

CAPP HYDRAULIC FRACTURING  
INDUSTRY SHARED PRACTICES

# ANOMALOUS INDUCED SEISMICITY DUE TO HYDRAULIC FRACTURING

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## BACKGROUND

Hydraulic fracturing is a safe and proven technique that is regulated and has been used extensively throughout Canada's oil and natural gas industry for more than 60 years. Low levels of small magnitude seismicity is an expected result of hydraulic fracturing.

In both Alberta and British Columbia, strict regulations are in place for operators to monitor and report on induced seismic activity.

In 2011, CAPP released the industry's *Guiding Principles for Hydraulic Fracturing* and seven *Operating Practices*. Developed in collaboration with CAPP member companies, the *Guiding Principles and Operating Practices* strengthen industry's commitment to continuous improvement to reduce potential environmental risks associated with hydraulic fracturing.

## WHAT IS INDUCED SEISMICITY?

Induced seismicity refers to seismicity caused by human activity. It is associated with several industrial processes including geothermal energy extraction, mining, and dam building and is a normal feature of hydraulic fracturing used in oil and natural gas development. Anomalous induced seismicity refers to seismic events caused by human activity that is unusual or inconsistent with what is expected.

## WHAT ARE INDUSTRY SHARED PRACTICES ON ANOMALOUS INDUCED SEISMICITY?

CAPP member companies encourage and support greater transparency and information sharing to strengthen the commitment to responsible hydraulic fracturing practices. Members have shared experiences and knowledge on induced seismicity risk appraisal, risk mitigation and approaches to research. This collection of information is documented in CAPP's *Industry Shared Practices: Anomalous Induced Seismicity due to Hydraulic Fracturing*. The shared practices are based on the current level of knowledge and recognize research is ongoing and understanding continues to grow. Any recommended shared practices are superseded by any regulatory requirements.

## HOW DO INDUSTRY SHARED PRACTICES DIFFER FROM CAPP'S OPERATING PRACTICES?

The *Industry Shared Practices* supplement the existing *Operating Practices* but provide more detailed recommendations for operators to use to address the risk of induced seismicity. Operators should adapt the *Industry Shared Practices* to their specific situation. An individual operator is responsible to conduct their operations safely, according to regulations, and consider the circumstances of their specific operations.

CANADA'S OIL  
AND NATURAL  
GAS INDUSTRY  
SUPPORTS AND  
ABIDES BY ALL  
REGULATIONS  
GOVERNING  
HYDRAULIC  
FRACTURING  
OPERATIONS.

## INDUSTRY SHARED PRACTICES

The *Industry Shared Practices* ensures that CAPP members have access to the same information so that any potential risks related to induced seismicity caused by hydraulic fracturing is managed using the best available information, technology and science.

## HOW WILL IT WORK?

Under the *Industry Shared Practices*, CAPP members share knowledge and experience related to anomalous induced seismicity in the areas of:

- Hydraulic fracturing seismicity risk appraisal;
- Risk mitigation approaches to induced seismicity related to hydraulic fracturing; and
- Key research completed.

## SCOPE

The *Industry Shared Practices* are for CAPP members who develop natural gas and oil resources in Canada using hydraulic fracturing. While use of *Industry Shared Practices* is voluntary (subject to applicable laws and regulations, and where the assessments of conditions are indicative), CAPP encourages members to consider the applicability of the *Industry Shared Practices* to their operations where appropriate.

## SEVEN INDUSTRY SHARED PRACTICES – ANOMALOUS INDUCED SEISMICITY FROM HYDRAULIC FRACTURING

1. Conduct a **COMPREHENSIVE RISK ASSESSMENT** prior to hydraulic fracturing.
2. Develop an **OPERATIONAL RESPONSE PLAN** based on local operational conditions, regulatory requirements and company protocols.
3. Establish an appropriate **MONITORING PROCEDURE** based on risk assessment.
4. Document the **ROLES AND RESPONSIBILITIES** of key people involved in the seismicity response system.
5. Support **SCIENTIFIC RESEARCH** and collaborate with academia.
6. Maintain **STRONG RELATIONSHIPS** with the regulator by providing clear, direct and accurate information on anomalous induced seismic events.
7. Operators are encouraged to **COMMUNICATE WITH EACH OTHER** and share experiences and information about their practices and research.



A line of trucks set up for a hydraulic fracturing operation.

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## DEFINITIONS

### INDUCED SEISMICITY

Induced seismicity refers to seismic events caused by human activity. Induced seismicity is associated with several industrial processes, including geothermal energy extraction, mining and dam building. Low levels of small magnitude seismicity is an expected feature of hydraulic fracturing.

### ANOMALOUS INDUCED SEISMICITY

Seismic events caused by human activity that is unusual or inconsistent with what is expected.

### HYDRAULIC FRACTURING

Hydraulic fracturing is a proven and highly regulated technique that has been used for more than 60 years to recover oil and natural gas from tight rock formations that are typically 2,000 to 3,000 metres below ground. It involves injecting fluids into the deep underground rock at high enough pressures to create fractures in the rock. This opens pathways in the rock to allow oil and natural gas to flow.

### HYDRAULIC FRACTURING FLUIDS

Hydraulic fracturing fluids are a mixture mainly of sand and water, and a small amount of additives that limit bacterial growth or prevent corrosion.

### PROPPING AGENT

Sand is the mostly commonly used ingredient that props open the fractures in the rock to release the oil or natural gas so it can flow to the surface.

### OPERATOR

Refers to the oil or natural gas company that is operating the oil or natural gas development.

### REGULATOR

An independent, single-window regulatory agency responsible for overseeing oil and natural gas development, including exploration, pipelines and reclamation.

### MAGNITUDE

Magnitude is a measure of the relative size of a seismic event.

### SEISMOGRAPH

An instrument that measures and records details of seismic activity such as ground motion.

## DIG DEEPER

LEARN MORE  
ABOUT CAPP'S  
*GUIDING  
PRINCIPLES FOR  
HYDRAULIC  
FRACTURING ON:*

[CANADASNATURALGAS.CA](http://CANADASNATURALGAS.CA)