

Who Should Attend?

This intermediate course is designed for process/facilities engineers, senior operating personnel, and production chemists.

The course is intended to be complementary to the G-4 Gas Conditioning and Processing course which is focused on the gas handling side of the upstream oil and gas facilities area. Exercises requiring calculations are utilized throughout the course.

The Participant Will Learn:

- Basic concepts and calculation techniques for optimization, de-bottlenecking and troubleshooting oil processing facilities
- About well inflow performance and its impact on processing facilities
- About oil, gas, and water compositions and properties needed for equipment selection and sizing
- How to select and evaluate processes and equipment used to meet sales or disposal specifications
- How to apply physical and thermodynamic property correlations and principles to the design and evaluation of oil production and processing facilities
- How to perform equipment sizing calculations for major production facility separation equipment
- How to evaluate processing configurations for different applications
- How to recognize and develop solutions to operating problems in oil/water processing facilities

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Oil Production and Processing Facilities (PF-4)

Course Outline

Daily schedule is approximate.

DAY 1	<ul style="list-style-type: none"> • Course introduction • Reservoir Traps, Rocks & Drive Mechanisms <ul style="list-style-type: none"> – Types of traps – Types of rock porosity & permeability – Drive mechanisms impact on production profiles & equipment • Phase Envelopes & Reservoir Fluid Classification <ul style="list-style-type: none"> – Phase behavior characteristics of different reservoir fluid types – Typical compositions • Well Inflow Performance <ul style="list-style-type: none"> – What is an inflow performance curve? – Darcy's equation for radial flow through porous media – Effect of facilities-imposed back pressure on well production rates 	DAY 6	<ul style="list-style-type: none"> • Desalting <ul style="list-style-type: none"> – What desalting is – Why desalt? crude oil salt specifications – Overview of desalting • Crude Oil Stabilization & Sweetening <ul style="list-style-type: none"> – Crude oil vapor pressure & H₂S specifications – Stabilization processes – Sweetening processes • Oil Storage & Vapor Recovery <ul style="list-style-type: none"> – Types of storage tanks & their applications – How vapor recovery systems work & where they are used • Sand, Wax & Asphaltenes <ul style="list-style-type: none"> – Surface facilities focused – Problems caused & typical solutions
DAY 2	<ul style="list-style-type: none"> • Artificial Lift <ul style="list-style-type: none"> – When is artificial lift required? – Different types of artificial lift – Selection of artificial lift method • Oil, Gas & Water – Composition & Properties <ul style="list-style-type: none"> – Compositions of oil, gas & water – Calculation of properties needed for equipment sizing 	DAY 7	<ul style="list-style-type: none"> • Sand, Wax & Asphaltenes (cont'd) • Crude Oil Flow Measurement <ul style="list-style-type: none"> – Types of meters used – Accuracy of commonly used oil meters – Selection guidelines • Fired Equipment <ul style="list-style-type: none"> – Direct & indirect fired heaters – Fire tube and process tube sizing • Pipeline Transportation of Crude Oil <ul style="list-style-type: none"> – Bernoulli's equation – Calculation of friction loss – Applicable piping/pipeline codes – Line sizing – Heat loss calculations
DAY 3	<ul style="list-style-type: none"> • Emulsions <ul style="list-style-type: none"> – What they are – How they are caused – Characterization of emulsions • Gas – Liquid Separation <ul style="list-style-type: none"> – Types of equipment used – Feed pipe and inlet devices – Gas gravity separation – Mist extractors 	DAY 8	<ul style="list-style-type: none"> • Pipeline Transportation of Crude Oil (cont'd) • Pumps <ul style="list-style-type: none"> – Types of pumps & their applications – Calculation of head requirements – Specific Speed and Suction Specific Speed – NPSHA/NPSHR • Produced Water Treating <ul style="list-style-type: none"> – Produced water composition characterization of hydrocarbon content – Importance of oil droplet size – Typical discharge/disposal specifications – Treating equipment options – Equipment performance – Combination of different equipment types
DAY 4	<ul style="list-style-type: none"> • Gas – Liquid Separation (cont) <ul style="list-style-type: none"> – Types of equipment used – Feed pipe and inlet devices – Liquid handling • Oil – Water Separation <ul style="list-style-type: none"> – Types of equipment used – Residence time & droplet settling theory – Compact electrostatic coalescers 	DAY 9	<ul style="list-style-type: none"> • Water Injection Systems <ul style="list-style-type: none"> – Typical flow diagrams – Source water quality – Injection water quality specifications – Equipment • Relief & Flare Systems <ul style="list-style-type: none"> – Causes of overpressure – Types of relief valves & sizing – Flare system components – Radiation calculations – Flare gas recovery
DAY 5	<ul style="list-style-type: none"> – Crude oil sales specs – Oil treating methods – Heat input requirements – Demulsifiers – Types of equipment, selection & performance – Sizing methods 	DAY 10	<ul style="list-style-type: none"> • Solution Gas Handling <ul style="list-style-type: none"> – Sales gas specifications – Sweetening, dehydration, NGL recovery, etc • Compressors <ul style="list-style-type: none"> – Types of compressors & applications • Course Wrap-up