

# **Re-Injection of Water Formation and Water Surface Treatment Technologies and Field Practices**

## **Course Price**

£3250

## **Course Description**

This course is aimed at creating an understanding of WATER FORMATION RE-INJECTION AND WATER TREATMENT AND DISPOSAL. The course is designed to build up knowledge in the participant to understand the WATER RE-INJECTION process facilities design and Water treatment and disposal. The course studies in depth and in accordance to classic and new technology. Also the effect of Separation pressure is introduced using the engineering system concept of nodal analysis, and by using the classic flash calculations method. The calculations for pump specifications in the petroleum industry is treated in a formal and practical way.

## **Course Objectives**

## **Who Should Attend**

Engineers, R&D personnel and managers from upstream oil and gas Industry. Project Managers and multi-discipline engineering personnel from Contractor companies. Petroleum Engineers recently transfer to production areas, All non-petroleum engineers working as petroleum Engineers in the oil and gas industry. All personnel in refinery and petrochemical industry. Petroleum Engineer Trainees. Production Technicians working in the oil and gas industry, and Reservoir engineers without experience in the production area.

## **Course Content**

### **Section I: Introduction**

- The Production Facilities
- The Engineering System Concept
- Production Facilities Types
- The role of Production Optimization Techniques
- Scope of the Course
- Initial Test

### **Section II: Fluid Properties, Basic Concepts, Definitions and Terminologies**

- Production Mechanisms in Reservoirs
- Basic Principles
- Specific Gravity, Density and Viscosity
- Flash Calculations
- Characterization of Flow Stream
- Approximate Flash Calculations
- Reservoir From a Phase behavior point of View
- Composition and types of Natural Gas
- Field Life and Production Profile
- Definition process streams
- Well fluid characteristics
- Crude oil characteristics

### **Section III: Oilfield Processing Methods**

#### **Processing Systems**

- Separation systems
- Water treatment and disposal

#### **Heavy Oil Production Facilities**

- Case History presentation and brief discussion
- Diluent Distribution System
- Case History: Diluent Model Application

### **Section IV: Process Equipment Selection and Technology**

- Two-Phase Oil and gas separation
- Factor Affecting Separation
- Equipment Description
- Horizontal separators
- Vertical separators
- Spherical Separators
- Other Configurations
- Scrubbers
- Horizontal vs. Vertical Vessels Selection
- Potential Operating Problems
- Foamy
- Paraffin
- Scales
- Sand
- Liquid Carryover
- Gas Blowby
- Theory
- Settling, Drop Size, Retention Time and Re-Entrainment
- Separator Sizing Calculation
- Examples:
- Sizing a Vertical Separator

- Sizing a Horizontal Separator
- Desanding
- Emulsion treatment and oil dehydration
- Oil dehydration technology

## **Section V: OIL AND WATER SEPARATION PROCESSES**

- Introduction
- Equipment Description
- Vessel Internals:
- Coalescing Plates
- Sand Jets
- Drains
- Emulsions
- Theory
- Gas separation
- Oil/water Settling
- Water Droplet size in oil
- Oil Droplet in Water
- Retention time
- Separation Sizing:
- Horizontal Separation Settling Equation
- Sizing a Horizontal Three-phases Separator

## **Section VI: Crude Oil Treatment Systems**

- Emulsion treatment theory
- Gravity Separation
- Treatment equipment
- Equipment Sizing and Theory
- Design Procedures
- Examples

## **SECTION VII: Chemical Water Analysis Pattern and Water**

### **Selection, Water treatment for Injection**

1. a. Selection of Water Sources
2. b. Estimation of Water requirements
3. c. Source Water Quality
4. d. Analyzing compatibility of the Water
5. e. Chemical Water Analyze Patterns
6. f. Water Treatment for Injection System

## **Section VIII: Produced Water Treatment**

- Introduction
- System Description
- Theory



- Treatment equipment
- Settling Tanks and Skimmer Vessel
- Skimmer/Coalescers
- Plate Coalescers
- Skimmer/Coalescers
- Precipitator/Coalescer Filters
- Free-Flow turbulent Coalescers
- Flootation Units
- Hydrocyclones
- Disposal Piles
- Influent Water Quality
- Produced Water Disposal technology and new research
- Example: Design the Produced Water Treatment System

## **Section IX: Pressure Analysis in Injection Wells and Management of Injection Wells**

- Pressure Fall-off Analysis, Liquid filled reservoirs
- Variable Rate Test
- Hall Plots Application and Analysis for Injection well performance
- Water Injection Profiling:
- Radioactive Surveys
- Temperature Profiling
- Prediction Injection Rates in Injection Well (Injectivity Index)
- Case Study Discussion

## **Section X: WATER INJECTION OPERATIONS**

- Waterflooding Injection Well Management Control
- Oil Production at the kick, Peak and breakthrough
- Water Treatment Efficiency
- Potential for Scaling Problems in the water Injection System

## **Section XI: DISCUSSIONS AND CONCLUSIONS.**

### **CPD Unit**

### **Continuing Professional Development**

### **35 HOURS CPD**