



Field Development Planning- Risk Assessment and Decision-Making-2 weeks

Course Description

This Field Development Planning course provides concepts, methodologies, and workflows to have a better understanding of the process of FDP design. The impact of reservoir uncertainties under the gathering system is also addressed as well as the impact on the FDP decisions.

Generally, investor select projects for capital investment based on organization's ability to design and accomplish trustworthy, and reliable field development plans. Then, oil and gas companies have the challenge to design the proper road map from discoveries to field abandonment in the most efficient way.

On the other hand, the reservoir complexity in many parts of the world is increasing because the conventional oil is declining has made field development plans (FDPs) increasingly difficult to design and carry out.

Industry studies have shown that FDPs routinely over-estimate field production rates and final recovery. This is caused by insufficient initial reservoir characterization studies, wrong selection of proper development technology, and lack of fully integrating of sub-surface to surface systems.

The Front-End Loading (FEL) methodology as well as decision scenario optimization are the core areas of this training. This FEL methodology demonstrate the importance of effective early planning decisions in delivering successful development projects.

At the end of the training the attendee will be able to identify the best practices related to field development plan design and optimization.

Who Should Attend?

The program provides engineering and management professionals knowledge needed to design top class FDP, such as project management principles, economic evaluations and risk analysis. This course is designed for professionals with background in Engineering (Petroleum, Mechanical or Chemical) or Sciences.

1. Attendants should be familiar with reservoir engineering, improved oil recovery processes, surface facility and project economics.



2. Preferably, attendants should have some basic knowledge of drilling and completion, production, reservoir characterization and production forecasting.





What You Will Gain:

1. Learn how to design field development plans under uncertainties and risks
2. Understand the concept and workflows related to Front-End-Loading (FEL), decision scenario optimization (DSO), and Integrated Asset Modeling (IAM).
3. Identify key elements of a Field Development Plan
4. Understand the workflow used for building static and dynamic models
5. Learn fundamentals of project economics
6. Understand the importance of risk assessment and management in FDPs.
7. Learn to use the basic techniques required

Training Methodology

The training course will combine lectures (30%) with workshop/work presentations (30%), interactive practical exercises and case studies (20%), supported by video material, software and general discussions (20%)

Course Content

Introduction to Field Development Planning and production optimization

- Field Development Planning (FDP)
 - Field development processes, uncertainties and decisions
 - Type of decisions, deliverables of a FDP.
- Optimization in Field Development
 - Optimization objective. Maximization of profit, NPV, recovery factor, production plateau duration; minimization of number of producer and injector wells, drilling cost, OPEX.
 - Examples
- Introduction to reserves and resources estimation methods: analogy, volumetric, decline curve analysis (DCA), material balance and reservoir simulation. Pro and cons of each reserve estimation methods

Reservoir Characterization and Modeling

- Reservoir modeling workflow
- Static modeling review
- Dynamic modeling review
- Flow Assurance Considerations
- Introduction to Well testing
- Sweet spot definition, well spacing criteria



Risk and Uncertainty analysis by using Stochastic Simulations

- Descriptive statistics
- Inferential statistics
- Uncertainty quantification by stochastic simulation (Monte Carlo)
- Sensitivity diagrams, Tornado plot
- Exercise – Build a Monte Carlo Simulator in Excel/Crystal Ball
- Exercise – Calculate OOIP Calculation with MC
- Exercise - Optimize Field Development NPV with MC
- FDP case studies

Drilling and Completion technologies for FDP

- Review of drilling and completion technologies
- Horizontal wells vs. vertical wells
- Intelligent and smart wells
- AFE Analysis, well cost optimization analysis
- Impact of new drilling and completion technologies in NPV
- Case studies

Introduction to EOR

- Introduction to EOR
 - EOR definition, Importance of EOR in FDP
 - Typical recover factor of EOR processes, EOR process maturity

Risk Management

- Risk management in FDP
 - Uncertainty versus risk analysis
 - Risk management
 - Decision Tree Analysis
 - Uncertainty processes impacting decision making (multidisciplinary approach)

Front-End-Loading for Field Development

- FEL (Front-End-Loading) methodology
- Decision Scenario Optimization (DSO)
- Uncertainty and decision-making evaluation from integrated profit models
- Case studies discussion

Overview of Economic Evaluations

- Introduction to oil and gas economic
 - Time value of money, present value formula
 - Inflation, escalation, real and nominal cash flow
 - Types of cash flow
 - Capital Expenditure (CAPEX)
 - Operating expenditures (OPEX)
 - Depreciation Methods



- Overview of main economic indicators
- Modern portfolio theory
 - Efficiency Frontier concept
- Practical session exercise using excel for building an economic model

FDP Workshop, hands-on project

