OIL, GAS AND WATER SYSTEMS AND EQUIPMENT

General:

Discipline: Production and Facilities engineering
Level: Basic/Intermediate
Duration: 5 days
Instructor: Jairo Balcacer

Purpose:

This course provides an understanding of two and three-phase oil separation, design procedures for sizing them, methods for treating oil, various processes used to stabilize a crude oil condensate stream. It also presents reasons to remove acid components from the natural gas, conventional TEG dehydration, a method to size and design the glycol dehydration equipment, guidelines to select gas compressor and piping system. Finally, considerations about the equipment used to separate, treat, collected and disposed of wastewater along with procedures for designing a water treating system and its components., as well as equipment and sizing for removing solids and dissolved asses from produced water.

Designed for:

This course is addressed to production and facilities engineers involved in the oil, gas and water production operations.

You Will Learn:

- The equipment description for oil, gas and water separation and treatment
- Basis of designing horizontal and vertical, two and three-phase oil separators
- Required treatments for the produced oil, gas and water
- Design examples for acid gas removal and glycol dehydration processes
- Fundamental criteria and design example of reciprocating gas compressors
- Equipment description and design procedure for treating oil and removing solids/dissolved gases from produced water

Course Content:

Two Phase Separators for Oil

- Equipment description
- Selection criteria
- Vessels internals
- Potential operating problems
- Separator design theory
- Horizontal separator design and example

- Vertical separator design and example

Three Phase Separators for Oil

- Equipment description
- Design theory
- Horizontal separator design and example
- Vertical separator design and example

Oil Treaters

- Equipment description
- Design procedure
- Vertical treater design and example

Desalting

- Theory
- Single and two stage desalting
- Design procedure
- Single, two-stage, multi-stage desalter design and examples

Crude Stabilization

- Theory and equipment description
- Multistage separation design example
- Crude stabilization design examples

Acid Gas Removal

- General process description
- Solid bell processes
- Iron sponge design procedure and examples

Glycol Dehydration

- Hydrate formation
- Dew point depression
- Glycol properties
- Equipment and design procedure and example
- Unit operating problems and troubleshooting

Reciprocating Compressors

- General considerations
- Performance considerations
- Process piping considerations
- Fundamental design
- Specifications and selecting compressors
- Design example

Treating Oil from Produced Water

- Theory
- Equipment description
- Design procedure

Removing Solids and Dissolved Gases from Produced Water

- Theory of solids removal
- Description of solids removal equipment
- Description of gas removal equipment
- Design procedure and example, soli and gas removal

Calculation Resources:

- MS Excel spreadsheets

Text and Consulting books:

- "Oil and Gas Separators" API Spec 123, ANSI/API Spec 123-1992
- "Surface Production Operations, Vol 1" Design of Oil Handling Systems and Facilities, Gulf Publishing Company, 1989, Volume 1, Second Edition
- "Surface Production Operations, Vol 2" Design of Gas Handling Systems and Facilities, Gulf Publishing Company, 1989, Volume 2, Second Edition