Modern Mud-logging Techniques Provide Opportunities for Better Sweet-Spot Delineation; an Example from the Lower Green River and Wasatch Formations of the Uinta Basin, Utah

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Abstract

While mudlogs of the past contain valuable pieces of information to help geologists understand reservoir potential, the data are not readily mappable or quantifiable. Modern mudlogging rectifies this through a combination of detailed cuttings descriptions, high-resolution photos, mudlog digitization, wellsite XRF, and advanced mass-spectrometry gas detection. The data obtained from these methods provide geologists with the opportunity to quantify and interpret variability in lithologies, facies, reservoir fluids, wireline log characteristics, and production trends in horizontal wells, thus generating a more robust geologic understanding across unconventional plays. Production in the Uinta Basin has more than doubled in the past 2 years, eclipsing 140,000 bbls/day in 2023. While the Uteland Butte Member of the Lower Green River Formation is considered the primary target of the Uinta Basin, detailed geologic work on legacy wireline logs and mudlogs has allowed operators to recognize additional resource potential in both deeper and shallower formations. Laterals targeting zones other than the Uteland Butte now comprise ~45% of all horizontals in the basin, and modern mudlogging techniques have given operators the necessary tools evaluate and exploit these zones. Case studies from the Douglas Creek Member of the Lower Green River Formation and the Middle Wasatch member of the Wasatch/Colton Formation are presented in detail to illustrate the effectiveness of the wellsite data collected by XCL.