

## **Earthquakes** [1]



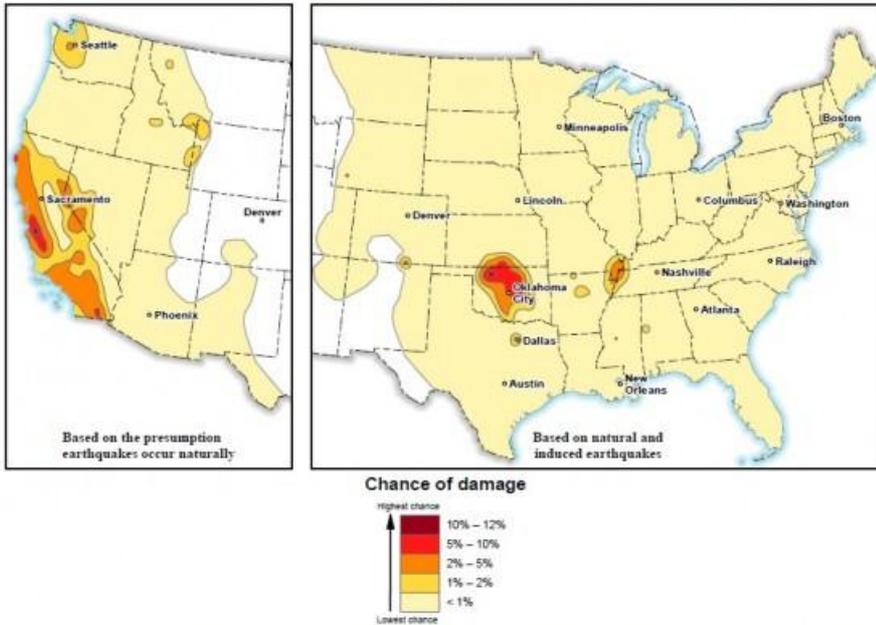
Recently, fracking has been blamed for small earthquakes in Ohio, Arkansas, Texas, and Oklahoma. In response to concerns, the National Academies [published a report](#) [2] on energy technologies and induced seismicity, minor earthquakes caused by human activities. Researchers found the process of fracking does not pose a high risk for inducing felt seismic events.

Small quakes that can be felt but do not significantly damage property or life have been linked to underground injection wells. Formal attribution to injection wells in the cases of Ohio and Arkansas has not been completed, but state authorities shut down the wells out of an abundance of caution.

Underground injection wells are used to permanently dispose of fluids deep underground or for enhanced oil recovery. Geologists have known for several decades that fluids pumped deep underground can lubricate faults, which can cause them to slip and induce small earthquakes. Although injection wells pose a risk for induced seismic activity, very few events have been documented over the last several decades relative to the large number in operation.

Underground injection wells are regulated by the Environmental Protection Agency (EPA) under the Safe Drinking Water Act's Underground Injection Control (UIC) program, with some states delegated regulatory primacy. Before a UIC well is drilled, geologists look for faults and other geologic features in order to avoid them, and wells are designed to ensure fluids stay in the target rock formation. In response to concerns about UIC wells generating induced seismicity, several states have tightened their procedures. Injection wells are also monitored to ensure the fluids stay deep underground and do not contaminate groundwater. If earthquakes occur once a well is put into use and the seismicity can be linked to the well, it is shut in. For example, several earthquakes were felt in the area of a new UIC well in Ohio. The state shut down the well and the seismicity ceased.

### USGS Forecast for Damage from Natural and Induced Earthquakes in 2016



USGS map displaying potential to experience damage from natural or human-induced earthquakes in 2016. Chances range from less than 1 percent to 12 percent.

#### Feature content:

No

#### Quick Facts:

- There are approximately 35,000 active wastewater disposal wells, over 80,000 active enhanced oil–recovery wells, and tens of thousands of hydraulically fractured wells in the United States. Only a few dozen of these wells are known [3] to have caused seismic activity felt at the surface.
- The Williston Basin in North Dakota and most other producing have virtually no issues [4] with induced seismicity, despite being home to hundreds of injection wells.
- The vast majority of induced seismic events are at too low of a magnitude to be felt by humans. Of those that are felt at the surface, the majority [5] are in the magnitude 3-4 range, which very rarely causes damage.

#### Related Content:

[National Academies report on induced seismicity](#) [2]

[University of Alberta study on showing fracking rarely linked to felt seismicity](#) [6]

**Source URL:** <https://www.westernenergyalliance.org/why-western-oil-natural-gas/what-fracking/earthquakes>

#### Links:

[1] <https://www.westernenergyalliance.org/why-western-oil-natural-gas/what-fracking/earthquakes>

[2] <https://www.nap.edu/resource/13355/Induced-Seismicity-Report-Brief-Final.pdf>

[3] [https://profile.usgs.gov/myscience/upload\\_folder/ci2015Jun1012005755600Induced\\_EQs\\_Review.pdf](https://profile.usgs.gov/myscience/upload_folder/ci2015Jun1012005755600Induced_EQs_Review.pdf)

[4] [http://bismarcktribune.com/news/state-and-regional/earthquakes-not-north-dakota-s-problem/article\\_c2485671-d783-5e05-b5b5-fff2572ba80d.html](http://bismarcktribune.com/news/state-and-regional/earthquakes-not-north-dakota-s-problem/article_c2485671-d783-5e05-b5b5-fff2572ba80d.html)

[5] <http://earthquake.usgs.gov/research/induced/myths.php>

[6] [https://www.eurekalert.org/pub\\_releases/2017-06/uoa-hfr062617.php](https://www.eurekalert.org/pub_releases/2017-06/uoa-hfr062617.php)