CSG Water Management Plan

Submission

Queensland Murray-Darling Committee Inc. Submission on the Coal Seam Gas Recycled Water Management Plan and Validation Guideline Including Exclusion Decision Application Guideline Consultation Draft June 2011

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This submission is presented by the Chief Executive Officer, Geoff Penton, on behalf of the Queensland Murray-Darling Committee Inc. (QMDC). QMDC is a regional natural resource management (NRM) group that supports communities in the Queensland Murray-Darling Basin (QMDB), to sustainably manage their natural resources.

1.0 Background

QMDC's internal policy, *Mining and energy industry impacts on natural resources in the Queensland Murray-Darling Basin Policy Final Draft 03 December 2009* (the QMDC Mining and Energy policy) provides a framework for QMDC's submission on the *Coal Seam Gas Recycled Water Management Plan and Validation Guideline Including Exclusion Decision Application Guideline Consultation Draft* (the CSG RWMP Guidelines).

The QMDC Mining and Energy policy has been drafted by the QMDC in consultation with those communities, organisations and stakeholders QMDC is working with in the region. It is currently being reviewed to reflect QMDC's growing knowledge on the CSG mining activities and infrastructure. The policy's purpose is twofold:

- to address the impacts of the mining and energy industry (the industry) on the Queensland Murray-Darling Basin's natural resources; and

- to provide a framework for best practice and policy decision-making, risk management and responses to the specific and cumulative impacts of the industry on the QMDB's natural resources.

QMDC has also considered the CSG RWMP Guidelines against the Regional NRM Plan (the NRM Plan).

This submission is therefore informed by the aspirations of the communities of this region who depend upon the sustainable functioning of the region's natural resources.

2.0 Lack of rigorous guidelines

QMDC in its submission (13 October 2010) on the Water and Other Legislation Amendment 2010 Exposure Draft Bill (the WOLA Bill) supported the amendment of the *Water Supply (Safety and Reliability) Act 2008* (Water Supply Act) to allow for "purpose built rigorous requirements" for coal seam gas water under the existing recycled water regulatory framework.

In QMDC's opinion the CSG RWMP Guidelines lack the rigor espoused by the amended Water Supply Act. QMDC is concerned that DERM has to this date not released relevant information or facilitated robust community and stakeholder consultation on indirect and direct augmentation of coal seam gas recycled water into water sources. Without access to and discussion on scientific and social research both international and local the CSG RWMP Guidelines are unable to provide QMDC assurance that public health will be protected.

It is not only the responsibility of coal seam gas producers to supply the coal seam gas recycled water in an environmentally acceptable manner but in the view of QMDC also the responsibility of legislators and regulators to implement legislation and policy that provide a high level of human and environmental protection regarding its reuse for both the communities and natural resources of the QMDB.

The term "water schemes supplying water to a water source as a source of drinking water" requires clearer definition. Water is taken from the Balonne River at St George for drinking water purposes. Does this mean that any recycled water discharged into the Condamine, Maranoa and Upper Balonne catchments (all upstream of St George) is deemed to be "supplying water to a water source as a source of drinking water"?

Options for disposal of coal seam gas recycled water into a water source (including to a watercourse, lake, dams, weirs or aquifers) or by directly supplying treated coal seam gas recycled water to a town as a source for drinking water supply are still contentious and fraught with scientific uncertainty.

QMDC asserts that recycled CSG water must be supplied in a manner whereby its reuse is defined against specific criteria and limitations that firstly avoids, then manages or mitigates the immediate risks associated with the chemistry, quantity, storage, transport, destination etc as well as the cumulative and long-term impacts of such water.

QMDC asserts the strength of the CSG RWMP Guidelines to protect public health are compromised by three key elements of the Water Supply Act and the proposed CSG RWMP Guidelines:

1. The “exclusion” decision making powers of the regulator that where the regulator reasonably believes there is no material impact on the town’s drinking water supply or where certain requirements specific to aquifers are met a CSG recycled water management plan (CSG RWMP) is not required;

2. The power a CSG company or responsible entity has through a commercial company leading the risk assessment process, which requires no public input nor recognition of local or indigenous knowledge to choose any risk management methodology, to identify hazards and hazard events, to rate a risk, to determine critical limits and alert levels for contaminants; and

3. The authority to validate the risk assessment process adopted by the CSG company being given to a recycled water provider, or owner of infrastructure which is likely to also be a commercial company or even the same CSG company.

QMDC submits that although the regulator plays the “last card” initial determinations on *“acceptable risk”* are not the prerogative of a private company with commercial interests in the outcome.

It is common practice that company based risk assessments, are frequently deemed confidential, do not incorporate regional NRM targets, do not respect local knowledge, depend too much on economic modeling which lacks peer review or environmental and social application and do not advocate a community participatory process or a precautionary approach.

The CSG RWMP Guidelines weaken the intentions of the Water Supply Act by merely suggesting “possible options” for a responsible entity or recycled water provider or scheme manager such as providing technical and scientific reports and evidence, seeking peer reviews etc

If the primary objective of the Water Supply Act in relation to CSG water is to protect public health, the release of CSG recycled water to aquifers or waterways because it carries a risk of environmental or ecological impacts should be covered by the CSG RWMP Guidelines. Ecological impacts are however not adequately considered. The vast majority of contaminants associated with CSG recycled water have had no trigger values set for fresh or marine water by ANZECC due to ‘insufficient data’.

It is stated that “CSG water has a different public health risk profile compared to other recycled water sources. The principal public health concern is adequate management of the chemical and radiological quality of water including management of long term exposure.”

The CSG RWMP Guidelines also need to address the fact that CSG water has a different environmental health risk profile compared to other recycled water sources.

3.0 Section 2 Exclusion Decisions

"*A Recycled Water Management Plan (RWMP) will be required by all coal seam gas (CSG) schemes proposing the supply of recycled water (directly or indirectly) into a water source used for a drinking water supply by a drinking water service provider, except where there is no material impact on a drinking water supply of a drinking water service provider, or when certain regulatory requirements for aquifers are met.*
In these cases the CSG responsible entity can submit, for approval by the regulator, an exclusion decision application (for either part of or the whole CSG recycled water scheme) to be excluded from the requirements of Chapter 3 of the Act."

QMDC questions whether the provision for an exclusion decision serves to protect public health and recommends that it not be applicable under the Water Supply Act.
The fact that its application relies on the regulator's reasonable belief, that the supply of CSG recycled water, will have no material impact on a drinking water supply, creates uncertainty and more concern for QMDC. How, for example, will the regulator assess 'material impacts'? What constitutes a reasonable belief?

"Cumulative affect within a water source" and other cumulative impact issues referred to throughout the CSG RWMP Guidelines are not adequately defined by the document. QMDC submits that the onus needs to be placed on polluters to contribute to ongoing research and monitoring of the fate of pollutants in both the human and environmental systems. In essence a "cradle to grave" audit of pollutants in natural and human systems with some assessment of where in these systems risks could be presented by individual and cumulative industry pollutant concentrations and loads.

3.1 Section 2.2 Exclusion decision application for recycled water proposed to be supplied under the scheme by its direct release into an aquifer

The CSG RWMP Guidelines do not provide adequate detail on how the regulator will assess:

- the 'hydraulic impact zone' and
- the cumulative impacts of the release of CSG water to an aquifer.

QMDC does not support the re-injection of CSG water into aquifers due to:

- Lack of evidence, scientific data and experience regionally to have certainty there will be no impact to receiving or other connected aquifers.
- Lack of agreed definition of a 'safe' aquifer for re-injection disposal.
- Lack of independent monitoring and assessments of this practice.
- Potential for impact to the Great Artesian Basin.

The power afforded the regulator under section 319 of the Water Supply Act to prepare a regulation specifically for aquifers prescribing circumstances where there is no material impact on a drinking water supply of a drinking water service provider is not supported by QMDC. This degree of power requires at the very least long term hydrological monitoring to justify such a decision.

What is the data to be used on which to base the decision? Will it be industry supplied data? Will it be on the recommendation of the Queensland Water Commission? Will it be based on CSIRO research data? (See further discussion below on Appendix 1)

3.2 Section 2.2.2 Contents of this exclusion decision application

QMDC is concerned that the information given by the responsible entity to the regulator will not amount to a full disclosure of the detail required to make a safe decision. It is unclear what "water quality criteria" is being referred to. Do the criteria take into account the fact that the chemical composition of CSG water in ponds changes?

QMDC submits that a number of CSG chemicals may be dangerous at levels at or below level of detection. Refer to **Chemical and Biological Risk Assessment for Natural Gas Extraction in New York. Ronald E. Bishop, Ph.D., CHO, Chemistry & Biochemistry Department, State University of New York, College at Oneonta, Sustainable Otsego March 28, 2011.**
http://www.sustainableotsego.org/Risk%20Assessment%20Natural%20Gas%20Extraction-1.htm

"A chemical and biological risk assessment for natural gas extraction by the Chemistry and Biochemistry Department from the State University of New York in March 2011, identified chemical products in widespread use, including in exploratory wells that pose significant hazards to humans or other organisms, "because they remain dangerous even at concentrations near or below their chemical detection limits. These include the biocides glutaraldehyde, 2,2-dibromo-3-nitrilopropionamide (DBNPA) and 2,2 dibromoacetonitrile (DBAN), the corrosion inhibitor propargyl alcohol, the surfactant 2-butoxyethanol (2-BE), and lubricants containing heavy naphtha."[1]

The recycled use and release of these and other chemicals into water supplies would therefore need to be considered before allowing, for example, section 319 regulatory powers.

3.3 Sections 2.2.3 & 2.3.3 CSG pre-supply water quality data collection program

The CSG RWMP Guidelines should provide a consistent methodology for sampling, tests and analysis. The provision for alternative methodology allows different approaches by different CSG companies or responsible entities. If an alternative methodology is used QMDC submits, it must be consistent with a NATA certified method and receive approval by the regulator before sampling etc takes place.

QMDC submits the definition offered for "fraccing" fails to appreciate the chemical contents of fraccing fluid. QMDC seeks a consistent and universal definition that accurately describes both the process and the content of fraccing fluids.

The potential health risks posed by the chemicals used in fraccing and their bioaccumulation or ecotoxicity requires stringent controls. The use of RA tracer beads and chemicals used in fraccing raises concern for QMDC because of issues surrounding drilling and the contamination of aquifers and the impact that this may also have on bores or springs taping in to those aquifers, potential leakage at well sites or from "frac ponds" and storage facilities.

QMDC submits that there is no disposal of RA tracer beads, proppant or other fraccing chemicals or toxic substances to soil or water sources.

3.4 Sections 2.2.4 & 2.3.4 Regulator considerations when making this exclusion decision

QMDC suggests consideration of each application should include the following:

- Social and cultural issues
- Public opinion
- Threshold limits and the capacity of natural resources
- Existing water quality at release point

QMDC recommends that exclusion decisions made by the regulator are disclosed to the public for comment.

3.5 Section 2.3.2 Contents of this exclusion decision application

QMDC submits that extreme weather events resulting from climate change and variability should be included in calculations and modeling of flows and potential impacts on infrastructure location to water source(s).

The CSG RWMP Guidelines must prevent adverse impacts from CSG activities on the surface and ground water flow system assets and function in the QMDB. The complex nature of the floodplains, particularly the Condamine floodplains, including:

- Alignment between Strategic Cropping Land and floodplains;
- The location of key aquifers under the floodplains;
- The impact any above ground infrastructure has on overland flows on floodplains;

highlight that CSG activities should not occur on the floodplains.

4.0 Section 3.2 Using this guideline to prepare RWMPs

Sections 201 and 329E of the Water Supply Act require RWMPs to be prepared in accordance with the CSG RWMP Guidelines. Where the regulator's requirements are mandatory they are requirements under the Act and the CSG RWMP Guidelines use the word 'must'. In this case, the responsible entity, must supply the information required in the manner prescribed. It is the recycled water provider's, or scheme manager's, responsibility to ensure that mandatory legislative requirements are met. Where the regulator's requirements are not mandatory, the CSG RWMP Guidelines uses the word 'should'. In this case, the responsible entity is able to follow the CSG RWMP Guidelines suggestion, or alternatively, choose their own methodology for achieving the requirements.

QMDC asserts that by not making certain actions mandatory undermines the protection mechanisms for public health the Water Supply Act intended. Safeguarding the water quality of drinking water supplies must not be left up to self-regulation practices by the CSG industry.

4.1 Sections 3.3.1 & 3.3.2 RWMPs for CSG recycled water schemes proposing the supply of CSG water into water sources and aquifers

QMDC is supportive of the need to find a solution or solutions for the management of CSG water. The first step however should be to demonstrate how any risks associated with a solution will be primarily **avoided.** The effective management or mitigation of impacts on the region's natural resources and environment and drinking water supplies are secondary actions. Where a hazard or hazard event can be avoided this should be a mandatory clause of the CSG RWMP Guidelines.

The supply of CSG water into an aquifer requires particular attention to **avoid** *the risks to public health and ensure the capacity of the aquifer is retained to sustain supply without degradation or detrimental impact.*

5.0 Section 4 Interim recycled water management plans (RWMPs)

QMDC is not clear why interim reports are required. QMDC asserts that owing to the need to provide for public health each assessment should require a full and complete RWMP. Allowing the process to proceed without full data especially water quality is unacceptable practice as it undermines the role scientific monitoring and evidence plays to support well informed decisions. All other sections related to interim RWMPs are therefore not supported. QMDC is concerned that requiring sample tests of only 10 per cent of all active petroleum wells for parameters listed In Table 2 (Appendix 1) will lead to biased results and not provide the mechanisms needed to protect public and environmental health.

5.1 Section 4.2.3 Receiving water source quality

QMDC recommends NRM organizations being recognized as stakeholders in the management of drinking water quality and their relevance to the scheme.

5.2 Section 4.2.4 Infrastructure description

Scheme descriptions should, for example, also include a reference list of risk management processes and systems (See section 4.2.4)

5.3 Section 4.3.3 Laboratory analysis

It is QMDC'S view that data analysis should be peer reviewed.

5.4 Section 4.3.4 Non-conformance and non-compliance

QMDC recommends that non-compliances must be notified to the regulator **immediately.**

5.5 Section 4.4 Incident and Emergency Response Plan

"*The plan should state that a health risk assessment for each parameter should be undertaken, if compliance with the values listed in section 9 (Appendix 1) is not maintained. Noncompliance with set water quality standards should be categorised as a significant incident or emergency*."

The CSG RWMP Guidelines do not stipulate which water quality guidelines non-compliance refers to. QMDC recommends that they be clearly identified and how any preventative or corrective actions identified in the risk assessment will be implemented following a non-compliance.

6.0 Section 5 Interim recycled water management plan (RWMP) for CSG (aquifer) recycled water schemes

"*A detailed risk assessment of the public health risks posed by a scheme must be undertaken as part of the interim RWMP for CSG (aquifer) recycled water schemes, and as part of the full RWMP for CSG recycled water schemes and CSG recycled water schemes proposing the direct supply of CSG water to a drinking water service provider as a source of drinking water. A detailed risk assessment should provide an analysis of the operational performance and water quality monitoring data (pre-supply, if applicable) for CSG schemes, with or without an interim RWMP. The risk assessment will lead to the identification of critical control points (CCP) and their operating critical limits and alert limits. Validation is then used to ensure that the system components are able to achieve the desired water quality and operational requirements.*

QMDC submits that is the role of government regulatory bodies in consultation with stakeholders and the community to set critical limits and alert limits not private companies.

6.1 Section 5.2 Risk management framework

As suggested for earlier sections risks to public health must be primarily avoided. The CSG RWMP Guidelines where risk is identified need to differentiate between exposure levels and the potential harm that may result to pregnant women and foetuses, children and adults.

6.2 Section 5.2.1 Risk management methodology

QMDC is concerned that by having a range of risk methodologies to meet the Water Supply Act's requirements may lead to discrepancies. Will each system highlight appropriate risks and hazards? Each methodology must demonstrate how the risks will be primarily **avoided** and then minimize.

6.3 Section 5.2.2 Risk assessment team.

"*Members should include internal personnel from the design, operation, maintenance, management and quality control departments of the recycled water provider's, or scheme manager's, business. External stakeholders, such as samplers, laboratories, drinking water service providers and public health officers should also form part of the team.*"

There is no reference offered by the CSG RWMP Guidelines to engage local landholders, NRM organisations, environmental NGOs and other key stakeholders in the risk assessment team. Inclusion would enable the use of local and indigenous knowledge in the risk assessment. QMDC asserts that risk assessments concerning risks to drinking water supplies and aquifer water sources need public participation. The Australian guidelines for Environmental Health Risk Assessment promote the need for community involvement.

CSG RW risk assessments will lack credibility if there is no public disclosure/involvement and local validation.

6.4 Section 5.2.5 Risk Assessment

A risk assessment should determine when a risk is too high for a recycling scheme to proceed. A clear description of what is deemed an unacceptable risk should be the responsibility of the regulator after community and key stakeholder consultation. Uncertainty should trigger a 'no go' decision.

6.5 Section 5.2.6 Control measure identification and residual risks

"*Due to the enclosed nature of aquifers and difficulty in taking corrective actions in the event of contamination from a hazard or the detrimental impact of a hazardous event, the risk assessment should investigate, and document, the possibility of alternate sources for drinking water, should a contamination event occur.*"

No contamination should be permitted. If there is a risk of contamination to an aquifer another solution for the CSG recycled water must be found. This section accentuates the inherent flaw of the CSG RWMP Guidelines, namely they do not provide assurance that public health will be safe under the Water Supply Act or at the hands of CSG companies.

6.6 Section 5.3.2 Critical limits & 5.3.3 Alert levels

"*For each CCP and critical limit there should be a set alert level. Alert levels are more conservative than critical limits and allow for early warning to be given prior to exceedences of critical limits. This allows the responsible entity, to implement corrective actions before the critical limit is exceeded.*"

"*Every CCP and critical limit should have an alert level associated with it.*
For each alert level, the RWMP should document: the values of the alert levels, which should be exact values and be set to ensure that sufficient time is given to allow appropriate corrective actions to be implemented before critical limits are reached."

Mandatory critical limits and alert levels at which responsible entities must take action should be defined by the regulator.

7.0 Section 5.4 Validation

Validation to ensure the operation of the scheme is able to achieve the desired water quality must be peer reviewed to provide real public assurance.

Table 1: Typical approach for validation

The points referred to in Table 1 because they are indicative only do not provide certainty or clarity as to which validation methodologies constitute best practice. This will allow for different approaches by CSG companies and may lead to discrepancies in relation to the regulator's assessment of the quality and relevance of the material supplied by the recycled water provider in the validation report.

7.1 Section 5.4.6 Commissioning validation

QMDC asserts any documents referred to in CSG RWMP Guidelines must be current and support best practices based on peer reviewed science, and both international and Australian experiences in the local CSG fields. Does the United States EPA Membrane Filtration Guidance Manual 2005 fit these criteria? Does that manual, for example, transcribe to the public opinion of local communities with regards to methodologies or to the treatment processes needed in Queensland to remove local specific target contaminants?

QMDC does not support on-site tracer studies that use radioactive materials for tracing purposes.

7.2 Section 5.4.7 Commissioning verification

Commissioning verification will confirm that the final water quality consistently complies with the required water quality criteria.

QMDC submits that validation and verification information would need to be publically disclosed including the water quality criteria and the risk assessment used.

7.3 Section 5.4.8 Receiving water source

The receiving water source must be an effective barrier that allows for sufficient management of any risk to the health of the public associated with potential incidents relating to recycled water quality.

QMDC does not support the flawed approach this section takes to potential contamination incidents. 'Dilution is NOT the solution to pollution'. It fails to address eco-toxicity issues or bioaccumulation and the persistency of potential contaminants. It also ignores the cumulative impact of potential contaminant mixtures.

8.0 Full recycled water management plans (RWMPs)

QMDC recommends risks must primarily be avoided and cumulative impacts taken into account.

8.1 Section 6.2.7 Supporting programs

Community involvement and awareness, media protocols and community information program: *engagement with stakeholders such as local communities and other parties that are either affected by, or hold an interest in, a water recycling scheme is important to ensure their continued support. This program should identify all stakeholders and state the commitment of the organisation to appropriately engage these stakeholders. This should include evidence that stakeholders were appropriately engaged during the planning stages of the project. There should be a documented process for appropriately engaging stakeholders throughout the life of the recycled water scheme. This should link to the incident and emergency response plan when communication to stakeholders is required.*

The CSG RWMP must provide a community engagement strategy and ensure it is a mandatory obligation.

9.0 Section 9 Appendix 1 CSG water quality requirements

Table 2 lists many chemicals without sufficient data for ANZECC to set water quality criteria. This is contrary to the requirement to set critical limits and alert levels in order to define acceptable levels of contaminants in recycled CSG water to be released to aquifers and waterways. Table 2 must include basic parameters such as EC, turbidity, DO, pH, nutrients or a number of other parameters that are listed in DERM's *Baseline Assessment Guideline March 2011* (for bores). If the CSG RWMP Guidelines and monitoring parameters are "in addition to monitoring requirements under Environmental Protection legislation" this needs to be outlined.

There is no indication that data used in the RWMP process is to be managed and stored as per evolving industry standards and made available under Commonwealth Water Regulations (2008) for public access. Local Governments (and Regional Bodies) are required to make their environmental and human use water data available under these regulations so why not the CSG industry?

There is no information in the CSG RWMP Guidelines that describes how data is to be used. By default it would be expected that "a reference or baseline dataset should be established to determine guidelines as per the ANZECC guidelines. Ongoing monitoring and reporting should then include an assessment of whether test data sets are within these guidelines and whether any outlying readings present any human or environmental risks."

Any receiving waters data collected through the implementation of the CSG RWMP Guidelines has the capacity to significantly enhance the development and refinement of local water quality guidelines established under the EPP (Water). However, the CSG RWMP Guidelines make no provision to ensure that this occurs. The preceding points on data availability and management have the capacity to enable links between RWMP and EPP (Water) but may well lead to a plethora of available data with no human or system resources to incorporate the data into Healthy Water Management Plans implemented under the EPP (Water). This risk could be mitigated if the onus is put on data suppliers to assess how the receiving waters monitoring compares with local water quality guidelines and make recommendations on enhancements to guidelines to reflect the latest available data.
Outside RWMP guidelines DERM needs to consider policy and capacity options to ensure Gas and Petroleum staff work with Environmental Protection staff to establish and maintain links between industry data and HWMPs.

10.0 Recommendations

That where the CSG companies make CSG recycled water available for 'beneficial use', the water:

- **Does not result in the contamination of aquifers, drinking water supplies or water supplies for other beneficial uses (agriculture, industrial, residential)**
- **Does not allow the release of radioactive material into water sources**
- **Does not create a "stockpile" of by-product to be dealt with once a future solution is found**
- **Does not permit untreated CSG water emergency disposal**
- **Is released to streams in a manner that allows natural drying and wetting cycles to be achieved**
- **Is subject to risk assessments based on the immediate, future or cumulative impact which may result from its use, taking into account potential contaminants including salt, surface and ground water interaction, changes to overland flow, and new and existing infrastructure.**
- **When it is released into streams or weirs, those streams or weirs are subject to chemical and biological monitoring to assess impacts; and all monitoring data is to be made available to the public within one month of collection.**
- **Should be measured against key water quality indicators as per the NRM Plan and indicators should remain below baseline levels:**
    - **Salinity concentrations at end of valley locations for specified median and peak EC unit levels and average salt loads;**
    - **Total suspended sediment loads for specified average and peak levels at set locations;**
    - **Pesticide concentrations for specified levels at set locations; and**
    - **Nutrients for specified levels at set locations.**
- **That it is mandatory for all responsible entities to have a full CSG RWMP for all CSG recycled water schemes.**
- **That all other recommendations stated in this submission are adopted.**