Please fill in the name of the event you are preparing this abstract for.	International Petroleum Technology Conference
Please fill in your 5-digit IPTC manuscript number and IPTC Control number.	IPTC-19556-MS 19IPTC-P-1259-IPTC
Please fill in your abstract title.	A Machine Learning Method for Predicting Optimal Formation Pressure Testing Zones and Parameters

Please fill in your author name(s) and company affiliation.

Given Name	Surname	Company
Aldrick	Garcia Mayans	Schlumberger
Miguel	Munoz Salinas	Schlumberger
Se Un	Park	Schlumberger
Francois Xavier	Dubost	Schlumberger
Manuel	Vizcaino	Schlumberger

Abstract

Reservoir sampling and pressure (RS&P) acquisitions are fundamental for drilling, to evaluate reserves or well productivity. While numerous technologies exist to perform such acquisitions, the workflow is common. Many operational parameters, varying with the characteristics of the environment, come into achieving successful measurements, resulting in great variability in success rates. Our data driven-analytics patented workflow targets that variability.

All relevant operational and petrophysical data is captured, transmitted to and stored in a data warehouse and made available for data driven analytics. The method extracts the data and, using Machine Learning technology, performs probabilistic data classification on offset data to find the relationship between correlating petrophysical measurements and mobility. All possible results are computed and stored for each of the different measurements. Of all the DDA results, the range values of the measurement where the most probable formation fluid mobility range occurs is automatically identified. It is then used to plot the DDA recommended optimal pre-test zones and parameters.

Our method was applied to improve test quality, minimize loss of seal, dry or tight tests in deep water exploration and land development wells. Three case studies are presented. First case, a land development well where previous RS&P acquisitions in three offset wells had a 62% rate of valid measurement. By applying the method using previous wells information, we increased the percentage of valid measurement to 87.5% for the well in study. Second case is an exploratory deep water well. Offset data from 8 offset exploratory wells in the same basin was used to build relationships between petrophysical measurements and mobility; a 90% success rate was achieved, compared to an average of 22% before. Third case treats of an appraisal deep water well, where the same database as case 2 was used, with an additional exploratory well in the field. 100% percent success rate was obtained in the formation testing survey, cutting by 40% the acquisition time as compared to the exploratory wells where the method was not applied.

Advances in data management infrastructure, network, and business intelligence tools are facilitating extracting value out of operational and petrophysical data. Our method puts this all together, producing business value in RT on an ongoing well, before the RS&P operation takes place, or on a prognosed well facilitating design. Case studies show the method results in more consistent, systematic, unbiased and effective operations; leading to a significant increase in test success rate.