

Health and Environmental Issues Surrounding Hydraulic Fracturing: A Canadian Perspective

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Canada Eh?



Health and environmental issues ... what's driving them?

- ⦿ Fear of the unknown
- ⦿ The “information vacuum”
- ⦿ Conflicting information
- ⦿ Myths, media, and missteps



Fracking lawsuit against Alberta Environment can go ahead, judge rules

Jessica Ernst launched multimillion-dollar lawsuit in 2011 alleging well water was contaminated

[CBC News](#) Posted: Nov 12, 2014 12:48 PM MT Last Updated: Nov 12, 2014 1:01 PM MT

What Does the Anti-fracking Movement Mean for Canada?

The anti-fracking movement continues to pile up victories, even scoring one in the heart of Texas. Is Alberta next?

BY MARKHAM HISLOP

Fracking Criticism Spreads, Even In Alberta And Texas

CBC

Posted: 04/07/2015 9:04 am EDT Updated: 06/07/2015 5:59 am EDT

Oil firms face growing concerns over fracking

Investors demand disclosure on risk to environment





F R A C T U R E D L A N D



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Public Perceptions

	<u>Natural Gas</u>	<u>Shale Gas</u>
<u>Response</u>		
Positive	44%	12%
Neutral	39%	47%
Negative	17%	41%



Source: CAPP 2011

Region

% Opposed to Fracking

Alberta

26

Atlantic provinces

68

BC

43

Manitoba/Saskatchewan

56

Ontario

65

Quebec

64

62%

of Canadians support a moratorium on all fracking for natural gas until all federal and provincial environmental reviews are complete

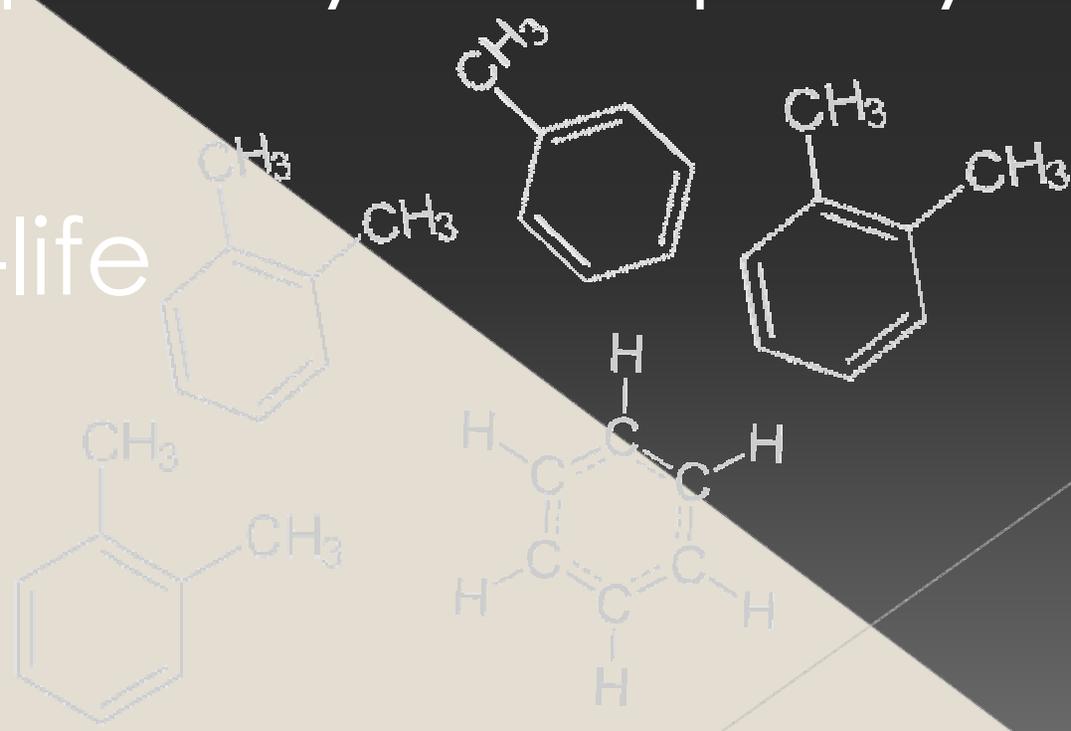
EnviroNics Research Poll – January 2013

Moratoriums





What are the issues?

- Water ... quantity and quality
 - Air quality
 - Quality-of-life
 - Disclosure
- 

Chemicals

- ◉ Drilling fluids
- ◉ Hydraulic fracturing fluids
- ◉ Flow-back/produced water
- ◉ Waste water
- ◉ Air emissions
 - Diesel exhaust
 - Venting and flaring
 - Fugitives



FracFocus

- Joint initiative of Groundwater Protection Council and Interstate Oil & Gas Commission.
- Well-by-well listing of chemicals delivered down-hole.
- BC Oil & Gas Commission, Alberta Energy Regulator and National Energy Board of Canada subscribers to FracFocus.ca
- www.fracfocus.org and www.fracfocus.ca

CAPP Principles & Practices

CAPP Hydraulic Fracturing Operating Practice: BASELINE GROUNDWATER TESTING

OVERVIEW

To support CAPP's Guiding Principles for Hydraulic Fracturing, six Operating Practices have been developed in collaboration with CAPP member companies. These Operating Practices strengthen industry's commitment to continuous performance improvement in shale gas and tight gas development.

The Baseline Groundwater Testing Operating Practice supports the Guiding Principles: "We will safeguard the quality and quantity of regional surface and groundwater resources, through sound wellbore construction practices, sourcing fresh water alternatives where appropriate, and recycling water for reuse as much as practical"; and "We will continue to advance, collaborate on and communicate technologies and best practices that reduce the potential environmental risks of hydraulic fracturing."

WHAT DOES THIS PRACTICE MEAN?

CAPP and its member companies are committed to protecting both groundwater sources. This practice outlines the requirement for companies to test domestic water wells within 500 meters of shale or tight gas development, and to participate in larger basin regional groundwater monitoring programs. The intention of these programs is to establish baseline characteristics of groundwater pre-development, monitor for changes over time, and ensure that any changes have been managed over time.

CAPP Hydraulic Fracturing Operating Practice: FRACTURING FLUID ADDITIVE DISCLOSURE

OVERVIEW

To support CAPP's Guiding Principles for Hydraulic Fracturing, six Operating Practices have been developed in collaboration with CAPP member companies. These Operating Practices strengthen industry's commitment to continuous performance improvement in shale gas and tight gas development.

The Fracturing Fluid Additive Disclosure Operating Practice supports the Guiding Principle: "We will support the disclosure of fracturing fluid additives."

WHAT DOES THIS PRACTICE MEAN?

CAPP and its member companies support and encourage greater transparency in industry development. To measure Canadians about the safe application of hydraulic fracturing technology, this practice outlines the requirements for companies to disclose fluid additives and the chemical ingredients in those additives that are identified on the Material Safety Data Sheet (MSDS).

HOW WILL THIS WORK?

Under this Operating Practice, companies will disclose, either on their own website or on a third party website, from material ingredients in their fracturing fluid additives which are identified on their MSDS.

CAPP Hydraulic Fracturing Operating Practice: FRACTURING FLUID ADDITIVE RISK ASSESSMENT AND MANAGEMENT

OVERVIEW

To support CAPP's Guiding Principles for Hydraulic Fracturing, six Operating Practices have been developed in collaboration with CAPP member companies. These Operating Practices strengthen industry's commitment to continuous performance improvement in shale gas and tight gas development.

The Fracturing Fluid Additive Risk Assessment and Management Operating Practice supports the Guiding Principles: "We will support the development of fracturing fluid additives with the least environmental risks"; and "We will continue to advance, collaborate on and communicate technologies and best practices that reduce the potential environmental risks of hydraulic fracturing."

WHAT DOES THIS PRACTICE MEAN?

CAPP and its member companies are committed to reducing the environmental risks associated with hydraulic fracturing. This practice outlines the requirements for companies to better understand the risks associated with hydraulic fracturing fluid additives and to implement measures to mitigate those risks.

CAPP Hydraulic Fracturing Operating Practice: FLUID TRANSPORT, HANDLING, STORAGE AND DISPOSAL

OVERVIEW

To support CAPP's Guiding Principles for Hydraulic Fracturing, six Operating Practices have been developed in collaboration with CAPP member companies. These Operating Practices strengthen industry's commitment to continuous performance improvement in shale gas and tight gas development.

The Fluid Transport, Handling, Storage and Disposal Operating Practice supports the Guiding Principles: "We will continue to advance, collaborate on and communicate technologies and best practices that reduce the potential environmental risks of hydraulic fracturing."

WHAT DOES THIS PRACTICE MEAN?

CAPP and its member companies are committed to reducing the risk of potential spills of fracturing fluids and produced water. This practice requires companies to transport, handle, store and dispose of fluids in a manner that is safe and environmentally responsible.

HOW WILL THIS WORK?

Under this Operating Practice, companies will implement practices and procedures to: identify, evaluate and mitigate potential risks related to fluid transport, handling, storage and disposal; and respond to any spills or leaks (including remediation of the spill site). These practices and procedures include:

- Following applicable federal, provincial and municipal regulations for fluid transport, handling, storage and disposal.
- Implementing maintenance and safety protocols to address the risks associated with fluid transport, handling, storage and disposal.
- Reducing fluid transport by risk in large scale development projects that transport fluids in accordance with applicable regulations.
- Controlling and operating pipelines that transport fluids in accordance with applicable regulations.
- Minimizing surface water and groundwater contamination from fluid storage.
- Following applicable regulatory requirements for fluid storage.
- Reducing wildlife access to fluid storage sites.
- Safely disposing of fluids that are no longer needed at approved waste management facilities.

CAPP Hydraulic Fracturing Operating Practice: WATER SOURCING, MEASUREMENT AND REUSE

OVERVIEW

To support CAPP's Guiding Principles for Hydraulic Fracturing, six Operating Practices have been developed in collaboration with CAPP member companies. These Operating Practices strengthen industry's commitment to continuous performance improvement in shale gas and tight gas development.

The Water Sourcing, Measurement and Reuse Operating Practice supports the Guiding Principles: "We will safeguard the quality and quantity of regional surface and groundwater resources, through sound wellbore construction practices, sourcing fresh water alternatives where appropriate, and recycling water for reuse as much as practical"; "We will continue to advance, collaborate on and communicate technologies and best practices that reduce the potential environmental risks of hydraulic fracturing."

WHAT DOES THIS PRACTICE MEAN?

CAPP and its member companies recognize that water is a resource we all share. We put great emphasis on the need to use and manage water responsibly in our operations. For shale gas and tight gas development, water is typically only required for well drilling and completion and not for the actual production of gas. Some of the water required during fracturing operations is recovered with the gas, and is either recycled to ensure water supply stability, measure water use and reuse water as much as practical in hydraulic fracturing operations.

HOW WILL THIS WORK?

Under this Operating Practice, companies will calculate water quantity through assessment and measurement of water sources (including recycled water). All with an industrial regulator, the volume of water that can be withdrawn is approved by the provincial regulator to ensure sustainability of the resource. These practices include:

- Complying with wellbore limits and recycling requirements of water treatment plants. Also, collecting and reusing water use data through CAPP's Responsible Canadian Energy™ Program.
- Implementing a decision-making framework to evaluate and understand available water sources.
- Monitoring surface water and groundwater quality data, as required to demonstrate sustainability of the water source and collaborating with other companies to meet positions.

CAPP Hydraulic Fracturing Operating Practice: WELLBORE CONSTRUCTION AND QUALITY ASSURANCE

OVERVIEW

To support CAPP's Guiding Principles for Hydraulic Fracturing, six Operating Practices have been developed in collaboration with CAPP member companies. These Operating Practices strengthen industry's commitment to continuous performance improvement in shale gas and tight gas development.

The Wellbore Construction and Quality Assurance Operating Practice supports the Guiding Principles: "We will safeguard the quality and quantity of regional surface and groundwater resources, through sound wellbore construction practices, sourcing fresh water alternatives where appropriate, and recycling water for reuse as much as practical"; and "We will continue to advance, collaborate on and communicate technologies and best practices that reduce the potential environmental risks of hydraulic fracturing."

WHAT DOES THIS PRACTICE MEAN?

CAPP and its member companies recognize that sound wellbore design and construction is fundamental to protecting groundwater resources and to maximizing shale gas development. Industry is committed to the design, installation and maintenance of wellbores. Each wellbore has design criteria that is submitted to provincial regulators and approved by the provincial regulator. Wellbore design is strictly controlled by provincial regulators, and companies have procedures in place to ensure wellbore integrity prior to installing hydraulic fracturing operations.

HOW WILL THIS WORK?

Under this Operating Practice, companies will demonstrate that processes are in place to ensure proper design and installation of the wellbore, and to ensure the integrity of the wellbore prior to installation of hydraulic fracturing. These processes include:

- Complying with applicable regulatory requirements and using good engineering practices to ensure the wellbore design and construction is in accordance with applicable regulations.
- Designing wellbores using wellbore strength and maximum loads anticipated during hydraulic fracturing operations.
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CAPP Hydraulic Fracturing Operating Practice: ANOMALOUS INDUCED SEISMICITY: ASSESSMENT, MONITORING, MITIGATION AND RESPONSE

OVERVIEW

To support CAPP's Guiding Principles for Hydraulic Fracturing, six Operating Practices have been developed in collaboration with CAPP member companies. These Operating Practices strengthen industry's commitment to continuous performance improvement in shale gas and tight gas development.

The Anomalous Induced Seismicity: Assessment, Monitoring, Mitigation and Response Operating Practice supports the Guiding Principles: "We will continue to advance, collaborate on and communicate technologies and best practices that reduce the potential environmental risks of hydraulic fracturing."

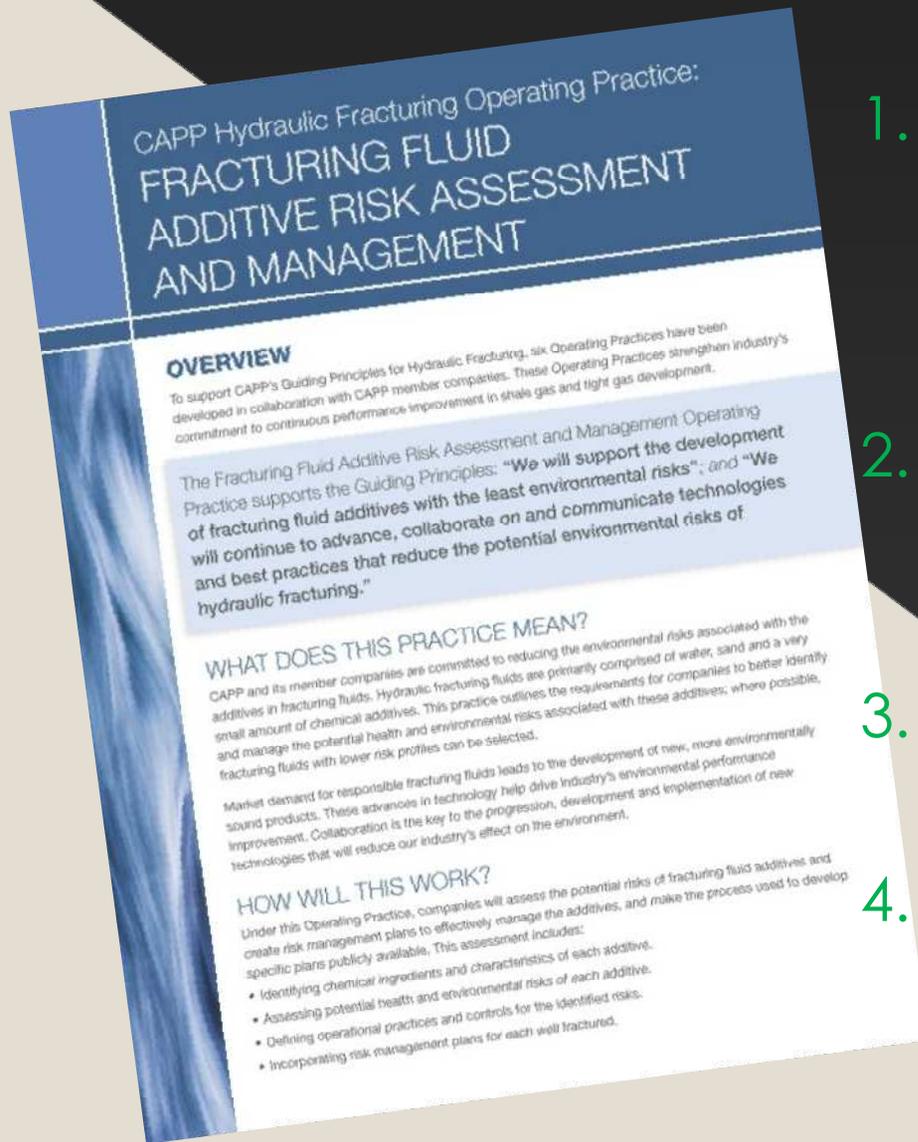
WHAT DOES THIS PRACTICE MEAN?

CAPP and its member companies support and encourage greater transparency in industry development. To measure Canadians about the safe application of hydraulic fracturing technology, this practice outlines the requirements for companies to assess the potential for anomalous induced seismicity and, where necessary, establish appropriate monitoring procedures, and procedures to mitigate and respond to anomalous induced seismicity in shale gas, tight gas and light gas development areas.

HOW WILL THIS WORK?

Under this Operating Practice, companies will assess the potential for anomalous induced seismicity for each hydraulic fracturing program or location. This practice includes:

- Assessing the potential for anomalous induced seismicity using available engineering, geologic and geophysical data.
- Complying with applicable regulatory requirements and employing sound wellbore construction practices.
- Evaluating wellbore placement and drilling design to account for geologic conditions.
- Communicating with onsite personnel, external agencies and the public on the possibility of anomalous induced seismicity.
- Establishing procedures to monitor for induced seismicity during hydraulic fracturing operations.
- Establishing procedures to mitigate and respond to anomalous induced seismicity.



1. Identify chemical ingredients and characteristics of each additive.
2. Assess potential health and environmental risks of each additive.
3. Define operational practices and controls.
4. Develop and implement risk management plans.

Summary

- Overall public perception of hydraulic fracturing in Canada is mixed to negative.
- A number of health and environmental issues continue to surface ... many of which match concerns in the U.S.
- Chemicals remain a significant concern to the general public.
- Regulators are responding, with actions ranging from moratoriums to special reviews to tighter rules to stricter oversight.
- Industry now responding with awareness programs, codes-of-practice, and research initiatives.