Energy - Oil and Gas Research; Investigators from University of Texas Austin Have Reported New Data on Oil and Gas Research (Methane Resaturation In Barnett Formation Core Plugs and New Approach for Determination of Post-coring Gas Loss)

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2020 AUG 4 (VerticalNews) -- By a News Reporter-Staff News Editor at Journal of Mathematics -- Investigators discuss new findings in Energy - Oil and Gas Research. According to news reporting originating from Austin, Texas, by VerticalNews correspondents, research stated, "Understanding the physiochemical mechanisms that control the loss of gas during coring processes is critical to accurately determining gas-in-place (GIP) resource assessments of unconventional shale-gas plays. Our study uses an experimental approach, utilizing methane (CH4) adsorption isotherms and degassing curves of methane-resaturated Barnett Formation core plugs, to determine the amount of lost-gas based on mass-balance analysis at different CH4 re-saturation pressures and varied exposure times."

Funders for this research include Mudrocks Systems Research Laboratory consortia at the **Bureau of Economic Geology**, Jackson School of Geosciences, University of Texas at Austin, National Natural Science Foundation of China (State Key Program), Anadarko, Apache, Aramco Services, BHP Billiton, BP, Cenovus, Centrica, Chesapeake, Cima, Cimarex, Chevron, Concho, ConocoPhilips, Cypress, Devon, Encana, ENI, EOG, EXCO, ExxonMobil, FEI, Geosun, Hess, Husky, IMP, Kerogen, Marathon, Murphy, Newfield, Oxy, Penn West, Penn Virginia, Pioneer, QEP, Repsol, Samson, Shell, Sinopec, StatOil, Talisman, Texas American Resources, Unconventionals, University Lands, US EnerCorp, Valence, YPF.

Our news editors obtained a quote from the research from the University of Texas Austin, "Several readily available empirical methods for estimating lost-gas were evaluated, quantified, and compared with the mass balance-derived lost-gas values in our experiments. A CH4 isotherm measurement on 3/8-inch Barnett Formation core plugs was performed at 35.4 degrees C; the amount of gas adsorbed in excess was then quantified and fitted to the modified Langmuir equation to determine the Langmuir maximum, Langmuir constant, and adsorbed gas-phase density. Two sets of CH4 gas-resaturation and degassing measurements, one varying saturation pressures and the other varying exposure times, were performed on 3/8-inch Barnett Formation core-plugs at an isothermal temperature of 35.4 degrees C. Degassing curves, the plot of the released gas yield versus the square root of degassing time, display three stages that correspond to different gas-releasing mechanisms. The rapid increase of released gas yield at the beginning of degassing represents that nonlinear gas expansion is dominant and that degassing evolves into a linear desorption-dominated phase over time. Experimentally derived values for lost gas were determined by subtracting the sum of the desorbed and retained gas at the peak of the degassing curve from the amount of gas initially charged into the samples at equilibrated resaturation pressure. Lost gas varies linearly with increasing gas-resaturation pressure and nonlinearly by a greater magnitude with increasing exposure time, indicating that lost gas is more sensitive to exposure time. The uncertainty evaluation of lost gas determined by three empirical methods was conducted by direct comparison with mass-balance-derived lost-gas values from our experiment. Nonlinear least-squares extrapolation overestimates, and both linear extrapolation and polynomial equation fitting underestimate, mass-balance lost-gas control points. Among the three empirical methods, the polynomial-fitted lost-gas values most closely agree with mass-balance lost gas, revealing that polynomial fitting to degassing curves is a viable way to accurately estimate lost gas and, more importantly, to estimate GIP values with up to 85% accuracy."

According to the news editors, the research concluded: "As free gas is the dominant storage mechanism in the Barnett Formation, the trends of experimentally measured cumulative desorbed gas content versus the square root of elapsed time match neither the calculated curves derived from USBM Direct Method nor Amoco Method."

For more information on this research see: Methane Resaturation In Barnett Formation Core Plugs and New Approach for Determination of Post-coring Gas Loss. Marine and Petroleum Geology, 2020;118():. Marine and Petroleum Geology can be contacted at: Elsevier Sci Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England. (Elsevier - www.elsevier.com; Marine and Petroleum Geology - www.journals.elsevier.com/marine-and-petroleum-geology/)

The news editors report that additional information may be obtained by contacting Tongwei Zhang, University of Texas Austin, Bur Econ Geol, Austin, TX 78712, United States. Additional authors for this research include Daniel A. Enriquez, Xun Sun, Di Meng and Yu Zhang.

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