Pressure Build-ups (PBU) vs. Static Gradient Survey / Flowing Gradient Survey

During a recent international marketing trip we have found that many operators of high rate gas and gas condensate wells perform Static Gradient Surveys (SGS) and/or Flowing Gradient Surveys (FGS) as opposed to Pressure Build-up or drawdown tests. The reason frequently given is that operational procedures dictate that a well must be shut-in when running wireline into the wellbore. By shutting in the well, before running wireline into the wellbore, you have introduced a major pressure transient into the reservoir that distorts the results from a subsequent build-up test unless you are willing to extend the flowing and shut-in times drastically. This is something the operator is rarely willing to do and therefore he only performs a SGS and/or a FGS.

When surveillance work is limited to Static and Flowing Gradient Surveys they are losing the opportunity to acquire critically important reservoir information such as completion efficiency (skin), permeability and reservoir pressure (P***). The need to derive skin and permeability thru transient testing is invaluable as you seek to understand not only the change in reservoir pressure over time due to depletion effects but also understand the changing nature of kh due to formation compaction, etc. and if skin is accreting over time due to precipitates or fines migration that tend to restrict flow in gravel pack completions.

Utilizing surface pressure measurements for pressure transient analysis avoids the concerns associated with running tools into a flowing well. The SPIDR® gauge well testing system has been performing that function for almost 25 years in gas and high-yield gas condensate wells all over the world. The system consists of the data acquisition unit, the SPIDR® gauge, and a very sophisticated computer model that converts well head pressures to reservoir conditions. The computer model takes into account frictional losses in the flowing wellbore, thermal effects in the well bore during rate changes, and phase changes in the wellbore going from flowing to shut-in conditions.

One of the primary ways that Halliburton demonstrates effectiveness compared to downhole gauges is to perform a simultaneous trial comparison. A downhole gauge is run to TD while the SPIDR® gauge is simultaneously capturing pressure data at the wellhead. To maximize effectiveness and value, a PBU, as a minimum should be performed. If the SPIDR® gauge converted data proves to be acceptable to the customer and SPIDR® Surface Well Testing Technology is deemed as a NO RISK and LOW COST alternative to running downhole; the SPIDR® gauge can be used for future pressure transient testing surveys WITHOUT operational concerns.

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