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EPA Advice on Modification Report

Dear Mr Nevill

Thank you for the request for advice (Public Authority Consultation PAE-14598501), requesting the review by the NSW Environment Protection Authority (EPA) of the Modification Report for the proposed modification of the major project approval (MP10_0138 Mod 7) for the Maules Creek Coal Mine.

The EPA has reviewed the following documents:

- *Maules Creek Coal Mine Landform Modification – Modification Report – Mail Report and Appendices A – E*, Whitehaven Coal, Undated;
- *Appendix A, Maules Creek Coal Mine Landform Modification Noise Assessment – Version F*, Wilkinson Murray, February 2021;
- *Appendix B, Air Quality Assessment Maules Creek Coal Mine Landform Modification*, Todoroski Air Sciences, 10 December 2020;
- *Appendix C, Maules Creek Coal Mine Landform Modification Surface Water Assessment*, WRM Water and Environment, 29 January 2021;
- *Appendix D, Maules Creek Geomorphic Landform Design Report*, Golder Associates Pty Ltd, November 2020; and
- *Appendix E, Maules Creek Landform Modification Groundwater Assessment*, Australasian Groundwater and Environmental Consultants Pty Ltd, 9 December 2020.

The EPA understand the proposal is for:

- An increase in the height and footprint of the mines Northern Overburden Emplacement Area (NOEA) to assist in the transition to full in-pit dumping of waste rock; and
- The relocation of water management infrastructure, topsoil stockpiles, an explosive reload area and access roads to accommodate the NOEA footprint extension.

Based on the information provided, the proposal is subject to an environment protection licence under sections 43 and/or 48 of the *Protection of the Environment Operations Act 1997* (POEO Act) for Coal works, Mining for coal and Crushing, grinding or separating (clauses 10, 28 and 16 of Schedule 1 of the POEO Act respectively).

The EPA has reviewed the Modification Report and Appendices and notes that they do not provide the information it requires to ascertain what additional conditions it may need to recommend to

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ensure the modified approval can be appropriately regulated, if it is approved. The EPA requests additional information to be able to assess the proposal.

The EPA has the following additional comments and recommendations:

1. Matters to be addressed prior to determination

a. Noise Assessment (NA)

The EPA recommends that the following issues identified through its review of the NA are addressed to better inform development assessment decisions around this proposal:

- i. The NA presents results in Table 6-9 that show predicted operational noise levels from the Modification will achieve both the adopted *Noise Policy for Industry* (NPfI) criteria and the current Project Approval criteria at all privately-owned residences. These predicted levels assume the implementation of a range of noise mitigation and management measures as detailed in Section 4.2, including adjusting mine operations with real-time and proactive measures, informed by a monitoring and forecasting system, such as:
 - relocating equipment to acoustically protected areas;
 - reducing operating equipment numbers or speeds;
 - changing dumping strategies and/or ceasing operations for certain periods.

For some receivers, these real-time and proactive measures are required to achieve the criteria, as is noted at the bottom of Table 6-9.

It is unclear from the NA what degree of real-time and proactive mitigation is required to achieve the criteria at all receiver locations. This mitigation is based on an operator developing operational responses to notifications from real-time monitoring and then relaying these to the Open-Cut Examiner for actioning and implementation (Section 4.4).

***Recommendation:** The proponent should demonstrate that this process, with its potential for delays and any necessary human intervention, is sufficiently timely and reliable so as to not present the proponent with an unacceptable compliance risk.*

The NA should be amended to show the predicted operational noise levels at privately-owned residences prior to the use of real-time and proactive mitigation measures, and detail what real-time and proactive measures have been included in the model (and their associated noise reductions) to achieve the criteria.

- ii. The EPA notes that the assessment of low-frequency noise in Section 6.5 of the NA, which found that no modifying factor correction for low frequency noise is applicable for the Mod, has been carried out against the criteria set out in Fact Sheet C of the NPfI, using low frequency measurement data from a noise audit at Bulga Village in the NSW Hunter Valley. The Bulga measurements were conducted at an approximate distance of 3km to 4 km from the relevant mine, which is lower than the distances to receivers at Maules Creek (4.6km to 9.7km, from Table 6-6).

***Recommendation:** The proponent should provide and use receiver-based measurements of noise emissions from the existing operations at Maules Creek to develop site-specific low frequency spectrum shapes, as recommended in *Acoustics Australia (2020), Volume 48: 149-180 – Forum Article – ‘An example approach to consider low frequency noise in the context of the NSW Noise Policy for Industry’*. Alternatively, the proponent should provide robust evidence to justify the Bulga measurements as representative of the operations at Maules Creek considering the differing source to receiver distances noted above.*

b. Surface Water Assessment (SWA)

- i. **Clarification is required regarding whether controlled discharges from sediment basins are proposed**

The SWA provides inconsistent information about controlled discharges from sediment basins, indicating that discharges could potentially occur while the water balance assessment assumes they would not. It is unclear whether the model assumption of no

controlled discharges from sediment basins reflects the proposed water management system

ii. Further details of the water balance modelling approach are required to ensure it reliably predicts discharge frequency and volume

The SWA provides limited details of the modelling approach and does not provide details of and justification for key model inputs, assumptions and limitations. For example, it is unclear whether the model assumption of no controlled discharges from sediment basins reflects the proposed water management system. It is also unclear whether an appropriate long-term rainfall dataset from a nearby meteorological station was used. It is also not clear how evapotranspiration was estimated and used in the model.

Figures 5.2 to 5.5 of the SWA indicate that the model assumes the storages are empty at the start of the model period. This is unlikely to reflect the actual mine water levels.

These figures also appear to predict that for most days during the model period the probability of exceeding the maximum operating volume is greater than 1% under both the current and proposed scenarios. This appears inconsistent with the statement, “The probability of spills from MWD or RWD is less than 1% (1 in 100) AEP for both the current MCCM configuration and the Modification”.

It is unclear whether modelled exceedances of the maximum operating volume equate to mine water spills. If the applicant plans to cease pumping to the Mine Water Dam to manage water levels and prevent spills, this does not appear to be reflected in the water balance model.

***Recommendation:** To ensure that the water balance reliably predicts the likely frequency and volume of discharges (including mine water overflows and controlled discharges and managed overflows from sediment basins) it is recommended that the applicant:*

- *provides further details and justification for the modelling approach, including model inputs, assumptions and limitations, and the 4-year model simulation period*
- *revises the water balance model to ensure that it reflects the current and proposed water management systems, including in relation to:*
 - *management of water levels within the mine water management system*
 - *initial water levels within the mine water storages*
 - *any controlled discharges from sediment basins and management of mine water levels*

It is also recommended that the applicant clarifies whether predicted exceedances of the maximum operating volume equate to predicted mine water spills. If exceedances equate to spills, then clarification is required regarding why the predicted probability of exceeding the maximum operating volume appears to exceed 1% on most days while the predicted annual expected probability of spills is less than 1%.

iii. If controlled discharges are proposed, revised modelling is required to include these discharges. If the revised modelling predicts increased frequency and/or volume of discharges, a simple water pollution impact assessment is required consistent with s45 POEO Act requirements.

***Recommendation:** The pollution impact assessment should:*

- *provide details of the practical measures that would be implemented to avoid discharges (e.g. reuse; transfers to the mine water system) and minimise potential water pollution (e.g. erosion controls)*
- *estimate the discharge frequency and volume*
- *characterise the expected quality of the proposed discharges in terms of the concentrations and loads of all pollutants present at non-trivial levels*
- *assess the potential impact of the discharge on the environmental values of the receiving waterway with reference to relevant guideline values for slightly to moderately*

disturbed ecosystems from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018; ANZECC, 2000)

- *where relevant, identify mitigation measures to address identified impacts.*

c. Air Quality Assessment (AQA)

i. The expected change in potential impacts from current operations lacks clarity

The Modification does not seek to change the project boundary, the approved development extent, the mining method, the operating hours, the mine life, the ROM coal production or the surface area and depth of the open cut. Therefore, when compared with the approved activities, it would appear that the proposed modification only involves changes to the location of the sources (i.e. location where activities will be undertaken).

The AQA has also modelled emissions from 2018. The EPA has interpreted that this modelling scenario is representative of approved operations. However, the AQA does not present estimated emissions, predicted ground level concentrations for this scenario or demonstrate that this scenario is representative of current approved operations.

Given that the modification does not seek to alter approved capacities or mining methods, the proposed modification may not result in a significant change in particulate matter emissions or potential impacts from current operations. However, the AQA does not include sufficient information (i.e. results from a modelling scenario demonstrated as representative of approved operations) to confirm (or otherwise) this conclusion. As such further information is required to understand the potential change in emissions and potential impacts from current operations.

Recommendation: *The AQA is revised to:*

- *include a modelling scenario representative of the Approved Operations. And/or demonstrate that the 2018 modelling scenarios is representative of Approved Operations*
- *present the corresponding emissions inventory (TSP, PM₁₀, PM_{2.5}) for the Approved Operations scenario and detailed discussion on the methodology and parameters for estimating emissions for the Approved Operations Scenario*
- *include incremental ground level concentrations predicted from the modelling scenario representative of Approved Operations;*
- *include a comparison of particulate emissions and predicted impacts between currently approved operations and proposed operations.*
- *provide analysis and discussion regarding the significance of the predicted change in emissions and/or impacts due to the proposed modification.*

ii. The methodology adopted for assessing cumulative impacts is not clear

Annual cumulative impact:

The AQA (section 5.4.2) indicates that the assessment includes emissions from the Boggabri and Tarrawonga operations. Further, 5.4.3 indicates that in order to estimate the 'Residual' background levels, modelled emissions from the Maules Creek, Boggabri and Tarrawonga and mines were subtracted from the measured monitoring points. It should be noted that the exhibited 'Residual' background (i.e. concentrations from non-modelled sources) is equivalent to the average difference between the measured and modelled concentrations rather than the actual estimated differences.

Further, there is uncertainty regarding:

- the number and location of monitoring locations selected for the analysis and calculation of the 'Residual' background. For instance, it is unclear whether all the monitoring locations presented in Section 3.1 were included in the calculation. This is important, as data from non-continuous monitoring instruments (i.e. HVAS) should not be used to determine annual

average concentrations¹. An annual average based on data recorded by a HVAS can underestimate the actual background levels, thus affecting the estimated 'Residual' background levels.

- the effect on the exhibited cumulative impacts as a result of using the average difference rather than the actual difference between the measured and modelled concentrations across the modelling domain.

***Recommendation:** Where the analysis of the predicted change in emissions and/or impacts due to the proposal is significant when compared with current approved operations (as per item i above), the AQIA must be revised to include further information regarding the methodology for assessing annual cumulative impacts. In providing further information consideration must be given to:*

- *a summary table showing the data used to calculate the 'Residual' background concentration. This table must include but is not limited to:*
 - *the predicted annual concentrations and corresponding locations where the data was extracted from the modelling domain; and*
 - *the measured concentration and the monitoring location/instrument where the data was recorded.*
- *discussion on the implications of adopting the average rather than the actual difference between the measured and modelled concentrations on the outcomes of the impact assessment.*

24-hr cumulative impact:

The AQA indicates that since the Maules Creek mine was operating in 2018, it would have contributed to the measured levels of dust in the area. In order to avoid "double counting" concentrations from the mine, emissions from on-site activities undertaken during 2018 were modelled to estimate the mine's 'contribution'.

While there are merits to this approach, it also presents some some potential issues adding uncertainty to the presented results and conclusions:

The approach used to estimate predicted increments requires clarification

Although unclear, it is likely that predicted increments presented in Appendix F are not the predicted increments from each modelling scenario, but rather the difference between predicted increments for the proposed operations in 2021, 2023, 2025 and the predicted mine's contribution in 2018 (i.e. predicted increments in 2018). If this is the case, concentrations presented in Appendix F are not the actual predicted increments due to the proposal but rather the change in increments between each modelled year and 2018. This could explain some of the negative results presented in this Appendix.

Whilst it is understood that this approach was taken to avoid "double counting" the mine's contributions to the total cumulative impacts, negative increments are unintuitive and therefore results in Appendix F should be revised to allow a robust and transparent review.

Predicted cumulative impacts results require further information and justification

It is noted that the AQA does not include detailed discussion regarding the information or assumptions made in the preparation of the 2018 modelling scenario.

Further, the AQA does not include detailed data analysis of the predicted ground level concentrations against the measured concentrations in 2018. This analysis is required to demonstrate the robustness of the approach. For instance, this analysis can help identify whether there are any days of the year when the daily predicted mine's contribution in 2018 was larger than measured background levels, resulting in negative background levels.

The contemporaneous assessment does not account for a potential increase in emissions from other mine operations

¹ Hi Vols (HVAS) collect 24-hour averaged PM₁₀ data every 6 days.

The background levels included in the contemporaneous assessment include measured background concentrations in 2018 (which include the surrounding mining operations) to estimate cumulative impacts. This means that the contemporaneous results presented in Appendix F do not account for the expected changes in future contributions from the adjacent mines. For instance, it is noted that based on information provided in Table 5-4, there are expected changes in annual emissions and therefore daily emissions.

Subtracting predicted from measured concentrations adds uncertainty to the exhibited results

Modelling scenarios are at best an “estimation” of the actual activities. For instance, when comparing the activities locations and rates for a day of the modelling year (e.g. 2018) against the ‘actual’ activities location and rates (i.e. real-life) on that same day, it is likely that these locations and rates will differ. These discrepancies in location and rates will lead to differences between predicted and measured concentrations.

The above is of particular interest in the context of the approach undertaken for the contemporaneous assessment as these differences between measured and predicted concentrations can overestimate (or underestimate for that matter) the mine’s contributions in 2018.

Over or under estimation of the mine’s contribution in 2018 will have a direct effect on the cumulative and contemporaneous assessment. If the modelling scenario for 2018 overpredicts concentrations, subtracting the overpredicted concentrations from the measured background levels in 2018 can result in:

- negative background levels, which cannot occur in real life and therefore indicate deficiencies in the adopted assumptions and in the approach;
- an underestimated ‘Residual’ background to be used in the contemporaneous assessment and therefore underestimating cumulative impacts.

Given that the AQA does not include a detailed description of the approach to account for background levels and the mine’s contribution in 2018 there is significant uncertainty related to the results and conclusions it presents.

Recommendation: Where the analysis of the predicted change in emissions and/or impacts due to the proposal is significant when compared with current approved operations (as per item 1), the AQA must be revised to include further information regarding the methodology for assessing 24-hour cumulative impacts. In providing further information, consideration must be given to:

- *presenting a clear and transparent, step by step list of the method adopted for undertaken cumulative assessment (i.e. contemporaneous assessment);*
- *for the top 3 most impacted receptors, for each modelling scenario, presenting contemporaneous cumulative results in tabular form showing:*
 - *the adopted background concentrations for 24-hr cumulative impact assessment;*
 - *the predicted mine’s contribution to the background concentrations;*
 - *the predicted increments for proposed operations;*
 - *the predicted increments from other mine operations (noting that emissions are predicted to increase in future years); and*
 - *the cumulative concentrations for the whole premise (including the modification);*
- *a comparison and detailed dataset analysis of the predicted mine’s contribution in 2018 against the measured concentrations (analysis of the predicted mine’s contribution in 2018 to background levels);*
- *detailed discussion to inform how the uncertainty related to the adopted approach was considered and what it means for the cumulative results; and*

- *if applicable, detailed discussion on the implications of not including changes in future adjacent mine's contributions on the outcomes of the impact assessment*

2. Matters to be addressed with conditions

a. Noise Assessment

Two sets of criteria have been applied in the NA for this Modification. The first set of criteria are the noise limits under the current Project Approval (10_0138) for the Maules Creek Coal Mine. These limits are LAeq(15min) 35 dBA Day/Evening/Night for all privately-owned residences (excepting Property 108 which has specific LAeq(15min) criteria of 35/39/39 dBA Day/Evening Night). The Project Approval also sets a night-time sleep disturbance criterion of LA1(1min) 45 dBA at all privately-owned residences.

The second set of criteria, drawn from the Noise Policy for Industry (NPfI), which as EPA's current policy on industrial noise, have been used as guidance in the preparation of the NA for this Modification. The lowest criteria available under the NPfI have been used, being LAeq(15min) criteria of 40/35/35 dBA Day/Evening/Night and a night-time sleep disturbance criterion of LAmax 52 dBA.

The EPA notes that for this Modification, the more stringent of the two sets of criteria are the noise limits in the Project Approval. The Project Approval (10_0138) was prepared by the then Planning Assessment Commission (PAC) and contains a number of other specific conditions in Schedule 3 of the Approval, such as Condition 17 which relates to the temperature inversion class to be applied to the Project.

Recommendation: The existing noise limits in the Project Approval should continue to apply to this Modification, if approved, in accordance with Item 6 of the Implementation and transitional arrangements for the NPfI. The EPA also recommends that in accordance with Item 8 of these same arrangements, the Project Approval for the Modification, if approved, should be amended to assess applicable modifying factors according to Fact Sheet C of the NPfI.

3. Minor matters

No minor matters that require additional action have been identified by the EPA at this stage of the assessment process.

If you have any questions about the EPA's response, please contact the undersigned on (02) 6773 7000 or via email at Armidale@epa.nsw.gov.au.

Yours sincerely



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