
Study links Texas quakes back to 1925 to oil and gas activity

Study says oil and gas activity going back through the decades has been causing rumblings all across the Lone Star State

By Jennifer Hiller, San ANTONIO EXPRESS-NEWS | May 18, 2016 | Updated: May 18, 2016 10:35pm

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SAN ANTONIO - Oil and gas activity has triggered most of the earthquakes in Texas for decades, according to a new study from researchers at the University of Texas and Southern Methodist University.



The study links earthquakes to the energy industry for nearly as long as there has been oil drilling in Texas, occurring in all of its oil and gas fields scattered in various geographic swaths of the state - North Texas, the Panhandle, West Texas, East Texas and Gulf Coast region, including South Texas and the 400-mile Eagle Ford Shale.

The research was published Wednesday in the journal *Seismological Research Letters*.

Cliff Frohlich, senior research scientist and associate director at UT's Institute for Geophysics, said that while much attention has been paid to Oklahoma's recent earthquakes, which have generally been stronger than those in Texas, researchers thought the Texas story was important to document.

The causes of earthquakes here changed as technologies and field practices evolved. Around the 1930s, quakes happened in shallow fields where drillers were extracting as much oil as fast as they could. By mid-century when some fields were depleted, earthquakes were more closely tied with activities such as water flooding, the practice of injecting water to sweep oil toward a production well.

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Recent earthquakes have been tied to the shale boom, when companies on a massive scale combined horizontal drilling with hydraulic fracturing, which pumps millions of gallons of water, chemicals and sand at high pressure to break the rock and prop open cracks in the ground, releasing oil and gas.

The shale wells return water to the surface, some that was used during fracturing and some from the rock itself, where it had been trapped alongside oil and gas molecules. All that water has to go somewhere, and it's usually to a disposal well, where it is pumped into a deep formation underground. There are tens of thousands of disposal wells in Texas.

Since 2008, the rate of earthquakes with a magnitude of 3 or greater has increased from about two per year to 12 per year, much of them occurring near water disposal wells, the study said.

The study offers important new information that could affect future seismic threat assessments for Texas, said Robert Williams, a geophysicist at the U.S. Geological Survey in Golden, Colo. The seismic activity has occurred not just in North Texas,

where the Dallas-Fort Worth quakes have created an uproar in some communities, he said.

In March, the U.S. Geological Survey released its first-ever forecast of quakes linked to human activity. It said more than 7 million people in the U.S. live in regions with increased risk of earthquake damage tied to the oil and gas industry.

Parts of Oklahoma and Kansas, where earthquakes were once rare, now face risks comparable to California's. Dallas-Fort Worth in the Barnett Shale gas field has between a 1 percent and 5 percent chance of earthquake damage this year, that report said. While seismic activity has struck South Texas, including a few quakes considered among the largest human-induced quakes in the country, the USGS did not predict any increased risk of earthquake damage in the region this year.

The most powerful South Texas quake was an Oct. 20, 2011, event centered at Fashing. People felt the 4.6 magnitude temblor throughout the San Antonio area, as far south as Kingsville and as far north as Burnet. It coincided with a significant increase in nearby oil production and was not tied to water disposal.

Texas regulators have disputed the link between oil and gas activity and earthquakes. A spokeswoman for the Texas Railroad Commission, which oversees the oil and gas industry, called the basis for the new study's conclusion's "purely subjective in nature."

The Texas Railroad Commission recently hired a seismologist but did not make him available for interviews Wednesday.

Frohlich said he welcomes criticisms of the study. He also said Texas regulators - while not publicly acknowledging a link like regulators have in Oklahoma, Ohio, Arkansas and Alberta, Canada - have made some rule changes and supported efforts for more earthquake monitoring.

"The Railroad Commission has been a positive force but has been a bit behind other states in recognizing that it happens," Frohlich said.

The commission said its new rules include requiring applicants for new disposal wells to conduct a survey for historical earthquakes within 100 square miles around a proposed new site, which can affect the application. The agency also requires more

frequent reports and clarified staff authority to modify, suspend or terminate a permit.

Texas has just 17 permanent seismic monitoring stations to provide real-time earthquake data, though it will soon have a statewide monitoring network.

In 2015, the Texas Legislature approved \$4.47 million for more earthquake monitoring. The TexNet Seismic Monitoring Program, led by UT's Bureau of Economic Geology, by year-end will place 22 additional seismometers throughout the state.

In the latest study, UT and SMU researchers used five questions to identify induced earthquakes in Texas historical records: How close in time and space earthquakes and petroleum operations are; whether the earthquake center is at a relatively shallow depth (which indicates a human trigger instead of a natural trigger); whether there are faults nearby; and whether published scientific reports supported a human cause for the earthquake.

The Associated Press contributed to this report.

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Once again, Texas is behind the rest of the country. There is no doubting the link between

seismic activity and manmade causes like disposing of waste water from fracking operations into underground storage wells. Wake up, RRC.

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@HoustonNative Republicans don't need any facts or scientific studies. Facts and science just get in the way of their positions. For right minded people who are pro-industry no matter what industry does, there is no such thing as man-made earthquakes and man-made climate control. On the other hand, if right minded people are against something, then it is a huge issue, even if there is no evidence to support the claim, like voter fraud.

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