

Study Finds “Plausible”™ Link Between 2012 Texas Quake and Injection Wells

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A new study released Wednesday by scientists at the University of Texas at Austin (UT) adds to the growing body of research suggesting a link between seismicity and underground wastewater injection wells.

The study, published in the peer-reviewed *Journal of Geophysical Research: Solid Earth*, looked at a series of earthquakes near Timpson, TX, including a 4.8 magnitude earthquake that occurred May 17, 2012. Researchers built a computer model that simulated the effects of fluid injection on the stability of the fault suspected of generating the seismicity using a number of parameters, including the physical properties of the reservoir and the orientation of the fault.

The results found it “plausible” that two injection wells near Timpson caused the earthquakes, which began occurring in April 2008, around 17 months after the wells began operating. However, while “earthquakes were generated using a certain range of input parameters,” the modeling also found that “no earthquakes were generated in simulations using a wider set of equally probable parameters,” according to a summary of the study's findings.

The use of a computer model differentiates the UT study from previous research that relied on the timing and proximity of underground injection activity to determine whether it had induced nearby seismic activity.

While showing a potential link between underground injection and seismicity, the results also “underscore the difficulty of conclusively tying specific earthquakes to human activity using currently available subsurface data,” according to the researchers.

“We used a more rigorous approach than previous studies, but our analyses are limited by the availability of robust, high-quality data sets that describe the conditions at depth at which water is injected and earthquakes occur,” said Peter Eichhubl, a senior research scientist with UT's Bureau of Economic Geology and a co-author of the study. “This study demonstrates the need for more and higher quality subsurface data to properly evaluate the hazards associated with wastewater injection in Texas.”

The UT study was authored by Eichhubl, Zhiqiang Fan and Julia F.W. Gale and funded through the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research and Development Program authorized by the federal Energy Policy Act of 2005.

The study builds on previous research suggesting a link between a number of small Texas temblors and underground injection wells, though there have been conflicting findings on the issue.

Regulators with the Railroad Commission of Texas (RRC) asserted at the time that earthquakes in May 2012 near Timpson, located in the eastern part of the state, were unlikely to have been caused by natural gas drilling or wastewater injection wells (see *Shale Daily*, [May 22, 2012](#)). But researchers at the U.S. Geological Survey (USGS) cited drilling-related injection wells as the reason for a “remarkable” uptick in seismic activity in the region (see *Shale Daily*, [April 2, 2012](#)).

Another report released in 2012 found a link between injection wells in the Barnett Shale and a series of small earthquakes nearby (see *Shale Daily*, [Aug. 8, 2012](#)).

More recently, the RRC conducted studies of injection wells operated in Texas by EnerVest Operating LLC (see *Shale Daily*, [Sept. 11, 2015](#)) and XTO Energy Inc. (see *Shale Daily*, [Sept. 2, 2015](#)) and found a lack of evidence to show that those wells had caused small earthquakes.

This year, Texas Gov. Greg Abbott appointed a seismicity technical advisory committee to advise the Bureau of Economic Geology on the use of \$4.47 million appropriated to UT by the Texas Legislature to help study seismic activity near oil and natural gas operations (see Shale Daily, [March 28a](#)).

Neighbor Oklahoma has also been dealing with a series of seismic events linked to underground injection wells (see Shale Daily, [March 29](#)). The USGS recently released a report showing Oklahoma as the riskiest state for induced seismicity, with Texas third on the list (see Shale Daily, [March 28b](#)).

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