QGC
A BG Group business

7 September 2015

Ms Christine McDonald
Secretary
Environment and Communications Legislation Committee
PO Box 6100
Parliament House
CANBERRA ACT 2600

Dear Ms McDonald

Landholders' Right to Refuse (Gas and Coal) Bill 2015 – response to public hearings

Thank you for your letter of 4 August 2015 regarding the inquiry into the Landholders' Right to Refuse (Gas and Coal) Bill 2015.

QGC welcomes the opportunity to respond to statements made during the public hearing on 27 July 2015 by witnesses for the Hopeland Community Sustainability Group which may adversely reflect on QGC.

Our detailed comments are outlined in the attachment to this letter. In addition, you may wish to refer to our original submission to the committee dated 29 May 2015, as well as our support for APPEA's submission of the same date.

Yours sincerely

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Additional Comments in relation to the Landholders' Rights to Refuse (Gas and Coal) Bill 2015 on behalf of QGC Pty Limited (QGC)

QGC's response to statements made at the Public Hearing on 27 July 2015

1. **Underground water impacts** ***(Refer Hansard page 23)***

A witness for the Hopeland Community Sustainability Group made comments regarding the dewatering of the Walloon Coal measures underground water.

QGC undertook two years of environmental assessments to ensure the long-term impacts of our Queensland Curtis LNG (QCLNG) project could be appropriately understood. This included commissioning an independent study on groundwater impacts, which was included in our QCLNG Environmental Impact Statement.

In the past five years, QGC has invested a further $100 million on additional groundwater research and monitoring in the Surat Basin. This includes the establishment of around 90 groundwater monitoring bores and the completion of advanced hydrogeological studies, as part of our Stages 1, 2 and 3 Water Monitoring and Management Plans approved by the federal Minister for the Environment and rigorously reviewed by the Expert Panel for Major Coal Seam Gas Projects. When combined with research undertaken by other CSG companies, it is likely that the Surat is currently the most intensively studied groundwater system in the world. Our extensive data acquisition, monitoring and interpretation is ongoing and will continue for decades and is regularly reported to the federal Environment Department.

The Queensland Government's Office of Groundwater Impact Assessment has also conducted detailed groundwater modelling. The OGIA cumulative model of the Surat and Bowen Basin is a groundwater flow model which stimulates groundwater movement through the major formation of the Basins and predicts water level impacts due to CSG development. Their 2012 Underground Water Impact Report concluded:

- About 528 bores of more than 21,000 across the Surat Basin may be affected by coal seam gas activities over the long term, with 85 potentially affected within three years; and
- Most of these 528 bores tap salty water from the Walloon Coal Measures.

QGC has undertaken baseline assessments of existing water bores in our tenement areas where landholders have consented, and we will continue to honour our commitment to 'make good' our impacts on landholder bores wherever required.

2. **Landholder negotiations** ***(Refer Hansard page 23-24)***

QGC notes one witness commented on a QGC negotiation and expressed dissatisfaction with the manner in which this was conducted. This negotiation occurred around 2008.

In the early days of the CSG industry, both landholders and companies were learning about the negotiation process. QGC has since put considerable effort into the standards of conduct we strive to uphold – both during negotiations and after an agreement is signed. Our process complies with the requirements of Queensland's Petroleum and Gas Act and values the co-existence of the agricultural, pastoral and natural gas industries and good faith negotiations.

Wherever possible, QGC's first point of contact with landholders will be a face-to-face meeting in which we seek to understand how they use their property and operate their business. We will also seek advice on any requests or constraints that need to be considered, such as existing access tracks, areas of personal or business significance, water flow, buildings or planned improvements.

After a conceptual design is developed, QGC will meet again with the landholder to discuss the proposal and agree a set of land access rules for preliminary activities, such as an on-ground survey. Landholders are encouraged to attend this survey and provide further input into potential infrastructure locations. Final layout and design must also take into account environmental, safety and cultural heritage considerations.

In the next phase of discussions, QGC will seek to reach agreement on the compensation and the terms and conditions under which we will operate. QGC personnel who conduct these negotiations have a variety of skills and experience.

During Conduct and Compensation Agreement (CCA) negotiations, QGC encourages landholders to seek legal advice to ensure their informed consent. QGC will cover the reasonable costs of legal, valuation and accounting advice throughout the negotiations.

In the event agreement cannot be reached, alternative avenues include a conference or an independent Alternative Dispute Resolution process or – as a last resort – either party may apply to the Land Court to make a decision. Despite this avenue being available, QGC's strong preference is to reach voluntary agreement with landholders and we have approached the Land Court on only one occasion. We have more than 2,100 voluntary land access agreements in place.

After a CCA is negotiated, QGC treats any breach of the commitments we've made seriously and we have procedures in place to investigate and act on landholder concerns. In addition, many of our CCAs contain clauses which require us to resolve grievances within particular timeframes, including by undertaking remedial action or by paying further compensation.

Any variations to the CCA, such as the addition of further infrastructure or wells, would be subject to further negotiations with the landholder.

3. Air Quality and emissions *(Refer Hansard page 26)*

During the public hearing, it was claimed that the people of the Western Downs local government area had been exposed to toxic emissions, including volatile organic compounds (VOCs), by the coal seam gas industry.

In response, QGC notes that we conduct ongoing air quality monitoring to ensure our operations meet regulatory standards set by the Department of Environment and Heritage Protection (DEHP).

This monitoring program shows our emissions are well within the acceptable levels stipulated in Queensland legislation and in our environmental authorities. Our results are reported to DEHP as well as the National Pollutant Inventory (NPI), which publishes the data online.

With regards to VOCs, QGC's report under the NPI legislation for the 2013/2014 year noted 75,132 kilograms of VOCs across our upstream operations.

VOCs at our operations primarily come from the combustion of hydrocarbons in motors including running vehicles, and the combustion of diesel and gas for power generation or

compression across various facilities. As an example, in second quarter 2015, QGC ran around 550 vehicles across our upstream area consuming 460,000 litres of diesel. VOC levels related to our operations are well within Queensland Environmental Protection (Air) Policy (2008) guidelines. Gas monitoring tests undertaken by the Queensland Government in 2010 found no VOCs in ambient air downwind from natural gas wells.

4. Hydraulic fracturing of wells *(Refer Hansard page 26)*

Comments were made regarding the chemicals used by the CSG industry for hydraulic fracturing. Of the more than 2,500 wells QGC has drilled, fewer than 65 have been hydraulically fractured. QGC notes that typically 98 percent of hydraulic fracturing mixture is water and sand. A small proportion of chemical additives is included to control clay swelling, reduce friction, remove bacteria, dissolve some minerals and enhance the fluid's ability to transport sand. The additives used are all commonly occurring and are contained in food, household products and also used in other industries. QGC publicly discloses on its website the chemicals that may be used in well stimulation. These additives are highly diluted and equivalent to about a teaspoon to every litre of water and sand. Most biodegrade within days or months.

Stimulation additives are typically found at higher concentrations in foodstuffs, detergents and cosmetics than in stimulation fluids (Table 1).

Table 1 Percentage comparison of stimulation additives in general use and stimulation fluid

Stimulation additive	Typical concentration in general use	Typical concentration in stimulation fluid
Caustic soda	Hair remover 0.2 – 0.5%	0.002 – 0.1%
Acetic acid	Vinegar 5%	0 – 0.1%
Guar gum	Ice cream 1%	0 – 0.6%
Calcium chloride	Sports drink 0.2%	0 – 0.06%
Sodium chloride	Table salt 99%	<0.1%
Potassium chloride	Light table salt 50%	0 – 2%
Sodium hypochlorite	Bleach 5%	<0.07%

Water flowing back and produced from stimulated wells is directed to regional storage ponds – which are designed, constructed and operated in accordance with standards set by the Queensland Government – before being treated at water processing plants.

QGC engages experienced and independent third party consultants to conduct ecotoxicity and risk assessments on the chemicals, as required by state and federal regulators. These risk assessments conclude that:

- Due to the depth of stimulation activities in the coal seams, the estimated fracture height (0m to 40m), estimated average lateral fracture distribution (about 100m), the thickness of confining rock layers, the sound mechanical integrity of QGC wells and the stimulation fluid water quality, and QGC engineering designs and operational procedures, the risk of contamination of other formations and of surface waters is low.
- Water quality analysis and ecotoxicity assessment of stimulation fluids and flowback water shows these fluids are very similar to regular coal seam groundwater, which is typically suitable for stock and domestic purposes.

Further details of QGC stimulation risk assessments are publicly available in the QGC Water Monitoring and Management Plans on the QGC website.

5. Water quality *(Refer Hansard page 26)*

Witnesses for the Hopeland Community Sustainability Group raised concerns about the quality of the water extracted as part of gas production and the impact on health, land, environment, climate and crops.

Gas in the Walloon Coal Measures is held in place by naturally-occurring groundwater. The process of extracting the gas involves also extracting some of the groundwater to reduce pressure in the coal seams and allow the gas to flow to the surface. Water produced in our development area has a salinity that typically varies between <1000 mg/L and 13, 000 mg/L total dissolved solids (TDS). Water up to 4000mg/l TDS is suitable for stock watering, which is a common activity in our area of operations. Local farmers sometimes have bores into the Walloon Coal Measures and extract and use the same water extracted during gas production.

The average TDS concentrations for QGC's development areas based on well site sampling are as follows:

- Northern Development Area: 8,900 mg/L.
- Central Development Area: 2,800 mg/L; and
- Southern Development Area: 5,200 mg/L.

To maximise beneficial use opportunities, QGC aggregates produced water via a pipeline gathering network and series of storage ponds, transferring it for treatment at one of three (3) water treatment plants (WTPs), mainly to reduce TDS levels.

QGC is responsible for the water treatment and monitoring for quality, under strict guidelines set down by the Queensland Government's Department of Environment and Heritage Protection before it is provided to SunWater, a bulk water infrastructure developer and manager, which supplies the water under offtake agreements to downstream users. Some of the water goes into the Chinchilla and Glebe Weirs. High water quality standards are required, as demonstrated in the BUA for the Central Area shown on the following pages.

(A2) The characteristics of the resource must not exceed the quality limits stated in Schedule A - Table 1.

Schedule A - Table 1 **Quality limits for resource and monitoring frequency prior to release into the Kenya to Chinchilla Pipeline**

Characteristic of resource	Quality Limit	Limit Type	Monitoring frequency
Electrical conductivity* (µS/cm)	500	Maximum	Continuous
pH (pH Unit)*	6.5 – 8.5	Range	Continuous
Suspended Solids (mg/L)	175	Maximum	Monthly
Calcium (mg/L)	6	Minimum	Weekly
Chloride (mg/L)	135	Maximum	Weekly
Fluoride (mg/L)	0.5	Maximum	Weekly
Magnesium (mg/L)	4.5	Minimum	Weekly
Sodium (mg/L)	95	Maximum	Weekly
Sulphate (mg/L)	8.8	Maximum	Weekly
Total dissolved solids	320	Maximum	Weekly
Alkalinity (mg/L)	20	Minimum	Weekly
SAR	6	Maximum	Weekly
Boron (mg/L)	1.0	Maximum	Weekly

in-situ, continuous or field monitoring
NOTE: in-situ or continuous monitoring does not require NATA laboratory analysis

(A6) The characteristics of the resource must not exceed the quality limits stated in Schedule A – Table 3 prior to release into the Chinchilla Weir.

Schedule A – Table 3 Quality limits and monitoring frequency for protecting the environmental value of drinking water

Monitoring point location	Characteristic of resource	Quality Limit (µg/L)	Limit Type	Monitoring Frequency
SunWater Treated Water Pump Station located at Longitude 150.4709 and Latitude -26.9442	Alpha Activity	0.5 Bq/L	Maximum	Quarterly
	Aluminium	200		Weekly
	Ammonia	900		Weekly
	Antimony	3		Quarterly
	Arsenic	7		Weekly
	Barium	2000		Weekly
	Benzene	1		Weekly
	Beta Activity	0.5 Bq/L		Quarterly
	Bisphenol A	200		Quarterly
	Boron	4000		Weekly
	Bromide	7000		Monthly
	Bromochloroacetonitrile (DB) [1]	0.7		Quarterly
	Bromodichloromethane (DB)	6		Quarterly
	Bromoform (DB)	100		Quarterly
	Cadmium	2		Weekly

Monitoring point location	Characteristic of resource	Quality Limit (µg/L)	Limit Type	Monitoring Frequency
SunWater Treated Water Pump Station located at Longitude 150.4709 and Latitude -26.9442	Chloroform (Trichloromethane) (DB)	200		Quarterly
	Chromium (VI)	50		Monthly
	Copper	2000		Monthly
	Cyanide	80		Quarterly
	Dibromochloromethane (DB)	100		Quarterly
	Dichloroacetonitrile (DB)	2		Quarterly
	Ethylbenzene	300		Weekly
	Fluoride	1500		Weekly
	Iodide	100		Weekly
	Iron	300		Weekly
	Lead	10		Monthly
	Manganese	500		Monthly
	Mercury	1		Weekly
	Molybdenum	50		Monthly
	Nickel	20		Weekly
	N-Nitrosodimethylamine (NDMA) (DB)	0.1		Quarterly
	Nonylphenol	500		Quarterly
	PAH (as B(a)P TEF) Species: TEF: (TEF benz[a]anthracene 0.1 benzo[b+j]fluoranthene 0.1 benzo[k]fluoranthene 0.1 benzo[a]pyrene 0.1 Chrysene 0.1 dibenz[a,h]anthracene 1.0 indeno[1,2,3 - cd]pyrene 0.1	0.01	Maximum	Quarterly
	Selenium	10		Quarterly
	Silver	100		Quarterly
	Strontium	4000		Weekly
	Sulfate	500,000		Weekly
	Toluene	800		Weekly

Monitoring point location	Characteristic of resource	Quality Limit (µg/L)	Limit Type	Monitoring Frequency
	Total Petroleum Hydrocarbons (TPH) (reported as separate fractions)	200		Weekly
	Vanadium	50		Quarterly
	Xylene (all isomers)	600		Weekly
	Zinc	3000		Weekly

1: DB indicates the characteristic of resource is a disinfection by-product.