SPE 128137 Integrated Production Model Calibration Applied to a Gulf of Mexico Sub-Sea Field

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This paper present a structured methodology for calibrating IPM models while accounting for multidisciplinary uncertainties.

Fully integrated models often require initial calibration and subsequent updates prior to use for reliable forecasting. Due to the range of disciplines involved, this can frequently result in non-unique solutions while poor quality data produces suspect results. A consistent and systematic procedure was developed to help in the IPM model calibration on a subsea Gulf of Mexico field. A workflow engine was developed to minimise the error function by coupling the IPM model to a spreadsheet and optimiser allowing thousands of scenarios to be evaluated in a few days.

IPM models have been used to:

- Increase awareness of assets performance by allowing continuous surveillance
- Increase asset uptime by identifying performance gaps
- Ensuring asset integrity by operating in safe envelopes
- Optimise asset value and performance by evaluating various producing scenarios

The overall production operation success of these models is however dependent on the technical uncertainties. An overall description in the steps taken to calibrating and therefore reducing these uncertainties is shown below:

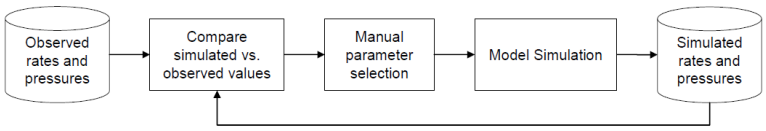

Figure 1 – Generic calibration process block diagram

Two cases are described in which the above steps were applied defining the overall objectives and challenges but the overall conclusions were:

1. Simultaneously calibrating multiple parameters for wells, separators and pipeline network while preserving the global field level measurements allows correction parameters to be determined.
2. Minimised time could be spent performing the IPM calibration.
3. Manual human data entry was minimised. This automatic handling allowed for a traceable database to be achieved.
4. A repeatable, consistent and systematic procedure was achieved which can be applied to future evaluations.
5. A valuable tool was obtained which can assist users in obtaining accurate results from the IPM model despite the many uncertainties.