A RESERVOIR MODEL FOR EXPLORATION IN AN ESTUARINE EMBAYMENT: THE CURTIS FORMATION OF THE WESTERN SAN RAFAEL SWELL, EMERY COUNTY, UTAH, USA

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Erosional and depositional features generated by tidal, wave, and storm currents are preserved in the Middle Jurassic Curtis Formation within east-central Utah. Independent studies have consistently shown a progradational, upward-shallowing succession of facies marked by nearshore marine sedimentation, particularly by tidal processes. A localized three-dimensional study of facies in the Middle Jurassic Curtis Formation exposed along the western San Rafael Swell is the focus of the project. The goal is to create a predictive reservoir model for hydrocarbon exploration in siliciclastic sedimentary rock deposited in an estuarine embayment with similar sedimentary texture and architecture as that of the Curtis. Five to seven complete stratigraphic sections are to be measured and described by traditional hand-levelling; paying particular attention to texture, geometry, structure, thickness, extent, and correlation of facies. Such bedding associations or facies will then determine compartments for an effective reservoir in terms of the migration and storage of hydrocarbons (oil and gas) as controlled by sedimentary texture and bounding surfaces of bedding units and packages of facies. Processing of background gamma radiation counts sensed by a portable scintillometer will create synthetic gamma ray profiles. The profiles will correlate to sedimentary facies and therefore to reservoir compartments. Core-plugs recovered with a portable rock drill will be tested for permeability via lab(s). Thin section data will yield information on mineral composition, diagenetic signatures, and sediment texture. Results of permeability tests and petrologic data will help define potential fluid flow units, flow pathways, permeability barriers, and reservoir size of the Curtis Formation.