

How to protect Kansans from earthquakes caused by Class II injection wells

By Cindy Hoedel, Jan. 4, 2018

EXECUTIVE SUMMARY:

Over the past decade, injection wells associated with fracking and enhanced oil recovery have caused hundreds of earthquakes per year in Kansas. (Kansas' 4,550+ Class II Salt Water Disposal wells account for 4.1-5.1% of all Class II waste disposal nationally.)

Inducing earthquakes that cause uncompensated economic damages is at odds with traditional Kansas values of conservation, stewardship, accountability and fairness.

As earthquakes continue to rock our south-central counties and spread northward into the Flint Hills and closer to population centers in the northeast, it is clear our regulatory system is failing.

Further, a widespread pattern of non-compliance by oil companies with public notice regulations has shaken public trust in the Kansas Corporation Commission.

Finally, citizens are being hindered from exercising their right to participate in the permitting process. When protest letters from scientists, legislators and landowners are barred from the official record, the public is rightfully concerned that the oil & gas tail is wagging the KCC dog.

The Kansas Legislature must act to prevent earthquakes and restore public confidence in the KCC's commitment to its stated mission: "(to) serve the people of Kansas by regulating the State's energy infrastructure, oil and gas production [...] to ensure public safety."

What is needed?

1. A fund paid by Class II injection well permit applicants and permit holders to compensate citizens and municipalities harmed by manmade earthquakes. (A new scientific technique can distinguish definitively manmade from natural earthquakes.)
2. Reforms to Class II well permitting regulations, including requiring applicants to assess seismic risk and conduct baseline water testing of nearby wells before drilling, and banning injection along known and suspected fault lines.
3. Reforms to regulations for citizen protests of Class II wells, including requiring public notification before, not after, a well is built; expanding the protest period to 90 days, and requiring operators to notify local governing bodies and appear at a public meeting.
4. Increased regulatory transparency and public access to Class II well data. KCC must be required to collect and post online: locations of proposed, operating and abandoned wells; applications; monthly pressure and volume records; complaints; violations, and fines.
5. A citizen advisory board to pay specialized attention to Class II well issues affecting communities and citizens and make recommendations to better inform KCC decisions
6. A moratorium on new Class II well permits until a fund and protective reforms are in place.

INTRODUCTION

Before 2011, most Kansans had never felt an earthquake; on average the state recorded zero to three a year. Since then, that number has increased by hundreds of times. Some of these earthquakes are among the largest in Kansas history:

- 4.9 on 11/12/14 in Conway Springs
- 4.3 on 10/02/14 in Harper
- 4.1 on 06/05/15 in Harper
- 4.0 on 05/23/15 in Pratt

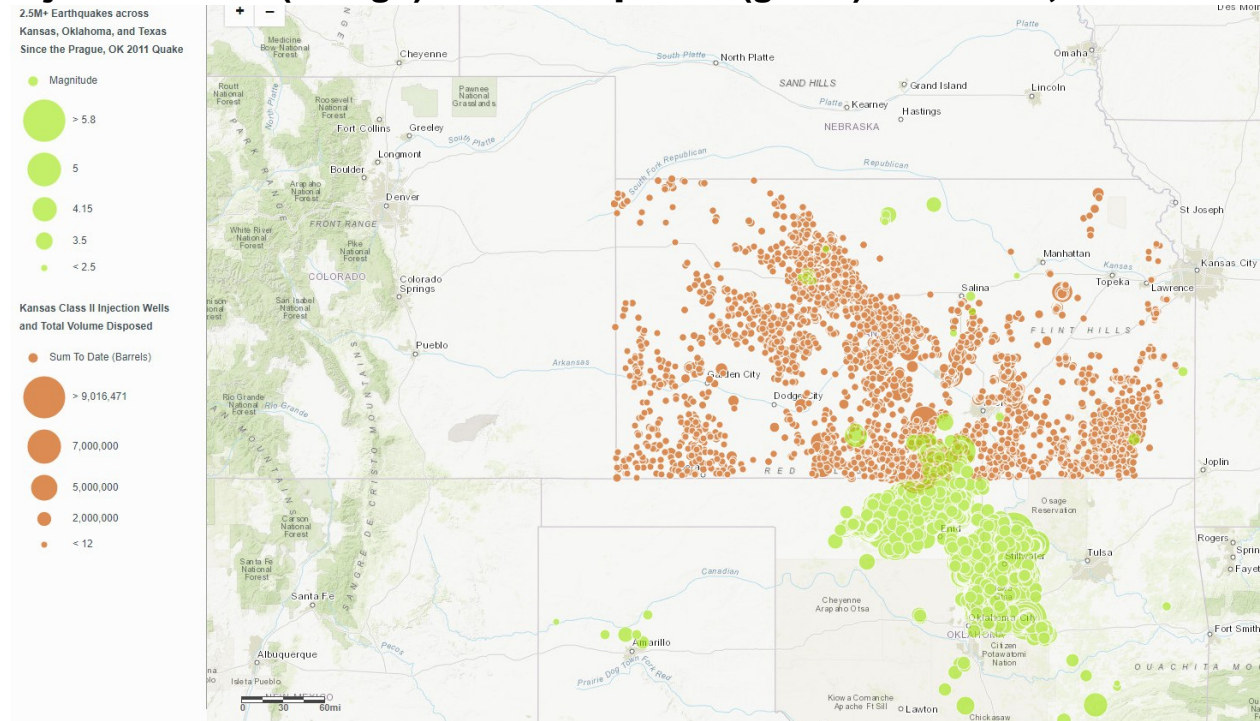
In 2017, Kansas had 122 earthquakes greater than 2.0 magnitude; 29 were greater than 3.0 magnitude.

And, the earthquakes are spreading northward as injection moves northward:

- 2.5 on 10/28/17 near Concordia
- 2.7 on 10/14/17 near Mankato
- 2.5 on 10/11/17 near Hallville
- 2.6 on 08/31/17 near Kackley

These earthquakes are caused by Class II wastewater disposal wells, which inject toxic wastewater under pressure deep underground, according to the United States Geological Survey.¹

Injection wells (orange) and earthquakes (green) in Kansas, 2011-2015



¹ <https://www.usgs.gov/news/new-usgs-maps-identify-potential-ground-shaking-hazards-2017>

Seismologists at Southern Methodist University in Dallas say injection wells in Texas, Oklahoma and Kansas are re-activating ancient faults that had been dormant for 300 million years,² a sobering prospect.

Stanford University scientists have developed a technique that distinguishes manmade from natural earthquakes by wave pattern; they warn that manmade earthquakes --- unlike natural ones --- can be expected to increase in magnitude the longer wastewater is pumped into a well, even if frequency does not increase, and no one can predict the ultimate maximum magnitude.³

PROBLEMS

- Kansas residents and municipalities have suffered uncompensated damages to residential and commercial structures from manmade earthquakes. The city of Wichita has had more than \$100,000 in damages to water mains and public buildings.
- Kansans, who previously did not need earthquake insurance, now must bear the cost of premiums and deductibles --- if they can find coverage. This is an unfair subsidy of the oil companies that are causing the damage.
- Kansas homeowners with damaged properties also suffer from reduced real estate value of their property, often their largest asset.
- No one can predict the possible consequences of re-activating long-dormant faults and knowingly triggering earthquakes (7,535 of magnitude greater than 2.5 in Oklahoma and Kansas from 2011 to Nov. 2016⁴).

WHERE DO WE GO FROM HERE?

- Citizens and municipalities must be guaranteed compensation from damages caused by manmade earthquakes.
- Regulations must be updated to address the new earthquake threat and aggressively promote the proverbial ounce of prevention over the pound of cure. KCC restrictions on wastewater disposal volumes in south-central counties have reduced earthquake frequency --- proving regulation can be effective --- and further action is urgently needed.
- The public must be accommodated in its demonstrated interest in participating in the permitting of Class II injection wells. And, the public's desire for access to information regarding location of wells, permit applications, well construction, monthly volume and pressure amounts, complaints, violations and fines must be accommodated.

² https://www.scientificamerican.com/article/drilling-reawakens-sleeping-faults-in-texas-leads-to-earthquakes/?utm_source=facebook&utm_medium=social&utm_campaign=sa-editorial-social&utm_content&utm_term=sustainability_news_text_free

³ <https://news.stanford.edu/2015/12/16/natural-manmade-quakes-121615/>

⁴ <https://www.fractracker.org/2016/12/oklahoma-kansas-injection-wells/>

- The oil and gas industry has an important role to play in helping solve the problem they created. Responsible drillers complain they are being punished for the actions of a few irresponsible operators. Who will be the oil & gas heroes that will protect responsible drilling by providing leadership in advocating responsible site selection informed by seismic risk assessment and monitoring and calls for tough enforcement of volume and pressure restrictions and a zero-tolerance policy for violators and polluters?

HOW DO WE GET THERE?

Establish a fund

The Kansas Legislature can find many models for a fund for earthquake damages by looking at other environmental funds on the national and state level.

These include the United States Environmental Protection Agency's superfund,⁵ the proposed Hardrock Mining Reform and Reclamation Act⁶, Massachusetts' petroleum cleanup fund,⁷ California's underground storage cleanup fund,⁸ Vermont's petroleum cleanup fund,⁹ and the New Hampshire hazardous waste cleanup fund.¹⁰

Enact regulations designed to prevent manmade earthquakes

A moratorium should be imposed on new Class II injection well permits until a damages fund is established and regulations designed to prevent manmade earthquakes are put into place. The Kansas Legislature can model reforms on measures successfully enacted by other states, as compiled by an EPA report,¹¹ including:

- Increased monitoring and reporting requirements for disposal well operators to provide additional operational data for reservoir analysis (central Arkansas).
 - Requiring an operator to install a seismic monitoring array prior to disposal as an initial permit condition (central Arkansas).
 - Plugging or temporarily shutting-in suspect disposal wells linked to injection-induced seismicity while investigating or interpreting additional data (several states).
 - Defining a moratorium area prohibiting Class II disposal wells in a defined high-risk area of seismic activity (central Arkansas).
 - Decreasing allowable injection rates and total monthly volumes in response to seismic activity (West Virginia).

Of states that have suffered oil & gas-caused earthquakes, Ohio has had the most success stopping them. They have done it by banning drilling near faults, requiring geologic surveys and

⁵ <https://www.epa.gov/superfund/natural-resource-damages-primer>

⁶ <https://www.tu.org/press-releases/tu-supports-bill-establishing-mine-cleanup-fund>

⁷ <http://www.mass.gov/dor/businesses/programs-and-services/underground-storage-tank-program/petroleum-product-cleanup-fund.html>

⁸ https://www.waterboards.ca.gov/water_issues/programs/ustcf/

⁹ <http://dec.vermont.gov/waste-management/contaminated-sites/PCF>

¹⁰ <https://www.des.nh.gov/organization/divisions/waste/swmb/rims/hwcf.htm>

¹¹ http://www.kdheks.gov/uic/download/NTW_Report.pdf

seismic monitoring as part of the permitting process, and shutting down nearby wells when an earthquake occurs¹².

Remove barriers to public participation in the permitting process and increase transparency at KCC

Needed reforms to KCC Class II UIC well regulations include, but are not limited to:

- Requiring public notification before, not after, a proposed well is built.
- Requiring notification of all households and property owners within a 10-mile radius of a proposed well.
- Requiring notification of all city councils and county commissions within a 20-mile radius of a proposed well; the notice shall include the time and date of the operator's appearance at a town hall meeting to answer questions from citizens.
- Allowing electronic submission of protest letters with no wasteful hard copies.
- Accepting a request for a hearing in the initial protest letter.
- Expanding the protest period to 90 days, to give citizens and municipalities a reasonable amount of time to study the risks of a proposed site; the alternative, as we have seen, is citizens and municipalities erring on the side of caution by protesting every well.
- Requiring operators to submit a permit application when they publish notice of the application, so it can be reviewed by potential protestants.
- Requiring KCC to collect and post online data including: location of proposed, operating and abandoned wells, timely reports of earthquakes in Kansas and Oklahoma from USGS, reports of spills and contamination, monthly volume and pressure reports from operators, violations and fines.
- Formation of a citizen advisory board to study how Class II wells affect citizens and communities and issue recommendations to better inform KCC decisions.

CONCLUSION

To protect Kansas and Kansans from oil & gas industry-caused earthquakes and hazards and damages they are causing, the Kansas Legislature must take immediate steps as outlined above to protect human health, safety and the environment, and impose a moratorium on new Class II injection wells until such protective and relief measures are in place.

Fairness requires a fundamental regulatory shift that places accountability for damages on the drillers that cause them, rather than on victims.

Stewardship and conservation demand a shift in regulatory purpose, with requirements aimed at preventing, rather than allowing and then attempting to manage, manmade earthquakes.

And finally, good governance requires ensuring that the taxpayer-funded Kansas Corporation Commission fulfills its stated mission of protecting citizens rather than protecting the narrow interests of the oil industry.

¹² http://www.gwpc.org/sites/default/files/event-sessions/Tomastik_Tom_1.pdf