NSW GOVERNMENT | Department of Primary Industries

OUT13/6077

Mr David Mooney
Mining Projects
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

15 MAR 2013

David.Mooney@planning.nsw.gov.au

Dear Mr Mooney,

Drayton South Coal Project (MP 11_0062)
Response to exhibition of Environmental Assessment

I refer to your email of 7 November 2012 requesting advice from the Department of Primary Industries in respect to the above matter.

Comment by Crown Lands
Crown Lands advise that there is both Crown land and Crown road within the project boundary that appear to be affected by the project.

Crown land affected by the project needs to be fully identified and acquired by the proponent by way of an application sale under the *Crown Lands Act 1989*. The proponent will also need to seek approval from Crown Lands to undertake this process.

Crown roads affected by the project will need to be either closed and purchased by the proponent or, if required to remain open, transferred to Muswellbrook Shire Council.

It is also noted that Table 17 (Licences and Approvals Required for the Project) in the Environmental Assessment refers to the Department of Lands as responsible for administering the *Crown Lands Act 1989*. This information is now out of date. The correct agency is Crown Lands, within the Department of Primary Industries (and to be referred to as NSW Trade & Investment-Crown Lands).

For further information please contact Melanie Osborne, Group Leader Hunter Area (East Maitland office) on 4937 9332 or at: melanie.osborne@lands.nsw.gov.au.

Comment by NSW Office of Water
The NSW Office of Water provides the following advice and the further detailed comment and recommended conditions, should the application be approved, in Attachment A:

(i) the water balance relies upon a number of water sources which may be harvested and temporarily stored on-site and in the existing Drayton operation post-closure. This creates uncertainty as to the regulation of such water harvesting, and requires quantification to determine the licensing requirements for the proposal under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009* (WSPHUAWS). The assumption that water supply from the existing Drayton open cut operation may occur without consideration of separate licensing obligations under the WSPHUAWS requires assessment against the rules of the WSPHUAWS and consideration of potential non-compliance under Section 60A of the *Water Management Act 2000* (WMA) should harvesting of runoff water continue following completion of mining operations at the existing Drayton coal operation.

(ii) no accounting is proposed for the take of water from the Jerrys Water Source (Saddlers Creek) surface and alluvial system. No presumption may be made that accounting for the take of water from the Saddlers Creek and/or its alluvium is limited to licences which may be obtained under Part 5 of the *Water Act 1912* (WA). The operational rules of the WSPHUAWS define the limits to available water, and commencement of minimum and low flow protection rules commencing in 2015 under Clause 17(1)(y). This may not apply to the Drayton South project if mining excavation is limited to beyond 40 metres from the top of bank of Saddlers Creek. However, the project may not be able to account for water taken from the Jerrys Water Source (Saddlers Creek), as the sum of access licence shares in the water source exceeds the total number of shares at the commencement of the WSPHUAWS. The current number of access shares in the water source is 4198 shares, whereas the total number of access shares in the Jerrys Water source at the commencement of the WSPHUAWS was 2573 shares. Additional trading in water access shares to the Jerrys water source is prohibited under Clause 71(2)(b)(ii) of the WSPHUAWS considering the total access shares within the water source.

(iii) the definition of water take under Section 60I of the WMA, which commenced on 1 March 2013, includes relocating groundwater from one area of an aquifer to another area of the same aquifer. As such, the accounting relationships required for the Drayton South proposal require greater assurance that the applicant holds and will maintain adequate access shares from the Jerrys Water Source to account for the displacement and direct take of water from the surface and/or alluvium of Saddlers Creek than asserted in the Environmental Asessment.

(iv) the security of supply of general security entitlement from the regulated Hunter River system carries an approximate 10% risk of available water determinations being reduced, to the extent that a potential impact on the mining operation exists if inadequate account water is held. It is recommended this issue be considered in terms of drought contingency in the absence of market opportunities to obtain water on the temporary trading market in such climatic situations or high security entitlement in Zone 1 of the Hunter Regulated River.

(v) water sharing options with BHP Mt Arthur Operations do not appear to have been fully considered, though off-site storage and transfer between the Bayswater 2 and 3 pits enhances the opportunities for such re-use of captured or intercepted water.

(vi) operational and long term (post-mining) impacts upon the Saddlers Creek alluvium and river flows should be examined as to constraints and options for rehabilitation of the watercourse, and the need for and design of final voids in the post-mining landform

For further information please contact Fergus Hancock, A/Senior Planning and Assessment Coordinator (Newcastle office) on 4904 2532, or at: Fergus.Hancock@water.nsw.gov.au.

Comment by Fisheries NSW
Fisheries NSW advise there are no fisheries habitat issues as a result of the proposal.

For further information please contact Scott Carter, Senior Conservation Manager (Port Stephens office) on 4916 3931, or at: scott.carter@dpi.nsw.gov.au.

Comment by Office of Agricultural Sustainability & Food Security
In accordance with arrangements for mining projects that require an Agriculture Impact Statement, the Office of Agricultural Sustainability & Food Security have responded to your Department by separate letter, dated 21 December 2012.

Yours sincerely

Phil Anquetil
Executive Director Business Services

Attachment A

Drayton South Coal Project (MP 11_0062)
Response to exhibition of Environmental Assessment

Additional comment by NSW office of Water

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1. Water Supply

The application relies upon catchment runoff capture as the primary water supply to the proposal. Water supply arrangements appear adequate to median or above-average rainfall years, as site runoff maintains a net surplus compared to dust suppression and rehabilitation water requirements. However, extended dry periods impose significant stress upon the water supply arrangements, which are only partially met from external supply from general security entitlements held in Zone 1 of the Hunter Regulated River water source.

Water supply from the regulated Hunter River is limited, in that water shortage declarations, leading to reductions in available water to general security access licences are made by Available Water Determinations (AWD). To address this issue, the proponent will have to enter the temporary water trading market during these periods or acquire high security entitlement to cover these periods. However, the ability to obtain high security entitlement from both Zones 1 and 2 of the regulated river system is limited as the power generation and mining industries already control virtually all existing entitlements in Zones 1, 2 and 3 of the Hunter Regulated River.

Anglo Drayton Operations should identify options in the event that an extended dry period or drought significantly impacts upon its ability to maintain adequate storage volumes to supply all demands for the project. It also should state that water shortage may impact upon production as a commercial risk to the ongoing mining operation.

2. Riverine rehabilitation

The severely degraded condition of Saddlers Creek downstream of the existing Drayton mine lease will impose difficulties in any rehabilitation of the condition of the watercourse. The loss of basal alluvial groundwater from the Jerrys (Saddlers Creek) water source not only requires access licensing accounting, but an approach to remediation of the watercourse which may require replenishment of alluvial groundwater connected to Saddlers Creek.

The Office of Water recommends that a rehabilitation programme be required for Saddlers Creek, which adopts principles from the Anglo Coal Dartbrook riparian corridor programme. This may not be a suitable area to replant *Eucalyptus camaldulensis* due to the shallow and intermittent saturated alluvial system. However, other riparian species may be successfully established along the riparian corridor, which will form a higher quality connected surface and alluvial system, and allow post-mining landform options which are suitable to post-mining land use options in the Upper Hunter Valley.

The Office of Water recommends the rehabilitation programme incorporate appropriate geomorphological frameworks, such as River Styles, to develop remediation options which are more effective into the post-mining period than has been used in the Hunter Valley previously.

3. Groundwater Model – Predicted Groundwater Take and Drawdown Impacts

A three-dimensional numerical groundwater flow model (MODFLOW SURFACT) was developed using hydrology, hydrogeology and geological structure data. A 13 year record of water level measurements was available for the monitoring bores located within the study area. A total of 95

water level sites were used to calibrate the steady state model. The ratio of RMS (12.15 m) to the total head change across the calibration points (174.9 m) indicated a SRMS of 6.95%. The industry standard SRMS typically varies between 5% and 10% for fractured rock models. A sensitivity analysis was undertaken to assess the model responses to variations in uncertain input parameters.

A transient calibration of the Drayton South model was not undertaken. The undertaking of a transient calibration of the Project was considered not feasible for the following reasons:

- no metered groundwater extraction data available for the Hunter River alluvium located within the groundwater model domain,
- no definitive assessment of river baseflow available for the Hunter River alluvium located within the groundwater model domain, and
- the long-term groundwater level hydrographs available from the monitoring bores located within the study area show little temporal movement, providing little opportunity for calibration targets.

The mass balance error, that is, the difference between calculated model inflows and outflows, at the completion of the calibration run expressed as a percentage of discrepancy, was close to zero, indicating good accuracy of the numerical solution and overall stability of the model.

Seepage of groundwater from the aquifers intersected during mining will reduce groundwater pressures in the coal seams and overburden/interburden aquifers around the mining areas.

The zone of influence for the shallow regolith/alluvium is predicted to be restricted to the immediate vicinity surrounding the mining areas. This is a maximum distance of approximately 600 metres to the west and south of the mining areas in Year 27. The zone of influence within the shallow regolith/alluvium is not predicted to extend into the Hunter River alluvial aquifer; however, it is predicted to extend marginally into the Saddlers Creek alluvium. A drawdown of up to 2 m is predicted to occur along a 6 km section of the Saddlers Creek alluvial aquifer as a result of cumulative impacts associated with the Project and the adjoining Mt Arthur Coal Mine operations to the north. This drawdown is within the Level 1 Minimal Impact Considerations of the Aquifer Interference Policy.

The zone of influence for the Permian coal measures is predicted to be restricted to a maximum distance of approximately 1 kilometre to the west and south of the mining areas at Year 27 and extend under Saddlers Creek alluvium. The zone of influence within the coal measures is not predicted to extend beneath the Hunter River alluvium at the end of mining.

The vertical leakage fluxes between the alluvial deposits associated with Saddlers Creek and the underlying coal measures will be affected due to the proximity of the Project. The pre-mining net upward seepage flux to the Saddlers Creek alluvium is in the order of 0.31 Megalitres per day. Operations at Mt Arthur Coal Mine are predicted to result in a maximum reduction in net flux to the Saddlers Creek alluvium of 0.19 Megalitres per day (at the end of mining). The remaining influx to the Saddlers Creek alluvium of approximately 0.12 Megalitres per day may therefore be reduced to zero as a result of the Project. The average reduction in flow from the bedrock to the Saddlers Creek alluvium is 58 ML/year.

The model predicts that cumulative inflow of groundwater over the life of the mine is approximately 23,663 ML, which is an average of 876 ML/year over the 27 years of mining. Inflows into the mining areas will gradually increase from the commencement of mining in the Drayton South area to a maximum of 4.6 ML/day (1682 ML/year) in Year 10. The zone of drawdown influence within the shallow regolith/alluvium is not predicted to extend into the Hunter River alluvium; however, it is predicted to extend marginally into the Saddlers Creek alluvium. The zone of influence within the coal measures is not predicted to extend beneath the Hunter River alluvium at the end of mining. The predicted average annual groundwater take for different water sources is summarised in Table 1.

Table 1: Predicted average annual groundwater take from various water sources.

Legislative Act	Water Sharing Plan	Water Source	Predicted average annual take (Ml/year)	Predicted average annual impact on water source (%)	Current licences	Licences/ Allocations Required
Water Act	N/A	Permian Coal Measures	477	N/A	Nil	477 Ml/year
WM Act	Hunter Unregulated and Alluvial Water Sources	Jerrys Water Source (Hunter River Alluvium)	2	0.08	Nil	2 Ml/year
		Jerrys Water Source (Saddlers Creek Alluvium)	58	2.25	Nil	58 Ml/year
	Hunter Regulated River Water Source	Management Zone 1	2	0.003	WAL 491 WAL 1066	2 Ml/year

The hydraulic conductivity value of under 10m/day for the Hunter Alluvium appeared on the lower end but it is noted that there was a 50% increase in hydraulic conductivity values applied when undertaking the sensitivity analysis.

The proponent has not estimated a maximum annual take of water for water sources other than the Permian Coal Measures, which means that the relevant range of statutory water licensing obligations, and risks associated with potential shortage of water supply for the proposal have not been fully assessed within the Environmental Assessment.

4. Licensing

The predicted water take is as shown in Table 1. It is noted the proponent has estimated the required licences and/or allocations based on the predicted average annual take. The NSW Office of Water advises that the risk associated with the take of water which may not be available by access trade within the water source is a commercial risk to the applicant. Taking water without holding adequate access shares or adequate water allocation held within its account is an offence under Sections 60A and 60C of the WMA.

In relation to the Hunter Regulated River Water Source, Anglo American currently holds two general security Water Access Licences (WALs) (WAL 1066 and WAL 491), totalling 198 units for agricultural and domestic purposes. The proponent acknowledges a component of these Water Access Licences may be transferred from use for the purpose of irrigation to use for the purpose of mining to offset an annual average of 2 ML/year take from the Hunter Regulated River Water Source.

The proponent is required to hold appropriate licences for each water source to account for the maximum predicted water take as part of its commercial risk with respect to the provisions of the *Water Management Act 2000*. In relation to the Hunter Unregulated and Alluvial Water Sources, the proponent acknowledges it will be necessary to purchase an entitlement of 60 ML/year, or seek this from an existing groundwater allocation to account for the average annual water take. However the proponent should be required to predict the maximum annual take of water and ensure that sufficient licensed entitlement is held to meet this demand from the commencement

of the activity. As the number of current access licence shares in the Jerrys Water Source exceeds the schedule of access licence shares at the commencement of the WSPHUAWS by over 70%, the risk of over-allocation of the water source must be considered within the assessment for the project, as well as any other proposed aquifer interference activity within the Jerrys Water Source.

The predicted take from the Permian coal measures will approach a maximum of about 900 ML/year (i.e. 28 L/s) in Year 10 with an annual average of 477ML. The proponent has made reference to licensing required under the Water Act for the take of this water only for the average annual take. The proponent should be required to hold sufficient licences to account for the predicted maximum annual take of 900ML/yr from the commencement of the activity.

5. Aquifer Interference

The groundwater assessment in the Environmental Assessment was completed prior to release of the NSW Aquifer Interference Policy (AI Policy) (released in September 2012). Consequently the Assessment only makes reference to the Draft AI Policy.

A total of two registered groundwater bores are located within the zone of influence (as defined by the 1 m drawdown contour. Both of these groundwater bores are located on land owned by Anglo American, and will be intercepted by mining. No other registered bores are located within the predicted zone of influence at the end of mining.

The closest registered water bore located outside of the study area and not on land owned by Anglo American is GW049223. This bore is screened within the Permian Coal measures and is located approximately 1.3 km north of the Project.

The Environmental Assessment would benefit from assessing the model drawdown impacts against the final AI Policy (2012). The drawdown predictions appear to be less than the AI Policy's Level 1 minimal impact considerations of 2 m at any neighbouring water supply work. However, further discussion is required against the minimal impact considerations.

While there are no groundwater dependent ecosystems (GDEs) listed in the Schedule of the WSPHUAWS, it is likely that the two types of terrestrial GDEs identified in the Environmental Assessment are consistent with the Schedule of High Probability of GDEs included in Appendix 7 of the NSW Office of Water report *Identification of high probability groundwater dependent ecosystems on the coastal plains of NSW and their ecological value July 2012*. It would therefore be prudent for the Environmental Assessment to assess potential impacts on these GDEs against the considerations in the AI policy.

6. Groundwater Monitoring and Reporting

The groundwater monitoring network for Drayton South consists of 15 bores installed in the 1990s and early 2000s in the Permian formations, augmented by four new monitoring bore sites installed in 2011 along the alignments of Saddlers Creek and the Hunter River. The network also incorporates seven Vibrating Wire Piezometers (VWPs), most of which are located between the study area and the Hunter River.

At each site, separate bores were constructed in the alluvial sediments and underlying coal measures. A total of nine new monitoring bores were installed at four sites situated between the Drayton South footprint, Saddlers Creek to the north and north-west, and the Hunter River in the south and south-east.

Groundwater levels are currently manually measured via groundwater monitoring bores on a quarterly basis. The current monitoring frequency is suitable for identification of long-term trends in groundwater levels. Pore pressures within the coal seams and interburden are automatically measured on a six-hourly basis by the VWPs. Automatic monitoring at six-hourly intervals is

suitable for the identification of both short and long term trends in groundwater levels, and is particularly suited to capturing a response (if any) to rainfall events

It is proposed that water table trigger levels be determined for the bores monitoring the Hunter River and Saddlers Creek alluvial aquifers. The trigger levels will be set after a baseline data set of two years of water level data has been collected. The baseline monitoring period will allow the natural fluctuations in alluvial water levels due to variability in rainfall recharge and surface water flow to be assessed, and a method for separating mining induced water level fluctuations developed.

The monitoring program will include the installation of monitoring bores in strategic locations to detect the movement of seepage water away from the emplacement areas. Water levels will be recorded on a quarterly basis. In addition groundwater samples will be collected and analysed on a six-monthly basis in accordance with the groundwater quality monitoring procedures noted above. This will enable direct comparison with groundwater samples collected from areas associated with the Project. Should the groundwater monitoring program surrounding the emplacement areas identify excessive seepage with water quality parameters exceeding guideline levels, interception or pump-back bores will be installed to avoid adverse impacts to receiving waters.

Monitoring of pH and EC has been undertaken for all monitoring bores on a regular basis. The monitoring of these in-situ physico-chemical parameters occurred on about a twice yearly basis from 2000 until 2008, and then quarterly from 2009 until present. Groundwater samples will be collected from the existing groundwater monitoring bores on a six-monthly basis and analysed for pH, EC, TDS, major ions and trace elements. Monitoring will continue on a six-monthly basis until mine closure in Year 27 and then for a period of five years post closure. This will ensure that any deviation from the predictions made in the assessment can be identified and mitigated in a timely manner. Trigger levels for water quality will be developed only for the monitoring bores installed in the Hunter River and Saddlers Creek alluvial aquifers. A unique trigger for each bore will be required due to the variability in the groundwater quality in the alluvial aquifers. Trigger levels should be developed after a minimum of two years of baseline data has been collected.

Proposed data management and reporting includes:

- annual assessment of departures from identified monitoring data trends. If consecutive, six monthly monitoring campaigns exhibit departure from the established or predicted trend, then such departures should initiate a detailed review. This may include a need to conduct more intensive monitoring or to seek professional advice to compare against model predictions and/or instigate mitigative measures if the departures are attributed to the mining operation,
- formal review of depressurisation of coal measures and alluvial aquifers should be undertaken annually by a suitably qualified hydrogeologist. The validity of the model predictions should be reassessed every five years, and if the data indicate significant divergence from the model predictions, an updated or new groundwater model should be developed for simulation of mining. If future modelling predictions indicate losses from the alluvial water sources could exceed previous predictions and these losses are attributed to the mining operation, mitigation measures including purchase and retirement of existing water licences should be evaluated, and
- annual reporting (including all water level and water quality data) as part of the Annual Review.

The groundwater monitoring and reporting program is satisfactory however it is requested the NSW Office of Water have the opportunity to review and endorse the proposed trigger levels.

7. Final Void and Land Use

Overburden and most coal reject materials are expected to have very low oxidisable sulphur content and significant excess acid neutralising capacity. These characteristics indicate that the materials are non acid forming and likely to have a high factor of safety with respect to potential acid generation.

At the completion of coal mining operations at Drayton Mine, three voids will remain. It is proposed that rejects and tailings generated from the Drayton South operation will be deposited in these voids, one of which will be utilised for water storage. There are three possible scenarios for rejects and tailings disposal; however, these are contingent upon reaching a commercial agreement with Macquarie Generation.

The final void within the Drayton South area will collect and accumulate water from a number of sources. The post-mining equilibrium water level is predicted to reach RL 117 metres after approximately 1,000 years. The depression of the potentiometric surface around the final void will act as a 'sink', which prevents water from flowing outwards into the regional system. The freeboard between the water level surface and the void spill height is approximately 90 m.

Under all scenarios for disposal of tailings in the East Void at Drayton Mine, the cone of depression will be retained and the water table within the void remains below the surrounding groundwater level, therefore it is unlikely that leachate will migrate out of the void.

The tailings and reject disposal designs for the North Void do not provide conditions which will promote the development of a long-term cone of depression. This may lead to the movement of leachate away from the void and towards the catchment of Ramrod Creek. A revision of the existing Drayton Mine water management plan will be undertaken to encompass the new procedures and targets required for the Project to avoid impacting on groundwater and the receiving environment. This will include a groundwater monitoring program with a key focus on the management of leachate associated with the tailings and rejects.

Given the length of time to reach post-mining equilibrium, the NSW Office of Water recommends that an appropriate volume of water access licences be retired to reflect the ongoing take of water. Verification of modelled drawdown extent and quantities of water taken by the mining activity should be undertaken during the life of the project based.

8. Recommendations

1. Anglo American should identify water supply options in the event that an extended dry period or drought significantly impacts upon its ability to maintain adequate storage volumes to supply all demands for the project.

2. Anglo American should also acknowledge that water shortages may impact upon production as a commercial risk to the ongoing mining operation.

3. Anglo American should be required to have adequate water supply authorities to all stages of the mining development, and if necessary, reduce the scale of its activity to match its water supply.

4. Anglo American should be required to hold all necessary access licence shares under the *Water Management Act 2000* and water licences under Part 5 of the *Water Act 1912*, to account for the removal or diversion of water from any water source, or re-located within that water source, as required under s60I of the *Water Management Act 2000.*

5. Anglo American need to update the Environmental Assessment as described below, to be consistent with the requirements NSW AI Policy (2012):
   a. include an independent review of the groundwater model.
   b. assess the model against the *Australian Groundwater Modelling Guidelines 2012.*
   c. assess the predicted drawdown impacts against the minimal impact considerations in Tables 1 and 2 of the AI Policy.
   d. include the calibration hydrographs in the Environmental Assessment Groundwater Assessment.

e. provide records of measured and inferred maximum annual take of water for each affected water source.
f. Anglo American should commit to address their licensing requirements for water take from all water sources.
g. provision of adequate methodologies to devise trigger levels within any Trigger Action Response Programme (TARP) in relation to alluvial drawdown, and impacts on flows within Saddlers Creek and groundwater dependent ecosystems within the drawdown envelope to the proposal. The NSW Office of Water will review the proposed monitoring trigger levels as part of the on-going groundwater management and reporting programme.

6. A rehabilitation programme should be developed for Saddlers Creek, incorporating appropriate geomorphological frameworks, and identification of suitable species for the re-establishment of a riparian corridor on Saddlers Creek in the reach affected by the Drayton South proposal. Consultation is requested with the NSW Office of Water to confirm the appropriate guidelines and frameworks to support the development of this programme. The following references will assist:
   - *A Rehabilitation Manual for Australian Streams.* I Rutherfurd, K Jerie, N Marsh. Land and Water Australia. 2000 (2 vols.).
   - *Where Land Meets Water Resource Kit: a Guide to Riparian Management in the Hunter Valley*. Hunter Central Rivers Catchment Management Authority, Tocal. 2007.

End Attachment A