

## **Bulk Gas Volume Estimation Using Multi-Attribute Regression and Probabilistic Neural Network (PNN): A Case Study in a Gas Field from East Coast of India**

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Effective porosity and hydrocarbon saturation prediction away from the well is essential to characterize reservoir effectively. Precise prediction of those parameters is a challenging task because of the non-uniqueness in its relationship with conventional seismic attributes. Again quantitative prediction of hydrocarbon saturation from seismic is ambiguous because of their independent nonlinear relationship particularly with amplitude, impedance etc. However, a property which is product of effective porosity multiplied by hydrocarbon saturation, named as 'Gas Volume' or 'Bulk Gas Volume', has a major effect on seismic amplitude than individual effect. In a complex geological setup with greater degree of heterogeneity in reservoir properties further intensifies the challenge of characterizing the reservoir based on individual seismic attribute. In the present case, major channel-levee complexes associated with smaller episodes of channel-cut-fill and migration has made the study area a geologically complex one. In the present study, a special approach has been adopted which combines multi-attribute linear regression with Probabilistic Neural Network (PNN) technology to predict Gas Volume. The predicted property has been found to contain finer detail amenable not only for better delineation of hydrocarbon saturated reservoir in 3D space but also its usage as an input for further quantitative reservoir characterization.