

28-Jan 2021

Director Regulatory Operations  
Regulatory Operations Metropolitan  
NSW Environment Protection Authority  
[RegOps.MetroRegulation@epa.nsw.gov.au](mailto:RegOps.MetroRegulation@epa.nsw.gov.au)

Suite 3, Ground Floor  
60 Leicester Street  
Carlton VIC 3053  
0422 974 857

[admin@dea.org.au](mailto:admin@dea.org.au)  
[www.dea.org.au](http://www.dea.org.au)

ABN: 80 178 870 373

*Healthy planet, healthy people*

### **RE: POEO license 761**

Dear Sir/Madam

Doctors for the Environment Australia is a national organisation of doctors and medical students committed to protecting human health through protecting the environment. We are concerned by the extremely generous license conditions allowing NSW power stations to pollute at much higher levels than similar facilities overseas.

The Vales Point power station would normally be regulated under the POEO class 5 license standards but an exemption can be granted to an older (class 2) plant "Where it can be demonstrated that the operation of Group 2 plant will not result in any adverse environmental or human health impacts". Recent developments in understanding the health impacts of NO<sub>2</sub> make it irrefutable that NO<sub>2</sub> from Vales Point is having human health impacts so it is no longer eligible for exemption.

#### **Quantifying the health impacts from NO<sub>2</sub> from Vales Point**

Nitrogen dioxide is a respiratory irritant for which the health effects were reviewed by the US EPA Integrated Science Assessment 2016<sup>1</sup>. That review found that there was strong and consistent evidence of health effects and concluded that short term exposure had a causal association with respiratory effects, and that long term exposure was likely to be causally associated with respiratory effects. This is a change from the previous ISA of 2008 and has material bearing on the current license review.

Australian work commissioned to inform the review of the National Environment Protection Measure, the Australian Child Health and Air Pollution Study (Knibbs 2018)<sup>2</sup> found substantial associations between NO<sub>2</sub> exposure and asthma in a sample of 2400 primary school children across 12 Australian cities. Importantly these effects were found with average exposure of 8.8 ppb, well below the current NEPM standard of 30 ppb. That work showed a linear relationship right down to very low levels, supporting that there is no threshold level below which NO<sub>2</sub> does not have an effect on asthma in children. This supports the argument that meeting the national air quality standards does not fully protect against health effects, and that there are strong scientific grounds to attribute child asthma to NO<sub>2</sub> exposure even in locations where national standards are met.

National Pollutant Inventory data for 2018/19 show that the two Lake Macquarie power stations emit substantial amounts of NO<sub>2</sub>; Vales Point 21,000 tonnes and Eraring 23,000 tonnes. The ground level concentration of NO<sub>2</sub> from the 5 NSW coal fired power stations has been modelled by Lauri Myllyvirta, Andreas Anhäuser, and Aidan Farrow at the University of Exeter using CALPUFF, the NSW EPA preferred atmospheric dispersion model. This showed

average ground level power station derived NO<sub>2</sub> of 2.5 ppb in Lake Macquarie and 2.21 ppb in both Central Coast and Cessnock LGAs. These three LGAs have the highest power station NO<sub>2</sub> of all LGAs in the state.

The effects of NO<sub>2</sub> on the prevalence of child asthma has been examined in a meta-analysis by Khreis et al 2017 showing an increase of 9.79% per extra 4ppb of NO<sub>2</sub>.<sup>3</sup> This is not about acute NO<sub>2</sub> exposure causing asthma attacks (which also occurs), but about the development of asthma sensitivity in children who would not otherwise have had it. It is due to long term exposure, so nothing to do with whether the one-hour standard is exceeded.

The NSW health survey includes questions that establish the 12-month period prevalence of asthma in children aged 2-14, allowing estimation of the total number of children in each LGA that have asthma from all causes. Using the appropriate formula<sup>1</sup> gives the numbers in the following table.

**Table 1:** Childhood asthma prevalence due to ground level NO<sub>2</sub> from the five remaining NSW coal fired power stations, showing results for the 7 most impacted local government areas. Confidence interval based on the concentration response function.

LGA	Power station NO <sub>2</sub> ppb, annual average.	Asthma prevalence ages 2-14	Power station attributable cases	95% confidence interval	Attributable proportion
Lake Macquarie	2.50	5649	321	132-439	6%
Central Coast	2.21	6649	335	138-459	5%
Cessnock	2.21	1767	89	37-122	5%
Muswellbrook	2.07	565	27	11-37	5%
Maitland	1.81	2623	109	45-149	4%
Newcastle	1.62	4052	150	62-207	4%
Singleton	1.55	759	27	11-37	4%

The power station NO<sub>2</sub> results in table 1 are from all 5 NSW power stations combined, but NO<sub>2</sub> values decline rapidly with distance. There would be very small contributions to Lake Macquarie NO<sub>2</sub> from power stations at Lithgow or Muswellbrook, so the local asthma burden in Lake Macquarie and Central Coast is nearly all due to the two local power stations, approximately half each due to Vales Point and Eraring.

Table 1 shows the substantial asthma burden created by locating power stations in heavily populated areas, and despite releasing similar amounts of NO<sub>2</sub> the Upper Hunter power stations cause a much smaller number of children to have asthma.

This asthma burden is due to long term exposure, as reflected in annual average values. There is also an acute effect of asthma attacks triggered by short term exposure. To reflect this the regulation of stack emissions should set a maximum average value while operating, as well as a peak one-hour concentration limit.

<sup>1</sup> The following formula is used to derive the exposure attributable number of cases of disease.  
 $P \times D \times 1 - 1rc$   
 where

P is the population aged 2-14 years in each LGA  
 D is the prevalence of asthma among persons aged 2-14 years in each LGA  
 r is the relative risk of the concentration response function per 4 ppb.  
 C is the power station attributable annual average NO<sub>2</sub> for each LGA (units ppb/4).

## License conditions

The operators of Vales Point power station have been given special exemptions in 2010 and again in 2015 from the POEO group 5 license conditions that would impose a stack limit of 800 mg/m<sup>3</sup>. Since that time the Integrated Science Assessment has found that there is sufficient evidence of causality that long term NO<sub>2</sub> exposure causes asthma in children. The NO<sub>2</sub> from Vales Point causes asthma in approximately 300 children in the adjoining local government areas. This adverse human health impact is sufficient grounds for the NSW government to deny the operators of Vales Point a further exemption to standard group 5 license conditions.

Coal fired power stations around the world are fitted with low NO<sub>x</sub> furnaces and post combustion scrubbers to meet much stricter environmental standards than apply in NSW. For instance, the European rules require existing power stations to meet average values no greater than 150mg/m<sup>3</sup> by 2021 and new plant to meet 85 mg/m<sup>3</sup>. In Japan, the average emission limit is 57 mg/m<sup>3</sup>. The NSW standards are lagging way behind industry best practice, and this is costing the community dearly in health damage.

The current requirement for a license exemption is an opportunity to improve the health of current and future generations of children in NSW and bring this old power station one step toward best practice internationally.

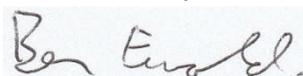
## Recommendations:

That the current application for yet another license exemption be refused.

That all NSW power stations be required to meet the European standards for NO<sub>2</sub> and SO<sub>2</sub> by 2025.

That stack emissions be regulated to both an average value and a maximum value.

Yours sincerely,



Convenor - Air Pollution Special Interest Group  
Doctors for the Environment Australia

## References:

1. US EPA Office of Research and Development NCFEA. Integrated science assessment for oxides of nitrogen- health criteria. United State Environmental Protection Agency; 2016.
2. Knibbs LD, deWaterman AC, Marks G, Williams G. The Australian Child Health and Air Pollution Study (ACHAPS): A national population-based cross-sectional study of long-term exposure to outdoor air pollution, asthma, and lung function. Environment International. 2018;120:394-403.
3. Khreis H, Kelly C, Tate J, Parslowc R, Lucas K, Nieuwenhuijsen M. Exposure to traffic-related air pollution and risk of development of childhood asthma: A systematic review and meta-analysis. Environment International. 2017;100:1-31.