

Nuclear Magnetic Resonance T2 Bin Derived Permeability Compared to Actual Production

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Log interpretation of the formations of western Oklahoma and the Texas panhandle has always been difficult. The formations consist of reservoirs that exhibit great variations in primary porosity, secondary porosity and secondary alterations. Primary porosity can be detrital, arkosic, very fine grained and sometimes, clean and very permeable. Secondary porosity alteration is observed in fractures, vugs and salt plugging. Every variation and enhancement causes problems for the interpretation.

Logging programs have generally been designed to extract specific answers for specific formations. Historically, many different evaluation devices have been attempted in order to better understand the formations. Notably, modern image logs and Magnetic Resonance Imaging Logs (MRIL) were used to apply new technology to an old problem. The image logs added significant geologic information, but understanding productive horizons was not enhanced. MRIL results were inconclusive and the technique was discontinued.

Recent examination of T2 spectrum provided a change in the approach to evaluation of MRIL data. Bin Distribution was applied directly to develop a permeability estimate. This technique seemed to work well in many different formations as permeability estimates to observed permeability was within 20% in most cases.

This case study examines the use of T2 bin distribution to estimate productive capacity. The permeability calculated is then used to estimate expected initial production rate for several wells. This paper presents the results of applying this technique to 7 Granite Wash wells in the Texas panhandle and 7 Britt wells

in south western Oklahoma. We used MRIL data that was recorded several years ago and recomputed the permeability to make this comparison. We also present the permeability as calculated by other techniques and compare all of those results to known production.