

Abstract

Quantitative Analysis of Undiscovered Reserves and Hindrance Exploration Difficulties in Middle East Basins

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This paper proposes a method of graphical analysis based on historical cumulative extrapolation to estimate historical undiscovered reserves (HUR). The paper compares Middle East Basin historical undiscovered reserves. The paper also presents and compares for the Middle East a second parameter called: "hindrance exploration difficulty." This parameter is used to characterize the Basins or areas of interest and to qualify the quality of the historical undiscovered reserve estimates. Hindrance exploration difficulty is estimated using a cumulative spread sheet system resulting in a statistical parameter ranging from one to zero. Zero hindrance exploration difficulty serves as an extrapolation point for the historical undiscovered reserves. The method incorporates cumulative resource addition (plotted on the X-axis) against a Y-axis statistical parameter that attempts measure hindrance exploration difficulty. The advantage of the plot is that it allows extrapolation to a zero line, somewhat like a Horner plot. The method does not estimate reserves for unexplored acreage, areas or Basins; but the method does provide quantitative results for explored area that can be proportioned by area or volume ratio to areas with analogous play concepts. Unexplored regions without imagined play concepts must be estimated by other means. A formula for clarification is: Total Undiscovered Reserves (UR) = historical undiscovered reserves (HUR) + analogue undiscovered reserves (AUR) + unexplored undiscovered reserves (UUR). $UR = HUR + AUR + UUR$. This paper

deals with estimating HUR. Historical undiscovered estimates (HUR) can be used to help make and temper estimates of AUR and UUR. The graphical method incorporates cumulative reserve addition graphing with a parameter: hindrance difficulty (Hd). Exploration difficulty is classified into "scarcity difficulty" and "hindrance difficulty". Estimates of HUR for high Hindrance Difficulty Hd are more tenuous. In this way the "current" or present day hindrance difficulty serves quality control index on the HUR and is an important parameter for understanding the exploration maturity of a Basin or area.