

Induced Seismicity in the Australian context: what you need to know



The claim of induced seismicity has prompted discussion on the safety of hydraulic fracturing, but repeated investigations have found this issue not to be a significant concern in Australia.

It is worth investigating the available science and experience in Australia, where hydraulic fracturing has been used in onshore production for more than 50 years.



Multiple inquiries in Australia have considered the concept of induced seismicity from hydraulic fracturing and have concluded that **the risk of it occurring, and of it having any negative effects, in Australia are low.**

This is because Australia is a [stable continent](#). Earthquakes are infrequent compared to those in plate boundary settings, such as parts of the US and Pacific Rim countries to Australia's north.

The [Independent Scientific Panel Inquiry into Hydraulic Fracture Stimulation in Western Australia](#) considered the concept of induced seismicity and noted that:

'Human activities are not capable of creating entirely new large faults in an intact rock mass, but they can influence patterns of natural seismicity.'



What we do know is that [seismic events can be triggered by man-made activities](#), such as mining, dams and the extraction or injection of material below the ground. Small seismic events have been known to result from stress changes in the ground due to oil and gas activities. This is known as induced seismicity.

There is no evidence to suggest that this is a cause for concern in Australia.

The risks associated with induced seismicity is very low and no correlation has been found between any earthquakes recorded by Geoscience Australia's Australian National Seismograph Network (ANSN) and oil and gas activities in Australia in its [Review of Hydrofracturing and Induced Seismicity](#) (section 9.7)



Here is what the independent and scientific inquiries and local experts found:

'Based upon experience in the US and UK, the extent of fracturing can be monitored using sophisticated micro-seismic technologies, with the fracturing distance controlled by varying the pressure that is used.'

– [Scientific Inquiry into Hydraulic Fracturing in the Northern Territory](#)

'The possibility of hydraulic fracturing causing earthquakes of sufficient magnitude to cause structural damage (2 or greater on the Richter scale) has been examined. Based on an extensive review of the evidence, the Panel has concluded that this is unlikely to occur as a result of hydraulic fracturing for onshore shale gas in the NT.'

– [Scientific Inquiry into Hydraulic Fracturing in the Northern Territory](#)

'The seismicity caused by hydraulic fracturing mostly has very low magnitudes (typically between MW = -2-0) and is unlikely to be felt or cause infrastructure damage.'

– [Scientific Inquiry into Hydraulic Fracturing in the Northern Territory](#)

'Provided best practice is followed, including ensuring that there is comprehensive knowledge of the sub-surface, hydraulic fracturing is most unlikely to cause damaging induced seismic events or result in widespread, systemic impacts on drinking water resources, of which there is no evidence from hydraulic fracturing of shales in the US.'

– [Australian Academy of Technology and Engineering](#)

'The evidence suggests that, provided appropriate monitoring programs are undertaken and a robust and transparent regulatory regime put in place (and enforced), there will be a low risk that shale gas production will result in contamination of aquifers, surface waters or the air, or that damaging induced seismicity will occur.'

– [The Australian Council of Learned Academies, Engineering Energy: Unconventional Gas Production: A study of shale gas in Australia](#)

'Finding 45: The Committee finds that, given Western Australia's geology and low background seismicity, the State is unlikely to experience any negative effects from induced seismicity as a result of hydraulic fracturing.'

– [Implications for Western Australia of Hydraulic Fracturing for Unconventional Gas](#)

'Finding 42: The Committee finds that the risk of induced seismicity associated with hydraulic fracturing of shale pays at any depth is negligible.'

– [Implications for Western Australia of Hydraulic Fracturing for Unconventional Gas](#)

'A site that is susceptible to induced earthquakes generally has a pre-existing susceptibility to natural earthquakes. This means that the worst-case scenario for a site is the same maximum credible magnitude earthquake that would have occurred eventually without any artificial trigger mechanism (without being induced).'

– [Report for the NSW former Chief Scientist Mary O'Kane](#)

'Frankly, the potential for problems from fracking in the context of an earthquake are minimal if non-existent.'

– Dr Chris Pigram, former CEO of Geoscience Australia, [Senate Estimates](#)