PETROLEUM RISK AND DECISION ANALYSIS (PRD)

COURSE LEVEL: Foundation **Public**

DESIGNED FOR

Geologists, geophysicists, engineers, planning analysts, and managers

ABOUT THE COURSE

Good technical and business decisions are based on superior analysis of project costs, benefits, and risks. Attendees learn a practical, systematic process for analyzing decisions under conditions of risk and uncertainty. Participants design and solve decision models. Probability distributions express professional judgments about risks and uncertainties. Decision tree and influence diagrams provide clear communications and the basis for valuing each alternative. The complementary Monte Carlo simulation technique is also presented and experienced in detail in a hand-calculation exercise. Economic evaluation fundamentals and basic probability concepts provide the foundation for the calculations. The mathematics is straightforward and mostly involves only common algebra. The emphasis is on practical techniques for immediate application.

This course is recommended for persons having strong English listening skills.

COURSE CONTENT

Decision Tree Analysis: decision models • low probability, high-consequence events • valuing additional information and control • project threats and opportunities • advantages and limitations • **Monte Carlo Simulation**: Latin hypercube sampling • solution convergence • portfolio problems • optimization • decision policy: value measures • multiple objectives • capital constraint and risk aversion • **Modeling the Investment**: influence diagrams • deal structures • sensitivity • real options analysis basics • **Basic Probability and Statistics**: four fundamental rules, including Bayes' theorem • choosing distribution types • "gambler's ruin" • common misconceptions about probability • expected value concept: avoiding biases in estimation • **Analysis Methods**: guidelines for good analysis practice • implementing decision analysis: team analyses • computer tools • mitigating risks • evaluating a multi-pay prospect (team exercise)

A semi-custom variant of this course, **Economic Evaluation of Prospects and Producing Properties***, is available for in-house presentation.*

SCHEDULE

Public course are scheduled for Houston, London, and Kuala Lumpur. (Normally, one course has been offered each year in South America.)

For a current schedule, please visit:

https://www.petroskills.com/ and search for "PRD".

ADVANCED DECISION ANALYSIS WITH PORTFOLIO AND PROJECT MODELING (ADA)

COURSE LEVEL: Specialized **Public**

DESIGNED FOR

Planners, analysts, economists, and evaluation team members

ABOUT THE COURSE

Quality forecasts and evaluations depend upon well-designed decision policy and project appraisal models in addition to professional judgments. Participants learn the methods and practice of building good evaluation models.

Practical analysis concepts are experienced by developing models with hands-on use of Monte Carlo simulation, influence diagrams, and decision tree software.

This course is for professionals involved with constructing project evaluation and other forecasting and assessment models. We use Excel is for developing project and risk assessment models. Add-in software provides Monte Carlo and decision tree capabilities. The emphasis is on the evaluation concepts and techniques rather than on particular software programs. Approximately half the class time is devoted to hands-on computer modeling. Enrollment is usually limited to 16 participants.

Participants are expected to know the concepts in the *Petroleum Risks and Decision Analysis* course or have similar substantial background. Basic Excel competence in an MS Windows environment is a requirement. Participants should have strong English listening skills.

Visit https://www.maxvalue.com/prereq.htm for a list of expected pre-course competencies.

One personal computer is supplied, at added cost, for every two participants.

COURSE CONTENT

Project Modeling: influence diagrams, correlation, good modeling practices • **Monte Carlo simulation**: project and portfolio models, prospect risking, calculating probabilities and distributions with simulation, modeling and optimizing portfolios, traditional and Latin hypercube sampling, stopping rules, methods for modeling correlation • **Decision Tree Analysis**: value of information; calculations with a utility function • **Decision Policy**: overview of finance theory related to PV discount rate and risk, real options overview, multi-criteria decisions, risk policy as a utility function, optimizing portfolios, shareholder value, modeling and optimizing portfolios • **Implementation**: presentation formats; team processes.

SCHEDULE

Four course are offered each year. The locations are Houston and London. For a current schedule, please visit:

https://www.petroskills.com/ and search for "ADA".

ECONOMIC EVALUATION OF PROSPECTS AND PRODUCING PROPERTIES (EPP)

COURSE LEVEL: Foundation **In-House Only**

DESIGNED FOR

Geologists, engineers, geophysicists, managers, and persons new to analysis and evaluation responsibilities

ABOUT THE COURSE

A typical *EPP* course covers has 85% of the same concepts and 70% of the same notebook contents as *PRD*. Less time is devoted to value of information problems so that more attention can be given to modeling concepts and best practices in economic evaluation analyses. The client company can select and prioritize from a long list of topics. PCs with spreadsheet software are recommended..

PORTFOLIO MODELING AND MANAGEMENT (PPM)

COURSE LEVEL: Specialized **In-House Only**

DESIGNED FOR

Planners, analysts, economists, and evaluation team members

Prior attendance in either *PRD* or *EPP* is strongly recommended. We offer a pre-course quiz for the candidate to self-assess whether he or she is sufficiently prepared for this course.

ABOUT THE COURSE

In recent years, we have seen growing interest in the portfolios.

This is a semi-custom version of *ADA* for companies wanting the training to focus on portfolios. Emphasis typically on project and portfolio modeling in Microsoft Excel®. Monte Carlo simulation and optimization are by means of Excel add-ins.

Optimizer's curse in portfolios, tail estimate bias, real options, competitive bidding, and other advance concepts may be added to the program as priorities and time permit.

TECHNICAL PUBLICATIONS

DECISION ANALYSIS FOR PETROLEUM EXPLORATION, 3.0 Edition

by Paul Newendorp, John Schuyler, and Timothy Nieman

This is a major rework of Paul Newendorp's 1975 best-seller, which became the standard reference in the field. This book is now structured as a handbook of over 330 important concepts in risk and economic decision analysis. Over half the examples apply to petroleum exploration investment decisions. However, 80% of the topics are generally applicable to capital investment, project management, and operations decisions.

As a handbook we are focusing on what is most important and practical. Major topic area include the decision analysis process, key concepts in probability and statistics, decision policy, popular economic metrics and concepts, project and enterprise modeling, decision tree analysis, Monte Carlo simulation. Value of information problems receive special attention. Over 270 figures help illustrate the concepts.

CONTENTS: Decision Analysis Process, Probability and Statistics, Decision Policy, Economic Matters, Modeling, Decision Tree Analysis, and Monte Carlo Simulation, Glossary, and Bibliography

Price $79.95 —approximately 570 pages, softcover, 2014, Planning Press ISBN 978-0-9664401-4-0

RISK AND DECISION ANALYSIS IN PROJECTS, 3.1 Edition *by John Schuyler*

Most of the world's assets are built or developed as projects. With so much money and resources devoted, it surprises that so many projects are failures or only marginally successful. One reason for failures is inattention to project planning and risk management. This book applies risk and decision analysis to project decisions: from feasibility analysis to end of life.

Probability is the language of uncertainty. The evaluation calculations are straightforward, and many everyday analyses can be solved with a hand calculator.

CONTENTS: Risk and Decision Analysis; Decision Analysis Process; Decision Policy; Utility and Multi-Criteria Decisions; Decision Trees; Value of Information; Monte Carlo Simulation; Project Risk Management—by the Numbers; Modeling Techniques; Probability Distribution Types; Judgments and Biases; Relating Risks; Stochastic Variance; Exploiting the Best of Critical Chain and Monte Carlo Simulation; Optimizing Project Plan Decisions; Probability Rules; Expert Systems in Project Management; Extensive glossary and bibliography.

Price $39.95 softcover, $29.95 Kindle—2018, Planning Press, approximately 485 pages,
Print edition ISBN 978-1719014236

TRAINING IN RISK AND ECONOMIC DECISION ANALYSIS

Capital Investment Decisions

Optimizing Engineering Design

Appraisal • Project /Asset Modeling
Portfolio Optimization
Project Planning and Risk Management

Quality decisions are more important than ever in these days of volatile oil prices and increasing competition. Where should your company apply its capital, people, and other resources—where they can best create shareholder value? Most decisions involve many factors. For most of us, intuition is inadequate for even modestly complex situations. Fortunately, new techniques and tools are available to help.

Decision analysis is the discipline that helps decision makers choose wisely under conditions of uncertainty. Decision analysis won't eliminate risk, though it does provide assurance of the best choice given the information available at the time. The most popular calculation techniques are **decision tree analysis** and **Monte Carlo simulation**. These methods are straightforward and often involve only common algebra. Personal computer programs are now widely available for large problems or those requiring repetitive calculations. Most people quickly become comfortable with decision analysis techniques after only a modest investment in training and practice.

John Schuyler and Tim Nieman present four courses in these techniques, described on the following panels:

- ***Petroleum Risks and Decision Analysis*** (PRD), which includes value of imperfect information, especially suited to explorationists.
- ***Applied Decision Analysis with Portfolio and Project Modeling*** (ADA), a sequel to PRD (preferred) or EPP, for analysts and persons wanting additional training.
- ***Economic Evaluation of Prospects and Producing Properties*** (EPP), a broad course about the evaluation process and techniques, including probabilistic reserves.
- ***Project Modeling and Management*** (PMM), a new advanced course that focuses on portfolios.

The PetroSkills class codes are in parentheses.

Over 100 Evaluation Tips about risk and decision analysis: Notes about articles, books, evaluation methods, and other topics are posted at:

https://www.maxvalue.com.

INSTRUCTORS

JOHN SCHUYLER

John Schuyler, CAM, CCP, CMA, CMC, DRMP, PMP, and PE (CO), is a decision analyst, evaluation engineer, and investor. He founded his consulting practice, Decision Precision, in 1988. He has over 40 years of experience in analysis, consulting, and management, primarily in the energy industry. Since 1990, John has presented over 300 courses in 36 countries. His career focus has been in feasibility analysis, appraisals, corporate planning, and evaluation software. He was VP and Petroleum Engineer with Security Pacific Bank, Planning and Evaluation Analyst and (later) Manager-Business Systems for Cities Service Co., and Sr. Management Consultant with a national accounting firm. John is a member of eight professional organizations and is an author and speaker on modern analysis practices. He holds a B.S. and an M.S. in mineral-engineering physics from Colorado School of Mines, and an MBA from the University of Colorado at Boulder John is the author or revisions author of the two books in this flyer. He has written over 40 articles, conference papers, and handbook chapters.

Contact: 303-693-0067 or
john@maxvalue.com

TIMOTHY NIEMAN

Tim Nieman is President of Decision Applications, Inc. His firm performs decision and risk analysis for various organizations facing complex decision problems. His recent work includes risk analysis of deepwater pipeline routing; portfolio analysis for budgeting E&P R&D portfolios; and developing methods for assessing new basin entry opportunities. Other recent work includes development of remediation and reuse strategies for impaired properties, including former refineries, manufacturing facilities and pipelines; projects for the Yucca Mountain nuclear waste repository; work for the US Geological Survey. He teaches courses on decision analysis and quantitative modeling.

Tim was formerly Senior Decision Analyst for Geomatrix Consultants, a geological and environmental consulting firm, Director of Operations for Lumina Decision Systems, a decision analysis consulting and software firm, and 14 years with Amoco as a geophysicist, economist, and risk and portfolio analyst. He has a B.S. in geology and an M.S. in geophysics from Michigan State University, and an MBA from Rice University.

Contact: 408-234-9988 or
tnieman@decisionapplications.com

Contact Information for PetroSkills

If you are interested in having one of these courses presented in your company, please contact:

Either John or Tim about course content, agenda, and dates.

For pricing and contracting details please contact:

Ms. Dawn Wolfe
In-House Programs and Proposals Manager

PetroSkills, Katy, Texas

832-426-1228 dawn.wolfe@petroskills.com

PetroSkills is a subsidiary of OGCI.

Additional DA Course Details

www.maxvalue.com/dp.htm or

www.petroskills.com (and online registration)

Your Examples

For any of these courses, participants are encouraged to bring examples from their work for discussion. Please contact PetroSkills or the instructor if you wish to submit a problem for class discussion.

JOHN SCHUYLER and TIM NIEMAN

PETROLEUM BUSINESS MANAGEMENT

Risk and Decision Analysis

Petroleum Risk and Decision Analysis

Advanced Decision Analysis with Portfolio and Project Modeling

Economic Evaluation of Prospects and Producing Properties

Portfolio Modeling and Management

PetroSkills®

Decision Precision®

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