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## **Induced Seismicity & Injection Wells in Kansas**

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Kansas is an area that has been seismically active over millennia. Seismic activity varies over time in an unpredictable manner. 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.

While hydraulic fracturing is an unlikely source of discernible seismic activity, considerable attention is being focused on injection wells. Too often, the mere presence of nearby oil, gas, or injection wells results in allegations that they are the source.

Although scientists agree wastewater injection from day-to-day oil/gas production can under very specific circumstances cause induced seismicity, it is important to understand that the risk is very low.

Effectively addressing induced seismicity from injection wells must take into account the fact that geological conditions are not uniform and similar wells in different areas may or may not have any nearby seismicity. A blanket one-size-fits-all approach is not an appropriate solution since every well is operating in different geologies and conditions.

Kansas oil and gas companies have taken the issue of induced seismicity very seriously. Industry has been actively engaged with state regulators, Kansas Geological Survey, and other government officials since 2014 sharing data and offering resources in efforts to reduce induced seismicity.

The efforts are producing results. The latest data shows an **87%** decline in seismic activity in Kansas from 2015 through 2021 with an average annual decline of **27.7%** from 2015-2021. Felt seismic activity (M>2.7) in Kansas has declined **58.4%** since 2017 with an average annual decline in seismic activity of **29.9%** from 2017-2021.

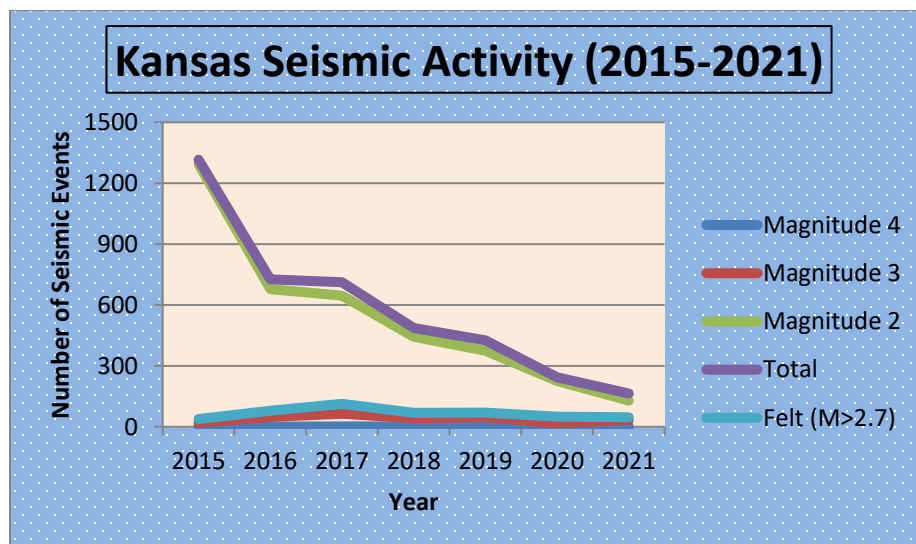
Seismic activity across Kansas in 2019 led some to point to Class II injection wells (wells used to inject fluid associated with oil and natural gas production) as the cause. Some have been led to believe that Class I injection wells (wells used to inject hazardous and non-hazardous industrial and municipal wastewater) were not likely contributors to seismic events because Class I injection rates had declined in recent years. The facts reveal that Class I injection rates declined by only 0.45% over the last year and the Class I wells were injecting an order of magnitude or more fluid into the ground than nearby Class II injection wells.

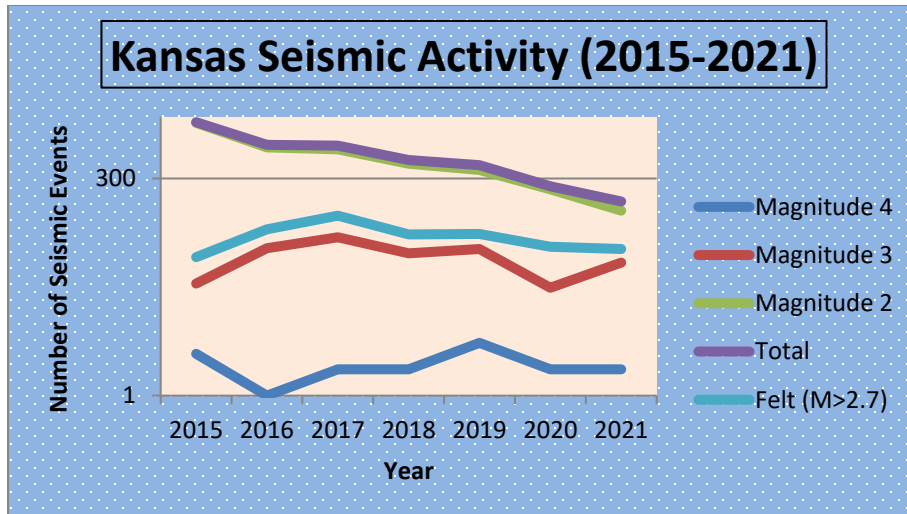
In 2019, Governor Kelly formed an *Arbuckle Study Workgroup* to look into the injection well/seismic event issue. The Kansas Independent Oil & Gas Association (KIOGA) encouraged Governor Kelly to make sure any such study is accurate, scientifically-based, and limited in scope to site specific features of areas in question. KIOGA also encouraged the Governor to make sure the workgroup gathers all data and information before drawing conclusions.

KIOGA has offered industry cooperation to the *Arbuckle Study Workgroup* including offering wells for testing. Unfortunately, the Kansas Geological Survey (KGS) has turned down wells offered for testing from several operators and the KCC. It seems the KGS is cherry-picking wells for testing to support their desired conclusion.

KIOGA offered insights about how drilling a well and injecting fluid into the granite wash (basement rock) in high seismic risk areas increases risk for seismic activity. KCC regulatory response offers a proven record of success. The KCC prohibits drilling/injecting into granite wash and limits injection volumes and pressure into the Arbuckle formation in high seismic risk areas. The KCC model should apply to all Arbuckle injection wells, both Class II and Class I.

Although seismic activity in Kansas and Oklahoma increased in years past, a recent [study](#) from Stanford University predicts a continuing decline in seismic activity in Kansas and Oklahoma. The result of the study is definitely good news.





Several recent studies and reports have found very few injection wells have been linked to induced seismicity, and the risk from these wells is low.

The most recent comprehensive [study](#) based on data from the USGS and peer-reviewed studies, found that less than one percent of injection wells across the nation and in Kansas have been linked to induced seismicity.

The USGS states in its list of [Myths and Misconceptions About Induced Earthquakes \(usgs.gov\)](#) regarding induced seismicity that “Most injection wells are not associated with felt earthquakes.”

A [report](#) conducted by StatesFirst, an initiative of the Ground Water Protection Council and Interstate Oil & Gas Compact Commission, takes a comprehensive look at potential induced seismicity associated with injection wells. The report finds that seismicity linked to oil and gas development is rare; that the risk associated with these rare occurrences are minimal; and that understanding of induced seismicity is growing and mitigation techniques are proving effective.

The bottom line is these studies and more confirm what have long been true - that seismicity induced by injection wells is rare and certainly not a widespread issue. Despite all the alarmist propaganda, misleading claims exaggerating risks and incorrectly linking seismicity to injection wells, and agenda-driven KGS rhetoric, the risk of induced seismicity from injection wells is small, rare, and manageable.