

## **Estimation of Reservoir Properties from Well Log and Rock Physics to Reduce Uncertainty in Formation Evaluation in Ratana Gas Field, Northern Potwar**

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### **Abstract**

Formation evaluation and rock physics is a powerful technique to link the physical properties of rocks and pore fluids with petrophysical, elastic, and seismic properties. However, several sources of uncertainty in the measurements of these properties can affect the strength of this link. Wireline logs and seismic data is used to estimate elastic properties of limestone reservoir of Chorgali Formation in Ratana Gas field, north Potwar, Pakistan. The linear regression relationships are developed between various petrophysical parameters extracted from wireline logs of Ratana-03 well and derived from rock physics. All these parameters are then used as input in fluid substitution model to predict seismic properties such as bulk and shear moduli, compressional and shear velocities. The rock physics parameters such as velocities, densities and elastic moduli derived from well data are in close agreement to those predicted from fluid substitution model. The permeability of reservoir intervals show fairly strong linear relationship with the porosity, indicating that the reservoir interval of Chorgali Formation is permeable and porous thus having large potential of hydrocarbon accumulation and production.