Trade & Investment Resources & Energy

INFORMATION SHEET

AGL Gloucester Waukivory Pilot Project: BTEX Investigation

May 2015

The Project

In 2012, AGL commenced the Waukivory Pilot Project, with the drilling of four coal seam gas (CSG) wells (Wells 11, 12, 13 and 14) at two properties at Forbesdale, near Gloucester NSW. This forms part of the Gloucester Gas Project.

The project involved the hydraulic fracture stimulation of the CSG wells using a mixture of water, sand and some compounds (known as hydraulic fracture fluid) which is injected into the coal seam at high pressure. The injected water and compounds (flowback) are then removed and captured above ground in storage tanks, or temporary storage in dams, for lawful disposal, prior to the gas removal

In October 2014, AGL commenced the fracture stimulation of the wells in accordance with approval from the Division of Resources and Energy (DRE) and the NSW Environment Protection Authority (EPA). The fracture stimulation process was undertaken on behalf of AGL by Haliburton.

Water analysis

As part of the approval process, ongoing monitoring of the ground and surface water in the vicinity of the CSG wells is required. At the Waukivory site the ground and surface water monitoring includes seven groundwater monitoring bores, a multi-zone monitoring well and three surface water monitoring sites located on the Avon River and Waukivory Creek, all within 0.6km of the pilot gas wells. The groundwater monitoring bores are located at depths ranging from 11m to 360m, with the multi-zone monitoring well at a depth of 1100m.

Baseline sampling was conducted before any fracture stimulation of the wells occurred to provide information on the existing groundwater and surface water conditions at the Waukivory site. The baseline sampling comprised four sampling events in March, June, September and October 2014.

AGLs baseline testing detected the BTEX compound toluene in shallow groundwater (ranging from 6 - 72 µg/L micrograms per litre) from monitoring bores located around well 11 at depths of 54m, 62m and 210m. However, there was no detection of the other BTEX compounds being, benzene, ethylbenzene or xylenes, within shallow groundwater systems.

Additional monitoring was undertaken during the fracture stimulation and flowback water removal stages.

What is BTEX?

BTEX stands for Benzene, Toluene, Ethylbenzene and Xylene. These chemical compounds most commonly occur in oil-based products such as petrol, diesel and thinners but can also be naturally occurring. BTEX compounds are typically measured in micrograms per litre (µg/L), the equivalent of parts per billion (ppb). One ppb is roughly equivalent to a teaspoon of material in an Olympic-size swimming pool.

More information about BTEX compounds can be found in the Office of Coal Seam Gas's BTEX and Coal Seam Gas Fact Sheet.

In 2012 the NSW Government banned the use of BTEX compounds as additives in CSG drilling and hydraulic fracture stimulation activities[i]. The DRE tested the chemicals used in the hydraulic fracture fluid by AGL immediately before their use and found that they complied with the policy prohibiting the use of BTEX compounds and no BTEX compounds were found.

Post Fracture Stimulation

BTEX compounds were not detected in the pre-fracture stimulation fluid samples taken and analysed by Government environmental officers in November 2014, prior to the hydraulic fracture stimulation of the wells.

On 15 January 2015, following routine monitoring of flowback water samples (taken on 16 and 29 December 2015), AGL detected BTEX compounds in the flowback water from Waukivory wells 12 and 13. The levels of BTEX identified in the flowback water ranged from 35 µg/L in the flowback tank and 47 µg/L in samples from well 12, up to 555 µg/L in samples from well 13. This is approximately five times that found in the baseline testing around well 11.

Additional water samples were taken and analysed by AGL, the DRE and the EPA in February 2015 which revealed elevated levels of BTEX chemicals in the flowback water from wells 11, 13 and 14 consistent with those found in December, with negligible levels in well 12.

When was the government notified and what was done?

AGL informed the EPA and DRE on 27 January 2015, that BTEX compounds had been found in the analysis of flowback water from Well 13. AGL voluntarily suspended the pilot production project at the four wells at the Waukivory site on this day. This notification occurred 12 days after the BTEX compounds were identified in the flowback samples.

DRE issued a suspension notice on 30 January 2015 in relation to alleged breaches of the activity approval for the operation associated with the identification of BTEX compounds in the flowback water samples.

Concurrent but independent investigations into the incident were undertaken by the EPA and the DRE. EPA investigated that samples had been taken correctly and DRE investigated the source of the BTEX. EPA concluded the sampling had been done correctly.

DRE Investigation

The DRE investigation considered whether BTEX compounds were introduced through the hydraulic fracture stimulation process. Rigorous testing of the fracture stimulation fluid, and flowback water samples was undertaken by DRE to inform the investigation as to the source of the BTEX compounds.

In addition, a review of the geology and hydrology of the area was conducted to look at potential connectivity and/or other potential sources or risks. A peer review of the investigation was undertaken by the Centre for Coal Seam Gas at the University of Queensland.

Findings

The investigation found no breach of the Petroleum (Onshore) Act 1991 and concluded from the evidence that the BTEX detected in the flowback water has come from naturally occurring BTEX in the deeper coal seams of the Gloucester Basin approximately 600+ metres underground.

Rigorous testing of the fracture stimulation fluid, flowback water, and groundwater, along with monitoring compliance of all other conditions of approval will continue.

What next?

As the investigation has now been completed with no adverse findings AGL can resume their operations.

AGL have an application to change the manner in which the flowback water is disposed of which is currently under consideration by the relevant agencies.

Rigorous ongoing regulatory oversight over the coal seam gas activities throughout NSW will continue by NSW Government agencies. Appropriate compliance and enforcement action will be undertaken when required to ensure the industry is carrying out activities in a safe and sustainable manner.

More information

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For more information on BTEX compounds please see Office of Coal Seam Gas's BTEX and Coal Seam Gas Fact Sheet[ii]

[i] NSW Trade & Investment Policy TI-O-120, *Ban on use of BTEX compounds in CSG activities,* March 2012

[ii] http://www.resourcesandenergy.nsw.gov.au/landholders-and-community/coal-seam-gas/facts-maps-links/fact-sheets