HUME COAL PROJECT SSD 15_7172
SUBMISSION ON ENVIRONMENTAL IMPACT STATEMENT

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1. SUMMARY

As a member of the Hume Coal Water Advisory Group (WAG) since its inception in December 2011, initially as the representative of the former Southern Highlands Business Chamber (SHBC) by invitation in my capacity as the then Chairman of the local Engineers Australia Southern Highlands and Tablelands Regional Group (EA-SHTRG), and latterly as a community member when the SHBC folded, I have viewed my role on WAG as ensuring that '*best practice*' engineering principles are applied to the proposed mining operations in order to safeguard the subterranean groundwater systems from any impacts of the mining operations.

Based on my experience on the WAG and my review of the Hume Coal EIS and other expert reviews, **I am objecting to approval of this Project** because of:

- its impacts on the subterranean groundwater inflows and drawdown;
- the impacts on the proposed rejects emplacement back into mined voids; and
- other potential impacts caused by mine viability

as outlined in the following sections, all of which are issues that I have raised in our WAG meetings and on which I remain unconvinced by this EIS.

I am firmly convinced the proposed mining operations will have significant impacts on the current pristine environment as well as long-standing local agricultural and unique cool climate wine industries.

2. MODELLED GROUNDWATER INFLOWS AND DRAWDOWN

<u>Hydraulic Conductivity</u>: A key parameter in modelling the groundwater inflows into the mine and the resulting groundwater drawdown over the lifetime of the mine is the hydraulic conductivity of the Hawkesbury sandstone above the coal seam. The EIS presents a scatter diagram in Figure 5.1 [1] of the hydraulic conductivity K (m/day) with depth at various locations. Although the mine lease packer test K values vary from 0.01 to 1.0 m/day, an average vertical Kv = 0.1 m/day at 100 metres depth was selected for the inflow and drawdown modelling studies. There is considerable debate as to the validity of this assumed low Kv value, which the EIS justifies as being due a clay interburden layer between the Hawkesbury sandstone and the coal seam in the lease area. This interburden layer is disputed by respected local geologists, and as the Independent Expert Scientific Committee (IESC) has rightly pointed out [2], "*The groundwater model lacks a sensitivity analysis on the full suite of hydrogeological parameters, without which it is not possible to assess the robustness of the proponent's prediction of impacts.*" I fully concur with this expert advice based on my own professional expertise with numerous modelling studies in the CSIRO and academia. Parameter sensitivity analysis is standard practice for modelling studies such as this.

<u>Groundwater Inflows</u>: Given the sandstone hydraulic conductivity is a *critical parameter* for groundwater movements, the modelled groundwater inflows into the mine over time as shown in Figure 12.1 [3] of the EIS are considered to be a very conservative prediction of the magnitude of the mine inflows that are likely to occur during the mining operations, and needs to be confirmed by more a robust modelling study as per the IESC advice.

<u>Groundwater Drawdown</u>: The same criticism applies to the modelled Project induced groundwater drawdown at Year 17 of mining shown in Figure 11.1 [4] of the EIS, which is also considered to be a very conservative prediction of the drawdown. This prediction also needs to be confirmed by more a robust modelling study as per the IESC advice.

This advice is also endorsed by WRL/UNSW review [5], which has strongly recommended that: "*Significant additional budget should be allocated to modelling and economic assessment. The missing technical details, uncertainty analysis and justifications for the current modelling should be presented for review and acceptance by experts. Until this occurs, the modelling information presented in the Pells and Pan (2017)* [6] *submission should be considered the best available sensitivity and uncertainty analysis.*"

Landholder make good agreements: Based on this conservative drawdown prediction, some 93 bores on 71 landholder properties are likely to experience drawdown of 2 metres or more as shown in Table 11.3 [7]. This statistic will undoubtedly be higher in more robust modelling studies and more landholder properties will be affected. It is proposed [8] that "*Legally binding make good agreements will be negotiated between Hume Coal and the affected landholders, where possible. These will include specific make good measures and outline a timeframe of commitments. Negotiations will be made case by case.*" Also, "*Hume Coal will continue to monitor groundwater levels in dedicated monitoring bores and verify the model as mining progresses. This will allow the accuracy of drawdown predictions at landholder bores to be monitored and assessed over time*".

The plausibility of this undertaking is likely to be tested over time, particularly in view of the questionable economic viability of the Project noted below. Not surprisingly, affected landholders are highly sceptical.

3. PROPOSED REJECTS EMPLACEMENT

I question the veracity of this proposal to backfill the mine voids with "co-disposal reject (comprised of crushed rock rejects and water from the coal processing plant mixed with up to 1% limestone)" [9]. "The use of the limestone is intended to increase the acid buffering capacity of the reject material." to achieve a near-neutral pH and reduce mobilisation in the groundwater [10]. The EIS analysis of the potential contamination of the groundwater by the reject material is superficial, and it also minimises the engineering difficulties and risks associated with pumping the reject 'slurry' underground. Mine safety considerations could also be problematic. I am aware that more expert submissions on this issue have been submitted, and defer to these expert opinions for consideration on such matters as [11]:

- fracturing of the Hawkesbury sandstone;
- the credibility of the kinetic leach column tests;
- the groundwater monitoring program "...to confirm the efficacy of the limestone treatment in mitigating acid and metals mobilisation from the emplaced reject material" and the lack of appropriate methodologies and control procedures that should to be applied;
- the more appropriate sealing of the mining voids by bulkheads that would remain sealed in the long-term.

4. OTHER POTENTIAL IMPACTS

Economic Viability: Analysis of the production schedule for the Project as tabulated in Table 4.4 [12] shows that the average annual production of 2.66Mtpa product coal will consist of 54% primary (metallurgical) coal and 46% secondary (thermal) coal over the 19 years of mining operations. This raises issues about the economic viability of the Project, including in turn the prospect of:

- increased coal production to improve profitability, and
- reduced coal column widths resulting in mine subsidence,

both of which invalidate the current EIS in its present form.

<u>Seismic Impacts</u>: Although impacts from seismic events are not required for this Project EIS under current statutes, *this does not mean that such events are irrelevant to the robustness and integrity of their pine feather mining operations*.

In June 2015, Dr Kevin McCue, Director of the Australian Seismological Centre, Canberra, gave a presentation on “Earthquakes in NSW?” to our EA-SHTRG in which he listed earthquakes in the Southern Highlands region, the most significant being:

- the Robertson-Bowral earthquake of magnitude 5.6 on 22 July 1961, which was felt over 50,00 square miles and caused significant damage to buildings, power failures and rockfalls on Macquarie Pass;
- the Picton earthquake also of magnitude 5.6 on 10 March 1973; and
- the Bowral earthquake of magnitude 4.0 on 11 December 2003.

Relevant intensity maps from his talk for this region are given in Attachment 2 [13]. His earthquake forecast that “*Emergency mangers and the public in NSW and Victoria should be prepared for a magnitude 6 earthquake; such an event is overdue*” should be noted in the current context, particularly in view of the most recent Appin earthquake of magnitude 3.9 on 3 January 2017, which shook homes and could be felt in a 56km radius, including parts of the Southern Highlands and Wollongong according to GeoScience Australia. As McCue demonstrated, the Southern Highlands is historically a seismically active region.

In conclusion, I fully agree with the recommendation by the WRL review [5] that in regard to this EIS, “*Consistent with the precautionary principle as defined in the NSW Environmental Planning and Assessment Act 1979, the reviewer recommends against approving and conditioning the development proposal on the basis of the information provided to date. The reviewer is prepared to revise this recommendation upon consideration of the proponent’s responses to submissions.*”

REFERENCES

1. Hume Coal EIS, Volume 4B, Appendix E, Volume 1: Data Analysis, p32.
2. IESC (2017), "Advice to decision maker on coal mining project, IESC 2017-083: Hume Coal Project (EPBC 2015/7526) – New Development", 8 May 2017, p3.
3. Hume Coal EIS, Volume 4A, Appendix E, p217.
4. Hume Coal EIS, Volume 4A, Appendix E, p201.
5. Hume Coal Project SSD 15_7172: Peer Review of Conceptual and Numerical Modelling that Predicted Likely Groundwater Impacts, Water Research Laboratory, UNSW, 23 June 2017, p
6. Pells and Pan (2017), "Groundwater Modelling of the Hume Coal Project", Pells Consulting Technical Report #S025.R1, 17 May 2017.
7. Hume Coal EIS, Volume 4A, Appendix E, "Summary statistics of landholder bore impacts" p211.
8. Hume Coal EIS, Volume 4B, Appendix E, Appendix O, 5.3 Make good agreement, p26.
9. Hume Coal EIS, Volume 4A, Appendix E, p23.
10. Hume Coal EIS, Volume 4A, Appendix E, 8.7.2 Water quality effects of co-disposed reject, p164.
11. Letter "Opinion relating to geochemical impact to the environment by underground placement of washery rejects at the proposed Hume Coal mine, Southern Highlands, NSW". Ryall Environmental Pty. Ltd., 19 June 2017.
12. Hume Coal EIS, Volume 4A, Appendix E, 4.5.1.1 Coal production rates, Table 4.4 "Schedules for ROM, primary and secondary products", Parsons Brinkerhoff| 2200539A-WAT-REP-001 Rev 10, p33.
13. Attachment 2: EarthquakesNearMittagong-June2015.pdf