Basic Well Testing Operations

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Introduction:

This comprehensive course provides the candidates with a basic understanding of the methods used to: design, conduct and analyze well tests in order to obtain reliable information about well conditions. It provides a basic understanding of well testing techniques and the equipment involved. You will know the definition of well testing, principles of stabilized well testing and transient well testing, concepts such as effective well bore radius, well damage skin factor, negative and pseudo skin as well as practical reasons will also be introduced.

The course will provide a clear understanding of the primary objective of surface and down hole well testing, that is, to assess well productivity by measuring the gas, oil and water flow rates from the well under controlled production conditions. Also, understanding of the safe handling of the produced effluents (solids, liquids and gases) at high pressures and temperatures is a key objective and concern within the Well Testing operations. This is achieved by design of equipment and operations including safety margins and protective equipment to guarantee the safety of people and integrity of the involved facilities and the environment.

Through the course, the candidates will gain a basic theoretical and practical knowledge of well testing operations. They will also be exposed to different basic well testing analysis techniques and a number of relevant examples will be presented as well. They will learn the different types of well tests and well test equipment used in subsurface operations and surface operations.

Objectives:

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

- Define the reasons for well testing
- Gain a basic understanding of well testing operations
- Know different types of equipment used in well testing operations

- Know the different types of well test
- Learn basic reservoir understanding and reservoir concepts.
- Know the reasons for performing well tests.
- Gain basic knowledge about surface & down hole well testing equipment description and operation.
- State the surface equipment functional requirements for well testing.
- Specify the requirements for a well test program including safety.
- Describe the function and operation of well test tools.
- How to perform flow rate calculations.
- Understand how well test planning is performed.
- How to conduct a well test.
- How to follow agreed safety guide lines on surface pressure testing ESD.
- How to carry out the appropriate selection and positioning of gauges.

Who should attend?

Well Testers, Production Engineers, Production Supervisors and Personnel, Well Testing Coordinators, Field Services Coordinators, Oil & Gas Engineers, Drilling Engineers and other service personnel who are required to have knowledge of basic well testing

Course Outline:

- Introduction: Principle & Objectives of Well Testing
- Basic Data for Predevelopment Studies
- Fundamentals of Fluid Flow in Porous Media
- Objectives of a well test operation
- Impact on the design and equipment of the well test
- Evolution of equipment and operations
- Needs, requirements and results expected from a well test
- Well Test Justification
- Understanding Drivers & Objectives of Well Testing
- Introduction to Surface Testing
- Introduction to Surface Well Testing and Well Test Parameters
- Equipment Introduction
- Equipment Selection and Testing Procedures/Standards Introduction

- Basic Well Test Operations and Processes
- Well Test Process Overview
- Well Test Equipment
- Surface Well Testing (SWT)
- SWT equipment, purpose, benefits, limitations, rig lay-out
- Operation of a 3-phase separator, choke manifold, tanks
- Testing Data Acquisition (TDA)

- Fluid Sampling and Analysis (FSA)
- Multiphase Flowmeter (Vx) theory
- TDA and FSA down-hole and surface equipment and specifications
- Downhole gauges, fluid sample carriers, acquisition systems
- Fluid Sampling & Analysis (FSA)
- Well Test Design
- Drill-Stem Testing (DST)
- DST down-hole equipment, string design and diagrams
- Packers, safety joints, hydraulic jars, tester valves, circulation valves, safety valves
- Well Test Program
- Well Test Execution
- Well Test Evaluation & Interpretation
- Basics of Well Testing Interpretation
- Permeability
- Description of Fluid Flow in Porous Media (Pressure Diffusion)
- Pressure vs. Flow Rate Relationship (Darcy Equation/Linear-Radial)

- Skin
- Pressure vs. Flow Rate Relationship (Diffusivity Equation)
- Example Pressure/Flow Rate vs. Time Data and Flow Periods
- Log-Log graph (Early-Middle-Late Time)
- Boundary types and derivative behavior
- Data matching for determining reservoir and boundary properties