

## **MINISTRY OF NATURAL GAS DEVELOPMENT**

### **BRIEFING NOTE FOR INFORMATION**

**I PREPARED FOR:** Honourable Rich Coleman, Minister of Natural Gas Development

**II ISSUE:** Meeting with Honourable Thomas Marshall, Minister of Natural Resources, Minister Responsible for the Forestry and Agrifoods Agency, and Attorney General of, Newfoundland, to discuss common issues including British Columbia's experience with and response to hydraulic fracturing operations.

### **III BACKGROUND:**

#### **Technology**

Hydraulic fracturing is the stimulation process that allows natural gas production from organic-rich shale, a rock not historically considered an oil or gas reservoir. Shale formations have very small pore spaces and low permeability which makes the flow of gas difficult. Hydraulic fracturing is required to increase the permeability of the rock and to facilitate the movement of gas up a wellbore.

Hydraulic fracturing involves injecting a fluid, primarily composed of water, sand and small amounts of chemical additives (friction reducers and surfactants) at a high enough pressure to fracture or crack the rock. Sand holds the cracks open once the pressure is lowered, allowing the natural gas to migrate to the wellbore and up to the well head at surface.

Specific hydraulic fracturing fluid formulas are often proprietary and vary amongst companies and applications. Chemical additives account for less than one percent of the water composition.

#### **History in British Columbia**

Hydraulic fracturing has been used in British Columbia to stimulate gas production in conventional reservoirs since 1950. As of 2005, with the development of horizontal drilling, hydraulic fracturing has enabled development of the vast unconventional shale gas resources in northeast British Columbia. There are currently about 7300 hydraulically fractured wells in the province.

#### **IV DISCUSSION:**

British Columbia has for decades been and continues to be a leader in safe, responsible natural gas development. There has never been a reported incident of groundwater contamination as a result of hydraulic fracturing operations within British Columbia.

##### **Regulatory Framework**

Hydraulic fracturing in British Columbia is strictly managed and addressed via rigorous regulation, industry best practices, and ongoing research on water quality and quantity. The *Oil and Gas Activities Act* (OGAA) is an updated regulatory framework, brought into force in 2010 in response to the growth in the natural gas sector and emergence of unconventional gas exploration. Under OGAA, specific construction and production regulations ensure safe hydraulic fracturing practices. These regulations include requirements for containment procedures and proper disposal of hydraulic fracturing fluids.

Extensive consultations on OGAA began in 2002 through the Oil and Gas Regulatory Improvement Initiative, which involved communities, local governments, First Nations, companies, landowners, environmental organizations and industry associations.

British Columbia was the first province in Canada to regulate the mandatory disclosure of ingredients used in the hydraulic fracturing process. The online registry, found at [FracFocus.ca](http://FracFocus.ca), provides a transparent accounting of each well drilled. [FracFocus.ca](http://FracFocus.ca) was built to accommodate future participation by other jurisdictions to enable one national site for disclosure information. Alberta has joined British Columbia in requiring the disclosure of hydraulic fracturing fluids via [FracFocus.ca](http://FracFocus.ca).

##### **Water Use**

Hydraulic fracturing in shale gas development uses significantly more water than conventional hydraulic fracturing. Water consumption in a single well is estimated at approximately 10,000 - 70,000 cubic meters, depending on the number of hydraulic fractures conducted. Water is mainly obtained from surface sources such as rivers and lakes and is approved by the British Columbia Oil and Gas Commission (BC OGC). Industry currently uses less than 0.25 per cent of the annual run off from river basins in northeast British Columbia for oil and gas production, and is legally required to report water use data.

Under British Columbia's *Environmental Management Act*, fluids produced from oil or gas operations cannot be discharged into the environment, (i.e., into rivers/lakes, onto the ground surface, or into aquifers) without authorization. OGAA further regulates waste water wherein produced fluids, including fracture flowback water from natural gas wells can be reused for well completions, or be disposed into deep, underground saline aquifers.

## Seismicity

A study by the BC OGC found hydraulic fracturing can induce seismicity by activating pre-existing faults, but in the cases studied, the impact was confined to the reservoir. Further work is underway to more fully understand the observed links between shale gas activity and induced seismicity, including a three-year project with the University of British Columbia.

## Affect on Communities

In the Peace region of the province the oil and gas sector contributes extensively to economic development. The spinoff infrastructure from oil and gas activity has created a significant amount of business and jobs for thousands of workers in the area. Activities such as road and facility construction, pipelines, safety and security services, environmental assessment services, and land reclamation have generated a large work force directly related to the oil and gas industry. The industry provides over 12,000 direct jobs in the North Peace region alone.

See Appendix 1 for a table of common myths related to hydraulic fracturing that have been brought to the attention of Government and the corresponding facts in British Columbia.

## Industry Initiatives

In September 2011, the Canadian Association of Petroleum Producers (CAPP) announced its “Guiding Principles for Hydraulic Fracturing” for industry to guide water management and improved water and fluids reporting practices for shale gas development. CAPP developed operating practices to support the guiding principles for hydraulic fracturing and is in the process of reviewing their members’ adherence to the practices.

In an effort to use less freshwater, industry in British Columbia is already increasing the use of other sources, such as saline (unpotable) groundwater from water source wells as well as recycled flowback water. Another example is Shell Canada’s use of municipal waste water from Dawson Creek.

The Petroleum Service Association of Canada which includes companies that perform hydraulic fracturing services, in February 2013, announced a new initiative, the Working Energy Commitment which will lead to the formation of a hydraulic fracturing code of conduct. Consultation is taking place in various locations throughout Alberta, British Columbia and Saskatchewan with release of the code anticipated by end of 2013.

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## Appendix 1

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### Hydraulic Fracturing Myth-Fact

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**ISSUE:** List of myths and corresponding facts for hydraulic fracturing

Myth	Fact
Hydraulic fracturing uses more freshwater than B.C.'s water systems can support.	<ul style="list-style-type: none"> <li>Water used for hydraulic fracturing is a very small amount – less than a fraction of a per cent of annual runoff in northeast B.C. river basins.</li> <li>In an effort to use less freshwater, companies are also increasing the use of other sources, such as saline (unpotable) groundwater from water source wells and recycled flowback water.</li> <li>Section 8 water approvals and water use supporting oil and gas activities in B.C. is posted on the BC Oil and Gas Commission's (Commission) <a href="#">website</a> and also available via the <a href="#">Northeast Water Tool</a>.</li> </ul>
Hydraulic fracturing contaminates groundwater and drinking water.	<ul style="list-style-type: none"> <li>There have not been any confirmed instances of groundwater contamination as a result of hydraulic fracturing in B.C.</li> <li>The province has strong regulations around groundwater protection, including cementing and casing requirements with a specific intent to protect groundwater</li> <li>In addition, hydraulic fracturing is not permitted above 600 metres unless specified by the Commission under a special review.</li> <li>Hydraulic fracturing occurs at significant depths (1,500 metres to 4,000+ metres below the surface) relative to potable groundwater zones (typically 25-120 metres below the surface in northeast BC).</li> </ul>
Hydraulic fracturing can cause large	<ul style="list-style-type: none"> <li>The Commission has undertaken extensive</li> </ul>

earthquakes.	<p>studies on the link between hydraulic fracturing and induced seismicity in the Horn River Basin.</p> <ul style="list-style-type: none"> <li>• Findings have been that hydraulic fracturing has caused small seismic events in the Horn River Basin north of Fort Nelson.</li> <li>• This occurred in an area with pre-existing underground faulting, which made it more susceptible to seismicity.</li> <li>• The Commission continues to study induced seismicity and hydraulic fracturing, and recent initiatives include: installation of six new seismograph stations in northeast B.C.; increased use of seismic assessments by operators, and enhanced permitting requirements in which operations must be ceased if an event magnitude of 4.0 or greater is detected.</li> </ul>
Hydraulic fracturing is not proven to be a safe industrial practice for people or the environment.	<ul style="list-style-type: none"> <li>• It has been used for decades. Technologies though have improved in recent years that have both increased the potential to capture natural gas from tight formations such as shale, as well increased the safety of the practice.</li> </ul>
Unconventional development has huge impacts on the landscape of northeast B.C.	<ul style="list-style-type: none"> <li>• Unconventional gas development is more predictable than conventional gas development, and as such reduces the overall footprint. This allows for better planning on surface features like roads, pipelines and facilities.</li> <li>• Use of multi-well pads and hydraulic fracturing also mean that more gas can be captured from a smaller footprint. One unconventional multi-well pad averages about 3.5 hectares and averages 8-16 wells per pad.</li> </ul>
Hydraulic fracturing fluid is full of harmful chemicals.	<ul style="list-style-type: none"> <li>• Hydraulic fracturing fluid is made up of approximately 99 per cent water and sand and less than 1 per cent other ingredients such as stabilizers and friction reducers.</li> <li>• Hydraulic fracturing fluids do not come in contact with the environment – they are used in a closed loop by which they are</li> </ul>

	<p>pumped down the wellbore and return to the wellhead where they are collected and either stored and re-used or transported to an approved disposal facility.</p> <ul style="list-style-type: none"> <li>• B.C. was the first province to require the mandatory disclosure of ingredients used in hydraulic fracturing, starting January 2012. These ingredients are searchable on a public database at <a href="http://www.Fracfocus.ca">www.Fracfocus.ca</a>. It also serves as a public resource for information on the process of hydraulic fracturing.</li> </ul>
Hydraulic fracturing emits major GHG emissions.	<ul style="list-style-type: none"> <li>• Hydraulic fracturing is a small component in the lifecycle of a natural gas well, lasting usually about two weeks, and as such it does not contribute greatly toward total emissions.</li> <li>• Lifecycle GHG emissions from unconventional natural gas wells are similar to those for conventional natural gas wells.</li> <li>• Overall, emissions from natural gas development are on the decline in British Columbia, largely due to flaring initiatives.</li> <li>• A lot of the criticism around shale gas development and GHG emissions stems from a perception regarding venting of natural gas after hydraulic fracturing, (i.e. the direct release of unburned gas to the atmosphere). Venting in this manner is prohibited in B.C. by the Drilling and Production Regulation.</li> </ul>

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