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## Texas, other states will collaborate on oil field-related earthquake research

By **Jennifer Hiller** Published 8:00 am, Monday, October 2, 2017



Maintenance workers inspect the damage to one of the spires on Benedictine Hall at St. Gregory's University in Shawnee, Okla., after two earthquakes hit the area in less than 24 hours in 2011. Researchers in some of the biggest oil producing states — Texas, Oklahoma, New Mexico and Kansas — are starting to collaborate with each other to monitor and study earthquakes caused by oil field activity.

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AUSTIN — Researchers in some of the biggest oil producing states are starting to collaborate with each other to monitor and study earthquakes caused by oil field activity.

A regional induced seismicity collaborative will launch this week with scientists from Texas, Oklahoma, New Mexico and Kansas, scientists at the University of Texas at Austin said.

The idea is to link up researchers across states so they can share information and use

similar methods, said Michael Young at the Bureau of Economic Geology at the University of Texas at Austin, who spoke at an energy journalism conference on campus last week.

Scientists are working to understand how processes tied to oil and gas development can cause once-quiet geologic faults to slip and cause shaking on the surface.

Recent earthquakes have been tied to the shale drilling 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. It's not fracking that causes earthquakes, though. Most of the concern has focused on the injection of water back into the earth.

Oil wells return water to the surface too — some that was used during hydraulic fracturing, and some from the rock itself, where it had been trapped alongside oil and gas molecules.

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All that briny water must go somewhere, and it's usually to a disposal well, where it's pumped into a deep formation underground. About 8,500 injection wells are operating in Texas.

A U.S. Geological Survey report published earlier this year noted that most injection wells do not trigger earthquakes strong enough to feel. But some do, and the number of quakes that can be felt at the surface in Texas and some other states has increased.

Researchers ultimately hope to figure out a way to manage the wastewater in a way that it reduces seismic events, Young said.

"We're not shouting into the wind here that all wastewater injection is causing earthquakes. We don't know whether one earthquake is caused by one well. These are the things we're trying to understand," Young said. "We want to understand the geologic cause."

Texas has been trying to better study seismic activity. The TexNet Seismic Monitoring Program has placed 22 additional seismometers throughout the state. There are also portable stations, which can be deployed to places such as Pecos in West Texas, an area identified by the USGS as a place where damaging earthquakes could happen.

Oklahoma has been the state most plagued by new earthquakes. Between 1980 and 2000, it averaged about two earthquakes that people could feel each year.

In 2014, there were 2,500 earthquakes strong enough to feel in Oklahoma. There were 4,000 such quakes in 2015 and 2,500 in 2016, including a magnitude 5.8 earthquake, the largest in the state's history.

The Oklahoma Corporation Commission, that state's oil and gas regulator, has placed

limits on wastewater injection in some areas.

Texas regulators introduced earthquake-related disposal well rules in late 2014.

A 2016 paper from scientists at Southern Methodist University and the University of Texas looked at the causes of earthquakes in Texas and how that has 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. Recent earthquakes have been tied to water disposal, especially in North Texas in the Barnett Shale natural gas field.

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. But scientists say that quake coincided with a significant increase in nearby oil production (removing liquids from the earth) and was not tied to water disposal.

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