FACIES MODELING AND RESERVOIR EVALUATION OF MESOZOIC SEQUENCE, SAWAN GAS FIELD, CENTRAL INDUS BASIN, PAKISTAN

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ABSTRACT

Sawan Gas Field, located in Central Indus Basin, Pakistan. Geologically the area lies in an extensional regime. It is situated in Pannu-Aqil Graben which is located in between Mari-Kandhkot High in the north and Jacobabad-Khairpur high in the south. 2 D seismic and well log data is used to carry out subsurface structural interpretation, reservoir evaluation and facies modeling respectively. Seismic interpretation inferred the presence of normal faults in the study area. The area under investigation displays a combination of two types of normal faults, 1) Major Faults (Type-1) and 2) Minor Faults (Type-2) with a dominant strike slip component (wrench faults). Total seven reflectors have been marked including Sui Main Limestone, Ranikot, Top Upper Goru, Lower Goru, C-interval, B-interval and Chiltan Limestone, seismic section shows that Lower Goru Formation is thinning towards the western side. There is a prominent eastward tilt in the horizons due to uplifting on the western side. Lower Goru C sands act as reservoir having sufficient potential of hydrocarbons. NPHI-RHOB chart has been generated which is super imposed on the benchmark chart for lithology identification, the reservoir marked in all wells mostly constitutes sandstone facies. The mineral cross plots generated for the mineral identification proposed that the major minerals present in reservoir zone are quartz and feldspar whereas clays act as a diagenetic cement. The study area comprises of alternate sand shale beds deposition. 3-D Facies modeling performed on the basis of stochastic object property modeling, where environment of deposition is provided i.e. Shelf edge delta deposits, deposition in form of channels geometry. Sand and shale lithology have been categorized by using GR Log and generated a 3-D model showing the amount of facies in the study area on the basis of well logs and alternate depositional pattern of sand and shale. The data have been extrapolated in between the wells using different algorithms and final model show that the reservoir quality sand was deposited in channel levee complex with a shelf edge deltaic depositional system.

DEDICATION

I dedicate this research work to my beloved parents.

CERTIFICATE OF ORIGINALITY

This is to certify that the intellectual contents of the thesis **"FACIES MODELING AND RESERVOIR EVALUATION OF MESOZOIC SEQUENCE OF SAWAN GAS FIELD, CENTRAL INDUS BASIN, PAKISTAN"** are the products of my own research work except, as cited properly and accurately in the acknowledgements and references, the material taken from such sources as research papers, research journals, books, internet, etc. Solely to support, elaborate, compare and extend the earlier work. Further, this work has not been submitted by me previously for any degree from this University, or any other University or institution. The incorrectness of this information, if proved at any stage, shall authorize the University to cancel my degree.

Signature: _____ Dated: _____

Name of the Research Candidate: Muhammad Atif Zafar

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