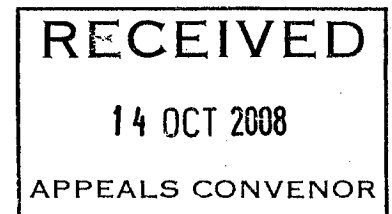


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Department of Environment and Conservation

Director: Alan Sands, A/Director, 6467 5381
Office of Origin: Environmental Regulation Division
Your Reference: 161-08
Our Reference: MINE3002/08 - A West



MINISTER FOR ENVIRONMENT

ATTENTION: APPEALS CONVENOR

LICENCE / WORKS APPROVAL – APPEAL REPORT

APPEAL NO: 161-08
AGAINST: Conditions of Licence
APPELLANT: Alcoa World Alumina Australia
LICENSEE / WORKS APPROVAL HOLDER: Alcoa World Alumina Australia
Wagerup Refinery
PO Box 84
WAROONA WA 6215
LICENCE / WORKS APPROVAL / PREMISES / NUMBER: 6217/12
NAME OF OFFICER PREPARING REPORT: Adam West
CONTACT NUMBER: 08 9411 1705

I refer to your request dated 2 September 2008 under Section 106(1)(b) of the *Environmental Protection Act 1986* for my report on the above appeal.

Background

The Alcoa Wagerup Alumina Refinery is located on the Swan Coastal Plain immediately within the western aspect of the Darling Scarp. Bauxite is transported to the Wagerup refinery via a conveyor from the Willowdale mine site, located 25 kilometres away. The refinery operates around the clock and currently has a licensed output of 2.6 million tonnes of alumina per annum. The refinery has operated in this location since 1982 and Alcoa predicts that it will remain in the area for a further 40-80 years.

In its application for renewal of the Alcoa Wagerup Refinery environmental licence, the company requested 11 amendments, six of which were appealed and dismissed in 2007. The Department of Environment and Conservation (DEC) considers some of the requested amendments would not promote emission reductions, as stated in Alcoa's letter to the Appeals Convenor dated 1 September 2008, rather they would allow for increased emissions from the refinery.

The four conditions appealed in licence 6217/12 were appealed in 2007 and dismissed. The former Minister for the Environment noted that a detailed discussion should occur between Alcoa, the Wagerup Tripartite Group (WTG) and DEC to try and improve the conditions, if possible. This has not yet taken place, as Alcoa has not provided details to the WTG in order for technical discussions to occur.

At the WTG meeting held in May 2008, Alcoa requested 11 amendments as part of the licence renewal process. The amendment request included six conditions that were appealed in 2007 and dismissed. The amendment requests included the same information that was presented to the WTG in 2007.

DEC presented its rationale for accepting or rejecting Alcoa's amendment requests to the WTG at its July 2008 meeting. Community members were supportive of DEC's approach and were critical of Alcoa's amendment requests. Specifically, the WTG was unhappy with the pattern of last minute amendment requests with little information being provided by Alcoa. This was captured in the minutes of the WTG's July meeting as below:

"There was general discussion and some expression of frustration from community members of the lack of time available to digest the information being presented by Alcoa. Community members acknowledged that Alcoa and DEC had tried to organise earlier meeting times.

It was generally supported that there needed to be a more organised meeting schedule moving forward with detailed discussion about licence changes and the Environmental Improvement Plans being a major focus of these discussions."

It should be noted that DEC supported, in principle, amendments for three of the four appealed conditions. As stated in the 6217/11 appeal report, DEC is prepared to amend three of the appealed conditions. However, these three conditions are unable to be amended until further technical details are provided by Alcoa. DEC requires this information to make an assessment of Alcoa's emissions and discharges and to determine appropriate conditions to place on the Wagerup Refinery licence. At this stage, despite several requests from DEC, Alcoa is yet to provide this information.

DEC is currently reviewing all three Alcoa Refinery licences to ensure consistent conditions are applied wherever possible. Air emissions are the first to be reviewed as they are considered the most significant emission from the refinery. The first part of the air emissions review is targeting liquor burning and oxalate kiln emissions as they are similar in nature, pollution control equipment and emissions profiles.

DEC has contacted Alcoa to organise a site visit to gain a better understanding of the operations and controls of the liquor burners and oxalate kiln. It is anticipated that discussions will then occur between DEC and Alcoa as to the information required to be included in an Environmental Assessment Report to determine appropriate conditions for this equipment. DEC has requested that this information be provided prior to the site visit and meeting, so that a detailed technical discussion can occur.

The appeal is based on the following grounds.

1. Ground:

The aggregate liquor burner priority volatile organic compounds (VOC) limit in Condition A2(a) fails to acknowledge the fact that the regenerative thermal oxidiser represents industry best practice pollution control equipment and, as such, represents an unjustified restriction to production and should be removed from the licence.

Advice:

Daily VOC emissions from the liquor burning facility (LBF) are calculated by multiplying the average daily exhaust stack flowrate (Nm^3/h , Dry) from the LBF by the VOC emission factor of $6 \text{ mg}/\text{Nm}^3$, dry. The factor has been derived from analysis of historic LBF emission data.

DEC is aware that since the regenerative thermal oxidiser (RTO) was installed on the LBF, VOC emissions have been reduced by approximately 93% and the LBF now contributes approximately 0.3% of the total VOC emissions from the refinery.

As part of the 6217/11 appeal report, DEC stated that "DEC intends to amend the licence by removing VOC limits for the liquor burner and replace them with the current NOx limit of 350mg/m³ in Condition A14, as well as new conditions relating to the operation of the RTO. DEC intended to make these changes in the new licence (6217/11) but was not able to consider information provided by Alcoa in time to do this. These amendments are intended to be applied once Alcoa has provided additional information which was requested and an environmental assessment report is completed."

To this date the information provided by Alcoa is not sufficient for DEC to make an adequate assessment of Alcoa's LBF operations. The last request made by DEC was sent to Alcoa on 1 August 2008, and a response is yet to be received.

As noted by the Minister in the 6217/11 appeal report, DEC intends to amend the licence conditions for the liquor burner. DEC is not prepared to remove the VOC limits for the liquor burner, however, without replacing them with new conditions relating to the operation of the RTO. Currently, DEC does not have sufficient details from Alcoa on the LBF operations in order to make these changes.

DEC agrees that the RTO installed on the LBF is generally accepted as being best practice pollution control equipment. However, it is essential there are appropriate controls on this equipment in the licence to ensure that all reasonable and practicable measures are taken to prevent or minimise emissions from this facility. DEC intends to place appropriate targets with management actions in the licence as per DEC's Limits and Targets Policy, which states:

"A target is:

- an emission level or ambient criteria that should be met most of the time;
- based on capability of available technology, or best practice;
- a trigger for management response if an expected level of performance is not achieved (such that failure to implement a required management response triggers enforcement."

It should be noted that failure to operate the LBF and RTO to best practice techniques could potentially result in increased emissions of odour, VOCs, CO, NOx and particulates.

On 8 July 2008, Alcoa submitted proposed changes to the LBF conditions to DEC and these have been included in the appeal. DEC reviewed the proposed changes and, on 1 August 2008, requested that Alcoa justify some of its supporting statements and provide further details on other operational parameters, including how it manages specific emissions. The comments are detailed below.

Feed to the liquor burner will be ceased immediately should the RTO temperature fall to below 750°C for greater than 120 consecutive minutes

DEC understands that the RTO operating temperature is the critical indicator of VOC destruction efficiency. DEC requested that Alcoa justify why the operational target is set at 850°C (ie. what level of VOC destruction efficiency occurs at 850°C) and provide details as to how setting the minimum operating temperature of 750°C does not significantly affect VOC destruction efficiency (ie. what level of VOC destruction efficiency occurs at 750°C).

DEC has requested details on the length of time it takes to safely cease feed to the LBF at Wagerup. The 120 minute period proposed by Alcoa is intended to allow sufficient troubleshooting time to resolve the RTO temperature loss and permit a safe controlled shutdown. There is concern that, during this period, there is the potential for increased odour and VOC emissions from the LBF. The levels during this period need to be quantified and assessed to ensure they are acceptable, and the condition reflects best practice operation of this equipment.

As part of discussions about the Alcoa Kwinana licence reissue, and an investigation into a breach of condition A13 of Kwinana licence 5245/10 (the same condition proposed by Alcoa for Wagerup), Alcoa stated that it is unable to safely cease feed to the Kwinana LBF within the 120 minute period. Limited details were provided to DEC two weeks prior to reissue of the Kwinana licence, and an amendment to this condition was not sufficiently justified. This contradicts the Kwinana LBF internal procedures, which require feed to be ceased in 90 minutes.

However, these details will be discussed as part of the licence review across the three sites and need to be resolved prior to making any amendments to LBF conditions. It would not be appropriate to amend a licence condition to require an unachievable management response.

Alcoa will continuously monitor and log the temperature within the RTO to ensure the required temperature is achieved and maintained, except for recognised exemption events

This proposed condition is different from condition A13(b) in the Kwinana licence 5245/10. DEC has requested information as to how Alcoa will manage LBF emissions if the only proposed online monitoring control (temperature) is unavailable. DEC has requested that Alcoa provide its current operating procedures for the LBF and the operating strategy mentioned in its proposed LBF condition changes submission of 8 July 2008. At this stage, exemption events have not been proposed by Alcoa and are not included in the Kwinana licence.

DEC is concerned that, if the one operational control measure proposed by Alcoa is unavailable, Alcoa would be unable to demonstrate it has adequate control of its LBF emissions. On 1 August 2008, DEC requested that Alcoa provide details of its proposed management of emissions from the LBF, when temperature monitoring is unavailable. This information is yet to be received by DEC.

DEC understands that there are other measures available for monitoring the effectiveness of VOC destruction, such as CO monitoring, which is discussed further below.

Alcoa will immediately shut off feed to the liquor burner kiln if the RTO has been bypassed for greater than 120 consecutive minutes

It should be noted that bypassing the RTO would result in significantly increased emissions from the LBF, as emissions would no longer be treated by the new best practice pollution control equipment (the RTO). Events of this type are expected to be infrequent, however, they are of significant concern to DEC and the community.

DEC agrees with the principle of allowing a short period of troubleshooting while the LBF is being brought offline in a controlled manner. This period should include a focus on minimising the emissions where practicable and will be captured in the new licence conditions. In this instance, it may be appropriate to require shutdown in a timeframe shorter than the 120 minutes allowed for a below-target temperature event, as there is no destruction of VOCs by the RTO. This is compared to the below target temperature RTO event mentioned previously, where there would still be some (yet to be quantified) destruction of VOCs.

As stated earlier, DEC has requested information as to how long it would take to safely cease feed to the LBF at Wagerup. This is essential information as Alcoa Kwinana has recently advised DEC that it is unable to meet the 120 minute time frame. It would not be appropriate to amend a licence condition to require a management action that Alcoa would be unable to achieve.

Alcoa will continuously monitor and log the concentration of CO within the RTO stack, except for recognised exemption events

Alcoa Kwinana has previously provided information to DEC in the Kwinana Liquor Burner Emissions Reduction Project Environmental Referral (19 January 2005) that CO monitoring is used to confirm VOC destruction efficiency. The referral states:

"Monitoring conducted by Worsley during the commissioning and operation of its liquor burner has found that the carbon monoxide destruction efficiency is a good indicator of the VOC destruction efficiency. As such, Alcoa intends to install and operate continuous carbon monoxide emission monitoring equipment to enable it to continually monitor the performance of the RTO."

This is supported by comments in the Pinjarra Efficiency Upgrade, Performance Verification Report for the Oxalate Kiln Scrubber and RTO (January 2008) which states:

"CO destruction was also determined by measuring the CO concentrations on the inlet and outlet of the RTO. This provides good confirmation of VOC destruction capability, because the self ignition temperature of CO is higher than any of the VOC's expected, and so VOC's are more readily reacted than CO. CO is also present at higher concentrations in the inlet to the RTO than are the VOC's, and so can be measured more readily."

CO monitors, located before and after the RTO, are currently in place on the Pinjarra oxalate kiln and Kwinana LBF to determine CO destruction efficiency, which is a surrogate for VOC destruction efficiency. However, this is not yet captured in its licence conditions.

DEC believes it is appropriate to have multiple monitoring systems in place where practical, to ensure emissions are minimised and confirm the accuracy of other monitoring systems. Without CO monitoring and appropriate targets and management actions in place, it would be appropriate to require the LBF to be shut down if the temperature monitors are not operational.

It is noted that Alcoa is providing conflicting information to DEC regarding CO monitoring. In the grounds of appeal, Alcoa states that CO monitoring is conducted to identify potentially explosive atmospheres rather than for environmental reasons. This is not in line with previous statements made by Alcoa in referral documents referenced above.

Alcoa has stated in appeal grounds supporting information that CO levels can increase significantly during temperature variation. DEC considers this is the type of event which requires appropriate conditions to ensure emissions are minimised during these events. DEC has requested that Alcoa justify its statement that a high CO concentration does not necessarily represent a poor VOC destruction efficiency, if the CO load to the RTO is significantly elevated. DEC also considers that, with the two CO monitors before and after the RTO, it is possible (and currently used on the Pinjarra Oxalate Kiln RTO and Kwinana LBF RTO) to determine CO destruction efficiency and therefore demonstrate VOC destruction.

The details surrounding recognised exemption events of CO monitoring have not been provided to, or discussed with, DEC. DEC understands that with the new best practice pollution control equipment in place, LBF emissions are acceptable when the operations are normal. However, it is the periods of upset conditions which are of concern where emissions are potentially elevated. DEC proposes to set licence conditions relating to the management of these events to minimise emissions where practicable.

Other areas of concern with LBF operations are NOx and particulate emissions. DEC has requested details from Alcoa as to how particulate emissions are managed and controlled from the LBF and the design capabilities of the LBF for particulates and NOx. DEC proposes to include conditions in the licence relating to the management of NOx and particulate emissions.

Condition A12 of the Alcoa Kwinana licence 5245/10 relates to a target for particulates which, following an exceedance event at Alcoa Kwinana on 16-19 December 2007, is no longer considered appropriate in its current form. During this event, the particulate target was exceeded by approximately 30 times the target level, which is believed to have occurred over a period of approximately four days. The average of the two stack samples taken on 19 December 2007 was 632mg/m³. This event began when the LBF was restarted on 16 December 2007 and it is likely therefore that emissions for the following three days were similar, or potentially higher than those measured on 19 December 2007. Putting this event into context, the calciner particulate limit at Wagerup is 80mg/m³ and LBF particulate emissions are believed to have greater environmental and health effects than calciner particulates.

As a result of investigations into the Kwinana incident, it appears the particulate emissions were rust from the inside of the stack. The elevated rust particulate emissions may not be as environmentally hazardous as sodium aluminate (standard LBF particulate emission). However, they are still considered to be high levels of particulate air emissions that were avoidable in this instance. The National Environment Protection Measures Guideline for Ambient Air Quality refers to particulates in general and does not differentiate between inert and potentially hazardous particulates.

It should be noted that, historically, the Wagerup LBF is considered to be the major source of community health and odour complaints. Previous operation of the LBF without appropriate pollution control equipment is considered to be partly responsible for community issues present in the Wagerup area today.

In summary, if all the information required to make an adequate assessment is provided by Alcoa, and is deemed acceptable, DEC will include it as part of an Environmental Assessment Report (EAR), present it to the WTG and make the amendments to the environmental protection licences for the three sites.

Recommendation:

That this ground of appeal be dismissed. Alcoa should be required to provide the information requested by DEC and have detailed technical discussions with DEC and the WTG. Once this occurs, DEC will finalise an EAR and determine the appropriate conditions to be placed on the Wagerup Refinery licence as soon as is practicable.

2. Ground:

Condition A4 is ambiguous and should be removed from the licence.

Advice:

Condition A4 was previously appealed as part of the 6217/11 appeals report and was dismissed by the former Minister for the Environment. No new information has been presented to the WTG or DEC by Alcoa, however, DEC was able to demonstrate the rationale behind inclusion of this licence condition to the WTG at its July 2008 meeting.

As part of the 6217/11 appeals report, DEC provided the following advice to the Appeals Convenor:

"There are many different tools available to DEC to determine if visible dust identified as crossing the boundary is a result of Alcoa's operations. Dust has been shown to be as a result of bush fires in the area on 23 January 2006 through photos and witness statements. Smoke is easily identified by its colour and smell. Dust from ploughing and general agricultural activities from surrounding properties can also be identified through photographic evidence as well as looking at HiVol and tapered element oscillating microbalances (TEOM) monitoring data in comparison with meteorological conditions at the time. Dust can be shown to originate from operations other than Alcoa's by their monitors showing high levels of dust upwind of the Wagerup Refinery and Residue Disposal Area's (RDA's) as well as the monitors down wind from these locations. If dust is generated from Alcoa's operations the monitors downwind of Alcoa's operations would likely register significantly higher readings than those of the upwind monitors.

DEC does believe that there is adequate monitoring of dust around the refinery, however not all of the monitors are required through licence conditions. The monitoring system includes five licenced HiVol samplers which have a limit of "260ug/m3 never to be exceeded once background corrected", in Condition A14 of the current Wagerup Refinery licence 6217/11. There are also four unlicenced TEOM monitors which provide six minute averaged real time data to Alcoa to assist in dust management of its RDA's. The TEOM's are located much closer to the RDA's and do not provide an accurate representation of ambient dust levels. However, the TEOM's can accurately display short term spikes in dust levels which, through comparison with data from the other TEOM's, can determine whether the dust is a result of Alcoa's operations.

DEC understands that it is not practical to have blanket coverage of HiVol samplers surrounding the RDA's to quantitatively determine levels of ambient dust. This has been of concern to local residents and subject to numerous appeals in the past. DEC acknowledges that dust events, although rare, may blow in directions where there are not any licenced HiVol monitors. It is unlikely that the current number of monitoring locations would fail to detect poor dust management practices from Alcoa's operations over an annual period. However, Condition A4 allows for an added layer of protection against short term dust pollution events and is similar to requirements in Regulation 6 of the Environmental Protection (Abrasive Blasting) Regulations 1998."

Abrasive Blasting in the open

"An operator must not carry on abrasive blasting in the open unless it is carried on in such a manner that no visible dust escapes from the premises at which the blasting is carried on (or if there are no defined boundaries to the premises, no such dust escapes onto any place to which the public has access)."

Alcoa has stated numerous times at WTG meetings that it would like the condition removed to reduce the risk of prosecution for a breach of licence. DEC does not consider this is a valid reason for removing a condition. This was also supported by the Appeals Convenor's Report to the former Minister which stated: *"Enforcement and compliance with conditions of the licence is a matter for the DEC as the regulator and issues of this nature are considered to be outside the scope of an appeal against a licence."*

As part of the licence reissue, DEC detailed the information previously provided to the Appeals Convenor to the WTG.

In response to Alcoa's point 3 in the 6217/12 ground of appeal, DEC provides the following comments:

- DEC considers the condition is related to the environmental risk of short term highly alkaline dust pollution events.
- Not all conditions in an environmental protection licence relate directly to environmental or health risk, e.g. annual reporting conditions and stack sampling requirements. DEC considers that Alcoa has not provided a valid reason for removing the condition.
- In Bulletin 1215 the Environmental Protection Authority (EPA) noted that the Wagerup 3 Health Risk Assessment (HRA) "... indicates that emissions from the refinery should not present an abnormal public health risk for the general community, irritation and other health symptoms may occur from exposure to ground level concentrations over shorter periods such as 3 – 10 minutes, particularly for members of the community who are sensitive to chemicals." As a result, the Ministerial Statement required that the air dispersion model, which was used for the HRA, be validated prior to the issue of a works approval for the expansion.

As part of the current licence review process for the three refineries, there is the potential to discuss development of an alternative condition that protects against short-term dust pollution events, including a detailed review of the modelling inputs. DEC discussed the possibility of including TEOMs in the licence, with limits, at the WTG meeting. DEC is not prepared to remove condition A4 unless it is replaced with a condition that protects against short-term dust pollution events.

Recommendation:

That this ground of appeal be dismissed. Visible dust may come from many sources around the refinery. However, with the availability of different types of scientific monitoring equipment, witness statements and photographic or video evidence, DEC can determine if the dust originated as a result of Alcoa's operations. Condition A4 provides an added layer of protection against short-term dust pollution events, and is similar to requirements in Regulation 6 of the Environmental Protection (Abrasive Blasting) Regulations 1998. DEC is not prepared to remove condition A4 unless it is replaced with a condition that protects against short-term dust pollution events.

3. Ground:

Condition A7 could create an environmental risk and the wording should be modified to allow for a controlled shutdown.

Advice:

This condition was previously appealed as part of Alcoa's appeals on the 6217/11 licence and was dismissed by the former Minister. The following advice was provided to the Appeals Convenor:

"Condition A7 has been in the Wagerup Refinery licence for a number of years in which Alcoa has been able to comply with the intent of the condition. The condition does not specifically require an instantaneous shutdown of liquor feed to the kiln. DEC has had several meetings with Alcoa regarding licence conditions relating to liquor burning and is intending to amend these conditions. DEC intends to amend these conditions to match Conditions A13 and A14 in the Alcoa Kwinana Refinery's Environmental Protection Licence 5245/10. These conditions will be able to be amended once this appeal is determined as noted previously."

As detailed in appeal ground 1, DEC is unable to finalise the conditions without the information requested from Alcoa. DEC is unable to match the Wagerup LBF Conditions with Conditions A12, A13 and A14 in the Alcoa Kwinana Refinery's Environmental Protection Licence 5245/10 as some parts have proven ineffective at minimising emissions from upset conditions from the LBF (e.g. particulate target exceedance of 19 December 2007 mentioned previously). However, conditions A13 and A14 in the Alcoa Kwinana Refinery's Environmental Protection Licence 5245/10 will form a foundation for the Wagerup LBF conditions. The Kwinana LBF conditions will be improved as part of this process and conditions also included in the Pinjarra licence for regulating emissions from the oxalate kiln.

Recommendation:

That this ground of appeal be dismissed. Alcoa should be required to provide the information requested by DEC and have detailed technical discussions with DEC and the WTG. Once this occurs, DEC will finalise an EAR and determine the appropriate conditions to be placed on the Wagerup Refinery licence as soon as is practicable.

4. Ground:

Condition W3(g) refers to water quality limits that are below background levels and the condition should be amended to reflect regional groundwater conditions.

Advice:

This condition was previously appealed as part of Alcoa's appeals on the 6217/11 licence and was dismissed by the former Minister. The following statement formed part of the Minister's determination in relation to Alcoa's appeal on condition W3(a) of licence 6217/11:

"The Minister noted that the purpose of the water monitoring is to detect any seepage from wastewater storage ponds or other parts of the refinery. The proponent may have a case that the guidelines values set are too low for some parameters, thus requiring excessive reporting requirements; however, in the absence of alternative values being put forward for consideration, the Minister couldn't not allow this appeal ground. Further, the Minister considered that this debate should occur between DEC and the company and also involve the WTG, in the first instance."

The water quality guidelines for metals are taken from the livestock watering guidelines given in the Australian Water Quality Guidelines for Fresh and Marine Waters – ANZECC November 2000. Livestock are often watered from groundwater sources and, therefore, these guidelines do refer to groundwater, and not specifically surface water as mentioned in Alcoa's appeal grounds.

Previous comments from a DEC hydrogeologist in 2007 are detailed below:

"The data provided does not provide evidence of groundwater contamination from the refinery site, and may be indicative of natural groundwater quality in the superficial aquifer in the area. However, this assessment is based on a limited dataset, and there may be additional groundwater monitoring data which I have yet to see."

"I have not seen sufficient monitoring data from the refinery or surrounding areas to confirm these results are indicative of natural background values."

"Based on information provided, the current suite of groundwater monitoring parameters is too limited to detect low levels of seepage from wastewater storage ponds or other parts of the refinery. It is recommended that additional parameters are included in the monitoring program."

"Changes to groundwater monitoring requirements in the existing licence should only be made after a comprehensive assessment of all relevant information for the site."

Based on these comments, DEC considers that it has not been provided with sufficient monitoring data from the refinery, or surrounding areas, to confirm these results are indicative of natural background values. Therefore, it is appropriate that monitoring continues and results are reported to DEC if an exceedance of the guideline values occurs. DEC considers that immediate notification is suitable in this circumstance, as it allows for action to be taken to remediate any impact on groundwater close to the time of detection.

Since the last appeals determination on 19 February 2008, Alcoa has not provided DEC with any alternative values for consideration. DEC has progressed issues surrounding the Wagerup licence on a risk-based approach. DEC has focused resources on reviewing air emissions from the refinery, however, as previously mentioned, DEC has not been provided with adequate information from Alcoa. Upon receipt of alternative values provided by Alcoa, DEC will review and consider amending the condition.

Recommendation:

That this ground of appeal be dismissed. Alcoa should to be encouraged to supply alternative values to DEC for consideration and discussion with the WTG.



Keiran McNamara
DIRECTOR GENERAL

14 October 2008

Att