Quick-Look Deterministic Approach for Evaluating Shale Distribution in Sandstone Reservoirs

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Shale distribution in sandstone reservoir can be broadly described in terms of three components: shale laminations interlayered within the overall sandstone interval, dispersed shale within the overall sandstone pore network, and structural shale comprised of sand-sized particles of shale composition. Quantification of shale distribution types can be readily constrained by quick-look deterministic graphical and mathematical analyses using total porosity versus shale volume, effective porosity versus shale volume, and density porosity versus neutron porosity. Use of conventional triple combination log data can determine the range of distribution quantities (from most pessimistic to most optimistic in terms of reservoir quality), but additional data such as nuclear magnetic resonance, core, and triaxial resistivity log data can constrain these ranges to specific quantities. Determination of the laminar shale fraction determines the sandstone fraction; the dispersed shale fraction reduces the effective porosity of the sandstone fraction; and the structural shale fraction further reduces the useful porosity of the sandstone fraction.

Biography

James J. Willis received his B.S. and M.S. degrees in Geology from the now University of Louisiana-Lafayette in 1989 and 1990, respectively, and his Ph.D. as a National Science Foundation fellow at Baylor University, Waco, Texas, in 1993, graduating with an overall university gpa of 4.0. From 1994-1996, he studied planetary tectonics as a NASA-funded postdoctoral fellow at Southern Methodist University. In 1996, he returned to UL-Lafayette, where he was awarded in 1997 the Hensarling-Chapman Endowed Professorship in Geology. He began independent consulting activities in 1991, and in 2001 he left academia for full-time consulting for clients ranging from one-man shops to supermajors. James has been an active researcher, receiving several million dollars in grants from federal, state, and industry sources, has presented numerous talks, and has published on a diversity of geoscience topics, including two best paper awards with GCAGS. He has been the GCAGS Publisher since 2006 and Managing Editor since 2011. In 2018, he founded the Willis School of

Applied Geoscience, reformulating decades of industry training and networking to provide fast-track industry-ready training for graduate students at zero cost—he graduates his first student this Spring.