

## **Analysis of transcript: IPC meeting on United Wambo proposal 5/2/2019**

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### **Analysis of groundwater issues discussed at meeting:**

#### ***Mine voids/rehabilitation***

At a meeting held on 5 February 2019 between the Independent Planning Commission (**IPC**) and independent experts engaged by the Environmental Defenders Office NSW on behalf of the Hunter Environment Lobby to provide advice on the United Wambo Open Cut Coal Mine Project (**Project**) and associated modifications, the IPC stated that they welcomed further comment on groundwater issues raised by the proponent in its 5 February 2019 meeting with the IPC (**Proponent Meeting**). The following information is provided for the IPC's consideration.

There was a discussion at the Proponent Meeting regarding different options/scenarios for back-filling of proposed mine voids during rehabilitation of the site. Groundwater is mentioned twice – both in terms of the recovery of groundwater levels following cessation of mining – p.38 line 5 and secondly in terms of water quality in the proposed voids (p.41 & p.58). It is generally the case that if a mine void is left in the landscape, this will act as a permanent drain with groundwater flow directed towards the voids (forming a pit lake). If back-filling of the voids were to occur only to an elevation that is below the water table, then seepage will still result in formation of a pit lake or wet area. Hence, the constraint discussed on p.38 by Mr Wills is that the amount of backfilling would need to occur to a level higher than the water table, in order for the land to be able to be used for other purposes in future.

With respect to water quality, a pit lake which forms due to the seepage of groundwater into mine voids will be subject to evaporation, and this will typically result in the development of saline water (as is noted on page 41 and p59 by Mr Wills). The level of salinity mentioned here, calculated by estimating the water inflow-outflow and evaporation rates, is approximately one third of seawater, an undesirable quality should the water move out into the surrounding landscape. This is a fairly unlikely scenario if the mine voids act as permanent groundwater sinks – the most likely outcome if voids are not back-filled or only partially backfilled. However, short-term over-topping of the voids during extreme rain events is one potential risk.

On pages 59 and 60 there is discussion about how under a back-filling scenario, groundwater levels are modelled as re-bounding back up to a point where the groundwater is then directed back towards surface water bodies in the area, posing a potential water quality risk. This is a plausible scenario, although one which would depend on a) the final level to which the pit(s) is backfilled and b) the permeability / hydraulic conductivity of the material used in backfilling. It is generally the case that mine spoil and loose rock that would typically be used for back-filling is characterised by a high permeability, which will indeed generally result in relatively high rates of recharge, which in turn could result in the effect discussed by Mr Wills. However, as noted by Mr Pearson on p.61 of the

transcript, this depends on a number of assumptions – e.g. permeability of the material, recharge rates, detail of the final landform. Without viewing a detailed description of the modelling methodology and outputs on this specific issue it is difficult to further comment.

### *IESC Advice*

p. 42: At page 41-43 of the transcript, Ms Kruk raised the issue of remaining uncertainties regarding impacts of the project on water resources, and community concerns over water issues in the wider Hunter region, making reference to issues raised by the IESC in its 2016 advice. As discussed in my submission and presentation to the IPC later in the day on the 5<sup>th</sup> of February, I don't believe that all of issues regarding impacts on groundwater and connected surface water systems have been satisfactorily addressed through the work mentioned by Mr Merrell (page 42, line 15-20). While a stygofauna survey was conducted, there were some shortcomings in this survey and the scale of the investigation (and repeatability) are questionable. Similarly, the geochemical study provided some new and valuable information, but did not address concerns over heavy metal occurrences in surface water and groundwater. Issues regarding the complexity of ground-surface water interaction, and a more detailed analysis of possible effects on baseflow and ground-surface water exchanges along the Hunter River and Wollombi Brook, have not been addressed. These issues (and others) are discussed in my recent submission (and previous reports following the EIS and applicant's response to submissions).

In the transcript Mr Merrell makes clear that he believes all the issues raised by the IESC and other technical reviewers have been addressed, however he notes that the company 'don't have anything directly from them (the IESC) to say they are happy.' In previous assessments, such as the New Acland Stage 3 expansion project in Queensland, the IESC provided advice on proposed mining projects on multiple occasions during assessment at the request of the Department of the Environment. A further review from the committee would provide greater certainty as to whether indeed the issues raised have been comprehensively addressed.