November 2019 - CSUR Members' Technical Luncheon

Thursday, November 21, 2019

PRESENTATION: Understanding and Quantifying Vertically Heterolithic Permian Basin Source Rock Reservoirs for Improved Completion Efficiency

Effective hydraulic fracture stimulation of source rock (mudrock) reservoirs relies to a large degree on maximizing fracture height growth in the most oil prone sections. Engineering models of these reservoirs commonly view them as isotropic, with uniform rock properties. While this may be partially true of some mudrocks, in the Permian Basin, vertically heterolithic Cline, Wolfcamp, and Bone Spring/Spraberry stacked reservoirs pose tremendous challenges to formation evaluation using conventional downhole logging tools. High-resolution core analysis can serve as a tool to help quantify vertical lithological variability and acts as a bridge between the geological and the engineering realms, in essence quantifying geological variability. Topics to be covered include: a) examples of vertically complex Pennsylvanian, Wolfcampian, and Leonardian producing intervals, b) distinguishing reservoir from non-reservoir facies, c) the underlying causes of lithologic complexity, and d) the use of high-resolution geomechanical profiling to derive a 'Heterogeneity Index'. An early application of this approach to a Penn Shale completion design will be shown.

PRESENTER: Dr. Martin Quest, Manager of Geoscience Operations

Dr. Martin Quest graduated with a 1st Class BSc. degree in Geology/Geography from the University of Manchester and a PhD degree in Geology from the University of Birmingham. His doctoral research focused on the petrography and geochemistry of Late Jurassic-Early Cretaceous mixed carbonate-siliciclastic deposits in Southern England. After a brief period working in the Norwegian Arctic for Cambridge University, Dr. Quest joined Core Laboratories in London as a carbonate sedimentologist. He has spent over 30 years with Core Lab in London, the Middle East, Canada, and the United States and is currently Manager, Geoscience Operations for Core Lab's Integrated Reservoir Solutions Division in Houston. For the last six years, Dr. Quest has been working as Project Director for Core Lab's Permian Basin Regional Studies, which currently comprise > 45,000 feet of analyzed conventional cores, in-depth petrophysical modeling of key producing intervals, and a thorough review of completion practices and production histories.