

**Comments on the United Wambo Open Cut Mine Project and associated documents,
for the IPC Public Meeting**

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I have been briefed by EDO NSW, on behalf of the Hunter Environment Lobby Inc, to provide an expert opinion in relation to the air quality assessment of the United Wambo Open Cut Mine Project (**Project**), for the IPC Public Meeting originally scheduled for 12 December 2018 and deferred until 7 February 2019. My brief includes regional air pollution (particularly Particle Matter, PM10 (less than 10 $\mu\text{g}/\text{m}^3$ aerodynamic diameter) and PM2.5 (less than 2.5 $\mu\text{g}/\text{m}^3$ aerodynamic diameter)), and if appropriate, greenhouse gases. I have been provided with several documents associated with the Project, including reports from the previous IPC review, responses by United Wambo, and responses by the NSW Department of Planning and Environment (**DPE**) (see References).

I confirm that I have read the Expert Witness Code of Conduct and agree to be bound by it.

The Project proposes to combine current Wambo and United open cut mines into a larger operation, extending over 23 years and extracting about 10 million tonnes per year (**MTY**) of coal for export (up to 156 MTY overall). Details of the Project are presented elsewhere and are not repeated here.

I have been asked to address my concerns stated in an earlier report (Bridgman 2108), and whether these have been adequately addressed. My original brief included the following questions:

- a. Is the air quality impact assessment (**AQIA**) undertaken for the project adequate?
- b. Are any air quality impacts arising from the project appropriate?
- c. Provide any further observations and opinions which you consider relevant.

I mainly focus on the areas of the documentation about Air Quality that, in my opinion, are most important. These are the IPC Review Report (2018), the response by United Wambo including Appendix 7 (2018), and the DPE Final Assessment Report (2018).

I fully support the 9 recommendations for Air Quality made in the IPC Review Report 2018, although I note that R13 (inclusion of current NEPM and EPA's approved methods updated 2016) includes the words "give consideration", which suggests that the applicant is not required to meet this recommendation. However, I also note that the applicant did agree to incorporate this recommendation (see Appendix 7).

Is the air quality impact assessment (AQIA) undertaken for the project adequate?

I have concentrated on PM10 and PM2.5, because these particle sizes are of greatest concern in terms of human health (Pope and Dockery 2006). I note that the IPC recommendation and the comment in the DPE Report focus strongly on diesel particle emissions, and that United Wambo has agreed to implement several measures to reduce these emissions.

The current NEPM standards are listed in the table below:

Pollutant	Averaging Period	Maximum Concentration Standard ($\mu\text{g}/\text{m}^3$)
PM10	1 day	50
	1 year	25
PM2.5	1 day	25
	1 year	8

Unlike the earlier NEPM, there are now *no* allowable exceedances. Instead these are replaced by an “exceptional event rule” (exceedance due to bushfire or continental wind-blown dust).

In Bridgman (2018), I noted that, in 2025, the PM2.5 24-hour standard is to be reduced to $20 \mu\text{g}/\text{m}^3$ and the annual standard to $7 \mu\text{g}/\text{m}^3$ (www.nepc.gov.au/resource/variation-ambient-air-quality-nepm-%E2%80%93-particles-standards). Given the 23-year lifetime of the proposed Project (to at least 2040), I suggested that this change should be considered as part of the assessment process, and could make an important increase in the area of exceedance depicted by the dispersion modelling. This suggestion has *not* been adopted in the IPC Review Recommendations (2018). The future impact of not considering the upcoming standards will depend on residential land use and human exposure to PM at that time.

My other concerns listed in Bridgman (2018) were

- Whether 5 years of data adequate to choose 2014 as the year to use as the basis for modelling*
Appendix 7 and the Response to the IPC Review Report (2018) provides further justification of 2014 as the year used for modelling. The IPC Review Report (Page 25) notes that this is accepted by the DPE as the “worst case” year of the 2011-2015 period. I will not argue with this acceptance, but note that under current drought conditions, the potential for more frequent, and more extreme particle concentrations is very high. Notwithstanding the air pollution management practices, intended but not yet established by United Wambo (IPC Review Report recommendation R18), particle emissions control under these very dry conditions from open cut mining operations will be extremely difficult.
- The adequacy of the method used to estimate background PM2.5 in the Project EIS, and the ratio of PM2.5 to PM 10*
There remains no direct answer to this question because there are no local measurements of PM2.5. It is encouraging that United Wambo intends to establish a new air quality monitoring station, and two new PM2.5 monitoring locations (United Wambo Response 2018 pp. 36-37). However, this is a plan for the future.
- CALMET results should be verified against existing monitoring data (including wind, temperature) for the year.*
This has now been completed adequately in Appendix 7.

Are any air quality impacts arising from the project appropriate?

I accept that under the requirements of clause 12AB of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (NSW)*, and in comparison with the current NEPM requirements (Table 1), the required modelled results show that the air quality impacts are consistent with NEPM expectations.

However, in Bridgman (2018) I stated: *HNEPH identifies a difference between the wind direction and speed wind roses for 2014 (shown in the EIS Appendix 7), and the spatial results from the dispersion modelling from the cumulative impacts (Agency Submissions ii). This is particularly noticeable when the wind is from the ESE and SE, and blowing toward the Jerry Plains and Moses Creek area (see wind roses Figure 12, EIS Appendix 7A). The modelled results show highest concentrations more to the north than the wind roses suggest for both PM10 and PM2.5 (example Figure 20, EIS, Appendix 7). In Response to Submissions A, in answer to HNEPH, is the statement that model “Contours do not typically represent a plume at any one point in time, rather that they represent the annual or 24-hr maximum concentrations predicted at each location. This means that the contours will not necessarily show a pattern that follows the pattern of wind roses from a single location” (page 143). This is because the plot maximum results at different individual times for each station, rather than all stations at the same time. This is not very realistic.*

My major concern about this problem continues. The updated model results (Appendix 7) still show overall concentrations of PM10 and PM2.5 from the mining operations when the winds are from the ESE and E that are very low in the Jerrys Plains area, even with the updated approach using the new NEPM and EPA’s approved methods for 2016,

Yet particularly under “worst case” conditions, these results are unrepresentative of reality. PM10 concentrations measured at the Jerry Plains monitoring station can be very high (see Figure A and B in Bridgman 2018), due to mining activity emissions, particularly under the current drought conditions. Although there is no NEPM for hourly PM10, regular human exposure to this kind of concentrations over short time periods will create health problems (Pope and Dockery 2006). High levels of PM concentrations, over shorter periods of time than 24 hours, are of great concern to residents and health experts.

I would still prefer *seasonal* modelling for summer and winter. This would allow a more direct comparison with measured results, and will reduce obscuring details by annual averaging. However, I acknowledge that there is no legal requirement for provision for seasonal modelling, or for modelling for shorter periods than 24 hours.

I repeat my question from Bridgman (2018): If the Project is approved, when air quality violations occur, and the source clearly identified, how will the mine operator, and the EPA and State Government, handle the problem?

Provide any further observations and opinions which you consider relevant.

For Project operations (Scope 1 and 2), 5.8 MTY CO₂-e of greenhouse gas emissions (**GHGE**) are expected; for export (Scope 3) 260 MTY CO₂-e are expected (from the burning of coal). The Project refuses to take any responsibility for the latter, and claims the former are insignificant. While the DPE recommendations request further attention to reducing local

GHGE emissions, it is the emission on a more global scale from the burning of coal that is of much greater concern for the near future (ABM & CSIRO 2016; IPCC 2018).

As I stated in Bridgman (2018), adding more coal mines such as the Project may benefit the short-term parts of the economy of NSW, but will also create continuing medium and longer-term damage to the country (in areas such as agricultural production). Federal Government promises to reduce GHGE (Paris Agreement) cannot be met by authorising more coal mines.

References

Australian Bureau of Meteorology and CSIRO Atmospheric Research, State of the Climate 2016, <http://www.bom.gov.au/state-of-the-climate/>, accessed January 2018.

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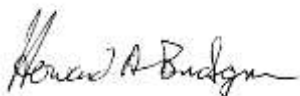
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United Wambo Open Cut Coal Mine Project, Response to Independent Commission on Inquiry Recommendations, 2018, Main Text and Appendix 7, July 2018.

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A/Prof Howard Bridgman, 3 January 2019