

Chemostratigraphy of wells A-U1, A-F1, K-M1 and A-G1 in Block 3A used to facilitate reservoir-scale interwell correlations in the Orange Basin Offshore the Southwest Coast of South Africa

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ABSTRACT

Chemostratigraphy is the study of the inorganic geochemistry of sedimentary sequences where it is used to study variations in the geochemistry of sediments as a correlation tool. This is done by analyzing cutting samples, conventional core samples, sidewall cores or outcrop samples which allows regional to reservoir-scale interwell correlations to be made (F. Schwab, 2003).

This project will entail the correlation of four wells for oil and gas provinces, with petrophysical logs and in the end determine potential reservoir compartmentalization. The four wells will serve as a good basis for correlation of sedimentary successions based on subtle changes in concentrations of key major, trace, and rare earth elements. With the aid of logs (Gamma ray, Resistivity log, Neutron – Density log, Spontaneous Potential [SP] and Sonic log the relevant reservoir zones can be determined.

The main aim of this project is to use chemostratigraphy analysis as the bases of reservoir-scale interwell correlation. And to also compare geochemistry of the core or side wall samples (if available) or ditch cuttings with the stratigraphic column to establish possible correlations. From these aims the end result will be to estimate the recoverable hydrocarbon reserves and the possible prediction of future production for the reservoirs. Chemostratigraphy then enables the main reservoir units to be differentiated and correlated on the reservoir-scale and subregionally. Core data will provide a direct measurement of well properties but for this project ditch cuttings will enable a more detail description of major, minor and trace elements.

The proposed area for this study is located in the Orange basin which is a quintessential passive margin that formed during the break up of Gondwana and the subsequent rifting of the South Atlantic Ocean. The syn-rift portion of the basin is characterized by a series of grabens and half-grabens that trend approximately parallel to the present day margin. The syn-rift fill, which is Upper Jurassic and Lower Cretaceous in age, predominantly comprises siliciclastic and lacustrine strata with a widespread occurrence of volcanic sequences (Gerard and Smith et al, 1983).

Key words: Orange Basin, Reservoir compartmentalization, Ditch cuttings, Wireline logs