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Appendix X.2
Assessment of Flow Impacts on Narran Lakes

RPS

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Our Ref: PR105153-1
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Attn: Chris Lingard
QGC
Level 30 275 George Street
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Brisbane QLD 4000

Via: email (Chris.Lingard@bg-group.com)

Dear Chris

RE: Assessment of Flow Impacts on Narran Lakes Ramsar Wetlands from Production Water Discharge

RPS Group was engaged by Queensland Gas Company Limited (QGC) to provide an assessment on the potential impacts of proposed discharge of treated coal seam gas (CSG) water (production water) on matters of National Environmental Significance (NES) with respect to Wieambilla Creek. RPS prepared a report called 'Assessment of Matters of National Environmental Significance for the creek section potentially affected by treated water discharge' (RPS 2010) which addressed most of the relevant environmental issues.

With respect to hydrological effects of the potential treated water discharge for Wieambilla Creek and downstream reaches of the catchment, the report (RPS 2010) briefly addressed the distant downstream effects at Narran Lakes in northern NSW (Section 2.2.1, RPS 2010). This letter develops that information further to provide a more comprehensive response to QGC with respect to Narran Lakes.

The Narran Lake Nature Reserve is listed as a wetland of international importance (i.e. a Ramsar site) and is protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Nature Reserve is located within the same catchment as QGC's proposed discharge sites. This assessment is limited to those potential impacts from discharge of production water on the flow regime into the Narran Lakes Nature Reserve and is based on the following sources of information:

- Water modelling report (Wieambilla Creek option only), Sinclair Knight Merz (SKM), 2010;
- Environmental Impact Statement for the Queensland Curtis Liquefied Natural Gas Project (QCLNG), QGC (2009); and
- Australian Ramsar Wetlands, Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) located at http://www.environment.gov.au/water/topics/wetlands/database/ramsar.html and accessed 29/10/2010.

Brief description of the QGC water discharge proposal

The proposed discharge of treated production water within existing waterways could be via several options, including discharge into Wieambilla Creek (part of the Condamine River catchment) and/or discharge into the Chinchilla Weir on the Condamine River south of Chinchilla. On the Condamine River, the weir is approximately 35km upstream of the confluence with Wieambilla Creek. QGC have advised that a constant 12 megalitres per day (ML/day) discharge is proposed for Wieambilla Creek for a period of six months.

Hydrological and geomorphological modelling completed by SKM (2010) has shown that the discharge at 12 ML/day would be unlikely to move far enough downstream of the proposed discharge point (near Kenya Gas-field) to reach the end of Wieambilla Creek at its confluence with the Condamine River. However, if the discharged water did move that far, its velocity would be very low (in the order of less than 0.1 metre per second). Mixing of flows is expected to be significant wherever water does reach the Condamine River trunk stream.

The Condamine River empties into the Balonne River and then into a distributary system of rivers and streams crossing the Queensland-NSW border. Among those distributary rivers is the Narran River which discharges into the Narran Lake, a terminal lake system in northern NSW. Therefore, some of the flows leaving the Balonne River will run to Narran Lakes, while the remainder runs along separate and more westerly streams and rivers before coming together into the Darling River.

Description of Narran Lake Nature Reserve

The Narran Lake Nature Reserve protects a portion of the Narran Lake wetland system that is fed by the Narran River. The Narran Lake is located in the north-west of New South Wales (NSW) and lies within the Murray-Darling Basin.

This Ramsar site contains two open water areas, Clear Lake and Back Lake. Annual inflows to the Narran wetlands are highly variable and Back and Clear Lakes will usually retain water for approximately four to six months following inundation.

The lakes are surrounded by extensive channelised wetlands vegetated with Lignum (*Muehlenbeckia* sp.), *Acacia stenophylla*, and River Red Gum (*Eucalyptus camaldulensis*). The eastern half of the Reserve is low, gently undulating, sandy and rocky ridge country. Other vegetation communities within the Ramsar site include sedges and ephemeral herbs, Common Reed (*Phragmites australis*), Coolibah (*E. coolabah*) and Black Box (*Eucalyptus largiflorens*) woodland. These species and other species within the lake system requires semi-regular inundation in which to thrive and regenerate.

The Narran Lakes Nature Reserve provides habitat for numerous waterbird species listed under international migratory bird conservation agreements and the EPBC Act. These include Greenshank (*Tringa nebularia*), Marsh Sandpiper (*T. stagnatilis*), Latham's Snipe (*Gallinago hardwickii*), Black-tailed Godwit (*Limosa limosa*), Curlew Sandpiper (*Calidris ferruginea)* and Sharp-tailed Sandpiper (*C. acuminata*). The extensive area of Lignum is a particularly important habitat for bird breeding events, supporting large nesting colonies of spoonbills (*Platalea* sp.), cormorants (Family: Phalacrocoracidae), and other waterbird species. Similar to many inland palustrine wetlands in Australia, the occurrence of irregular flooding of the wetlands triggers mass breeding events of these species and other waterbirds many of which travel inland from coastal regions.

The Narran Lake Nature Reserve meets three of the nine criteria as set out under the Ramsar Convention:

- Criterion 1: The Narran Lake Nature Reserve is a particularly good representative example of a natural or near-natural wetland that is characteristic of the Darling Riverine Plains biogeographical region. The reserve contains a considerable diversity of habitats, including

some of the largest expanses of Lignum in NSW, which are significant as an excellent example of a relatively undisturbed terminal lake system in NSW.

- Criterion 4: The Reserve's wetlands flood more frequently, and also hold their water for longer periods, than most other wetlands in north-western NSW. This allows these wetlands to be among the highest ranked sites in NSW for species richness, number of breeding species and total number of birds. Birds recorded breeding within the Ramsar site includes Australian Pelican (*Pelecanus conspicillatus*), Nankeen Night Heron (*Nycticorax caledonicus*), Little Egret (*Egretta garzetta*), Intermediate Egret (*Ardea intermedia*), Straw-necked Ibis (Threskiornis spinicollis), Royal Spoonbill (*Platalea flavipes*) and Australian White Ibis (*T. molucca*). Narran Lake Nature Reserve also supports a significant number of internationally important migratory bird species.

- Criterion 6: The large numbers of Black-winged Stilts (*Himantopus himantopus*), Red-necked Avocets (*Recurvirostra novaehollandiae*), Marsh Sandpiper, Straw-necked Ibis and Red-kneed Dotterel (*Erythrogonys cinctus*) recorded in the lake system suggests that it is nationally and internationally important for these waterbird species.

Assessment of potential impacts of proposed QGC discharge

The modelling of the proposed discharge into Wieambilla Creek (SKM 2010) confirms that discharged water is highly unlikely to reach the Narran Lakes Nature Reserve due to the following:

- A relatively small volume of proposed discharge water compared to combined total discharge amounts through the Condamine, Balonne, Culgoa and Narran River systems;
- Numerous impoundments and water management schemes within the Condamine and Balonne Rivers that affect water source and fate through the system;
- The distance downstream from the proposed QGC discharge locations is greater than approximately 500km before Narran Lakes;
- The distributary river system south of StGeorge is very complex and water through this system and into NSW is divided volumetrically and directionally with smaller proportions having their fate in individual rivers such as the Narran River; and
- Modelling (SKM 2010) indicates that the proposed QGC discharge volumes will not move far through the system downstream of the proposed discharge points. Indeed, early calculations indicate transfer distances from the Wieambilla Creek discharge, for example, of less than 20km.

The Condamine and Balonne Rivers are highly regulated systems containing numerous weirs, dams and other impoundments. It is therefore highly unlikely that discharge would reach the Narran Lakes and therefore is highly unlikely to impact on the known values of this significant wetland area.

This letter is provided as a response to Task 1 of RPS project PR105153-1. Although the potential discharge to Chinchilla Weir is referred to in some places, this letter (and the project task it relates to) resulted from earlier work specifically about Wieambilla Creek that RPS was engaged to do by QGC. The detail in this letter, and its intent with respect to potential downstream impacts is primarily focused on the proposed Wieambilla Creek water discharge for which modelling is available.

We trust this information is sufficient for your purposes; however, should you require any further details or clarification, please do not hesitate to contact me.

Yours faithfully

RPS Australia East Pty Ltd

Dr Paul Clayton
Manager - Toowoomba