***SPE 121175 Uncertainty Analysis Applied to Biogenic Reservoir Souring Simulation***

***Alexandre Guedes de Siqueira, Carlos Henrique Vieira Araujo, Rodrigo Rekslider and Marcio de Castro Pereira (in memoriam), PETROBRAS***

Reservoir souring relates to the growth of hydrogen sulphide concentration in produced fluids from initially sweet petroleum reservoirs. The aim is to estimate the probabilistic concentration range of H2S in the produced fluid. This objective is due to the great complications arising from souring.

The future evolution of H2S concentration in the produced fluids needs to be accounted for at the field development and planning stage to ensure that and economical and safe system has been developed. The estimation of H2S biogeneration is carried out by accounting for the following parameters:

- SRB metabolic activity.
- Minimum and maximum temperature for bacterial activity.
- Duplication rate of SRB population.
- Minimum and maximum concentration of SRB.
- Water composition.

The uncertainty analysis procedure itself can be described by the following diagram:

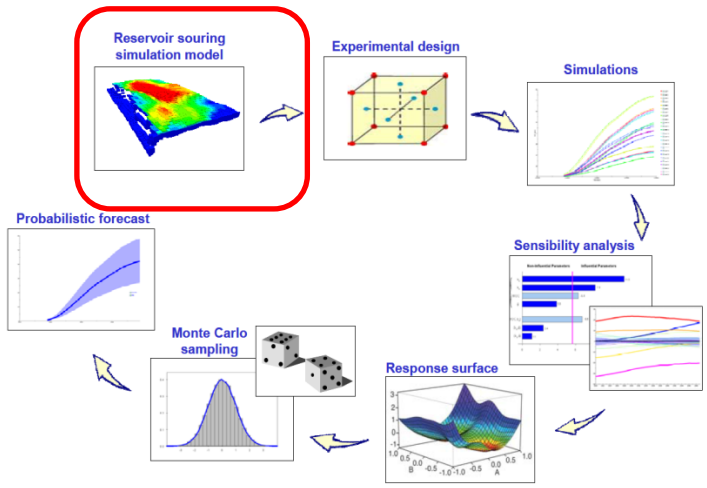


Figure 2- General workflow of uncertainty analysis applied to biogenic reservoir souring simulation

**The reservoir souring-simulation model used in this approach was REVEAL from the PETEX IPM suite**

*Conclusion:*

In the field operation phase, history matched probabilistic forecasts can be valuable in updating the asset integrity management plan. As such, the application of the uncertainty analysis techniques to the H2S mathematical modelling helped the project team to make decisions which can involve millions of dollars.

This approach allows for studies to be carried out for specific scenarios including development strategies and reservoir specific characteristics.

Uncertainties linked to some of souring simulation parameters are still very high and deserve more investigation. In particular, lab tests to determine the reservoir rock H2S adsorption capacity have not been designed and this is a critical parameter.