This research presents a geological model of a giant Middle Eastern oil reservoir, based on field data from 161 wells. Its primary aim is to determine the reservoir's value and assess modeling feasibility before an investment decision regarding field development. The model, built on PETREL using well logs, seismic maps, facies data, and core tests, seeks to estimate the initial oil volume. Three scenarios were applied, accounting for sensitivity and uncertainty in five variables, to accurately estimate this volume. The oil–water contact (OWC) level is identified as the main uncertain factor due to insufficient data, with only 13% of wells penetrating the Mishrif Formation's water zone. All scenarios indicate enormous oil quantities, confirming the field's importance and the study's value for its development.

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