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Executive Director, Resource Assessments and Business Systems
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NSW Department of Planning and Environment
Major project Assessment – Hume Coal Project
GPO Box 39
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Attention: Mr Clay Preshaw

Submission Regarding Environmental Impact Statement by Hume Coal Pty Ltd, SSD 15-7172. Berrima District NSW

As a retired geologist formerly associated with the mining industry I am generally supportive of coal mining, provided it happens in appropriate lands where there is little conflict with other commercially or socially valuable pursuits, and provided the net national benefits are significant. That is not the case on either count for the proposed Hume project (SSD7172) in Authorisation A349, which lies within an area of high-value grazing/farmland and expensive country residences prized for its scenery and tranquillity, with a not-insignificant population that will increase with growth of the Sydney-Canberra corridor. Accordingly I do not support the project. I should state for the record that my own property lies several kilometres outside the southern boundary of A349 and well outside the proposed mine footprint, so I am not directly conflicted in providing an unbiased opinion, except should geographic expansion of the proposal by Hume or others be proposed in future.

The Hume EIS includes a chapter by economists that claims, without authenticating details, financial benefits to the State and the local community and Wingecarribee Shire. Notably, there are no monetary figures at all on costs versus revenue such as would establish the project's economic viability or justify its 'State Significance' status. The EIS does not present the necessary exploration drilling results or data on product quality that would allow an independent assessment by external specialists or relevant Government officers of the veracity of the resource estimate cited therein, nor of statements concerning technical aspects raised below of the proposed mining plan. Normally one might not expect such information in an EIS focussed on environmental issues, but here it is essential because Hume has never released such data publically, unlike what stock exchange regulations require for a listed company such as Cockatoo Coal, the former owner and joint venture partner with POSCO in A349.

Moreover, older publically-available information (DIGS database, NSW Geological Survey) including lithology logs from earlier explorers of A349 and precursor licenses (Bellambi, Austen and Butta, Shell, Anglo American) raises doubts about claimed coal quality. The geological literature (Markham and Basden, 1974; Read, 1975; McElroy and Associates, 1980) rates Wongawilli coal in the Southern Highlands as poor quality, low rank, and high ash. I understand from a now-retired participant in early CSIRO research that

nearby Berrima coal was unsuitable for production of coke with the strength needed in iron or steel production. There is no mention in the EIS of any new tests and measurements undertaken by Hume or POSCO that would refute such doubts.

The EIS justifies this lack of transparency by claiming 'commercial confidentiality', which is surely unacceptable and unnecessary under the circumstances. There are no commercial competitors or predators hovering.

On a global or national scale the proposed Hume operation would constitute a trivial contribution to the coal industry. Its 23-year lifetime yield would equate to just one year's production or less from many mines of the NSW Hunter or Queensland. There is no new total resource statement in the EIS, but the production figures provided imply a mineable resource closer to that that estimated by Anglo American (115 million tonnes, mt) rather than the 446 mt upgrade announced by Hume-Cockatoo in 2011-12. The Anglo estimate is broadly consistent with 'back of the envelope' calculations from the proposed mine footprint, a 3.5m working height, and a specific gravity of 1.2 for the 'run-of-the-mine' coal.

A small mine indeed if it went ahead, but an expensive and likely unprofitable one with distinctly negative community acceptance overall.

We don't have any details of any new tests conducted on drill core regarding washery beneficiation, but the claimed recovery (implied variously at 78% and 84% by figures in the EIS) and proportion of metallurgical product (55% with 10% ash) and thermal coal (45%, 22% ash) as cited by Fitzsimmons and Doyle (2017) are consistent with the literature. Even if used to 'bulk up' higher-quality coal from other sources (overseas?), it is difficult to imagine mining at Hume would be economic given the procedures envisaged (mining, washing, emplacement of rejects underground, panel sealing, railway construction, continuous monitoring. etc.). The proposed, essentially experimental "pine feather" mine design at Hume (designed to avoid stability issues but only recovering one-third of the resource) is technically complex and super-expensive, requiring employment of highly qualified and experienced miners, many from outside the area.

Summarising the above, mining at Hume could well make substantial losses from the start, in which case Hume or its parent POSCO might terminate operations without proceeding to the final rehabilitation stage, without providing the royalties and local support expected by the Government and the community respectively, and potentially leaving an environmental disaster including aquifer damage.

Even if the mining were approved and it then proceeded, the likely contributions to state funds as listed in the EIS are really minor within the overall NSW economy, around $5 million only per year in royalties plus $3M in tax share and other derivatives from figures in the EIS. This amount would barely cover the salaries of government staff involved in past and future decision-making on the project, and of inspectors monitoring the activity. And it is doubtful that the social contributions claimed would be sufficient to alleviate the angst experienced by residents, the reputation loss of the Southern Highlands as a tourism destination, or the reduction in property values in the vicinity (already happening).

Dealing specifically with environmental matters, many such as groundwater integrity being cogently argued by other respondents to the EIS, I will refer only to the question of mine stability and the possibilities of harmful subsidence. In modelling by Hume's consultants of the stability of the various coal pillars that will not be extracted and are conceptually relied upon to avoid roof and overburden collapse, use is made of a limited number of physical property measurements on diamond drill core from the different lithologies (rock types) expected. These measurements would necessarily have been made on single 'solid' lengths of core, which would mostly have broken at their ends along fractures or weaknesses naturally present in the overall rock bodies and especially within the coal seam, which to an unknown extent (no data provided) will reduce the theoretical significance of those measurements. Furthermore, the individual physical property measurements, such as Young's Modulus and Poisson's Ratio, were actually quite variable within lithology categories, but only averages (in some cases trimmed of 'anomalous' values) have been used in modelling pillar behaviour. The 'abnormal' values actually measured on some specimens must imply locally 'abnormal' pillar strengths including weaker cases more likely to fail. We don't have the data to assess how many of these there might be, or whether they cluster in 'danger zones'. Little significance in the EIS is attributed to more shaly (weaker) lithologies directly above the proposed working section, including shale or mudstone horizons assigned to the Hawkesbury Sandstone, the upper (uneconomic) sections of the Wongawilli Seam, or those logged in some drill sections as Farnborough Formation.

The abundance of faults that could also contribute to instability is likely to have been underestimated in this area of compressive tectonic stress today and in the geological past. They would be difficult to detect in fractured drill core even if recoveries were high (no data provided), and would definitely not be detectable in holes drilled by methods producing only rock chips ("air rotary"; again no data provided on the proportion of cored versus open holes but the piezometer holes referenced in the groundwater section of the EIS are predominantly uncored). The EIS simply states that if faults and intrusives are encountered in initial developments the mine layout will be "modified appropriately". How so? And wouldn't this be too late? The EIS also refers to supporting the drives "where necessary" to keep voids open prior to infill with washery rejects, which surely means some collapse is anticipated. Many "inevitable" conclusions in the EIS are drawn from empirical results at other mines, not necessarily comparable.

Finally, no mention is made of the fact A349 lies within the seismicity zone once known as the Robertson-Moss Vale seismic belt. Even minor earthquakes might cause pillar and roof collapse during or after mine development.

Despite the intricate mine plan (far better than the initial Longwall proposal) and the confidence by Hume's consultants in its long-term stability, there is a non-zero risk of pillar collapse over a sufficient area to cause roof caving, goaf formation, and consequent harmful subsidence at the surface, even 'glory-holing in shallower parts of the proposed mine. McElroy and Associates (1980) note that roof conditions in the historical Murrumba Colliery were "very bad". This site is just west of A349, and exhibits Hawksbury sandstone directly overlying the Wongawilli Seam, just as presumed by Hume in assessing stability of its mine plan.

Despite these issues, on the face of it the Hume EIS is professional and well presented, and potentially persuasive to authorities. However before any approval of the EIS or of the mining lease applications a lot more information must be provided for assessment by Government and independent specialists. In reality I doubt the company could justify this additional expense in terms of the small scale yet large costs of the proposed operation, and its limited, if any, profitability. Far better for all concerned that the proposal be abandoned now. Should that not be the case, then any Government approval should include the strict condition that if, after commencement, events demonstrate that basic assumptions and conclusions in the EIS regarding mine stability, effects on the aquifer, etc., were wrong, then mining should be quickly terminated and any surface damage rectified with costs borne by the proponent. Perhaps there should be a limited trial under the Belanglo State Forest.

I confirm that I have not made any political donations, ever.

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