Tasman Extension Project
Environmental Impact Statement

ATTACHMENT 7

PEER REVIEW LETTERS

Resource Strategies

DONALDSON COAL
Part of Gloucester Coal

T.A. (Tom) McMahon FTSE
Professor Emeritus

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Dear Mr Sutherland

I have completed my assessment of the Tasman Extension Project Surface Water Assessment Report and my comments are set out below. My review consisted of:

1) an initial meeting with Mr Josh Hunt of Resources Strategies Pty Ltd and Dr Steve Perrins of Evans & Peck Pty Ltd;

2) commenting on a draft report *Tasman Extension Project Characteristics of Creeks in the Tasman Extension Project Area* prepared for Donaldson Coal September 2011 Assignment No. 24182; and

3) commenting on a draft of the Report *Tasman Extension Project Surface Water Resources* prepared for Donaldson Coal March 2012 Assignment No. 24182 emailed to me on 14 March 2012. Responses to my several sets of comments were provided to me following each activity.

Based on my reading of the draft Report, I recommended a number of changes, and I can confirm that all these were adequately addressed. I have perused the final Report *Tasman Extension Project Surface Water Resources* prepared for Donaldson Coal May 2012 Assignment No. 24182 and note there are some changes to the final Report including a new section 10.7 Climate Change Analysis. 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 13 sections including a section listing references and four appendices: Appendix 1 – Flow Regime; Appendix 2 – Surface Quality Data; Appendix 3 – Pit-Top Water Management & Water Balance Analysis; and Appendix 4 – Director General's & Agency Requirements.

Following an introduction to the Project (Section 1), Section 2 summarises the Director General's requirements relating to surface water and Section 3 summarises the legislation, policies and guidelines relevant to providing an assessment of the surface water relating to the Tasman Mine extension. The material included in these three sections is an appropriate background for the analysis in the following sections of the Report.

Section 4 describes the catchment characteristics under the headings of land use, topography, soil landscapes, drainage systems, geomorphic characteristics, and existing surface

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water users. The material included in this section is an appropriate introduction for the analysis in the following sections of the Report.

Subsidence impacts and management are dealt is Section 5 incorporating performance measures separately for 1st and 2nd order streams, 3rd and higher order streams, and groundwater dependent ecosystems (Section 5.1). The conclusions summarised in Section 5.1 are based on a report *Subsidence Assessment* by Ditton Geotechnical Services (2012). Section 5.2 summarises the subsidence expected along representative stream reaches. The impact of subsidence on watercourse bed slope and knick points is dealt in Sections 5.3 and 5.4 respectively and on ponding in Section 5.5. The last two sections address the management of any impacts of subsidence and monitoring of subsidence. I have no specific expertise in the area of surface subsidence due to mining, but based on my general engineering experience I conclude that the proposed monitoring programme is logically based.

Section 6 and Appendix 1 deal with the flow characteristics of the streams and creeks in and adjacent to the Tasman Underground Mine and the proposed extension. The analyses are based on two hydrologic models – the Australian Water Balance Model (AWBM) and the Probabilistic Rational Model (PRM). Both models are 'state-of-the-art' analytical tools and most appropriate for the hydrologic analyses undertaken. Available climate and streamflow data, which are reviewed in Sections 6.1 and 6.2, are utilised in the AWBM to determine the model parameters – the results are discussed in Section 6.3. Section 6.4 describes the application of AWBM to seven representative ungauged creeks. In Section 6.5 peak flows are estimated for the same seven catchments using the PRM model. The application of both AWBM and PRM models is standard practice. The resulting daily flows and the peak discharges are realistic. I endorse the approach. The impact of the proposed mining is examined in considerable detail in Section 6.6. I endorse the observations set out in the section.

Water quality is dealt with in Section 7 and in Appendix 2 which together include monitoring locations, a statistical summary of water quality parameters, and ANZECC default trigger values. Although water quality is not my expertise I believe that the interpretations of the results in Section 7.2 are logical and the observations are appropriate.

The proposed water management system for the Tasman Extension Project is described in Section 8 and Appendix 3 including water sources (pit-top surface runoff and groundwater inflow to the mine workings), water discharge, water storages including the available storage in the void space of the old workings, mine water dam, storage tank and stormwater dam. Water requirements and supply (underground operations, dust suppression and potable water) are also discussed in this section along with effluent treatment and disposal. The information provided appears to be inclusive and an appropriate background to the site water balance analysis detailed in the next section.

The site water balance (Section 9) describes three largely independent systems – a pit-top stormwater management and recycling system, a mine water management system and a pit-stormwater drainage system. Based on the material in the Report and from a hydrologic perspective, I believe the water balances are carried out at an appropriate time-step, in sufficient detail and are logically developed, to allow conclusions that are scientifically defensible to be

drawn about the impact of the Tasman Mine Extension on the surface water resources in the local and adjacent environment. These impacts are summarised in Section 10 under the headings: water demand and supply, surface water hydrology, channel geometry and bed slope, water quality and water sharing plan. Within my area of expertise I endorse these conclusions.

An additional Section 10.7 *Climate Change Analysis* has been included in the final Report and is based on a report by the NSW Department of Environment, Climate Change and Water (2010) *NSW Climate Impact Profile – The Impacts of Climate Change on the Biophysical Environment of New South Wales.* Included in Section 10.7 is a statement from the NSW report "Increased evaporation due to increased projected temperatures". I suggest this statement needs to be tempered as there is a large body of evidence from Australia and from other parts of the world that shows that even though temperatures have been increasing over the past 30 years or so, the increases have not resulted in increased evaporative demand, in fact, evaporative demand has decreased (as measured by Class A evaporative pans); the reduction, it seems, is due to increased cloudiness and reduced wind speed. Based on this evidence, it is suggested that projected increases in temperature may not necessarily result in an increase in future evaporative demand.

Section 11 deals with mitigation and management measures under the headings of subsidence impacts on creeks, site water management, sediment control and effluent irrigation. The proposed management measures appear to me to be logical and appropriate.

Section 12 sets out the proposed monitoring, licensing and approval procedures. It is recommended that three additional water quality monitoring sites and two additional flow gauging stations and a recording pluviometer be added to the monitoring network. I endorse the surface water quality and flow monitoring programme, the wastewater management plan, and the proposed expansion of the monitoring network.

In summary, the three objectives of the Report set out in Section 1.4 have been appropriately addressed. Furthermore, I confirm that, as far as I can ascertain, all the Director-General's requirements as listed in Table 2.1 of the Report and Appendix 4 have also been addressed. Finally, I conclude that overall the study detailed in the Report *Tasman Extension Project Surface Water Assessment* was completed in a professional and detailed manner, and the conclusions in the Report are appropriately supplemented by the field and modelling studies carried out by the authors.

Thomas A McMahon

31 May 2012