



The Queensland Murray-Darling Committee Inc. Comments on the Draft General Beneficial Use Approval irrigation of coal seam gas water

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These comments are 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 General comments

1.1 Avoiding adverse impacts

QMDC asserts that the *Draft General Beneficial Use Approval irrigation of coal seam gas water (the Draft Approval)* should demonstrate how it promotes sustainable natural resource management processes by providing a high level of stewardship for both natural resources and those communities dependent on them. QMDC believes if the *Draft Approval* is to contribute to the overarching legislative framework to control and manage the impacts of CSG development within the QMDB it must be implemented primarily to prevent avoidable adverse impacts to the region's natural resources, community, and economy in the short and long term.

The purpose of the *Draft Approval* to manage CSG water as a 'resource' is supported. QMDC however sees it not only as a potential human resource but also one that primarily serves as an ecosystem and natural resource. Its value therefore, should also be appreciated and recognised when in its non-extracted state within the coal seam. As an extracted resource, CSG water may be able to support other important environmental values; and also provide a socio-economic resource for local and regional communities but that support must be informed by good science and research.

QMDC believes that by assessing how to 'optimise', not simply "maximise" resource opportunities, the *Draft Approval* should be able to identify risks that may impact on the natural resources of a region, its communities and other industry. Identification of such risks will inform appropriate responses and management strategies. QMDC asserts that the *Draft Approval* should be drafted after conducting an independent peer reviewed whole life cycle analysis of





CSG associated water and its by-products. Objectives need to “optimise” gas and water extraction and must strive for a balance between a range of key factors such as water quality and availability, soil health and land capability, biodiversity and vegetation management. The *Draft Approval* if it supports the maximisation of economic growth, for example, as its primary *beneficial use* objective risks promoting investment which may support perverse outcomes. This may mean for example during periods of wet weather where storage and disposal options may be limited, caps on water production may be necessary in order to avoid any discharge of untreated CSG water and to optimise beneficial uses of treated CSG water.

QMDC asserts that described within the *Draft Approval* should be the environmental values of all receiving environments that require protection. If this is not within the core document than there should be at least be a reference made to another appropriate document or source of information outlining those values. All EISs and EAs describe the environmental values a CSG operation or activity must take into consideration and protect. QMDC, therefore believe this requirement should be encapsulated within a beneficial use approval.

1.2 Independent peer reviews of all research and trials conducted and relied on by the CSG companies to promote irrigation of CSG water

Neither the government nor the resource industry have provided a full and accurate picture of what current impacts are occurring or what future ones will occur during the CSG mining exploration and production activities. Impacts caused by the irrigation of CSG water whether detrimental or beneficial still require close scrutiny by all stakeholders. This investigation should also include independent peer reviews of all research and trials conducted and relied on by the CSG companies to promote irrigation of CSG water.

QMDC asserts that the extraction of CSG water is having a major impact in this region, socially and environmentally. Turning this waste product into a beneficial resource is still an unproven benefit to agriculture, farm forestry and other beneficiaries of irrigation systems.

An approval process that promotes a “one size fits all” is not scientifically wise. The extracted water, because it has been in contact with hydrocarbon-bearing formations for centuries, means it contains some of the chemical characteristics of specific formations and the hydrocarbon itself. Additionally it may include water from a Basin reservoir, water injected into the formation, and any chemicals added during the production and treatment processes. CSG extracted water is therefore not a single commodity. The physical and chemical properties of the water will vary considerably depending on the geographic location of the gasfield, the geological host formation, and the type of hydrocarbon product being produced. The adverse nature of the impacts potentially caused by extracted water must be properly recognised simply because properties and volume are likely to vary throughout the lifetime of a Basin reservoir.

In QMDC’s experience many of the EIS and EA background references to the quality of CSG water and its contents invisibilises potentially damaging contaminants and minimises major issues associated with salinity and the extraction of CSG water. The major constituents of concern in CSG extracted water are:

- Salt content (salinity, total dissolved solids, electrical conductivity)
- Oil and grease (organic chemical compounds)

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- Various natural inorganic and organic compounds or chemical additives used in fracking, drilling and operating the well
- Naturally occurring radioactive material

1.3 Storage of CSG water

QMDC believes integral to making CSG water available for irrigation a review of all EAs and existing storage ponds and dams in use is required. This review is required to ascertain:

- How many such dams are in the QMDB landscape?
- How much salt is being evaporated and spread in the landscape?
- What occurrences and volume of water is leaching below the dams?
- What amounts of leachate are seeping into shallow aquifers?
- If dam is lined for what length of time does the lining retain its integrity and successfully contain the CSG water?
- Is there a specific chemical composition of CSG water where the design shows lack of integrity?

It is clear from government policy and legislation that dams will remain a core part of CSG mining practice as they still seem to be the only option for a waste product that has no clear scientific backing for best management practice. QMDC is concerned that the *Draft Approval* if it is not supported by evidence or findings from research activities that address the whole life cycle of CSG water, then it is blindly rescuing the resource industry from its waste liabilities. Without the benefit of this research it seems inappropriate to be devising policy. Indeed much emphasis should be placed on the value of this research to inform good policy.

Allowing the irrigation of CSG water without a full environmental analysis of current storage methods is not supported and in QMDC's opinion weakens the *Draft Approval*.

1.4 Cumulative impacts

How are the cumulative impacts assessed and their mitigation and management incorporated into appropriate plans? The *Draft Approval* must articulate clearly what management strategies are needed to address maximum and cumulative impacts for all affected aquifers. The UWIR estimates that in the absence of reinjection or similar measures into affected aquifers 50% recovery of water levels is not expected until 30 or 50 years after the maximum impact expected to occur between 2060 and 2070 in the Springbok Sandstone and Condamine Alluvium. Will the approvals and their reporting mechanisms be designed to address this length of time? Will proposed mitigation measures address the predicted maximum impacts.

QMDC recommends, that the approvals and their reporting mechanisms must include in their assessment of water management options and their effectiveness, the cumulative upper and lower limits for changes to natural resource asset condition and function (e.g. aquifers, Great Artesian Basin). These limits must be assessed in accordance with defined zones and timeframes in order to protect the integrity, health and value of the asset, and productive capacity, of those zones. CSG water management options that exceed such limits should not be permitted under any circumstance, and the *Draft Approval* should deem it an offence to do so.

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QMDC believes that beneficial use approvals for the irrigation of CSG water and other management options should not be offered before relevant research trials have been concluded as this is misleading community and industry that current beneficial use preferences are safe and viable management options.

QMDC asserts that where ever possible water transfer should be via a pipeline and not use streams or rivers as a conduit. Conditions must therefore be regulated to ensure there are no adverse impacts on ecology e.g. constant wetting or altering the chemical composition of water.

Should CSG water be sourced for irrigation there should not develop a permanent reliance on it as a source of water and all water use should then be considered within water resource planning mechanisms.

As a waste or resource product CSG extracted water should be managed as close to the source as possible, QMDC does not support transporting or piping the water out of the region it was extracted from.

2.0 Specific comments

2.1 Self-regulation not supported

QMDC is concerned by the lack of regulation proposed by the *Draft Approval*. QMDC does not support self-regulation as a practice. (see p.1 *Statement of Reasons*).

2.2 Exception rule in condition 4

QMDC does not support this condition. Water quality criteria must be met at all times.

3.0 Recommendations

3.1 That all Beneficial Use Approvals be regulated by EHP regulatory staff.

3.2 That condition 4 be deleted.

3.3 That all research and/or trials relied on by CSG companies and industry to support the irrigation of CSG water be independently peer reviewed.

3.4 That the below listed principles in Appendix 1 be reconsidered to inform the *Draft Approval* and all other associated approvals



APPENDIX 1

QMDC's Principles for the Beneficial Use of CSG Water

Below are some of QMDC's recommendations on *Principles for the Beneficial Use of CSG Water* submitted to the **Surat Basin CSG Engagement Group** on 19th December 2011. These are relevant to the proposed *Draft Approval*.

A. List of recommended beneficial use principles

- a) Optimise beneficial use opportunities
- b) Responsible business practice
- c) Scientific certainty & precautionary principle
- d) Maintain and improve riverine, aquatic, wetland, floodplain and riparian assets and function.
- e) Water assets are sustainably managed in a conjunctive manner

B. Principle explanatory notes

- a) Optimise beneficial use opportunities principle (described above in 1.1)
- b) Responsible business practice principle

Global investors and asset managers are increasingly integrating a broader assessment of risk into decision-making. Assessment of risk into decision-making integrates environmental, social and governance factors. Responsible business practice recognises and responds to the interconnectedness and interdependence of business within the global landscape including the consequences of financial crisis and climate change. The principles of a beneficial use policy therefore need to reflect the following core elements as part of responsible CSG mining business practice:

- 1 Environmental** - the environmental impact, direct or indirect, of an organisation's operations, products or services including those of its suppliers.
- 2 Community/Social** - the impact of an organisation's projects, products, services or investments on the community at a local or global level.
- 3 Workplace Practices** - including respectful, treatment of employees in matters related to recruitment and selection, diversity and equal opportunity, work/life balance, professional development and progression, managing redundancies and full entitlement to employment rights.
- 4 Marketplace & Business Conduct** – responsible behaviour in developing, purchasing, selling and marketing products and services.
- 5 Ethical Governance** - from board level and throughout an organisation: transparency; risk management; due diligence; effective codes of conduct and ethics.

Principles promoting a high-quality stewardship of the Great Artesian Basin (GAB) must promote practices relating to the exercise of water "rights" by CSG and petroleum projects which will ensure high-quality stewardship of GAB resources; minimise disturbances to GAB resources; and protect GAB resources for future human and environmental purposes.

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c) Scientific certainty & precautionary principle

The *precautionary principle* must be formulated as a legislative obligation, linked to achieving the objects of water and other associated environmental legislation as well as specified beneficial use processes or outcome standards. The principle must be developed on a regional basis, with respect to, for instance, specific sites or landscapes, or protected areas.

The implementation of precaution within national and regional frameworks, objectives and priorities needs to carefully address and outline the specific purposes of precautionary management and the standards to be aimed for, and find ways to address the interaction of competing interest groups with different aims, values, and priorities. Application and implementation of the precautionary principle if context-specific will enable specific decisions and management or policy measures to support regional interests and natural resource assets. Applying the precautionary principle should be accompanied by efforts to gather more information and reduce uncertainty, and address uncertainty in management

d) Maintain and improve riverine, aquatic, wetland, floodplain and riparian assets and function principle.

Priority landscape scale regional ecosystems should be maintained or improved so that ecological processes and ecosystem linkages are increased in extent and abundance at priority catchment scales. Flow regimes for health of wetland organisms, for example, must be maintained or improved against baseline conditions. Balance must be ensured between ecosystem health and water use by achieving priority water quality objectives. The following key water quality indicators therefore must remain below baseline levels within specified conditions:

- salinity concentrations at end of valley locations
- total suspended sediment loads
- pesticide concentrations
- nutrient concentrations.

e) Water assets are sustainably managed in a conjunctive manner principle.

Water assets are sustainably managed in a conjunctive manner to achieve:

- water use efficiency measures for high water use industries/sectors;
- the stabilisation of groundwater levels for high priority sub artesian groundwater systems and the prevention of lowered pressure in the Great Artesian Basin;
- trading rules that are in accordance with water allocation security objectives as defined by the final Condamine Balonne, Border Rivers, Warrego/Paroo and Moonie Water Resource Plans; and
- ecological outcomes that are in accordance with Environmental Flow Objectives as specified in the Condamine Balonne, Border Rivers, Moonie and Warrego, Paroo, Bulloo and Nebine Water Resource Plans.



Adverse impacts are prevented on the surface and groundwater flow system assets and function by beneficial use activities recognising 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. and
- the impact any above ground infrastructure has on overland flows on floodplains.

C. Examples of practices that apply principles

a) Optimise beneficial use opportunities principle

- If associated water production and water storage capacity is such that emergency discharges are required then first option should be to reduce production at the well head end.
- If used for irrigation highest value for megalitre.
- CSG associated water and byproducts treated as close as possible to source thereby implementing current waste management lifecycle policy objectives

a) Responsible business practice principle

- CSG water “by-products” must be disposed of in a manner whereby ‘disposal’ is defined against specific criteria and limitations that mitigates the risks associated with the storage, transport, destination, and cumulative and long-term impacts of such volumes of water or “by product”. Specific disposal criteria needs to include but is not limited to the following:
 - Does not result in a contaminated site
 - 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
- Risk Assessments are based on the immediate, future and cumulative impacts which may result from CSG water use, taking into account potential contaminants including salt, surface and ground water interaction, changes to overland flow, and new and existing infrastructure.
- No beneficial use activity knowingly causes environmental harm.
- No increase in deep drainage in high salinity risk areas is permitted by avoiding land based disposal (unless it is highly efficient irrigation)in areas that are deemed to have a high salinity risk(see DERM mapping)
- In order to increase the beneficial use options any further contamination should be avoided e.g. adding chemicals, radioactive isotopes in fracking process



- Avoiding permanent development or infrastructure that is reliant on future water supply when CSG water runs out so there is no permanent reliance on temporary supply of water by existing or new industry.
 - It should be a mandatory requirement that all CSG companies use a set monitoring and data collection methodology that is independently reviewed and regularly evaluated against community values and regional guidelines on, for example, water quality. Raw data and methodology should be made public per evolving water data transfer protocols as they progress under the Federal Government's Water Regulations Act. And regional Water Quality Guidelines This should assist in filling gaps in the identified need to have baseline data.
 - The continued release of an emergency release of CSG recycled water should not be permitted under any Act. An emergency release should have a very limited timeframe of no more than 7 days. If a CSG entity perceives the likelihood of emergency releases their operations should not be allowed to proceed and an environmental authority be declined or revoked. The cumulative impact of emergency CSG water releases by multiple CSG or other entities must be considered. An emergency release should be within the water quality limits set by any current or future Regional Water Quality Guidelines.
 - Robust community and stakeholder consultation is required so that communities have access to and be involved in discussion and decisions based on scientific and social research both international and local e.g. indirect and direct augmentation of CSG recycled water into water sources under the Water Supply (Safety and Reliability) Act does not put human health at risk.
 - Public consultation requires statutory timeframes that allow for real time disclosure and consultation.
- b) Scientific certainty & precautionary principle
- Options for disposal of coal seam gas recycled water release into any water source (including to a watercourse, lake, dams, weirs or aquifers or town drinking water supply) must be based on scientific certainty addressing e.g. issues such as impacts resulting from bioaccumulation and contamination.
 - Streams or rivers not to be used as a conduit for CSG water distribution; must be in a pipeline.
 - Maintain and improve riverine, aquatic, wetland, floodplain and riparian assets and function principle



- Appropriate planning and design of activities at the landscape and local level to identify and adequately protect all waterways, floodplain functioning and wetlands, considering values and function, taking into account:
 - in-stream flow regimes
 - surface water flow systems (eg potential contaminants such as salt, erosion, groundwater interface, barriers to movement of flow and in-stream species risks)
 - groundwater flow systems
 - riparian function (e.g. groundcover, bank stability, habitat, connectivity)
 - wetland and floodplain function.
 - Restricting activities within water quality baseline indicators to be set appropriate to sub-catchment levels, and local and regional threshold limits (when determined).
 - Prevent direct and indirect adverse impacts from beneficial use activities by:
 - Excluding activities from within a defined buffer zone for waterways appropriate to stream order and defined buffer zones upstream from and including wetland; specifically 500m for stream orders 5, 6 & 7; 100m for stream orders 2, 3 & 4.
 - Ensuring that legislative protection is afforded to Ramsar listed wetlands and feeder streams for 100 kilometres or a safe distance depending on activity upstream.
 - Not permitting diversions of number 4, 5, 6, and 7 stream order waterways.
 - Not permitting and actively preventing off-site movement of soil, salt, contaminants and weeds to riverine, aquatic, wetland, floodplain and riparian areas, either directly or through landscape processes.
 - No adverse impact to surface water flow systems within the floodplains including interaction with groundwater flow systems.
 - Requiring rehabilitation of the site at least to its pre-mining condition (including former value and function).
- c) Water assets are sustainably managed in a conjunctive manner principle
- The cumulative impact to surface and groundwater flow system assets from individual site activities is managed by:
 - Appropriate planning and design at a local and landscape level to manage changed surface flow regimes under varying circumstances and reduce impact to local and downstream natural and built assets.
 - Not permitting activities on floodplains within established buffer zones.
 - Enforcing the Floodplain Management Guidelines.



- Restricting activities impacting on water quantity, quality and pressure, with baseline indicators to be set appropriate to local and regional threshold limits (when determined).
- Requiring rehabilitation of the aquifer or stream to at least to its pre-mining condition (including former value and function).
- Not causing interconnectivity between groundwater flow systems.
- Establishing and implementing minimum standards for safe drilling depths to ensure drilling stops at the coal seam and does not penetrate any adjoining (below) GAB sandstones.
- Requiring CSG companies to implement a long term management plan for wells (including exploration, production, monitoring wells). This should include a bond for long term maintenance.
- Associated water (including by-products such as brine) must be aggregated only where risk and safety measures are appropriate for the volume of water and storage location within the landscape.
- By-products from associated water treatment processes, including brine, must be:
 - Preferably utilised for a tertiary industrial use that safely manages any contaminants or potential offsite impacts of waste accumulation.
 - Removed from the landscape and managed within a controlled and safe environment, with disposal sites registered with the Environmental Protection Agency.
 - Not permitted to be covered or buried in-situ in the landscape from or within evaporation ponds or storage ponds, regardless of whether the pond has clay or impermeable lining.