

Uncertainty and Risk in Development: Quantifying Subsurface Risk and Uncertainty for Producing Assets (G038)



Tutor(s)

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Overview

The quantification of risk and uncertainty is often discussed in the context of exploration and appraisal, yet most of the upstream E&P business concerns decision-making in producing assets. Handling uncertainty in development and production must deal with a growing and often imperfect production database, against a backdrop of constantly changing circumstances. As the life cycle progresses, initial uncertainties over volume and productivity narrow but are supplanted by new uncertainties, such as sweep efficiency, fine scale architecture and changing responses to new production mechanisms and techniques. These new issues demand a change in approach for the quantification of uncertainty, and vigilance is required to avoid the subsurface interpretation simply collapsing to a best guess. This short, focused workshop explores the key aspects required to manage subsurface uncertainties and associated risks during the producing field life, in terms of people, tools and approach. It will close with a set of questions to ask yourself and others, suitable for reference in informal personal or team reviews, peer reviews and peer assists.

Duration and Logistics

Classroom version: A 1-day course comprising a mix of lectures, case studies and exercises. The manual will be provided in digital format and participants will be required to bring a laptop or tablet computer to follow the lectures and exercises.

Virtual version: Two 4-hour interactive online sessions presented over 2 days. A digital manual and exercise materials will be distributed to participants before the course. Some reading and several exercises are to be completed by participants off-line.

Level and Audience

Advanced. Designed for geoscientists, reservoir engineers, petrophysicists, well technologists, team leaders and management involved in the quantification of risk and uncertainty in fields under development or in production. The class will provide an opportunity for learning, inspiration and discussion with other modelers.

Objectives

You will learn to:

1. Resolve misunderstandings over definitions in risk and uncertainty.
2. Understand the key differences between uncertainty and risk in development, compared to exploration and appraisal.
3. Explain and mitigate common errors in handling probability.
4. Describe workflows for handling risk and uncertainty in development decisions.

5. Account for the impact of cognitive bias in E&P, and what to do about it.

Course Content

Course Details

1. Context

- The driving issue: decision-making in producing assets
- The key difference between uncertainty and risk in E&A vs development and production
- Why it matters – some examples

2. Practice

- People – recognizing personality and imperatives, sources of bias, common heuristics and how to minimize them
- Tools – the choices available, balancing simplicity and complexity, determinism and probability, and the pros and cons of each
- Team approach – stitching tools of choice into a coherent methodology, the primacy of the underlying concept, the choice between forward modelling and inversion, and the key to successful team-based approaches beyond initial framing sessions
- The Forth Rail Bridge example

3. Advice

- Questions to yourselves and others