



**Appeals Convenor**  
**Environmental Protection Act 1986**

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**REPORT TO THE  
MINISTER FOR ENVIRONMENT**

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**APPEALS IN OBJECTION TO AMENDMENTS TO WORKS APPROVAL W5291/2013/1**

**WAGERUP ALUMINA REFINERY  
WAGERUP**

**Proponent:  
Alcoa of Australia Ltd**

Appeal numbers 124 to 132 of 2014

**December 2014**

## Appeal summary

This report concerns nine appeals received in objection to the amendment to conditions applying to Works Approval W5391/2013/1 issued to Alcoa of Australia Ltd for the Wagerup Alumina Refinery, south east of Perth.

Appellants raised concerns in relation to refinery emissions and the monitoring of those emissions, particularly with regard to amendments to the works approval, which included a three-stage process for the completion of commissioning.

It is noted that Works Approval W5391/2013/1 relates to a VOC Reduction Project, which is a targeted project for the redirection of air emissions from the Calciner 1-3 low volume vents (LVV) into the combustion zone of Calciners 1, 2 or 3 for the destruction of VOCs to achieve a reduction. It is noted that only air emissions from these sources relate to amended Works Approval W5391/2013/1.

It is understood that the proponent has undertaken sampling of emissions from Calciners 1-3, as well as Calciner 4 under an Air Emissions Verification Plan (AEVP), and that the Department of Environment Regulation (DER) is satisfied, following its review of the AEVP, that the plan provides an adequately detailed methodology for verifying VOC emission reductions through a staged commissioning process.

It is also noted that Calciners 1, 2, 3 and 4 are all monitored in accordance with the conditions of existing Licence L6217/1983/15.

More generally, it is noted that the proponent is undertaking a VOC and Odour Monitoring and Modelling Plan, which includes a review and update of the refinery's air emissions inventory for all emission sources based on current production rates.

### Recommendation

After investigating the issues raised by the appeals, it is considered that the DER was justified in amending the conditions of Works Approval W5391/2013/1. It is therefore recommended that the appeals be dismissed.

## INTRODUCTION

Nine appeals (including seven *pro forma* appeals) were lodged in objection to the decision of the Department of Environment Regulation to amend the conditions of Works Approval W5391/2013/1 relating to a project by Alcoa of Australia Ltd (Alcoa/proponent) to reduce volatile organic compounds at the Wagerup Alumina Refinery.

This report provides the Appeals Convenor's recommendations to the Minister for Environment in respect to the appeal, and is given under section 109(3) of the *Environmental Protection Act 1986* (EP Act).

The appellants are:

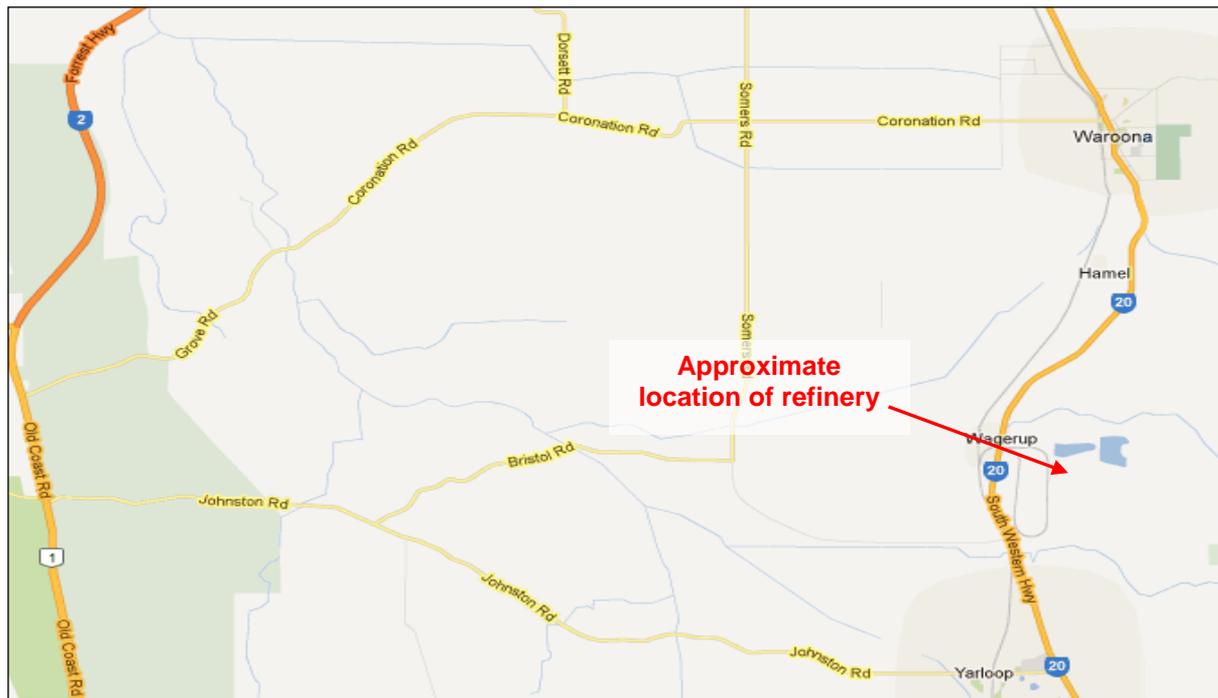
- Community Alliance for Positive Solutions Inc.
- A Bowden;
- D Busher;
- TA and SM Cockerham;
- H Diamond;
- A Jovanovich;
- J Jovanovich;
- A Puccio; and
- T Puccio.

## BACKGROUND

Alcoa operates an alumina refinery in Willowdale Road, Shire of Waroona, shown at Figure 1.

**Figure 1 – Location of proposal**

(Source: whereis.com)



On 5 June 2013, the former Department of Environment and Conservation (DEC) issued Works Approval W5391/2013/1 to the proponent to undertake works for a project to reduce volatile organic compound (VOC) emissions at the Wagerup Alumina Refinery (Refinery). Works Approval W5391/2013/1 was subject to appeals which were dismissed by the Minister for Environment on 7 January 2014. Details of the consideration of those appeals are contained in the Appeal Convenor's report for Appeal Numbers 028-063 of 2013.

On 22 January 2014, the proponent applied to the Department of Environment Regulation (DER) to amend Works Approval W5391/2013/1 to undertake staged commissioning, to minimise delays in the project.

It is understood that the DER advertised the proposed amendments for a 21 day submission period and contacted direct interested stakeholders. On 12 June 2014, amended Works Approval W5391/2013/1 was issued. It is noted that Appendix F of the decision document attached to the works approval outlines consideration of submissions received.

The scope of the amendments to Works Approval W5391/2013/1 are summarised as follows:

- conditions for the submission of three compliance certificates in a staged manner, including requirements to notify the DER prior to commencing commissioning;
- a requirement to submit an Air Emissions Verification Plan detailing a staged air emissions verification methodology that complements the minimum requirements for an air emissions monitoring program retained in Condition 3.2.2 of the amended works approval; and
- amendments to noise verification conditions including the additional requirement to submit a Noise Verification Plan for approval.

## **APPEAL PROCESS**

The investigation included obtaining a report from the DER on the matters raised in the appeals under section 106 of the EP Act. The proponent was also provided with an opportunity to respond to the appeals.

The environmental appeals process is a merits based process. Appeal rights in relation to works approval amendments are against the amendments made. That is, whether the amendments are adequate or appropriate to minimise, manage or abate pollution and to ensure that a premises is operated in an environmentally acceptable manner.

## **OUTCOMES SOUGHT BY APPELLANTS**

Appellants sought for the works approval to be updated with further details about VOC and other emissions.

## STATUTORY CONTEXT

The appeals received relate to the amended conditions applied to Works Approval W5391/2013/1 in June 2014. The right to appeal an amendment to a works approval arises from two provisions of the EP Act:

Section 102(2) – subject to section 105, the holder of a works approval who is aggrieved by the amendment of the works approval may lodge an appeal within 21 days of being notified of the amendment; and

Section 102(3)(b) – a person who, not being the holder of a works approval, disagrees with a amendment referred to in section 102(2) may lodge an appeal within the period within which the works approval holder can lodge an appeal.

In considering appeals lodged against an amendment, section 109(2) of the EP Act provides that the Appeals Convenor...:

...shall not consider, or make recommendations in respect of, a matter which is not directly related to or consequential to that amendment.

## GROUND OF APPEAL

Two broad grounds of appeal were raised that relate to amendments to Works Approval W5391/2013/1, including:

1. Refinery emissions; and
2. Monitoring of emissions.

Other matters raised outside the scope of the amendments, are not considered to be appeal grounds in the context of this investigation, consistent with section 109(2) of the EP Act. It is noted that a number of these matters have been considered in previous Appeals Convenor's reports. The Appeals Convenor's reports for Appeal Numbers 315-323 of 2012; 028-063 of 2013; and 372-426 of 2013 are relevant in this regard. The Appeals Convenor's reports and the Minister for the Environment's determination of those appeals are publicly available from the Office of the Appeals Convenor's website.<sup>1</sup>

## GROUND 1 – REFINERY EMISSIONS

By this ground of appeal, appellants expressed concerns about particular VOC sources in the Refinery, including Calciner 4, and queried the difference between Calciners 1-3 and Calciner 4. Appellants also raised concern that emissions from the 50B Tank Vent should be tested at current production levels, and that testing for mercury and organo-mercury compounds should be carried out before and after commissioning as part of the works approval.

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<sup>1</sup> [www.appealsconvenor.wa.gov.au](http://www.appealsconvenor.wa.gov.au).

## Consideration

By way of background, it is noted that Works Approval W5391/2013/1 relates to the Volatile Organic Compound (VOC) emissions reduction project, which aims to achieve a reduction in VOCs that equates to at least 1.5 times the amount of VOC emissions attributed to a production increase to 2.8 million tonnes per annum. The proponent has advised that this will be achieved by reducing the Aggregate Calciner Priority VOC licenced emissions by constructing a gas handling system to redirect the Calciner 1-3 vacuum pump discharge emissions stream from the Low Volume Vent (LVV) into the combustion zone of the existing Calciners 1, 2 and 3, though the D8 ducts, instead of venting to the atmosphere.

It is understood that redirecting the vacuum pump discharge stream through the combustion zones of the furnaces, the VOCs from the vacuum pump discharge will be thermally oxidised thereby reducing the VOC emissions footprint of the Refinery.

The DER advised that the licensing and measurement of emissions from the Calciner 4 LVV are not related to the VOC reduction project. The DER noted that the proponent was issued with Works Approval 02217 on 14 January 1998 for the construction of Calciner 4, a gas turbine and waste heat boiler for the power station and residue handling upgrades. In this regard, the DER advised that Calciners 1, 2, 3 and 4 are all monitored in accordance with the conditions of Licence L6217/1983/15. The DER also advised that Calciner 4 stack emissions and its two LVVs stack emissions are not within the scope of the VOC reduction project. The omission of Calciner 4 and other sources from the VOC reduction project in relation to Works Approval W5391/2013/1 were considered in the Appeals Convenor's report for Appeal Numbers 028-063/13. The Minister for Environment dismissed these appeals in January 2014.

In relation to emissions from the 50B tank vent, the DER advised that condensate discharge from this tank vent is channelled through the Calciner 1-3 LVV and that the VOC reduction project the subject of the Works Approval W5391/2013/1 will not change this discharge process. Appendix B of the Works Approval W5391/2013/1 decision document depicts this process. The DER noted that quarterly sampling of C1-3 LVV is a requirement of the existing conditions of Licence L6217/1983/15, and will be tested during the VOC reduction project verification monitoring, as required by the conditions of the amended works approval. The DER added that quarterly sampling will be an ongoing requirement of Licence L6217/1983/15 after completion of the VOC reduction project.

The proponent advised that a revised test method has been presented in relation to testing the 50B tank vent, as part of the works approval supporting information for the LVVs. It is noted that Section 5.2 of the supporting information states:

Due to the redirection of flow for the LVV vent, the current sampling methodology for the LVV will not be valid post project implementation. The air flow entering the LVV stack post project will be from the 50B condensate tank and filter hoods. The air flow will be reduced significantly to the point where velocity measurements are expected to be below the reportable detection limit of the test method. Consultation has been undertaken with Emission Testing Consultants, who have proposed new methodology for testing that will maintain Australian Standards compliance. This methodology was discussed with the (then) DEC representatives on 9th November 2012.

The proponent noted that this methodology, which explains how the VOC emission rate can then be calculated from the measured concentration and flow rates, was presented in Appendix K of the supporting information and was accepted by the DER.

With regard to the submission that the emissions inventory should be updated, it is noted that this matter was considered in detail in the Appeals Convenor's report for Appeal Numbers

372-426 of 2013. That is, the proponent's VOC/Odour Monitoring and Modelling Plan (VOC and Odour MMP) will:

[R]eview the Wagerup emissions inventory to ensure all significant sources of VOC & odour emissions in the southern part of the refinery have been included (e.g. an emissions source workshop to be held with refinery process experts and air emissions specialists). Update the Emissions inventory to include any additional sources that are identified.

It is noted that under this item, the proponent must provide a copy of the revised emissions inventory to the DER.

It is also noted, as advised by the DER that the VOC and Odour MMP is unrelated to the amended works approval and instead forms a separate commitment by the proponent to implement a VOC and odour management plan. The DER noted that the proponent has advised it intends to update the Wagerup Air Emissions Inventory with monitoring data from the VOC reduction project.

With regard to the appellants' submission that mercury and organo-mercury compounds should be included in the Calciner Priority emissions, the DER advised that the commissioning of the air emissions monitoring program specified in Condition 3.2.2 of the amended works approval replicates the monitoring program specified in the conditions of Licence L6217/1983/15. The DER advised that this program does not include monitoring of mercury or organo-mercury compounds. The DER submitted that this was justified based on an understanding of the proponent's investigations, monitoring, and verification of changes to mercury emissions throughout the Refinery from the recommissioning of the oxalate kiln assessed by the then DEC in 2009 (Works Approval W4587/2009/1). It is understood that the oxalate kiln now operates in accordance with Licence L6217/1983/15, including conditions for a mercury control system. The DER advised that it was unnecessary to assess mercury emissions from calcination related to the VOC reduction project and it would not expect any change to total mercury emissions.

In this regard, the proponent advised the following in respect to mercury emissions:

Mercury emissions from Calcination originate from the trace levels of mercury contained in/on hydrate. When Calcined at high temperatures, the mercury is volatilised and released as an emission from the Calciner stack. For quantifying mercury emissions from Calcination, mercury on hydrate analysis is used due to 100% of the mercury on hydrate being released when exposed to Calcination conditions. This method of quantification is considered more representative/accurate when compared to traditional stack sampling methodologies and is an analysis conducted regularly on site. These results are used in the reporting of mercury for the National Pollutant Inventory.

The LVV mercury emission rates are low when compared to the Calciners. Regardless of the small contribution from the LVV, the VOC reduction project is based on routing these LVV emissions through the Calciners. This will result in a change in point source mercury emissions in Calcination, but will not change the absolute emission rate.

The chemical form of the mercury released in Calcination was measured in the Wagerup mercury survey conducted in 2002. This study demonstrated that under Calcination conditions the mercury is predominantly emitted as elemental mercury (97% of the mercury was quantified as being in the elemental form, with the remaining 3% measured as particulates). Speciation for ionic mercury was below the method detection limit. Therefore, it is expected that the mercury routed from the LVV will remain in the elemental form under Calcination conditions.

The proponent noted that mercury is already analysed as part of the standard processes, and that the mercury is predominantly in the elemental form and not classified as a VOC.

In considering the above, it is noted that the amended Works Approval W5391/2013/1 relates specifically to the VOC reduction project for four air emission point sources (Calciners 1, 2

and 3, and C1-3 LVV). It is understood that these air emission point sources are already monitored and regulated under the proponent's existing licence, and that air emissions from other sources are unaffected by the VOC reduction project. It is also noted that the actual VOC reduction will be calculated from real time monitoring data during the commissioning and is based on aggregate priority VOC emissions, as defined in Licence L6217/1983/15.

The DER's advice in respect to emissions from the 50B tank vent is also noted, and that quarterly sampling of the C1-3 LVV will be an ongoing requirement of Licence L6217/1983/15 after completion of the VOC reduction project.

Taking into account the information presented, it is recommended that this ground of appeal be dismissed.

## **GROUND 2 – MONITORING OF EMISSIONS**

By this ground of appeal, appellants queried how the DER will determine reductions in emissions and how the results will be verified. Appellants were also concerned that the three-step proposal implementation introduced under the amended works approval will allow monitoring results to be manipulated.

### **Consideration**

It is understood that the VOC Reduction Project is a targeted project for the redirection of air emissions from the Calciner 1-3 LVV into the combustion zone of Calculiners 1, 2 or 3 for the destruction of VOCs. The DER advised that only air emissions from these sources are affected by these works. The DER noted that all other air emission points, including Calciner 4, the cooling towers, 25A tank vents and LVV 4, are unaffected and not within the scope of amended Works Approval W5391/2013/1.

It is noted that 'verification of emissions' was an appeal ground addressed in the Appeals Convenor's report for Appeal Numbers 028-063 of 2013. In this report, the DER advised that it would review the data and findings presented in the commissioning report required by clause 5.1.3 of Works Approval W5391/2013/1. Under the amended works approval, it is noted that the proponent must submit a commissioning report to the DER within three months of the completion of all commissioning.

In its advice on the current appeals, the DER also noted that the commissioning report must include results of any monitoring required by the works approval conditions and that the report will be reviewed by the Department. It is noted that the report must also comply with clause 3 of amended Works Approval W5391/2013/1 on 'Monitoring', which contains conditions for record keeping, calibration of monitoring equipment and reference to sampling methods to ensure all monitoring undertaken is reliable and accurate.

In relation to the introduction of the three-step proposal implementation, the DER noted that the proponent provided options for air emission verification including a staged approach to be conducted as Calciner 1 (July), Calciner 2 (August) and Calciner 3 (September) were incorporated to the existing works approval. The DER advised that it was satisfied that a staged approach to Calciner commissioning and monitoring would not impact on the proponent's ability to use the data to calculate the post-commissioning VOC reduction.

As part of its reasoning, the DER noted that the proponent submitted the Air Emissions Verification Plan (AEVP), as required in Appendix A of the DER's decision document for amended Works Approval W5391/2013/1.

It is noted that the AEVP requires the proponent to test emissions from Calciners 1-3 in the following way:

- "Sample 4 times over a period of 8 weeks, each run to be a minimum of 5 days apart.
- For each run, sample all Calciner stacks and the LVV stack in duplicate.
- For each run, all Calciners will be sampled pre and post VOC system running.
- Each run will take 2 days to complete due to the quantity of sampling required"

Under the AEVP, it is also specified that '[a]lthough Calciner 4 is not being connected to this system, it will still require sampling as per the compliance monitoring program to determine its updated emission factor'.

The DER advised that it has reviewed the AEVP and found that the results of the VOC reduction project comply with the specifications in condition 3.2.2 of amended Works Approval W5391/2013/1. Specifically, the DER noted that it is satisfied the AEVP provides an adequately detailed methodology for verifying VOC emission reductions through the staged commissioning process.

Overall, it is noted that the scope of amendments to Works Approval W5391/2013/1 is relatively limited, as outlined in the background to this report, and that the DER has commenced its review of the proponent's commitments under amended Works Approval W5391/2013/1.

It is further considered that the DER was justified in its decision to amend Works Approval W5391/2013/1 to allow a staged commissioning of the VOC reduction project. It is therefore recommended that this ground of appeal be dismissed.

## **OTHER MATTERS**

A number of issues were raised in appeals that are not considered to be appeal grounds in the context of this investigation, as the issues do not relate to amendments to Works Approval W5391/2013/1. It is noted however that a number of these issues were broadly covered in the Appeals Convenor's reports for Appeal Numbers 315-323 of 2012; 028-063 of 2013; and 372-426 of 2013, and these reports may be consulted for further information.

In respect to queries relating to an alternative location for monitoring the LVV, the DER advised that this relates to monitoring locations labelled "A1" and "AM1" on the "Diagram of Air Monitoring Locations" in Schedule 1 of amended Works Approval W5391/2013/1. While it is noted that this was not amended, and therefore not been considered in the context of these appeals, the DER provided the following advice which is included for information only.

Monitoring location "AM1" is a proposed new location for air flow measurements during commissioning of the VOC reduction project and will be included in the licence post-commissioning. Monitoring location "A1" is an existing monitoring location for C1-3 LVV that will be used to monitor all other parameters except air flow measurements during commissioning and post-commissioning. DER refers to Appendix A; Section 1 (page 13) of the decision document supporting the amendment works approval where it states:

*“Due to the redirection of flow from the LVV, the current sampling methodology for the LVV will not be valid post project implementation. Alcoa included correspondence from Emissions Testing Consultants (ETC) dated 7/11/2012 as part of its works approval application to support a modified sampling approach. The outcome involves sampling air velocity from a new point close to the 50B condensate while retaining the existing LVV stack exit point for VOC concentration measurements. DER will need to reflect this in the amended licence once commissioning has been completed.”*

As 50B condensate will be the only remaining source for the C1-3 LVV stack post-VOC reduction project, the air flow will be reduced significantly where velocity measurements are expected to be below the reportable detection limit of the test method at the existing sample point. This will be resolved through a new monitoring location (“AM1”) for air flow measurements close to 50B condensate. Given the moisture burden of air stream from 50B condensate, it is appropriate to retain monitoring location “A1” for all other parameters.

For post-commissioning licence changes, refer to the Department's comments on page 14 and 15 of Appendix A; Section 1 of the decision document:

*“The amendments to the licence post-commissioning will reflect that air flow measurements (velocity, temperature, moisture and static pressure) will be taken at a new sample location from the 50B condensate. The existing LVV stack monitoring location will be retained for other parameters including VOC's.”*

## **RECOMMENDATION**

Taking into account the information presented during the appeal investigation and as detailed in this report, it is considered the DER was justified in amending conditions of Works Approval W5391/2013/1. It is therefore recommended that the appeals be dismissed.

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APPEALS CONVENOR

**Investigated by:**  
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