Exploration Of Resource Plays In The Rocky Mountain Basins And The Economic Consequences

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ABSTRACT

The Upper Cretaceous exploration resource plays in the Powder River Basin of Wyoming and the Denver-Julesburg Basin of Colorado, Nebraska, and Wyoming have numerous stacked plays. The Powder River Basin exploration resource plays include the Teapot Ss, Teckla Ss, Parkman Ss, Sussex Ss, Shannon Ss, Niobrara chalks and marls, Frontier-Turner Ss, and Mowry siliceous siltstones and sandstones. The Denver-Julesburg Basin exploration resource plays include the Niobrara chalks and marls, Fort Hayes Ls, Codell Ss, and Greenhorn Ls-Ss. The exploration techniques utilized in the evaluation and reservoir characterization of each of these prospective producing horizons may include: 1) well log, core, DST, petrophysics, and sequence stratigraphic evaluations and interpretations; 2) borehole temperature modeling and GOR modeling; 3) source rock and rock mechanics evaluations which may include cores, drill cuttings, geochemistry, microscopy, conductivity, and proppant analysis; and 4) seismic interpretations and sequence stratigraphic and structural 3D reservoir modeling. These four techniques are then incorporated into an integrated reservoir characterization model and applied into the drilling, completion, and reservoir engineering. These techniques do not need to be costly, if already available geologic data is utilized and paired with a precisely modeled study. These stacked exploration resource plays have the potential to significantly improve the economics of the plays. The TEAM approach will result in identifying and high grading sweet spots, infill locations, and PUD's for greater producibility. The rates of return (ROR), return on investment (ROI), and net present value (NPV) for the exploration resource play improves.