

Net Pay Cutoffs from Capillary Pressure

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Abstract

Cutoffs are used to define “net pay” and “reservoir rock.” Reservoir rock is sometimes referred to as “net sand.” Reservoir rock, as used herein, is rock that is permeable enough to allow hydrocarbons to move to the well bore. It meets the permeability cutoff and/or the porosity cutoff, volume of shale cutoff, and other appropriate reservoir quality criteria.

Net pay is reservoir rock that meets the water saturation cutoff. The water saturation cutoff is generally thought of as the highest S_w (or S_{we} in an effective porosity methodology) that will still produce hydrocarbons, the S_w where the oil or gas cut is roughly 1% or higher.

Hydrocarbons exist in most reservoirs in rocks that are not considered either net pay or reservoir rock. Using conventional petrophysical and reservoir engineering methods, these hydrocarbons will not be included in the computation of hydrocarbons-in-place. So, by using cutoffs to compute net pay, a portion of the hydrocarbon-in-place is excluded from the reserves calculation. Great care must be used in selecting cutoffs so that the hydrocarbons excluded are truly not producible using current and foreseeable technology.

Capillary pressure analysis, backed up with proper core measurements, can provide justification for cutoffs. This sort of analysis can also be used to help select the proper cutoffs. The talk describes one method of building a capillary pressure model, how the parameters are selected, and how the model can be used to pick appropriate cutoffs in a heavy oil reservoir.