ADVANCED OPERATIONAL TECHNIQUES FOR OIL & GAS OPERATORS

TRAINIT ACADEMY

PCE185
Process and Chemical Engineering

COURSE TITLE

Advanced Operational Techniques for Oil & Gas Operators

COURSE DATE/VENUE

01st Jul-05th Jul 24'

Dubai, UAE

COURSE REFERENCE

PCE185

COURSE DURATION

05 Days

DISCIPLINE

Process and Chemical Engineering

COURSE INTRODUCTION

The purpose of this course is to present an advanced understanding of the wide range of oilfield production handling and treatment equipment. The attendee would learn not only "what" but "how" field fluid treating equipment works. The fundamental principles of fluid behavior are first introduced, then applied to all the various equipment and systems comprising production operations. Emphasis is on understanding the internal workings inside the piping, valves and vessels. A major goal of this course is to improve communication among the technical disciplines, field and office in order to enhance operational efficiencies, lower costs and improve production economics. Example step-by-step exercises are worked together with the instructor to drive home the important points. Daily sessions include formal presentation interspersed with directed discussion and problem solving.

Besides Overview of the gas industry and gas processing – Surface facilities; gathering lines and system; and phase separations

This course studies all aspects of gas handling, conditioning and processing facilities with particular focus on the practical aspects of managing, evaluating, sizing, selecting,

installing, operating and troubleshooting. A proper understanding and execution of each of the above is a key in assuring a surface production facility that operates at maximum efficiency and experiences minimal problems.

COURSE OBJECTIVE

By the end of this course, participants will be able to understand

- The physical properties and phase behavior of crude oil and natural gas that govern production operations.
- Field processes for treating and conditioning full well stream production for sales or final disposition
- An introduction to the wide range of equipment used to process, treat, transport, and store oilfield produced fluids
- The basics of oilfield corrosion prevention, detection and treatment
- How to determine and minimize pressure drop in pipelines, valves and pressured vessels Internal workings of separators, pumps, compressors, valves and other treating equipment
- An overview of the processes and equipment used to handle acid gases.
- A basic understanding of a wide range of produced fluid volume measurement and metering devices
- A description of treating equipment whether located down hole, on the surface, offshore platform or sea floor.

COURSE AUDIENCE

Production Engineers and Petroleum Engineers. Technical and operations staff from other disciplines, which require a cross-training to or a basic understanding of surface production operations, Technical personnel involved in the activities of natural gas industry. Specifically, technical, operations and maintenance personnel who had limited exposure in this area, or professionals involved in other areas of the gas industry who require a comprehensive overview of natural gas processing will find this course ideally suited for them

COURSE CONTENT

DAY 1

- ✓ Chemical and physical properties of crude oils
- ✓ Types of Storage Tanks.
- ✓ Crude oil storage tanks and supply distribution.
- ✓ Separation Facility Equipment: -
- ✓ Equipment description - Horizontal vs. Vertical vessel selection - Vessel internal
    - Treating facility up-to-date description of new equipment for handling high pressure/temperature, three phase flow
    - Overview of upstream oil and gas production operations
    - Fluid properties & phase behavior
    - Overview of artificial lift
    - Processing configurations (example PFD's)
    - Phase separation of gas, oil, and water
- ✓ Gas – oil – and water separation
- ✓ Principles of liquid flow through
- ✓ pipelines
- ✓ The production Facility: -
- ✓ Making the equipment work
- ✓ Gathering pipelines system
- ✓ Process corrosion, fouling and scaling

DAY 2

- ✓ Emulsions
- ✓ Sand, wax, & asphalt ness
- ✓ Oil treating.
- ✓ Field desalting
- ✓ Crude stabilization & sweetening
- ✓ Crude oil storage & vapor recovery

- ✓ Measurement of crude oil
- ✓ Transportation of crude oil
- ✓ Produced water treating.
- ✓ Water injection systems
- ✓ Overview of solution gas processing
    - Relief & flare systems
- ✓ Breaking oil/water emulsion
- ✓ Dehydration Theory of emulsions,
- ✓ Factors promoting stability of oil – water emulsions , Treatment of wet – crude oil
- ✓ Principles of electric dehydration
- ✓ Alternating current and dual polarity electrostatic system

DAY 3

- ✓ Operation of the Desolaters
- ✓ Desalting of crude oil
- ✓ Desalting process Performance and design data
- ✓ Theory, operating condition, troubleshooting
- ✓ Pumps and compressors
- ✓ Determine wash water quantity.
- ✓ Design considerations.
- ✓ Facilities Integration Troubleshooting
- ✓ Retention time Carry – over problems
- ✓ Water Treatment:
- ✓ Water Treatment principles
- ✓ Water Treatment methods
- ✓ Water Treatment networks.
- ✓ Water de oiling
- ✓ Water injection

DAY 4

- ✓ Calculation of hydrate forming conditions

- ✓ Methods for preventing hydrate formation – Chemicals (inhibitors (methanol), advanced methods and methanol injection rates), Heat (line heaters and heat tracing), and dehydration (glycol dehydration, refrigeration, and molecular sieves).
- ✓ Physical properties of hydrates - Density, heat capacity, heat of formation, and mechanical properties.
- ✓ Water content of gas – Calculating the water content of sweet, sour and acid gas.
- ✓ Use of phase diagrams to understand the subtleties of hydrate formation conditions – Phase Ioci, triple points, quadruple points, pressure- temperature diagrams, and temperature-composition diagrams, and temperature-composition diagrams.
    - Determination of hydrate formation temperature or pressure
    - Condensation of water vapor
    - Temperature drop due to gas expansion
    - Thermodynamic inhibitors
- ✓ Condensate stabilization

DAY 5

- ✓ Dehydration with liquid desiccants – Glycols, Safety, physical properties, Storage and Handling and tri-ethylene glycol (TEG)
- ✓ Glycol dehydration
- ✓ TEG Dehydration process description – Glycol contactor, inlet separator, the regenerator and process flow.
- ✓ TEG Dehydration: Design – Inlet gas temperature, contactor pressure, number of equilibrium stages, circulation rate, contactor diameter, lean glycol temperature, glycol concentration, reboiler temperature, reboiler pressure, stripping gas, still temperature and reboiler duty.
- ✓ TEG Dehydration: Operation – Operations problems and dehydration unit start-up.
- ✓ Adsorption Process
- ✓ Adsorbent selection
- ✓ Solid desiccant dehydration –
- ✓ Absorbents, process description and dryer regeneration.

- ✓ Mole sieve simplified design – Absorption design and regeneration
- ✓ Process selection
- ✓ Solid bed dehydration
- ✓ Process description
- ✓ Design consideration
- ✓ Design procedure for iron-sponge units
- ✓ Natural Gas treating
- ✓ Design calculations.
- ✓ The turbo expander control.
- ✓ Expander / compressor Operation.
- ✓ Principles of diethazine operation

Process Control and Safety Systems – Control objectives and control loops; PID control theory; control valves; and flow measurement and control. Flow of Fluids – Pressure drops in piping; choosing a line diameter and wall thickness; pressure ratings and determining pressure breaks; designing Loop Systems; Single-Phase and two-phase flow; testing and inspection; pigging; and flow splitting.

COURSE CERTIFICATE

TRAINIT ACADEMY will award an internationally recognized certificate(s) for each delegate on completion of training.

COURSE FEES

£4,500 per Delegate. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

COURSE METHODOLOGY

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will make extensive use of real-life case examples in which he has been personally involved.

You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises
- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions