

**SOURCE ROCK EVALUATION OF DATTA
FORMATION USING WIRELINE LOGS OF
WELL CHANDA-02 UPPER INDUS BASIN, PAKISTAN**



By

Muhammad Haris Mahmood

Muhammad Sharjeel Raza

Mujahid Hassan Khan

Department of Earth and Environmental Sciences

Bahria University, Islamabad

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

Muhammad Haris Mahmood

Muhammad Sharjeel Raza

Mujahid Hassan Khan

Department of Earth and Environmental Sciences

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DEDICATION

We dedicate this research work to our parents who always loved and appreciated us. We thank them for providing us support and encouragement. We are also grateful to our teachers and class fellows who assisted, cooperated and guided us throughout our research work.

ABSTRACT

This research work is carried out to delineate source rock potential of Datta Formation using wireline log data of well Chanda-02. The study area is located in Kohat district. Geologically, the study area is a part of Kohat sub-Basin of Upper Indus Basin. Log data utilized to conduct this research work includes Gamma ray log, Spectral Gamma ray log, Density log, Resistivity log and Sonic log. The research work indicates that Datta Formation has a good source rock potential, this quantitative research for the calculation of TOC includes two methods: (i) using Density log (ii) Passey's DlogR method. Two source rock zones are marked on the basis of shaly content with high SGR values and with a positive anomaly of uranium were subjected to the quantitative analysis. For both the zones the estimated values of TOC's are 1.11% and 1.17% respectively which we can say Datta Formation is a probable source rock. Lithologically, Datta Formation is comprised mainly of sandstone with intercalations of shale beds as indicated by the two cross-plots including bulk density vs neutron porosity and sonic vs neutron porosity respectively for the identification of lithology. Mineralogically the Datta Formation contains heavy thorium bearing minerals as indicated by the cross plot of thorium and potassium. The vitrinite reflectance proves Datta Formation to be a mature source rock, capable of producing hydrocarbons.

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ABBREVIATIONS

| | |
|-------------|---|
| OGDCL | Oil and Gas Development Company Limited |
| LMKR | LandMark Resources |
| DGPC | Directorate General of Petroleum Concession |
| PEF | Photo-Electric Factor |
| LLS | Lateral Log Shallow |
| LLD | Lateral Log Deep |
| MSFL | Micro-Spherically Focused Log |
| SP | Spontaneous Potential |
| Fm | Formation |
| GR log | Gamma Ray Log |
| SGR log | Spectral Gamma Ray |
| CGR log | Composite Gamma Ray Log |
| ρ_{ma} | Density of Matrix |
| ρ_f | Density of Fluid |
| Sh | Saturation of hydrocarbons |
| Sw | Saturation of water |
| Rmfeq | Resistivity of Mud Filtrate Equivalent |
| T.D | Total Depth |
| ZPCL | Zaver Petroleum Corporation Limited |
| GHPL | Government Holdings Private Limited |
| POL | Pakistan Oilfields Limited |
| PPL | Pakistan Petroleum Limited |
| MOL | Magyar Olaj, Hungarian Oil and Gas Public Limited Company |
| APEC | Asia Pacific Economic Corporation |