

## **Digital Core Data Management and Integrated Reservoir Characterization Workflows for Shallow Depth Unconventional Reservoir in Kuwait – A Pilot Study**

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### **ABSTRACT**

Kuwait Oil Company has undertaken the development of a shallow low-pressured unconsolidated sandstone reservoir containing unconventional heavy oil resource in Kuwait. The highly stratified nature of this reservoir causes significant challenges in defining the diagenetic process and nature of fluid distribution patterns in this reservoir. More than thousand wells have been drilled so far and conventional cores have been obtained in about 150 wells.

A centralized digital data repository was proposed to integrate the intensive information of sedimentological, petrographical, XRD, SEM, RCAL, and SCAL studies on these cores in a suitable manner for integrated reservoir characterization. A total 15 wells were selected across the entire field for a pilot study for core data consolidation, automation, standardization, integration, analysis, and interpretation. This data include log and various core studies performed. Suitable templates were created to display graphical image data. Accordingly, lithological descriptions, log suites, core image, porosity, permeability, saturation, grain size, fluid, MICP, capillary pressure, XRD mineralogical/clay, petrographical, and depositional data are integrated in a single template to analyze variations in the data for reservoir characterization purpose.

The pilot study comprising of 15 wells leveraging best core data management practice across the field has been completed successfully. With standard quality procedures and governance in place, most accurate and high quality core and log data templates are generated for reservoir characterization purpose. Reports have been created highlighting core details with an associated well, and its availability and analysis for reservoir characterization purpose. Proposed solution has integrated existing core data in place with relevant borehole data types for quality assurance and generates instant multiple cross-plots.

The solution will facilitate handling of high value borehole data types such as core header, photos and descriptions, XRD/SEM and descriptions, RCAL data including Porosity, Permeability, Water Saturation, Oil Saturation, Grain Size, SCAL data, including relative permeability, capillary pressure and fluid analysis, Paleontological and Biostratigraphy data, digital reports for the interpretation. Such efficient system will result in high quality reservoir characterization, risk reduction and more accurate reservoir based decisions.