



PE106: Modern Oil & Gas Production Operations



Training Description:

This course provides participants with an integrated view of the oil and gas production and related facilities during the life of the reservoir.

It presents an overview/fundamental understanding of the wide range of oilfield production handling and treatment equipment. With this view and tools and knowledge on the properties and flow of the fluids provided in this course, participants are able to understand the behavior of the fluids from the reservoir up to end users.

The training gives strong emphasis of the calculation of reserves, fluids properties from reservoir through gathering network. This knowledge is necessary for the surface facility engineer to design or operate the equipment's and facilities.

Training Objectives:

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

- ✓ Gain an improved knowledge about various aspects of the oil & gas production operations
- ✓ These include production of gas and oil and surface processing units and operations such as artificial Lift and pressure maintenance operations
- ✓ Issues related to mid-stream and down-stream will be discussed as well, including recent developments
- ✓ Gain an overall knowledge of various hydrocarbon production processes from the time a reservoir is discovered to end users
- ✓ Understand the role of the petroleum/reservoir engineer in optimizing recovery
- ✓ Gain sufficient knowledge of various surface and sub-surface equipment's and processing facilities used in a typical oil & gas field
- ✓ Gain sufficient knowledge about health, safety and environmental issues
- ✓ Understand the role of petroleum economics in evaluating field development projects

Training Designed for:

This course is intended for all Oil & Gas Production Field Personnel, Operations and Maintenance Supervisors, Technicians, Support Engineers and Engineering Trainees. It would also benefit safety and other support staff who have an interest in increasing their understanding of Oil & Gas Operations.

Training Program:

DAY ONE:

- ❖ PRE-TEST
- ❖ Introduction and Overview
 - History of the Natural Gas Sector
- ❖ Characteristics of Natural Gas
 - Physical Description, Composition, and Properties
 - Transport Properties
 - Heating Value
 - Thermodynamic (State) Properties
 - Equilibrium/Phase Behavior
- ❖ Natural Gas Reservoirs and Exploration
 - Chemical Origins of NG





- Sedimentation and Reservoir geology
- Modern Exploration
- Geographical Studies, Geophysical Surveys, Well Logs, Data Analysis

DAY TWO:

❖ Natural Gas Drilling and Production

- Rotary Drilling Equipment and Systems
- Drilling Operations
- Well Pressure Balance and Blow Out
- Directional and Offshore Drilling
- Well Completion, Testing, and Stimulation
- Primary and Enhanced Recovery Methods
- Offshore Production
- Production Profiles and Recovery Estimation
- Problem Well Analysis

❖ Natural Gas Processing and Utilization Strategies

- Historical and Modern Approaches
- Processing Objectives and Restrictions
- Natural Gas Products and Specifications
- Associated vs Non-Associated Natural Gas
- Modern Approaches: CNG, LNG, GTL, NGL, Condensate

DAY THREE:

❖ Free Liquids and Solids Separation

- Well Stream Separators: Functions, Design, Operations
- Multi-Stage Separators
- Solid Filtration and Filter Separators: Functions, Design, Operations

❖ Hydrates

- Hydrate Characteristics
- Hydrate Formation and Thermodynamics
- Preventing Hydrate Formation

❖ Dehydration

- Effect of the Presence of Water
- Approaches to Dehydration of Natural Gas
- Absorption: Equipment, Solvents, Operations, Regeneration
- Adsorption: Process, Adsorbent Selection, Operation
- Gas Permeation Dehydration

DAY FOUR:

❖ Hydrocarbon Fractionation and Purification

- Thermodynamics of Refrigeration
- Isenthalpic and Isentropic Flash Refrigeration Processes
- External Cycle Refrigeration: Compression and Absorption
- Fractionation by Low Temperature Distillation
- Oil Absorption
- Selective Adsorption
- Condensate Stabilization



- C2+ Fractionation
- Impact of Presence of Water Vapor (and Hydrates) on Fractionation
- ❖ **Natural Gas Treating**
 - Chemical Removal of Acid Gases
 - Physical Absorption Removal of Acid Gases
 - Adsorption
 - Gas Permeation and Low-T Distillation
 - LPG and C5+ Sweetening
 - Sulfur Recovery
 - Nitrogen and Helium Removal
 - Mercury Removal
- ❖ **Compression and Expansion**
 - Compressor Functions and Classification
 - Theory of Compression
 - Reciprocating Compressors
 - Reciprocating Compressor Selection and Operations
 - Turbine-Drive Centrifugal Compressors
 - Turboexpanders: Configuration, Design, Operations
 - Measurement, Storage, and Transportation
 - Natural Gas Flow, Temperature, and Specific Gravity Measurement
 - NGL Metering
 - Natural Gas Sampling and Testing
 - Natural Gas Storage: Depleted Reservoir, Aquifer, Salt Cavern
 - Cryogenic Storage
 - Natural Gas Transportation chains: Pipelines, LNG, Chemical Conversion, Electricity
 - Natural Gas Pipelines: Design, Construction, Operations, Offshore

DAY FIVE:

- ❖ **Liquefied Natural Gas**
 - Historical Development
 - Cryogenics Cascade Cycles
 - Commercial Liquefaction Processes
 - Liquefaction and Treating Operations
 - Transport Tankers: Commercial Designs and Operations
 - LNG Storage: Tank Designs and Statistics
 - Boil-Off During Transport and Storage
 - LNG Re-Gasification: Commercially Available Designs and Operations
- ❖ **Gas-to-Liquids and Other Chemical Conversion Technologies**
 - Historical Development
 - Process and Chemistry Fundamentals
 - Competing Technologies
 - Economic Drivers and Strategies
 - Current and Anticipated Implementations
 - Synergies and End-Use Operations



❖ **Refinery gas processing**

- Crude Oil Composition and Light Ends
- Modern Petroleum Refining and Light Ends Manufacture
- Saturated Gas Plant
- Unsaturated Gas Plant
- Refinery and End-Product Utilization Operations

❖ **Course Conclusion**

❖ **POST-TEST and EVALUATION**

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”.

Please note that the above topics can be amended as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Methodology:

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

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, 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:

- 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

