

Comparison of Magnetic Resonance Bin Distribution Permeability to Observed Production

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The Granite Wash formation in Oklahoma is made up of arkosic detrital material resting on older Precambrian rocks. It can range in age from Precambrian to Middle Pennsylvanian. Formed by erosion of uplifted segments, it is generally granitic in nature and it may also include large areas of reworked carbonate. This wash presents a very difficult log interpretation problem since reservoir consistency varies greatly from well to well.

Magnetic Resonance Image Logs were added to the logging program to establish additional parameters that could be used for reservoir description. The standard Coates permeability equation and its variations were applied to estimate permeability with little correlation to production. An observation was made that T2 bin distribution data tended to mirror production rates. We were able to establish an algorithm that would directly establish permeability for a formation using the measured T2 data. We designate this as the Bray-Smith algorithm and we are now using this as an absolute value for permeability.

In this case study, we estimate the productive potential of seven Granite Wash wells in the Texas panhandle by application of this equation. These estimated production rates are compared with the actual rates from the wells involved. We also show the results of estimations using the Coates equation and the Timur relationship. These results clearly show the validity and application of this relationship.