

Lithofacies Prediction: A Case Study on Carbonate Reservoirs in Saudi Arabia

Basmah A. Almustafa¹

¹Reservoir Characterization Department, Saudi Aramco, Qatif, Eastern Province, Saudi Arabia.

ABSTRACT

The prediction of textural facies and depositional environment, based on described sedimentological and petrophysical data of cored and uncored wells in three carbonate reservoirs of an oil field was successfully completed. The prediction was drastically improved from initial 60% to 90% in uncored wells by integrating different workflows and weight-adjusted logs using one of the company approved software. Core description, interpreted depositional environment and defined sequences were the major foundations for cored wells. Wire-line logs such as GR and DT were normalized as they were of different campaigns and constitute a major input for prediction of texture facies in uncored wells. The field was subdivided into three major sectors. Each sector was further subdivided into vertical zones. Blind tests aerially and vertically indicated high quality prediction of textural facies and depositional environment. Blind tests at cored wells are conducted to estimate and predict better results at uncored well. This step is necessary to insure better facies training for unsupervised prediction and analysis. In addition, several workflows and algorithms were ran and tested to achieve textural facies prediction of more than 90% and to decipher the depositional pattern over the entire area. This study helps to find a relationship between wireline logs and defined lithofacies. This relationship is very important to understand the distribution of lithofacies in uncored wells and to interpolate and extend the distribution of the lithofacies types between wells for the 3D modeling. Better prediction results of cored wells yield better analysis and interpretation in the geological area through different types of reservoirs.