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Information Technology - Data Analytics; Findings on Data Analytics Reported by Investigators at University of Texas Austin (Unveiling Well Performance Through Integrated Numerical Modeling and Basin-scale Data Analysis In the Midland Basin)
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2024 DEC 24 (VerticalNews) -- By a News Reporter-Staff News Editor at Information Technology Newsweekly -- New research on Information Technology - Data Analytics is the subject of a report. According to news reporting originating from Austin, Texas, by VerticalNews correspondents, research stated, "This study explores the performance of high-density drilling spacing units (DSUs) in the Permian Basin, focusing on key drivers of well performance in shale oil reservoirs. A comprehensive simulation was conducted at the Hydraulic Fracture Test Site (HFTS-1) to develop an integrated workflow for understanding cross-bench well interference and the impact of completion parameters on production."

Funders for this research include University of Texas at Austin's **Bureau of Economic Geology**, Agency for Science Technology & Research (A*STAR).

Our news editors obtained a quote from the research from the University of Texas Austin, "A 3D heterogeneous corner-point model simulated hydraulic fracture propagation in two horizontal wells: one in Wolfcamp A and another in Wolfcamp B, accounting for interactions between hydraulic and natural fractures. The simulation revealed distinct fracture propagation patterns: in the Wolfcamp A well, fractures near the toe showed greater height but shorter half-lengths, while those near the heel exhibited shorter height but longer half-lengths. In contrast, Wolfcamp B displayed the opposite pattern, with fracture height growth more pronounced above the wellbore. The fracture system was then subjected to a production simulation (POP) based on actual well production sequences. Comparing the POP results of the combined well scenario with individual well scenarios showed a slight reduction in estimated oil production, suggesting well interference. Reservoir pressure analyses indicated that the pressure fields of the two stacked wells began to overlap early in their production, contributing to the interference. To further explore productivity drivers, the study utilized machine learning methods, including XGBoost and SHapley Additive exPlanations (SHAP) 1. This analysis identified critical factors such as fracturing fluid intensity, completion year (reflecting advancements in completion practices like cluster spacing), formation thickness, and initial gas-oil ratio. Sensitivity analyses showed that reducing cluster spacing significantly improves initial production, while increasing fluid intensity enhances long-term performance."

According to the news editors, the research concluded: "The crossover point, where the impact of increased fluid intensity surpasses reduced cluster spacing, varied between Wolfcamp A and B. This work offers valuable guidance for optimizing completion strategies to maximize production potential in the Midland Basin's shale oil formations."

This research has been peer-reviewed.

For more information on this research see: Unveiling Well Performance Through Integrated Numerical Modeling and Basin-scale Data Analysis In the Midland Basin. Energy & Fuels, 2024. Energy & Fuels can be contacted at: Amer Chemical Soc, 1155 16TH St, NW, Washington, DC 20036, USA. (American Chemical Society - www.acs.org; Energy & Fuels - www.pubs.acs.org/journal/enfuem)

The news editors report that additional information may be obtained by contacting Yiwen Gong, University of Texas Austin, Jackson School of Geosciences, Bur Econ Geol, Austin, TX 78758, United States. Additional authors for this research include Timothy P. Mcmahon and Sofia Berdysheva.

Keywords for this news article include: Austin, Texas, United States, North and Central America, Data Analytics, Information Technology, Mathematics, Numerical Modeling, University of Texas Austin.