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Oklahoma worries over swarm of earthquakes and connection to oil industry



Jan. 26, 2015 Oklahoma Geological Survey seismologist Amberlee Darold wires a solar-power panel to a seismometer in Oklahoma City as part of efforts to determine whether a major increase in earthquakes is related to oil and gas exploration.

By Lori Montgomery: January 28, 2015

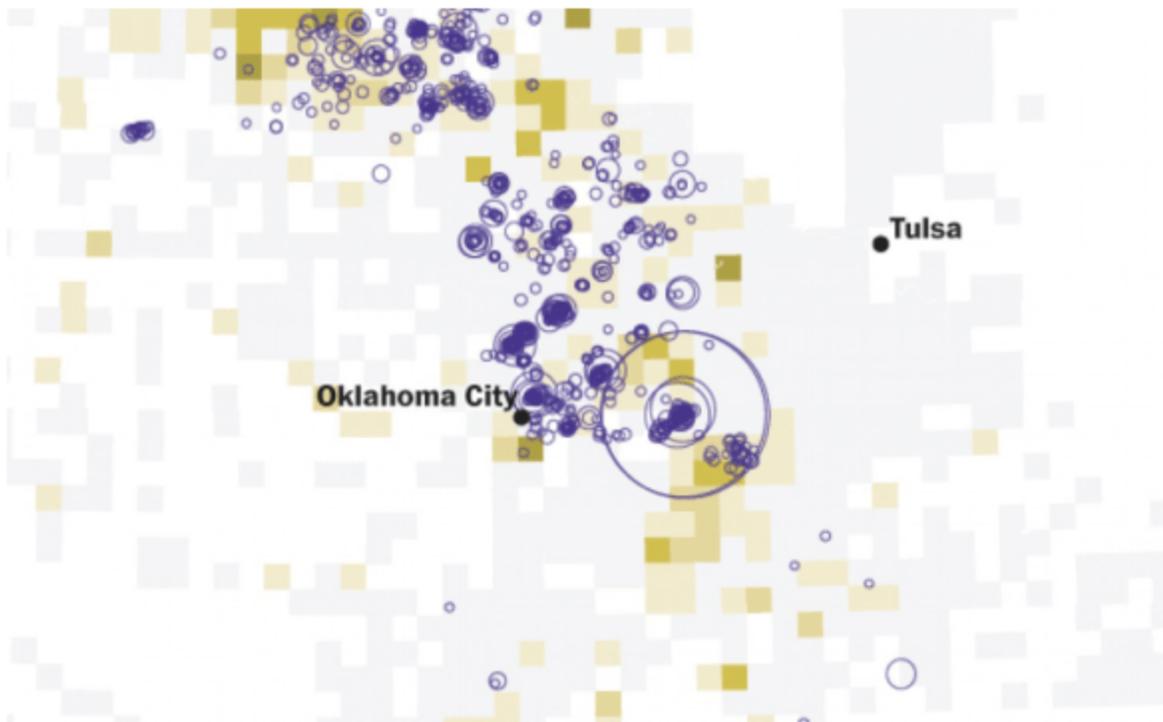
GUTHRIE, Okla. – The earthquakes come nearly every day now, cracking drywall, popping floor tiles and rattling kitchen cabinets. On Monday, three quakes hit this historic land-rush town in 24 hours, booming and rumbling like the end of the world.

“After a while, you can’t even tell what’s a pre-shock or an after-shock. The ground just keeps moving,” said Jason Murphey, 37, a Web developer who represents Guthrie in the state legislature. “People are so frustrated and scared. They want to know the state is doing something.”

What to do about the plague of earthquakes is, however, very much an open question in Oklahoma. Last year, 567 quakes of at least 3.0 magnitude rocked a swath of counties from the state capital to the Kansas line, alarming a populace long accustomed to fewer than two quakes a year.

Scientists implicated the oil and gas industry — in particular, the deep wastewater disposal wells that have been linked to a dramatic increase in seismic activity across the central United States. But in a state founded on oil wealth, officials have been reluctant to crack down on an industry that accounts for a third of the economy and one in five jobs.

With seismologists warning that the spreading earthquake swarms could trigger something far bigger and potentially deadly, pressure is building to follow the lead of other oil and gas-producing states and take more aggressive action.



Map: Earthquakes and drilling in Oklahoma VIEW GRAPHIC

“The question is: Is it all about profits, or do the people have any rights at all?” said Robert Freeman, 69, a retired Air Force contracting officer who is trying to rally his neighbors in Guthrie to demand a moratorium on new disposal wells.

“I understand the oil and gas industry is the economic lifeblood of the state. I get some of my paycheck from the oil and gas industry,” added Lisa Griggs, 56, a Guthrie environmental consultant. “But they don’t get to destroy my house.”

State officials insist they are doing all they can to develop new regulations. In September, Gov. Mary Fallin (R) named a coordinating council to study seismic activity. And the Oklahoma Corporation Commission, an elected three-member panel that regulates oil and gas producers, has imposed new restrictions on wells in seismically active areas.

“We’ve taken a proactive approach,” said commissioner Dana Murphy (R).

But in Oklahoma — where the state monument is a Golden Driller that stands half as high as the Statue of Liberty; where an active oil rig still pumps on the grounds of the state capitol — politicians can move only so fast. Murphey, the lawmaker, called Murphy, the commissioner, “courageous” for abstaining from a vote to approve a disposal well north of Guthrie, even though the commission ultimately okayed the well.

“The oil and gas industry funds so much of those [commission] races,” said Murphey (R) with a sigh. “And she hasn’t been a tool of the industry.”

Meanwhile, the state seismologist, Austin Holland, readily acknowledged that the industry has tried to influence his work — even as he and his colleague, Amberlee Darold, are pelted with “hate e-mail” from quake victims.

“I can’t really talk about it,” Holland said, taking a cigarette break from the dirty work of burying instruments near a cow pasture southwest of Oklahoma City. “I try not to let it affect the research and the science. We’re going to do the right thing.”

For the most part, Oklahoma oil companies and their representatives have declined to engage in the public debate. When industry representatives have ventured forth, they have denied responsibility for the quakes. At a luncheon hosted by the Oklahoma City Geological Society last summer, Glen Brown, a Continental Resources geologist, blamed a worldwide surge in seismic activity that has nothing to do with wastewater disposal.

“There’s a hysteria that needs to be brought back to reality that these [quakes] are light and will not cause any harm,” Brown said, according to local news reports.

In an interview, A.J. Ferate, vice president of regulatory affairs for the Oklahoma Independent Petroleum Association, said, “It’s hard to deny that in certain geographic locations with certain geologic circumstances, we’ve had some problems with some wastewater wells.” But “to make a blanket assertion that wastewater wells are always the cause, I don’t know that I can agree with that.”

Though mild for the most part, the Oklahoma quakes have already caused harm, and not just to people’s foundations and swimming pools. Around 11 p.m. on Nov. 5, 2011, a magnitude 5.6 quake — the biggest in state history — hit the small town of Prague, east of Oklahoma City. Sandra Ladra, a business manager for a state job training center, was sitting in a recliner watching television when the quake toppled her two-story stone fireplace. Big rocks rained down on her legs, gashing her knees.

“I nearly went into shock,” said Ladra, 63. “You just really don’t think you’re going to live through it.”

In August, Ladra filed suit, the first case in Oklahoma to try to pin liability for the quakes to the oil companies — in this case, New Dominion LLC and other producers with disposal wells near Prague. In October, a trial judge dismissed the case, agreeing with New Dominion that Ladra must first go before the Corporation Commission and prove “a scientific basis” for her claim.

Last month, in an unusual decision, the Oklahoma Supreme Court agreed to review that ruling. If the case goes to trial, Ladra’s attorney, Scott Poynter, said he intends to convince a jury that the oil companies are at fault — a potential gamechanger, both legally and politically.

“The science has been there since the 1960s to link injection wells to earthquakes,” said Poynter, who has also represented victims of “induced” or manmade quakes in Arkansas.

There, Poynter is on solid ground. Both the U.S. Geological Survey (USGS) and the Oklahoma Geological Survey have confirmed a connection between the recent oil and gas boom and a sharp uptick in seismic activity in Texas, Colorado, Arkansas and Ohio, as well as Oklahoma. New extraction techniques, such as

horizontal drilling and hydraulic fracturing, generate massive amounts of wastewater, which are then injected deep underground to avoid contaminating clean water near the surface.

Under the right geological conditions, those injections can trigger quakes.

“An earthquake that was sitting there waiting goes kabooing. Then things shake,” said John Armbruster, a geologist at the Lamont-Doherty Earth Observatory at Columbia University, who studied manmade quakes in Youngstown, Ohio.

There, a single well was linked to a well-defined area of seismicity, Armbruster said, and the response was easy: Shut it down. Similarly, Arkansas declared a moratorium on new disposal wells in northern Faulkner County after earthquakes led to the discovery of a previously unknown fault.

But Oklahoma has about 3,300 active disposal wells, pumping more than 2 billion barrels of toxic brine a year into a vast network of faults buried under the red-dirt prairie. So far, state regulators have been unable to establish a clear connection between the quakes and any particular well.

“Broadly, we can say it looks like there are some strong correlations” between the wells and seismicity, said Holland, the state seismologist. “But when you zoom in, the quakes aren’t happening next to the wells, where you’d expect to find them.”

With few answers forthcoming from state bureaucrats, Jason Murphey teamed up last fall with Rep. Cory Williams, a Democrat from Stillwater, to hold the first legislative hearings on the quakes.

Oklahoma State University professor Todd Halihan, a member of Fallin’s coordinating council, testified that the Corporation Commission “is not following injection protocols designed to prevent induced seismicity.” He concluded that the state could either do nothing and risk a major calamity. Or officials could reduce volumes at several “monster” wells, with names such as “Deep Throat” and “Flower Power,” that scientists say may be responsible for a huge share of quakes across the Midwest.

“Rather than just one well, one earthquake, it may be that the broader region is affected by multiple wells,” said Robert Williams, a geophysicist with the USGS Earthquake Hazards Program in Golden, Colo., citing forthcoming research by Stanford geophysicist Mark Zoback.

Murphy said the commission is watching Zoback’s work. “We have to see what the results are to see if that causes us to take another step,” she said.

In the meantime, skepticism runs deep. Jerry Ellis, a former Democratic state senator, said he met with Murphy and other commission officials before he retired last year.

“This was in August. In July, we had 33 earthquakes in Payne County, where Oklahoma State University is located. The last thing I said was: Those high-rise dorms at the campus, if one or more were toppled and several students were killed, would you be able to look back and say you did everything you could to prevent it?”

“They did not answer,” Ellis said. “They just kind of hung their heads.”
