



DE367-4D: Advance Petroleum Geophysics and Methods

Training Description:

This training course provides a working knowledge of the main qualitative and quantitative techniques used by petroleum geoscientists in finding and evaluating subsurface resources. Basic techniques utilised in geological and geophysical analyses of the subsurface are discussed. Practical application of these techniques are demonstrated in exercises.

The Petroleum Geology section provides a detailed description of clastic and carbonate reservoir rocks, with the unifying theme being that reservoir location, shape and properties can be understood and predicted from knowledge of the environments in which the sediments forming the rocks were deposited, and the various processes which occur following deposition (diagenesis). The behaviour of fluids in reservoir rocks is covered next, with capillary pressure principles as a basic concept for understanding issues such as vertical and lateral distribution of fluids in a reservoir, seal capacity, and recovery efficiency. Volumetric reserve estimation is covered next, followed by discussions on enhanced oil recovery, unconventional reservoirs and the storage of carbon dioxide in reservoir rocks as a technique for greenhouse gas emissions abatement.

The Petroleum Geophysics section presents an introduction to refraction and reflection seismology, the main geophysical method used in hydrocarbon exploration and development. After an outline of the various types of information that can be obtained using the method, the basic physics at its heart is described - the reflection of (sound) waves from interfaces within the earth, and the refraction and attenuation of these waves as they travel down and back up to the surface. The interpretation of the data to produce maps or models of the reflecting interfaces is covered, and the section includes a brief description of seismic surveying and the data processing required to produce the seismic images which the interpreter works with. The section concludes with specialist uses of seismic reflection survey data for advanced interpretation, reservoir evaluation and production monitoring. A series of spreadsheet exercises illustrate technical principles of seismic reflection theory.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Learn basic principles of petroleum exploration and field development
- ✓ Understand the principles of sedimentology and stratigraphy for both clastic and carbonate reservoir rocks with particular emphasis on deposition and diagenesis
- ✓ Learn specific tools and processes for analysing capillary pressure data to determine fluid migration from a source rock, to a reservoir and then to a producing well; use same principles to determine seal properties of caprocks. Practice using these tools and processes with hands-on exercises
- ✓ Learn methods for estimating volumetric reserves in discovered hydrocarbon accumulations
- ✓ Review example of how reservoir characterization studies lead to better field management
- ✓ Illustrate basic principles of Carbon Capture and Storage (CCS) and how the principles of petroleum geology can be applied to geological sequestration of CO₂
- ✓ Understand the physical principles of reflection seismology
- ✓ Understand the techniques used to interpret seismic data and the utility of this information in the exploration for and development of hydrocarbon fields



Training Designed for:

This course is intended for geologists, geophysicists, petroleum engineers and other technical staff who have some years' work experience in the Petroleum field.

Training Requirement:

"**Hand's on practical sessions, equipment and software** will be applied during the course if required and as per the client's request." (This hands-on, highly-interactive training includes simulator, real-life case studies and exercises).

This training course is available upon request in English or Arabic. Content, location and duration can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

FOUR DAYS:

- ❖ PRE-TEST
- ❖ **Petroleum Geology**
- ❖ Overview of petroleum geology
 - Assessment of risk
 - Sources of geological data
 - Traps
 - Reservoirs and seals
 - The reservoir team
- ❖ Clastic reservoirs
- ❖ Carbonate reservoirs
- ❖ Capillary pressure principles
- ❖ Reserves evaluation
- ❖ Carbon capture and storage
- ❖ **Petroleum Geophysics**
 - Introduction
 - Types of Information obtained from seismic data
- ❖ Basics of the reflection seismic method
 - the seismic trace, section and volume
 - the convolutional model – reflection coefficients, travel times and wavelet
 - wave propagation – reflection, refraction and attenuation
 - resolution and velocity
- ❖ Basics of Interpretation
 - 2D vs 3D
 - Well ties
 - Interpretation procedure
 - Depth conversion



- ❖ Reservoir Interpretation
 - Amplitude interpretation for seismically thin beds
 - Direct Hydrocarbon Indicators
 - Seismic Attributes
 - 4D seismic
- ❖ Course Conclusion
- ❖ POST-TEST and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures, Concepts, Role Play
- 30% Workshops & Work Presentations, Techniques
- 20% Based on Case Studies & Practical Exercises
- 20% Videos, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

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|---------------|-------------------------------|
| 07:45 - 08:00 | Morning Coffee / Tea |
| 08:00 - 10:00 | First Session |
| 10:00 - 10:20 | Recess (Coffee/Tea/Snacks) |
| 10:20 - 12:20 | Second Session |
| 12:20 - 13:30 | Recess (Prayer Break & Lunch) |
| 13:30 - 15:00 | Last Session |

For training registrations or in-house enquiries, please contact:

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Training & Career Development Department

