The Hon Kevin Humphries MP
Minister for Natural Resources, Lands and Water
Minister for Western New South Wales

BN14/3249

Professor Brett Whelan
Acting Chair, NSW Mining and Petroleum Gateway Panel
GPO Box 39
Sydney NSW 2001

Dear Professor Whelan

I refer to the Gateway Application for the Caroona Coal Project near Quirindi NSW.

I have considered the input of the Independent Expert Scientific Committee and note their advice in relation to incomplete information and uncertainty in regard to impact predictions. As a result, there is not sufficient information available to allow for a proper assessment of the impacts of the proposal on water resources.

An outline of key issues in relation to impacts on water resources is at Attachment A, with a technical assessment from the Office of Water also attached for your reference.

I have asked that Mr Michael Bullen, Deputy Director General for Agriculture and Water be available to discuss this matter further with you. Mr Bullen may be contacted on 6391 3333 or by email Michael.Bullen@water.nsw.gov.au.

Yours sincerely

Kevin Humphries MP
Minister for Natural Resources, Lands and Water
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Encl.

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Attachment A: Advice on the Gateway Certificate application: Caroona Coal Project

Provided with consideration of the NSW Aquifer Interference Policy and the advice provided by the Commonwealth's Independent Expert Scientific Committee

1. Significant drawdown has been predicted in a number of existing groundwater works. However, none of these works are in the high value Namoi alluvial aquifers, and none of these works have water access licences. These bores are basic rights bores or not for water supply.

   In accordance with the Aquifer Interference Policy, make good provisions are required for all bores where a drawdown of greater than 2m is predicted.

   The proponent should ensure it consults with the affected bore owners as early as possible, and should consider writing and publishing a framework on its approach to developing make good provisions.

   Consultation on developing make good provisions is encouraged with the Department of Primary Industries, including the Office of Water and the Office of Agricultural Sustainability and Food Security.

2. Potential for cumulative impact to water resources in relation to other nearby mining projects is a significant community concern. The proponent has assessed potential cumulative impacts in relation to the proposed Watermark Coal Mine.

   In relation to groundwater drawdown, the modelling indicates that the cumulative impacts will not increase the number of groundwater works that will be drawn down by >2m.

   The cumulative assessment has found that reduction in baseflow to the Mooki River will be cumulatively impacted by both projects, leading to a peak cumulative reduction to baseflow of up to 0.9ML / day. Both proponents are expected to ensure that they hold sufficient licences for this reduction in baseflow, and should ensure that assessment of possible impacts on users and the environment is considered on a cumulative basis.

3. The project may result in groundwater take from multiple water sources in the Upper Namoi Alluvium. This is proposed to be managed by trading existing entitlement from Upper Namoi Zone 8, Mooki Valley (Quirindi—Pine Ridge Road to Breeza) Groundwater Source (Zone 8) to other water sources as required. However, transfers between water sources are limited by the water sharing plan that only permits transfers into Upper Namoi Zone 10, Warrah Creek Groundwater Source. The proponent will need to acquire licences from within the relevant water source to account for estimated take from each source. Total groundwater take across all Namoi alluvial sources is predicted to peak following the closure of the mine at 487 ML / year.

4. The proponent has predicted that there will not be any salinity impacts to the alluvial aquifers or the highly connected surface water, and the proposal is therefore considered acceptable in relation to water quality under the Aquifer Interference Policy.

5. The Office of Water and the Independent Expert Scientific Committee have made a number of further recommendations, and the proponent should address these in consultation with the Office of Water.

KEVIN HUMPHRIES MP
Minister for Natural Resources, Lands and Water
Minister for Western NSW

Technical assessment by the NSW Office of Water for the Minister for Natural Resources, Lands and Water

Caroona Coal Project – Application for Gateway Certificate

1. Purpose

To review the Preliminary Groundwater Assessment provided in application for a Gateway Certificate for the Caroona Coal Project.

2. Background to the Project

Coal Mines Australia Pty Ltd, a wholly owned subsidiary of BHP Billiton, is seeking consent to develop an underground coal mining operation in the New England - North West region of NSW. The Project is located approximately 40 km south east of Gunnedah. Expected coal output is 260 Mt over a mine life of approximately 30 years.

The proponent has made an application for a Gateway Certificate, which is a requirement for any State Significant Development mining or petroleum proposal which is proposed in areas where there is designated Biophysical Strategic Agricultural Land (BSAL). The proposal area contains approximately 2,215 ha of BSAL. This is a preliminary assessment made ahead of the regular planning and assessment process which will require a full Environmental Impact Statement (EIS).

Two documents have been examined in detail for this review:

- Caroona Coal Project Application for Gateway Certificate – Technical Overview
- Caroona Coal Project Application for Gateway Certificate – Appendix C: Preliminary Groundwater Assessment

A third document has been used as reference; Caroona Coal Project Application for Gateway Certificate – Appendix D: Subsidence Assessment.

The Technical Overview and Preliminary Groundwater Assessment have been reviewed in two parts:

- assessed against the NSW Aquifer Interference Policy (AIP), and
- review of the numerical groundwater model.

3. Review and Comment

General

1. The potential impact of the activity on the Mooki River has been assessed by the model, however the proponent has not identified and documented volumes of estimated take for any surface water sources. In turn, there has been no consideration of the licensing requirements for surface water take.
2. The groundwater model domain extends to a number of groundwater sources not identified and assessed for impact or volumetric take. Impact on these sources is likely to be nil or negligible, but need to be addressed by the proponent for completeness.
3. Volumes of take have been estimated for all potentially affected groundwater sources. Minor volumes are expected to be drawn from the Liverpool Range Basalt and from the Gunnedah–Oxley Basin MDB (Spring Ridge) Management Zone of the Gunnedah–Oxley Basin MDB water sources. Maximum estimated take from all Namoi alluvial water sources is approximately 460 ML/year, with the majority of take coming from the Gunnedah-Oxley Basin MDB (Other)

Management Zone of the Gunnedah–Oxley Basin MDB water source at an average of 1030 ML/year and maximum of 2300 ML/year. All estimates are very preliminary and shall be refined as part of the more detailed EIS model.

4. Water licensing for estimated groundwater take from the Upper Namoi Alluvial water sources is proposed to be managed by trading existing entitlement from Zone 8 to other zones as required. Dealing rules under the WSP restrict transfers between water sources, thus any such licenses will need to be acquired from water holdings within the applicable zone (apart from trades from Zone 10).
5. The subsidence impact assessment predicts land subsidence and surface cracking in areas above the long wall mining. This presents a risk that surface water flows could be diverted from the natural runoff process to percolate into the subsurface and eventually to the mine void. The assessment is silent on this risk and does not consider the potential for surface water take.
6. The closest long wall panel is within 250 m of the Mooki River. The Subsidence Assessment report identifies that there will be no impact on the Mooki River, however the groundwater modelling report estimates that water will be taken from the river. There is a potential connection between the mine and the Mooki River which requires further assessment.
7. Level 2 impacts (>2 m of drawdown) have been identified for 27 private bores within a highly productive groundwater source and 34 private bores within a less highly productive groundwater source. Maximum drawdown in any bore of 13.77m is predicted for the highly productive groundwater source, and 185.84m in a less productive groundwater source.
8. Of the bores with predicted level 2 impacts, none are within the alluvial aquifers and none have Water Access Licenses. The affected bores are used for Basic Rights (stock and domestic) or are not in use for a water supply.
9. It is not clear if the proponent has modelled drawdown impacts on private bores in less highly productive water sources that are not located on Biophysical Strategic Agricultural Land, and this should be addressed in any future studies.
10. The proponent has undertaken to develop risk mitigation, prevention and avoidance strategies as part of the EIS, and to define a groundwater monitoring strategy, trigger levels and a trigger response action plan in a Groundwater Management Plan. For bores affected by Level 2 impacts, the proponent has undertaken to "make good" the impacts by deepening or relocating bores, or by providing an alternative water supply. At the Gateway stage, the assessment and forward undertakings proposed by the proponent are considered appropriate.
11. The proponent has undertaken to develop a complete site water balance. We recommend that this include consideration of dewatering of the coal prior to mining, groundwater entering the mine during the mining, and post mining groundwater aquifer re-stabilisation. Groundwater licences will also be required for all water pumped during mine operations.

Groundwater Model

12. For the Gateway process, the AIP requires impact estimates based on a simple modelling platform, using suitable baseline data, and that is fit-for-purpose. For the purpose of this review, this is interpreted to mean that the Gateway application should demonstrate the proponent's capacity, intention and strategy to develop an appropriately complex model to be used at the EIS stage for better assessment of potential impacts.
13. The proponent has characterised the scope of the model developed for Gateway and compared it with the scope expected for the more complex model to be developed for the EIS stage. The general limitations of the preliminary model are acknowledged, and the proponent

provides a strategy and capacity for the development of the model to a complexity suitable for the EIS.

14. The conceptual model has been developed using an appropriate level of literature and data review, and appropriate processes relating to the dynamics of the groundwater system are captured. Inclusion of all major relevant processes provides a capacity to estimate impacts to the extent allowed by its limited complexity.
15. The proponent has classified the model against the standards of the Australian Groundwater Modelling Guidelines leading to an assessment of a "Class 2" ("medium") confidence level. This classification is considered appropriate.
16. Spatial and temporal discretisation are somewhat coarse, but are considered appropriate for a Gateway model. The model domain is large in order to limit the effect of boundary conditions and to ensure all potential impacts are analysed.
17. Model parameterisation is considered to adequately represent the dominant processes impacting the groundwater system for the purpose of Gateway modelling. A brief assessment of the quality of transient calibration is provided and assessed by the proponent as "good". The calibrated parameters and resulting water balance appear reasonable in the context of a Gateway model.
18. Mine inflow is represented using the MODFLOW drain package applied progressively over time in accordance with the mine schedule. This representation is considered acceptable.
19. The model is used to predict groundwater level drawdown and to estimate induced fluxes between water sources and the volume of water taken due to the Project. Maximum drawdown is presented as a key impact consideration, however the consideration of the timing of maximum drawdown is not provided.
20. The potential impacts of the Watermark Coal Project located immediately to the north are applied cumulatively to the Caroona impacts.
21. The sensitivity of model predictions to model parameters is assessed in a limited way. Vertical hydraulic conductivity of the layers above the coal seam, assumed to be the dominant parameter affecting mine inflows, is tested to one magnitude higher. The dominance of this parameter compared to others is not proven and must be evaluated to a higher degree in the EIS model. The impact of variability of other model parameters should also be assessed in the EIS model.
22. The location of river cells for Werris Creek in the model appears inconsistent with its mapped position. This should be checked by the proponent and rectified as required.
23. The model exceeds the minimum requirements for, and is therefore fit for the purpose of, a Gateway application. It is anticipated that the EIS model would be developed at least to a level of complexity pledged by the proponent and, certainly, to a level commensurate with assessing future impacts of the proposed activity with a high degree of reliability. The groundwater model provided with the EIS should be subjected to a significantly greater level of scrutiny than has been applied to the Gateway model.

5. Advice from the Independent Expert Scientific Committee

1. The advice provided by the IESC is generally consistent with the assessment of the NSW Office of Water and many of the recommendations overlap. Recommendations requesting additional studies are useful and supported.
2. However, there appears to be an expectation for the numerical model to be more advanced than the Office of Water would generally consider required at the Gateway stage.

6. Recommendations

1. The proponent should adopt the recommendations for future work described in Section 8.1 of the Preliminary Groundwater Assessment.
2. The potential impacts on all groundwater sources located within the model domain should be documented, even where impacts are expected to be nil or negligible.
3. Impacts upon all potentially affected surface water sources (including the impact of surface cracking due to land subsidence) should be assessed, the volume of estimated take quantified, and the licensing requirements for that take be considered.
4. The proponent should ensure that possible drawdown impacts on all private bores are estimated and documented.
5. The proponent should re-examine their strategy for water licence acquisition with a full understanding of the trading rules that apply to all relevant Water Sharing Plans. This should include an understanding of the process for the release of Controlled Allocation for water sources which are under committed.
6. The proponent should evaluate the risk and document potential access restrictions (eg, Available Water Determinations) due to growth or variation in water use, and in the case of surface water, river flows.
7. A complete project water balance should be provided in the EIS quantifying all water take and water movement between all surface and groundwater sources. Methods for the metering or monitoring of take, and reporting of, should also be provided.
8. All bores quoted in future reports should be uniquely identified by the NSW standard GW bore numbering system. Where applicable, water licence identifiers should accompany this information.
9. The EIS model should avoid unnecessary approximations employed in the Gateway model – such as data set extrapolation (e.g. section 3.3.2).
10. The EIS model should employ spatially variable hydraulic properties where possible, especially for the layers representing the alluvial groundwater system.
11. The EIS model should contain a higher level analysis of model parameter sensitivities and a more reliable (or better documented) identification of parameters with greatest potential to affect model outcomes. Such analysis should guide the construction of scenarios used for predictive modelling.
12. The EIS model should be developed to the level of discretisation required such that stream leakage can be analysed with a greater degree of confidence than for the Gateway model. The EIS model should be a calibrated transient model, providing some capability for well-defined stream leakage properties so that stream leakage should not need to be totally controlled by layer hydraulic properties. Development of the EIS model might also entail an assessment of the relative merits of the MODFLOW RIV and SFR packages with justification for the choice of package provided in the report.
13. Where the modelled potential impact is represented by "maximum" drawdown, this should be accompanied with information about timing and duration of impact. A clearer indication of these would improve impact assessment.
14. The need for more rigorous assessment of model parameters is required. The EIS model report should justify the focus on identified sensitive parameters used for predictive scenarios.

As a more complex model, the EIS model will have considerable scope for parameter insensitivity and uncertainty with potential for a high degree of variability of predicted model outcomes. Documentation of the EIS model should include justification for chosen predictive scenario parameter values and discussion of predicted outcome uncertainty.

15. The proponent should ensure it consults with the affected bore owners as early as possible, and should consider writing and publishing a framework on its approach to developing make good provisions.
16. Refine the scale of the simulated drawdown and recovery maps to allow a clearer assessment of the depth of maximum depressurisation for model layers 5 to 9, and when those effects occur.