Review of Dissertation "Geological and Petrophysical Characterization of Hawaz Sandstones Reservoir in "H" Oil Field, Murzuq Basin, SW Libya"

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Comprehensive Dissertation forwarded to appreciation presents 142 pages and contents 7 chapters with numerous figures and tables. In first 5 chapters geological setting of Libya in general is discussed, stratigraphy and sedimentology of Murzuq Basin in SW Libya, litology and petrography of Hawaz Formation in detail. These chapters are elaborated very carefully and include a lot of information but I as a geophysicist will focus on chapter 6 that is mostly aimed to geophysical evaluation of the most interesting Hawaz Formation in "H" Oil Field.

Reservoir petrophysical analyses of Hawaz Formation were based on the study and interpretation of well logging data, core analyses data and on determination of petrographic distribution of clay minerals in the formation. Well logging data were given by oil companies from 8 wells from Murzuq Basin. Two of these wells had a good cored interval in Hawaz Formation that was used for core versus log correlations. The following well logging curves were available for further computer processing:
Gamma ray GR, Spontaneous potential SP, Compensated neutron log CNL, Formation density compensated log FDC, Borehole compensated acoustic log BHC, Electrical resistivity logs (e.g. Laterolog Device LLD). In this part I miss information by which company were logging measurement executed. The logging curves were digitized by author and then processed by software GDBase developed in company GDSOFTWARE, Prague. By standard computing procedures used in oil evaluation were obtained porosities either from individual methods such as sonic BHC, neutron CNL and density FDC, either from combination of these methods. In Table (6-1), page 101 are given average results of porosities calculated from various methods (in this table should be used term Average instead of Avenge). There are 6 principal sediment facies in Hawaz Formation with various thickness, porosities, shale content and permeability. The correlation between average porosities calculated from well logging and from core analyses is good to excellent in general. There are of course some differences which can be explained both by poor borehole conditions and by changes in core due to drilling and changed conditions of measurement (pressure and temperature). The most important for permeability is the content of clay or shale material in sandstones. Table (6-3) shows in 6 boreholes average content of shale in main facies of Hawaz Formation. In Figures (6-1 to 6-3) are given nice examples of logging curves in the interval of Hawaz Formation. The best advantage of logging is measuring "in situ", continuous measurement and sampling of larger volume of rocks in the vicinity of borehole. On logging curves are clearly visible anomalies that reflect changes of clay content inside individual facies. Correlation profile of porosities through 5 boreholes in 5 main H.F. facies are shown in Fig. 6-5. The facies differ both in porosity and permeability therefore this oil reservoir had to be treated selectively and not as a one unit opened by perforation.

In the last chapter 7 is given discussion and summery of results. Well logging data were useful for better understanding of porosity distribution in the area of study and contributed to better resolution of litology and structure of Hawaz Formation.

Mr. Yousef Sherif submitted perfectly elaborated Dissertation. I must highly appreciate authors access to his work in which he gave us precise view to geology, petrography and well logging evaluation in oil reservoir in Murzuq Basin. I have not found any objections and I can fully recommend acceptation of this Dissertation.

Prague, 28th of February, 2008

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AQUATEST a.s.