

Advice to decision maker on coal mining project

Proposed action: The Range Project near Wandoan, Queensland (EPBC 2011/5860) – New Development

Requesting agency	Department of Sustainability, Environment, Water, Population and Communities
Date of request	10 April 2013
Date request accepted	10 April 2013
Advice stage	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 Supplementary Environmental Impact Statement. Specifically, the Department seeks the advice of the Committee on:</p> <ol style="list-style-type: none"> 1. Does the Committee consider that the proponent has provided sufficient information on water resources and its management to assess likely significant impacts from its proposed action? – If the information is considered insufficient, what advice regarding areas of inadequacy can the committee provide? 2. Does the draft Supplementary Environmental Impact Statement (SEIS) provide for thorough assessment/mitigation of potential water related downstream impacts on listed threatened species and communities, in particular, the Fitzroy River Turtle and the Murray Cod that live and breed in the tributaries of the Fitzroy River? 3. Is the groundwater modelling (SEIS, Chapter 15.4.5) provided by the proponent adequate to gauge likely impacts to nationally protected matters? For example are the estimates of the project's water balance; potential drawdown; and conclusions regarding indirect impacts to nearby vegetation reasonable? 4. Does the water balance recommendation (SEIS, Appendix 9) of a 'no release' site seem feasible and realistic? If the proponent did opt to use one of the scenarios what mitigation strategies would the IESC suggest to avoid downstream potential impacts to Matters of National Environmental Significance (MNES) (as identified in Q1)? Are the project activities likely to result in substantial changes to water quality downstream from the project site? For example, are there likely to be substantial impacts through either erosion, the disturbance of acid sulphate soils, or increases in

salinity?

5. Is the design of the water monitoring program likely to detect and remedy any substantial/unacceptable changes to water quality as a result of project activities? (SEIS, Chapter 34, Appendix 1. Point 3, pages 34-9).
6. Are the findings of the water based Cumulative Impacts Assessment (CIA) (SEIS, Chapt. 31) reflective of likely impacts to the Surat Basin and/or the Great Artesian Basin? Has the CIA adequately represented nearby and likely developments, for example the potential development of other nearby coal projects currently under assessment (i.e. Cockatoo Coal's Taroom and Collingwood mines)?
7. Is the design of the dams, including the tailings storage facility, sufficient to prevent seepage and minimise loss of dam site water (ensuring any potential downstream impacts to MNES are adequately protected)? (SEIS, Chapter 8.8).
8. The Department requests that the IESC review the responses provided by the proponent and, where appropriate, nominate if the proponent has suitably addressed the issues within their SEIS.
9. The Department requests advice on the consideration of downstream water-based impacts to MNES with reference to the stated design intention of the development being a zero release project.

Advice

The Committee was requested to provide advice on the proposed Range project near Wandoan in Queensland to the Commonwealth regulator on the Supplementary Environmental Impact Statement.

This advice draws upon aspects of information in the Supplementary Environmental Impact Statement, together with the expert deliberations of the Committee. The Supplementary Environmental Impact Statement and information accessed by the Committee are listed in the source documentation at the end of this advice.

The proposed coal mine is located approximately 35 km south east of the township of Wandoan in Queensland's Surat Basin and covers an area of approximately 5,226 ha. The proposed project is anticipated to produce approximately up to 5 million tonnes per annum of Run of Mine coal. The proposed project involves the development of open cut coal pits with associated coal handling facilities, power supply, water supply and transport infrastructure.

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

There is insufficient data and quantitative information provided for the Committee to comprehensively assess the proposed project's potential impacts. In particular, the extent of the field surveys and water quality information provided is too limited for the Committee to adequately assess the potential impacts on the Condamine-Balonne catchment. Local water quality objectives have not been established due to the limited number of baseline monitoring survey events. Further, there is limited information provided in relation to the scale and extent of the monitoring programs to detect water quality changes resulting from the proposed project.

Appropriate methodologies which have been applied correctly: key conclusions

Insufficient quantitative and peer reviewed modelling information has been provided to assess the full suite of potential impacts to the groundwater system, the regional water balance and cumulative impacts within the

region.

Although the predictive groundwater model was updated since the earlier draft Environmental Impact Statement, there remains uncertainty with respect to predicted groundwater impacts and their implications. The Committee considers the use of peer reviewed numerical groundwater models to inform risk assessments to be best environmental practice.

The Committee advises that a quantitative assessment of risks is needed, including the potential for an emergency release of water from the mine site and associated risks to Matters of National Environmental Significance (MNES) and other downstream receptors within the Condamine-Balonne catchment.

Reasonable values and parameters in calculation: key conclusions

The predictive groundwater model is limited by the use of a simplified conceptual model and assumptions. Further information is needed with respect to the predicted lack of impact on the Hutton Sandstone.

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

1. There is insufficient data and quantitative information provided for the Committee to comprehensively assess the proposed project's potential impacts. The Committee advises that the proposed project would benefit from the proponent addressing the advice contained in Questions 2 to 9 (below), particularly:
 - a. Additional ecological survey data;
 - b. More extensive groundwater modelling;
 - c. A detailed plan on post-mine closure water management; and
 - d. The development of local water quality objectives.

With the provision of this information there would be a reduction in the uncertainty in assessing impacts to water resources as a result of the proposed project.

Question 2: Does the draft Supplementary Environmental Impact Statement (SEIS) provide for thorough assessment/mitigation of potential water-related downstream impacts on listed threatened species and communities, in particular, the Fitzroy River Turtle and the Murray Cod that live and breed in the tributaries of the Fitzroy River?

2. The risk assessment within the Supplementary Environmental Impact Statement of potential impacts to nationally listed threatened aquatic species, particularly the Fitzroy River Turtle and the Murray Cod, has the following limitations:
 - a. Aquatic ecology survey sites are limited to the mine lease area, therefore potential impacts to aquatic species downstream of the mine lease area appear to be inferred, rather than directly assessed. The proponent infers that due to the small size and conditions (high turbidity, low dissolved oxygen) of tributaries in the proposed project area impact on the Murray Cod is unlikely to occur;
 - b. Aquatic ecology survey sites were predominantly located within the Fitzroy Catchment, with only a minimal number being located within the Condamine-Balonne Catchment. The sites within the Condamine-Balonne catchment were located nearer to the headwaters and therefore are unlikely to directly represent the ecology of downstream aquatic environments; and
 - c. No additional aquatic surveys have been undertaken since the initial surveys in 2011, limiting conclusions which would account for potential changes over time. Furthermore, the proponent has significantly changed the location and design of tailings and mine water storage dams in the Supplementary Environmental Impact Statement, with all storage dams to be located to the east of the mine pit. As a result, any potential discharge, leakage or dam failure is now more likely to impact the Dogwood Creek, and other downstream tributaries within the Condamine-Balonne Catchment, rather than the Fitzroy Catchment, where the majority of the aquatic survey sites were located.

The Committee recommends:

- d. Additional temporal aquatic surveys downstream of the mine lease area in both catchments to confirm the absence or presence of species such as the Murray Cod. These surveys will provide data that is directly representative of downstream environments and are needed to support the current conclusions regarding potential impacts to aquatic species;
- e. Quantification of the risk to downstream receptors within the Condamine-Balonne Catchment so as to consider the increased risk produced by the new location and design of the storage dam; and
- f. Mitigation of impacts from the potential release of mine water by ensuring that the water released meets ANZECC (2000) guidelines.

Question 3: Is the groundwater modelling (SEIS, Chapter 15.4.5) provided by the proponent adequate to gauge likely impacts to nationally protected matters? For example are the estimates of the project's water balance; potential drawdown; and conclusions regarding indirect impacts to nearby vegetation reasonable?

3. Although the predictive groundwater modelling was updated within the Supplementary Environmental Impact Statement there remains uncertainty about the potential impacts to MNES, as a result of the:
 - a. Simplified assumptions used in the predictive groundwater model including:
 - i. the geological strata is limited to only 5 layers;
 - ii. limited inclusion of structural geology; and
 - iii. simplified concepts around the homogeneity and porosity of strata;
 - b. Use of the predictive groundwater model to draw conclusions that no significant impacts will occur to the Hutton Sandstone, when the model shows that there will be significant levels of drawdown in the overlying Eurombah Formation. The Committee recommends the expansion of the model to define the predicted drawdown within the Hutton Sandstone; and
 - c. Provision of insufficient detail on how dewatering will occur at the site. The Committee recommends the provision of additional information on dewatering methods to assist in assessing the potential impacts to nationally protected matters and nearby vegetation.

Question 4: Does the water balance recommendation (SEIS, Appendix 9) of a 'no release' site seem feasible and realistic? If the proponent did opt to use one of the scenarios what mitigation strategies would the Committee suggest to avoid downstream potential impacts to Matters of National Environmental Significance (MNES) (as identified in Q1)? Are the project activities likely to result in substantial changes to water quality downstream from the project site? For example, are there likely to be substantial impacts through either erosion, the disturbance of acid sulphate soils, or increases in salinity?

4. The proponent has selected the 'no release' site operation from amongst its list of preferred operating options. To support this option, the proponent has redesigned storage dams so that releases should only be necessary under emergencies. The Committee has the following concerns as to whether this option can be realistically achieved:
 - a. The 'no release' option does not eliminate the need to manage the disposal of the highly saline mine water, but delays it until the end of mine life. The management strategy for dealing with mine water does not allow for an adequate understanding of the potential impacts to MNES after mine closure. The Committee recommends that the proponent provide a detailed plan to address this issue;
 - b. The 'no release' option requires a large volume of highly saline water to be stored on site for the duration of the proposed development. Failure or unanticipated leakage of storage dams could result in uncontrolled discharge of highly saline water into the ephemeral Dogwood Creek. The Committee recommends further contingency planning to cover unexpected dam failure or leakage to ensure that high volumes of saline mine water do not flow into the downstream catchments; and
 - c. The Committee understands that the proponent plans to discharge only in the event of an emergency and that discharge would be a rare or exceptional event. If emergency discharges were to become more frequent, the Committee would be concerned about the potential downstream impacts to

ecological receptors. Dogwood Creek is a low flow / low salinity receiving environment and therefore has a lower capacity to assimilate salt loading or large volumes of water without changes to the existing flow regime, water chemistry and ecological communities.

Question 5: Is the design of the water monitoring program likely to detect and remedy any substantial/unacceptable changes to water quality as a result of project activities? (SEIS, Chapter 34, Appendix 1. Point 3, pages 34-9).

5. There is insufficient information within the Supplementary Environmental Impact Statement in relation to the scale and extent of the monitoring programs to detect water quality changes resulting from the proposed development. The Committee recommends:
 - a. Development of a Receiving Environment Monitoring Plan regardless of the proponent's intent to operate as a 'no release' site. This Receiving Environment Monitoring Plan should, as a minimum, contain proposed surface water monitoring locations (including both upstream and downstream sites); proposed suite of analyses; and an explanation of the proposed monitoring approach; and
 - b. Scheduling of surface water quality sampling over an increased number of events to account for temporal and seasonal variations. This additional sampling should aim for a statistically representative baseline to be established that would allow for the development of local Water Quality Objectives.
 - c. The development of local Water Quality Objectives on the basis that some background samples in the receiving water already exceed the default Water Quality Objectives (ANZECC 2000).

Question 6: Are the findings of the water based Cumulative Impacts Assessment (CIA); (SEIS, Chapt. 31) reflective of likely impacts to the Surat Basin and/or the Great Artesian Basin? Has the CIA adequately represented nearby and likely developments, for example the potential development of other nearby coal projects currently under assessment (i.e. Cockatoo Coal's Taroom and Collingwood mines)?

6. The proponent's approach to undertaking a cumulative impact assessment has eliminated a number projects that would arguably contribute to cumulative impact. As a result, the Committee is unable to determine whether the cumulative impact assessment is representative of the likely impacts to the Surat and Great Artesian Basins and advises that:
 - a. A comprehensive cumulative impact assessment would have included a wider range of developments, for example: Cockatoo Coal's Taroom and Collingwood mines (Interim Committee provided advice in May 2012), Australia Pacific Pty Ltd's 'Expansion of Coal Seam Gas Fields' (EPBC 2009/4974), Syntech Resources Pty Ltd's 'Cameby Downs Coal Mine Extension' (EPBC 2009/4966) and British Gas International Ltd and Queensland Gas Company Ltd's 'Development of Existing Coal Seam Gas Fields' (2008/4398);
 - b. When assessing potential cumulative groundwater impacts, the proponent has determined that groundwater drawdown will be regionally insignificant when compared with the larger nearby Wandoan Coal Mine and Arrow Surat Coal Seam Gas project. A cumulative impact assessment would acknowledge that the drawdown from this development will contribute to some degree to the cumulative impacts, regardless of whether this is regionally significant in comparison to other developments. The Committee recommends that mitigation measures are included that minimise this contribution; and
 - c. The proponent has only considered the large Wandoan project, which is located to the north of the site within the Fitzroy Catchment, when assessing the cumulative surface water impacts of the proposal. Although the proponent is proposing a 'no release' scenario, if discharge were to occur it would affect the Condamine-Balonne Catchment, which was not included within the cumulative assessment.

Question 7: Is the design of the dams, including the tailings storage facility, sufficient to prevent seepage and minimise loss of dam site water (ensuring any potential downstream impacts to MNES are adequately protected)? (SEIS, Chapter 8.8).

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7. The proponent has updated the Supplementary Environmental Impact Statement with information on the dam liner and seepage management system. Within the Supplementary Environmental Impact Statement the proponent selected the 'no release' site operation from its list of preferred operating options, and states that the design of the dams has been undertaken to support this operating method. The proponent indicates that, based on the revised dam design, there is only a 5 per cent chance that the dam levels will enter into the Design Storage Allowance and a less than 1 per cent chance that the dams will over-top. The Committee considers that:
- a. Based on recent extreme rainfall events in the region, the use of 1 in 100 year average recurrence interval rainfall event for dam storage design may not be appropriate. A design for a 1 in 1000 year rainfall event would reduce the likelihood of emergency discharge from the site. In the event that an emergency discharge was to occur, potential impacts on MNES would need to be considered;
 - b. The proponent has considered seepage in the construction of both tailings and mine water dams. Any potential seepage or dam discharge would be likely to occur only within the Condamine-Balonne catchment, via Dogwood Creek. The proponent has not adequately assessed the potential impacts of possible discharge to this catchment within the documentation provided; and
 - c. The proponent has identified that the majority of the subsurface soil within the mine lease area is highly sodic, particularly soil type A.2 (grey brown cracking sodic clays) which covers 70 per cent of the proposed mine and associated infrastructure area. The proponent indicates it is likely that clays from the pit will be used in construction of the basement and embankment liner for tailings storage dams but that this is dependent on confirmation from future geotechnical investigations. The Committee notes that there is a potential erosion risk to dams constructed using highly sodic soils. Erosion leading to dam failure may adversely affect downstream ecological receptors due to exposure to highly saline tailings. Additional geotechnical investigation is needed to ensure that construction materials have characteristics that ensure that the long-term integrity of the dam infrastructure is maintained.

Question 8: The Department requests that the IESC review the responses provided by the proponent and, where appropriate, nominate if the proponent has suitably addressed the issues within their SEIS.

8. The response to this question is addressed within the answers for Questions 1 to 7 (above), with the following additional advice:
- a. The void design has been updated within the Supplementary Environmental Impact Statement, with 1 large void now revised to 3 smaller voids. There are risks associated with the long-term management of 3 highly saline voids, following the end of mine life. Although these voids represent a minimal discharge risk and may mitigate potential impacts associated with tailing leachate, the Committee considers that these points are outweighed by the potential long-term management hazard that these deep voids will create in the landscape (e.g. void B has a ground level to maximum water level depth of 43 m). Voids are a long-term environmental legacy and backfilling of voids and pit lakes represents best environmental practice.
 - b. If the proposed clearing of 87.84 ha of the Brigalow ecological community (*Acacia harpophylla* dominant and co-dominant) is to occur, the Committee notes that there may be potential impacts to water dependent matters of national environmental significance, e.g. the Black-throated Finch, which are supported by the Brigalow ecological community for habitat.

Question 9: The Department requests advice on the consideration of downstream water-based impacts to MNES with reference to the stated design intention of the development being a zero release project.

9. The response to this question is discussed as part of Question 3. The proposal of a 'zero release' site is not consistent with the proponent's own provision of an emergency release plan. The Committee recommends that a quantitative assessment of the risks to matters of national environmental significance and other downstream receptors within the Condamine-Balonne catchment is undertaken.
10. The Northern Inland Catchments, which includes the Condamine-Balonne catchment, has been identified as a bioregional assessment priority region. Data and relevant information from the proposed project

should be made accessible for this bioregional assessment to assist the knowledge base for regional scale assessments.

Date of advice 18 April 2013

Source documentation available to the Committee in the formulation of this advice Stanmore Coal Limited, 2012. The Range Project. Supplementary Environmental Impact Statement.

References cited within the Committee's advice 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>
