Risk, Uncertainty & Economic Analysis of Oil Sands

DESCRIPTION
This course covers the assessment methods required for the technical and economic evaluation of Oil Sands reservoirs. The course is designed for Engineers, Geoscientists, Commercial team members, Business Analysts and Managers that are charged with creating value. The premise for this course is that sound estimation of key engineering, geotechnical, and economic parameters is essential for maximizing profitability. Unlike traditional deterministic methods which call for the ongoing study of key parameters to get ever closer to "The Answer." Probabilistic methods recognize that most parameters are fraught with uncertainty.

Course Outline
- **Day 1 – Fundamental Concepts**
    - **Course Overview**
    - **Probability, Distributions, and Correlation**
    - **Estimating Under Uncertainty**
    - **Decision Trees & Expected Value**
- **Day 2 – Reserve Assessment**
    - **Volumetric EUR Assessment**
    - **Chance Assessment**
    - **Resource Stage Gate Assessment**
    - **Aggregation Principles**
- **Day 3 – VOI Assessment**
    - **Production Type Curve Development**
    - **Assessment With Limited Data Based on Analogs**
    - **The Value of Information**

Topics Covered

♦ Introduction to Probability and Statistics - The Language of Uncertainty.
- Distribution Types and when to use what
- Sampling and the number of samples required to validate a distribution
- Correlations / Dependencies and their impact
- Resource sampling exercise

♦ Estimating Under Uncertainty
- What is an 80% Confidence Interval
- Deterministic P50 versus estimating P50's using probabilistic ranges
- How to develop P10 to P90 Ranges, reality checks!
- Exercises focused on developing better estimating skills with an emphasis on estimating in ranges, rather than single values

♦ Reserve Estimation
- Average Concept – Porosity. Saturations, and Net pay
- Reserve Type Curve Development
- Aggregation Principles
- Volumetric Resource Assessment – Reality Checks
- Production Type Curves – basis for generation, their pros and cons

♦ Chance Estimation
- Chance of Geologic Success
- Chance of Commercial Success

♦ Oil Sands Resource Assessment – Sampling Issues
- How many wells do I need before I can move to the next stage?
- Can we fast track this program or do we need to slow down?
- How do I determine the range of the mean outcomes from my limited sample size?
- One Shale gas exercise and one Tight oil exercise are worked by the class to develop this understanding in the attendees.
- The use of Sequential Accumulation plots to determine if your Type curve is changing

♦ Decision Trees and the Value of Information.
- Decision Tree basics
- Expected Value Concept
- The Value of Perfect and Imperfect Information
- The application of Bayes' Theorem
- Contingent well locations, how to deal with conditional probabilities
- Exercise on the Value of additional Stratigraphic vertical well test(s), exercise to assess the optimal time to develop versus drill additional stratigraphic test
- Exercise on assessing a new opportunity