APPENDIX H7

Hydrodynamic modelling assessments

APPENDIX H7.1

Introduction and testimonial letter

H7.1 INTRODUCTION AND TESTIMONIAL LETTER

H7.1.1 INTRODUCTION

For the Supplementary EIS, BHP Billiton commissioned BMT BWM Pty Ltd to upgrade the models used in the Draft EIS with additional field-collected data and with improved modelling technologies. One outcome is an integrated three dimensional model that supersedes the separate mid-field and far-field models used in the previous work (see Appendix H5.1 of the Supplementary EIS). Other outcomes include:

- comprehensive diffuser modelling using a range of tools, including Computational Fluid Dynamics (CFD) (see also Appendix H6 for the diffuser investigation)
- development of a robust return water injection technique to link the CFD and ELCOM models
- improved warm-up of model simulations
- plume dispersion scenarios similar to those used in the Draft EIS
- development and validation of a low-resolution version of the ELCOM model to facilitate long-term (70 year) assessments of desalination and climate change impacts
- modelling of dissolved oxygen levels by linking the CAEDYM model to ELCOM
- assessment of the potential for wind-driven upwelling
- particle tracking to model larval dispersion and entrainment potential.

These studies are primarily presented in Appendix H7.2. They have been independently peer-reviewed by Doug Treloar, from the internationally recognised marine engineering company Cardno (NSW) Pty Ltd (see letter of testimony overleaf), and by oceanographer Dr Rick Nunes-Vaz, an author of some of the definitive papers on Spencer Gulf oceanography (see letter of testimony in Appendix H5.1 of the Supplementary EIS).

Shortly after BHP Billiton's consideration of a desalination plant at Point Lowly began in 2004, the South Australian Government asked BHP Billiton if its planning for the project could include the option of water being available from the plant to supply areas of northern South Australia currently receiving water from the River Murray. The SA Government proposed this because of the need to reduce pressure on environmental flows in the River Murray. As a result, BHP Billiton completed its assessment of a desalination plant based on a maximum daily supply of 280 ML/d, with 80 ML/d to be available for government purposes.

In 2009, after the completion of the Draft EIS, the SA Government advised BHP Billiton that because of its decision to construct a desalination plant in the Adelaide metropolitan area, which would significantly reduce the draw on River Murray supplies, it no longer wanted to be involved in a desalination plant at Point Lowly.

It is noted, however, that BHP Billiton is continuing to assess the impact of the larger 280 ML/d desalination plant (i.e. 370 ML/d peak return water discharge) to maintain consistency with the project referral documentation and the assessments presented in the Draft EIS, and to provide a conservative assessment. The Supplementary EIS also provides comparisons, where appropriate, with the smaller 200 ML/d desalination plant (i.e. 265 ML/d peak and 186 ML/d average return water discharge rate) proposed to supply water to the expanded Olympic Dam operation.

Animations showing salinities within Upper Spencer Gulf over several months, both with and without desalination (280 ML/day plant), are provided by Appendix H7.4 of the Supplementary EIS.

H7.1.2 TESTIMONIAL LETTER

See overleaf for letter.

Our Ref LJ2849/L2202 :sge

Contact P.D. Treloar

30 September 2010

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Dear Sir,

OLYMPIC DAM PROJECT
REVIEW OF REPORT: 'SPENCER GULF MODELLING ASSESSMENTS FINAL REPORT'

As part of this EIS project, Arup have requested that Cardno Coastal, Ocean & Environment (formerly Cardno Lawson Treloar), review the BMT WBM report 'Spencer Gulf Modelling Assessments' provided in August 2010. This work follows-on from previous BMT WBM reports on this matter. It is noted that the modelling adopts the ELCOM model again, and includes CFD analyses for the near field investigations.

WBM have considered Cardno's review comments and provided to us an updated report in September 2010.

Following our review of the September 2010 version of the BMT WBM report we advise that WBM have satisfied Cardno's comments/information requests in great detail.

I am satisfied that the model-based investigations have been undertaken with attention to detail and to a level that generally equals or exceeds standard industry practice.

Yours faithfully,

P.D. Treloar
Manager - Coastal, Ocean & Estuarine Modelling
for **Cardno (NSW/ACT) Pty Ltd**