



14 October 2009

Dr Ian Holland  
 Committee Secretary  
 Standing Committee on Environment, Communications and the Arts  
 PO Box 6100  
 Parliament House  
 Canberra ACT 2600

Dear Dr Holland

Thank you for your 1 October 2009 letter regarding the inquiry into mining in the Murray-Darling Basin and affording Eastern Star Gas the opportunity to respond to a submission received by the Committee. The following comments may assist the Committee with its deliberations and endeavours.

- Gas production does not involve mining

While gas production is an extractive activity, it does not involve 'mining' in the ordinarily understood sense. Mining is generally accepted as involving excavation activities either on or under the surface of the earth. Gas production does not involve excavation of that kind. It involves the drilling of wells so that water can be pumped from target coal seams to allow gas desorption and production. In Eastern Star Gas' view, references to 'gas mining' and 'gas miners' are not helpful in furthering considered debate on issues relating to coal seam gas.

- Quality of Produced Water

The typical quality of water produced by Eastern Star Gas from present target coal seams is as set out in the following table. The water does NOT contain heavy metals or radioactive components.

*Indicative Water Quality Information*

| Typical values            | As produced                    | After processing |
|---------------------------|--------------------------------|------------------|
| pH                        | 7.5 to 8.0 (slightly alkaline) | 5.5 to 6.0       |
| TDS (mg/l)                | 8,000 to 10,000                | 80 to 150        |
| Bicarbonate (mg/l)        | 5,000 to 8,000                 | ~ 50             |
| Chloride (mg/l)           | ~ 1,000                        | ~ 5              |
| Fluoride (mg/l)           | < 1                            | 0                |
| Hydroxide, Nitrate (mg/l) | < 1                            | < 1              |
| Potassium (mg/l)          | ~ 50                           | < 1              |
| Sodium (mg/l)             | 3,000 to 4,000                 | ~ 20             |
| Calcium (mg/l)            | ~ 10                           | 0                |
| Barium(mg/l)              | ~ 1                            | 0                |
| Iron (mg/l)               | < 1                            | < 1              |
| Magnesium (mg/l)          | ~ 60                           | < 1              |
| Strontium (mg/l)          | ~ 2                            | 0                |



The principal solid contained within produced water is sodium bicarbonate, which is often referred to as baking soda. Eastern Star Gas uses reverse osmosis technology to process produced water with the brine being evaporated in a lined pond. It is possible the brine stream may itself be used for separate processing to recover the sodium bicarbonate.

- Coal Seam Gas Production and 'Fracking'

Eastern Star Gas' present preferred gas production technique involves the drilling of lateral, or 'in-seam', wells. Lateral wells do not require fracking. Where fracking has been historically carried out, modern high-pressure techniques were adopted to fracture coal seams about 1 kilometre deep. Explosives were not used and the fracking process was not detectable on the surface. Further, since the coal that was fraced is structurally weaker than the rock that lies above and below it, the resulting fractures remain predominantly within the coal.

On the specific matter of Mr Pickard's failed water bore, the following background information is relevant:

- Fracking of the Bibblewindi pilot production wells took place during the second half of 2006.
- Mr Pickard's bore pump failed during 2008. Eastern Star Gas verbally offered to investigate the cause of the failure but was advised by Mr Pickard that it had already been independently assessed by a local irrigation specialist. We understand poor initial construction and the deterioration of the substandard PVC bore casing prevented the bore pump from being removed from the borehole. As a result, Mr Pickard had another water bore drilled which we understand is fully operable and yields appropriate volumes of water.
- Failure of the water bore was not attributable to fracking operations carried out in separate strata some 15km southwest and 900 metres deeper than the failed water bore.

- Well Design Protects Aquifers

Within the Narrabri region the Pilliga sandstone, which lies from just below the surface to a depth of up to several hundred metres, contains high quality aquifers that are routinely drawn upon, for agricultural and other purposes, by bores only around 80 metres deep. Below the Pilliga sandstone lies the Napperby shale, a laterally continuous, impermeable layer that prevents poorer quality water from deeper in the earth entering the Pilliga Formation, and also prevents leakage of water from the Pilliga sandstone to the deeper layers .

Eastern Star Gas' coal seam gas wells are designed and drilled to specifically protect the integrity of the Pilliga sandstone and the valuable aquifers that lie within it. The layout of the wells is depicted in the attached figure. It is noteworthy that:-

- While drilling through the Pilliga sandstone, Eastern Star Gas uses fresh water (from its water treatment plant) to which is added bentonite (clay) to ensure no leakage into or contamination of



the Pilliga sandstone and the aquifers that lie within it. Small quantities of caustic soda may also be added to the water if necessary to keep its pH at around 9 to 10.

- While drilling through the Purlawaugh formation, in addition to bentonite and possibly caustic soda the water has added to it KCl and NaCl (to prevent reactive clays in the formation from swelling) and cellulose (which forms a coating to prevent fluid from entering the formation). The cellulose used by ESG is known as 'Pac R', and is itself used as an additive in the food industry for thickening and taste enhancement.

From time to time, small amounts of xanthum gum (a thickening agent also used in the food industry) and lime may be used. All additives are used in concentrations that are neither toxic nor harmful to the environment.

- After drilling through the Pilliga sandstone and entering the Napperby shale (at a depth of around 300 to 400 metres), steel casing is inserted into the borehole, cemented into position back to surface and pressure tested. This casing ensures nothing can enter or leave the Pilliga sandstone during subsequent drilling operations.
- A second steel casing is subsequently installed and cemented into position from surface down to the target coal seam, further guaranteeing the integrity of the aquifers in the Pilliga sandstone.

- Compliance with Licence Conditions

Eastern Star Gas takes exception to suggestions that it is not complying with licence conditions. Allegations of this nature have been and continue to be made by one Narrabri resident but, without exception, have been proven to be without foundation.

- Community Interaction

Eastern Star Gas also takes exception to suggestions that it has a 'cavalier attitude to the local people'. On the contrary, Eastern Star Gas aspires to maintain close working relations with all stakeholders, and especially the Narrabri community. A single and simple public example of this is Eastern Star's sponsorship of the annual Nosh on the Namoi regional cultural event, at which the company's senior management have voluntarily manned a stand to raise money the proceeds of which have been donated to Riding for the Disabled. While there are other examples, it is not the company's philosophy to publicise them as a substitute for real engagement with the local community.

While some seismic and corehole drilling has, with prior approval of landowners, taken place on private land, Eastern Star Gas' coal seam gas production activities have to date been entirely within the Pilliga Forest. Planning is now underway, and agreements have been reached with affected parties, for establishment of a pilot production project on private land in the Dewhurst area. Well in advance of this development, the company has provided all landholders in the Dewhurst area with a fact sheet explaining what will take place and detailing what roads will be used to move equipment to and from site. Personal contact has subsequently been made with landholders, including Mr Pickard.



As most people will appreciate, natural gas is an environmentally friendly fuel that has an important role to play in NSW', and Australia's, development. Through a prudent approach to exploration and eventually development of the world-class coal seam gas resource of the Narrabri region, it is Eastern Star Gas' aim to ensure the state of NSW, the Narrabri region and company shareholders benefit through, among other things, job creation, royalty revenue and dividends.

Should you wish to discuss any of the matters referred to above or have any further questions, please feel free to contact me.

Yours sincerely

*DC*  
  
David Casey  
Managing Director  
Eastern Star Gas

# Anatomy of a Narrabri CSG Well

