

Well Completion and Workover

Successful Well Completion & Workover Practices: A practical approach from design to field operations
Course Level : Intermediate

24th - 28th June 2024 at Kuala Lumpur, Malaysia



Petrosync Distinguished Instructor Mike Etuhoko, P.Eng., PMP, M.Sc., MBA, CCB.D

- Founder & CEO: Protekz Inc, Calgary, Canada
- Member, Business & Leadership Committee, The Society of Petroleum Engineers (SPE) Board of Directors

A lot of Practical Things, Case Studies and Exercises!

- Over 30 years of engineering, operations, and management experience in Completion, Workover & Well Services, and Drilling
- Highly sought after Consultant, President & Founder of Protekz Inc Canada, an independent well and production engineering consultancy
- Leads major completion and workover projects with companies such as Shell Canada, KNOC, KPO etc in North America, Europe, Africa, Central Asia, & Far East Asia
- Authored and presented SPE Papers at the SPE Asia Pacific Oil & Gas Conference (Australia, 2004) & SPE Annual Technical Conference & Exhibition (Texas USA)

PROGRAM SCHEDULE

09:00	Registration (Day1)
09:10 – 11:00	Session I
11:00 – 11:15	1 st Tea Break
11:15 – 13:30	Session II
13:30 – 14:30	Lunch Break
14:30 – 16:00	Session III
16:00 – 16:15	2 nd Tea Break
16:15 – 17:00	Session IV
17:00	End of Day

*Schedule may vary for each training

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Course Overview

This 5-day course will cover successful well completion and workover practices. It is a practical oriented course designed to bridge the knowledge gap in the area well completion and workover designs and operations.

Well completion is considered to be one of the most critical practices for reservoir exploitation and management. During this process, the responsible personnel is tasked to optimally design and install a system that can deliver its full potential to optimize oil gas and production, without compromising safety and reliability.

During the field life cycle, some reservoirs undergo some physical and chemical changes. This leads to loss of revenue as the wells are no longer operating at their optimal conditions. Hence, a workover/well intervention may be required to safely and efficiently restore the wells back to production. This presents a lot of challenges due to the different reservoir fluids, various operating conditions, and different operating environments.

The course possesses the following features:

- ▶ It is the first of its kind in the industry.
- ▶ It is loaded with practical examples, case studies, and industrial applications taken from:
 - ▶ Different operating environment (land, swamp, and offshore including deep-water)
 - ▶ Different well conditions: High-Pressure High-Temperature, sour gas, and sweet gas, etc.
 - ▶ Tropical and arctic (temperate) climates
- ▶ It provides practical exercises, and delegates will be followed up to ensure they can handle all the calculations, without difficulties.
- ▶ Focuses on different technological innovations to optimize reservoir drilling and completion practices, to improve well productivity.
- ▶ Sustainable and responsible oil and gas field development and production amid energy transition.
- ▶ It could be designed to meet the need of the clients on specific topics of interest.
- ▶ Team learning. A group completion design project accomplishes the course. All the elements of the course will help you and your team to handle the project challenge.
- ▶ Towards the end of the course, the groups formed in the class will present their completion design project for discussions/reviews.
- ▶ Delegates are allowed to come with their projects of interest, which they could substitute for the class field project design work but must be presented for discussions/reviews

Course Objectives

- ▶ Identify and understand the parameters that influence the selection and design of completion components.
- ▶ Integrate the importance of completion process to future production.
- ▶ Deliver techniques to select the best tubing size and best materials for well completion.
- ▶ Gain practical methods to design, plan and install safe and efficient well completion and workover.
- ▶ Manage well environments with extreme reservoir conditions (pressure, temperature, etc.)
- ▶ Bridge the importance of well design in relation to the ability to carry out well intervention.
- ▶ Explore new technological developments in well completions and workovers.
- ▶ Plan an appropriate intervention and workover strategy to maintain or increase the field production.
- ▶ Gain how to navigate sustainable and responsible oil and gas field development and production amid energy transition.

Who Should Attend?

- ▶ Completion Engineer /Supervisors /Superintendent
- ▶ Completions Team Lead /Manager
- ▶ Well Services /Intervention Engineer /Supervisors
- ▶ Workover Engineer /Supervisors
- ▶ Petroleum Engineer
- ▶ Reservoir Engineer
- ▶ Drilling Engineer/Superintendent /Site Manager
- ▶ Oil and Gas industry Drilling/Completion/Intervention Service providers

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Course Agenda

Day 1

- ▶ Introduction
- ▶ Introduction of individual, professional background, etc.
- ▶ Aim / Objective of the course
- ▶ Individual expectation from the course
- ▶ Safety Alert
- ▶ **Starter Quiz & Review**
- ▶ Introduction to Completion design
 - ▶ Definition of well completion
 - ▶ Oil and gas project life cycle
 - ▶ Types of well completion
 - ▶ Completion planning
 - ▶ Work flow for successful well completion & workover
 - ▶ Integrated approach to well completion
- ▶ Concept of Darcy's Law & SKIN
- ▶ Reservoir Completion:
 - ▶ Well Performance
 - ▶ Perforations
 - ▶ Well Stimulation
 - Stimulation of Sandstone reservoir
 - Stimulation of Carbonate reservoir
- ▶ **Introduction to completion design project**

Day 2

- ▶ Reservoir Completion: Hydraulic Fracturing
- ▶ **Class exercise:** The objectives of the class exercise on hydraulic fracturing are as follows:
 - ▶ Calculations on Fold of Increase (FOI) as a screening tool to select wells for hydraulic fracturing candidate.
 - ▶ Calculations to compare acid frac versus propped frac in a carbonate reservoir
- ▶ Sand control stimulation techniques:
 - ▶ Causes of sand production
 - ▶ Sand control design concepts
- ▶ **Class exercise:** The objectives of the class exercise on sand control are as follows:
 - ▶ Perforation gun selection
 - ▶ Perforation cleaning
 - ▶ Sand control design selection
 - ▶ Gravel size selection
 - ▶ Screen size selection
- ▶ Tubing Performance
- ▶ Artificial Lift Methods
- ▶ Production Chemistry
- ▶ Problem Identification
- ▶ **Class exercise:** The objectives of the class exercise on well problem identification are as follows:
 - ▶ Calculations on the effect of formation damage on well production
 - ▶ Calculations on flow efficiency
 - ▶ Use of production history to assess formation damage
 - ▶ Stimulation well candidate selection

▶ **Group work: Completion design project**

Day 3

- ▶ Tubing Stress Analysis
- ▶ Purpose of Stress Analysis
- ▶ Stress Loads: stress/strain, axial loads, burst/collapse and tri-axial analysis
- ▶ Safety Factors and Design Factors
- ▶ Load Cases
- ▶ Completion Equipment and Connections
- ▶ **Class exercise:** The objectives of the class exercise on tubing stress analysis are as follows:
 - ▶ Basic TSA calculations including weight in air, buoyancy force, axial force due to bending, safety factors, collapse loads, tensile yield, internal yield pressure, etc.
 - ▶ Tubing movements and tension calculations during well stimulation
- ▶ Materials Selection:
 - ▶ Metallurgy
 - ▶ Corrosion triangle
 - ▶ Types of corrosion:
 - Metallurgy
 - Corrosion triangle
 - Types of corrosion:
 - Sour corrosion (stress corrosion cracking, sulphide stress cracking, etc.)
 - Sweet corrosion,
 - Galvanic corrosion
 - Erosion-corrosion, etc.,
- ▶ Corrosion prevention methods
- ▶ Elastomers and Plastics
- ▶ Protective Coatings
- ▶ Material selections for all types of wells: Sour, sweet, HPHT wells, etc
- ▶ NACE/ISO on material selection
- ▶ Completion Components
 - ▶ OCTG selections
 - ▶ Completion components and selections: Christmas tree, tubing hangers, downhole safety valve, packers, expansion devices, nipples, downhole gauges, etc.
- ▶ **Group work: Completion design project**

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Course Agenda - Continue

Day 4

- ▶ Completion operation base preparation
 - ▶ Equipment purchasing, manufacturing and factory acceptance
 - ▶ Service contracts
 - ▶ Equipment preparation
 - ▶ Technical program
- ▶ Rig preparation and completion installation process
 - ▶ Operation planning
 - ▶ Equipment shipping/transportation
 - ▶ Equipment reception
 - ▶ Pre-job meeting
 - ▶ Casing cleaning operation
 - ▶ Running in hole the completion equipment
 - ▶ Well clean-up
 - ▶ Reporting
 - ▶ After-action review
- ▶ Emerging Techniques
 - ▶ Fiber Optics: Distributed Temperature System (DTS), Pressure/ temperature (P/T), etc
 - ▶ Intervention-less packers (Hydrostatic packers, swelling packers, etc.)
 - ▶ In-situ self generating weak acid
 - ▶ Expandable tubulars
 - ▶ Expandable Sand Screens (ESS)
 - ▶ Sand Control in High angle and long interval: Alternate path technology (SHUTS, CAPS, etc.)
 - ▶ Formation Isolation Valves (FIV)
 - ▶ Intelligent & Smart Well
 - ▶ Completion: Interval Control Valves (ICV)
 - ▶ Underbalanced Drilling & Completion
 - ▶ Cased Hole Circulation Drilling & completion
 - ▶ Multistage Fracturing
- ▶ **Group Work: Well completion design**

Day 5

- ▶ Well Control:
 - ▶ Well control Equipment:
 - Blowout preventer system requirements
 - Choke Manifold
 - Circulating System
 - ▶ Kicks and its causes
 - ▶ Well Killing Operations:
 - Forward circulation
 - Reverse circulation
 - Bullheading
 - Lubricate and Bleed
- ▶ **Class exercises on well control**
- ▶ Workover Operations:
 - ▶ Workover definition and description
 - ▶ Workover Types:
 - Safety Workover (SWO)
 - Long term suspension (LTS)
 - Plug and Abandonment (P&A)
 - Production enhancement (PE)
 - ▶ Workover Feasibility Studies
- ▶ **Group presentation / General Review of the Well completion Design Project**
- ▶ **Wrap up**

IN-HOUSE SOLUTIONS

SAVE COST • IMPROVE PERFORMANCE • REDUCE RISK

PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical for all our clients. This excellent training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

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Instructor Profile



Petrosync Distinguished Instructor

Mike Etuhoko, P.Eng., PMP, M.Sc., MBA, CCB.D

- Founder & CEO: Protekz Inc, Calgary, Canada
- Member, Business & Leadership Committee, The Society of Petroleum Engineers (SPE) Board of Directors

Mike Etuhoko has a proven track record of driving transformative strategies that consistently enhance profitability while promoting sustainable practices in the energy sector. With over three decades of oil and gas experience, he has delivered exceptional results, generating a cumulative profit exceeding \$2.7 billion across diverse international ventures.

Mike has handled challenging drilling and workover, well completion, sand control, well interventions, formation damage prevention and treatments, and well integrity management projects for oil and gas major brands such as TotalEnergies, Shell, Karachaganak Petroleum Operating (KPO), Korean National Oil Company and HCML. In 2012, following his exceptional contributions to the KPO project in Kazakhstan.

Mike received the Chief Executive Innovation Award for "Open Hole Multistage Fracturing Completion with Swelling Packers and Sliding Sleeves in Carbonate Reservoir." He is a Professional Engineer registered in Alberta, Canada, a certified Project Management Professional and a certified Shell Round 2 holder specializing in completion and well intervention.

Mike holds a B.Sc. in Mechanical Engineering and an M.Sc. in Petroleum Engineering and Project Management from the Institute Francais du Petrole (IFP school) in France. In addition, he recently earned an MBA from Warwick Business School and a distinctive Sloan M.Sc. from London Business School, which is exclusively designed for senior executives with substantial leadership experience. Complementing these qualifications, he has engaged in diverse executive leadership and financial education programs at Harvard and Said Business School and several sustainability certifications showcasing his commitment to continuous learning and growth amidst the global poly-crisis and energy transition.

Mike is a lifelong member of the Society of Petroleum Engineers (SPE). Between 2006 and 2007, he served as the Secretary of the Congo SPE section and is currently on the Business and Leadership committee of the SPE International Board of Directors

Sample of Project List

- Lead Completions & Intervention for Karachaganak Field, Kazakhstan
Completion & Intervention for Field with Characteristics: Deep wells (\pm 6200m TVD on the average), light oil/condensate and gas, High GOR, H₂S > 7%, CO₂ > 6%, low porosity, low permeability and HPHT reservoir environment
- Subsea Intervention/Workover/Completion for Korean National Oil Company
Diagnose and restore Donghae 1-4P Sub-sea well back to production
- Completions, Sand Control, & Well Testing (Deepwater Exploration Asset) for BG Nigeria
Responsible for "Well Completion and Testing" operations in deepwater exploration campaign
- Well Productivity for Total E&P
Scales Squeeze treatment for Dunbar, Alwyn, Otter and Elgin/Franklin fields; Fracturing design and operations in HPHT wells; Sand Control in HPHT wells, Water shut-off in HPHT wells

HYBRID TRAINING SOLUTIONS

FOCUS TRAINING • REDUCE COST • ENHANCED RESULTS

Over the years, there has been a growing demand for hybrid training programs. It is an excellent option to maximize your training dollar for your specific training needs. We make it possible to run a training program that is customized totally to your training needs at a fraction of an in-house budget!

If you like to know more about this excellent program, please contact us on +65 3159 0800 or email general@petrosync.com

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Instructor Profile - Continue

Partial Client List

- ▶ Husky-CNOOC Madura Limited
- ▶ ERCB
- ▶ PennWest Exploration
- ▶ NAL Resources
- ▶ Apache Corp
- ▶ Nexen Inc.
- ▶ Bircliff Energy Ltd.
- ▶ Suncor Energy
- ▶ BP Indonesia
- ▶ Petronas Malaysia
- ▶ SKKMigas Indonesia
- ▶ Nippon Japan
- ▶ TotalEnergies Indonesia
- ▶ Statoil Canada
- ▶ Cairn India
- ▶ and many more

Publications

- ▶ M. Etuhoko, "The Role of Energy Executives in Transformational Leadership to Accelerate the Energy Transition" MBA dissertation. Warwick Business School, Coventry, United Kingdom, Jan 2023.
- ▶ SPE PAPER #189248-MS: Lusiana Chendrika, I. M. Purwitaningtyas, Muhammad Fuad, Schlumberger; Michael Etuhoko, Syaiful Nurdin, Lian Jihong and Barne Rusli, Husky-CNOOC Madura Limited, "First Removal of Manganese Tetroxide Water-Based Mud cake in HPHT wells with H₂S and CO₂ Environment using Acetic Acid conveyed with Coiled Tubing", SPE Symposium: Production Enhancement and Cost Optimisation held in Kuala Lumpur, Malaysia, 7-8 November 2017.
- ▶ SPE PAPER #186217-MS: M.S. Nurdin, M.O. Etuhoko, D.R. McKen, J. Lian, Husky-CNOOC Madura Ltd.; A. Syapari, H. Nuryadi, Baker Hughes; M. Fadil, P.P. Utomo, SKKMigas, "First Open Hole Horizontal Near HP/HT Critical Sour Gas Wells Completion in Indonesia: Lesson Learned from BD Field Development Project in Kujung Formation", SPE/IATMI Asia Pacific Oil & Gas Conference and Exhibition held in Bali, Indonesia, 17-19 October 2017.
- ▶ SPE PAPER #186274-MS: J. Lian, Y. Tian, Z. Yang, K. Yustendi, D. Rizkiani, S. Nurdin, D.R. Mcken, M.O. Etuhoko, Husky CNOOC Madura Limited; K. Jiang, CNOOC International Ltd.; A.P. Diemert, Husky Energy Inc.; M. Fadil, P.P. Utomo, A. Mahry, S.D. Yudento, SKKMigas, "BD Field Development: First Kujung Horizontal near HPHT - Critical Sour Wells Offshore Indonesia",
and many more

WHY YOU SHOULD ATTEND PETROSYNC'S EVENTS

- To ensure that all objectives of the course matches yours, all PetroSync programs are developed after intensive and extensive research within the industry
- PetroSync programs focus on your immediate working issues to ensure that you are able to apply and deliver immediate results in real work situations
- Application and implementation of industry knowledge and experience are the drivers for our course design, not theoretical academic lectures
- PetroSync training focuses on practical interactive learning tools and techniques including case studies, group discussions, scenarios, simulations, practical exercises and knowledge assessments during the course. Invest a small amount of your time to prepare before attending the course to ensure maximum learning
- PetroSync follows a rigorous selection process to ensure that all expert trainers have first-hand, up-to-date and practical knowledge and are leaders of their respective industrial discipline

COURSE DETAILS

Title : Well Completion and Workover

Date : 24th - 28th June 2024

Location : Kuala Lumpur, Malaysia

INVESTMENT PACKAGES

Please checklist the package that you are attending!

Well Completion and Workover Schedule	Price
<input type="checkbox"/> 24 th - 28 th June 2024 at Kuala Lumpur, Malaysia	USD 4,250

* All prices are subject to change without notice and are not guaranteed, except that prices for an order that have been accepted by PetroSync is not subject to change after acceptance.

* Price is nett excluding Withholding Tax if any and will be quoted separately. Please send us the withholding tax payment receipt.

DELEGATE DETAILS

1st Delegate Name _____ Mr Mrs Ms Dr Others

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

2nd Delegate Name _____ Mr Mrs Ms Dr Others

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

3rd Delegate Name _____ Mr Mrs Ms Dr Others

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

*Please fill all the details including mobile number. This help us to contact participant if they are late in class or if there is any urgent update (through whatsapp/call)

INVOICE DETAILS

Attention Invoice to: _____

Direct Line Number: _____ Fax: _____

Company: _____ Industry: _____

Address: _____ Postcode: _____

Country: _____ Email: _____

Please note:

- Indicate if you have already registered by Phone Fax Email Web

- If you have not received an acknowledgement before the training, please call us to confirm your booking.

PAYMENT METHODS

By Credit Card

By Direct Transfer : Please quote invoice number(s) on remittance advice

PetroSync Global Pte Ltd Bank details:

Account Name : PetroSync Global Pte Ltd

Bank Name : DBS Bank Ltd

Bank Code : 7171 • Bank Swift Code : DBSSSGSGXXX • Branch code : 288

Account No : 0288-002682-01-6-022 (USD)

Bank Address : 12 Marina Boulevard, Level 3. Marina Bay Financial Centre Tower 3. Singapore 018982

COURSE CONFIRMATION

I agree to PetroSync's payment terms and cancellation policy.

Signature : _____

Date : _____

PAYMENT TERMS : Payment is due in full at the time of registration. Full payment is mandatory for event attendance.

PROGRAMME CONSULTANT

Name : Cay Aagen

Email : registration@petrosync.com

Phone : +65 3159 0800

TERMS AND CONDITIONS

DISCLAIMER

Please note that trainers and topics were confirmed at the time of publishing; however, PetroSync may necessitate substitutions, alterations or cancellations of the trainers or topics or location (classroom / Virtual). As such, PetroSync reserves the right to change or cancel any part of its published programme due to unforeseen circumstances. Any substitutions or alterations will be updated on our web page as soon as possible.

DATA PROTECTION

The information you provide will be safeguarded by PetroSync that may be used to keep you informed of relevant products and services. As an international group we may transfer your data on a global basis for the purpose indicated above. If you do not want us to share your information with other reputable companies, please tick this box

CANCELLATION POLICY

Delegates who cancel after the training is officially confirmed run by email, are liable to pay the full course fee and no refunds will be granted. You may substitute delegates at any time as long as reasonable advance notice is given to PetroSync.

In the event that PetroSync cancels or postpones an In the event that PetroSync cancels or postpones or change the trainer or change the training location (classroom / virtual) of an event for any reason and that the delegate is unable or unwilling to attend in on the rescheduled date, you will receive a credit voucher for 100% of the contract fee paid. You may use this credit voucher for another PetroSync to be mutually agreed with PetroSync, which must occur within a year from the date of postponement.

PetroSync is not responsible for any loss or damage as a result of the cancellation policy. PetroSync will assume no liability whatsoever in the event this event is cancelled, rescheduled or postponed due to any Act of God, fire, act of government or state, war, civil commotion, insurrection, embargo, industrial action, or any other reason beyond management control.

DETAILS CERTIFICATE OF ATTENDANCE

80% attendance is required for PetroSync's Certificate of Attendance. Please email us at registration@petrosync.com and inform us of any incorrect details. We will amend them accordingly.

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CHARGES & FEE(S)

- For Payment by Direct Telegraphic Transfer, client has to bear both local and oversea bank charges.

- For credit card payment, there is additional 4% credit card processing fee.