

Early Prediction of Ultimate Production Calibrated to Historical Data, Method for Unconventional Gas

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Abstract

The intent of the study has been to find a reliable way to predict ultimate production as soon as possible after the start of production in a well. The work has focussed on unconventional gas from the USA and from Canada.

The production data of over 160,000 tight sands and shale gas wells has been studied using statistical methods. The fifty percentile values through time have been equated to a theoretical P50 and used to characterize the production of each well against its peers and against wells producing from other formations. In order to make meaningful comparison between formations, the monthly production from the Canada data set has not been used in this first stage analysis as it was not available in the USA data set. These results, based on cumulative production, have later been tested against the monthly production for the Canadian data set.

The second stage of the analysis has been the testing of a new dimensionless parameter that reflects the speed of production decline. The results are harmonic pseudo decline curves that are consistently in line with the productivity indicated by traditional methods. The last step has been to determine how little data was needed to be able to give an acceptable prediction. The method does not deliver an ultimate production value but determines the level of analogy with any well or formation with a longer production life.

The method is in an early stage of development and is expected to evolve rapidly as the inverse function mathematics behind it is simple and reliable.