Research Note on the Resources Legislation Amendment (BTEX Prohibition and Other Matters) Bill 2014

Executive Summary

- On 5 August 2014, the Coalition Government introduced the Resources Legislation Amendment (BTEX Prohibition and Other Matters) Bill 2014 into the Victorian Legislative Assembly.

- The main purpose of the Bill is to implement a statutory condition restricting the use of BTEX compounds in hydraulic fracturing (fracking) in Victoria. At present, there is a moratorium on hydraulic fracturing in Victoria until July 2015.

- The acronym ‘BTEX’ stands for ‘benzene, toluene, ethylbenzene and xylene’. These compounds are found in petroleum products and are known to be harmful to human health. Benzene, the most toxic of the compounds, is a known carcinogen.

- The use of BTEX compounds in hydraulic fracturing has already been restricted in Queensland and New South Wales.
Introduction

On 5 August 2014, the Coalition Government introduced the Resources Legislation Amendment (BTEX Prohibition and Other Matters) Bill 2014 (‘the Bill’) into the Victorian Legislative Assembly. The main purpose of the Bill is to implement a statutory condition restricting the use of BTEX chemicals in hydraulic fracturing in Victoria. At present, there is a moratorium on hydraulic fracturing in Victoria until July 2015.

The acronym ‘BTEX’ stands for ‘benzene, toluene, ethylbenzene and xylene’. These chemicals are found in petroleum products and are known to be harmful to human health. BTEX chemicals can be added to hydraulic fracturing fluids. Hydraulic fracturing or ‘fracking’ is a technique that can be used to aid the extraction of unconventional gas (coal seam, shale and tight gas). It involves pumping fluid into a well to fracture the surrounding rock to enable the gas to flow more freely. The concern with the addition of BTEX chemicals to fracturing fluids is that they may contaminate ground water supplies or the air at surface level.

This Research Note focuses on the provisions of the Bill relating to the restriction of BTEX in hydraulic fracturing fluids. It is important to note that the Bill proposes a number of other amendments to Victorian resources legislation. For information on these other amendments, readers are advised to consult the Bill itself and the Explanatory Memorandum. For more detailed information on unconventional gas in Victoria and the process of hydraulic fracturing, see the Parliamentary Library’s Research Paper on Unconventional Gas published in December 2013.¹

Background

Hydraulic Fracturing and Hydraulic Fracturing Fluids

As stated above, hydraulic fracturing or ‘fracking’ (sometimes also called ‘fraccing’) is an extraction method used by the oil and gas industry. In regard to coal seam gas, fracturing involves injecting fluid made up of water, sand and chemicals down a well at high pressure to fracture the surrounding rock and enhance gas flow. Once the fractures are made, the fracturing fluid flows back to the wellbore and is pumped to the surface, where it needs to be stored for reuse or appropriately disposed of at an approved site.²

Potential environmental implications of fracking include the risk of creating new fractures that intersect adjacent aquifers and contaminate water resources with fracturing fluid chemicals, methane, or geogenic materials (naturally occurring toxic materials, such as uranium, moved by the fracturing process). There is also the identified risk of spills at ground level when fracturing fluids flow back to the surface and need to be stored or disposed of. The use of chemicals in fracking and the potential risk of contamination are causes of community concern. Industry and Government assert that these risks are minimised if best-practice guidelines are adhered to.

The CSIRO states that the exact nature of fracking mixtures used by gas companies can vary. The availability of information detailing what chemicals are actually used in fracking fluids is contested. For example, the Australian Petroleum Production & Exploration Association (APPEA), the peak body representing the oil and gas industry in Australia, states that companies do disclose what chemicals are being used in a fracking operation. Whereas, the New South Wales Legislative Council 2012 Committee report on coal seam gas found that it was difficult to obtain evidence from companies detailing the exact composition of fracking fluids.

**BTEX: Benzene, Toluene, Ethylbenzene and Xylene**

The BTEX compounds benzene, toluene, ethylbenzene and xylene are found in petroleum, a wide range of petroleum products, and coal tar. They are highly volatile which means that they evaporate quickly into air and can also dissolve in water. BTEX compounds can be naturally occurring and are also human-made in large quantities for use during the processing of refined petroleum products and coal, and for use in consumer products (such as paints, solvents, cosmetics and pharmaceuticals). Humans are also exposed to BTEX from breathing contaminated air from car exhaust, around petrol stations and cigarette smoke.

BTEX containing petroleum products – such as diesel – have been used as additives to hydraulic fracturing fluids, to thicken the fluid and improve the efficiency of the fracturing process. Dr Leusch and Dr Bartkow, from the Griffith University Smart Water Research Centre, Queensland Government Department of Environment website, pp. 1.
Research Centre, state that there are two potential exposure sources to BTEX from fracking. Firstly, from the use of BTEX in fracking fluids and secondly through the fracking process causing a link between naturally occurring BTEX in a coal seam and nearby groundwater.\textsuperscript{12}

Benzene, the most toxic component of BTEX, is a well-established cause of cancer in humans.\textsuperscript{13} The World Health Organisation states that ‘Human exposure to benzene has been associated with a range of acute and long-term adverse health effects and diseases, including cancer and aplastic anaemia’ and that ‘Public health actions are needed to reduce the exposure of both workers and the general population to benzene.’\textsuperscript{14} The World Health Organisation benzene guidelines specify 0.01 mg/L for drinking-water and state that ‘No specific guideline value has been developed for air. Benzene is carcinogenic to humans, and no safe level of exposure can be recommended.’\textsuperscript{15} The Australian Drinking Water Guidelines are stricter and state that the guideline value for benzene in drinking water is 0.001 mg/L.\textsuperscript{16}

In regard to toluene, Leusch and Bartkow state that:

Toluene is readily absorbed from the gastrointestinal tract after ingestion, and is distributed preferentially in adipose tissue, then the kidneys, liver and brain. The main effect of toluene is on the brain and nervous system, with fatigue and drowsiness being the most obvious symptoms.\textsuperscript{17}

Ethylbenzene is also absorbed from the human gastrointestinal tract. Liver and kidney effects and irreversible damage to the inner ear and hearing have been found in animal studies. Irritation of the eyes and respiratory tract has been reported by humans exposed to high levels in the air.\textsuperscript{18}

In regard to xylene, Leusch and Bartkow state that:

Xylenes are readily absorbed after inhalation. Both short- and long-term exposure to high concentrations of xylene can also cause a number of effects on the nervous system, such as headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance as well as irritate the eyes and respiratory tract.\textsuperscript{19}

\textsuperscript{12} Leusch & Bartkow, op. cit., p. 4.
\textsuperscript{14} ibid., p. 1.
\textsuperscript{15} ibid., p. 2.
\textsuperscript{17} Leusch & Bartkow, op. cit., p. 5.
\textsuperscript{18} ibid.
\textsuperscript{19} ibid.
**BTEX in Hydraulic Fracturing Fluids in Other Jurisdictions**

The use of BTEX as an additive to fracking fluids in the United States has decreased since the early 2000s. Leusch and Bartkow state that ‘since 2003 the US industry has voluntarily agreed to discontinue using BTEX in fracing fluids due to the availability of safer alternatives’.20

Legislative amendments in Queensland and policy amendments in New South Wales have prohibited the addition of BTEX compounds to fracting fluids. In 2010, the Queensland Government introduced the *Natural Resources and Other Legislation Amendment Act (No. 2) 2010* which amended the *Environmental Protection Act 1994* to restrict the use of stimulation fluids that contain BTEX.21 In 2012, New South Wales introduced a formal policy banning the use of BTEX compounds in coal seam gas activities.22

**Current Situation**

At present, the Victorian unconventional gas industry is at a very early stage. Victoria has no coal seam or shale gas production or confirmed resources. Tight gas has been found in Gippsland but is yet to be commercially produced.23

On 24 August 2012, the Victorian Government announced a hold on further approvals to undertake hydraulic fracturing as part of onshore gas exploration, and a hold on new exploration licences until national regulatory frameworks were finalised. The Government also announced a ban on the use of BTEX chemicals in hydraulic fracturing in Victoria.24

On 21 November 2013, following the publication of the Gas Market Taskforce Report (chaired by former Federal Minister Peter Reith), the Victorian Government announced that the moratorium on hydraulic fracturing would remain in place until at least July 2015 while a community consultation process and water studies are conducted, and that the ban on BTEX chemicals would be enshrined in legislation.25

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21 Section 16 of the *Natural Resources and Other Legislation Amendment Act (No. 2) 2010* (Qld) inserted a new section into the Environmental Protection Act 1994 (Qld) which provided for the restriction on BTEX in fracturing fluids. At the time this Research Note was prepared section 206 of Chapter 5 of the *Environmental Protection Act 1994* (Qld) provides for the BTEX restriction.
Second Reading Speech

The Minister for Energy and Resources, the Hon. Russell Northe, provided the Legislative Assembly with the second reading speech for the Bill on 6 August 2014. In the speech, the Minister emphasised the importance of the earth resources sector, including the mining and extractive industries, to the Victorian economy, and the Government’s commitment to maintaining an effective regulatory framework for the sector.26

He said that the amendment proposed by the Bill to restrict the addition of BTEX chemicals to fracking fluids, ‘will provide Victorians with confidence that strong protections apply to the regulation of the earth resources sector, with a focus on the continued protection of our environment and our agricultural industries.’27

What the Bill Proposes

This section of the Research Note summarises the provisions of the Resources Legislation Amendment (BTEX Prohibition and Other Matters) Bill 2014 relating to the restriction of BTEX chemicals in hydraulic fracturing fluids. Readers seeking an overview of the Bill in its entirety are directed to the Explanatory Memorandum.

Clause 1 of the Bill provides that a purpose of the proposed Act is to amend the Geothermal Energy Resources Act 2005, the Greenhouse Gas Geological Sequestration Act 2008, the Mineral Resources (Sustainable Development) Act 1990, and the Petroleum Act 1998 to prohibit the use of BTEX chemicals in hydraulic fracturing.28 Clauses 3, 6, 13, 25, 63, and 69 of the Bill then provide for the statutory condition prohibiting the use of BTEX chemicals in hydraulic fracturing.29

Clauses 3, 6 and 69 insert identical new sections into the Geothermal Energy Resources Act, the Greenhouse Gas Geological Sequestration Act, and the Petroleum Act respectively.30 The new sections provide that an authority issued under those Acts is subject to the condition prohibiting the use of ‘restricted hydraulic fracturing substances’ as well as definitions of ‘hydraulic fracturing’ and ‘restricted hydraulic fracturing substances’:

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27 ibid.
28 Clause 1 of the Bill continues on to state that the purposes of the proposed Act also include other amendments to these Acts, and amendments to the Offshore Petroleum and Greenhouse Gas Storage Act 2010 and the Pipelines Act 2005.
Further statutory condition of authority—hydraulic fracturing

(1) In addition to any other conditions, an authority is subject to the condition that the use of restricted hydraulic fracturing substances is prohibited in carrying out any hydraulic fracturing permitted by the authority.

(2) Despite anything to the contrary in this Act, this condition cannot be varied.

(3) In this section—

hydraulic fracturing means the injection of a substance or substances into a bore under pressure for the purposes of stimulating a geological formation;

restricted hydraulic fracturing substances means fluids or gases used for the purpose of hydraulic fracturing that contain petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene in more than the maximum amount prescribed by the regulations.

Clauses 13, 25 and 63 of the Bill amend the Mineral Resources (Sustainable Development) Act (MRSD Act). Clause 13 inserts the same definitions of ‘hydraulic fracturing’ and ‘restricted hydraulic fracturing substances’ into section 4(1) of the MRSD Act. Clause 25 of the Bill inserts new section 26(5) into the MRSD Act which provides that ‘It is a condition of a licence that the use of restricted hydraulic fracturing substances is prohibited in carrying out any hydraulic fracturing permitted by the licence.’

Clause 63 of the Bill repeals the definition of ‘hydraulic fracturing’ that was provided by section 41 of the Mineral Resources (Sustainable Development) Amendment Act 2014, for proposed clause 2 of schedule 4A to the MRSD Act. This is because of the new definition of hydraulic fracturing inserted by clause 13 of this Bill into the MRSD Act.31

It is important to note that the Bill provides that regulations will prescribe the maximum amount of BTEX that can be included in fracturing fluid before it becomes restricted.

It is also of note that the Bill does not proscribe a date of commencement for clauses 3, 6, 13, 25, 63 and 69. In this regard the Explanatory Memorandum states that, ‘In order for the statutory condition to take effect, substantial amendment to associated regulations will be required’ and emphasises that there is a moratorium on hydraulic fracturing in Victoria until ‘at least July 2015’.32 Hence, while the majority of the Bill’s provisions commence on the later date of the day of proclamation or 1 September 2015, the BTEX clauses will not commence unless specifically proclaimed by the Government.

31 Explanatory Memorandum, p. 25.
32 ibid., pp. 1-2.
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