

**Petrophysical analysis of Qadirpur well-03, central Indus
basin, Pakistan**



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PETROPHYSICAL ANALYSIS OF QADIRPUR WELL-03, CENTRAL INDUS BASIN, PAKISTAN



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ABSTRACT

The main objective of this dissertation is to evaluate the hydrocarbon potential of the well Qadirpur-03 of Qadirpur Gas field. Geographically Qadirpur-03 well is located at $28^{\circ} 05' 15.10''$ N and $69^{\circ} 20' 40.28''$ E at a distance of 8 km from Ghotki in Sindh Province. Tectonically Qadirpur Gas field lies at the South Eastern boundary of Sulaiman foredeep in Central Indus basin. Sulaiman sub-basin contains 14 gas and condensate fields with proven reservoirs of Eocene carbonates. Habib Rahi limestone of Kirthar Formation (middle to late Eocene) and Sui Upper limestone (lower Eocene) are the proven reservoirs of Qadirpur well-03 which is producing 526 MMscf gas per day. To evaluate the potential of these two reservoirs physical properties were calculated and analysed using petrophysical analysis. Four zones, two at the level of Habib Rahi limestone and two at Sui Upper limestone were marked. Out of four zones, zone 3 ranging from 1222-1225m of Sui Upper limestone comes out to be potential zone with good effective porosity 23.22% due to presence of vugs. Although total thickness of this zone is less than other zones but it is showing high hydrocarbon saturation of 72.2% which is economical.

ABBREVIATIONS

OGDCL	Oil and Gas Development Company limited
LMKR	Landmark Resources
PEL	Pakistan Exploration limited
PPL	Pakistan Petroleum limited
KUFPEC	Kuwait Foreign Petroleum Exploration Company
OOIP	Original Oil In Place
Tcf	Trillion cubic feet
MMscf	Million cubic feet
Bcf	Billion cubic feet
Bbl	Billion barrel
SP	Self Potential
NGL	Natural Gas Liquefied
PEF	Photo electric effect
Cal	Caliper
GR	Gamma Ray
API	American Petroleum Institute
MSFL	Micro-Spherically Focused Log
LLS	Lateral Log Shallow
LLD	Lateral Log Deep
R_i	Resistivity of invaded zone
R_t	True resistivity
R_{xo}	Resistivity of flushed zone
S_{xo}	Saturation of flushed zone
R_w	Resistivity of water
R_{wa}	Apparent water resistivity
R_{mf}	Resistivity of mud filtrate
R_{mfeq}	Equivalent resistivity of mud filtrate
R_{mc}	Resistivity of mud cake
S_w	Saturation of Water
S_h	Saturation of Hydrocarbon
GR_{min}	log response in the shale beds
GR_{max}	log response in the clean beds

GR_{log}	log response in the zone of interest
I_{GR}	Volume of shale within the formation
Δt_{log}	Interval transit time in the formation
Δt_{fl}	Interval transit time in fluid
Δt_{ma}	Interval transit time in matrix
Φ_D	Density Porosity
Φ_s	Sonic Porosity
Φ_e	Effective Porosity
Φ_N	Neutron Porosity
Φ_T	Total Porosity
Φ_A	Average Porosity
Vshale	Volume of shale
RHOB	Bulk density
NPHI	Neutron porosity
GIS	Geographical Information System
Ma	Million Annum
D_h	Borehole Diameter
ρ_b	Bulk density
ρ_{ma}	Matrix density
ρ_{fl}	Fluid density

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