RESERVOIR EVALUATION OF SUI MAIN LIMESTONE USING SEISMIC AND WELL DATA OF QADIRPUR AREA, CENTRAL INDUS BASIN, PAKISTAN

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A thesis submitted to Bahria University, Islamabad in partial fulfillment of the requirement for the degree of MS in Geophysics

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CERTIFICATE OF ORIGINALITY

This is to certify that the intellectual contents of the thesis

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ABSTRACT

The study area is located in Qadirpur block, Central Indus Basin situated in Sindh province of Pakistan. It is bounded by Sargodha high in the North, Sukkur rift in the South Indian shield on the Eastern side and in marginal zone of Indian plate is on the West. Qadirpur area has strong exploration history in the gas exploration and production and named as second largest gas field in Pakistan. 2D seismic data interpretations along with petrophysical analysis, facies modeling and reserves estimation have been done in Qadirpur area to characterize the reservoir properties and the structure styles existing in the area. Further studies and interpretations are still being made in the area to enhance the hydrocarbon production. Due to the geological setting of Qadirpur area, normal faulting is observed in the area with horst and graben structures. Interpretation was done on five seismic lines data and well logs data of two wells. Three horizons have been marked which are Habib Rahi Limestone, Sui Upper Limestone and Sui Main Limestone. In this area, the source rock is Sembar shale. Sui Main Limestone is primary reservoir while Habib Rahi Limestone is acting as secondary reservoir. Ghazij shale is acting as regional seal in the area. Out of five zones marked in the petrophysical analysis, two zones have proved to be more promising. Zone 1 of Qadirpur-14 well having average porosity values of 18-19%, the 10m thick zone have 60-70% saturation of hydrocarbon. Sui Main Limestone is proven to be reservoir in this well. In Qadirpur-03 well, 13m thick zone have porosity values ranging from 15-18%. Saturation of hydrocarbon was 60-72%. Habib Rahi Limestone is proven to be reservoir in this well. Facies modeling which was done to identify and characterize the lithology in both wells. For this purpose, combination of GR, LLD and RHOB log was plotted, resulting in the formation of polygons and by using the logs behavior and color scheme formations were marked and identified. Volumetric reserves estimation technique was applied in order to find the mean recoverable reserves of the area and it turns out to be 0.23 billion cubic feet.

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