SPE 155031 Enhancing Production Allocation in Intelligent Wells via Application of Models and Real-Time Surveillance Data

Xingru Wu; Kathryn Humphrey; Tony T. Liao, BP

The traditional approach to rate allocation is based on well rate tests and downtime which is both time consuming and generally carried out sporadically. This approach does not allow for a proactive approach to well asset management when wells may also be producing in a transient state. This paper discusses how to improve the well rate allocation and save engineering time by capitalising on real time data from well pressure and temperature sensors and applying them to an IPM model.

With real-time data collected from intelligent wells, several models can be used to contribute to well rate allocation such as; inflow performance relationships and hydraulic lifting curves which have been used to determine the optimal rate for a well.

The following data is necessary in ensuring that reliable well rate allocation can be achieved:

- Hydraulic models for wellbore flow performance
- Choke models
- Reservoir response models
- Temperature models

Having ensured that the above data is available, rate allocation using well models (PROSPER) and real time can be carried out by following the steps below:

1. Prepare the real time data for calculation
2. Obtain the correct separator rate
3. Select the appropriate models
4. Ensure well rate test validity for model calibration
5. Periodically calibrate the well models

The impacts and learnings of carrying out well rate allocation are positive:

- Better decision making and a more use of the valuable resources has now been employed.
- It is important that the reservoir, target wells and limitations of the selected models are well understood.
- Implementation of the real-time data assisted model based allocation method enhances allocation accuracy, reduces well rate testing frequency and improves allocation efficiency.
- For complicated fields, rate allocation is a continuous long-term project.