

Breaking Open the Bakken: A Data Analytical Approach

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Summary

The Williston Basin is in the mature period of its basin lifecycle in terms of exploratory potential, as operators have reaped the benefits of extracting hydrocarbon resources from multiple intervals throughout its stratigraphy. The Bakken Formation is the gear that keeps this basin ticking. By utilizing data analytics, it is possible to provide a framework with respect to how much tick is left in the basin, where there is room for maintenance, and what areas are better left untouched.

Theory / Method / Workflow

The intent of this study is to utilize a selection of machine learning techniques in correspondence with geological, completions and historical production data to delineate the boundaries of which the Bakken and Three Forks Formations are prospective. Using a random forest regression technique, geological, completions and spacing attributes were utilized as input into a model with the target variable being lateral-normalized oil EUR.

Results, Observations, Conclusions

The resultant geological parameters that had the most influence on the target variable were resistivity, depth and thickness. As a result of the evaluation, which involved an integrated map of all parameters with diagnostic cut-offs applied, it was determined that the most promising acreage positions would be across Mckenzie and Dunn counties in North Dakota. In addition, the boundaries of core prospective reservoir were delineated in both the Middle Bakken Formation and the Three Forks Formation, providing insight into expectations of prospectivity for those intervals as interest moves to the fringier areas of the basin.

Novel/Additive Information

This mature basin continues to produce at a market level that is competitive with other popular plays across the lower 48. Utilizing data analytics as a diagnostic tool can help maintain and prolong the productive life cycle of this basin for years to come.

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References

