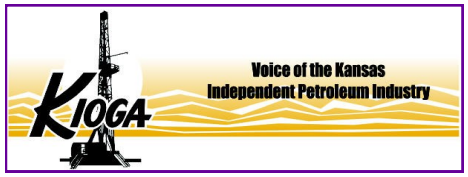
What Others are Saying

"In Kansas, there's no evidence that the earthquakes are being caused by fracking." - *Rex Buchanan, Kansas Geological Survey Interim Director*

"It is important for the public to recognize that the risks posed by injection of wastewater are extremely low. In addition, the risks can be minimized further through proper study and planning prior to injection, careful monitoring in areas where there is a possibility that seismicity might be triggered, and operators and regulators taking a pro-active response if triggered seismicity was to occur." *Mark D. Zoback, Professor of Geophysics at Stanford University*

"Injection for disposal of wastewater derived from energy technologies into the subsurface does pose some risk for induced seismicity, but very few events have been documented over the past several decades relative to the large number of disposal wells in operation." - *National Research Council's Committee on the Induced Seismicity Potential in Energy Technologies*

". . . there is not a one-and-one (correlation) between barrels of oil equivalent produced or injection wells to earthquakes." - *Lynn Watney, Senior Scientific Fellow, Kansas Geological Survey*



Kansas Independent Oil & Gas Association

800 SW Jackson Street - Suite 1400
Topeka, Kansas 66612-1216

Phone: 785-232-7772
Fax: 785-232-0917
www.kioga.org

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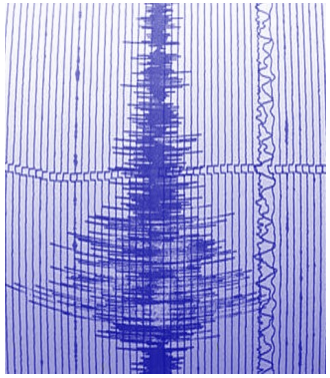
Seismic Activity in Kansas



Kansas Seismicity Overview and Context

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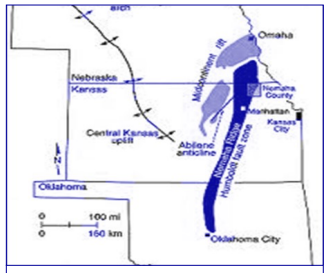
The Kansas Independent Oil & Gas Association (KIOGA) and its member companies continue to follow seismic events in south-central Kansas and Oklahoma. Like many Kansas citizens, we too are concerned by these events and are proactively enhancing our knowledge in order to gain a better understanding as to why the events are occurring.



Nemaha Ridge

Kansas is an area that has been seismically active over millennia. The majority of these events are located on or near a prominent structural geologic feature known as the Nemaha Ridge, which extends north and south across much of Kansas and Oklahoma. This feature is responsible for many of Kansas' and Oklahoma's significant and historic oil fields. Numerous ancestral faults are associated with the uplifting of the Nemaha Ridge over geological time. Periodic adjustments are naturally occurring and reasonable to expect. They've been occurring for millennia. Kansas and Oklahoma has recently experienced some of those adjustments.

What is causing seismic activity in Kansas?

Seismic activity varies over time in an unpredictable manner. Sudden increases/decreases in activity with no obvious external causes have been documented around the world. Because oil and gas are produced in 90 of Kansas' 105 counties, any seismic activity within the state is likely to occur near oil and gas production.

The State Task Force on Induced Seismicity was formed by Gov. Brownback in 2014. The task force released a *Kansas Seismic Action Plan* in September 2014 and revised plan in January 2015. The report said there was insufficient research available to say what is causing the minor seismic activity in Kansas. In addressing oil and gas activity, the report noted that "most agree that the physical act of hydraulic fracturing does not cause measurable seismic activity."

While hydraulic fracturing is an unlikely source of discernible seismic activity, considerable attention is being focused on Class II Underground Injection Control (UIC) disposal wells. Given the long history of successful UIC operations across the nation, the likelihood that induced seismic events will occur in properly permitted and operated UIC wells is very small. Too often, the mere presence of nearby oil, gas, or UIC wells results in allegations that they are the source.

In early 2015, the Kansas Corporation Commission (KCC) ordered oil companies in 5 areas of Harper and Sumner counties to reduce the amount of brine fluid they injected. The Kansas Geological Survey (KGS) reported that seismic activity in Kansas decreased in 2015. When looking at the epicenters of seismic events in Kansas and corresponding injection volumes in the vicinity, there is not always an obvious correlation. The KGS said seismic activity is going to fluctuate naturally and it is too soon to tell whether there is any relationship between reduced injection volumes and seismic activity.

Industry Response

While we do not know what is causing the seismic activity in Kansas, efforts are currently being made to ensure the assumptions and results of numerous studies and reports are correct, scientifically-based, and limited in scope to the site-specific features of the areas in question. The KGS, KCC, and the Kansas Department of Health & Environment (KDHE) are devoting significant resources to analyzing seismicity causes. KIOGA supports increased monitoring and geophysical research to provide assurance to landowners and the public that an improved understanding of these subjects is available to all. Varying, and at times sensational, media coverage highlights the need for more scientific research and explanations in a sea of misinformation. Gathering and analyzing important scientific and non-anecdotal data and information about seismic events is important to better understand these events.

A new report titled ***Injection Wells and Earthquakes: Quantifying the Risk*** consults data from the U.S. Geological Survey and several peer-reviewed studies to examine the number of injection wells that have been suspected of causing earthquakes, compared against the total number of operating injection wells. The report helps to quantify the risk of induced seismicity from underground wastewater disposal, demonstrating that despite prevalent media coverage of each seismic event, the number of wells even potentially linked to earthquakes is comparatively small across the U.S. The report shows that less than 1/2 of 1% (0.48%) of UIC wells in Kansas are even potentially linked to seismic events.