WELL LOG INTERPRETATION AND 3D RESERVOIR PROPERTY MODELING OF THE MAUI-B FIELD, TARANAKI BASIN, NEW ZEALAND

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Maui-B is one of the largest hydrocarbon-producing fields in the Taranaki Basin. Many previous works have estimated reservoir volume. This study uses 3D property modeling, which is one of the most powerful tools to characterize lithology and reservoir fluids distribution through the field. This modeling will help in understanding the reservoir properties and enhancing the production by selecting the best location for future drilling candidates. In this study, 3D seismic, core, and well log data were used to build and define a structural model, facies analysis, and petrophysical parameters. After well log interpretation and petrophysical parameter calculations, each parameter was upscaled. Then, geostatistical methods, including Gaussian simulation, variogram, and Monte Carlo simulation, were used to build a 3D property model. A thousand 3D models were constructed and performed for each parameter; the outputs were implemented into Monte Carlo simulation, which is a highly reliable method regarding accuracy to calculate the mean of each parameter. Volume of the reservoir was estimated. In this study, integration of seismic interpretation and well logs defined the depth and thickness of the hydrocarbon reservoir through the field. Gamma ray, spontaneous potential, and caliper logs were used for depth correlation and identifying permeable zones. As a result, five different lithofacies, where sandstone and claystone distribution have the significant impact on reservoir quality were identified. The matrix identification (MID) method was used for porosity correction, which showed effective porosity ranges of 15% to 25%. Moreover, permeability was estimated as 79 to 3700 mD, where all results were calibrated using available core data. Furthermore, 9% to 40% water saturation was estimated using the resistivity logs and core data. Finally, oil and gas in place were estimated.