EXPERT PEER REVIEW of the *Revised Pinjarra Refinery Health Risk Screening Assessment* (ENVIRON, December 2014)

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SCOPE

To provide independent expert peer-review of the *Revised Pinjarra Refinery Health Risk Screening Assessment* (ENVIRON, December 2014). The review is in the form of desktop review, reporting on the soundness of the analysis performed and conclusions reached on the basis of the information presented, in order to assist the EPA in its consideration of Alcoa's application to increase production at the refinery.

In addition to the reviewing this document, the review makes reference, when appropriate, to the original (2008) assessment, which for completeness has been revisited.

For simplicity, the *Revised Pinjarra Refinery Health Risk Screening Assessment* (ENVIRON, December 2014) will be referred to herein as the "HRA".

LIMITATIONS

In providing a high-order desktop review, the reviewer has not checked the original data sources, calculations, or modeling; these are taken as accurate for the purpose of assessing the public health risk posed by the proposed increase in production at the refinery.

FINDINGS

1. **Completeness of HRA**

   The HRA is a comprehensive and professionally presented document. Data have been included from a range of receptor locations that remain unchanged from the original (2008) screening assessment, and the accuracy of and confidence in these data has improved as a result of what is now a longer available time series of air quality sampling. The

results of this monitoring have been compared to the best available environmental guideline values for health risk assessment purposes, such as those of the WHO and US EPA. For acute and chronic non-carcinogenic health effects, hazard indices (HI) have been calculated, and for carcinogenic substances incremental carcinogenic risks (ICR) have been calculated. The HIs and ICRs have been interpreted using standard approaches, and when options have been available in this context, the conservative (health protective) options have been selected (eg ICR $1/10^{-6}$). The work is heavily supported by data tables and figures, allowing the interpretations to be checked for completeness and accuracy.

The HRA considers only inhalational exposure, and does not include data for potential ingestion, transdermal absorption, or other routes of potential indirect exposure. Such exposure pathways are likely to be trivial in comparison to inhalational exposure, and the reviewer supports their omission for the purposes of a screening assessment. Further, the very conservative (health protective) approach used in assessing potential inhalational exposure means that even if alternative pathways were contributing to the total exposure, it is likely that levels of exposure would still be well within the guidelines summarised in Table A10. Nevertheless, in guise of community reassurance, it could be a worthwhile exercise for Alcoa to support a small research project examining the magnitude of, for example, soil and surface deposition of chemicals in selected areas.

2. Suitability and appropriateness of collected data for HRA

The HRA provides clear data tables, based on comprehensive sampling from a range of receptor locations coupled with rigorous modeling. In comparing these HRA data to the original (2008) assessment, it is a strength of the current data set that it has been strengthened by several years of collection, allowing confidence intervals to be narrowed, and estimates consolidated. Data relevant to potential non-inhalational exposure have not been included, but it is very unlikely that their inclusion would have altered the conclusions reached, as discussed above.

3. Suitability and appropriateness of analysis and interpretation of these data for HRA

The monitoring results have been compared to the best available environmental guideline values for health risk assessment, and HIs and ICRs have been calculated and interpreted using standard approaches. Since the original HRA (2008), changes to the health protective guidelines have been published, and these new values have been taken

into account in the analysis. It is a strength of the HRA that results are presented in a way that allows a comparison of HIs using both the old and the new guidelines (Scenarios 1 and 1A), and despite the fact that several new guideline values are an order of magnitude lower than the old ones (eg. nickel and benzene), the conclusions of the original 2008 assessment remain unaltered.

Another change relevant to the analysis and interpretation of the data presented is the use of '9th highest concentration' rather than the predicted maximum at each receptor, and this approach reduces the level of conservatism in the interpretation. However, the previously used approach is overly conservative for the purposes of a screening assessment, with a significant safety margin already built in to both the guideline values and the additive way in which HIs are calculated. Taken together, the use of the new guideline values and adjusted exposure assessment provide a more accurate reflection of the potential public health risk.

4. **Accuracy of the conclusions reached** in relation to the predicted potential impacts on neighbours and other persons in the vicinity of the refinery (not including those working within the facility).

   Although it is not the intention that a health risk screening assessment should attempt to estimate actual health impacts, it is clear from the data provided that if such an exercise were to be carried out, the risk of any increase in community disease burden resulting from the proposed increase in production would be negligible. It could in fact be argued that from a population health perspective, the risk of any impact on community health would be reduced (since the majority of the local population resides in the area of Receptor 4, which is associated with a predicted improvement in ambient air quality). The reviewer therefore has no concerns that the proposed increase in production at the Pinjarra Refinery would pose any risk to local residents, and supports the conclusions reached in the HRA.

CONCLUSION

The *Revised Pinjarra Refinery Health Risk Screening Assessment* (ENVIRON, December 2014) provides a sound breadth and depth of data and analysis upon which solid conclusions can be based. The present review supports the conclusion that an increase in production at the Pinjarra Refinery as proposed would not pose any public health risk to local residents.