Department of Primary Industries

OUT15/28820

Ms Rose-Anne Hawkeswood
Resource Assessments
NSW Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

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Dear Ms Hawkeswood,

Narrabri Coal Project Modification 5 (MP 08_0144 Mod 5)
Response to exhibition of Environmental Assessment

I refer to your email dated 24 September 2015 requesting advice from the Department of Primary Industries (DPI) in respect to the above matter.

Comment by DPI Water
DPI Water has reviewed the Environmental Assessment for the Narrabri Coal Project Modification 5. DPI Water's key comments are outlined as follows with detailed comments on the surface water and groundwater assessment provided in Attachment A.

Groundwater Assessment

DPI Water considers the following must be addressed prior to determination of the proposed modification.

- DPI Water recommends that Narrabri Coal be required to source adequate groundwater entitlement from the Gunnedah - Oxley Basin Murray Darling Basin Groundwater Source to cover the predicted groundwater impact of 1,009 ML, prior to the commencement of the modified activity. Narrabri Coal currently have an entitlement of 818 ML, which gives them a shortfall of 191 ML. A condition or commitment from the proponent to obtain this is recommended.

- The groundwater assessment indicated the water table impacts at two bores are predicted to exceed the Level 2 impact assessment consideration of the NSW Aquifer Interference Policy. Make good provisions are therefore required and should be described and committed to by the proponent prior to the commencement of the modified activity.

- Clarify the location of the two fracture zones and the constrained zone to aid in understanding the subsidence and fracturing processes. It is suggested a graphic figure be provided showing the extent of the fracture zones and its implications for vertical permeability. An explanation is requested as to why cracking will not go to the surface and why affected surface flows will not percolate down to the mined area.

- Clarify the discrepancy in the groundwater model of the 15 metres between the modelled and observed initial heads. The modelled initial head needs to reflect as close as possible to the observed initial head.

- Clarify where the water is going that prevents the groundwater levels recovering to the initial levels. Noting that this may be an issue with boundary conditions used in the model for the Pilliga Sandstone layer. The current predictions of groundwater levels recovering to 3m below initial levels after 120 years are a concern and needs to be discussed and justified.

- The Main Report is recommended to reflect what is published in the Appendices. There are inconsistencies between Table 8 in the main report and Table 18 in Appendix B which need to be clarified.

Surface Water Assessment

DPI Water considers the following must be addressed prior to determination of the proposed modification.

- The assessment outlines as a result of the modification there are going to be major impacts on the creeks, however the assessment concludes the geomorphic condition of the creeks won't be changed beyond the original assessment. It is unclear how the geomorphic condition of the creek will not be changed as a result of the major impacts predicted. Clarification is required.

- Clarify requirements for surface water licences to cover surface water take from regulated and unregulated rivers due to impacts on the surface water flows off site or as a result of surface cracking. Adequate entitlement will need to be obtained to cover the predicted impact and the proponent is requested to consider the market depth to obtain the necessary entitlement.

- The surface water assessment outlines the management actions and contingency measures for potential subsidence impacts on watercourses are outlined in the Extraction Plan Water Management Plan. It is requested this information be included in detail in the documents for this modification, to allow for an adequate review.

General Recommendation

- It is recommended a new groundwater model is built using MODFLOW USG for future reviews (The calibration statistics have not improved in the last two

versions of the model V3 and V4, and discrepancies exist in the initial heads and the calibrated heads. The Modflow USG platform may assist in improving the calibration statistics and the discrepancies).

For further information please contact Christie Jackson, Water Regulation Officer, (Tamworth office) on (02) 6763 1426 or at christie.jackson@dpi.nsw.gov.au.

Yours sincerely

Mitchell Isaacs
Director, Planning Policy & Assessment Advice
16/10/15

Attachment A

Narrabri Coal Project Modification 5 (MP 08_0144 Mod 5)
Response to exhibition of EIS
Detailed comments - DPI Water

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1. SURFACE WATER ASSESSMENT

- The surface water assessment outlines a number of predicted subsidence impacts that could occur beneath Pine Creek, Pine Creek Trib. 1, Pine Creek Trib. 3, Kurrajong Creek, Kurrajong Creek Trib.1 and Kurrajong Trib. 2. These impacts include substantial in stream and over bank ponding, sedimentation of the channel in ponded areas, and some of the first order channels may drain into the major watercourses at alternate locations and cause localised bank scour. The surface water assessment outlines the impacts are generally consistent with the currently approved impacts however it is acknowledged the predicted impacts for the modification are moderately larger due to the more detailed LIDAR survey data available for this assessment.
- The assessment outlines as a result of the modification there are going to be major impacts on the creeks, however the assessment concludes the geomorphic condition of the creeks won't be changed beyond the original assessment. It is unclear how the geomorphic condition of the creek will not be changed as a result of the major impacts predicted.
- The surface water assessment outlines a number of water licences held by the company which authorise extraction from the Namoi River. The report outlines no additional water access licences would be required. However, the surface water assessment outlines some first order channels may drain into the major watercourses at alternate locations. It appears there is the potential for surface water loss from these minor watercourses but no indication of volumes. The proponent is requested to clarify any additional surface water take and will be required to obtain sufficient entitlement in the relevant water sources.
- The surface water assessment outlines the management actions and contingency measures for potential subsidence impacts on Pine and Kurrajong Creeks and their tributaries are outlined in the Extraction Plan Water Management Plan. Whilst the main report for the modification includes a brief description of mitigation and monitoring measures, it is considered this information should be included in detail in the documents for this modification. The modification documents should be stand alone and the reviewer should not have to source previously approved documents to understand the proposed mitigation and management measures.

2. GROUNDWATER ASSESSMENT

- Version 4 of the groundwater model seems to be performing better (Figure 15 A, Figure 16 B) or as well as version 3. However, overall calibrations statistics provided in Table 13 for the two versions suggests that version 3 is better calibrated than version 4. There have been three updates to the original model already, and there's a need to monitor and periodically update a model for the mine. When next updating the model it is suggested that a new model is built using MODFLOW USG, for future reviews. The calibration statistics have not improved in the last two versions of the model V3 and V4. Discrepancies exist in the initial heads and the calibrated heads. The Modflow USG platform may assist in improving the calibration stats and the discrepancies.

- There seems to be a variation between observed initial heads, and the model's initial heads. This may be due to the use of interpolated heads as initial heads in the model. The hydrograph for the bore P6 (Figure B2) has water levels between 236-237m AHD. This is less than the model starting head of 252m AHD in Figure 34. There is a discrepancy of 15 metres between the modelled and observed initial heads that needs to be clarified. The modelled initial head needs to reflect as close as possible to the observed initial head.

- The proposed modification seeks to increase the width of longwalls and reduce the number of longwalls, essentially to remove the down-time of mining operations, to accelerate the rate of mining. Overall footprint of the mine will be the same as that already 'approved'. Hence the long-term (100 years or more) impacts of the 'approved' proposal and 'modified' proposals on groundwater resources are expected to be the same. However, due to accelerated mining, the dewatering will be at a higher rate in the case of the 'modified' mine than in the case of 'approved'. As anticipated, the model predicts accelerated drawdown due to accelerated dewatering if the modified proposal is implemented (Figures 39 and 40).

- In the long term, DPI Water expects the groundwater levels to recover to initial levels, because there are no changes to the recharge processes and or flow paths (as mine location and geometry has not changed). However, Figure 34 and 35 show that the recovered levels are 3m below the initial levels. Pilliga Sandstone groundwater levels are not recovering to the original levels, even after 120 years. This is a matter for concern. Figure 41 shows drawdown as only 10cm less than the original level and mining does not alter recharge processes; it only alters the flow paths. As such clarification is required to demonstrate where the water is going that prevents the groundwater levels recovering to the initial levels. It is noted that there may be issues with the boundary conditions used for Pilliga Sandstone layer producing these results.

- Aquifer Interference Policy for the GAB Southern Recharge Zone recommends a maximum of 2m decline of groundwater levels at any water supply work. The Environmental Assessment recognises that there will be impacts greater than 2m (up to and greater than 10m) in two bores, and refers to the Water Management Plan for the make good provisions. Details of such 'Make Good Provisions' need to be provided in this report.

a) <u>Groundwater licence entitlement to cover predicted take</u>

In Appendix B Groundwater assessment:

"*it is noted that NCOPL holds sufficient licences to cover the predicted impacts for the Approved and Modification mine plans, with the exception of the NSW Murray Darling Basin Porous Rock Groundwater Sources, Gunnedah - Oxley Basin MDB Groundwater Source (818 ML/annum held). NCOPL would monitor underground mine inflows versus model predictions and obtain additional licence(s) volumes of this water source to account for actual inflows, as necessary*".

In the main report the following tables are listed:

Table 7 Groundwater Licence Summary

Licence Number	Description	Valid to	Extraction Limits	Relevant Water Sharing Plan
Water Management Act, 2000				
WAL15922	Water Supply	Perpetuity	248 ML/year	Assigned to the Southern Recharge Groundwater Source under the Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2008.
WAL20131	Water Supply	Perpetuity	150 ML/year	Upper Namoi Zone 5 Namoi Valley (Gin's Leap to Narrabri) Groundwater Source for the Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003
WAL12833	Water Supply	Perpetuity	67 ML/year	
WAL29549	Mining - Low Security	15 January2025	818 ML/year	Gunnedah – Oxley Basin Murray Darling Basin Groundwater Sources under the Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011[1]

Source: After HydroSimulations (2015).

1 Issued in the Gunnedah – Oxley Basin Murray Darling Basin (Other) Management Zone.

Table 8 Groundwater Licensing Requirement Summary

Water Sharing Plan	Management Zone/Groundwater Source	Predicted Annual Inflow Volumes Requiring Licensing (ML/year)	
		Currently Approved	Modification
Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2008	Southern Recharge Groundwater Source	204	179
Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003	Upper Namoi Zone 5 Namoi Valley (Gin's Leap To Narrabri) Groundwater Source	122	110
Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011 Gunnedah – Oxley Basin	Murray Darling Basin Groundwater Sources[1]	856	1,009

Source: After HydroSimulations (2015).

- Water licence requirements have not been adequately addressed, the mine currently has access to 818 ML from the Gunnedah - Oxley Basin MDB Groundwater Source, but they require 1,009 ML. Currently a deficit of 191ML of entitlement needs to be sourced. (EA Table 8 – reproduced above).

b) Greater than 2m drawdown and make good provision

- The minimum 2m impact for the Aquifer Interference Policy will be exceeded in two bores. Mitigation measures for the two bores impacted by more than 2m have not been addressed in the reports. The report refers to the URS Australia (2013) Narrabri Mine Water Management Plan, but no further detail. The URS Australia (2013) Narrabri Mine Water Management Plan is available on the web but has not been submitted to DPI Water for review.

c) Uncertainty of surface water requirements

- The Environmental Assessment has not addressed take from the surface water that would normally flow down the system but may be now diverted into the mine from the cracking to the ground surface. The relevant Water Sharing Plan (WSP) that covers this surface water is WSP for the Namoi Unregulated and Alluvial Water Sources 2012 and the relevant water source is the Eulah Creek Water Source. (Narrabri Coal has 2,034 unit shares).

d) Inconsistencies between Table 8 (Main Report) and Table 18 (Appendix B)

The EA states that:

"*the modelling showed that groundwater inflows would be similar to predictions for the existing/approved underground mines layout and previous predictions, albeit the peak inflows would occur earlier in the mine life*". The predicted input "*from the start of mining, predicted rates of mine inflow increase progressively for both layouts, to peak values of 3.52 ML/day (approximately 1,290 ML for the year) and 3.77 ML/day (approximately 1,380 ML for the year) for the currently approved and modified layouts. This is an increase of 90ML/yr*".

In Appendix B Groundwater Assessment:

Table 18. Groundwater Licensing Summary for Narrabri Mine

Water Sharing Plan	**Management Zone/Groundwater Source**	**Predicted Annual Inflow Volumes requiring Licensing (ML/a)**	
		Approved Mine Plan	**Modification**
NSW Great Artesian Basin Groundwater Sources	Southern Recharge Groundwater Source	**204**	**179**
Upper and Lower Namoi Groundwater Sources	Upper Namoi Zone 5 Namoi Valley (Gin's Leap To Narrabri) Groundwater Source	**122**	**110**
NSW Murray Darling Basin Porous Rock Groundwater Sources	Gunnedah – Oxley Basin MDB Groundwater Source	**856**	**1,009**
Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	**91**	**78**
	TOTAL	**1273**	**1376**

In the Main Report section 4.5, Surface water extraction is explained:

> "*NCOPL holds four Water Access Licences that allow extraction from the Namoi River. The Water Access Licences allow for a total combined extraction of 678 ML from the Namoi River*".

- The two tables Table 8 and Table 18 are not consistent. There are discrepancies between the Main Report and Appendix B Groundwater Assessment. The effect on the Lower Namoi Regulated River Water Source, as explained in Appendix B Groundwater Assessment, is reduced baseflow to the Namoi River, and is not actual take from the river. This needs further clarification in the Main Report. Sufficient water is held to account for the baseflow losses, but the Main Report doesn't seem to capture the concept that some of this water will be required for overall groundwater take.

e) <u>Subsidence, fracture zones</u>

- The report refers to the Ditton Geology model for determining the extent of the fracture zone above the goaf areas. It indicates that the fracturing will not reach the surface. The Main report refers to subsidence of up to 2.75m indicating that subsidence will reach the surface. Appendix C Surface Water Assessment indicates that there will be significant impacts due to settlement.

- The report discusses a lower part of the fractured zone where higher vertical permeability occurs and a disconnected fractured zone where the vertical permeability should not be significantly greater than under natural conditions. There is no explanation of where these two fracture zones occur in the overburden. The report also discusses a constrained zone. A figure would be useful to explain what is going on and as to why cracking will not go to the surface and why affected surface flows will not percolate down to the mined area. Ephemeral streams exist above the mine footprint area. Clarification is required on the area of subsidence and percolation of surface water down to the mine, ensuring explanation is given as to why cracking will not go to the surface and why affected surface flows will not percolate down to the mined area.

End Attachment A