COURSE OVERVIEW DE0831
Fishing Operations (Drilling and Work-Over Operations) (E-Learning Module)

Course Title
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Course Reference
DE0831

Course Format & Compatibility
SCORM 1.2. Compatible with IE11, MS-Edge, Google Chrome, Windows, Linux, Unix, Android, IOS, iPadOS, macOS, iPhone, iPad & HarmonyOS (Huawei)

Course Duration
30 online contact hours
(3.0 CEUs/30 PDHs)

Course Description

The profitability of a well as an investment venture depends on how long it is on stream and how much it produces. Its lifetime and output are naturally due to the reservoir's initial characteristics. However, they are also dependent on keeping the well maintained in good working order and adapting completion properly to the constantly varying conditions prevailing in the reservoir and around the wellbore. The operations that may have to be carried out on a well are numerous and can be broken down into measurements, maintenance and workover.

Working on a well to reclaim or increase oil and gas production is a formidable segment of today's petroleum industry. This was not always the case, however, and many factors have changed the position of the workover industry from a minor to a major role. Foremost of these factors is that petroleum demand continues to grow, while reserves continue to decline. This difference has to be made up with existing wells, which means reworking off-production wells.

This E-Learning is designed to provide participants with up-to-date overview of fishing operations. The course covers the main factors influencing well construction, mud technology, casing design, directional drilling and completion design; the overall approach to a well's flow capacity; and the major types of completion configurations.

During this interactive course, participants will learn the main phases in completion, treating the pay zone, the special case of horizontal wells and the general configuration of flowing well equipment; the production wellhead, the production string or tubing, packers, downhole equipment, subsurface safety valves, servicing & workover operations, servicing & workover special cases and well stimulation; the origin of pore pressure; the drilling problems associated with abnormal pressure; the optimization of bit hydraulics, casing design process, single and multiple stage cementing; the trajectory for a directional wells; the directional drilling tools and BHA, directional surveying tools and the main factors influencing completion design; the overall approach to a well's flow capacity; the major types of completion configurations and the main phases in completion; the cement job, perforating and treating the pay zone; the general configuration of flowing well equipment, the production wellhead, the production string or tubing and packers; the down hole equipment, subsurface safety valves and running procedure; the run procedures, artificial lift process and down hole equipment for smart completion; the main types off well servicing and workover; the servicing & workover special cases; and the carbonate acidizing, sandstone acidizing, scales and paraffin removal and squeeze cementing.

Course Objectives

After completing the course, the employee will:-

- Apply and gain an in-depth knowledge fishing operations (drilling and work-over operations)
- Operational knowledge to specify tools and procedures to ensure the recovery of tools and/or equipment left downhole
- Evaluate the techno- economics and risks involved in fishing as compared with other alternatives such as sidetracking
- Ability to specify tools and procedures to ensure the recovery of tools and/or equipment left downhole under supervision
- Evaluate the economics and risks involved in fishing as compared with other alternatives such as sidetracking
- Monitor fishing operations in the field and provide recommendations regarding the tools and methods being used
- Discuss the origin of pore pressure as well as identify drilling problems associated with abnormal pressure, predict and confirm formation fracture pressures, select drilling fluid
- Recognize optimization of bit hydraulics, casing design process, single and multiple stage cementing
- Design the trajectory for a directional well as well as identify directional drilling tools and BHA, directional surveying tools and the main factors influencing completion design
- Explain the overall approach to a well's flow capacity, the major types of completion configurations and the main phases in completion

- Evaluate and restore the cement job as well as demonstrate perforating and treating the pay zone
- Recognize the general configuration of flowing well equipment, the production wellhead, the production string or tubing and packers
- Identify down hole equipment, subsurface safety valves and running procedure
- Perform run procedures, choose an artificial lift process and distinguish down hole equipment for smart completion, main types off well servicing and workover, servicing & workover special cases including well stimulate on methods
- Demonstrate carbonate acidizing, sandstone acidizing, scales and paraffin removal and squeeze cementing

Who Should Attend

This course is primarily designed for well engineers, drilling supervisors, reservoir engineers, geologists, production and completion engineers needing a practical understanding and an appreciation of well construction, well completion design and operation, well stimulation and intervention.

Training Methodology

This Trainee-centered course includes the following training methodologies:-

- Talking presentation Slides (ppt with audio)
- Simulation & Animation
- Exercises
- Videos
- Case Studies
- Gamification (learning through games)
- Quizzes, Pre-test & Post-test

Every section/module of the course ends up with a Quiz which must be passed by the trainee in order to move to the next section/module. A Post-test at the end of the course must be passed in order to get the online accredited certificate.

Course Fee

As per proposal

Course Certificate(s)
Internationally recognized certificates will be issued to all participants of the course.

Certificate Accreditations
Certificates are accredited by the following international accreditation organizations: -

- USA International Association for Continuing Education and Training (IACET)

  Haward Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 1-2013 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 1-2013 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Association for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Contents

- Well Planning
- Well Planning Objective
- Safety
- Minimum Cost
- Usable Holes
- Classification Of Well Types
- Formation Pressures
- Data Collection
- Data Sources
- Formation Pressure Prediction
- Causes Of Abnormal Pressure
- Methods Of Formation Pressure Predictions
- During Drilling
- Formation Kicks
- Fracture Pressure Determination Methods
- Casing Setting Depth Selection
- Intermediate Casing And Liner
- Surface Casing Setting Depth Selection
- Surface Casing
- Borehole Problems Appraisal, Prevention And Curing
- Borehole Problems
- Indicators
- Preventative Measures For LOC
- Remedial Procedures For Loss Circulation
- Partial Loss (Highly-Porous Or Fractured Formations)
- Total Loss (Caverns, Vugs, Or Induced Fractures)
- Formulation Tables For The Preparation And Use Of Various Lost-Circulation Pills In Water-Based Systems
- Soft Plug Formulations (Total Loss Of Circulation)
- Drillstring Sticking
- Remedial Procedures For Stuck Pipe
- Spotting Fluids

- Drilling Fluids
- Basic Mud Types
- Water Base Mud
- Water Base Mud Formulation
- Oil Base Mud
- Oil Base Systems
- Oil Base Mud Advantages
- Shale Stability And Inhibition
- Temperature Stability
- Lubricity
- Resistance To Chemical Contamination
- Gauge Hole In Evaporite Formations
- Solids Tolerance
- No Formation Damage
- Reduced Tendency For Differential Sticking
- Drilling Underbalanced
- Re-Use
- Reduced Cement Cost
- High Penetration Rate
- Flexibility
- Reduction Of Stress Fatigue
- Reduced Corrosion
- Oil Base Mud Disadvantages
- High Initial Cost Per Barrel
- Mechanical Shear Required
- Reduced Kick Detection Ability
- Pollution Control Required
- High Cost Of Lost Circulation
- Disposal Problems
- Solids Control Equipment Based On Centrifugation Does Not Work Effectively
- Hole Cleaning
- Rig Cleanliness
- Special Skin Care For Personnel Is Required

- Hazardous Vapors
- Effect On Rubber
- Fire Hazard
- Special Logging Tools Required
- Gas Stripping
- Oil Mud Applications
- Productivity Drilling
- Perforation Spots
- Workover And Completion Fluid
- Coring
- Stuck Pipe Spots
- High-Temperature Drilling
- Shale Control - Stability
- Corrosive Gas
- Salt And Contaminating Formations
- Differential Sticking
- Drilling Directional Holes
- Packer Fluids
- Mud Properties
- Mud Weight
- Rheology
- Fluid Loss
- Retort
- Ph
- MBT
- Ions Titration
- Course Recap
- Rheology And Hydraulics
- Importance Of Rheology In Drilling Operations
- Relationship Between Shear Stress And Shear Rate
- Rig Hydraulics
- Surface Connection Losses
- Field Method Of Optimising Bit Hydraulics

- Maximum Bit Hydraulic Horsepower
- Optimum Hydraulics Guidelines
- Mud Properties & Flow Profile
- Cementing Overview
- Cement Job
- Cementing Problems
- Problem 1: Poor Displacement Of Mud
- Plug Flow Cementation
- Turbulent Flow Cementation
- Problem 2: Lost Circulation
- Problem 3: Bridges Composed Of Cement Filter Cake
- Problem 4: Swapping Out Of Mud And Cement Below Pipe
- Problem 5: Flash Setting Of Cement
- Problem 6: Cement Can Shrink And May Fail To Isolate Zones
- Problem 7: Permeability Of Cement May Cause An Interzonal Flow
- Problem 8: Gas Migration May Fail To Isolate Zones
- Problem 9: A Micro-Annulus
- Problem 10: Temperature Retrograde Of Cement
- Problem 11: Perforation Of Cement Mechanism
- Problem 12
- Casing Design
- Running And Cementing Casing
- Types Of Casing And Common Size
- Conductor Casing
- Surface Casing
- Summary Of Surface Casing
- Intermediate Casing
- Production Casing
- Summary Of Production Casing
- Hole Conditions
- Sloughing
- Drill Pipe Drag
- Low Pressure Zone

- Mud Condition
- Fluid Movement
- Formation Movement
- General Considerations
- Physical Properties
- Length Ranges
- Grades Yield Strength Color Coding
- Couplings
- API Couplings
- Non – API Couplings
- Casing Design
- Burst Loading
- Collapse Loading
- Tensile Loading
- Biaxial Loading
- Casing Design Chart
- Refer To Examples In The Text
- Running Casing
- Conclusion
- Chemical Properties Of API Grades
- Description Of Most Commonly Used Casing Grades In The Oil Industry
- Graphical Design Method
- Ellipse Of Plasticity
- Course Recap
- Completion Overview
- Packer Advantages
- Perforation Objectives
- Jet Perforators
- Perforating Performance
- Perforation Depth Control And Orientation
- Perforation Interval Is Dictated By:
- Well Control
- Types Of Completion

- Basic Completion Categories
- The Production Method
- The Number Of Zones Completed
- Open-Hole Completions
- Advantages Of Open-Hole Completions
- Openhole Completions Are Particularly Attractive:
- Limitations Of Openhole Completions
- Un-Cemented Liner Completions
- Perforated Completions
- Completions For Pumping Wells
- Application Range
- The Applicability Of Each Method Depends On:
- Single String Flowing Well Completion
- Multizone Completions
- Subsea Completion
- Completion Selection And Design Criteria
- Drilling Considerations
- Factors To Be Considered Include:
- Completion Productivity
- Sizing The Tubing
- There Are External Parameters That Limit Choice Flexibility
- Risks Of Formation Damage
- Drilling Damage
- Perforation Damage
- Fluids Damage
- Sand Fill
- Maximizing Well Productivity
- Drilling Fluid Selection
- Perforating
- Through-Tubing Perforating
- Disadvantages And Limitations
- Tubing Conveyed Perforations
- Selection Of Completion Fluids

- Stimulation
- Key Considerations In Selecting Stimulation Method
- Summary
- Completion Design
- Shaped Charge Components
- Perforating Techniques
- Reusable Hollow Carrier Gun
- Expendable Shaped Charge Gun
- Parameters Affecting Performance
- Pivot Gun
- Hollow Carrier
- Wire-Line Expendable Guns
- Expendable Guns
- Initiation Systems
- Factors Affecting Perforating Efficiency
- Drilling And Perforating Damage
- Grabel Pack – Screens
- Wellhead Pressure Control Equipment
- Hydraulic Pack-Off
- Wellhead Pressure Control Equipment
- Weight Vs. Well Pressure And Friction At Balance Point
- Charge Normalization
- Optimum Completion Design
- Productivity Ratio As Function Of Penetration And Shot Density
- Productivity Ratio
- Formation Definitions
- Consolidated
- Unconsolidated
- Completion Design Procedure
- Classify Formation
- Determining Perforating Under-Balance To Overcome Total Skin Damage
- Acoustic Data To Determine ΔP
- Applications Of Wire Line Conveyed Perforating

- Tubing Conveyed Perforating
- Gun String Component
- Procedure
- Firing Systems
- Gun Release
- Venting Devices
- Shot Detection
- Gun Positioning
- Dual Completions
- Perforation Cleaning
- Under-Balance Perforating
- Perforation Washing
- Back-Surging
- Directional Drilling
- Applications Of Directional Drilling
- Types Of Directional Well Profile
- Build & Hold Applications
- S – Shape Applications
- Continuous Build Applications
- Survey Measurements
- Down-Hole Components
- Surface Equipment
- MEASUREMENT WHILE DRILLING (MWD)
- Mud Pulse Telemetry
- Survey Instruments
- Geosteering
- Formation Evaluation Measurements:
- Surveying Calculations
- Tangential Method
- Average Angle Method
- Directional Problem
- Dogleg Calculation
- Whipstock

- Theory Of Operation
- Horizontal Drilling
- Well Profile
- Applications Of Horizontal Wells
- Reducing Water Coning
- Gas Reservoirs
- Reducing Gas Coning
- Formation Damage
- Sand Control
- Sand Control Case
- Intersection Of Vertical Fractures
- Enhanced Oil Recovery
- Development Of Non-Petroleum Resources
- Considerations In Selecting Horizontal Wells
- Parameters Considered
- Keys To Successful Horizontal Drilling
- Horizontal Drilling Systems
- Horizontal Well Costs
- Equipment
- Non-Magnetic Drill Collars
- Positive Displacement Motor-PDM
- Compression Service Drill Pipe
- External Casing Packers
- Stabilizers
- Bottom Hole Assemblies
- Types Of Bits (PDC Bits)
- Problems Associated
- Delivering Weight To Bit
- Course Recap
- Carbonate Acidizing
- Matrix Stimulation
- Design Of A Matrix Treatment
- Acid Fracturing

- Response Of Carbonates To Acid Fracturing
- Matrix Stimulation
- Stoichiometry
- Kinetics Of HCL Reaction
- Key Factors In Carbonate Acidizing
- Wormhole Penetration Vs. Skin
- Acid Reactivity
- Mineral Versus Organic Acids
- Injection Rates: Dissolution Patterns
- Impact Of Pump Rate And Temperature
- Wormhole Pattern From Radial Flow
- Wormhole Growth For Various Rates
- Pore Level Model
- Placement
- Conclusions
- Sandstone Acidizing
- Mineral Acids
- Oil Well Stimulation
- Gas Wells
- Water Injection Wells
- Acid-Mutual Solvent Volume Requirements
- Mistakes Found In The Application Of The Acid-Mutual Solvent Method
- Use Of Acids Containing No Hydrogen Fluoride (HF)
- Use Of Diesel Oil In The Treatment Of Gas Wells
- Omission Of EGMBE From The Mud Acid Treatment
- Lack Of A Regular Acid Preflush
- Inadequate Acid Volume
- Lack Of Immediate Cleanup
- Fracturing The Formation During Treatment
- Hydraulic Fracturing Stimulation
- Purpose
- How
- Candidate

- Treatment
- Four Steps Of Treatment And Their Respective Functions
- Pre-Pad
- Pad
- Proppant Carrying Fluid
- Flush
- Surface Equipment Layout
- Fracture Geometry
- Fracture Width Equations
- Fracturing Treatment Selection
- Selection Of Base Fluid
- Potential Damage From Frac Fluid
- Lab Tests
- Selection Of Gel System
- Types Of Gel System
- Laboratory Tests Of Formation Samples
- Whole Cores
- Fracturing Treatment Selection
- Sidewall Cores Or Cutting Samples
- Formation Properties Affecting The Orientation And Growth Pattern Of Hydraulic Fractures
- Fracture Gradient
- The Poro-Elastic Constant
- Young's Modulus, E:
- Poisson's Ratio
- Hydraulic Fracturing Fluids
- Storage And Mixing Requirements
- Horizontal Versus Vertical Fracture
- Course Recap
- Squeeze Cementing
- Purposes Of Squeeze Cementing
- Squeeze Terminology
- Squeeze Pressure

- The "High-Pressure" Technique
- The 'Low-Pressure" Technique
- Block Squeezing
- Breakdown Pressure
- In High-Pressure Squeezing
- With The Low- Pressure Technique
- Fracture Gradient
- Fracture Propagation
- Bottom-Hole Treating Pressure
- Cement Dehydration
- If Excessive Pressure Is Exerted
- Squeeze Techniques
- Braden Head Squeeze Method
- Squeeze-Packer Method
- Squeeze Pressure Requirements
- Squeezing Fractured Zones
- Slurry Design
- Squeeze Packers
- Drillable Packers
- Retrievable Squeeze Packer
- Testing Squeeze Jobs
- Summary
- Scale Deposition
- Scales
- Causes And Tendency Of Scale
- Prediction And Identification Of Scale
- Scale Removal
- Removal Methods
- Chemical Removal Methods
- Conclusions
- Scale Deposits
- Causes Of Scaling
- Action To Solve Scale Problems