

# Advanced Completion Engineering



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## Introduction:

Proper and effective well completion design and implementation are the keys to achieving maximum recovery in the most economical and safe manner. Another equally important aspect of optimizing production is the ability to identify the causes of production impairment or deficiency and properly select, design and implement remedial workover operations.

This course provides the candidates with the knowledge needed to effectively select, design and implement well completions and workover operations. They will learn how to make the most effective selection of well completions for various conditions. The various types of subsurface completion, production and control equipment and their functions and selection criteria will be covered. Tubing design and selection procedure will be discussed and they will be familiarized with the different types of completion and work over fluids, their properties and selection criteria. The course will then cover the descriptions, design considerations and implementation procedures of typical completion and work over operations such as perforating, remedial cementing, sand control and matrix stimulation.

## Objectives:

**By the end of this BTS training course, participants will be able to:**

- Develop a high level completion strategy for wells in a variety of situations
  - Select tubing, packers, and completion flow control equipment
  - Appraise and design a suitable flow barrier strategy
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- Make recommendations on installation and retrieval practices for tubing, packers, etc.
  - Identify key design for horizontal, multilateral, HPHT wells, etc.
  - Select an appropriate intervention strategy and equipment
  - Identify key features and applicability of the main sand control, fracpack and well stimulation options
  - Assess & specify concerns/remedial measures for formation damage & skin removal
  - Develop and outline overall strategy for a completion program

## Who should attend?

Petroleum Engineers, Production Engineers, Well Completion Engineers, Workover Engineers, Operation and Reservoir Engineers, Operations Managers and Supervisors, Production Personnel, Drilling Supervisors, Hoist Supervisor, Well Services Engineers, Site Drilling Engineers and Project Engineers

## Course Outline:

### Introduction: What Are Well Completion & Workover Operations?

### Types of Completion

### Well Productivity

- Tubing Sizes, Formation Damage, Concept of Skin, Sources of Skin
- Maximizing Productivity, Formation Damage during Workovers, Prevention

### Equipment & Design Practice

- Tubular goods, Packers, Subsurface Safety
- Valves, Well Head Equipment, Subsurface Safety Valves, Artificial Lift Installation

### Completion & Workover Fluids

- Functions, Damage, Types, Properties

### Perforating

- Jet Perforating, Gun Perforation, Factors Affecting Perforation
- Pressure Control Equipment, Types of Perforating, Normalization from API RR43

### Optimum Completion Design

- Optimum and under balance Pressure, Design Procedures

### Advanced Tubing Conveyed Perforating

- TCP systems, TCP Design, Perforation Cleaning
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### **Acidizing Principles**

- Introduction, Specifications, Retardation, Acid Fracturing, Matrix Acidizing
- Explosives, Stimulation of Carbonate Formations
- Acidizing Special Well Types, Coiled Tubing Jetting, Coiled Tubing Stimulations

### **Hydraulic Fracturing & Squeeze Cementing**

- Purpose, Candidates, Treatment, Width Calculation, Fracturing Fluids
- Requirements, Terminology, Techniques, Pressure requirements
- Theories, Job Planning, Testing Job

### **Scale Removal & Prevention**

- Identification of Scale, Types, Formation, Removal
- CALCHEK Process, Treatment Suggestion
- Paraffin Removal and Control, Methods of Inhibiting Deposition

### **Well Performance**

- Inflow & Outflow Performance, Completions Inflow Performance
- Well Performance Sensitivities, Perforating & Advanced Perforating

### **Selection of Artificial Lift Techniques**

- Rod Pump, Electrical Submersible Pumps
- Hydraulic Pumps, Progressive Cavity Pumps

### **Gas Lift & Unstable Formations & Sand Control**

- Introduction, Application, Design Objectives
- The Unloading Process, Side Pocket Mandrels
- Gas Lift Valve Mechanics, Gas Lift Design
- Operational Problems, Gas Lifted Field Optimization
- Intermittent Gas Lift, New Technology