

Advice to decision maker on coal mining project

Proposed action: Coalpac Consolidation Project (EPBC 2010/5776) – Expansion

Requesting agency	Department of Sustainability, Environment, Water, Population and Communities
Date of request	29 May 2013
Date request accepted	29 May 2013
Advice stage	Environment Impact Assessment (draft) and Environment Impact Assessment (supplementary)
Summary of request from the regulator	<p>The Department of Sustainability, Environment, Water, Population and Communities (the Department) is currently assessing the proposed project in accordance with the provisions of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act).</p> <p>The Department notifies the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (the Committee) of an opportunity to comment on the Draft Environmental Impact Statement. Specifically, the Department seeks the advice of the Committee on whether:</p> <ol style="list-style-type: none"> 1. Does the Committee consider that the proponent has provided sufficient information on the water resources and its management to assess likely significant impacts from the proposed action described in the Environmental Assessment and published in April 2012? <ol style="list-style-type: none"> a) If the information is considered insufficient for that purpose, what advice regarding areas of inadequacy can the Committee provide? b) What are the likely impacts of the proposed mining operations on surface and groundwater resources? In particular changes to surface and groundwater hydrological regimes that may impact on remnant vegetation remaining on the project sites and in the vicinity of the project site. 2. In considering the various minor changes made to the project, as described in the Preferred Project Report and published in April 2013, would the Committee alter their advice relating to Question 1? If so, which elements would the Committee change and how so?

Advice

The Committee was requested to provide advice on the Coalpac Consolidation Project in NSW to the Commonwealth regulator at the Environmental Impact Assessment (draft) stage. The Committee was further requested to provide comment on the revised proposed project as presented in the Preferred Project Report released in April 2013.

This advice draws upon aspects of information in the Environmental Assessment and Preferred Project Report, together with the expert deliberations of the Committee. The project assessment documentation and information accessed by the Committee are listed in the source documentation at the end of this advice.

The proposed project as described in the Environmental Assessment is a consolidation and extension of two existing coal mining developments: Invincible Colliery and Cullen Valley coal mines, located in the Western Coalfields of New South Wales 25 km north-west of Lithgow. The proposed project would extract up to 108 million tonnes run of mine (ROM) coal over the 21 year life of project, from highwall and open-cut mining operations covering an area of approximately 40 km². In addition, 5 million bank cubic metres of sand are proposed to be extracted from the Marrangaroo Formation. Associated proposed infrastructure includes: a coal conveyor over Castlereagh Highway; upgrading and building of coal preparation plants; bridge and haul road across the Wallerway Gwabegar railway line; and water management infrastructure.

The revised project proposal outlined in the Preferred Project Report reduces the total ROM coal from open cut and highwall mining operations by 11.8 Mt to 96.2 Mt over the life of project, including exclusion of the Hillcroft mining area. The proposed extraction of sand from the Marrangaroo Formation has also been removed from the project.

The Committee, in line with its Information Guidelines¹, has considered whether the proposed project assessment has used the following:

Relevant data and information: key conclusions

Given that the proponent has owned and operated mines in the Cullen Bullen region since 1989, it is expected that surface water and groundwater data would be available from the proposed project site and the surrounding region.

The Committee notes that there is limited data in the Environmental Assessment and Preferred Project Report from previously undertaken monitoring or assessments within the existing mining operations or from the wider Turon River sub-catchment. Further information should be included in the following broad areas: water quality and surface flow; existing subsidence within the project area; structural geology and regional hydrology.

Appropriate methodologies which have been applied correctly: key conclusions

The inclusion of a regional water balance and the refinement of the groundwater model, site water balance and cumulative impact assessment would improve quantification of potential impacts on groundwater and surface water resources.

Reasonable values and parameters in calculation: key conclusions

Water quality and flow data should be gathered from the surrounding Cullen, Dulhunty and Jews Creeks. The data provided from Wangcol Creek may not be an appropriate analogue as the monitoring station is located 4.9 km south of the proposed project and is not in the Turon River sub-catchment.

Question 1a: Does the Committee consider that the proponent has provided sufficient information on the water resources and its management to assess likely significant impacts from its proposed action? – If the information is considered insufficient for that purpose, what advice regarding areas of inadequacy can the Committee provide?

1. The proponent has not provided sufficient information to fully assess the likely impacts on water resources from the proposed consolidation project. The inclusion of the following analyses would improve

quantification and confidence in the assessment of potential impacts on groundwater and surface water.

- a. A more detailed cumulative impact assessment and a regional water balance would increase confidence in the proponent's assessment that there is low potential for impacts on surrounding groundwater dependent ecosystems, including the Jews Creek Swamp and Coxs River Swamp, other groundwater users in the region and on catchment water flow and quality.
- b. The water balance model should be updated to include: regional water data including the inflows and outflows from the underground mine workings; definition of groundwater ingress into pits; definition of the amount of groundwater to be pumped from mine voids; the amount of water from storage dams to be placed in mine voids and proposed sediment dams.
- c. The project assessment documentation does not provide information on the extent or measurement of the subsidence that has occurred as a result of existing mining operations. This information would assist in quantification in the water balance model of predicted inflows to the open-cut areas and underground workings from runoff and infiltration. On-site mine data should be obtained, including mine water dam levels to improve confidence in the assessment of runoff coefficients.
- d. The groundwater impact assessment is based on a conceptual geological model and simplistic flow analysis. Further investigation is required into the Marrangaroo Sandstone, as the extent (including location of outcrop) and characteristics of this formation are not clearly defined in the conceptual geological model. The conceptual model should also consider the potential impacts of fault zones on groundwater hydrology, particularly the Coxs Graben.
- e. In addition to a conceptual model, the Committee, in line with its Information Guidelines¹, considers that it is best practice to develop a numerical groundwater model that is calibrated to baseline conditions and enables a probabilistic evaluation of potential future scenarios. The groundwater modelling should:
 - i. outline the model conceptualisation of the aquifer system or systems, including key assumptions and model limitations;
 - ii. represent each aquifer, storage and flow characteristics of each aquifer, linkages between aquifers, if any, and the existing recharge/discharge pathways of the aquifers, and the changes that are predicted to occur upon commencement of the development activities;
 - iii. incorporate the various stages of the proposed development and provide predictions of water level/pressure declines in each aquifer for the life of the project and beyond;
 - iv. provide information on the time to maximum drawdown and the time for drawdown equilibrium to be reached;
 - v. identify the volumes predicted to be dewatered on an annual basis with an indication of the proportion supplied from each aquifer;
 - vi. provide information on potential water level recovery rates and timeframes in each aquifer for the life of the project and until equilibrium is expected to be achieved;
 - vii. include recommendations, a program for review and an update of the model as more data and information become available; and
 - viii. for this specific project, include the Jews Creek Swamp and Coxs River Swamp.
- f. Water quality data collected from existing monitoring points at Cullen and Dulhunty Creeks and surface water flow data for on-site minor tributaries and for the surrounding Cullen, Dulhunty and Jews Creeks should be included in the surface water impact assessment. The proponent should install flow gauges on Cullen, Dulhunty and Jews Creeks, as part of the proposed monitoring network to ensure

that the hydrological condition of these creeks is understood and maintained.

- g. In consideration of the high biodiversity characteristics and values of the proposed project site, further survey effort should be undertaken in line with the New South Wales and Commonwealth guidelines; particularly related to amphibians and other water dependent species.

Question 1b: What are the likely impacts of the proposed mining operations on surface and groundwater resources? In particular changes to surface and groundwater hydrological regimes that may impact on remnant vegetation remaining on the project sites and in the vicinity of the project site.

2. The proposed project is likely to impact on the existing unnamed minor tributaries within the proposed project boundary and result in changes of flow to the Cullen, Dulhontys and Jews Creek, which ultimately converge into the Turon River. Further:
 - a. The analysis of catchment loss includes the physical disturbance area, however, the potential impacts to flow as a result of runoff draining into underground workings or upstream diversions are not addressed by the proponent. Therefore, the potential impacts to the surrounding tributaries as a result of this reduction in catchment runoff, which is assumed to be a major contributor to flow, have not been considered.
 - b. Surveys report that the unnamed tributaries within the project area are considered to be ephemeral and generally poorly defined. In areas where the catchment has been cleared there is reported to be significant erosion resulting in bare earth and grass lined channels with steep banks. The further clearing of vegetation and subsequent erosion, are likely to impact on flow regimes and water quality by altering tributary morphology and sediment load in the unnamed tributaries in the proposed project area.
 - c. The potential impacts on the above mentioned catchments are further compounded by subsidence, which is already observed in the proposed and existing Cullen Valley mine due to underground operations in the Ivanhoe mine, Old Invincible Colliery and Baal Bone Colliery and is likely to impact on surface water hydrology.
3. There is the potential that water quality in the surrounding tributaries will be impacted as a result of discharge from the proposed project. Modelling undertaken for five stages of the proposed project (years 0, 2, 8, 14 and 20) found that the volumes of releases of water from the project are likely to vary, however, the proposed project will have spills in all years. The existing licence discharge points from Cullen Valley Dam 1 (LD001) and Cullen Valley Dam 4 (LD002) are predicted to spill under all climate scenarios. The collection and publishing of baseline data and implementation of the proposed 'surface water monitoring program' would address uncertainty regarding the potential impacts on the quality and quantity of water to the surrounding creeks. The proponent should also consider changing the monitoring period from quarterly to monthly when extensive clearing activities are being undertaken, for the reasons outline in paragraph 2b above.
4. It is noted that there is the potential for acid drainage from the Marrangaroo Formation and Lithgow Coal Seam rejects. These formations have been identified as having moderate to high acid forming capacity, which may generate acidic and more saline runoff if exposed to oxidising conditions. Surface water and seepage from coal reject material and overburden should be monitored to ensure that key water quality parameters remain within appropriate levels. It is recommended that the proponent monitor runoff and seepage from coal reject emplacement areas on a monthly basis, including monitoring dissolved metals, pH and sulphate concentrations, to ensure there are no adverse impacts on water resources.
5. If disturbance to rehabilitated overburden emplacement areas occurs within the vicinity of drainage lines, there is the potential to impact the health of downstream watercourses, through an increase in sediment load and contamination of water resources. It is noted by the proponent that material below the topsoil layer and in the first 10 m from the surface may have the potential to be sodic and prone to dispersion and erosion. It is recommended that field trials be undertaken to identify the most appropriate topsoil and overburden materials for the revegetation and rehabilitation of final landforms to be included in the

appropriate post-mine rehabilitation plan.

6. The potential impacts as described above to water quality and flow are likely to impact downstream ecology. Given that the fauna survey effort did not conform to New South Wales and Commonwealth guidelines, further survey effort is required to properly document the presence of water-dependent species and identify whether there is likely to be suitable habitat for these species in the Cullen, Jews and Dulhuntys Creeks. This information should inform an assessment of the likely ecological impacts as a result of changes in water quality and flow within the tributaries that drain the proposed project boundary.
7. The site water balance predicts that between 379 to 926 ML/year of water will be needed for mine site water requirements. This water will be sourced from recycled water collected on-site, however, if demand cannot be met it will be sourced from the Invincible, Old Invincible and Old Tyldesley underground workings. The potential impact of extracting water from the underground workings has not been fully assessed, including the potential to exacerbate the existing underground heating issue in the Old Tyldesley underground workings. To address some of the issues related to the water balance, the proponent should proceed with the existing plan to engage in a groundwater data sharing agreement with the Baal Bone Colliery and expand this to include the other mining operations in the area. This would increase the regional water data available and provide input into the water balance model.
8. The potential impacts on the groundwater regime are predicted to be confined to the proposed project area and adjacent mines based on current information and assessment. This is as a result of the slow hydraulic gradient and low hydraulic conductivity of the coal seam and sandstone aquifers, within a relatively confined system bordered by outcrops to the east and west of the proposed project area. Notwithstanding the predicted localised impacts, the potential impacts to aquifer integrity, groundwater dependent ecosystems and existing bores due to drawdown and depressurisation in the Permian Coal Measures should be quantified and mapped, consistent with the advice provided in paragraph 1e above.
9. There are no identified groundwater dependent ecosystems identified within or downstream of the proposed project area. The closest groundwater dependent ecosystems are Coxs River Swamp and Jews Creek Swamp, which are located 2 km and 3.5 km to the east and north east of the project boundary. These systems are fed by perched alluvial aquifers that are unlikely to be connected to the Permian Coal Measures; however, the existing Baal Bone Colliery monitoring stations should be used by the proponent to monitor the health of the swamps. If significant changes are observed, the current conceptual geological model should be revised, as this would indicate a greater than anticipated level of interconnectivity between the alluvial aquifers, Triassic sediments and the Permian Coal Measures.
10. The groundwater regime falls within the Murray-Darling Basin Porous Rock Groundwater Sources and the Greater Metropolitan Region Groundwater Water Sources. All proposed development activities would need to be consistent with the associated water sharing plans for these regions.

Question 2: In considering the various minor changes made to the project, as described in the Preferred Project Report and published in April 2013, would the Committee alter their advice relating to Question 1? If so, which elements would the Committee change and how so?

11. The Committee notes that the proponent has submitted a Preferred Project Report at the request of the New South Wales Director General, in response to the Planning and Assessment Commission merit review² of the proposed project. This report does not contain further information or analysis on the potential impacts to surface water or groundwater resources; however, the Statement of Commitments has been updated in areas relating to water resources.
12. The Committee considers that the likely impacts of the proposed mining operations on surface and groundwater resources identified in paragraphs 2 to 10 are valid and continue to be applicable to the proposed project described in the Preferred Project Report.
 - a. The Committee notes that the extraction of sand from the Marrangaroo Formation has been removed from the Preferred Project Report. This will decrease the volume of water required in the proposed year of extraction and the potential for acid mine drainage from the extraction and processing of the

Marrangaroo Formation. However, there is still the potential for acid mine drainage from the Lithgow Coal rejects as described in paragraph 4 above.

13. The implementation of the following commitments made by the proponent in the Preferred Project Report would assist in further assessing and quantifying the potential likely impacts identified under Question 1:
 - a. The proponent will reconfirm predicted depressurisation and groundwater inflows, in consultation with the New South Wales Office of Water, to provide a greater level of confidence that problems will not arise with groundwater or surface water resources.
 - b. The proponent will seek an environmental monitoring data sharing agreement with neighbouring industry to allow for the assessment of cumulative impacts and the development of co-operative management measures.
 - c. Groundwater monitoring will continue to confirm the assessment of the condition of the historic flooded underground workings of Old Invincible Colliery and that this storage will not be significantly impacted by the project. This data (for a total period of at least two years) will be used to confirm the key findings of the surface water and groundwater assessments undertaken for the proposed project.
 - d. The proponent will implement a Plan of Works as agreed with New South Wales Division of Resources and Energy (DRE) for the management of historical subsurface heating in overburden emplacement areas and underground mine workings.
 - e. The proponent will include Potentially Acid Forming (PAF) material management measures and provide details on PAF monitoring and management in the Rehabilitation and Landscape Management Plan for the project.
14. Commitments for surface and groundwater monitoring should be presented as part of a water monitoring plan and should be consistent with the National Water Quality Management Strategy.
15. Data and relevant information from the proposed project should be made accessible for the relevant Bioregional Assessments to assist the knowledge base for regional scale assessments.

Date of advice	27 June 2013
Source documentation available to the Committee in the formulation of this advice	<p>Hansen Bailey 2012. Coalpac Consolidation Project Environmental Assessment. Prepared for Coalpac Pty Ltd.</p> <p>Hansen Bailey 2012. Coalpac Consolidation Project Environment Assessment Response to Submissions. Prepared for Coalpac Pty Ltd.</p> <p>Hansen Bailey 2013. Coalpac Consolidation Project Preferred Project Report. Prepared for Coalpac Pty Ltd.</p>
References cited within the Committee's advice	<p>¹ Information Guidelines for Proposals Relating to the Development of Coal Seam Gas and Large Coal Mines where there is a Significant Impact on Water Resources available at: http://www.environment.gov.au/coal-seam-gas-mining/project-advice/pubs/iesc-information-guidelines.pdf</p> <p>² NSW Planning and Assessment Commission 2012. Coalpac Consolidation Review Main Report.</p>