NSW GOVERNMENT | Department of Primary Industries

OUT13/14661

- 7 JUN 2013

Mr Matthew Sprott
Mining Projects
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

Matthew.Sprott@planning.nsw.gov.au

Dear Mr Sprott,

Mt Arthur Open Cut Mine: Proposed Modification (MP 09_0062 Mod.1)

I refer to your email dated 24 April 2013 requesting advice from the Department of Primary Industries (DPI) in respect to the above matter.

Comment by Fisheries NSW

Fisheries NSW is responsible for ensuring that fish stocks are conserved and that there is no net loss of key fish habitats upon which they depend. To achieve this, Fisheries NSW ensures that developments comply with the requirements of the *Fisheries Management Act 1994* (namely the aquatic habitat protection and threatened species provisions in Parts 7 and 7A of the Act, respectively), and the associated *Policy and Guidelines for Fish Habitat Conservation and Management (2013).* In addition, Fisheries NSW is responsible for ensuring the sustainable management of commercial and recreational fishing in NSW.

Fisheries NSW has reviewed this proposal in light of these provisions and has no objections as the modifications do not impact on key fish habitat in the area.

For further information please contact Bill Talbot, Director, Aquaculture, Conservation and Marine Parks (Port Stephens office) on 4916 3854, or at: bill.talbot@dpi.nsw.gov.au.

Comment by NSW Office of Water

The NSW Office of Water advises as follows:

(i) According to the Environmental Impact Statement (EIS) and NSW Office of Water records, the proponent holds access licences from the Hunter Regulated Water Source and Hunter Regulated River Alluvial Water Source.

(ii) Current operations and the proposed extension may take water from the Muswellbrook Water Source of the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*. The proponent needs to estimate the volumes water taken from both the surface water and groundwater from this water source to determine licensing requirements.

(iii) The proponent may be required to trade or transfer water in the Muswellbrook water source to account for this take. The Water Sharing Plan and Access Licence Dealing Principles provide the framework for water access licence dealings, including the trade and transfer of entitlement and allocations.

(iv) The current development and the proposed extension involves removal of a number of surface water sub-catchments and alluvial aquifers within the Muswellbrook water source, which drain to the Hunter River. The proponent will need to develop strategies on how to manage the surface and groundwater in a modified land form, and should also update the Water Management Plan to accommodate this modification.

Detailed comment, including a summary of licences and approvals required under the *Water Management Act 2000* and the *Water Act 1912* and recommended conditions should the application be approved, is provided in Attachment A.

For further information please contact Hemantha Desilva, Senior Water Regulation Officer (Newcastle office) on 4904 2525, or: hemantha.desilva@water.nsw.gov.au.

Comment by Crown Lands

Crown Lands advise there are no Crown lands directly affected by the additional open cut areas and proposed upgrades of infrastructure, and that any Crown roads affected have been applied to be closed and purchased.

For further information please contact Rob Micheli, Group Leader Property Management (Maitland office) on 4937 9343, or at: rob.micheli@lands.nsw.gov.au.

Comment by Office of Agricultural Sustainability & Food Security

In accordance with procedures for mining proposals that affect agricultural land, the Office of Agricultural Sustainability & Food Security has responded direct to your Department by letter dated 31 May 2013.

For further information please contact Liz Rogers, Project Officer (Orange office) on 6391 3642, or at: liz.rogers@dpi.nsw.gov.au.

Yours sincerely

~~Phil Anquetil~~ Tony Hefferman

A/ **Executive Director Business Services**

Attachment A

Mt Arthur Open Cut Mine: Proposed Modification
(MP 09_0062 Mod.1)
Comment by NSW Office of Water

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1. Groundwater modelling

1.1 *Conceptual model, model calibration and performance*

The conceptual groundwater model consists of following groundwater systems:

- alluvium along the Hunter River and Saddlers Creek and an upper weathered bedrock zone;
- an upper Permian section of the Jerrys Plain Subgroup;
- a mid Permian section of the Jerrys Plain Subgroup (Burnamwood Fm); and
- a lower Permian section of the Jerrys Plain Subgroup including the Archerfield Sandstone

A finite-element simulation package (FEFLOW) was used to simulate the impact of the mining operations on the groundwater regime. Both steady state and transient modes of the model were applied. The model contains of 8 layers comprising 391,480 elements where the mesh size varies laterally with the highest discretisation at the different mine sites (approx. 30 m cell size).

Layer 1 is the alluvium along the Hunter River and Saddlers Creek and an upper weathered bedrock zone. The Hunter Alluvium was assigned a horizontal hydraulic conductivity of 8 m/day and vertical hydraulic conductivity of 0.2 m/day. The Hunter River to the north of the Modification proposal is simulated as a fixed hydraulic head boundary. This boundary condition allows for the infiltration of surface water into the groundwater systems or drainage of the groundwater system. In contrast, the alluvial deposits associated with the creeks have constrained fixed hydraulic head boundaries which do not allow infiltration of surface water into the alluvium. A map of the model grid and boundary conditions is provided in Figure 2. It is noted that there is a small creek that extends directly between the Hunter River and alluvium into the northern extent of the Modification that is defined as a no flow boundary. The alluvium of Saddlers Creek and weathered bedrock was assigned a horizontal hydraulic conductivity value 0.4m/day and vertical hydraulic conductivity of 0.2 m/day.

Layer 2, 3 and 4 represent the overburden of the Mt Arthur Coal Seam.

Layers 5 and 6 represent the coal seams and interburden.

Layer 7 represents section of the Wittingham Coal Measures

Layer 8 represents the underlying Saltwater Creek Fm and is considered impermeable and the base of the model.

Storativity for the coal seams and interburden was assigned 0.5% and .005% respectively.

1.2 *Model calibration assessment*

The model calibration presented in this report was based on an earlier report prepared by AGE (2009) as part of another project approval for Mt Arthur. No further calibration work was carried out for the Modification study. Steady State model calibration was based on groundwater measurements from the years 1999 to 2003 (21 bores with 20 observation points on graph). The total head loss within the model area where the observation targets are distributed is 130m. The RMS error calculated for the calibrated model is 4.5m. The ratio of RMS to total head loss for the calibrated steady state SRMS was 3.5%. The mass balance error between inflows and outflows was 1.5%, higher than the 1% target.

The calibrated model was verified against currently available transient groundwater level datasets which were available to mid 2012. Verification was undertaken against 35 bores within the model domain. The model was run using SAMG solver with automated time stepping with a convergence criteria set at $1*10^{-3}$. The RMS and SRMS for the calibrated transient model were not provided.

The impact assessment model and report is assessed against the Groundwater Modelling Guidelines (2012) as having a Class 2 confidence level. The study lacks model sensitivity and uncertainty analysis.

1.3 *Model predictions*

The model predicts peak mine inflows of 2.50 ML/day. The proposed Modification does not result in an increase in maximum total average inflow. Mining in the area will reduce the rate of groundwater discharge from the Permian Coal Measures to the alluvium of the Hunter River and Saddlers Creek. Flux from the Hunter River alluvium to Permian Coal Measures predicted by the updated model is up to between 0.72 ML/d from the Hunter River alluvium. This represents a small increase of 0.03 ML/d due to the Modification. There is negligible change predicted for Saddlers Creek alluvium which remains at 0.1ML/d.

Water table recovery predictions have been estimated for up to 500 years post mining in which under the four scenarios modelled, the mine pit is a permanent sink where the pit void lake level is some 70m+ below the pit spill point and well below the Hunter River. Due to the on-going sink in the local Permian coal measures the proposal is not expected to result in deterioration in groundwater quality.

The transient model was calibrated on several years of data, with a prediction period of 500 years. This is beyond the recommended timeframe of between 3 and 10 times as outlined in the Australian groundwater modelling guidelines. Ongoing monitoring and validation of the transient model predictions will be required to ensure that the proponent has sufficient access entitlement to account for the take of the mining operation.

2. Groundwater monitoring

The proposed Modification does not include any mining within the Hunter River Alluvium. The report states "*Mt Arthur Coal will continue to monitor hydro-geomorphological conditions. Mining other than that already previously approved will not extend beyond a nominal distance of 150m buffer zone from the Hunter River Alluvials until agreement is reached with NOW regarding installation of lower permeability barrier along the point of connections of mining and the alluvium or other appropriate safeguards.*"

These safeguards are put forward by the proponent to address any inherent uncertainty in modelled predictions in this study.

3. Licensing requirements

The licensing requirements associated with the Modification are summarised in Table 1.

Table 1: Licence requirements.

Table 14: LICENSING REQUIREMENT SUMMARY

Relevant Legislation	Groundwater Source	Predicted Maximum Annual Licensing Requirements (ML/annum)		
		Approved	Incremental Increase due to the Modification	Total Including the Modification
HURAWSP	Hunter River Alluvium	252[1]	12[2]	264
Water Act	Porous Rock	1,270[3]	No Increase[4]	1,270

A summary of licences held is provided in Table 2.

Table 2: Licences held.

Table 13: GROUNDWATER LICENCE SUMMARY			
Licence Number	**Licence Volume (ML/annum)**	**Issue Date**	**Expiry Date**
Licence under the Water Management Act 2000			
WAL18175	13	16/11/2011	Perpetuity
WAL18141	104	25/07/2011	Perpetuity
WAL18247	247	25/07/2011	Perpetuity
Licences under the Water Act 1912			
20BL171995	750	5/11/2008	4/11/2013
20BL168155	750	28/05/2007	27/05/2017
20BL171156	150	13/03/2007	Perpetuity
20BL170620	250	5/12/2011	4/12/2016

Source: BHP Billiton Ltd (2011).
ML/annum = megalitres per annum.

4. Aquifer impact assessment

The two main aquifers in the area are the semi-confined to confined porous rocks associated with the coals seams and the unconfined to semi-confined alluvial aquifers associated with the Hunter River and Saddlers Creek.

Information available in the report allows for the Modification to be assessed against the minimal impact considerations of the Aquifer Interference policy, see Table 3.

Table 3: Assessment of proposal against AI Minimal Impact Considerations

Aquifer	Category	Level 1 Minimal Impact Consideration	Assessment
Alluvial	Highly Productive	Less than or equal to 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan"(2) variations, 40 m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site listed in the schedule of the relevant water sharing plan; or A maximum of a 2 m decline cumulatively at any water supply work unless make good provisions should apply.	No high priority GDEs or cultural significant sites identified. Only one alluvial bore is impacted by more than 2 m however this is on mine-owned land
		A cumulative pressure head decline of not more than 40% of the "post-water sharing plan" pressure head above the base of the water source to a maximum of a 2 m decline, at any water supply work. If the predicted pressure head decline is greater than requirement 1. above, then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.	N/A for Hunter Alluvials.
		(a) Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40 m from the activity; and (b) No increase of more than 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity. Redesign of a highly connected(3) surface water source that is defined as a "reliable water supply"(4) is	a) No predicted change in beneficial use category beyond 40 m from the activity b) N/A c) Complies

		not an appropriate mitigation measure to meet considerations (a) and (b) above. (c) No mining activity to be below the natural ground surface within 200 m laterally from the top of high bank or 100 m vertically beneath (or the three dimensional extent of the alluvial material - whichever is the lesser distance) of a highly connected surface water source that is defined as a "reliable water supply".	
Porous/ Fractured Rock	Less Productive	A cumulative pressure head decline of not more than a 2 m decline, at any water supply work.	The predicted groundwater level drawdown will cause a decline of more than 2 m on water supply works off the mine site. Mt Arthur Coal will undertake a census of privately owned bores to ascertain their current usage and provide a baseline against which to compare and future impacts. In the event of interruption to water supply resulting from the Project, an alternative water supply will be provided, until such interruption ceases.
		Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40 m from the activity.	No predicted change in beneficial use category beyond 40 m from the activity

5. Conclusions

(i) The proposed Modification as modelled will result in negligible increased impact to that already approved. The impacts can be classified as Level 1 impacts under the Aquifer Interference Policy.

(ii) Regular model validation will be required as part of the groundwater monitoring plan. The monitoring and evaluation of the residual groundwater level drawdown, and model validation, will be required post mining.

6. Licence requirements

6.1 *Water Act 1912*

- No exemptions for licences under the *Water Act 1912* apply as a result of approval under the *Environmental Planning and Assessment Act 1979*.
- Licences required for all bores under Part 5 of the *Water Act 1912* (as defined under s105).
- Monitoring bores may require licensing under Part 5 of the *Water Act 1912* unless the bores meet the criteria for exempt monitoring bores as defined in the *Water Management (General) Regulation 2011*.
- Flood control works will require licensing under Part 8 of the *Water Act 1912*.

Application forms for licences and approvals are available on the Office of Water website at www.water.nsw.gov.au.

6.2 *Water Management Act 2000* (WMA)

- Water Access Licences are required to take water from any water source managed under the WMA.

- Exemptions for access licences are provided in Clause 18 and the Schedule 5 of the *Water Management (General) Regulation 2011*.
- Section 54 of the WMA provides details on harvestable rights.
- Requirements for access licence dealings are provided in the following documents:
  (a) Section 71 of WMA
  (b) Access Licence Dealing Principles: www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+433+2004+cd+0+N
  (c) Part 12 of the Water Sharing Plan: www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+347+2009+cd+0+N

Application forms for access licence and access licence dealings are available on the Office of Water website at www.water.nsw.gov.au.

7. Recommended Conditions of Approval

1. The Proponent is required to estimate the volumes of water taken from both the surface water and groundwater from the Muswellbrook Water Source of the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources*, and obtain sufficient licensed entitlement to account for take from all water sources managed under the *Water Management Act 2000* prior to commencement of activities.
   (Note: Actual allocation may vary time to time due to changes in available water determination.)

2. The proponent is required to obtain all necessary licences under the *Water Act 1912*.

3. The Site Water Management Plan should be amended to incorporate the proposed modification. The amended plan should include:
   (i) a methodology to estimate the annual volume of surface water and alluvial groundwater intercepted by the operation;
   (ii) a groundwater monitoring and contingency plan;
   (iii) review and validation of model predictions using groundwater monitoring data; and
   (iv) strategies to manage water in the post mining landscape to minimise harm to water sources or their dependent ecosystems.

End Attachment A