BMT WBM Pty Ltd
Level 11, 490 Upper Edward Street
Brisbane 4000
Queensland Australia
PO Box 203 Spring Hill 4004

Tel: +61 7 3831 6744
Fax: + 61 7 3832 3627

ABN 54 010 830 421 002

www.wbmpl.com.au

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16 August 2007

Department of the Environment and Water Resources
GPO Box 787
Canberra
ACT 2601

RE: ADDITIONAL GENERAL ADVICE IN RESPONSE TO MINISTERIAL QUESTION

Background

The Minister has asked the question: '*What would be the effect of moving the outfall further offshore - and into deeper water - on the diffusion/dispersal of pollutants and the chance of their being driven ashore (as per the Godfrey paper)?*'

This letter provides general information in this regard.

Response

Generally deeper water provides greater opportunity for mixing and entrainment of discharged effluent in either a buoyant plume or jet. This is primarily because the distance over which the plume/jet travels prior to interacting with the surface increases with increasing depth of discharge, and it is this process of interaction that initially governs the exchange of discharged material with ambient receiving waters, and the consequent dilution of effluent.

Currently, the 200m diffuser is proposed to be located in approximately 24m of water, with 20 ports. Given this, it is likely that centreline plume dilutions of two to three orders of magnitude at a location downcurrent of the point where the effluent surfaces might be expected. These are only indicative dilutions and should not be taken as a quantitative.

These dilutions will increase with increasing water depth, and also with the potential increase in ambient velocities associated with deeper waters. The magnitude of this increase in not readily quantifiable in a short response such as this. The current near field model could be used to investigate these dilution changes in more detail via the execution of a series of sensitivity tests.

Locating the diffuser further from shore will also increase the travel distance for effluent being potentially driven ashore, assuming a shoreline perpendicular to the outfall alignment. Given that the hydrodynamic model, as it currently stands, is unable to properly examine the process of onshore (wind driven) advective transport, the impact of moving the outfall offshore (in terms of the chance of effluent reaching the shoreline) is not easily assessed by the proponent. Once the hydrodynamic model is appropriately upgraded (as recommended by BMT WBM) and properly calibrated, such an assessment would be possible.

To summarise, moving the outfall further offshore will increase the diffusion/dispersal of pollutants and reduce the chances of them being driven ashore.

Yours Faithfully
BMT WBM Pty Ltd