COURSE OVERVIEW DE0848
Well Completion & Workover
(E-Learning Module)

Course Title
Well Completion & Workover
(E-Learning Module)

Course Reference
DE0848

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

This E-Learning is designed to provide participants with a detailed and up-to-date overview of well completion and workover. It covers the types of well completion; the advantages and disadvantages of cased-hole completions, open hole completion and perforated liner completion; the gravel pack, comparison of completions, hole volume calculations and single string flowing well completion; the multi zone completion, components of a typical well and the main configurations of production string(s); the conventional completions and single-zone completions with a tubing and production packer; and the multi-zone completions, parallel tubing string completion, tubing-annulus completion and alternate selective completions.

Further, the course will also discuss the tubingless completions, single-zone tubingless completions, multiple-zone tubingless completions and remedial cementing; re-establishing the pay zone-borehole communication; the well testing, treating the pay zone and equipment installation; putting the well on stream; assessing performance; moving the rig and applying later operations in measurements, maintenance, workover and abandonment; the producing string, tubing objectives and tubing material selection; the tubing connection and threaded/coupled versus integral; and the completion equipment, tubing accessories, standing valve, flow couplings, blast joints, communication equipment and sliding side door or sliding sleeves.

Moreover, the course will also cover the side pocket mandrel (SPM), packers and method of setting; setting permanent packer; the principle of operation and perform packer milling assembly; the method of setting retrievable packers, hydraulic set retrievable packers and selection considerations; the dual packer systems, wellhead, Christmas tree, production optimization and artificial lift; the artificial lift strategy, artificial lift techniques, artificial lift selection parameters and artificial lift selection process; the wellbore analysis and the relative advantages and disadvantages of SRP systems; the nodal analysis, vertical lift performance, inflow performance, well performance analysis and production tubing; the classification of reservoir fluids and completion; and the factors affecting well completion, reservoir considerations, mechanical considerations and the rules of completion design.

During this course, participants will learn the single zone with tubing and without packer completion; the technologies, advanced completion and intelligent well completion system; the sand control management, flow assurance and operability, well performance analysis, well stimulation, well productivity, flow assurance and application of propellant stimulation; where to use STIMGUN; the isolation, reduce operating costs and solid answers to mature-field challenges; the solid and reliable system for increased production capacity; the MetalSkin cased-hole liner versus conventional alternatives; the solid performance advantages, long-term solution and solid results; and advancing the design of solid-expandable liner connections.

Course Objectives

After completing the course, the employee will:-

- Apply and gain an in-depth knowledge on well completion and workover
- Understand the general overview of surface and subsurface well equipment
- Identify and describe the function and configuration of the key christmas tree and well completion components
- Identify the objectives of work-over and techniques
- Understand the methods for well control and well killing with associated pressure control equipment/stacks
- Discuss well completion and its types as well as advantages and disadvantages of cased-hole completions, open hole completion and perforated liner completion
- Explain gravel pack, comparison of completions, hole volume calculations and single string flowing well completion
- Identify multi zone completion, components of a typical well and the main configurations of production string(s)
- Carryout hole volume calculations, conventional completion and single-zone completions with a tubing and production packer
- Explain multi-zone completions, parallel tubing string completion, tubing-annulus completion and alternate selective completion
- Determine tubingless completions, single-zone tubingless completions, multiple-zone tubingless completions and remedial cementing

- Re-establish pay zone-borehole communication and carryout well testing, treating the pay zone and equipment installation
- Put the well on stream and assess performance as well as move the rig and apply later operations in measurements, maintenance, workover and abandonment
- Discuss the producing string, tubing objectives and tubing material selection covering forces acting on the tubing and extreme operational conditions
- Illustrate tubing connection and differentiate threaded/coupled versus integral
- Recognize completion equipment, tubing accessories and landing nipples
- Identify standing valve, flow couplings, blast joints, communication equipment and sliding side door or sliding sleeves
- Describe side pocket mandrel (SPM), packers and method of setting
- Set permanent packer, explain the principle of operation and perform packer milling assembly
- Apply the method of setting retrievable packers, hydraulic set retrievable packers and selection considerations
- Recognize dual packer systems, wellhead, Christmas tree, production optimization and artificial lift
- Employ artificial lift strategy, artificial lift techniques, artificial lift selection parameters and artificial lift selection process
- Apply wellbore analysis and recognize the relative advantages and disadvantages of SRP systems
- Carryout nodal analysis, vertical lift performance, inflow performance, well performance analysis and production tubing
- Classify reservoir fluids and completion as well as identify the factors affecting well completion, reservoir considerations, mechanical considerations and the rules of completion design
- Recognize single zone with tubing and without packer completion including packers, completion packer functions, dual completions, single string dual zone and two packers
- Recognize technologies, advanced completion and intelligent well completion system
- Apply sand control management, flow assurance and operability, well performance analysis, well stimulation, well productivity, flow assurance and application of propellant stimulation
- Determine where to use STIMGUN, discuss isolation, reduce operating costs and acquire solid answers to mature-field challenges
- Apply solid and reliable system for increased production capacity
- Differentiate MetalSkin cased-hole liner versus conventional alternatives
- Identify solid performance advantages, long-term solution and solid results as well as advancing the design of solid-expandable liner connections

Who Should Attend

This course covers systematic techniques and methodologies on rock physics and petrophysics for seismic interpretation for geoscientists, petrophysicists, and engineers wishing to understand rock physics and learn how to work together in integrated teams to build geomechanical models.

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.

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 Contents

- What is Well Completion?
- Video – Process of Completing a Well
- Areas
- Types of Well Completions
- Cased-Hole Completions
- Exercise - 1
- Advantages
- Disadvantages
- Open Hole Completion
- Advantages
- Disadvantages
- Perforated Liner Completion
- Advantages
- Disadvantages
- Video – Well Completion: Perforation
- Gravel Pack
- Comparison of Completions

- Hole Volume Calculations
- Single String Flowing Well Completion
- Case Study -1: Challenges of Well Completion & Testing in High Pressure High Temperature Environment
- Quiz 1
- Multi Zone Completions
- Multi Zone Well Completions
- Case Study – 2: Optimizing Multizone Coalbed Methane Well Completions
- Components of a Typical Well
- Video – Well Completion: Multizone Completion
- Main Configurations of Production String(s)
- Hole Volume Calculations
- Two Main Types
- Conventional Completion
- Single-zone Completions with a Tubing and a Production Packer
- Multi-zone Completions
- Parallel Tubing String Completion
- Tubing-Annulus Completion
- Alternate Selective Completion
- Tubingless Completions
- Single-zone Tubingless Completions
- Multiple-zone Tubingless Completions
- Remedial Cementing
- Video – Cementing Operations
- Re-establishing Pay Zone-Borehole Communication
- Quiz - 2
- Well Testing
- Video – Well Test
- Treating the Pay Zone
- Equipment Installation
- Putting the Well on Stream and Assessing Performance
- Moving the Rig
- Later Operations: Measurements, Maintenance, Workover and Abandonment
- The Producing String “Tubing”

- Tubing Objectives
- After Some Years
- Tubing Material Selection
- Forces Acting on the Tubing
- Extreme Operational Conditions
- In Conclusion Key Message
- Tubing Connection
- Threaded/Coupled vs. Integral
- Tubing Connections (Functional Requirements)
- Completion Equipment
- Tubing Accessories
- Communication Equipment
- Landing Nipples
- No-Go Landing Nipple
- Used to Hang Off or Set
- Locking Mandrel
- Standing Valve
- Flow Couplings
- Blast Joints
- Communication Equipment
- Sliding Side Door (SSD) or Sliding Sleeves (SS)
- Video – Sliding Sleeve
- Quiz - 3
- Side Pocket Mandrel (SPM)
- Packers
- What is a Packer?
- Why Run a Packer?
- Production Control
- In Steam Injection Wells
- Protection of Equipment
- Well Prepared & Stimulation
- HSE Reasons
- Video – How Horizontal Steam Injection Works

- Typical Packer
- Packer
- General Mechanism
- Main Types and Application
- Retrievable Packers
- Video – Oil and Gas Safety 101: Being Aware of Hazards While Working in the Oil Field
- Case Study – 3
- Quiz – 4
- Permanent Packers
- Tubing Connection
- Video – Well Completion
- Application 1
- Application 2
- Video – Gravel Pack
- Method of Setting – Permanent Packers
- Setting
- Retrieving
- Setting Permanent Packer
- Video – Mechanical Set Packer
- Principle of Operation
- Packer Milling Assembly
- Retrievable Packers
- Advantages
- Disadvantages
- Method of Setting Retrievable Packers
- Video – Hydraulic Set Packer
- Case Study – 4: Well Control
- Case Study – 5: High Pressure Fishing Operations with 56 MPA BHP, 2700m TVD and 4600 m MD
- Quiz – 5
- Method of Setting Hydraulic Set Retrievable Packers
- Hydraulic Set Retrievable Packers
- Exercise – 2

- Selection Consideration Hydraulic Set Retrievable Packers
- Video – Hydraulic Set Retrievable Seal Bore Packer
- Dual Packer Systems
- The Wellhead
- X-Mas Tree
- Video – Wellhead and Christmas Tree: Installation & Compounds
- Case Study – 6: Slim Hole FRAC Strings
- Quiz – 6
- Overview of Production Optimization
- Well Productivity
- Video – Well Production System: VLP and IPR
- Exercise – 3
- Exercise – 4
- Exercise – 5
- Overview of Artificial Lift
- The Purpose of Any Artificial Lift Method
- Artificial Lift Strategy
- Artificial Lift Techniques
- Artificial Lift Selection Parameters
- Exercise – 6
- Overview of Artificial Lift
- Major Forms of Artificial Lift
- Video - - Schlumberger HEAL Horizontal Enhanced Artificial Lift System
- Artificial Lift Strategy
- Strategy Process
- Why
- When
- What
- Production Profile
- Dynamic Simulation Model
- A/L Methodology
- Reservoir Analysis
- Video

- Wellbore Analysis
- Nodal Analysis
- Integral Subsurface-Surface Optimization
- Production System from Reservoir to the Separator
- Phase Envelope/Phase Diagram
- Qualitative A/Ls Selection
- Advantages of Major Artificial Lift Methods
- Disadvantages of Major Artificial Lift Methods
- A/L Technology
- Artificial-Lift Surveillance
- Optimization Process
- Economical Analysis
- Integrated Production System
- Case Study – 7: High Efficiency ESP Increases Annual Well Return by $511,000 USE Over Previous Rod- Lift System
- Case Study – 8: Decrease Operating Costs by Replacing ESP with Hydraulic Jet Pump
- Case Study – 9: Converting from an ESP to a Jet Pump
- Case Study – 10: Artificial Lift Using Jet Pump in Highly Corrosive Environment
- Quiz - 7
- Relative Advantages and Disadvantages of SRP Systems
- Nodal Analysis
- Vertical Lift Performance
- Inflow Performance
- Video – Reservoir Inflow Performance
- Vertical Lift Performance
- Well Performance Analysis
- Exercise – 7
- Nodal Analysis
- Tubing Size Optimization
- Restricted flow by Reservoir
- Optimize Perforation
- Optimization Procedure

- Applications
- Summary
- Conclusion
- PVT Applications
- Data/Schematics
- Material Balance
- Video – Well Nodal Analysis
- Video – Well Completion: Perforation
- Quiz – 8
- Production Tubing
- Classification of Reservoir Fluids
- Definitions
- Factors Affecting Well Completion
- Reservoir Considerations
- Mechanical Considerations
- Rules of Completion Design
- Completion Classifications
- Natural Flow
- Single Zone with Tubing and without Packer Completion
- Packers
- Examples of Completion Packer Functions
- Dual Completions
- Single String Dual Zone, Two Packers
- Technologies
- Advanced Completion
- Intelligent Well Completion System
- Video – Intelligent Completions, Data Collection Enhance Reservoir Management Drilling Contractor
- Sand Control Management
- Video – Sand Control Management
- Video – SandVA – Inspection & Analysis of Sand Control in Gas Storage Wellls
- Flow Assurance and Operability
- Well Performance Analysis

- Well Stimulation
- Flow Assurance
- Well Productivity
- Video – Tracerco Flow Assurance
- Quiz - 9
- Flow Assurance
- Stimulation
- Theory – Propellant Stimulation
- What is Propellant?
- Sand Screen cleaning
- Where to Use STIMGUN?
- Isolation
- Case History
- Video – Weatherford Completion Running Application
- Reducing Operating Costs
- Solid Answers to Mature-field Challenges
- Solid and Reliable System for Increased Production Capacity
- MetalSkin Cased-Hole Liner Versus Conventional Alternatives
- Solid Performance Advantages the Only Solid-Expandable, Cased-Hole Liner with No Drillout Required
- Quick, One-Trip Installation for a Reliable, Long-Term Solution
- Solid Results from Around the World
- Advancing the Design of Solid-Expandable Liner Connections
- Video – TruFormTM Expandable Liner Hanger System
- Quiz