ENVIRONMENTAL ASSESSMENT

Duralie Extension Project

ATTACHMENT 3
PEER REVIEW LETTERS

GLOUCESTER COAL

ResourceStrategies

T.A. (Tom) McMahon FTSE
Professor Emeritus

THE UNIVERSITY OF MELBOURNE

Tony Dwyer

Duralie Coal Pty Ltd
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Dear Mr Dwyer

I have completed my assessment of Duralie Extension Project Surface Water Assessment and my comments are set out below. My review process consisted of an initial meeting and field visit to Duralie Coal Mine (DCM) operation on 12th and 13th October 2009 with Lindsay Gilbert and Tony Marszalek of Gilbert & Associates accompanied by staff from the coal company.

During the field exercise we visited the open cut operations and surrounds, inspected the engineered waterway and runoff diversions, all dams, the relatively new meteorological station, Mammy Johnsons River water quality and stream gauging sites, local catchments, and the partially and the completed rehabilitated landform areas including areas under irrigation.

I have commented on several draft reports, recommended a number of changes, and I can confirm that all these were adequately addressed. I have perused the final draft Report *Appendix A: Duralie Extension Project Surface Water Assessment* (emailed to me on 23rd November 2009) and, excluding Attachment AB *Irrigation Water – Suitability Assessment* which I was not required to review, I am confident that the surface hydrology assessment and water balance methodologies are appropriate and, within the limits of the available data, are scientifically defensible.

The Report consists of nine sections and two attachments dealing respectively with water quality and irrigation water suitability. Following an introduction to the Project and the related area (Section A1.0) and some comments on the baseline climate and surface hydrology (Section A2.0), Section A3 considers the existing and proposed water management systems. Next, in Section A4.0 a water balance analysis of the project area is reported on. Section A5.0 provides a detailed assessment of the surface water impacts of the proposed mine operation expansion on the flows and water quality of the local creeks and Mammy Johnsons River. The potential impacts of increased irrigation are also addressed. Following cessation of mining the progression of the water level in the final void is analysed by water balance and a description of the components of the proposed design for the reconstructed Coal Shaft Creek are set out in Section A6.0. The impact of climate change on the predicted surface water is addressed in Section A7.0 and recommendations regarding water quality and flow monitoring along with additional monitoring associated with the expanded irrigation areas are dealt with in Section A8.0.

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Section A2.0 covers the baseline hydrology with major sections dealing with climate, catchments, runoff characteristics, flooding and surface water quality. The section concludes with a brief discussion of the relevance of the Karuah River Water Sharing Plan to the project. The material included in this section is an appropriate background for the analysis in the following sections of the Report. Although water quality analysis is not my expertise, I believe that the interpretation of the results in Section A2.5 and graphed in Attachment AA are logical and the observations are appropriate.

In Section A3.1 the existing surface water management of the DCM is comprehensively described and in Section A3.2 the proposed project is set out. The approach to achieving the design criteria (integrity of local and regional water, no release of mine-related water offsite, separation of undisturbed site water from affected water, and reliable sources of water for mine operation) is detailed, logical and as far as I can tell, based on my site visit, is complete.

Section A4.0 describes the water balance for the site, its calibration, its application to the DCM, and a sensitivity analysis. The water balance is driven by 1000 sequences, each 9 years in length, of stochastically generated daily rainfall data. I believe the method adopted, although relatively new, is appropriate and it is shown in the Report that the rainfall generation method performs satisfactorily.

Some data were available for model calibration. Weismantel Open Pit inflows were shown to be satisfactorily modelled. The Main Water Dam (MWD) which receives runoff from the residual catchment between the storage area and the MWD diversion, direct rainfall, water pumped from the open pit and other DCM dams, seepage from the MWD diversion and the first flush capture from the Type II irrigation area, also was modelled satisfactorily.

Insufficient data were available to check the salinity balance of the MWD and Auxiliary Dams. Nevertheless, given that some data on salt concentrations were available and noting the assumptions made in the modelling I am satisfied that the approach adopted was appropriate.

The potential operational impacts of the Project are described in Section A5.0. Based on information in the Report and my site visit, I believe that the issues identified have been dealt with satisfactorily.

Two issues, namely the final void water management and Coal Shaft Creek realignment, are dealt with in Section A6.0. In the case of the final void, a water balance analysis was carried out which I consider appropriate. While there will be some uncertainty about the values of the model parameters, a sensitivity analysis was carried out and I believe the conclusions based on that analysis regarding the final void water level arrived at in the Report are appropriate. A number of recommendations are made about the proposed reconstruction of Coal Shaft Creek. While I have little experience in the stream restoration, the approach proposed appears to me to be appropriate.

The conclusions reached in Section A7.0, which briefly reviews the effects of climate change on predicated surface water impacts, are appropriate and are not inconsistent with the broad observations noted by others dealing with the impact of climate change on future hydrology.

Section A8.0 offers comments on monitoring of surface water flows, surface water quality, irrigation and site water balance and salinity which I fully endorse.

In summary, I conclude that overall the study detailed in the Report *Appendix A: Duralie Extension Project Surface Water Assessment* was completed in a professional and detailed manner, and the conclusions in the Report were appropriately supplemented by the field and modelling studies carried out by the authors.

T.A. McMahon
30 November 2009

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Review of Duralie Extension project
Groundwater Assessment and Modelling
Dr N Merrick – Heritage Computing
Reviewed by Dr Frans Kalf

Background

I have previously reviewed a third draft of a report dated 16 November 2009 prepared by Heritage Computing and made a number of comments, suggestions and recommendations prior to the preparation of this letter.

The Report Contents

The Merrick report comprises 54 pages of text together with numerous figures. The main section topics include: Introduction, Hydrogeological setting; Conceptual model; Groundwater simulation model; Scenario analysis; Impacts on the groundwater resource; Management and mitigation measures; Model limitations; Conclusions and references.

I have examined only the report provided. The report is well presented and I believe covers the important issues regarding any likely impacts to the groundwater and surface water systems due to additional mining. The report has been completed and presented in professional manner in my opinion.

One aspect that has been highlighted in comments made to the authors is the use of conductance in controlling mine inflow using the MODFLOW drain function. This should be discouraged, as it is not a suitable device for this purpose. However, I have assessed all the results and in my opinion any changes made to this parameter (with a corresponding adjustment of formation permeability or “measured” inflow) would not change the overall conclusions of the report. In particular such changes would not affect the conclusion that the water levels in the river alluvium or leakage from the Mammy Johnson’s River would not be significantly affected.

Conclusion

Based on the evidence presented and the modelling conducted I concur with the report conclusions and management and mitigation measures presented.

F Kalf **B.Sc, M. App. Sc, Ph.D.**

21 November 2009

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11th of November, 2009

To whom it may concern

I was engaged by Resource Strategies Pty Ltd to undertake a peer review of the report prepared by Gillespie Economics titled Duralie Extension Project: Socio-Economic Assessment.

This report details the performance of a very professionally conducted socio-economic study to assess and evaluate the potential impacts of continued coal mining operations on regional and state communities. Key components of the study include a benefit cost analysis, a regional economic impact assessment, and an assessment of potential impacts on employment, population and community infrastructure.

The benefit cost analysis is thorough and appropriate. As normal with these types of applications, the focus is on the most significant impacts, with additional sensitivity testing to check whether there are particular treatments of the data that would lead changed findings. The report is extremely thorough in terms of (a) the attention to identifying and analysing the different impacts that might be involved, (b) the use of benefit transfer to estimate values for key environmental and social impacts and (c) the use of sensitivity analysis to demonstrate that results are robust to a variety of different treatments and underlying assumptions.

The regional economic impact assessment is based on an application of input-output models, which, while not as accurate as general equilibrium models, are suitable for these types of project assessments and form the dominant input into economic impact assessments. The conduct of the input-output modelling is appropriate, and the multipliers that are generated for the regional and state economies are broadly consistent with other similar exercises.

The assessment of the potential impacts on employment, population and community infrastructure is appropriate. Based on the available information, the conclusion that the potential in-migration impacts of the project workforce will be small and are unlikely to have major implications on infrastructure and service needs, is considered to be appropriate.

I provided a number of comments on the draft Socio-Economic Assessment study (Attachment 1). These have subsequently been addressed to my satisfaction in the final report.

Yours sincerely

Dr John Rolfe

R&Z Consulting

Attachment 1

Major comments

1. Page 9 and Table 2.3. I am not convinced about the explanation for including the delayed commissioning costs in the cost benefit analysis. On page 9, the costs of decommissioning are estimated at $2M. These costs would presumably be incurred whenever the mine closure occurs and are therefore included (at a higher cost in the future) in the operating costs? There is a value to delaying any cost into the future, but this is essentially the value of the capital represented by the discount rate, not the actual sum itself. I would think that the net benefits of delaying decommissioning are quite small.

2. Cost benefit analysis – Sensitivity testing in Attachment B. The table headings need to be amended to reflect the fact that the results are presented for the Project Net Present Value. In addition, the second set of tables in the sensitivity analysis are supposed to exclude employment benefits (social values of employment), yet values for this item are still included in the table.

Minor comments

1. Page 1, 6th paragraph, 4th line. Add 'of' after '…into the Project through the purchase'

2. Page 2, 5th paragraph, first dot point. The 3rd sentence in the dot point is not a proper sentence and needs rewording.

3. Page 9, notes to Table 2.2. I'm not sure what 'million bank cubic metres' means, and there is an undefined date.

4. Page 9, 4th paragraph, second sentence. Add 'equipment' after 'For this analysis, capital'

5. Page 19, 3rd paragraph. The single sentence that forms this paragraph is not very well phrased – perhaps replace 'working' with 'level'

6. Appendixes – page footing labels do not match the appendix numbers

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19 November 2009

Tony Dwyer
Manager – Approvals and Environment
Duralie Coal Pty Ltd

Dear Tony

RE: DURALIE EXTENSION PROJECT - REHABILITATION AND LANDSCAPE MANAGEMENT STRATEGY

Resource Strategies Pty Ltd have asked me to peruse Appendix N (Rehabilitation and Landscape Management Strategy) of the document being prepared for Duralie Coal Pty Ltd for a Project Approval. I have been asked to do this on the basis of my 35 years of experience in mine rehabilitation particularly in my capacity as the former Director of the Centre for Mined Land Rehabilitation at the University of Queensland and former Executive Director of the Australian Centre for Minerals Extension and Research (ACMER), a national centre focussing on environmental management in the minerals industry.

I have assessed the section and believe that it effectively covers the key requirements spelt out in the section 75F of the *Environmental Planning and Assessment Act, 1979*.

I have made some comments on the document which are generally of a minor nature, but overall I thought it addressed all of the major issues, was well written and referenced the key published scientific material which will help guide future rehabilitation efforts.

Yours sincerely

Emer Prof L Clive Bell