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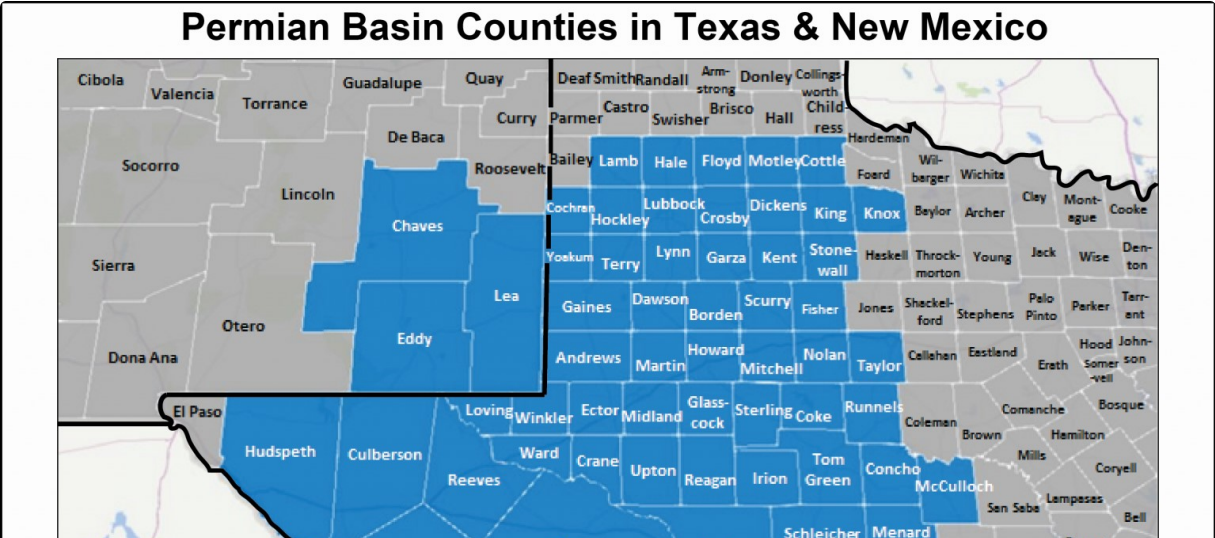
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Texas Natural Gas, Oil Regulator Investigating Another Permian Earthquake

 BY LETICIA GONZALES
December 29, 2021

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The Railroad Commission of Texas (RRC) is suspending all disposal well permits to inject oil and gas waste into deep strata within a portion of the Permian Basin following a series of earthquakes.



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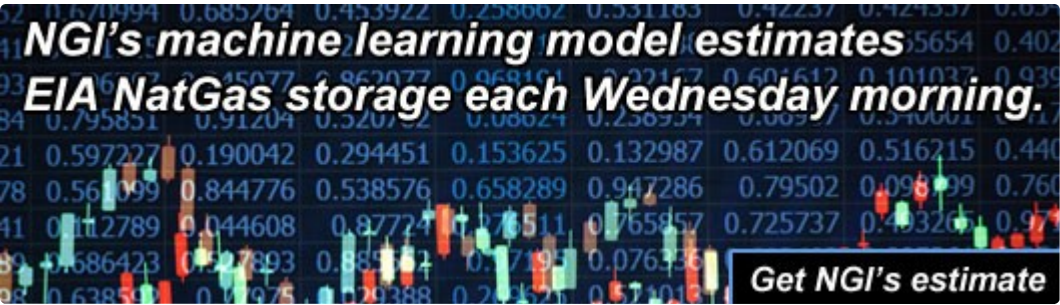
The action, taken earlier in December and set to take effect on Friday (Dec. 31), applies to 33 deep disposal wells within the boundaries of the Gardendale Seismic Response Area (SRA). The area includes northeastern Ector County to southwest Martin County.

Injections also were suspended as of Dec. 15 in a smaller area within the Gardendale SRA, and other limitations have been put in place in Northern Culberson and Reeves counties.

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The permit suspensions preceded an investigation by the RRC into a 4.5 magnitude earthquake that struck about 11 miles north of the sleepy town of Stanton, in West Texas, late Monday.

The quake struck at a depth of 4.8 miles in Martin County in the Midland sub-basin of the Permian, according to the U.S. Geological Survey (USGS). No injuries were reported.



The RRC has been in contact with oil and gas disposal well operators in the area, according to spokesperson Andrew Keese. “We’re sending inspectors to the facilities as well.”

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detected by the University of Texas at Austin's Bureau of Economic Geology. The Bureau's TexNet Seismic Monitoring Program was developed after the Texas Legislature tasked it with helping to locate and determine the origins of earthquakes in the state.

Regarding Monday's quake, TexNet was investigating the data associated with the event. "Our first concern, of course, is for any people who might have been affected by this earthquake," said Scott W. Tinker, who manages the program.

The scientists on the TexNet team, led by principal investigator Alexandros Savvaidis, "are working diligently to analyze the data that we have received from our network of monitoring stations," according to Tinker.

On Dec. 15 and 16, TexNet reported that four earthquakes occurred in northwestern Midland County with magnitudes of 3.1, 3.6, 3.7 and 3.3, respectively. These were the most recent events in an increasing sequence of earthquakes that has occurred in this area over the last two years, according to the RRC.

"RRC staff has determined that injection into deep geologic strata — below the top of the Strawn formation and especially the Ellenburger formation — across the area is likely contributing to recent seismic activity" in the Gardendale SRA, the state regulator said.

The Permian, a sprawling basin spanning 86,000 square miles in West Texas and southeastern New Mexico, had **294 active rigs** as of Dec. 23, according to the latest available data from Baker Hughes Co. (BKR). This was the most of any other play in the United States. Of that total, 127 were in the Midland sub-basin and 157 were in the Delaware. For comparison, the Havnesville Shale had the second-largest number of rigs at 48 BKR

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In a study published earlier this month, the USGS said efforts should continue to systematically quantify nationwide earthquake risks to natural gas pipelines. Because they are buried underground, pipelines are vulnerable to the compounding effects of an earthquake, such as strong shaking, fault ruptures, landslides and liquefaction, according to the federal agency.

Leveraging publicly available data on gas pipelines such as incident data from past earthquakes and information collected by the Pipelines and Hazardous Materials Safety Administration, the USGS developed a first-order assessment of quake risks to U.S. gas transmission pipelines caused by strong ground shaking.

Models determined that California had the highest distribution of average annual loss (AAL) for pipelines from earthquake-induced shaking. Other western states also saw a higher percentage of AAL, while Arkansas, Mississippi, Missouri and Tennessee recorded a moderate percentage of AAL.

“To quantify the risk and its associated uncertainties, we systematically integrated the latest USGS National Seismic Hazard Model, a logic tree-based exposure model, three different vulnerability models and a consequence model,” said lead author Neal Simon Kwong.

The results enable comparisons against other risk assessment efforts, encourage more transparent deliberation regarding alternative approaches – such as characterizing displacement demands or alternate models to evaluate leaks or breaks – and facilitate decisions on potentially assessing localized risks due to ground failures that require site-specific data.

“USGS science remains critical to systematically evaluate both short- and

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infrastructure investments to mitigate risks.”

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