

ABSTRACT

The Offshore Field is one of the hydrocarbon-producing areas in the Northeast Java Basin and is part of the working area of PT Pertamina EP Cepu Zone 11. The reservoir in this field is composed of carbonate reef formations within the Kujung Formation. The data used in this study consist of 3D PSTM stack seismic data and three well data. The purpose of this research is to identify and classify the quality of carbonate reef reservoirs using model-based acoustic impedance (AI) seismic inversion and root mean square acoustic impedance (RMS AI) analysis. The research workflow includes well log analysis, well seismic tie, low frequency model (LFM) construction, and seismic inversion to generate an AI volume, which was then utilized for AI map and RMS AI map analysis. The results indicate that AI values show a negative correlation with porosity, where lower AI values are interpreted to be associated with rocks with relatively higher porosity based on crossplot analysis. In addition, lower RMS AI values indicate better reservoir development. Based on the integration of the AI map and RMS AI map, the quality of the Kujung carbonate reef reservoir is classified into three reservoir quality zones. The very good zone is identified around Well V2, characterized by AI values of approximately 16,000–21,000 g.ft/(cm³.s) and RMS AI values of approximately 15,000–20,000 g.ft/(cm³.s). The good zone is identified around Well V1, characterized by AI values of approximately 21,000–26,000 g.ft/(cm³.s) and RMS AI values of approximately 20,000–25,000 g.ft/(cm³.s). Meanwhile, the fair zone is identified around Well S7, characterized by AI values of approximately 26,000–29,000 g.ft/(cm³.s) and RMS AI values of approximately 25,000–28,000 g.ft/(cm³.s). Based on these results, model-based AI seismic inversion and RMS AI analysis can be effectively used to identify the distribution and quality of carbonate reef reservoirs in the Kujung Formation.

Keywords: *Acoustic Impedance (AI), Seismic Inversion, RMS AI, Carbonate Reef, Kujung Formation, Northeast Java Basin.*