Oil and Gas Surface Production Operations: Separation, Treating and Flow Assurance

4 – 8 July 2027
Dammam - Eastern Province five-star



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Ref: 92_14906 **Date:** 4 – 8 July 2027 **Location:** Dammam - Eastern Province five-star **Fees:** 19500 SAR

Introduction:

Oil and gas surface production operations lose barrels and money in small ways: a separator run outside its design envelope, off-spec crude sent to export, a hydrate plug in a cold flowline or an ESP well left below its best rate. This Core Concept course gives operators and engineers the working methods to run the wellhead-to-export train to target, from chokes and separators to crude treating, gas dehydration, artificial lift and flow assurance. Participants walk through realistic facilities and produce a Production Facility Operating Envelope and Optimisation Plan for their own asset.

Course Objectives:

- Describe how reservoir fluids change from bottomhole to stock tank and read a phase envelope, PVT report and gas-oil ratio trend
- Operate wellheads, chokes, manifolds and flowlines within pressure and erosional velocity limits
- Set level, pressure and interface controls on two-phase and three-phase separators to meet oil, gas and water quality targets
- Run crude stabilisation, dehydration, desalting and glycol gas dehydration units to export specification
- Prevent and remediate hydrates, wax, asphaltenes and scale using inhibitor dosing, pigging and thermal methods
- Monitor well and facility performance with well tests and nodal analysis and compile a Production Facility Operating Envelope and Optimisation Plan

Target Audience:

- Production operators and control room technicians who run wellsites, gathering stations and separation plants on shift
- Production supervisors responsible for daily output, well line-ups and shift handover
- Production and facilities engineers responsible for surface equipment performance and debottlenecking
- Petroleum engineers who manage well testing, artificial lift and well allocation
- Production chemists responsible for demulsifier, inhibitor and scale chemical programmes
- Maintenance and instrument technicians who support separators, treaters, compressors and control valves

Course Outline:

Day 1: Reservoir Fluids and the Wellhead-to-Export Chain

- Black Oil, Volatile Oil, Gas Condensate and Dry Gas Phase Envelopes
- PVT Report Reading: Formation Volume Factor, Bubble Point and Solution GOR
- Gas-Oil Separation Plant Block Flow Diagram from Wellhead to Export Meter
- Christmas Tree, Wellhead Valves and Fixed Versus Adjustable Chokes
- Asset Baseline Survey: Well Count, Water Cut, GOR and Facility Capacity

Day 2: Flowlines, Manifolds and Separator Design Basis

- Multiphase Flow Regimes: Slug, Stratified and Annular Flow in Flowlines
- Erosional Velocity Check per API RP 14E for Flowlines and Headers
- Test and Production Manifold Line-Up and Slug Catcher Duty
- Separator Sizing Basis per API Specification 12J: Retention Time and Gas Capacity
- Separator Internals: Inlet Diverters, Mist Extractors, Weirs and Vortex Breakers

Day 3: Separator Operation, Crude Treating and Gas Conditioning

- Three-Phase Separator Level, Interface and Pressure Control Loop Tuning
- Multistage Separation Pressure Selection and Crude Stabilisation Column Operation
- Heater-Treater and Electrostatic Dehydrator Operation for BS&W Control
- Desalter Wash Water Rate, Mixing Valve Differential and Salt-in-Crude Targets
- TEG Glycol Dehydration Contactor and Regenerator Operation with Water Dew Point Checks

Day 4: Flow Assurance, Artificial Lift and Safe Operating Limits

- Hydrate Formation Curve Prediction and MEG or Methanol Inhibitor Dosing Rates
- Wax Appearance Temperature, Pigging Frequency and Asphaltene Onset Control
- Scale Tendency Prediction and Scale Inhibitor Squeeze Programmes
- ESP, Gas Lift and Rod Pump Selection with Nodal Analysis Well Performance Curves
- Surface Safety Systems per API RP 14C: Safety Analysis Tables and Shutdown Levels

Day 5: Facility Walkthroughs and the Operating Envelope Plan

- Onshore Gathering Station Walkthrough: Manifold, Separator Train and Flare Knockout Drum
- Offshore Platform Process Walkthrough: Gas Lift Compression, Treaters and Produced Water Hand-Off
- Well Test Validation and Production Allocation Reconciliation Exercise
- Production Loss Waterfall and Debottlenecking Priority Matrix
- Production Facility Operating Envelope and Optimisation Plan Drafting and Peer Review

Skills You Will Gain:

- Reservoir Fluid Characterisation
- Choke and Flowline Management
- Separator Control Tuning
- Crude Dehydration and Desalting
- Glycol Gas Dehydration
- Hydrate and Wax Prevention
- Artificial Lift Performance Review
- Production Allocation

Why Attend This Course:

- Leave with a Production Facility Operating Envelope and Optimisation Plan built from walkthroughs of onshore and offshore production trains
- Recover deferred barrels by spotting separator carryover, off-spec crude and underperforming lifted wells earlier
- Cut unplanned shutdowns from hydrate plugs, wax build-up and scale through correct inhibitor and pigging routines
- Compare production practice with operators and engineers from national oil companies, independents and service contractors

Conclusion:

Steady production depends on understanding the fluid, keeping every piece of surface equipment inside its operating envelope and acting early on flow assurance threats. The course moves from reservoir fluids and the wellhead-to-export chain, through flowlines and separator design basis, to separator operation, crude treating and gas dehydration, then to flow assurance, artificial lift and surface safety systems. The final day applies this material in facility walkthroughs and produces an operating envelope and optimisation plan for participants' own assets.