

PETROLEUM RISKS and DECISION ANALYSIS

Course Instructor

John Schuyler

Course Level

Foundation

Who Should Attend

Geologists, engineers, geophysicists, managers, and planning analysts

You Will Learn

- ◆ How to approach all three types of evaluation problems; ranking, valuing, and optimizing
- ◆ How to use decision trees and Monte Carlo simulation (in exercises with your hand calculator) to calculate expected values
- ◆ To think and model probabilistically
- ◆ How to measuring shareholder value and handle incorporate other criteria (such as HSE: health, safety and the environment)
- ◆ About decision policy and popular criteria — which work and which do not work well with probabilities
- ◆ How to use probability distributions and basic statistics, useful in project evaluation
- ◆ About low-cost PC software tools for decision analysis
- ◆ How to value additional information (e.g., geophysical survey) and control (e.g., higher safety margins)

About the Course

Decision-making is perhaps the most important skill for a successful business or career. Good technical and business decisions are based on superior analyses of costs, benefits, and risks of projects. Attendees learn practical, systematic ways to analyze decisions under conditions of risk and uncertainty.

Participants learn how to design and solve decision trees and payoff tables, popular decision modeling techniques. These methods provide clear communications and the basis for valuing each alternative. Judgments about risks and uncertainties are expressed as probability distributions. Monte Carlo simulation, another powerful technique, is also presented. Four basic probability concepts provide the foundation for the calculations. The mathematics is straightforward and mostly involves only common algebra.

There are no prerequisites other than a general familiarity with the geologic, engineering, and business aspects of the petroleum industry. Participants learn how many real-world problems can be solved with a scientific or business hand calculator (which they bring to the course), three reference textbooks, and the 700+ page course notebook. The emphasis is on practical techniques for immediate application.



Course Content

- ◆ **Decision Tree Analysis:** Calculation procedures; valuing additional information and control; advantages and limitations contrasted with Monte Carlo simulation
- ◆ **Monte Carlo Simulation:** Sampling techniques; solution accuracy and stopping rules; Latin hypercube sampling; correlation; considerations for portfolio problems and optimization; advantages and limitations
- ◆ **Decision Criteria:** Value measures; decision rules; decisions with multiple objectives; discrediting intuition; advantages of the decision analysis approach; dealing with capital constraint and risk aversion; portfolios
- ◆ **Modeling the Investment Opportunity:** The ten-step Decision Precision® problem-solving process; real options analysis; operations, earnings and cash-flow model structures; modeling tools, including influence diagrams (briefly); deal structures; sensitivity analysis; scenario analysis
- ◆ **Basic Probability and Statistics:** Four fundamental probability rules, including Bayes' theorem; types and uses of distributions applicable to the petroleum industry, especially exploration; "gambler's ruin" concept; alternate ways to represent correlation between variables; common misconceptions about probabilities
- ◆ **Risk Analysis and Expected Value Concept:** Quantitative estimates of risk and uncertainty; capturing expert judgments; recognizing and avoiding biases and errors
- ◆ **Analysis Methods in the Petroleum Industry:** Characteristic risks of exploration, field development, EOR, transport, and plant investments; risk mitigation methods
- ◆ **Implementing Decision Analysis:** Interpreting decision analysis results from a management perspective; facilitating team analyses; low-cost computer tools; establishing credibility in the analysis
- ◆ **Team Workshop:** Evaluate a multi-pay prospect using trees and the probability concepts learned in the course; solving again using Monte Carlo simulation

Examples

Participants are encouraged to bring examples from their work for discussion. Please contact OGCI Training if you wish to submit a problem in advance for possible use as a class exercise.

2004-5 SCHEDULE and TUITION	5 DAYS
LONDON, ENGLAND	
Oct.25-29, 2004.....	US\$2,200
HOUSTON, TEXAS	
Dec. 6-10, 2004.....	US\$1,900
 LONDON, ENGLAND	
Apr. 25-29, 2005.....	US\$2,450
HOUSTON, TEXAS	
June 13-17, 2005.....	US\$2,100
COLORADO SPRINGS, COLORADO	
Aug. 22-26, 2005.....	US\$2,100
DUBAI, UNITED ARAB EMIRATES	
Sep. 10-14, 2005 (Sat.-Wed.).....	US\$2,750
KUALA LUMPUR, SELANGOR, MALAYSIA	
Sept. 19-23, 2005.....	US\$2,825
LONDON, ENGLAND	
Oct.24-28, 2005.....	US\$2,450
HOUSTON, TEXAS	
Dec. 12-16, 2005.....	US\$2,100

About the Instructor

JOHN SCHUYLER, CAM CCE CMA CMC CPIM PMP and PE, is a decision analyst and evaluation engineer. He founded his consulting practice, Decision Precision[®], in 1988. He has over 29 years of experience in analysis, consulting, and management, primarily in the energy industry. He has presented almost 220 courses in 25 countries since 1990. His focus has been in feasibility analysis, appraisals, corporate planning, and evaluation software development. He was vice president and petroleum engineer with Security Pacific National Bank, planning and evaluation analyst and (later) manager of business systems for Cities Service Co., and senior management consultant with a national accounting firm. John is a member in eight professional organizations and is a frequent author and speaker on modern analysis practices. He holds a BS and an MS in mineral-engineering physics from Colorado School of Mines and an MBA from the University of Colorado. John is the revision author of *Decision Analysis for Petroleum Exploration, 2nd ed.*, author of *Risk and Decision Analysis in Projects, 2nd ed.*, and has written over 40 articles and handbook chapters. His Web site is <http://www.maxvalue.com>.

In-House Presentations

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