

Seismicity Frequently Asked Questions

Does hydraulic fracturing cause seismicity?

Investigations in the Montney and Horn River Basin show fluid injection during hydraulic fracturing operations has caused low-level seismicity in northeast B.C., primarily in areas with pre-existing, underground faults. This is not unique to B.C. – other jurisdictions have experienced induced seismicity as a result of hydraulic fracturing.

Should the public be worried about these earthquakes? What about the people living near hydraulic fracturing?

No. The Commission has effective regulatory measures that apply to every well approved in northeast B.C. to ensure there is no risk to the safety of the public. Anyone with concerns, or that feels a seismic event, should contact the Commission (250-794-5200) directly. Less than 0.2 per cent of hydraulic fracturing operations cause felt events.

Can we expect to see – and feel – more seismic events as drilling continues in this area?

The intent of mitigation measures in place is to reduce the number of felt seismic events related to hydraulic fracturing. Measures include new regulations that require operations to shut down immediately in the event of a Magnitude 4.0 or greater.

Is this area prone to seismicity and larger quakes?

Northeast B.C. does not have a history of high magnitude events. The magnitude of induced seismic events has, to date, fallen within the range of naturally occurring events in northeast B.C.

What are “stages” in hydraulic fracturing and why do they affect induced seismicity?

For an unconventional well, the wellbore is drilled vertically, then deviated in the build section to the depth of the reservoir, and then out horizontally, which is the portion that is hydraulically fractured. The wellbore along the horizontal length is separated into segments, called “stages.” Each stage is isolated prior to hydraulic fracturing in order to maximize the amount of pressure to fracture the rock. It is the fluid injected during these stages that can cause underground fault slippage, resulting in induced seismicity.

What is the cumulative impact of all these earthquakes in northeast B.C.?

These are primarily low-level seismic events, the likes of which occur naturally thousands of times a year. In most cases in northeast B.C., induced seismic events took place in complex structural settings with lots of stressed faults, so the susceptibility to seismic events existed before hydraulic fracturing took place. The Commission is working to reduce the frequency and magnitude of induced events. Areas with felt events are receiving particular attention, with localized monitoring and mitigation plans.

Is there potential for fractures created by hydraulic fracturing to make pathways to potable groundwater?

No. Hydraulic fracture completion depths in the Montney and Horn River Basin range from approximately 1,800-2,500 m. Maximum freshwater aquifer depths range from 300-600 m, with potable water in northeast B.C. occurring from 25-120 m. This leaves, at minimum, 1,200 m of mixed lithology sediments as a barrier to hydraulic fracture fluid infiltration. When the well is put on production, fluid and gas preferentially flow to the wellbore, not upwards along faults. Over time, 30 to 50 per cent of the fracture fluid is usually recovered. The remaining fluid is locked in the fracture network.

Were there any injuries or damages from the 4.6 induced seismic event that occurred Aug. 17, 2015?

No, there were no reports of injuries or damages. According to the Richter scale classification, the event was classified as "light," meaning there can be noticeable shaking of indoor items and rattling noises, but significant damage is unlikely.