



Department of Primary Industries

OUT13/12644

29 MAY 2013

Ms Elle Donnelley
Mining and Industry Projects
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

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Dear Ms Donnelley,

Ravensworth Operations Project (PA 09_0176 Mod 1) Response to exhibition of Environmental Assessment

I refer to your email dated 8 April 2013 requesting advice from the Department of Primary Industries (DPI) in respect to the above matter.

Comment by NSW Office of water

The NSW Office of Water (Office of Water) appreciates the opportunity to review the Environmental Assessment (EA) for the Narama West Modification submitted by Xstrata Coal Pty Ltd. The key issues that should be addressed by the applicant are listed below and detailed comments are provided in Attachment A. Recommended approval conditions are also included in Attachment A.

1. The applicant classifies the model based on the Australian Groundwater Modelling Guidelines.
2. The applicant supplies sufficient information to confirm that the existing Part 5 *Water Act 1912* licence is adequate for the total take of water from the proposed modification and the existing groundwater inflows into the Narama mine void.
3. The applicant addresses the minimal impact considerations of the Aquifer Interference Policy with respect to groundwater quality for the highly productive Hunter River Alluvium and the less productive porous rock.
4. The applicant defines negligible impact in relation to baseflow.

For further information please contact Christie Jackson, Water Regulation Officer, Tamworth, on ph (02) 6701 9652 or Christie.Jackson@water.nsw.gov.au.

Agriculture, Fisheries, Crown Lands and Forestry divisions do not have any comments on the EA.

Yours sincerely

Phil Anquetil
Executive Director Business Services

Attachment A

Ravensworth Operations Project (PA 09_176 Mod 1) **Response to exhibition of Environmental Assessment** **Additional comments by the NSW Office of Water**

Groundwater Management:

The Ravensworth Operations has a network of 26 piezometers and 12 vibrating wire piezometers, no sites are within the proposed mining area and no new sites were installed as part of this assessment.

The proposed modification is within the area where a numerical model was prepared by Mackie Environmental Research (2009) to provide model predictions of groundwater impact for the Ravensworth Operations Project.

Pre-mining groundwater levels in the Ravensworth Operations Project area were predicted to be approximately RL 55 m to RL 60 m. The model showed that the 2009 piezometric level in the shallow Permian coal measures in the proposed Narama West mining area are between RL 0 m and RL 40 m, which the proponent considered was consistent with the groundwater level data. These predicted model elevations are a drawdown of between 20 m to 60 m from pre-mining groundwater levels.

The proponent identifies that drawdown for the Ravensworth Operations Project in 2040 is predicted to be between 80 m to 170 m below pre-mining levels. They have predicted drawdown in the Bayswater Seam within the proposed Narama West mining area to be fully dewatered and depressurised from the approved mining activities at the Ravensworth Operations.

Geology/Hydrogeology

The proponent presents the conceptual hydrogeology of the site based on a summary of data presented in previous more detailed investigations (MER 2009; MER 2012 & Umwelt, 2011). The three main aquifer systems identified within the vicinity of the Narama West mining area, these are:

- Quaternary alluvium primarily associated with the Hunter River and major drainages;
- parts of the overlying weathered zone or regolith; and
- Permian coal seams.

The main channel of the Hunter River is approximately 1.4 km to the south of the proposed Narama West mining area. The alluvium associated with the Hunter River is generally comprised of 10 m to 20 m of unconsolidated gravels, sands, silts and clays.

The Permian formations occur as a regular layered south-easterly dipping sedimentary sequence, which can be categorised into the following hydrogeological units:

- hydrogeologically "tight" and hence very low yielding to essentially dry sandstone, siltstone and conglomerate that comprise the majority of the Permian interburden/overburden;
- low to moderately permeable coal seams, which are the prime water bearing strata within the Permian sequence.

The coal seam aquifers are typically confined above and below by Permian interburden or overburden. Groundwater within the coal seams is transmitted through the cleats of the coal. As the depth of the coal seam below ground level increases, so to do the confining pressure on the coal cleats. This increased depth of burial typically results in a decrease in the hydraulic conductivity of the coal seam.

Surface water bodies and Groundwater Dependent Ecosystems

The main surface water bodies in the vicinity of the proposed modification are Bowmans Creek to the east, Bayswater Creek on the western margin and the Hunter River to the south.

Previous mining activities within the Narama mining area have removed the southern portion of the alluvium associated the original alignment of Bayswater Creek. The proponent notes that there is no notable baseflow in Bayswater Creek due to the removal of the alluvium.

The proponent has identified no known Groundwater Dependant Ecosystems (GDEs) within Ravensworth Operations, which includes the Narama West mining area.

Existing Groundwater Users

The proponent has identified that there are no identified private boreholes within or near the Narama West mining area.

Groundwater Modelling

The proponent has conceptualised that the eastern margin of the proposed West Narama modification is the Narama void. The Narama mined void has been backfilled with overburden, which the proponent has identified would be more permeable than the Bayswater Seam and the Permian overburden. They have anticipated that this will enhance seepage and drawdown in the coal seam.

The proponent has identified that the interpreted groundwater level contours for the Bayswater Seam show that on the western margin of the Narama West mining area, the groundwater levels are likely to be approximately RL 40 m. These levels reduce to the east and south following the dip of the Permian strata. At the south-eastern corner of the Narama West mining area, the groundwater levels are assessed to be RL 20 m. Based upon the Bayswater Seam floor structure contours, it is assessed that the coal seam is unsaturated over the eastern and southern part of the Narama West mining area and potentially partially saturated to the north and west.

To assess the volume of groundwater presently seeping into the proposed mine void and the above conceptualisation, a steady state 2D SEEP/W cross sectional numerical model was developed by Australasian Groundwater and Environmental Consultants Pty Ltd.

The model is non-calibrated and based on a number of assumed parameters, including recharge rates, constant head boundaries and seepage.

The assessment of the broader groundwater impacts of the proposed modification are addressed by reference to the numerical model previously developed for the broader Ravensworth Operations Project.

The proponent has justified that the model is fit for purpose by replicating the groundwater level outcomes of the Ravensworth Operations Project numerical model.

The proponent identifies that the model predicts 0.0115 m³/day per metre of model section and is assumed to be representative of the 1700m length of the mine area, being equivalent to a flux of 19.6 m³/day through the Narama West mining area.

The proponent considers that this volume would be removed by evaporation and as bound moisture in the local and overburden.

The impact on surface water is based on the numerical model for the Ravensworth Operations. The proponent has determined that simulation of the Narama mining area demonstrates that impacts to baseflow from these operations are predicted to be negligible. There is insufficient information provided to determine what is defined as a negligible impact on baseflow.

The proponent has used a steady state 2D SEEP/W to assess the impacts of the proposed modification. It is not identified why this approach was taken rather than using the existing numerical model developed for the Ravensworth Operations. It can only be assumed that there were limitations and the steady state 2D SEEP/W model would provide the most accurate prediction of the impacts of the modification.

The long term impacts of the groundwater level drawdown in the Narama West mining area is determined by the proponent to be overshadowed by the depressurisation from existing approved mining activities at the Ravensworth Operations and that there would be no cumulative impact to groundwater associated with the modification.

The proponent has not classified the steady state 2D SEEP/W model to the Australian groundwater modelling guidelines. It is considered that this is a class 1 model.

Groundwater Monitoring

The proponent has identified that that existing Water Management Plan for the Ravensworth Operations includes groundwater monitoring, which includes existing monitoring in the vicinity of the Narama West mining area is adequate to monitor the impact of the modification.

It is considered that this is justified due to the proposed modification being overshadowed in the long term by the existing approved mining activities.

Licensing and Water Sharing Plans

The proponent has identified that Part 5 *Water Act 1912* licence (20BL170749) entitlement of 150 ML/year is held for the Narama mining area. The current estimated inflow to the mined void is less than 0.5 ML/day.

There is insufficient information to determine if the current entitlement is sufficient to account for the current inflows into the mined void. An entitlement of 150 ML/yr is equivalent to an inflow of 0.41 ML/day. The proposed modification will cause additional inflows in the Narama mining area of 7.2 ML/year.

The proponent has identified that the groundwater inflows into the proposed Narama West mining area will have a negligible impact on the alluvial water source in the area. Any losses from the alluvium will be consistent with those predicted for the existing approved operations. They have determined that no additional licensing for groundwater interception under the *Water Management Act 2000* and relevant water sharing plan is required.

Aquifer Impact Assessment

A summary of the consistency of the proposed modification to the Aquifer Interference Policy minimal impact considerations is shown in Table 1.

Table 1: Level 1 Aquifer Interference Policy minimal impact considerations

Aquifer	Category	Level 1 Minimal Impact Consideration	Assessment
Porous/ Fractured Rock	Less Productive	Less than or equal to 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m 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. A maximum of a 2m decline cumulatively at any water supply work.	There is no predicted cumulative impact associated with the proposed modification. The area of the modification is overshadowed by existing approved mining groundwater level drawdowns.
		Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity.	There is no comment by the proponent on groundwater quality.
Alluvium – Hunter River alluvium	Highly productive	Less than or equal to a 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" ⁽²⁾ variations, 40m 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 2m decline cumulatively at any water supply work.	There is no predicted cumulative impact associated with the proposed modification. The area of the modification is overshadowed by existing approved mining groundwater level drawdowns

		<p>(a) Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity; and</p> <p>(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.</p> <p>Redesign of a highly connected⁽³⁾ surface water source that is defined as a "reliable water supply"⁽⁴⁾ is not an appropriate mitigation measure to meet considerations 1.(a) and 1.(b) above.</p>	<p>There is no comment by the proponent on groundwater quality.</p>
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Surface Water Management:

The main surface water bodies in the vicinity of the proposed modification are Bowmans Creek to the east, Bayswater Creek on the western margin and the Hunter River to the south. The EA outlines there will be little difference in total catchment area captured by storages on the site for the modification in comparison with that captured by the approved existing operation.

Recommended Conditions of Approval

The Office of Water suggests the following to be included as conditions of any project approval for the application.

1. The applicant must ensure that it has sufficient water licences to account for the change in mining operations as a result of the modification.
2. The applicant must ensure it has sufficient licensed entitlement in each water source from which water is extracted or intercepted, to account for the take of water under all circumstances for the life of the project, and for any post-mining interception of water.
3. The applicant must hold a water access licence for any surface water runoff that is harvested, diverted or captured in excess of the site's Harvestable Right for each relevant surface water source.
4. The proponent must maintain records of water taken from all water sources and provide to the Office of Water when requested. Records of water taken must be include in an annual environmental monitoring report.
5. The current Water Management Plan must be updated for the project in consultation with the Office of Water, to reflect any changes as a result of the modification.

End Attachment A