Alcoa of Australia Limited

Noise Management Plan

Huntly and Willowdale Mines

This management plan reflects current operational practices and will be revised to align with the mitigations and outcomes detailed in the Assessment 2253 Environmental Review Document (which is considered to take precedence).

October 2024

1. Scope

This document outlines the management and monitoring actions WA Mining undertakes to ensure regulatory and internal noise standards are met and maintained. For details on those standards, refer to Sustainability & Social Surrounds Overview.

2. Objectives

Noise management at WA Mining is important, not only to meet regulatory requirements but also to maintain Alcoa's social licence to operate within the communities surrounding the operations. Both mine sites are in close proximity to residential properties. It is important for continuity of operations, that any potential noise emissions are minimised and complaints promptly investigated and resolved.

3. Relevant Documents

Environmental Protection (Noise) Regulations 1997

Sustainability & Social Surrounds Overview

Perform Noise Monitoring on Conveyor 371 (WDL)

Blast Monitoring Locations Description (HUN)

Blast Monitoring Locations Description (WDL)

Blasting Techniques Overview (MIN)

Fly Weather Balloon (MIN)

Determine Weather Conditions for Blasting (MIN)

Perform Blast Monitoring Using the B&K 2250 Hand-held Analyser (MIN)

Process for Handling Complaints and Other Community Contacts (MIN)

Perform Operational Noise Complaint Investigation (MIN)

Conducting a Noise Survey on Private Property for Assessment of Environmental Noise (WAO)

Access to Nexus User Manuals within the Nexus System

4. Operational Control

There are two types of noise emissions present at WA Mining; operational noise; and blast noise. Operational noise includes noise generated by the mobile equipment used to develop, mine and rehabilitate pits (such as haul trucks, excavators, loaders, scrapers, dozers, drills, etc.), and fixed plant noise generated by conveyors, crushers and transfer points.

Blast noise is generated during a blast. This is where explosives are set into the ground and fired to release compaction in the soil and rock profile to make it easier to mine out a new pit.

4.1 Blasting

The management of blast noise is important to ensure that the mine's blasting does not impact on noise sensitive premises. It is a legal requirement to ensure that all blasts have noise levels below the Environmental Protection (Noise) Regulations 1997. To maintain compliance and minimise impacts on noise sensitive premises Alcoa has set internal blast noise limits including:

- No blast to exceed 110dB LZ peak in Dwellingup or Yamba; and
- No blast to exceed 115dB LZ peak at any other offsite location.

The internal limits are slightly lower than those required by the Noise Regulations, to reduce the likelihood of having a reportable noise incident occurring.

There are numerous aspects to blasting that have the potential to impact the noise generated by the blast. These are detailed in Blasting Techniques Overview (MIN).

The Noise Regulations stipulate blasting may only take place between 0700hrs and 1800hrs. In addition, Alcoa typically will not blast on Sundays, public holidays and during times that may impact on scheduled community events (for example Return to Hoffman - held annually in November). Similarly, Alcoa has committed to not blasting in locations where noise levels at nearby camping grounds (such as Lane Poole Reserve) are predicted to be greater than 100 dB on:

- Saturdays and Sundays prior to a Monday public holiday and all other public holidays
- Thursday prior to Easter, up to and including Easter Monday
- Christmas Eve, up to and including Boxing Day (24th – 26th December)
- New Year's Eve and New Year's day (31st December – 1st January).

To assess the risk of blast noise the following actions are taken in the lead up to a blasting event:

1. Determine if weather conditions are favourable for blasting. See Determine Weather Conditions for Blasting (MIN). If conditions are unfavourable the blast may be delayed or cancelled.
2. Use the Nexus Blast Module, typically run at approximately 0900hrs, to predict noise levels. You can find the Nexus Blast Module manual located within the Nexus program.

   If the Blast Module does not predict any high noise readings the blast can proceed. If the Blast Module predicts blast noise levels at neighbouring premises exceeding the internal limits, the following should be considered:

   - Run the Blast Module again with other forecast weather data (e.g. later in the day or the following day) and schedule the blast for a time when the Blast Module predicts noise levels below the internal limits;
   - If you find that no weather conditions over time are resulting in predicted noise levels lower than 115 dB at neighbouring premises or 110 dB for Dwellingup and Yamba, consider utilising alternative blasting material and techniques to reduce the predicted noise impact.
3. If required, fly a balloon approximately 2 hours before the blast to obtain local wind conditions. See Fly Weather Balloon (MIN).

4. Run the Blast Module approximately 1 hour before the blast to confirm there have been no changes in weather conditions that might negatively impact on noise levels. If the Blast Module does not predict any high noise readings, the blast can proceed.

If the main shot exceeds 115 dB, then the Blast Module should be run, and/or the Balloon should be flown, within one hour of the blast completion to aid in the incident investigation.

Five Flag Formula

The Five Flag Formula for Blasting is used to minimise the risk of breaching the Environmental Protection (Noise) Regulations 1997 and impacts on nearby residents. It should be used at each stage of the process to determine if the blast should proceed.

The Five Flag Formula takes into account:

1. Synoptic situation and daily weather conditions
2. Nexus Blast Module
3. Shot design factors
4. Pilot shot levels
5. Intuitive feelings

Each of the five flags can signal a negative or unfavourable condition (e.g. when the prevailing wind is blowing directly toward a resident). When the condition is unfavourable then a “Red Flag” is allocated to it. When conditions are such that there are five “Red Flags”, firing of that blast would be expected to cause community complaints. Likewise, when there are no Red Flags, firing would be expected to produce favourable results. The Five Flag Formula prompts a review of these factors and takes this to account when making the decision to fire. Experience of personnel is utilised to determine the weighting of “Red Flags”.

Synoptic Situation and daily weather conditions

A “Red Flag” condition exists if any of the following occurs:

- Prevailing Wind Direction - The wind at any altitude up to 5000 feet is blowing towards the sensitive area (within 45o of the direction of the sensitive area).
- Prevailing Wind Strength - The surface wind blowing toward the sensitive area is greater than 15 knots.
- Temperature Inversion - A temperature inversion or isothermal is present at any altitude up to 7000 feet.
- Wind Shear - A wind shear is present at any altitude up to 7000 feet, where the wind speed immediately above the shear is greater than the wind speed immediately below the shear.
- Instability - There is significant thunderstorm activity present at either the blast site or at the noise sensitive receiver location.
- Forecast Accuracy - The rate of change in the synoptic situation cannot be readily forecast.

Nexus Blast Module Predictions

A “Red Flag” condition exists if any of the following occurs:

- Input Data Accuracy - The weather data integration with Blast Module is not active.
- High Prediction Levels - If the Blast Module predicts noise levels greater than the cut-off level of 110dB for Dwellingup and Yamba, or 115dB for all other points, a “Red Flag” condition exists.

Shot Design Factors

Shot design integrity introduces variables in noise emission and noise direction which is difficult to measure. Also characteristics of the material being fired can effect the confinement of the explosive and therefore the noise output.

A “Red Flag” condition exists if any of the following occurs:

a) The number of holes missing or not loaded in a shot is 10% or greater.

b) The blast does not have a free face to fire to.

c) The blast area has thin caprock or areas of no caprock at all.

d) The blast area has a significant amount of dolerite.

e) The orientation of rows is aligned in the direction of the sensitive area and the shot is being fired towards the sensitive area.

f) Any of the holes have less than the designed depth of stemming material.

Pilot Shot Levels

The pilot shot levels are of particular importance. Given the main blast is typically expected to be 20dB higher than the pilot shots, should they exceed the cut-off levels (90dB at Dwellingup and Yamba and 95dB for all other locations) then indications are the main blast is likely to exceed internal limits (see section 4.1). Therefore, the main blast should not proceed.

An expected noise reduction of -3dB can be applied to shots fired at 2 holes per delay and needs to be considered against prescribed noise levels.

A “Red Flag” also exists if the pilot shot noise levels are markedly different to that expected from the Blast Module. *For example, if the Blast Module predicts no noise impact at a neighbour but the pilot levels are above 90 dB, it is a good indication that the Blast Module may not truly reflect the current weather conditions.*

Intuitive Feelings

A “Red Flag” condition exists if any of the following occurs:

a) Weather conditions at the moment of firing have changed significantly from the time the Blast Module was run, e.g. wind drops in strength or changes direction.

b) The “instinctive” feeling of the person monitoring is that the blast will go louder than planned. This can be due to the noise properties of the pilot shot.

4.2 Operations

All operational equipment is manufactured and constructed to Australian Standards and are part of a regular maintenance schedule to ensure they perform properly. This helps to eliminate any maintenance related noise concerns. Retrofitting of equipment with engineering controls also assists to further reduce noise emissions. Some examples of this:

- Barrier fencing and machine and balanced idlers were installed along some sections of the conveyor to reduce noise at the neighbour's properties.
- Acoustic enclosures were installed over the transfer station drives to reduce noise.

There is also a process in place for any new equipment to follow industry best practice (e.g. meet applicable Australian Standards) and internal requirements (refer to Project Environmental Health & Safety Review (PEHSR)).

Strategic noise assessments (utilising noise emission models) have also been undertaken at both mines to identify areas where mining may result in excessive noise at neighbouring properties. Modelling uses noise measurements from different pieces of equipment, seasonal weather data, and considers local topography. The modelling estimates the noise levels at noise sensitive premises. Results of this modelling determines appropriate locations to mine under certain conditions.

For example, modelling was undertaken prior to the move to the Larego mine region (Willowdale). Modelling showed Conveyer 371 to be generating noise that could impact on noise sensitive premises. As a result of this, noise attenuation measures were installed at conveyor 371, including significant upgrades to the transfer station. Conveyor 371 also has a specified monitoring program as described in section 5.2.2.

Nexus Scheduler Module

Nexus incorporates data from multiple sources to predict noise exposure from activity on site. Sources include:

- Weather and environmental data.
- Operations data.
- Noise monitoring data.

The Nexus Scheduler Module ensures that planned operations are compliant with noise limits and provides auditable evidence that the mining activities were compliant during planning. Details on the use of Scheduler can be located within the Nexus program.

Scheduler has been programmed to include tasks and locations (pits) that are typical during operations. Sitting under each task is the common equipment used to complete that task, which have assigned noise levels based on testing. Planners can develop the operational plan in Scheduler by selecting areas and tasks, and a cumulative noise profile is developed based on that plan.

Nexus utilises a traffic light system for ease of identification. Cumulative noise levels shown as red are higher than internal limits and will require the planner to investigate the source of the predicted noise and alter the plan to reduce it. Planners can identify the tasks that are contributing greatest to the cumulative noise level using the traffic light system, and then can further identify individual equipment that is contributing the greatest noise for that task.

Planners can then alter the plan such as exchanging equipment for another that may have a lower noise profile or reducing the quantity of equipment operating in that location at that time.

Scheduler also displays the planned operations on a map, with noise contours. Planners can visualise how the noise profile will change throughout shifts and identify if/which receptors will be impacted by noise.

Long Term Planning

Utilising some of the capabilities as outlined in section 4.2.1, Nexus can also be used to provide long term planning noise data. Long term strategic plans can be described in Nexus and based on long term weather and other data, the program provides a noise profile for operations within a given time-frame. The functionality of Nexus Long Term Planning and its use can be found in the Nexus program.

Every 8-15 years, Alcoa's mining operations are required to relocate to a new crusher region, where a number of planning tools are used to assess the appropriate location. This includes completing a noise management strategy. Noise modelling is undertaken to understand the distribution of noise emissions under a worse-case scenario for both the fixed plant and operational noise extents. This will determine if there are potential noise emissions exceeding allowable levels and the location of sensitive receptors. Strategies can then be implemented to reduce predicted noise emissions as necessary.

5.0 Monitoring and measurement

5.1 Blasting

If the modelling has shown the blast is to proceed, monitoring locations to record noise data during the blast should be established. Suitable locations are identified as any points expected to be significantly impacted upon (i.e. the closest noise sensitive premises to where the blast noise is expected to impact, and outputs from the Nexus Blast module).

Blast monitoring locations are identified in Blast Monitoring Locations Description (HUN) for Huntly and Blast Monitoring Locations Description (WDL) for Willowdale.

Monitoring will be undertaken either by;

- Utilisation of the permanent and trailer mounted noise monitoring stations (if located in the appropriate location), and/or
- Handheld monitoring using a handheld Sound Level Meter (SLM) (operated by a suitably trained individual).

Measurement of the pilot blast(s) are undertaken to ensure that noise limits are not exceeded prior to proceeding with the main blast. Generally, duplicate pilot blasts are employed as an extra level of control but may be particularly required where;

- Possible impact on close neighbours,
- Variable wind conditions.

Download Blast Monitoring Data from B&K 2250 Sound Level Meter describes the downloading process.

All blast noise monitoring equipment is calibrated and maintained as per the Environmental Protection (Noise) Regulations 1997 (Schedule 4). Equipment calibration due dates are managed via the Sphera Essential task manager and site-specific equipment calibration registers.

5.2 Operations

Nexus Execute

As with Nexus Scheduler Module (see section 4.2.1), Nexus Execute Module utilises a range of data sources to provide in-the-moment noise data. Live weather data, the fleet management system (FMS) and the operations schedule developed via Scheduler feed into Execute.

Execute also uses a traffic light system, with noise levels in red exceeding internal limits. When an exceedance is identified by the program an alarm – both audio and visual – will sound with a countdown signalling the length of time operations has to make changes before that noise level becomes an exceedance.

As with Scheduler the user can see the cumulative noise level, locations and activities taking place during a shift – as developed by Planning – and the equipment undertaking those tasks. Where an exceedance has been detected, the user can view which location/activity is contributing greatest to the noise levels and further define the equipment contributing to the exceedance. The user can then take action to alter operations to reduce those noise levels so an exceedance isn't recorded.

Execute enables site to adaptively manage its operations when circumstances (i.e. weather and equipment) change, thus ensuring that operations remain in compliance. It also provides reports for auditable evidence and any ongoing regulatory reporting requirements.

Further details on the use of Nexus Execute can be located within the Nexus program.

Conveyor 371

Conveyor 371 has been identified as a potential source of noise impacting on nearby neighbours. Designated reference points have been established along the conveyor for periodic monitoring.

Fixed plant maintenance personnel monitor the conveyor on a daily basis for maintenance purposes. Environmental personnel undertake quarterly measurements with a handheld SLM to provide ongoing quantitative monitoring and assessment.

Further details of the monitoring measures for Conveyor 371 is described in Perform Noise Monitoring on Conveyor 371 (WDL).

5.3 Noise Complaint Monitoring

Investigations of noise complaints are undertaken as per Perform Operational Noise Complaint Investigation (MIN).

6. Audits & Inspections

Noise management is covered under Operational Control Audits as per Describe Environmental Auditing (MIN).

7. Training

Training for noise management is dependent on your role within WA Mining. Appropriate training will be provided based on individual role requirements. Speak to your Supervisor or Learning and Development Consultant for information on the noise training requirements for your role.

For an overview of WA Mining's noise management see Noise Management Training Package (MIN).