Geomechanics; Study Data from University of Texas Austin Update Knowledge of Geomechanics (Poroelastic Models for Fault Reactivation In Response To Concurrent Injection and Production In Stacked Reservoirs)

513 words
11 December 2020
Science Letter
SCLT
3135
English

2020 DEC 18 (NewsRx) -- By a News Reporter-Staff News Editor at Science Letter -- Investigators publish new report on Geomechanics. According to news originating from Austin, Texas, by NewsRx correspondents, research stated, "Concurrent production and injection in stacked reservoirs as commonly conducted in unconventional resource exploitation potentially influences reactivation of nearby faults. Using three-dimensional, fully-coupled poroelastic finite-element simulations, we assessed the potential for reactivation of a barrier normal fault in a normal-faulting stress regime for twelve generic injection-production scenarios that differ in the depth of injection and production, and in the position and distance relative to the dipping fault plane."

Funders for this research include TexNet, Center for Integrated Seismicity Research at the **Bureau of Economic Geology**, The University of Texas at Austin.

Our news journalists obtained a quote from the research from the University of Texas Austin, "The simulations display significant variation in the Coulomb failure stress (CFS) with depth along the fault plane for these scenarios, reflecting differences in pore pressure distribution and associated poroelastic changes in normal and shear stress across the fault. Based on the CFS trends with depth we find that 1.) concurrent production and injection reduces or increases the fault reactivation potential in the injection reservoir depending on the lateral position and the distance of the wellbores relative to the fault plane; 2.) the fault is most prone to reactivation with stacked wellbores and injection into the upper reservoir within the hanging wall or the lower reservoir within the footwall, and 3.) the fault is least prone to injection-induced reactivation for stacked wellbores and injection into the lower reservoir within the hanging wall at wellbore-to-fault distances ten times the reservoir thickness. With decreasing wellbore-to-fault distance, induced poroelastic shear stresses and thus CFS increase, making injection only into the lower reservoir, without concurrent production, the most stable configuration at close distance. These simulations demonstrate the importance of the coupled poroelastic effects and of the three-dimensional arrangement of injection and production wellbores on fault reactivation."

According to the news editors, the research concluded: "Our results are intended to provide general guidance for further detailed site-specific geomechanical evaluations needed for induced seismic hazard assessment."

This research has been peer-reviewed.

For more information on this research see: Poroelastic Models for Fault Reactivation In Response To Concurrent Injection and Production In Stacked Reservoirs. Geomechanics for Energy and the Environment, 2020;24. Geomechanics for Energy and the Environment can be contacted at: Elsevier, Radarweg 29, 1043 Nx Amsterdam, Netherlands.

The news correspondents report that additional information may be obtained from Mahdi Haddad, University of Texas Austin, Bur Econ Geol, Jackson School of Geosciences, Pob 10, Austin, TX 78713, United States.

Keywords for this news article include: Austin, Texas, United States, North and Central America, Geomechanics, University of Texas Austin.

Document SCLT000020201211egcb002cn

