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**Director**  
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CRICOS PROVIDER NUMBER 00025B

Mr Keir Delaney  
Secretary  
Environment and Planning Standing Committee  
Victorian Legislative Council  
Parliament House  
Spring Street East Melbourne, Victoria, 3002

3 August 2015

Dear Mr Delaney,

Thank you for the opportunity to provide a submission to the Inquiry into Unconventional Gas in Victoria. I write from my position as Director at The University of Queensland (UQ), Centre for Coal Seam Gas. The Centre conducts and coordinates research on technical and social challenges associated with the development of CSG onshore in Queensland. It was founded in December 2011 and is funded by both by The University of Queensland and the four main CSG industry proponents in Queensland. The Centre supports research across 18 different UQ schools and centres and all research is subject to the University's research integrity and ethics policies and procedures ([www.ccsq.uq.edu.au](http://www.ccsq.uq.edu.au)).

My understanding is that this Inquiry will include a review of the potential benefits, risks, legal rights, management issues and legislative and regulatory frameworks that would need to be addressed and met if unconventional gas were pursued as an energy source in Victoria.

The scope of your Inquiry is very wide-ranging, however the topics have been covered in significant detail in many government-commissioned reviews (both Australian and international) that have either focused on a similar range of issues or have been topic specific e.g. hydraulic fracturing. I am not outlining these in any detail as many have been referenced in other submissions to your Inquiry. However, based on these reviews I believe that the following comments are worth noting:

- There is by and large a reasonable understanding of the general hazards associated with the development of the onshore gas industry. There is also good understanding of the strategies and techniques that can be used to minimise and mitigate the environmental and social impacts of the industry. The challenge is to tailor this knowledge to Victoria's own circumstances.
- Many reviews have found that there is no current scientific evidence that supports a moratorium on hydraulic fracturing. Importantly though, these reviews do agree that a

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robust regulatory framework is required to effectively manage hydraulic fracturing processes. To emphasise one point, research at UQ Business School ([Stakeholder trust in the CSG industry](#)) suggests that public trust in regulator capability is critical to perceptions of this 'robustness'.

- Within this wider body of review work, it would seem that understanding how best to engage and communicate risks, benefits and trade-offs in a contentious arena might require a new look!

In addition to the many comprehensive reviews, it is important to recognise that lessons have been learned from the developments in Queensland. For example, there are several regulatory innovations that include use of statutory authorities, independent expert advisors and strategies for adaptive management of cumulative impacts that could be translated into the Victorian context. Robust monitoring and compliance strategies are critical in establishing community trust in both the industry and regulator. Key initiatives here include the establishment of:

- The Queensland GasFields Commission as a statutory authority to facilitate improved relationships between the CSG industry, agricultural landholders and regional communities
- The Office of Groundwater Impact Assessment (OGIA), Department of Natural Resources and Mines, to assess the cumulative groundwater impacts of the CSG industry, assign responsibility for actions in areas of overlapping tenure and develop springs management and groundwater monitoring strategies across the cumulative management area. Particularly important is this organisation's in-built update and revision process to make use of new data as it emerges and to make public its technical assessments.
- The Coal Seam Gas Compliance Unit (Department of Natural Resources and Mines) to provide a primary point of contact for landholder and community complaints regarding the industry and also regional management of a structured compliance program in relation to both CSG well integrity and safety, and groundwater management.

Many of the main changes and challenges may be felt at local government level. Providing practical and timely support to local government authorities to assist with the assessment of impacts and the planning and delivery of services can be key. Local authorities need to be equipped and prepared to handle increased activities and this might require different resourcing levels or models *in advance* of the changes.

The unconventional gas industry contrasts with the mining sector in that it cohabits land with the agricultural sector. Change is therefore most keenly felt at the landholder level. Land-use in terms of hectares taken out of production might not be large in absolute terms and the day-to-day impact is highly variable with project phase, farm size and agriculture type. However, it should be recognised that there is a relatively high 'front end loading' on landholders' time at

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the earliest phases of development. This occurs when landholders are least familiar with the sector, in the early stages of company-landholder relations and the resultant engagement work load may be irrespective of their other working concerns. Research at UQ and GISERA is focusing on practical difficulties with making co-existence work and methodologies to measure both positive and negative impacts (e.g. [Interactions between CSG and agriculture research](#) and [www.gisera.org.au/research/agricultural.html](http://www.gisera.org.au/research/agricultural.html))

There are a number of key actions that can assist in managing the sector, such as:

- Promoting research. In Queensland, while activity in the field rose steadily from 2007/8, the CSG development decisions were finally taken in late 2010 and early 2011. Independent initiatives resulted in the establishment of two main research providers (this Centre and GISERA) in mid - late 2011. Both involved substantial industry funding support. Today, in addition to extensive research overseas, there exists a large body of onshore gas research completed and underway across Australian research institutions. UQ's [Onshore Gas Research Directory](#) provides an easy tool to search the summary details of more than 400 research projects and government reports, primarily from Australia, and may assist the Inquiry to locate relevant scientific information. A large number of publications will continue to be generated over the next year or two.
  - Ensuring that a comprehensive range of baseline data is gathered before commencement of large field developments in relation to issues perceived to be important e.g. groundwater, biodiversity, environmental and public health, socio-economic conditions. For example, there has been a focus on greenhouse gas (GHG) emissions, though without clarity on expectations of pre-existing backgrounds or natural variability. Researchers at UQ have found that there are often important, under-used, pre-existing exploration records (oil, gas and mining) which contain data highly relevant to setting expectations for water quality, emissions and natural occurrences of hydrocarbons (e.g. see [Surat and Bowen basins hydrocarbons research](#)). Currently colleagues at CSIRO/GISERA are undertaking direct measurements of fugitive methane emissions to ground truth factors used in calculating GHG impacts, as well aiming to study regional background fluxes (e.g. see [www.gisera.org.au/research/ghg.html](http://www.gisera.org.au/research/ghg.html)). Methods developed in these studies will be applicable in other areas.
  - Ensuring that *cumulative* socio-economic impacts are effectively assessed and monitored. For example, UQ's research in this regard has focused on establishing metrics for impacts which are accepted by the communities as important and also lend themselves to objective measurements ([Cumulative socioeconomic indicators research](#)). Likewise colleagues in GISERA/CSIRO have added much understanding to this sphere ([www.gisera.org.au/research/impacts.html](http://www.gisera.org.au/research/impacts.html)).
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- Ensuring that *cumulative* environmental, and especially ground water impacts are forecast, monitored and reported. This has been achieved in Queensland through OGIA's modeling, monitoring and updating work (which is supported closely by a range of geosciences and groundwater research here at UQ).
  - Establishing high quality data management infrastructure and systems that can hold historical, baseline, production and monitoring data and facilitate the interrogation of this data. It is important that government facilitates sharing of data as well as providing access to researchers. Techniques have been developed that are ready to transfer to other geographical areas and content, such as a [Water Chemistry Atlas for the CSG fields](#), which uses 3D visualization technology to interrogate groundwater data and a regional geological model.
  - Providing transparent reporting of activities, monitoring, compliance and enforcement data to the public. The Queensland government has established CSG Net ('a grass roots water bore monitoring program') to gather and share previously 'private' data. Similarly, the [CSG Globe](#) is an on line mapping tool which facilitates a public view of industry data.

It is worth repeating that in Queensland, there has already been a long journey. After several years and several thousand wells, there have been trials, lessons and innovations. Of course, not all 'problems' are solved for all, nor are all matters 'smoothed over'. There are always trade-offs which need to be made transparent and, whatever the aspiration, upside and downside impacts will not fall evenly. Nevertheless, extensive research is now well underway to help understand the impacts, both positive and negative. In the research space, it's fair to say, we all wish we'd started earlier and hope that other States can build on work in train here. In many cases community members can be actively involved in problem identification and solutions development.

Research in the areas of cumulative socioeconomic indicators, stakeholder trust, co-existence between agricultural and CSG industries and the effective integration of hydrological and geological data (both here at UQ and with colleagues in other Universities and GISERA/CSIRO) are examples of projects delivering insights and methods which may help other States considering a similar path.

Sincerely,



**Professor Andrew Garnett**  
**Director**  
**University of Queensland**  
**Centre for Coal Seam Gas**

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