacts to amenity. The closest residential premises are located 2.3 km NNW and S, with other residences located from 2.9 km S/SE and 3.6 km N. The closest townsite (Wagerup) is located approximately 2 km S.	See section 11.1.1	C = Slight L = Unlikely <b>Low Risk</b>	The delegated officer considers that the risk of fugitive dust emissions from the storage and handling of alumina product impacting on nearby sensitive receptors is low, subject to licence holder controls being implemented. Therefore, the existing condition regarding the removal of spilt alumina from rail carriages has been retained, with some minor amendments based on information provided by the licence holder.	<b>Existing licence conditions</b> Condition 1: Spilt alumina removed from alumina rail carriages prior to the train leaving the premises. <b>Additional regulatory controls:</b> Minor amendments to above existing condition to include inspections and the loading area.
Residue storage area	Fugitive dust	Air / windborne pathway causing impacts to health and amenity. The closest residential premises is located 1.4 km E, with other residences located from 2.3 km N, 2.9 km S and 4.3 km W. The closest townsite (Hamel Extension) is located approximately 2.2 km NNE.	See section 11.1.1	C = Moderate L = Possible <b>Medium Risk</b>	The delegated officer has considered the licence holder's proposal to update the dust monitoring network to transition from TSP to PM <sub>10</sub> monitoring. The department considers that TSP is not a contemporary measure of potential health or amenity risks posed by airborne particles with preference for the monitoring of PM <sub>10</sub> . Therefore, the delegated officer supports the licence holder's proposal to transition from TSP to PM <sub>10</sub> monitoring. For continuity of monitoring purposes for the transition of monitoring from TSP to PM <sub>10</sub> , the licence holder will be required to continue monitoring TSP at the HVAS, as per existing licence conditions, until the established network of BAM monitors, for PM <sub>10</sub> monitoring, is in place. A sufficient timeframe is allowed for to ensure the BAM network is installed and operating. The delegated officer acknowledges that a network of PM <sub>10</sub> monitors can provide 1-hour averaged data. The delegated officer has included the licence holder proposed PM <sub>10</sub> BAM monitors on the licence, with results of monitoring required to be submitted to the department annually. The delegated officer notes that in information submitted to the department for this review, the licence holder proposed to install 12 PM <sub>10</sub> BAM monitors, and indicated that they wanted 5 of these to be included on the licence. However, the delegated officer has elected to include 7 PM <sub>10</sub> BAM monitors to ensure the ambient air quality monitoring network has adequate coverage of likely dust sources. Additionally, the delegated officer has determined to retain one HVAS monitor to enable dust composition analysis. PM <sub>10</sub> will be required to be monitored at this HVAS as PM <sub>10</sub> and PM <sub>2.5</sub> , rather than TSP, are the particle fractions used to measure potential human health risks. Existing site RW has been selected for the PM <sub>10</sub> HVAS monitoring based on prevailing wind direction (downwind of RSAs). Monitoring is required daily between 1 November and 30 April, when there is a higher potential for dust impacts (stronger prevailing winds and lower rainfall). Two samples per month will be required to be analysed for a suite of parameters which have been based on existing licence conditions, the <i>Ambient dust monitoring campaign</i> conducted by the department in Pinjarra (DWER 2024), and the department's draft Guideline: Air emissions (DWER 2019). To ensure there is enough dust to be analysed, the two samples that are selected for dust composition analysis should be the highest and second highest PM <sub>10</sub> concentrations for the month being monitored. Filters papers from the HVAS PM <sub>10</sub> monitoring, where dust composition analysis is not undertaken, will be required to be retained for a minimum of 12 months to enable additional dust composition analysis where required. Monitoring data and analysis will be required to be reported in the annual report. Meteorological conditions will also be required to be reported for the days on which the dust composition analysis is completed. The delegated officer notes that if, after sufficient data has been collected, the results of the dust composition analysis show that the concentrations of parameters analysed pose a suitably low risk of impact to nearby sensitive receptors, the licence holder may apply for a licence amendment to remove this monitoring. The delegated officer	<b>Existing licence conditions</b> Condition 1: Oxalate stored on the premises to be stored in the oxalate storage ponds. Condition 1: Oxalate in the oxalate storage ponds to be moist when discharged, and kept moist or beneath a full surface cover. Condition 10: Monitoring equipment to be operated and calibrated in accordance with manufacturer's specifications. Condition 12: Availability of monitoring equipment. Condition 20: Monitoring of TSP at 5 locations using HVAS. Condition 22: Monitors to be sited and maintained in accordance with Australian Standard. Condition 39: Report results of TSP monitoring. <b>Additional regulatory controls</b> Condition 1: Visual inspections of RSAs, implementation of weather forecasting system, implementation of dust control measures and system to track age of mud deposited in RSAs. Condition 1: Development of dust management plans for mechanical works greater than 1 ha, and RSAs that have not had mud poured for 6

Risk events				Risk rating <sup>1</sup> C = consequence L = likelihood	Reasoning	Conditions of licence
Sources / activities	Potential emission	Potential pathways, receptors and impact	Licence holder controls			
					<p>considers that monitoring should continue for at least two years to enable sufficient data to be collected.</p> <p>The delegated officer has determined that existing TSP limits for dust emissions from the RSA will be removed from the licence. This is due to the short timeframe until the PM<sub>10</sub> monitoring network is established; and that the averaging period of data provided by the current ambient monitoring system (HVAS) is a 24-hour average; therefore, any exceedance of existing limits, or potential dust events, may only be realised after a dust event has occurred. Limits such as these are therefore not conducive for responsive dust management when levels increase.</p> <p>The PM<sub>10</sub> monitors are not located at sensitive receptors, and therefore monitoring results are not able to be compared to relevant guidelines such as the NEPM (see section 7); however, the delegated officer has determined to specify a PM<sub>10</sub> response level of 100 µg/m<sup>3</sup> over a 1-hour averaging period for the PM<sub>10</sub> monitoring network. The NEPM sets a PM<sub>10</sub> standard of 50 µg/m<sup>3</sup> as a 24-hour average. Given the response level is a short-term average of 1-hour, the department considers 100 µg/m<sup>3</sup> appropriate criteria for managing responses to dust events. In the event this level is exceeded, the licence holder will be required to investigate the cause of the fugitive dust emissions. The response level will allow a rapid response to potential dust events, to investigate, identify the source and take management action(s) to reduce any impacts. Following sufficient PM<sub>10</sub> monitoring results, the department will be able to review the data and amend any response level limits if required.</p> <p>The delegated officer has determined that the dust monitors and associated meteorological station are required to be available 90% per calendar month (amended from an annual availability of 95% and 90% respectively). This will ensure that the ambient monitors are operational for an acceptable period of time and the potential that dust events are not captured is minimised. This is a minimum availability requirement which is consistent in other part V licences which contain ambient monitoring requirements and is consistent across other monitoring equipment availability in the licence.</p> <p>The delegated officer acknowledges that there is community concern regarding dust emissions from the premises. In the interest of transparency to the public, the delegated officer has included a condition on the licence that requires the licence holder to publish a quarterly summary of ambient air quality monitoring data on their website. The delegated officer acknowledges that the ambient dust monitoring locations are not situated at sensitive receptors and therefore, cannot be compared to relevant standards. However, the publishing of the information will allow the public to view the dust monitoring data and any associated dust events. The delegated officer considers that quarterly data is appropriate, rather than real-time data. As the monitors are not located at sensitive receptors, the delegated officer considers that real-time data could be open to misinterpretation. The quarterly data will be required to be uploaded to the licence holder's website within one-month of the end of each quarter. This will allow the licence holder sufficient time to collate the data and provide an explanation of any dust events and any management actions undertaken.</p> <p>The delegated officer has considered community concern regarding PM<sub>2.5</sub> impacts. As discussed in section 7.6, the ratio of PM<sub>2.5</sub> in PM<sub>10</sub> is relevant to the focus of the dust monitoring network. While the review undertaken on behalf of Alcoa concludes that it is likely the ratio is less than 0.5 and thus a PM<sub>10</sub> monitoring network focus is appropriately conservative, the delegated officer has determined to require the licence holder to include one PM<sub>2.5</sub> monitor to confirm the ratio is as expected. If monitoring results indicate a ratio of PM<sub>2.5</sub> to PM<sub>10</sub> above 0.5 the department can determine to impose additional PM<sub>2.5</sub> monitoring locations if deemed necessary. The delegated officer acknowledges that while the PM<sub>2.5</sub> to PM<sub>10</sub> ratio will be measured within the premises boundary, it is not necessarily representative of the ratio that may be received at sensitive receptors. However, it can give an indication of the fraction of the dust generated at the premises that is PM<sub>2.5</sub>.</p> <p>The monitoring network proposed will give Alcoa the ability to respond to dust events; however, the BAM monitors do not allow for the determination of whether there may be any cumulative amenity impacts over time. Therefore, the delegated officer has determined that dust deposition monitoring will be included on the licence. The delegated officer has determined that two monitors will be required, one upwind (NE of the RSAs), and one in the prevailing wind direction (W of the RSAs) and must be sited and maintained in accordance with AS/NZS 3580.1.1. The monitors will be required to operate continuously with an averaging period of 30 days. The department's draft guideline Dust emissions (DWER 2021) include guideline values for deposited dust of 4 g/m<sup>2</sup>/30 days (maximum) and 2 g/m<sup>2</sup>/30 days (above background). The delegated officer acknowledges that the monitors are not located at sensitive premises; however, they will be able to give an indication of any cumulative amenity impacts.</p> <p>As the delegated officer has considered the implementation of licence holder controls as part of the risk assessment, they will be added to the licence to ensure the risk is minimised. Additionally, the delegated officer considers it appropriate to keep existing controls for fugitive dust emissions, such as oxalate being kept moist.</p>	<p>months or more, open area work, landfill areas, isolation or modification of sprinklers, sand/spoil/fill stockpiles.</p> <p>Condition 1: Sprinkler system requirements and availability.</p> <p>Condition 1: Availability of dust control equipment.</p> <p>Condition 1: Surface treatment weekly survey and limits.</p> <p>Condition 21: Monitoring of PM<sub>10</sub> at 7 locations using BAMs.</p> <p>Condition 21: Monitoring of PM<sub>10</sub> between 1 November and 30 April the following year at 1 location using HVAS.</p> <p>Condition 21: Monitoring of PM<sub>2.5</sub> at one location using BAM.</p> <p>Condition 21: Monitoring of deposited dust at two locations with an averaging period of 30 days.</p> <p>Condition 22: BAM monitors to be sited in accordance with Australian Standard.</p> <p>Conditions 21, 23 and 39: PM<sub>10</sub> response level, associated management actions and reporting requirements.</p> <p>Condition 24 and 25: Ambient dust composition analysis</p> <p>Condition 39: Report results of ambient dust monitoring.</p> <p>Condition 40 and 41: Publishing of ambient dust monitoring results online.</p>
	Mercury	Air / windborne pathway causing impacts to health and amenity.  The closest residential premises is located 1.4 km E, with other residences located from 2.3 km N, 2.9 km S and 4.3 km W. The closest townsite (Hamel Extension) is located approximately 2.2 km NNE.	See section 11.1.1	C = Minor L = Rare <b>Low Risk</b>	<p>The delegated officer considers that the risk of mercury emissions from the residue storage area impacting on nearby sensitive receptors is low, subject to operation of the premises mercury control systems. The delegated officer understands that mercury that exits from the refinery to the residue storage area is in a stable solid form, similar to that which is in the bauxite. The process to convert the mercury to this stable form occurs within the Mercury Treatment Facility; therefore, licence holder controls have been conditioned to ensure this system is operated.</p> <p>The delegated officer considers that controls for fugitive dust emissions from the residue storage area are also relevant to minimising the discharge of mercury to the environment. See row above for risk assessment and associated controls.</p> <p>Existing conditions for the management of oxalate separated from the process stream that is stored on the premises will be retained.</p>	<p><b>Existing licence conditions</b></p> <p>Condition 1: Oxalate stored on the premises to be stored in the oxalate storage ponds.</p> <p>Condition 1: Oxalate in the oxalate storage ponds to be moist when discharged, and kept moist or beneath a full surface cover.</p> <p><b>Additional regulatory controls</b></p> <p>Condition 1: Operation of the mercury treatment facility to convert dissolved mercury to a stable solid form prior to discharge to the residue storage area.</p>
Bauxite ore refining	Point source emissions to air (Mercury)	Air / windborne pathway causing impacts to health.  The closest residential premises is located 1.5 km NW, with other residences located from 2.7 km N and S, and 8.3 km W. The closest townsite (Wagerup) is located approximately 1.7 km S.	See section 11.1.1	C = Minor L = Unlikely <b>Medium Risk</b>	<p>The department has considered the apparent increase in mercury emissions at the premises as outlined in the Minister's Appeal Determination (143 of 2015) and is satisfied that the variation is likely largely the result of natural variation in mercury content in the bauxite. However, the department acknowledges that increased mercury to air emissions from 2022 to 2025 are also likely to be influenced by apparent decreased performance of the condensers.</p> <p>As discussed in section 8, the HRA for 2.85 Mtpa and 3.3 Mtpa throughput operating scenarios found the acute, chronic and carcinogenic health risks associated with pollutants from the premises including mercury to be low. The delegated officer is satisfied that the likelihood of the premises exceeding public health criteria for mercury is unlikely given the conclusions in the HRA and the licence holder's reported sensitivity analysis determining a 20 fold 'buffer' in mercury emissions prior to a potential risk to public health criteria (Katestone 2020, Alcoa 2023a). The delegated officer considers that there is an increased risk of mercury emissions to air impacting on sensitive receptors due to the apparent decreased performance of the condensers and the increasing mercury</p>	<p><b>Existing licence conditions</b></p> <p>Condition 1: Cease feed to the oxalate kiln if oxalate polysulfide dosing pump is offline for more than 72 consecutive hours during operation of the oxalate kiln.</p> <p>Condition 30: Weekly (amended from quarterly) monitoring of mercury in the oxalate belt filter cake.</p> <p>Condition 30: Monitoring of polysulfide dosing rate.</p>

Risk events				Risk rating <sup>1</sup> C = consequence L = likelihood	Reasoning	Conditions of licence
Sources / activities	Potential emission	Potential pathways, receptors and impact	Licence holder controls			
					<p>emissions to air trend that is observed in this assessment.</p> <p>The delegated officer understands that the licence holder has undertaken some work, and has additional work planned that includes trialing retubing a condenser with high pitting-resistant alloy tubes to improve corrosion resistance. The licence holder will conduct a review following the trial to confirm the extent of the correlation between condenser efficiency and mercury emissions. As there is potential for mercury emissions emitted to air to continue to increase with decreasing performance of the condensers, the delegated officer has included an improvement condition based on these licence holder commitments. Further licence amendments may be required following completion of the improvement conditions to implement review outcomes.</p> <p>Additionally, a graph showing annual total mercury in main refinery inputs and outputs (similar to Figure 2) will be required in the annual report to enable the department to monitor mercury emissions and general performance of the condensers. The delegated officer considers a time-series graph of a minimum 10-year period to be sufficient to identify any trends in the data.</p> <p>The delegated officer notes that the licence holder has requested to remove operational controls (for mercury emissions) in the licence, with management of mercury emissions to continue being managed through the licence holder's internal Mercury Management Plan.</p> <p>As the licence holder controls have been considered in determining the risk of mercury emissions to air, the delegated officer has determined to retain the conditions related to the management and monitoring of mercury emissions to air, with some amendments as discussed below, to ensure the risk is minimised. Additionally, licence holder controls for minimising mercury emissions have been included on the licence.</p> <p>As discussed in section 8, the delegated officer understands that mercury concentrations in bauxite processed at the premises fluctuate over time depending on the source of the bauxite. This then impacts the amount of mercury in the air emissions, which generally tends to follow the trend of the amount of mercury in the incoming bauxite. The delegated officer understands that adjusting the polysulfide dosing rate with the fluctuating mercury levels in the bauxite may enable more mercury to be captured through existing systems. The delegated officer has therefore determined to remove the response level and requirement for management actions related to the oxalate polysulfide dosing rate to allow the licence holder greater flexibility to balance the effectiveness of polysulfide in reducing mercury on the oxalate cake while ensuring excess polysulfide is not in the liquor circuit. The removal of this requirement will allow the licence holder to manage the polysulfide dosing rate as the concentration of mercury in the bauxite fluctuates, which is anticipated to reduce mercury emissions to air. The existing polysulfide dosing system will be added to the licence as an operational requirement; however, the polysulfide dosing rate will not be specified. The licence holder will still be required to monitor the polysulfide dosing rate and report the results in the annual report.</p> <p>The department understands that the licence holder currently monitors mercury in the oxalate belt filter cake weekly, with existing licence conditions requiring quarterly monitoring. The delegated officer has determined to amend the quarterly requirement to weekly, as per the licence holder's current monitoring regime, and to ensure the licence holder is able to respond to any "high" mercury results in a timely manner.</p> <p>Additionally, management actions where mercury in the oxalate belt filter cake has been found to be &gt;1,000 ppb have been amended. Due to the flexibility in the polysulfide dosing rate (see above), the requirement to increase above 6 L/hr has been removed. However, the licence holder will be required to provide details of any response criteria exceedances to the department in the annual report which includes any management actions they undertook following any exceedances (amended from within 4 weeks in the existing licence). The existing condition that requires re-sampling after 7-days has been captured in the general monitoring which has been amended to weekly. Results of weekly monitoring will be required to be submitted in the annual report. These changes are considered necessary to provide the required flexibility to adapt polysulfide dosing to mercury concentration while also giving the department oversight of mercury management actions through annual reporting information.</p> <p>The delegated officer considers it appropriate to keep existing controls for mercury point source emissions.</p>	<p>Condition 30: Monitoring of temperature in digester and evaporation mercury condenser exit gases.</p> <p>Condition 39: Report the results of monitoring of the mercury control system in the annual report (mercury in the oxalate belt filter cake, polysulfide dosing rate, temperature of digester and evaporation mercury vapour condenser exit gases).</p> <p>Condition 39: Report details of any response criteria exceedances (amended from 4 weeks to annual).</p> <p><b>Additional regulatory controls</b></p> <p>Condition 1: Digestion and Evaporation: Operation of polysulfide dosing system on non-condensable gas stream with subsequent condensate directed to the mercury treatment facility.</p> <p>Condition 1: Operation of polysulfide dosing system at oxalate removal.</p> <p>Condition 39: Time-series graph of total mercury inputs and outputs to be provided in annual report.</p> <p>Condition 42: Improvement condition – retubing of at least one condenser and review following retubing.</p>

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

## 12. Decision

### 12.1 Ambient dust

Licence holder controls for ambient dust have been conditioned for the bauxite storage facility, alumina storage and loading area, residue storage areas and mercury treatment facility to implement regulatory controls which suitably mitigate the risk of dust impacts to receptors.

Monitoring of ambient dust is an important tool for responsive dust management and informing risk assessment. The department considers that TSP is not a contemporary measure of potential health or amenity risks posed by airborne particles and therefore supports the licence holder's proposal to transition from TSP to PM<sub>10</sub> ambient dust monitoring. TSP will continue to be required to be monitored at existing HVAS monitors until the licence holder's proposed BAM PM<sub>10</sub> monitoring network is established. PM<sub>10</sub> monitoring at one HVAS location between November and April is also considered necessary to facilitate dust composition analysis, which will be required at least two times each month during this period. Dust deposition monitoring is required to enable the determination of whether there may be any cumulative amenity impacts over time.

The delegated officer has determined to set a response criteria with associated licence holder management actions if the criteria is met at the BAM PM<sub>10</sub> monitors. Details of any response criteria being met are required to be reported in the annual report.

For public interest and transparency reasons (see Table 9), the delegated officer has required the licence holder to publish quarterly PM<sub>10</sub> monitoring data on their website. The delegated officer notes that the ambient dust monitors are not located at sensitive receptors and therefore cannot be compared to relevant guidelines; however, can still give an indication of dust events. A quarterly summary has been determined to be sufficient.

### 12.2 Mercury

The delegated officer considered the apparent increase in mercury emissions from the premises reported in the Minister's Appeal Determination (143 of 2015) and the implications for public health criteria. The delegated officer is satisfied that the apparent increase is likely the result of variation in mercury content in the bauxite; however, acknowledges that increased mercury to air emissions from 2022 to 2025 are also likely to have been influenced due to decreased performance of the condensers. Critically (as discussed in section 8) the HRA along with the licence holder's sensitivity analysis demonstrates that an increase in mercury emissions can be tolerated without posing an unacceptable risk to receptors (Katestone 2020; Alcoa 2023a).

As the licence holder controls have been considered in determining the risk of mercury emissions to air, the delegated officer has determined to retain the conditions related to the management and monitoring of mercury emissions to air, with some amendments as detailed in section 11.2, to ensure the risk is minimised.

The main amendment includes the removal of the response level and requirement for management actions related to the oxalate polysulfide dosing rate to allow the licence holder greater flexibility to balance the effectiveness of polysulfide in reducing mercury on the oxalate cake while ensuring excess polysulfide is not in the liquor circuit.

The licence holder will continue to be required to submit results of monitoring of the mercury control system in the annual report. The licence holder will continue to be required to notify the department when the response criteria for mercury on the oxalate belt filter cake is met. The notification must include any management actions for managing these mercury emissions.

Additionally, an improvement condition has been added, based on licence holder proposed actions, to undertake condenser retubing works and provide a review on the effectiveness of the works in regards to condenser efficiency and mercury emissions to air.

## 12.3 Administrative updates

Administrative amendments have been made to the licence that include updating the following:

- Format of the licence. *Licence holder obligations have not changed, apart from changes identified through the risk assessment (section 11).*
- Prescribed premises boundary. *See further information below.*
- Methods for the monitoring of aldehydes and ketones. *See section 9.1.*
- Complaints reporting conditions. *See section 9.2.*
- Notification and AER requirements. *See further information below.*
- Availability of equipment conditions. *See further information below.*

### Prescribed premises boundary

The cadastral details described on the existing licence are not aligned with current cadastral information. The legal description for the premises details has been updated to reflect the current cadastral information, as provided by the licence holder, and is shown in Schedule 2 of the licence. Two cadastral lots have been described as “part of” due to the licence holder provided map clearly depicting the premises boundary ending along an existing road and not including the western section of these lots. There have been no significant changes to the physical premises boundary from the existing licence; with a minor change occurring on the southern boundary of the premises where approximately 4 lots have been omitted.

### Notifications and AER requirements

Annual reporting requirements have been amended to align with the department’s current framework. The information that is requested is required to enable the department to review and confirm compliance with the licence.

Existing notification conditions (non-annual) have been combined, where possible. This has resulted in some notifications being required in a slightly shorter or longer timeframe. For consistency purposes, non-annual notifications of limit exceedances are required within seven days. Table 10 details any changes that have been made. The delegated officer considers that these changes are administrative and do not change the risk profile.

Additionally, the requirement to provide a paper copy of the annual report has been removed from the licence.

### Availability of monitoring equipment

Existing conditions have been combined where possible. This has resulted in meteorological station and ambient dust monitoring to be available 90% of the measurement intervals in every calendar month (previously >90% and 95% respectively over a calendar year). Other monitoring equipment availability has remained the same.

## 13. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a revised licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

### 13.1 Summary of amendments

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

**Table 10: Summary of licence amendments**

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
Front page	Registered business address	Front page	Updated to current registered business address for the licence holder.
Front page	Premises detail	Front page and Schedule 2	Updated prescribed premises legal description to cadastral information provided by licence holder.
Front page	Assessed production capacities	Front page	Clarified assessed production capacities for prescribed premises categories.
G1	Annual reporting	39	Removed requirement to submit <i>three copies of an annual report (one electronic)</i> . Only one copy is required, which is submitted to the department electronically. Updated to current licensing format.
G1(i)	Annual reporting – assessment of data against limits or response levels	39	Transfer of condition and update to current licence format.
G1(ii)	Annual reporting – monitoring methods	39	Transfer of condition and update to current licence format.
G1(iii)	Annual reporting – alumina produced	33, 34, 38, 39	Transfer of condition for annual amount. Notification(s) of any limit exceedances to be reported to department within 7 days. Summary of notification to be provided in annual report. Annual Audit Compliance Report requires statement of actual production, which includes amount of alumina produced on the premises each reporting period.
G1(iv)	Annual reporting – complaints	39	Administrative amendment to require licence holder to provide details of each complaint received. Percentage distribution and monthly complaints profiles are not required to be reported specifically. This information can be determined, if required, from the information the licence holder is required to provide.
G1(v)	Annual reporting – continuous monitoring unavailability	N/A	Non-compliance with continuous monitoring equipment availability (condition 11) must be reported in the AACR (condition 38) which includes providing information on cause, impacts and action taken.
G1(vi)	Annual reporting – progress on oxalate management	39	Transfer of condition with minor amendment following licence holder comments (see Appendix 1). Reference to the Alcoa of Australia – Wagerup Refinery Oxalate Management Strategy has been removed. The intent of the condition has not changed.
G1(vii)	Annual reporting – cooling tower water supply	39	Transfer of condition.
G2	Annual audit compliance report	38	Updated to current licence format.
G3	Monitoring equipment calibration	10	Updated to current licence format. Following licence holder comments (see Appendix 1) reference to the dust concentration strategy has been removed. The intent of this condition is included within conditions 10 and 11.
G4(a)	Complaints recording	37	Updated to current licence format. Transferred the requirement to note details of wind direction, wind speed and temperature at

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
			the time of which any complaint relates.
G4(b)	Complaints published in local newspaper	N/A	Removed the requirement to publish complaints in the newspaper. See section 9.2.
G4(c)	Complaints data available	31, 32, 39	Updated to current licence format which specifies books, including complaints, are to be made available on request.
G5(a), (b), (c)	Limit exceedances	33, 34, 39	Updated to current licence format – notifications and annual reporting. The timeframe for reporting has been amended from “as soon as practicable” to “7 days” to enable the licence holder time to investigate the cause of the limit being exceeded and report on any corrective actions or potential environmental impacts. A summary of any notifications reported during the annual period is required within the annual report.
G6(a), (b)	Response level exceedances	39	Updated to current licence format with amendments. Following licence holder comments (see Appendix 1) the delegated officer has removed non-annual notification requirements for response level criteria exceedances. The licence holder is still required to carry out any specified management actions following any response level criteria exceedances. Condition 39 details the requirements of the annual notification which includes date and time, cause, corrective actions and indication of any known or potential environmental impacts, similar to that of existing condition G6(b).
G7(a)	Meteorological station	29	Transfer of condition and updated to current licence format. The reference to a paper chart has been removed. Updated condition to clarify the meteorological station is at Bancell Rd West for wind speed and direction. The delegated officer considers this meteorological station to be appropriate as the height is relatively similar to that of the ambient dust monitors and is surrounded by less trees than the station closer to the refinery.
G7(b)		31, 32	Updated to current licence format.
G7(c)		12	Updated to current licence format and combined with similar conditions where possible. See section 12.3. This has resulted in the monitoring station being required to be available >90% of the measurement intervals in every calendar month, amended from a calendar year.
A1(a)	Production limit	2	Transfer of condition. Clarified that daily means 24-hour period.
A1(b)	Production limit compliance reporting	33, 34, 39	Transfer of condition and updated to current licence format. The delegated officer has determined that a separate report in November is not required. The licence holder is required to notify the department within 7 days of any limit exceedances. A summary of notifications submitted to the department during the annual period is required to be provided in the annual report. See also existing conditions G5(a) and G1(iii).
A2(a), Table 1, Table 18	Aggregate calciner VOC limit	4, 5	Transfer of condition and updated to current licence format. The condition has been included as a point source discharge to air limit with calculation requirements (condition 5). An administrative amendment has been made following licence holder comments (see Appendix 1) to refer to the point source discharges to air monitoring condition rather than “isokinetic stack sampling pursuant to licence conditions”.

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
A2(b)	Reporting of daily production limit and aggregate calciner VOC emissions	39	Transfer of condition and updated to current licence format. Amended to require the information as part of the annual report, rather than a separate report within 21 days after the annual period.
A2(c)	Operation of causticisation tanks	1, Table 1, row 3	Transfer of condition and updated to current licence format – included as an operational requirement.
A2(d)	Records of causticisation tanks	31, 32	Transfer of condition and updated to current licence format – requirement to keep records.
A2(e)	Precipitation cooling towers make-up water	1, Table 1, row 6	Transfer of condition and updated to current licence format – included as an operational requirement.
A2(f)	Precipitation cooling towers make-up water records	31, 32,	Transfer of condition and updated to current licence format – requirement to keep records.
A3	Exhaust gas exit velocity	18, 39	Transfer of condition and updated to current licence format. Additionally, exhaust gas exit velocity information is required to be reported in the annual report to determine compliance with this condition.
A4	Alumina rail carriages	1, Table 1, row 10	Transfer of condition and updated to current licence format – included as an operational requirement. Minor amendment to include inspections and the loading area following review (see section 11.2).
A5	Condenser	1 Table 1, rows 2 and 11	Transfer of condition and updated to current licence format – included as an operational requirement. Powerhouse boilers have been included as infrastructure, with no specified requirements, as they are referred to in row 2 of Table 1.
N/A	Digestion non-condensable gas stream	1, Table 1, row 2	Licence holder controls conditioned – operation of polysulphide dosing system on non-condensable gas stream. See Table 9 of this decision report.
	Evaporation non-condensable gas stream	1, Table 1, row 4	
	Mercury treatment facility	1, Table 1, row 5	Licence holder controls conditioned – operation of the facility. See Table 9 of this decision report.
A6, Table 2	Liquor burning facility response levels	15, Table 9	Transfer of condition and updated to current licence format. Response levels have been included as response criteria within the monitoring of point source discharges to air.
A7, Table 17	Liquor burner exemption to response level	1, Table 1, row 8	Transfer of condition and updated to current licence format – included as operational requirements. Requirement to submit a plan to the CEO prior to recommencing feed to the LBF kiln has been removed. The conditions specify operational requirements for the LBF kiln, of which the licence holder is required to comply with. The delegated officer has determined that immediate notification is not required; however, information on any cease feeds will be
A8(a), (b), (c)	Liquor burner cease feed requirements	39	
A9	Liquor burner RTO bypass		

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
A10	Liquor burner feed recommencement		required to be reported in the annual report.
A11	Oxalate kiln RTO stack response levels	15, Table 9	Transfer of condition and updated to current licence format. Response levels have been included as response criteria within the monitoring of point source discharges to air.
A12	Mercury control system response levels	30, Table 17	Partial transfer of condition and updated to current licence format. See Table 9 of this decision report. Response level of $\geq 6$ L/hr for polysulfide dosing rate has been removed.
A13	Mercury control system management actions	39	Partial transfer of condition and updated to current licence format. See Table 9 of this decision report. Removed requirement to undertake specified management actions relating to polysulfide dosing. Where response level criteria are met, the licence holder is required to provide details in the annual report.
N/A	Mercury emissions to air – improvements	42	Licence holder commitments conditioned – retubing of a condenser and reviewing correlation between condenser efficiency and mercury emissions to air. See Table 9 of this decision report.
A14	Oxalate kiln RTO exemption response level	1, Table 1, row 7 39	Transfer of condition and updated to current licence format – included as operational requirements. Requirement to submit a plan to the CEO prior to recommencing feed to the oxalate kiln has been removed. The conditions specify operational requirements for the oxalate kiln, of which the licence holder is required to comply with. The delegated officer has determined that immediate notification is not required; however, information on any cease feeds will be required to be reported in the annual report.
A15(a), (b), (c), (d), A16, A17	Oxalate kiln cease feed requirements		
A18	Oxalate kiln feed recommencement		
N/A	Oxalate removal polysulfide dosing system		Licence holder controls conditioned – operation of polysulfide dosing system. See Table 9 of this decision report.
N/A	Monitoring frequency	14	New condition that is standard to the current licence format where periodic monitoring is specified to ensure an appropriate separation time occurs between sampling events.
A19(a)	Stack sampling method	16	Transfer of condition with reference to relevant monitoring conditions in revised licence. Reference to the Australian Standard publication year has been removed following licence holder comments.
A19(b)	Stack sampling NATA accreditation requirements	17	Transfer of condition with reference to relevant monitoring conditions in revised licence.
A20(i), (ii), (iii), (v)	Ambient dust monitoring HVAS	20	Transfer of condition for the continued monitoring of TSP using HVAS monitoring stations. See sections 11.2 and 12.1. A daily averaging period has been included to capture the daily renewal of the filter papers.

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
A20(iv)	Ambient dust monitoring HVAS availability	12	Updated to current licence format and combined with similar conditions where possible. See section 12.3. This has resulted in the HVAS ambient dust monitors required to be available >90% of the measurement intervals in every calendar month, amended from 95% for each calendar year.
A21, Table 12	Ambient dust monitoring HVAS chemical analysis	24, 25	See Table 9 of this decision report. Monitoring amended from TSP to PM <sub>10</sub> . Dust composition analysis is based on existing licence conditions with additional parameters (antimony, calcium, chromium III, chromium VI, iron (as Fe <sub>2</sub> O <sub>3</sub> ), magnesium, manganese, phosphorus, potassium, sodium, sulfur, thorium, tin, titanium, uranium) as per <i>Ambient dust monitoring campaign</i> conducted by the department in Pinjarra and the department's Guideline: Air emissions (DWER 2019). Transfer of condition – analysis of filter paper blank.
N/A	Ambient dust monitoring – PM <sub>10</sub> and PM <sub>2.5</sub>	21, 22	New conditions – see sections 11.2 and 12.1.
	HVAS filter paper retention		
	Deposited dust monitoring		
	PM <sub>10</sub> response level criteria		
	BAM monitor availability	12	
	PM <sub>10</sub> response level criteria exceedance management actions	23	
	Live publishing of PM <sub>10</sub> monitoring	40, 41	
A22(a), Table 13	HRSG and boiler stack monitoring	15	Transfer of condition and updated to current licence format – included as point source discharge to air monitoring.
A22(b)		39	Transfer of condition and updated to current licence format – reporting of monitoring results in the annual environmental report.
A22(c)		15	Transfer of condition and updated to current licence format – included as point source discharge to air monitoring.
A22(d)		19	Transfer of condition and updated to current licence format.
A23(a), Table 14	Calciners monitoring and reporting	15	Transfer of condition and updated to current licence format – included as point source discharge to air monitoring.
A23(b)			Updated method for aldehydes and ketones as per section 9.1. Clarified SO <sub>x</sub> is SO <sub>2</sub> to align with USEPA methodology.
A23(c)		39	Transfer of condition and updated to current licence format – reporting of monitoring results in the annual environmental report.

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
A24(a)		15, 11	Transfer of condition and updated to current licence format – included as point source discharge to air monitoring. Clarified units for PM as optical density converted to mg/m <sup>3</sup> and g/s based on information provided in annual reports.
A24(b)		11	Updated to current licence format and combined with similar conditions where possible. See section 12.3.
A24(c)		31, 32, 39	Transfer of condition and updated to current licence format – reporting of monitoring results in the annual environmental report.
A25(a), Table 15	LBF stack and oxalate kiln RTO stack monitoring and reporting	15	Transfer of condition and updated to current licence format – included as point source discharge to air monitoring. Updated method for aldehydes and ketones as per section 9.1. Clarified SO <sub>x</sub> is SO <sub>2</sub> to align with USEPA methodology.
A25(b)		39	Transfer of condition and updated to current licence format – reporting of monitoring results in the annual environmental report.
A25(c), Table 2, Table 3		15, 11	Transfer of condition and updated to current licence format – included as point source discharge to air monitoring. Clarified units for PM as optical density converted to mg/m <sup>3</sup> and g/s based on information provided in annual reports.
A25(d)		11	Updated to current licence format and combined with similar conditions where possible. See section 12.3.
A25(e)		31, 32, 39	Transfer of condition and updated to current licence format – reporting of monitoring results in the annual environmental report.
A26	Mercury control system monitoring and management actions	30	Transfer of condition and updated to current licence format – included as mercury control system monitoring. Frequency of oxalate belt filter cake mercury monitoring amended from quarterly to weekly as per Table 9, bauxite ore refining, point source emissions to air (mercury).
A27	Air emission limits	4	Transfer of condition and updated to current licence format. The condition has been included as a point source discharge to air limits. TSP limits for the RSAs has been removed as per Table 9, residue storage area, fugitive dust.
A28, Table 16	Calciner particulate limit exemption	6, 1	Transfer of condition and updated to current licence format – included as calciner discharge to air limit exemption events and as operational requirements for the calciners.
A29(a), (b), (c)	Calciners – requirement to cease feed	1, Table 1, row 9	Transfer of condition and updated to current licence format – included as operational requirements. Minor amendments for clarification purposes following licence holder comments (see Appendix 2, Table 12.)
W1	RSA drainage	1, Table 1, row 13	Transfer of condition and updated to current licence format – included as operational requirement.
N/A	Residue storage areas operational requirements		Additional regulatory controls as per Table 9.
W2	Containment of contaminated or potentially	1, Table 1, rows 12, 15, 16, 17	Transfer of condition W2 with amendment to condition wording to reflect the Minster's appeal determination 143 of 2015.

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
	contaminated waters Spillages	and 18	Infrastructure for the storage or containment of contaminated or potentially contaminated water or process liquor have been included in the infrastructure table with operational requirements to maintain sufficient lining systems to minimise seepage.
W3(a), (b), (d)	Surface water quality monitoring	26, 39	Transfer of conditions and updated to current licence format – included as monitoring of ambient surface water. “or equivalent TDS measurement” has been removed as, from licence holder provided annual reports, EC is measured and results provided. Guideline criteria has not been transferred with this condition except for pH and EC, as per W3(b), as no other surface water monitoring conditions referred to the livestock watering guidelines. Reporting of monitoring results is required in the annual report.
W3(c)	Surface water quality monitoring limits	27	Transfer of condition and updated to current licence format – included as surface water quality monitoring limits.
W3(e)	Flow metering device availability	13	Transfer of condition and updated to current licence format.
W3(f)	Groundwater monitoring	28, 39	Transfer of condition and updated to current licence format – included as monitoring of ambient groundwater. Monitoring bores 23G and 23W have been removed from the licence as the licence holder has advised these bores were decommissioned in 2015. “or equivalent TDS measurement” has been removed as, from licence holder provided annual reports, EC is measured and results provided. Sodium and chloride have both been added as parameters to be measured as the sodium chloride ratio is required to be calculated. Reporting of monitoring results is required in the annual report.
W3(g)	Groundwater monitoring guideline exceedance reporting	28, 39	Transfer of condition and updated to current licence format. Response criteria have been included in condition 28. Reporting to CEO of response level criteria exceedances has been amended from “as soon as possible” to annual reporting following licence holder comments (see Appendix 1).
W3(h)	Reporting of decommissioned monitoring locations	N/A	Condition has been removed from the licence. If a sampling point is required to be removed from the licence, the licence holder can apply for a licence amendment and provide justification for the removal of that monitoring point.
W4(a)	Method for collecting water samples	26, 28	Transfer of condition and updated to current licence format – has been incorporated into the surface water and groundwater monitoring conditions.
W4(b)	Laboratory NATA accreditation		
W4(c)	Original laboratory reports	31, 32, 39	Transfer of condition and updated to current licence format. Conditions 31 and 32 require the licence holder to maintain monitoring records. Additionally, copies of original monitoring, laboratory and analysis reports are required to be submitted with the annual environmental report for point source discharges to air, ambient

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
			dust, surface water and groundwater monitoring as per current licence format.
W5, W6 and Table 19 and Table 20	ROWS pond and spillway	7, 29, 35, 36	<p>Transfer of conditions and updated to current licence format.</p> <p>The words “to 30 April in the following year (inclusive)” have been added to clarify the dates where no discharge may occur, as was intended by the condition in Table 20 of the existing licence.</p> <p>Added requirement to measure rainfall to meteorological station monitoring as the definition of Wet Winter requires rainfall to be measured.</p> <p>Added requirement to notify the department within 24 hours of a discharge occurring at the ROWS pond spillway. A summary of any notifications is required in the annual report.</p>
S1(a)	Waste acceptance	8, 9	<p>Transfer of condition and updated to current licence format.</p> <p>Clarified the waste types that can be accepted at a class II landfill as per the Landfill Waste Classification document. Definitions for each waste type has been included in the licence. Clean fill has not been specified as the department does not consider it a waste. Asbestos materials have been amended to special waste type 1 to align with Landfill Waste Classification document terminology.</p> <p>Rate at which waste is received has been included to ensure waste cannot be accepted above the production capacity for Category 64 (Class II landfill).</p> <p>A condition to require the licence holder to record the amount of waste accepted at the premises for disposal has been included to verify compliance with the rate at which waste is allowed to be received and a requirement to dispose of waste to the landfills to ensure stockpiling of external waste does not occur.</p> <p>Following licence holder comments (see Appendix 1) process waste acceptance sources and disposal area have been clarified. The intent of the condition has not changed.</p>
S1(a)	Waste disposal	1, Table 1, row 19	<p>Transfer of condition and updated to current licence format.</p> <p>Clarified the waste types that can be accepted at a class II landfill as per the Landfill Waste Classification document. Definitions for each waste type has been included in the licence. Asbestos materials has been amended to special waste type 1 to align with Landfill Waste Classification document terminology.</p>
S2(a), (b)	Waste management	1, Table 1, row 19	Transfer of conditions and updated to current licence format – included in operational requirements for the landfill.
S3(a)	Storage of oxalate	1, Table 1, row 7	Transfer of condition and updated to current licence format – included in operational requirements.
S3(b)		1, Table 1, row 14	<i>Approved oxalate storage areas located in the RSAs</i> has been clarified to <i>oxalate storage ponds</i> .
S3(c)		1, Table 1, row 14	<p>Transfer of condition and updated to current licence format – included in operational requirements.</p> <p>Removed reference to <i>within 12 hours of oxalate being discharged into the oxalate storage ponds</i> as it is a requirement for the oxalate to be in a moist state when discharged.</p>
N/A	Bauxite storage and handling area	1, Table 1, row 1	Additional regulatory controls as per Table 9.

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
	operational requirements		
Definitions	Definitions	Definitions, Table 18	<p>Transfer of conditions and updated to current licence format with some definitions amended, added or removed as follows.</p> <p>Amended definitions: AS 4323.1 (<i>removed reference to year and updated title</i>), CEMS code (<i>updated</i>), CEO (<i>updated</i>), and Landfill Waste Classification and Waste Definitions 1996 (<i>updated</i>).</p> <p>Added definitions for ACN, Alinta Corporation Wagerup Cogeneration Plant, AACR (<i>replaces approved form</i>), annual period (<i>replaces licence year</i>), AS 3543, AS/NZS, AS/NZS 3580.9.11, AS/NZS 3580.9.12, AS/NZS 5667.11, averaging period, books, Bunbury Rail Terminal and Port Loading Facility, clean fill, clinical waste, CO, dark smoke, department, discharge, emission, EP Act, g/s, ha, HRSG, HVAS, hydrocarbon contaminated waste, inert waste type 1, L/hr, Lakewater circuit, licence, licence holder, m, mm, m<sup>2</sup>, mAHD, mbgl, m/s, m<sup>3</sup>/hr, m<sup>3</sup>/min, m/sec, monthly, NH<sub>4</sub>, NTU, neutralised acid sulfate soil, PM, PM<sub>2.5</sub>, PM<sub>10</sub>, ppb, premises, prescribed premises, putrescible waste, quarterly, special waste type 1, spot sample, stack test, surface treatment, SWL, TDS, tonnes/hr, Type A soil, Type B soil, uncontaminated fill, USEPA Method 2, USEPA Method 5, USEPA Method 6C, USEPA Method 7E, USEPA Method 10, USEPA Method 17, USEPA Method 18 (adsorption tube), USEPA MMTO5, USEPA SW-846 Method 0011, VOC, waste, and Willowdale Minesite.</p> <p>Removed definitions: advise, ANZECC 2000, approved form (<i>replaced by AACR</i>), approved, background concentration and background corrected (<i>TSP limits have been removed</i>), licence year (<i>replaced by annual period</i>), normal operating conditions (relative to stack sampling) (<i>definition for normal operating conditions remains</i>), RDA (<i>replaced by RSA</i>), TEOM (<i>monitors are not referred to in the licence</i>), upset (<i>not referred to in the licence</i>), and usual business day (<i>not referred to in the licence</i>),</p>
Appendix B	Premises map	Schedule 1: Maps and Schedule 2	Updated premises map with map and included cadastre information provided by licence holder in Schedule 2.
N/A	Schedule 1: Maps, Infrastructure maps – Refinery and Bauxite storage and handling, residue management area		Included maps, provided by licence holder, to show the location of all infrastructure listed in Table 1 of the licence.
N/A	Schedule 1: Maps, Authorised discharge points		Included maps, provided by licence holder, to show the location of all authorised discharge points depicted in Table 2 of the licence.
Appendix C	Schedule 1: Maps, Location of ROWS spillway		Removal of existing map. Licence holder has provided the location for the ROWS Pond and ROWS Pond Spillway as part of the map of Residue Management Area infrastructure.

Relevant section or condition number			Description of amendments to condition
Existing condition number	Existing / New condition summary	Revised licence condition number	
N/A	Schedule 1: Maps. Monitoring locations – Map 1 and Map 2.		<p>Included Map 1 provided by licence holder, to show the location of all ambient surface water, ambient groundwater and some ambient air quality monitoring locations depicted in the revised licence.</p> <p>Included Map 2, produced by the department, to include the remaining ambient air quality monitoring locations (and zones) that are not included in Map 1 and the additional ambient meteorological monitoring station location. Map 2 is based on information provided by the licence holder. The delegated officer determined not to use the map provided by the licence holder as it included additional information not required for the licence conditions and did not specify the specific name of all additional ambient air quality monitoring locations.</p>

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## Appendix 1: Summary of licence holder's comments on risk assessment and draft conditions

**Table 11: Licence holder comments received 25 July and 26 September 2025, with department's response**

Condition	Summary of licence holder's comment	Department's response
1, Table 1 <i>Infrastructure and equipment</i>	Request to remove references to Building numbers as the individual building(s) referenced do not necessarily contain all of the associated process activities.	References to building numbers have been removed from within the decision report and licence. The areas are still referred to by their relevant names, with infrastructure and equipment listed in Condition 1, Table 1 of the licence.
1, Table 1, row 1 <i>Bauxite storage and handling area</i>	<p>The proposed operational requirements have been extracted from an internal operational procedure which forms part of the Environmental Management System (EMS). Operational procedures document how tasks are to be performed to achieve the commitments set out in the Environment, Health and Safety (EHS) Policy. Documented procedures make it easier to review, audit and achieve continual improvement which is a core principle of the EMS.</p> <p>Prescribing components of the internal procedure as operational requirements in the licence will impede flexibility and continual improvement as any proposed change (i.e. in response to an internal inspection/audit, technological advancements etc) will necessitate a licence amendment.</p> <p>An additional requirement has been proposed that provides flexibility and adaptability as to how it can be implemented.</p>	<p>As outlined in section 2.2, the purpose of the licence review is to undertake a full risk-based review in accordance with the department's risk based regulatory framework to ensure that the regulatory controls on the licence are appropriate and risk based, and to address outcomes of Appeal number 143 of 2015. Stage 1 of the licence review included reviewing the risk profile of fugitive dust to ensure conditions remain commensurate with risk.</p> <p>The department completed a risk assessment (section 11) which included assessing fugitive dust emissions from the bauxite ore storage and handling area and residue storage area. Licence holder controls were considered in determining the risk; therefore, the department drafted conditions based on these controls. The delegated officer considers these controls as minimum requirements that do not prevent the licence holder from implementing additional measures.</p> <p>The delegated officer does not consider the licence holder's proposed alternative condition for <i>dust suppressant (water or chemical) to be applied to bauxite stockpile as required</i> to be enforceable as, per the department's Guidance Statement (GS): Setting Conditions (DWER 2015), it is not clear and precise on the measures that are required and is not worded so that the requirements for compliance are clear.</p> <p>It is noted that the licence holder has not identified any specific conditions that impede flexibility or continual improvement.</p> <p>Given the above, the delegated officer considers that the dust management regulatory controls included on the licence for the Bauxite storage and handling area are appropriate and align with the Department's regulatory framework.</p>
1, Table 1, rows 2 and 4	Confirmed that existing licence conditions A5(i) and A5(ii) only apply to the Digestion building.	Noted.

Condition	Summary of licence holder's comment	Department's response
<i>Digestion and Evaporation</i>	Requesting additional wording to be added to item (d) of row 2 and item (a) of row 4 to avoid administrative non-compliance and to clearly articulate that the dosing system can be in an offline state for maintenance purposes.	The additional wording requested by the licence holder has been included within these conditions noting that condition 31 requires the licence holder to keep records of any maintenance.
1, Table 1, rows 7 and 8 <i>Oxalate Removal and Liquor Burning Facility</i>	Request removal of reference to condition 16 as this relates to non-continuous stack monitoring.  Confirm oxalate stored on the premises is directed to the oxalate storage ponds.	The department has corrected the administrative error. The condition now refers to condition 15.  Noted. Reference to tanks has been removed.
1, Table 1, row 13 <i>Residue Storage Area</i>	<p><b>RSA 1</b> Remove RSA1 from list of residue storage areas. The spent liquor pond, landfill and oxalate storage ponds 2 and 3 were constructed within the footprint of the previous RSA1.</p> <p><b>Operational requirements</b> Proposed operational requirements (c) to (l) have been extracted from internal operational procedures. It is contested the maintenance and operation of the RSA sprinkler system and use of water carts, coupled with the ambient dust monitoring program adequately address the risk of adverse impacts to public health associated with fugitive dust emissions and negate the requirement for prescriptive process and management-based conditions. Furthermore, prescribing aspects of internal operational procedures inhibits continual improvement.</p> <p><b>RSA base and embankments</b> It is acknowledged proposed operational requirement (a) reflects existing condition W1; however, it is contested the existing condition is not reasonable or actionable.  The Wagerup facility contains a number of RSAs which were constructed</p>	<p>RSA1 has been removed from the list of residue storage areas.</p> <p>Refer to the Department's response in the above section for the <i>Bauxite storage and handling area</i> and the <i>RSA Reticulation System</i> section below.</p> <p>The delegated officer does not consider the licence holder's proposed alternative condition to <i>maintain and operate RSA dust suppression sprinkler system and water carts to minimise dust generation</i> to be enforceable as, per the department's GS: Setting Conditions (DWER 2015), it is not clear and precise on the measures that are required and is not worded so that the requirements for compliance are clear.</p> <p>The delegated officer considers visual inspections and targeted dust controls in response to weather conditions critical to identify and respond to higher fugitive dust emission risk periods.</p> <p>It is noted that the licence holder has not identified any specific conditions that inhibit continual improvement. The delegated officer considers the conditions, which are based on licence holder controls, do not prevent the licence holder from implementing additional measures above and beyond. Minor wording amendments have been made to ensure this.</p> <p>As outlined in section 2.2, and the department's response in the above section for the <i>Bauxite storage and handling area</i>, the scope of Stage 1 of this licence review included reviewing the risk profile of fugitive dust and mercury emissions. A consideration of the risk to groundwater and surface water will form part of the second stage of this licence review.</p>

Condition	Summary of licence holder's comment	Department's response
	<p>between 1970 and present day. The requirements and methods of construction associated with the existing RSAs has evolved over time. Applying a condition to maintain the specified permeability to existing RSA's is not practicable or an effective condition. In the event that a historical RSA facility does not meet the prescribed permeability, it is not practicable to reline an RSA that contains residue mud. Conditions focused on items that are implementable and measurable, such as maintaining the underdrainage systems and seepage monitoring are considered to be more appropriate.</p> <p><i>Reticulation system</i></p> <p>The reticulation system consists of a network of sprinklers arranged at equal spacing's on laterals which are connected to a main header. A two ring main piping and associated pumping system transports sprinkler water across the residue storage facility and provides for appropriate coverage of mud drying areas. The basic control philosophy consists of the operation of each sprinkler for 4 minutes duration, with a total cycle time of up to 90 minutes maximum, which covers 80% of the total residue storage area. The sprinkler locations and rise height are subject to constant review based on the residue deposition schedule.</p>	<p>Existing condition W1 has been transferred and updated to the current licence format, with obligations remaining the same. The licence holder can apply to amend the requirements of the condition at a future date or this may be incorporated into a future review.</p> <p>As above, licence holder controls were considered in determining the risk of fugitive dust emissions from the RSAs impacting on sensitive receptors. The department drafted conditions based on these controls and considers these controls as minimum requirements that do not prevent the licence holder from implementing additional measures. Minor wording amendments, based on licence holder comments, have been made to ensure this.</p> <p>The delegated officer has amended this condition such that it applies to the total residue storage area. The sprinkler height requirement has been removed as the delegated officer considers that this can be managed through the sprinkler coverage requirement.</p>
<p>1, Table 1, rows 15 to 18 <i>ROWS pond, ROCP, Cooling pond and spent liquor pond</i></p>	<p>Remove ROCP1 from the list – this pond is no longer being used to capture runoff and is in the final stage of being capped with sand.</p> <p>Clarified the general lining systems for the ponds.</p> <p>As for the RSA base and embankments, specifying minimum permeability requirements for existing infrastructure is not considered appropriate. The licence holder is in the process of collating historical construction records related to liner systems and this information will be provided to the department at a later date.</p>	<p>Noted.</p> <p>As outlined in section 2.2 and above, a consideration of the risk to groundwater and surface water will form part of the second stage of this licence review, during which the department may clarify requirements relating to lining of these ponds. Existing condition W1 has been transferred and updated to the current licence format, with obligations remaining the same.</p>
<p>2 <i>Alumina production limits</i></p>	<p>Requesting the removal of the daily alumina production limit.</p> <p>Existing condition A1(a) appears to have been applied for the sole purpose of minimising air pollution. Proposed conditions are sufficient to control the risks to air quality under current production rates. The daily production limit can occasionally limit operations requiring ramp down and ramp up of operations.</p>	<p>As outlined in section 2.2, the scope of Stage 1 of this licence review is to assess ambient dust emissions and mercury emissions. It is not in the current scope of the licence review to amend or reassess this daily production limit. The department has previously advised the licence holder (meeting on 25 February 2025) that they are able to submit an application for a licence amendment, which should include justification and supporting evidence, for the amendment or removal of this condition.</p>

Condition	Summary of licence holder's comment	Department's response
5	Benzene is monitored in accordance with USEPA method 18 (adsorption tube) which is NATA accredited but is a non-kinetic method.	The wording of the existing condition has been amended to refer to NATA accredited analysis as per the point source discharges to air monitoring. The intent of the condition remains the same.
8, Table 7 <i>Waste acceptance</i>	<p>Wastes generated from alumina production and associated activities principally includes bauxite residue, oxalate, waste bauxite, alumina and hydrate, and scale (any solid material from process circuits or tanks that contain caustic).</p> <p>The abovementioned process wastes are directly associated with Category 46 activities and are deposited at a dedicated tip face separate to the Class II landfill. As such, process waste should not contribute towards the Class II assessed deposition rate. Wherever possible, bauxite from Willowdale Mine is processed in the refinery. However, there are circumstances where bauxite from the Willowdale Mine is not considered suitable for refining. Similarly where possible, alumina and hydrate are recovered for export. There may be small amounts of waste alumina generated onsite or at the Bunbury Rail Terminal and Port Loading Facility required to be disposed of. It is acknowledged process wastes are unlikely to be generated by the Alinta Cogeneration Plant. As such, the Cogeneration Plant can be removed from the alumina production waste section.</p>	<p>Noting the licence holder's comments, the delegated officer has amended the wording of this condition to:</p> <ul style="list-style-type: none"> <li>• Clarify the types of process wastes that can be accepted onto the premises.</li> <li>• Remove the Alinta Corporation Wagerup Cogeneration Plant as a source of process wastes accepted onsite.</li> <li>• Clarify that process wastes are disposed of to the Process Waste Deposition Area.</li> </ul> <p>The intent of existing condition S1(a) has not changed.</p>
10 <i>Calibration of monitoring equipment</i>	The dust concentration strategy relates to several internal operational procedures that were developed to address the requirements of Section 2.1 of the CEMS Code. As condition 11 requires compliance with the CEMS Code, it is unnecessary to reference the dust concentration strategy within condition 10.	Noted. Reference to the dust concentration strategy has not been transferred to the revised licence. The delegated officer is satisfied that the intent of existing condition G3 is included within conditions 10 and 11.
11 <i>Calibration of CEMS monitoring equipment</i>	Propose change from Section 2, to Section 2.1 and 2.2 of the CEMS Code. Section 2.3 of the WA CEMS Code refers to <i>Accuracy of verification / calibration equipment and materials</i> via cylinder gas audits and relative accuracy test audits. These calibration methods are not required for opacity monitors.	<p>Continuous monitoring requirements in the licence apply to the monitoring of CO, temperature and PM. It is noted that section 2.3 of the CEMS Code applies to timing devices used for verification/calibration of equipment and materials used for response time tests; which apply to opacity monitors (see section 5.1.4 of the CEMS Code).</p> <p>The delegated officer understands that not all equipment mentioned in section 2.3 may be relevant for monitoring at the premises; therefore, those specific parts of section 2.3 may not apply.</p> <p>Given the above, the delegated officer has determined to leave the existing condition unchanged.</p>
14 <i>Monitoring frequency</i>	The proposed wording of this condition may lead to administrative non-compliance. It is understood the intent of the condition seeks to ensure each sample is representative of operations over the monitoring period, however, it does not allow for major maintenance overhauls or process upsets. Furthermore, it does not allow for retesting / sampling activities.	<p>As part of the review, the licence has been converted to the current format and conditions modernised. This condition is a standard condition and is included to ensure an appropriate separation in the time between monitoring dates for periodic sampling.</p> <p>The delegated officer does not consider the licence holder's proposed condition and definition wording to be enforceable as it is not clear and</p>

Condition	Summary of licence holder's comment	Department's response
		<p>precise or worded so that requirements for compliance are clear, and it allows too much flexibility on when samples can be taken, thereby not achieving the outcome of the condition.</p> <p>The condition does not limit the licence holder from taking additional samples outside of the required time periods. However, it ensures that the results of monitoring that are submitted to the department in the annual report are carried out within appropriate timeframes. In the event that maintenance of infrastructure is required, this should be reported in accordance with condition 31.</p>
<p>15 <i>Monitoring of point source discharges to air</i></p>	<p>Include definition for averaging period.</p> <p>Request monitoring parameter SO<sub>x</sub> be revised to SO<sub>2</sub> to align with USEPA Method 6C which relates to the measurement of SO<sub>2</sub> emissions from stationary sources.</p>	<p>The definition of averaging period has been included on the licence; however, the licence holder's proposed wording has been amended to remove reference to limits and targets. Conditions for limits included in the licence refer to monitoring in accordance with the relevant condition, which includes the averaging period.</p> <p>References to SO<sub>x</sub> have been updated to SO<sub>2</sub> to align with USEPA Method 6C.</p>
<p>16 <i>Non-continuous stack sampling location standard</i></p>	<p>Request that the year of release is omitted from the Australian Standard to accommodate future revisions of the standard.</p>	<p>Reference to the year for Australian Standard 4323.1 has been omitted and the definition updated. The licence now refers to the most recent revision of the standard.</p>
<p>20, 21 <i>Ambient dust monitoring</i></p>	<p>Request for timeframe to be removed from proposed condition 20 and proposed condition 21 be removed in its entirety.</p> <p>It is requested the transition from a TSP monitoring network to a PM<sub>10</sub> monitoring network be considered as part of Stage 2 of the licence review to incorporate the outcomes from the pending Katestone ambient dust monitoring review (due for completion Q4 2025).</p> <p>Departmental support for the proposed transition from TSP to PM<sub>10</sub> BAMS was first acknowledged in the draft decision document (May 2025). Development approval to facilitate installation of BAM-S was obtained on 6 June 2025.</p> <p>Installation of BAM-S, BAM-E and BAM-NE and associated hardstand is scheduled to occur in Q4 2025 once the paddocks have dried out and the areas can be safely accessed.</p>	<p>As outlined in section 2.2, the licence holder was notified of the department's intent to review licence L6217/1983/15 on 7 February 2017. The purpose of the licence review is to undertake a full risk-based review in accordance with the department's risk based regulatory framework to ensure that the regulatory controls on the licence are appropriate and risk based, and to address outcomes of Appeal number 143 of 2015.</p> <p>Several meetings between the department and licence holder were held during 2022, which were followed by the department requesting further information (RFI) (22/11/2022 and 30/06/2023). During these 2022 meetings and in the RFIs the department clearly indicated an intent for the licence holder to provide options for improvements to the licensed ambient dust monitoring network that reflected principles that included:</p>

Condition	Summary of licence holder's comment	Department's response
	<p><i>PM<sub>10</sub> BAMS</i> The Wagerup Residue Storage Area Dust Monitoring Network Review</p>	<ul style="list-style-type: none"> <li>• New continuous monitors capable of monitoring PM<sub>10</sub>, PM<sub>2.5</sub> and TSP</li> <li>• Retention of some existing HVAS monitors to facilitate filter paper collection and analysis activities</li> <li>• Options for live ambient dust monitoring data publishing.</li> </ul> <p>The department discussed proceeding with the licence review in Stages during a meeting in November 2023. Stage 1 of the licence review included reviewing the risk profile of fugitive dust and ensure conditions remain commensurate with risk.</p> <p>The department completed a risk assessment (section 11) which included assessing fugitive dust emissions from the residue storage and bauxite ore storage and handling areas. As per section 11.2, the department has used the information available to inform the risk assessment which has determined that it is appropriate to move towards the monitoring program proposed in the licence and considers it necessary to have response criteria.</p> <p>Licence holder controls and commitments were considered in determining the risk; therefore, the department drafted conditions based on information provided by the licence holder. The delegated officer considers these controls as minimum requirements that do not prevent the licence holder from implementing additional measures.</p> <p>The licence holder has not provided any additional information (e.g. results of monitoring of existing PM<sub>10</sub> BAMS that are already installed) in their comments on the draft documents. The delegated officer considers the risk assessment has been based on information available to date with the conditions proposed commensurate with the risk.</p> <p>As noted in the risk assessment, if, after sufficient data has been collected, the results of the ambient air quality monitoring data show that the concentrations of parameters analysed pose a suitably low risk of impact to nearby sensitive receptors, the licence holder may apply for a licence amendment to remove or amend monitoring conditions or response criteria.</p> <p>The dates for transitioning between the existing and proposed ambient air quality monitoring program have been amended to allow time for the finalisation of Stage 1 of the licence review and installation of any additional ambient air quality monitors.</p> <p>See department's response above.</p>

Condition	Summary of licence holder's comment	Department's response
	<p>(Katestone 2023) recommended a monitoring regime that focused on PM<sub>10</sub> and was logical and consistent with most modern licences for dust-generating industries and will be more indicative of potential health effects and dust nuisance (Katestone 2023).                      The Draft Wagerup Residue Ambient Dust Monitoring Network Upgrade (Alcoa 2023) proposed 5 licenced PM<sub>10</sub> BAMS.                      BAM-NW and BAM-W have been operational since January 2023. BAM-S, BAM-E and BAM-NE are scheduled to be installed in Q4 2025.                      Consistent with the recommendations of the Wagerup Residue Storage Area Dust Monitoring Network Review, Katestone was engaged on 29 May 2025 to undertake a third-party review of the PM<sub>10</sub> data collected by BAM-NW and BAM-W. The scope of this review included developing a set of operational dust trigger and limits, having regard to:</p> <ul style="list-style-type: none"> <li>- Ambient PM<sub>10</sub> criteria (24-hour average of 50 µg/m<sup>3</sup>)</li> <li>- Relationship between 1-hour and 24-hour average concentrations measured at the monitors</li> <li>- Contemporaneous monitoring data collected by the rest of the monitoring networks</li> <li>- Ability to derive a specific RSA contribution using an automated upwind/downwind approach.</li> </ul> <p>The Katestone review is due to be finalised in Q4 2025. It is requested details of the BAM PM<sub>10</sub> monitoring program be considered as part of Stage 2 of the licence review to incorporate the outcomes from the pending Katestone ambient dust monitoring review.</p> <p><i>PM<sub>10</sub> 1-hour response criteria</i>                      The proposed 90 µg/m<sup>3</sup> response criteria appears to be an arbitrary limit, and not a health or amenity-based criteria. Whilst there may be value in setting an internal trigger value for management response, there is no intrinsic correlation between a 1-hour average PM<sub>10</sub> concentration exceeding 90 µg/m<sup>3</sup> and exceedance of the NEPM standard for 24-hour concentrations of PM<sub>10</sub> of 50 µg/m<sup>3</sup>. Equally, it is possible for the NEPM standard to be exceeded without the response criterion being exceeded.                      Furthermore, the response criteria is proposed to be applied at the proposed BAM monitoring sites, which are not located at sensitive receptors and are therefore not indicative of impacts at the sensitive receptors. For these reasons, Alcoa request condition 21 be omitted from the licence until such time as the Katestone assessment work is completed and site-specific criteria are developed.</p>	<p>From information provided to the department on 14 July 2023 it is noted that the licence holder proposed to have a network of twelve PM<sub>10</sub> BAM monitors, and one PM<sub>10</sub> HVAS. The delegated officer acknowledges that the licence holder intended for five of the PM<sub>10</sub> BAM monitors to be included in the licence; however, it is noted that monitors BAM-N and BAM-SW were proposed to be installed as they are “recommended to provide adequate coverage for the north” and “recommended to provide adequate coverage for the South West wind vector and align with future residue planning”. The delegated officer considers that these two monitors are required to be included in the ambient air quality monitoring to ensure adequate coverage of the ambient air quality monitoring network.</p> <p>As the licence holder has not provided the requested map for the location of the BAM network, a map has been included in the licence to show the location of BAM-NW and BAM-W, and the general areas for the location of the other proposed ambient air quality monitors. This map has been based on previously provided information. The licence holder may provide an updated map to show actual locations.</p> <p>See department's response above.</p> <p>The delegated officer understands the scope of the Katestone review (to be completed Q4 2025) includes developing a set of operational dust triggers and limits. The department recognises that the current TSP limits were not conducive for responsive dust management when ambient dust levels increase; therefore they were removed from the licence. The delegated officer considers it appropriate and necessary to include criteria for managing responses to dust events in the licence and, in the absence of PM<sub>10</sub> monitoring results at this time, has determined an appropriate response criteria (see risk assessment in section 11.2) based on available information. The delegated officer acknowledges that the response criteria of 90 µg/m<sup>3</sup> does not directly relate to the NEPM; however, it is intended to enable the licence holder to have a rapid response to elevated dust events; to investigate, identify</p>

Condition	Summary of licence holder's comment	Department's response
	<p><i>HVAS</i></p> <p>The Wagerup Residue Storage Area Dust Monitoring Network Review (Katestone 2023) notes <i>it would be beneficial to temporarily co-locate the BAMs measuring PM<sub>10</sub> with the existing HVAS monitors to compare measured concentrations against future licence limits for PM<sub>10</sub></i>. HVAS and BAMs have been co-located at RW/BAM-W and RNW/BAM-NW since June 2023 providing sufficient data to determine appropriate licence limits. Ongoing HVAS monitoring is not linked to a response criteria or dust management actions. Katestone has been engaged to review the monitoring data collected at BAM-W and BAM-NW and develop site specific criteria. Upon completion of this review it is proposed to decommission the existing RW (HVAS) and RWN (HVAS).</p> <p><i>BAM – PM<sub>2.5</sub></i></p> <p>The Katestone report stated <i>There should be no need for the network to monitor both PM<sub>10</sub> and PM<sub>2.5</sub> as either should provide a reasonable indication of the potential for exceedances of the standards for both size fractions. However, if a PM<sub>10</sub> – focused network is adopted, it may be prudent to operate a single PM<sub>2.5</sub> monitor co-located with one of the PM<sub>10</sub> monitors so that the ratio can be monitored.</i></p> <p>The recommendation for a single PM<sub>2.5</sub> was to facilitate continual improvement of the PM<sub>10</sub> focused dust monitoring program. PM<sub>2.5</sub> monitoring is not linked to a response criteria or management action. It is considered unwarranted to include PM<sub>2.5</sub> monitoring and the associated reporting obligations.</p> <p><i>BAM – Bauxite handling</i></p> <p>As noted in previous correspondence (January 2023) it is contested the risk of fugitive dust emissions from the bauxite handling operations is low (slight / unlikely) on the basis:</p> <ul style="list-style-type: none"> <li>- <i>onsite impacts from any dust are localised and able to effectively controlled in accordance with procedures</i></li> </ul>	<p>the source and take management action(s) to reduce any impacts to receptors.</p> <p>As per the risk assessment, following sufficient PM<sub>10</sub> monitoring results, the department will be able to review the data and amend any response level limits if required.</p> <p>See department's response above.</p> <p>As per the risk assessment in section 11.2, the delegated officer has determined to retain one HVAS monitor to enable dust composition analysis. Monitoring is required during summer months when there is a higher potential for dust impacts. If, after sufficient data has been collected, the results of the dust composition analysis show that the concentrations of parameters analysed pose a suitably low risk of impact to nearby sensitive receptors, the licence holder may apply for a licence amendment to remove this monitoring. The delegated officer considers that monitoring should continue for at least two years to enable sufficient data to be collected.</p> <p>See department's response above.</p> <p>As per the risk assessment in section 11.2, the delegated officer has considered community concern regarding PM<sub>2.5</sub> impacts. As discussed in section 7.6, the ratio of PM<sub>2.5</sub> in PM<sub>10</sub> is relevant to the focus of the dust monitoring network. The delegated officer has determined to require the licence holder to include one PM<sub>2.5</sub> monitor to confirm the ratio is as expected. If the monitoring results indicate a ratio of PM<sub>2.5</sub> to PM<sub>10</sub> above 0.5 the department can determine to impose additional PM<sub>2.5</sub> monitoring locations if deemed necessary. The delegated officer acknowledges that while the PM<sub>2.5</sub> to PM<sub>10</sub> ratio will be measured within the premises boundary, it is not necessarily representative of the ratio that may be received at sensitive receptors. However, it can give an indication of the fraction of the dust generated at the premises that is PM<sub>2.5</sub>.</p> <p>See department's response above.</p> <p>As per the risk assessment in section 11.2, the delegated officer has determined that the current dust monitoring network does not provide adequate coverage for the bauxite storage and handling area which is a potential significant source of dust and closer than the RSAs to some</p>

Condition	Summary of licence holder's comment	Department's response
	<ul style="list-style-type: none"> <li>- there are no offsite impacts indicated by recent complaints history</li> <li>- the most recent Health Risk Assessment indicates that site public health criteria are met</li> <li>- If there are amenity impacts they will be local scale and limited to site.</li> </ul> <p>Voluntary installation and collection of 12 months of PM<sub>10</sub> data at the bauxite handling area with the BAM being operational since February 2024. Katestone was engaged in May 2025 to undertake a third-party review of the monitoring data and if required determine appropriate monitoring limits. It is considered premature to include the bauxite handling BAM as a compliance monitoring location until Katestone has completed their review. It is requested the need for ongoing monitoring at the bauxite handling area be evaluated as part of Stage 2 of the licence review.</p> <p><i>Depositional Dust Monitor</i></p> <p>The proposed inclusion of dust deposition monitors is to assess potential cumulative impacts on amenity over time. As the likelihood of cumulative amenity impacts is unknown it is considered unwarranted to impose deposition monitoring as an ongoing control. It is proposed to collect 12 months of deposition dust monitoring data to enable the risk of cumulative impacts on amenity to be assessed.</p>	<p>individual sensitive receptors (NE and E of the RSAs). The delegated officer has therefore determined to include the dust monitor within the bauxite storage and handling area as part of the network of monitors on the licence.</p> <p>The delegated officer notes that if, after sufficient data has been collected, the results of the monitoring show that there is a suitably low risk of impact to nearby sensitive receptors, the licence holder may apply for a licence amendment to remove this monitoring.</p> <p>See department's response above and the risk assessment in section 11.2.</p> <p>It is agreed that it is unknown, and needs to be established, whether there may be any cumulative amenity impacts over time. Hence, the delegated officer has determined that dust deposition monitoring will be included on the licence. Established standards will enable the department to use the monitoring results to further inform the risk.</p>
22, 23 Siting standard and response criteria exceedance management actions	<p>It is requested to remove reference to condition 21 within condition 22.</p> <p>It is requested to remove condition 23 in its entirety. It is requested the BAM PM<sub>10</sub> response criteria and investigative actions be considered as part of Stage 2 of the licence review to incorporate the outcomes from the pending Katestone ambient dust monitoring review (due for completion Q4 of 2025).</p>	<p>See department's responses above and the risk assessment in section 11.2.</p>
24 <i>Ambient dust composition analysis</i>	<p>It is proposed to decommission RW (HVAS) and RNW (HVAS) collocated with BAM-W, upon completion of the Katestone data review.</p> <p>It is proposed that the established HVAS monitoring programme, as detailed within the existing licence, continue until the BAM PM<sub>10</sub> monitoring network has been commissioned.</p> <p>Following licensing of the BAM PM<sub>10</sub> network as part of Stage 2 of the licence review, condition 24 can be omitted in its entirety.</p>	<p>See department's responses above, particularly for HVAS, and the risk assessment in section 11.2.</p>
26 <i>Ambient surface water</i>	<p>A shaft encoder flow meter is located at an existing concrete weir (SP12). This system utilises a float and pulley mechanism within a stilling well to convert the vertical movement of the float (due to water level changes) into a rotational</p>	<p>The condition has been updated to clarify that the method for measuring volumetric flow at SP12 is calculated.</p>

Condition	Summary of licence holder's comment	Department's response
<i>monitoring</i>	signal used to calculate flow. The continuous logger records levels within the stilling well (at increments of 1 mm) at 10 minute intervals. Using the flow measurements and the known dimensions of the weir, volumetric flow is calculated.	
29 <i>Meteorological monitoring</i>	The meteorological station at Bancell Road is utilised for compliance reporting. Request amend to reflect this.	<p>As per section 13.1, reference to the meteorological station in the licence has been updated to refer to Bancell Rd West. The delegated officer considers this meteorological station to be appropriate as the height is relatively similar to that of the ambient dust monitors and is surrounded by less trees than the station closer to the refinery.</p> <p>Additionally, as per section 7.6, the Wagerup Residue Storage Area Dust Monitoring Network Review report (Katestone 2023) identified that the "<i>Bancell Rd West meteorological monitor provides suitable meteorological data for analysis of dust impacts related to the RSAs, and should be maintained</i>". Section 2.1 of this report states "<i>The Bancell Road West AWS is located on level terrain and is unobstructed in the immediate surrounding environment, compared to the Bancell Road AWS which has a higher density of trees in the immediate surrounding environment. The Bancell Road West AWS is hence considered more representative of conditions in the vicinity of the RSAs area</i>".</p> <p>The department understands that both meteorological stations (Bancell Rd West and Bancell Rd) are operational. The licence holder has not provided any specific justification on why Bancell Rd West cannot be used; therefore, for reasons above, the revised licence has been updated to require meteorological monitoring from the Bancell Rd West station.</p>
33, 34 <i>Notifications</i>	<p>Request removal of notifications in regards to response level criteria being met. Response criteria are intended to forewarn the approach of an exceedance of a prescribed limit and/or an exceedance of a level which has been assessed as representing an unacceptable risk to public health or the environment.</p> <p>Exceedance of a response criteria will initiate a management action in accordance with the relevant internal procedure and/or management plan.</p> <p>It is not considered appropriate to notify the department within 7 days of all response criteria exceedances.</p> <p>The annual environmental report will include an interpretation of monitoring data results including a comparison to response criteria.</p>	<p>The existing licence has requirements for the licence holder to notify the department in certain circumstances including: where management actions have been initiated in response to response level exceedances for the LBF; prior to recommencing feed to the LBF or oxalate kiln where feed has ceased due to exceeding response level criteria; mercury control system response level exceedances; and groundwater monitoring results exceeding specified guideline values.</p> <p>The existing conditions required the licence holder to notify the department within a range of timeframes including as soon as practicable, before 5pm on the next usual business day, within 7 days, before feed can recommence to the LBF or Oxalate kiln, and within 4 weeks.</p>

Condition	Summary of licence holder's comment	Department's response
		<p>Existing notification conditions (non-annual) were combined where possible, requiring notification within seven days; resulting in some notifications being required in a slightly shorter or longer timeframe.</p> <p>Following consideration of the licence holder's comments regarding notification of response level criteria exceedances, and a review of the proposed requirements, the delegated officer has decided to remove these notification requirements. Exceedance of response level criteria will be required to be reported in the annual report. The licence holder is still required to carry out any specified management actions following any response level criteria exceedances.</p>
<p>39 <i>Reporting of oxalate management activities</i></p>	<p>The Wagerup Refinery Oxalate Management Strategy referenced in the existing licence is no longer an active internal procedure. This change is due to several reasons, including the recommissioning of the kiln and the installation of the Biox building through subsequent works approvals. Despite this, the following oxalate management activities are implemented as part of the operations, which align with the intent of the previous strategy:</p> <ul style="list-style-type: none"> <li>• Removal of oxalate from the Bayer liquor circuit. Oxalate is crystallised and filtered from the liquor circuit to maintain product quality and prevent "oxalate outbreak".</li> <li>• Thermal destruction of oxalate in the oxalate kiln with off-gas treatment. Oxalate cake is processed in the oxalate kiln, converting hazardous oxalate into non-hazardous carbonate. Off-gas scrubbing and regenerative thermal oxidation (RTO) control odorous and volatile compounds.</li> <li>• Biological destruction of residual oxalate in the BiOx facility. A biological treatment facility converts residual oxalate into sodium bicarbonate, reducing storage requirements and environmental risk.</li> <li>• Controlled storage of oxalate in lined ponds or tanks under moisture management. Interim storage in lined oxalate ponds or tanks, ensuring material remains moist or covered to minimise dust and environmental exposure.</li> <li>• Ongoing monitoring and reporting of oxalate management activities in the annual environmental report. Continuous monitoring of kiln emissions (dust concentration monitors) and inclusion of oxalate management summaries in the annual environmental report.</li> </ul> <p>Request amendment to this condition to remove reference to the obsolete oxalate management plan.</p>	<p>Noted. The wording of the existing condition has been amended to remove reference to the Alcoa of Australia – Wagerup Refinery Oxalate Management Strategy. The delegated officer notes that the licence holder is still required to provide a summary of oxalate management activities in the annual environmental report.</p>
<p>40, 41 <i>Publishing of</i></p>	<p>Reflecting the response for ambient dust monitoring, request removal of these conditions.</p>	<p>See department's response regarding ambient dust monitoring above.</p>

Condition	Summary of licence holder's comment	Department's response
<i>data</i>	It is requested the publishing of BAM PM <sub>10</sub> monitoring data be considered as part of Stage 2 of the licence review to incorporate the outcomes from the pending Katestone ambient dust monitoring review (due for completion Q4 2025).	As outlined in section 2.2, the scope of Stage 1 of the licence review includes reviewing the risk profile of fugitive dust and ensure conditions remain commensurate with risk. Following the risk assessment (see section 11.2), the delegated officer has determined whether existing conditions relating to fugitive dust are appropriate, and whether additional regulatory controls are required. The delegated officer does not intend to defer any aspects of the review of fugitive dust emissions to Stage 2 of the licence review.  As outlined in section 11.2, the delegated officer acknowledges that there is community concern regarding dust emissions from the premises. In the interest of transparency to the public, the delegated officer has determined to include the requirement to publish a quarterly summary of ambient air quality monitoring data. The publishing of the information will allow the public to view the dust monitoring data and any associated dust events.
Section 8 of Decision Report <i>Mercury</i>	Request change of wording to more accurately reflect the statement within the Wagerup Refinery Mercury Emissions – Emissions Performance (Alcoa 2022).	Wording has been updated.

**Table 12: Licence holder comments received 28 November 2025, with department's response**

Condition	Summary of licence holder's comments	Department's response
1, Table 1, row 9 <i>Calcination</i>	Request to add “for a continuous period exceeding 60 minutes” within section (a)(i).  This is to remove the potential for misinterpretation of the specific scenarios when the feed to a calciner must be immediately ceased. Without the additional text, the condition may be misinterpreted to mean the calciner feed must be ceased in the event the CEMS records a 1-minute PM concentration above 80 mg/m <sup>3</sup> .  The purpose of the 60-minute period as described within in the existing licence condition A29(a) and Appendix A, Table 16, row (VI) is to allow the operators time to correct the process and avoid the higher dust emissions associated with ceasing the feed to, and subsequent start-up of, a calciner. It avoids the need to shut down in response to isolate peaks in the CEMS data which have negligible impact on the environmental performance of an asset.  Without the 60-minute period provided in condition 1, there would be need to program the interlocks to shut the feed to a calciner when particulate emissions over a 1-minute period approach the 80 mg/m <sup>3</sup> limit. This is a significant	As outlined in section 2.2, the scope of Stage 1 of the licence review includes converting the licence to the current format and modernising conditions. The delegated officer notes that some existing conditions regarding the calciners weren't clear, particularly in relation to CEMS monitoring. The department has therefore aimed to improve clarity of these licence conditions.  Part of this clarification was made through specifying a 60-minute averaging period for CEMS monitoring (condition 15), which subsequently applies to the calciner PM limit (condition 4). To be clear, the calciner PM limit in condition 4 is only exceeded where the 60-minute average is >80 mg/m <sup>3</sup> .  The delegated officer has considered the licence holder's comments regarding calciner shut-down requirements and acknowledges that the above CEMS monitoring clarification and the wording of condition 1, Table 1, row 9(a)(i) has unintentionally altered these requirements from the intent of the existing licence condition. Considering the licence holder's

	<p>deviation from how the calciners are currently operated and the outcomes of this would be:</p> <ul style="list-style-type: none"> <li>• Creating unnecessary upset and unstable process conditions that can have an impact on upstream process areas.</li> <li>• An increase in emissions from the calciner stacks as a feed shut would need to occur every instance there is a brief intermittent peak in the CEMS data, or in situations where operators would otherwise be able to correct the process within 60 minutes.</li> <li>• Curtailed production due to the increased frequency of shuts.</li> </ul> <p>Notwithstanding the above, it was understood that amendments to conditions associated with refinery point source emissions were outside the scope of this Stage 1 licence review and were scheduled to be addressed in the Stage 2 amendment round.</p>	<p>concerns the delegated officer has revised the wording of this condition to better reflect the intent of the existing condition.</p> <p>The delegated officer notes that Stage 2 of the licence review will include a review of the risk profile of air emissions, which may result in changes to these conditions.</p>
<p>1, Table 1, row 13 <i>Residue Storage Area</i></p>	<p>Request to remove item (g) – “Implement a system to track the age of mud deposited in each RSA”.</p> <p>The decision document is silent on the justification for tracking mud age. It has been assumed operational requirement (g) has been imposed in response to the risk of dust emissions from friable surfaces associated with aged mud (RSA that have not had fresh mud poured in more than 6 months).</p> <p>The statement within the Residue Dust Emission Control Strategy <i>that aged mud will form a very friable surface that can't be controlled with sprinklers</i> only applies to mud that remains completely inactive and unwatered for extended periods, a scenario that does not occur under current Wagerup operations. RSAs are routinely managed with sprinkler systems, decanting activities, and natural rainfall, which maintain surface moisture and prevent friability even beyond six months.</p> <p>Mud age is tracked for operational purposes to determine consolidation for subsequent pours, ensuring RSAs do not remain inactive for prolonged periods. In the unlikely event an area of the RSA will remain inactive for more than six months, a dust management plan will be prepared in accordance with operational requirement (h).</p> <p>Inclusion of operation requirement (g) doesn't provide any additional control and dust mitigation and is a duplication of operational requirement (h)(ii) which also requires the tracking of mud age to ensure dust management plans are prepared in accordance with the condition.</p>	<p>The delegated officer considers that the purpose of the inclusion of the requirement to implement a system to track the age of mud deposited in each RSA is to aid in determining compliance with condition 1, Table 1, row 13, part (h)(ii). The department understands that the tracking of the age of mud within each RSA already occurs onsite. As the delegated officer considered the implementation of licence holder controls, such as tracking the age of mud, as part of the risk assessment (section 11), they were added to the licence to ensure the risk is minimised.</p>
	<p>Request to remove items (j)(i) and (j)(ii) – “Maintain and operate a sprinkler system that: (i) has at least 95% availability of sprinklers; and (ii) is able to cover at least 80% of the total residue storage area.”</p> <p>The proposed 95% sprinkler availability and 80% coverage requirements specified in operational requirements (j)(i) and (ii) are in effect licence limits.</p>	<p>As per the risk assessment of fugitive dust emissions from the residue storage area in section 11.2, the delegated officer has considered the implementation of licence holder controls as part of the risk assessment and therefore has included them on the licence to ensure the risk is minimised.</p>

	<p>However, a breach of these criteria doesn't necessarily result in increased or unacceptable dust emissions, or adverse environmental or human health impacts. This is supported by the fact that reduced sprinkler availability or cover during a period of rainfall or low wind speeds is highly unlikely to result in increased dust emissions from the RSAs. For these reasons, the proposed limit criteria for sprinkler availability and cover are not appropriate to be applied as limits, which if breached would result in a formal licence condition non-compliance.</p> <p>The sprinkler availability and cover criteria are intended to be internal trigger response criteria to initiate investigation and to identify any required remedial measures that may be required to prevent unacceptable dust emissions. They are not intended to be limits that represent poor environmental performance or human health impacts.</p> <p>Based on the above, licence holder requests that these operational requirements are removed from the licence, or at a minimum be amended to have effect as response criteria that initiate investigation and remedial measures where required.</p>	<p>It is evident from ambient dust monitoring results (licence holder provided annual reports and the recently provided <i>Residue Dust Monitoring Third Party Review</i> (Katestone 2025)) that there is a clear pattern of elevated dust events from October to May each year; however, it is noted that there are some elevated events that occur during June to September.</p> <p>The delegated officer has determined to retain the condition because it is considered critical that the sprinkler system is maintained, operated and has a high level of availability and coverage on elevated dust risk days to mitigate dust emissions.</p> <p>In light of the licence holder's comments, the delegated officer has however amended the condition to only apply to moderate, high and extreme daily dust risk ratings as implementation of dust mitigation on these days is a control to minimise the risk of dust impacts.</p> <p>Clarification has also been made such that the coverage of the sprinklers applies to the mud drying areas.</p>
	<p>Request to amend (l) to include "and areas subject to a dust management plan in part (h)".</p> <p>It is requested to amend the condition to exclude areas subject to a dust management plan in accordance with operational requirement (h).</p> <p>A requirement of the dust management plan is to detail the total unprepared surface area that will remain open for the duration of the project. The dust management plan will document the project specific controls to mitigate the risk of dust emissions.</p>	<p>The delegated officer considers this request to be reasonable. The condition has been amended to also exclude areas subject to a dust management plan as per condition 1, Table 1, row 13, (h).</p> <p>It is noted that there must be sufficient dust control equipment for dust suppression purposes to meet the requirements of any dust management plan developed as per part (h).</p>
<p>20 and 21 <i>Monitoring of ambient dust</i></p>	<p>Request to extend the specified date for existing TSP monitoring from 31 January 2026 to 31 March 2026.</p> <p>Request to commence new ambient dust monitoring from 1 April 2026; to account for the scheduled monitoring station installation.</p>	<p>Noted. The dates in these conditions have been amended to allow time for the licence holder to install relevant ambient dust monitoring equipment. To allow sufficient time between the grant of the licence and commencement of the new ambient monitoring a commencement date of 1 May 2026 has been specified.</p>
<p>21, Table 11 <i>Response criteria – process contribution vs absolute concentration value</i></p>	<p>Request the PM<sub>10</sub> BAM response criteria is amended from an absolute concentration value to a process contribution concentration value which considers background concentrations and wind direction (arc of influence and reference location).</p> <p>Consistent with the methodology described within the <i>Residue Dust Monitoring Third Party Review</i> (Katestone 2025) to differentiate refinery-related dust emissions from regional dust events (i.e. bushfires and dust storms). Process contribution is determined by:</p> <p>Process contribution = monitoring location (PM<sub>10</sub>) – reference location (PM<sub>10</sub>)</p> <p>Where:</p>	<p>The department completed a risk assessment (section 11) which included assessing fugitive dust emissions from the residue storage and bauxite ore storage and handling areas. As per section 11.2, the department has used the information available to inform the risk assessment which has determined that it is appropriate to move towards the monitoring program proposed in the licence and considers it necessary to have response criteria.</p> <p>Licence holder controls and commitments were considered in determining the risk; therefore, the department drafted conditions based on information provided by the licence holder and in accordance with the</p>

	<p>Monitoring location = PM<sub>10</sub> dust concentration recorded at a location downwind of the residue storage area or bauxite handling area. The monitor is only considered downwind when the wind direction is within the defined arc of influence.</p> <p>Reference location = PM<sub>10</sub> dust concentration recorded at a location outside the arc of influence of the residue storage area or bauxite handling area. The BAM located on Boundary Road (BAM-BR) will be utilised as the reference location for all downwind monitoring locations, with the exception of BAM-S.</p> <p>To accommodate the proposed process contribution response criteria, the licence holder requests to include an “arc of influence” and “reference location” for each respective monitoring location.</p> <p>As noted in the decision document, the Department considers a short-term 1-hour average response criteria appropriate for managing responses to dust events. Based on analysis of data collected at BAM-W, BAM-NW and BAM-Bauxite from June 2023 to April 2025, there was 723 hours where at least one monitor exceeded the Department proposed 1-hour absolute response criteria of <math>\geq 90 \mu\text{g}/\text{m}^3</math>. Such a high number of exceedances would result in excessive investigation and reporting obligations, including for regional dust events such as bushfires or dust storms that are not attributable to refinery operations. This would create an unnecessary administrative burden and divert resources away from proactive dust management measures that are more effective in minimising emissions.</p> <p>Other minor amendments have been proposed associated with the location references of the monitors and additional notes to provide further detail regarding the calculation of process contribution, and arc of influence related to BAM-N and BAM-SW.</p> <p>With regards to the recommendation presented in the Katestone 2025, specifically section 4 which outlines a series of internal management triggers based on both a 24-hour rolling average and 1-hour average – it is the licence holder’s intention to update the relevant internal procedures <i>Weather Forecast and Response to Dust Risk Ratings</i> and <i>Dust Risk Rating Matrix</i> to reflect the recommendations of the report. These new internal management triggers provide a robust management framework for identifying and responding to dust emissions in real-time.</p>	<p>department’s GS: Setting Conditions (DWER 20215).</p> <p>The delegated officer does not consider the licence holder’s proposed changes to the ambient air quality monitoring (to include reference locations, arc of influence and a process contribution response criteria) to be suitable as they introduce too many additional elements reducing enforceability and rigor. Additionally, the proposed changes make it challenging to manage and determine compliance of the ambient air quality monitoring response.</p> <p>The aim of the monitoring, and the associated response criteria, is to ensure a rapid response to potential dust events, to investigate, identify the source and take management action(s) to reduce any impacts where premises activities are identified to be the likely source.</p> <p>Given the licence holder’s concerns regarding excessive investigation and reporting obligations, the delegated officer has amended the wording of condition 23 such that visual inspections are only required following review of meteorological data and identifying that activities on the premises are the probable cause of the response criteria being met.</p> <p>Additionally, the delegated officer has considered the licence holder’s comments and increased the response criteria for ambient air quality monitoring to <math>100 \mu\text{g}/\text{m}^3</math>. The delegated officer notes that this is an absolute concentration as, for reasons outlined above, the department considers the licence holder’s proposed change to a process contribution concentration would reduce enforceability and significantly increase the complexity of determining compliance.</p> <p>The delegated officer notes that the licence conditions do not limit the licence holder from using additional information, such as arc of influence and reference locations, as part of any investigation that may be required as per condition 23 of the licence.</p>
<p>21, Table 11 <i>Response criteria value</i></p>	<p>Request the response criteria value be amended from <math>90 \mu\text{g}/\text{m}^3</math> to <math>100 \mu\text{g}/\text{m}^3</math> to align with the extreme 1-hour trigger response criteria proposed in the <i>Residue Dust Monitoring Third Party Review</i> (Katestone 2025).</p> <p>The Katestone 2025 review details standalone trigger levels (moderate, high and extreme) based on a 1-hour average RSA process contributions. The purpose for these triggers is to ensure prompt action in the event of sudden increases in emissions from the RSA that might not be triggered when focusing on rolling 24-</p>	

	<p>hour average concentrations in isolation.</p> <p>Based on the monitoring data the extreme 1-hour management trigger (process contributions <math>\geq 100 \mu\text{g}/\text{m}^3</math>) was triggered multiple times on days when elevated 24-hour average concentrations were recorded.</p> <p>Prescribing the extreme 1-hour management trigger (process contributions <math>\geq 100 \mu\text{g}/\text{m}^3</math>) as the response criteria in the licence will ensure the Department is informed of dust concentrations and resulting management actions on the days when operations present the greatest potential risk to human health and/or the environment.</p>	
21, Table 11 <i>BAM-Bauxite</i>	<p>Request relocation of BAM-Bauxite monitor.</p> <p>As noted in the <i>Bauxite Handling Area Fugitive Dust Monitoring Data Assessment</i> (Katestone 2025), the recommendation is to relocate the BAM-Bauxite closer to the sensitive receptor and then obtain sufficient data at the relocated BAM-Bauxite to determine appropriate internal management triggers. Once 6-12 months of data (including summer and autumn) has been collected, the licence holder will commission a third-party review to identify the likelihood of exceedance and to determine appropriate trigger levels to control dust emissions from the bauxite handling area. In the interim it is proposed to apply the residue extreme 1-hour management trigger (process contributions <math>\geq 100 \mu\text{g}/\text{m}^3</math>) as the response criteria.</p>	<p>See above for Department response to request for changes to the response criteria value.</p> <p>The delegated officer has noted the licence holder's proposal to move the location of the BAM-Bauxite PM<sub>10</sub> monitor and has updated the location on the maps in the licence.</p>

**Table 13: Licence holder comments received 9 January 2026, with department's response**

Condition	Summary of licence holder's comments	Department's response
1, Table 1, row 5 <i>Mercury treatment facility</i>	Request additional wording to be added to item (a) to avoid potential administrative non-compliances and to clearly articulate that the mercury treatment facility can be in an offline state for maintenance purposes.	The additional wording requested by the licence holder has been included within this condition noting that condition 31 requires the licence holder to keep records of any maintenance.
23 and 39 <i>Response criteria investigation and reporting</i>	<p>Request additional wording “/or” to condition 23(c)(i) such that the required visual inspection is limited to the area (residue storage area (RSA), bauxite storage and handling area (BHA)) associated with the dust event. A dust event associated with a RSA monitoring location only, should not necessitate a visual inspection of both the RSA and BHA.</p> <p>Request additional wording “Where the investigation triggered condition 23(c)” to apply to condition 39, Table 18, 21, 23 <i>Ambient air quality monitoring – response criteria</i> items (c) to (g). This is to clarify that requirements (c) to (g) only apply where the investigation identifies that the activities on the premises are the probable cause of the exceedance of the response criteria.</p>	<p>The delegated officer has considered the licence holder's comments and has included the requested wording change in condition 23(c)(i). It is noted that condition 39 requires the licence holder to report on the date, time, location, wind speed and wind direction at the time of any response criteria being met, regardless of the source/cause of the dust event.</p> <p>The delegated officer has considered the licence holder's comments and has amended condition 39 where it relates to <i>Ambient air quality monitoring – response criteria</i> such that some items are only required to be reported where the investigation in condition 23(b) identifies that activities on the premises are the probable cause of the response criteria being met. The</p>

	<p>In response to condition 23 (a) and (b), the licence holder proposes to develop automated alerts utilising bespoke software applications. The system will automatically assess real-time data, undertake defined computations, and issue alerts when the defined response criteria are met. The licence holder is proposing to use wind direction, arc of influence and calculated process contribution to determine if the dust event is related to operations on the premises.</p>	<p>delegated officer considers that the “cause of the response criteria being met” is required to be reported for every response criteria being met and has amended condition 39 accordingly.</p> <p>As noted above in Table 12, the delegated officer notes that the licence conditions do not limit the licence holder from using additional information, such as arc of influence and reference locations, as part of any investigation that may be required as per condition 23 of the licence.</p>
<p>29 <i>Meteorological monitoring</i></p>	<p>Request to change the monitoring location for rainfall from Bancell Rd West to Bancell Rd.</p> <p>The Bancell Road West automatic weather station (AWS) is not equipped with a rain gauge. Rainfall data will continue to be obtained from the Bureau of Meteorology registered Bancell Road AWS (BOM site #9894) to ensure continuity of monitoring and compliance with relevant reporting requirements.</p> <p>The licence holder will undertake a review to determine whether the continued operation of both AWS units is necessary. Should the review conclude that the Bancell Rd AWS is no longer required and is to be decommissioned, a rain gauge will be retrospectively installed at the Bancell Rd West AWS. Any modification to monitoring infrastructure will be documented and formalised as part of a future licence amendment application.</p>	<p>Noted. The monitoring location for rainfall has been amended to Bancell Road and is shown in Schedule 1, Figure 5 of the licence.</p>
<p>42 <i>Improvements</i></p>	<p>Requesting an extension of one month for the date of completion of IR1. The scheduled completion date for onsite works associated with the retubing of the B30 condensers is 28 May 2026. The condenser will subsequently be brought back into service by 30 June 2026.</p> <p>A performance review will be conducted following the completion of IR1. While this review could be finalised by 31 July 2026, it is recommended that it occur after collecting 12 months of operational data to minimise the impact of seasonal variations in condenser performance attributed to ambient temperature changes. It is proposed that mercury outputs will be monitored from 1 July 2026 to 30 June 2027, with a final performance report to be submitted no later than 31 July 2027.</p>	<p>The delegated officer considers the licence holder’s request to be reasonable and has amended the date of completion for IR1 accordingly.</p> <p>The delegated officer has considered the licence holder’s comments requesting a delay of 12 months for submission of the review report but notes that they state the review could be finalised by 31 July 2026.</p> <p>The delegated officer considers it critical that a preliminary report, based on available data at the time, is submitted to enable the department to gauge preliminary effectiveness of the condenser retubing.</p> <p>It is acknowledged that a further 12 months of collected data will improve knowledge of seasonal variations in condenser performance attributed to ambient temperature changes.</p> <p>Considering the above, and the change to the date of completion for IR1, IR2 has been amended to require the licence holder to submit a preliminary report (based on approximately 1 month of data) by 31 August 2026 and a final report (based on at least 12 months of data) by 31 July 2027.</p> <p>As per the risk assessment, further licence amendments may be required following completion of the improvement conditions to implement review outcomes.</p>



## Appendix 2: Summary of stakeholder comments

Theme	Summary of comment	Department's response
Dust emissions	<p>Proposes that the department include the requirement for no visible dust to leave the premises boundary that was previously removed.</p> <p>Requests that independent comprehensive monitoring data be obtained by the department (similar to departmental air monitoring LiDAR studies completed at Point Samson) to have more up to date air monitoring data (using more up to date equipment) to provide baseline information to inform the department's review of the licence.</p> <p>Requests that dust is regulated in a similar manner to Cockburn Cement and Port Hedland Authority licences, where emission sources are identified and enforceable conditions applied.</p> <p>Concerned about the amount of PM<sub>10</sub> and PM<sub>2.5</sub> emitted from the refinery and mudlakes with the request to reduce community exposure to PM<sub>2.5</sub> by implementing buffer zones.</p> <p>Seeking clarification on how the licence review will address the ongoing impacts of air pollution from dust (PM<sub>10</sub> and PM<sub>2.5</sub>).</p>	<p>In amending the licence in 2015 the department determined to remove the condition relating to visible dust across the boundary. This was not specific to the premises but was part of the department's policy decision for the removal of all conditions considered redundant. The department considered the condition to not be risk-based, and that substantive offences of the EP Act provide enforceable prohibitions for dust emissions that result in pollution or environmental harm.</p> <p>The dust monitoring campaign at Point Samson was designed to assist in determining the origin of dust impacting the town of Point Samson. Although LiDAR is often presented as a concentration in the air, LiDAR is not an approved method for measuring against dust health criteria and should instead be considered as an approximate measure of particulates (including aerosols) in the air. The department has no current plans for a further LiDAR study in the Wagerup area.</p> <p>As part of the review of the Wagerup Alumina Refinery licence L6217/1983/15, the department has reviewed the risk profile of fugitive dust emissions (see sections 7 and 11) as per <i>Guideline: Risk Assessments</i> (DWER 2020). The review has resulted in some existing licence conditions being retained, licence holder controls conditioned, and additional regulatory controls. The department supports the licence holder's proposal to transition from TSP to PM<sub>10</sub> ambient dust monitoring. Following the risk assessment, it was determined that some PM<sub>2.5</sub> and deposited dust monitoring is also required. The department considers these, and other controls in section 11, Table 9, Fugitive dust, adequate to mitigate the risk of fugitive dust emissions from the residue storage area impacting on sensitive receptors.</p> <p>As below, the department does not enforce housing buffers in Part V licences.</p>
Annual reports	<p>Proposes for the licence to state that a copy of the annual environmental report and annual audit compliance report must be provided to the public (community).</p>	<p>See sections 9.2 and 12.3 – Complaints, and Notifications and AER requirements.</p> <p>Annual reporting requirements have been amended to align with the department's current framework. Details of any complaints made to the licence holder are provided to the department in the annual reports.</p>
Complaints	<p>Proposes for the complaints condition to be amended to additionally require the licence holder to record complaints regarding health impacts. The database (records) shall be made available to the public upon request.</p>	<p>The Department has obligations relating to the confidentiality of personal and business/commercial information therefore certain information such as annual environmental reports and complaint details are only made available through Freedom of Information processes. The public can request a copy of information such as annual reports directly from the licence holder or alternatively, the public can apply for access to these documents under the <i>Freedom of Information Act 1992</i>.</p>
Community engagement and	<p>Seeking guidance on what measures the department is exploring on an ongoing basis with respect to better community engagement and transparency.</p>	<p>The department undertakes community consultation as part of the regulatory assessment process. The <i>Environmental Protection Act 1986</i> requires, and in accordance with the department's <i>Guideline: Industry Regulation Guide to Licensing</i></p>

Theme	Summary of comment	Department's response
consideration of stakeholder comments	Consider data from the licence holder to be flawed and inaccessible without Freedom of Information requests and are dissatisfied with the department's treatment of stakeholder submissions. Additionally concerned about the transparency and reliability of data.	<p>(DWER 2019), the department advertises applications for works approvals or licences. The department may choose to advertise other applications, such as licence amendments. Interested parties seeking to make comment on applications can submit comments to the department and can request to be registered as a stakeholder for specific premises or applications. The department undertook public consultation as part of the review process as documented in Table 6.</p> <p>The department also seeks comments from people and public authorities who, in the department's opinion, may have a direct interest in the application. Submissions received from stakeholders are documented and considered as part of the department's assessment process in line with our Regulatory Framework.</p> <p>Once the department determines the grant of an instrument, this decision and a copy of the granted instrument are published on the department's website. The publication of the decision provides further opportunity for members of the public to lodge an appeal if they wish.</p> <p>Additionally, as part of this review, in the interest of public transparency, the delegated officer has included the requirement for the licence holder to publish a quarterly summary of ambient air quality monitoring data on their website (see Table 9, Residue Storage Area).</p> <p>Discussion of monitoring and reliability of data is also addressed in the air emissions section below.</p>
Surface and groundwater	<p>The risk of surface and groundwater contamination is of concern, and the adequacy of current licence conditions (particularly W2). Anticipate that the licence review will, at a minimum, be brought into line with the Minister's appeal determination – to amend existing condition W2 to ensure that no contaminated water is released to the environment from the premises.</p> <p>Concerned about the extent of ground and surface water contamination associated with the refinery and mudlakes. Proposes new licence condition requiring groundwater remediation.</p>	<p>As outlined in section 2.2, the scope of Stage 1 of this licence review is to look at ambient dust emissions and mercury emissions, however a consideration of the risk to groundwater and surface water, including a review of monitoring requirements will form part of the second stage of this licence review.</p> <p>As part of the conversion of the licence to the most current format, infrastructure for the storage or containment of contaminated or potentially contaminated water or process liquor have been included in the infrastructure table with operational requirements to maintain sufficient lining systems.</p> <p>Additionally, existing condition W2 has been transferred with an amendment to condition wording to reflect the Minister's appeal determination 143 of 2015.</p>
Spills	Would like to understand how spills will be prevented from occurring at the refinery, and what the process is for preventing spills and preventing contamination to waterways and forests.	<p>The only authorised discharge of water within the residue storage area is from the run-off water storage (ROWS) pond spillway in a 1 in 100-year wet winter. This spillway was previously assessed under Amendment Notice 1 (July 2019).</p>
Air emissions	<p>Requests that a third-party regulator monitor and report on all refinery emissions points, and the third-party regulator will report any exceedances of emission limits.</p> <p>Remove existing monitoring conditions; instead apply comprehensive monitoring conditions, similar to Cockburn Cement for point source air</p>	<p>As outlined in section 2.2, air emissions, including VOCs, will be considered in the next stage of the licence review and are not within the scope of this assessment. DWER will further take into account submission aspects related to VOCs and air emissions as part of that next stage.</p> <p>In current condition setting it is standard practice for the department and other regulatory bodies across Australian jurisdictions for monitoring to be implemented by</p>

Theme	Summary of comment	Department's response
	<p>emissions monitoring.</p> <p>Monitoring should include additional parameters including polycyclic aromatic hydrocarbons, heavy metals and radioactive gases.</p> <p>Requests that the department apply enforceable limits on emissions from the premises to protect the health and wellbeing of people and the environment. It is not clear how some currently specified emission limits have been determined to ensure that public health is protected.</p> <p>Concerned about VOC emissions (particularly from low-elevation sources) potentially increasing with production increases. Seeking the department's position in relation to VOC emissions.</p> <p>Licence holder to provide a free copy of Australian Standards to the public (community).</p>	<p>industry and on behalf of industry by specialists, with licence conditions that require installation and operation to national standards.</p> <p>Australian Standards are subject to copyright and therefore are available through third parties as paid access / subscription.</p>
Residue Storage Area	<p>Concerned as to the RSA capacity, integrity and permeability and the structural integrity of the RSA. Also request that any RSA height increases are subject to contemporary engineering checks and investigations.</p>	<p>As outlined in section 2.2, the scope of Stage 1 of this licence review is to look at ambient dust emissions and mercury emissions.</p> <p>Any proposed new or altered structures will be subject to requirements under the <i>Environmental Protection Regulations 1986</i>, which will include an assessment process for the structure where information, such as capacity, integrity and permeability, will be assessed and subject to provision of technical advice from DEMIRS on the engineering design of the structure.</p>
Noise emissions	<p>Proposes that noise emissions should be monitored continuously.</p> <p>Proposes that noise emissions from the refinery must be 35 db or less during nighttime hours.</p> <p>Noting the licence holder's regulation 17 noise application:</p> <ul style="list-style-type: none"> <li>• request confirmation that the review is being undertaken by a noise specialist, and whether the department intends to obtain independent peer review of the noise report.</li> <li>• request intended timeframe for finalisation of the report.</li> <li>• request a summary report recommendations and the extent to which it addresses issues previously raised.</li> </ul>	<p>Noise emissions are not being assessed as part of this licence review. The Department is conducting a separate assessment of a noise application to the Environment Minister under regulation 17 of the Environmental Protection (Noise) Regulations 1997.</p>
Water use	<p>Licence holder should source their own water, such as building a desalination plant and/or sourcing recycled water from major towns/cities at their own cost, and this should be a condition on their licence.</p>	<p>The licence holder sources water for the Wagerup Alumina Refinery from rainwater, surface water licences that are authorised under the <i>Rights in Water and Irrigation Act (RIWI) 1914</i>, groundwater recovery bores, water contained in bauxite, and purchased water for industrial use (Alcoa 2020).</p> <p>The department administers licences for taking and using of water, and these are administered under the RIWI Act not a licence under Part V of the EP Act.</p>
Buffer zone	<p>Do not accept the department's position that it is not in the department's powers to legislate buffer zones through licence conditions.</p>	<p>Buffers or exclusion zones are primarily a planning matter and therefore not directly linked to Part V instruments under the EP Act.</p>

Theme	Summary of comment	Department's response
	<p>Public records indicate the department liaises with Department of Health, the Environmental Protection Authority and the Department of Planning (now DPLH) to determine suitable separation distances/buffer zones for industry.</p> <p>Proposes a condition that requires the licence holder to establish a 10 km buffer zone which includes purchasing private residences.</p>	<p>In the event that other decision-making authorities (DMAs), including DPLH or local government authorities request input from the department with respect to planning decisions, the department provides input for other DMAs to consider. It is not the role of the department to implement buffer zones however through a Part V licence.</p> <p>The department is not aware of any change in 2018 advice to CAPS, from the then Minister for Planning, that a buffer is not being progressed by the State Government. Enquires on planning controls and buffers should be directed to relevant planning agencies.</p> <p>The stakeholder also references the 2005 EPA guidance document 'Separation Distances between Industrial and Sensitive Land Uses'. This guidance was developed for use in assessments under Part IV of the EP Act; however, environmental siting and separation distances are considered, and inform risk, for assessments under Part V of the EP Act as per departmental guidelines (DWER 2020) but are not a limiting factor. Additionally, this EPA guidance does not specify a particular separation distance for bauxite refining, rather it is listed as 'case by case'.</p>
Greenhouse gas (GHG) emissions	<p>As noted in previous appeal of the licence, the stakeholder considers that the department has failed to consider greenhouse gas emissions in the assessment of increases in production capacity. Seeking guidance on the departmental approach to ensure the licence holder's activities are consistent with Australia's domestic and international climate change targets.</p>	<p>Greenhouse gas (GHG) emissions are beyond the current scope of the department's Part V of the EP Act published risk-based regulatory framework. In accordance with the guidance in the <i>Government of Western Australia Greenhouse Gas Emissions Policy for Major Projects (2024)</i> GHG emissions will be subjected to alternative regulatory measures under the Commonwealth's Safeguard Mechanism.</p>
Health risk and hazard index	<p>Proposes for the Department of Health to conduct a health study on past and present residents (including deceased) to determine potential adverse health impacts within the surrounding communities.</p> <p>In the Legislative Council Standing Committee On Environment and Public Affairs Report in October 2004 they recommend that the Department of Health derive a hazard index for locations near to Wagerup to assess the health risks caused by cumulative chemical impact.</p>	<p>The department considers the Department of Health to be the primary agency for public health matters in Western Australia, and this particular recommendation relates to action for the Department of Health.</p> <p>The 2020 HRA that was peer reviewed as part of the EPA s46 assessment process concluded that the acute risk for all receptors was low, the chronic health risk was low and the carcinogenic risk was low (for a scenario of 2.85 million tonnes per annum production capacity, and an expansion scenario) (Katestone 2020).</p> <p>A primary and additional evaluation by the Department of Health to assess the likelihood of a cancer cluster in the Shire of Murray (Pinjarra and surrounding areas, of which the Pinjarra Alumina Refinery is a potential source of dust) concluded that there was no clear or consistent evidence to support the presence of a potential cluster in the Shire of Murray (DoH 2023).</p>
State agreement	<p>The State Agreement Acts under which the licence holder operate should be reviewed along with their licence. The stakeholder considers the agreement to be outdated considering the known environmental and human impacts of alumina production since the Acts were passed.</p>	<p>The Department of Jobs, Tourism, Science and Innovation (DJTSI) are responsible for administration of Alcoa's State Agreements.</p>