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AUSTRALIAN ALUMINIUM COUNCIL SUBMISSION ON THE PROPOSED VARIATION TO THE AMBIENT AIR QUALITY NEPM

Thank you for the opportunity to make a submission on the proposed variation to the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) under review by the National Environment Protection Council.

The Australian Aluminium Council represents the bauxite, alumina and aluminium industry in Australia. The industry is committed to following measures to improve and maintain ambient air quality around bauxite mines, alumina refineries and aluminium smelters. However, in setting particulate matter concentration standards we must also be mindful of operational and technological limitations. Facilities should not be unreasonably inhibited from running at full capacity, provided actual point source emissions are acceptable. As noted by the NEPC, it is important that particulate concentration standards allow an appropriate margin to account for particulate matter dispersed by natural processes; including wind erosion, dust storms, bushfires and sea spray.

We particularly note that:

- Standards may be too restrictive when applied at or nearby the boundaries of operations, particularly at facilities in regional areas, if standards are based on measurements of exposure to metropolitan populations
- Allowing for unusual and variable levels of background PM would avoid unwarranted penalisation of facilities
- The PM₁₀ 24-hour mean standard would be most realistically set at 50 µg/m³

- The form of PM standards used by the US Environmental Protection Agency, in which the 98th percentile PM concentration in a given year is compared to a standard, could be appropriate for application in Australia
- The introduction of further PM metrics would be difficult due to a lack of data on finer particulate matter

The NEPM impact statement

The NEPM Impact Statement examines the options for variations to current fine particulate concentration standards. The proposed changes are based on evidence of the effects of PM in ambient air on community health. While the NEPM concentration standards are not strictly compulsory, the values are often applied by jurisdictions to function as licensing and regulatory compliance criteria. As a result, it is important to ensure that AAQ NEPM standards provide realistic PM ambient air concentration values for facilities, and that background PM is taken into account.

The NEPM standards are based on the “general exposure of populations in large metropolitan areas” (p.xvi of the Impact Statement). *We note that the figures may therefore be too restrictive if applied as conditions at or nearby the boundaries of regional facilities.*

Sources of particulate matter in the bauxite, alumina and aluminium industry

Our industry consists of three types of operations: bauxite mines, alumina refineries and aluminium smelters.

Mine dusts are essentially chemically inert and are mostly spread by natural dust generating processes, including dust storms, general erosion and wind after rainstorms.

Sources of particulate matter from alumina refining are mainly in the form of point source emissions from calciners (alumina and hydrate dust) and power generation equipment (fly ash). There are also fugitive or area sources; including emissions from stockpiling and the handling of bauxite at the front of the process, and emissions from bauxite residue storage or drying areas at the back of the process.

Alumina is the predominant form of particulate matter emitted from aluminium smelters, along with carbon and some fluoride containing species. The emissions are mainly fugitive in nature but do include some point sources.

Preferred options and comments on the changes

Natural events can increase background PM to a level close to the guideline itself, leaving a narrow margin for expected point source emissions. In some cases, facilities will be unable to avoid exceeding the guideline limit solely as a result of background PM.

Levels of background PM vary significantly with natural processes, including soil erosion, sea spray, and bushfires; as well as with weather conditions, including rainfall and wind. The proposed measurement standards may be unrealistically restrictive in a day or year where weather events generate high background PM. *A measurement method in which unusual levels of background PM could be removed, or at least accounted for in measurements, would avoid unwarranted penalisations of facilities.*

The location of PM measurement should also be taken into account in the process of setting standards. Measurement figures closer to metropolitan areas will clearly differ from measurements at regional facilities.

Preferred options for PM standard means

The PM₁₀ 24-hour mean would be most realistically set at the upper value proposed by the Impact Statement, which is the current NEPM standard at 50 µg/m³. It is already difficult for regional facilities to meet this standard – again, this is due in no small measure to high and variable levels of particulate matter to which background PM contributes.

Internationally, there are no jurisdictions imposing a PM₁₀ 24-hour standard lower than 50 µg/m³. To reduce the standard to below 50 µg/m³ would be premature and likely prove unrealistic for many Australian facilities.

As most Australian bauxite mines operate near non-industrial dust sources, we note that the standard levels and allowable exceedances for other global jurisdictions may not actually be appropriate for the Australian ambient air environment. Australia experiences frequent exposure to background PM, largely originating from the erosion of sparsely vegetated soil on our large expanse of arid landscape as well as from dispersed particulate matter from relatively frequent seasonal bushfires. Refineries and smelters also experience these interferences in PM measurements.

Below is a table of our preferred standard values for the annual and 24-hour means of PM_{2.5} and PM₁₀.

Preferred standards

| | |
|--------------------------------------|----------------------|
| PM₁₀ annual mean | 20 µg/m ³ |
| PM₁₀ 24-hour mean | 50 µg/m ³ |
| PM_{2.5} annual mean | 8 µg/m ³ |
| PM_{2.5} 24-hour mean | 25 µg/m ³ |

Note that these proposed standards will likely require an exceedance allowance mechanism in the event that high levels of background PM are generated by unusual weather occurrences.

Form of PM standards

We recommend the form of the 24-hour PM₁₀ and PM_{2.5} standards applied by the US Environmental Protection Agency. This form involves a rule in which the 98th percentile PM concentration in a given year is compared with a standard. Data for exceptional events is excluded and the numbers may be evaluated using either monitoring data, which takes the average of the 98th percentile concentration for each of 3 years of monitoring (after exclusion of exceptions), or using modelling data, which takes the average of the 98th percentile concentration for each of 5 years of data modelling.

Introduction of further PM metrics

The introduction of further metrics into PM regulations or standards would most likely require an additional monitoring program to gather data. The standards for PM_{2.5} also cover finer PM fractions. There is little data on levels of fine PM (PM₁ and smaller) in the Australian context, and the amount of current health data on which to establish standards for finer fractions of PM is not likely to be adequate.

Exposure reduction framework

We agree with the Impact Statement that it would not be feasible in practice to introduce a gradient 10% reduction in the annual mean of PM_{2.5}. Our preference is therefore for option ER2, an exposure reduction framework based on monitoring levels against an average exposure concentration index. This may be an achievable way to observe and reduce the exposure of urban populations to particulate matter.

The bauxite, alumina and aluminium industry is committed to assisting in the maintenance of safe levels of PM in the ambient air environment for the health of communities. However, we note that in setting PM standards it is particularly important to take into account the variable level of natural background particulate matter in the ambient air environment. The basis for the values for PM standards should also be appropriate when applied in the measurement of concentrations in regional locations, where much of the Australian aluminium industry is located.

Yours sincerely



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