

Ohio Earthquake Likely Caused by Fracking Wastewater

Saturday 31 March 2012, by [FISCHETTI Mark](#) (Date first published: 4 January 2012).

Injecting wastewater deep underground is the prime suspect, potentially widening earthquake worries linked to hydraulic fracturing.

Residents of Youngstown, Ohio, received an extra surprise on Christmas Eve and again on New Year's Eve—earthquakes, measuring 2.7 and 4.0 on the Richter scale, respectively. No one was injured and only a few cases of minor damage were reported after the Dec. 31 event.

Scientists have quickly determined that the likely cause was fracking [1]—although not from drilling into deep shale or cracking it with pressured water and chemicals to retrieve natural gas. Rather, they suspect the disposal of wastewater from those operations, done by pumping it back down into equally deep sandstone.

Fracking is part of a nationwide boom in the production of natural gas, which is a ready replacement for home heating oil and could lessen dependence on foreign fossil fuels [2] if vast underground shales could be hydraulically fractured. Opposition to fracking has arisen mostly out of fear that the technique could potentially contaminate drinking water supplies.

Nine small earthquakes had already occurred between March and November 2011 within an eight-kilometer radius of a wastewater injection well run by Northstar Disposal Services. Because quakes are otherwise rare in the Youngstown area, the Ohio Department of Natural Resources in November asked Columbia University's Lamont-Doherty Earth Observatory (LDEO) to place mobile seismographs in the vicinity to better determine what was going on. John Armbruster from LDEO installed four seismographs on November 30.

By triangulating the arrival time of shock waves at the four stations, Armbruster and his colleagues needed only a day or two to determine with 95 percent certainty that the epicenters of the two holiday quakes were within 100 meters of each other, and within 0.8 kilometer of the injection well. The team also determined that the quakes were caused by slippage along a fault at about the same depth as the injection site, almost three kilometers down.

Although LDEO scientists are not saying that the pumping caused the quakes, injection fluids have been implicated in other strike-slip earthquakes close to deep-injection wells [3]. In essence, the fluids can act as lubricants between two abutting rock faces, helping them to suddenly slip along the boundary. The scientists did say that subsequent quakes from the Youngstown injections, which had been underway for a year, could continue to occur for up to another year, even if no more fluids are added. Ohio lawmakers have asked Northstar to stop operations until a full investigation is complete; the company has agreed but is not talking publicly about the events.

For the latest science and debates about fracking, including the unlikely chance that the practice caused a magnitude 5.6 temblor on November 14 near Oklahoma City, see our ongoing Storify file, which is updated weekly. News in New York State is picking up again because the deadline for

public comments about proposed fracking rules is January 11, and regulations from the state's Department of Environmental Conservation that would allow fracking are likely to follow.

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P.S.

* Scientific American | January 4, 2012 | 26:

<http://www.scientificamerican.com/article.cfm?id=ohio-earthquake-likely-caused-by-fracking>

Footnotes

[1] <http://www.scientificamerican.com/article.cfm?id=fracking-evolving-truth-natural-gas>

[2] <http://www.scientificamerican.com/topic.cfm?id=fossil-fuels>

[3] <http://www.scientificamerican.com/article.cfm?id=method-predicts-size-of-fracking>