SPEE Houston Luncheon on September 2, 2020

The below are additional questions raised during the Q&A session for Dr. John Lee but due to time restrictions we were not able to ask. Thank you Dr. Lee for taking the time to answer these additional questions for the group.

Priyank @ 12:43 PM

Can we delineate interference effects from depletion effects, using SBF?

As demonstrated in the presentation, SBF can generate forecasts based on FDI=0 and FDI>0 then calculate differences in EUR caused by depletion and interference for both primary and infill wells.

Stuart @ 12:50 PM

Has there been an SPE Comparative Reservoir Simulation study, similar to the older conventional comparative studies?

I am not aware of such a comparative reservoir simulation study.

Tim @ 12:58 PM

"SRV" means area reached by hydraulic fractures (stimulated rock volume) or the effective propped volume?

Stimulated rock volume

Stephen @ 12:58 PM

Therefore a rate cum plot of less then 14 months is not a good test of a wells type curve match and ultimate recovery

The reason we used 14 months is because that is the number of months that the infills had produced. If the infills you are working with have produced for fewer than 14 months, we would use the actual number of months the infills have produced. The only reason we compared the actual production to the forecasts is because, in the blind study, our objective was to validate the efficacy of the SBF approach.

Anonymous @ 12:58 PM

Is there no interference impact in the first 14 months because the wells are wellhead constrained for a large portion of that time?

Interference can occur early depending on the size of SRVs we have created and how aggressive our choking strategies are.

Sadam @ 01:01 PM

Why have you used data for 14 months only? Did you compare cumulative production of the primary and infill wells having interference?

This was the total producing time for the infills, and we wanted to compare the actual infill production to the SBF and DCA forecasts

Manuel @ 01:03 PM

What is the minimum amount of data required to obtain a reasonable calibration of the SBF simulation models? Asked differently, would you feel comfortable using SBF in a prospective area with little public production data?

SBF can be used from exploration phase to full development phase. In a prospective area with little public production data, SBF can be calibrated with reservoir and completion parameter ranges.

Tim @ 01:03 PM

Are increases in EUR with increased well spacing indicating that the effective propped volumes and drainage area are actually larger (than we once thought), or that there are less frac hit effects, but areas of non-recovery between wells?

The increases in EUR are a combination of optimized spacing to access more of the unstimulated reservoirs, and also that there are fewer frac hits.

Maria @ 01:03 PM

You mentioned SBF method does history match, so would it be reasonable to assume that it will always have a more accurate result than from TPW DCA?

Yes, the first step in SBF is to history match the primary wells to obtain a range of reservoir parameters. We then place a range on those parameters to match the infill wells. This is why the SBF approach is more rigorous than DCA-based TWPs. Furthermore, SBF uses a large range of reservoir, completion, production, and pressure parameters and also takes into account interference results.

Ali @ 01:03 PM

When is the best time to infill a well?

This depends on the project. A sensitivity analysis needs to be run to determine the best timing of the infill wells. Completing all wells at the same time is always best if investment capital is available.

Alejandro @ 01:03 PM

Thanks for sharing Dr. Lee.

Could you help me understand how SBF being previously ran simulation models under different flowing bottom hole conditions, can be calibrated to make predictions about these wells?

The study was based on data obtained from operators in the Delaware Basin working in this area. SBF used the base curves and generated different FBHP profiles for the predictions.