



Oklahoma
Corporation
Commission

News Release



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MANAGING RISK OGS, OCC, Industry collaboration bears fruit

While more research is needed, efforts to manage the potential risk of induced earthquakes not associated with wastewater injection wells are showing some positive results, say officials with the Oklahoma Geological Survey (OGS) and the Oklahoma Corporation Commission (OCC).

“While still evolving, the “traffic light” protocol system developed by the OCC and OGS and put in place by directive in December has thus far yielded some good results,” said OCC Oil and Gas Division Director Tim Baker. “The actions taken under the directive have been in response to events that have occurred away from the Arbuckle injection wells that have been linked to most of the earthquake activity in the state. Researchers have linked some of this smaller and relatively rare activity outside the main earthquake area to well completion operations, including hydraulic fracturing.”

OGS Director Dr. Jeremy Boak and OGS State Seismologist Dr. Jacob Walter say preliminary evidence suggests the type of seismicity associated with well completion is stratigraphically shallower than the earthquakes linked to deep injection, and does not appear to reactivate basement faults, unlike the more numerous and often far larger quakes linked to injection.

“Based on the present data, wastewater disposal into the Arbuckle Group, not hydraulic fracturing operations, poses the highest risk when it comes to induced earthquake activity,” said Boak.

Under December’s directive outlining operator procedures in the event of well completion-linked seismicity, the OCC has contacted operators on 27 events of 2.5 magnitude or greater, as reported by OGS, that have occurred within approximately 2 kilometers of a well completion operation and mitigation actions were taken.

“In the cases where companies have taken mitigation actions, the earthquake activity either stopped quickly or tapered off and stopped soon after,” Boak said.

Officials say there have been instances where the operator had already seen the event on a tool called a seismic array, which some operators are using to alert them to seismicity. In these cases, the operator had already taken mitigating actions. OCC’s Baker says while officials are glad to see some companies using such tools to manage seismicity risk, they have their limits.

“Not all operators have these proprietary arrays, and any response by the OCC is and must be based on the proven expertise, monitoring and data provided by the Oklahoma Geological Survey,” said Baker. “This data is not only critical for the public today, but also as part of the overall research effort.”

Walter agrees.

“The work to ensure the safe, responsible, and economically viable development of Oklahoma’s oil and gas resources is an ongoing process. When it comes to all forms of induced seismicity we know far more now than we did only a few years ago, but there’s much work that remains. OGS will continue to monitor and track seismic activity and lead research projects to better understand induced seismicity. Areas we are focusing on include the possible link between initial small-scale seismic activity and subsequent larger events, and the physical properties of the Arbuckle Group and basement rocks that may play a role in seismicity,” said Walter.

- OGS/OCC -

Note: Well completion seismicity protocol attached

SUMMARY OF WELL COMPLETION SEISMICITY PROTOCOL

**Terms: Oil and Gas Conservation Division (OGCD)
Oklahoma Geological Survey (OGS)**

Action following anomalous seismic activity within 1.25 miles of hydraulic fracturing operations:

- **If magnitude, as determined by the OGS, is greater than or equal to 2.5M:**
 - **OGCD contacts designated representative for the operator with active completion operations within a 2 km radius of located seismic events.**
 - **Implementation of the operator's internal mitigation practices commences.**
 - **Operation continues.**

- **If magnitude is greater than or equal to 3.0M:**
 - **Operator initiates a pause of operations for no less than 6 hours.**
 - **Technical conference/call held between the OGCD staff and operator about operator mitigation practices.**
 - **Upon agreement between operator and OGCD regarding mitigation practices and reduced seismic activity, operator permitted to resume with revised completion procedure.**

- **If magnitude is greater than or equal to 3.5M:**
 - **Operator suspends operations**
 - **In-person technical conference held with OGCD staff and operator to examine whether operation can resume with changes.**