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Energy - Oil and Gas Research; New Oil and Gas Research Study Findings Have Been Reported by Investigators at Peter Kiewit Institute (Study on the ratio of pore-pressure/stress changes during fluid injection and its implications for CO2 geologic storage)

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2017 MAR 17 (VerticalNews) -- By a News Reporter-Staff News Editor at Energy Weekly News -- A new study on Energy - Oil and Gas Research is now available. According to news originating from Omaha, Nebraska, by VerticalNews correspondents, research stated, "The success of fluid injection into geological formations, which is the main operation during both carbon dioxide (CO2) geologic storage and wastewater injection, is contingent on the geomechanical integrity of the site. A key task that allows us to evaluate the risk of geomechanical failure is the precise prediction of pore-pressure buildup and subsequent change in the state of stresses during and after the fluid injection."

Funders for this research include Bureau of Economic Geology, U.S. Department of Energy.

Our news journalists obtained a quote from the research from Peter Kiewit Institute, "Contrary to traditional approaches, where total stresses are assumed to remain constant, recent studies have ascertained that total stresses in fact change in every direction as fluid extraction/injection disturbs the pore-pressure field and causes deformations. In this study, we conduct an in-depth investigation of the ratio of change in total stress to that in pore-pressure, Delta sigma/Delta P, which has been denoted in the literature as the pore-pressure/stress coupling. We employ a numerical simulation method that couples single-phase fluid flow in porous media with poroelasticity to explore the spatiotemporal evolution of the Delta sigma/Delta P ratio for various conditions. These numerical experiments allow us to examine how different material properties and structural geometries would influence the evolution of Delta sigma/Delta P in both vertical and horizontal directions. These ratios of pore-pressure/stress changes exhibit different spatiotemporal evolutions depending on key factors that include the hydraulic boundary condition, Biot's coefficient, Poisson's ratio, and the hydraulic diffusivity of both the injection zone and caprock."

According to the news editors, the research concluded: "On the basis of observations, we suggest firsthand guidelines for analytically determining the ratio of pore-pressure/stress changes, Delta sigma/Delta P. Finally, we use examples and case studies to illustrate how the Delta sigma/Delta P ratio can be incorporated into an analytic calculation for determining a maximum sustainable pressure limit."

For more information on this research see: Study on the ratio of pore-pressure/stress changes during fluid injection and its implications for CO2 geologic storage. Journal of Petroleum Science and Engineering, 2017;149():138-150. Journal of Petroleum Science and Engineering can be contacted at: Elsevier Science Bv, PO Box 211, 1000 Ae Amsterdam, Netherlands. (Elsevier - www.elsevier.com; Journal of Petroleum Science and Engineering - www.journals.elsevier.com/journal-of-petroleum-science-and-engineering/)

The news correspondents report that additional information may be obtained from S. Kim, Univ Nebraska Lincoln, Dept. of Civil Engn, Peter Kiewit Inst, Omaha, NE 68182, United States.

Keywords for this news article include: Omaha, Nebraska, United States, North and Central America, Oil and Gas Research, Energy, Peter Kiewit Institute.

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