



N602: Introduction to the Upstream Petroleum Industry

Tutor(s): Easton Wren

2 Days

Competence Level:
Awareness



Classroom Course

Summary

The upstream petroleum industry is a complex mixture of technical and non-technical disciplines, with a consequence that many in it do not understand the basic activity and terminology. This course provides an overview of the key aspects of exploration and production (the upstream industry), including geology, exploration fundamentals, risk factors, drilling, formation evaluation, production, unconventional resources, reserve estimations and the history of the oil price.

Learning Outcomes

Participants will learn to:

1. Understand the key technical activities and business drivers of the upstream oil and gas industry.
2. Use appropriate terminology to communicate intelligently with company colleagues.
3. Discuss the role of regulatory agencies in oil and gas development.
4. Discuss recent trends in the industry, including the role of resource plays and the impact of changing oil and gas prices.

Duration and Training Method

A two-day course comprising lectures and video clips. Participants earn 1.6 CEUs (Continuing Education Credits) or 16 PDHs (Professional Development Hours).

Who Should Attend

The course is intended for anyone who does not have a familiarity with exploration and production. Within the industry, this includes new-hire subsurface staff as well as non-subsurface staff of any experience level (such as Drilling, Petroleum Engineering, Finance, Accounting, IT, Land, Administrative Assistants). The course is also suitable for any workers outside the industry who interact with the industry (such as government and service company staff).

The basis for the seminar is that every individual involved in the industry is requested to provide a basic service. It is therefore important that they understand the whole picture to realize where they fit and the significance of their contribution in terms of their company's objectives. The knowledge learned from this seminar is immediately transferable to the working environment.

Prerequisites and Linking Courses

There are no prerequisites.

For those that wish further study, please refer to the RPS Training website for courses dealing with each of the topics presented in this Introduction to the Upstream Industry course.



Course Content

Day One

1. Introduction and objectives
 - Understanding the petroleum industry
 - A review of significant historical events
 - The seven sisters
 - The independents
 - The service companies
 - The IOCs and the NOCs
 - The anatomy of an oil company
 - Definition of hydrocarbons
2. Basic geology
 - A review of the behavior of the planet
 - Mountain building
 - Plate tectonics
 - Petroleum geology
 - The concept of erosion
 - Transportation of sediments by rivers to oceans and the depositional process
 - Rock types
 - The organic theory for the origin of petroleum
 - Porosity and permeability
 - Exploration fundamentals
 - Geology and geophysics
 - Well logs
 - Core
 - Aerial photos
 - Seismic (2D and 3D)
 - Integration of geology and geophysics to build drilling prospects
 - Risk aspects
 - A review of the various risk elements in the industry
 - Pricing
 - Costs
 - Drilling accident
 - Drilling in the wrong place
 - Production decline
 - Risk assessment/chance of success
 - Regulatory agencies
 - The extent to which the oil industry is controlled by government agencies
 - Licensing round
 - Drilling licenses
 - Abandonment procedures
 - Exploration, appraisal and development terms
 - Farmout agreements



- Relinquishments
- Mineral rights, leasing and land
 - The difference between surface rights and mineral rights
 - The historical narrative
 - Royalties
 - PSC and PSA
 - Drill spacing units

Day 2

1. Drilling the well
 - Historical evolution from cable tool to rotary to top drive
 - Onshore and offshore rigs, the basic elements of a drilling rig
 - Drill pipe and bits
 - Circulation with drilling mud
 - The rotary system and the kelly
 - Tripping
 - Fishing
 - Drilling the well in stages
 - Casing and cementing
2. Formation evaluation
 - Analysis of all data collected from the wellbore to determine the likelihood of a commercial well
 - Logs, cuttings, core (vertical and sidewall)
 - Pressure data
 - DST
 - Decision to complete
3. Well completion
 - Process of running production casing
 - Perforation
 - Christmas tree installation
4. Directional and horizontal drilling
 - Explanation of both types of drilling
 - Rationale and benefit
 - Differences in equipment
 - Costs
 - Application for old oil fields and current shale plays
 - Coiled tubing
 - Underbalanced drilling
5. Production
 - Ancient and modern techniques
 - Reservoir analogies
 - Separation facilities
 - Decline curves
 - Primary production
 - Secondary production



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- Tertiary production
- EO
- 6. Non-conventional resources
 - A summary of the current “unconventional” resources
 - Shales
 - Oil sands
 - Coalbed methane
 - Tight sandstones
 - Oil shales
 - Gas hydrates
 - Animation of horizontal well with multi-stage frac
- 7. Reserves and resources
 - The approach to reserves estimation
 - The definitions of the main categories of proven, probable and possible
 - Oil in place and stock tank barrels
 - The write-downs by shell and other companies
 - Global reserves
- 8. The oil price
 - The history of the oil price and the factors driving it
 - The story of OPEC
 - Comparison of petrol/gasoline prices with other liquids