AP14

Complex Carbonate Evaporite Reservoir Description Using Isotope Geo-chemistry and Ichno-facies to Fine-tune a High Resolution Sequence Stratigraphic Framework Model of Marrat Reservoirs

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SUMMARY

Field development in complex carbonate evaporite reservoirs has been a challenge for geoscientists by using simple sedimentology based geological models. A high resolution sequence stratigraphic framework has been designed from a conceptual 3D depositional model to a deterministic predictable model. In this process framework boundaries have been fine-tuned with carbon and oxygen isotope signals and defining ichno-facies associations to map lateral continuity of member formations within Marrat sequence. As dolomites and porous grain stones are the key reservoir quality rock types for Marrat Group of formations, position of precursor lithofacies in sequence stratigraphic frame work is found to be crucial. Dolomite samples are analyzed for d13C and d18O. Upper and Lower Marrat members are characterized by thinly laminated, micro crystalline exposure dolomites and high in d18O signal which are associated to low stand packages, whereas Middle Marrat dolomites are relatively low in d18O and high in d13C are associated to high stand precursor facies. Moreover, typical ichnofacies association of porous dolomites defines vertical and lateral connectivity of flow zones in Middle Marrat reservoirs. The reliability of this model has been established through recent tested intervals, with PLT and MDT data integration demonstrates predictability of flow zone connectivity.