

# WELLBORE TREATMENT

Sculpt Your Wellbore Treatment Knowledge and Skill by Learning Practical Things From The Expert !

Course Level : Basic - Intermediate

21<sup>st</sup> - 25<sup>th</sup> August 2023 at Kuala Lumpur, Malaysia



## PetroSync Distinguished Instructor

### Magdi El Naggar

Managing Director

Oil Fields Global Consultants (OFGC)

- ▶ Officially Certified as Professional Petroleum Engineering Consultant (License 116/7)
- ▶ Technical Advisor for several companies in the Middle & Far Easts, Africa and Gulf countries
- ▶ 46 years of professional experience in various phases of Petroleum/Reservoir/Production/Drilling & Workover Engineering and field operations with several multi-national international companies including ARAMCO (Saudi Arabia) and ADCO (UAE).
- ▶ Professional in all phases of well intervention operations utilizing coiled tubing and well control as well as extended reach operations.

A lot of  
Practical Things,  
Case Studies  
and Exercises!

### Course Objectives

- ▶ Understand the geological and basic reservoir properties
- ▶ Understand the formation damage concept and mechanism
- ▶ Understand and identify the nature and origin of formation damage and mechanism
- ▶ Understanding the effect of formation damage on revenue to the operator
- ▶ Understanding the impact of skin damage effect on productivity for both vertical and horizontal wells.
- ▶ Gain knowledge about various types of wellbore treatments to activate and remove formation damage.
- ▶ Understand acid/fracturing, Nitrified & Foamed acid as well as N2 kick off operations design basics and procedures.
- ▶ Acquire knowledge on how to select the best fluid (less damaging) at every phase of the well development: drilling, completion, cementing, perforating, stimulation, gravel packing, workover, production and injection operations
- ▶ Understand acid and frac procedures and phases/stages including acid displacement and back flow.
- ▶ Learn how to choose the adequate stimulation and fracturing and kick off method techniques.
- ▶ Learn how to select the suitable candidate for each technique of the treatment operations.
- ▶ Understand the best practices and procedures to execute operations, backflow and stabilize wells post operations.
- ▶ Learn how to evaluate effectiveness of treatment operations and measure the improvement.

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### Course Overview

This course is designed to provide better understanding, enhance knowledge and strengthen the decision-making capability of the participants for all types of wellbore treatments implemented to recover or enhance well performance.

It is important for proper decision making to have basic understanding of the types of formations and basic reservoir properties. For this reason, efforts will be exerted at the early phase of the course to understand the geological and reservoir properties for vertical, horizontal and multilateral wells prior to developing the basic concepts of formation damage, acidizing and hydraulic fracturing. Moreover, the course includes acidizing and fracturing quality control, conducting treatments, monitoring pressures and other critical parameters, during and after the treatments. A vital part of the course is class teamwork whereby attendee's teams evaluate and design stimulation treatments to bring out important information and parameters discussed during the course.

### Who Should Attend?

- ▶ Operations Engineers with 0-10 Years Experience
- ▶ Operations Supervisors with 0-10 Years Experience
- ▶ Production Engineers with 0-10 Years Experience
- ▶ Petroleum Engineers with 0-10 Years Experience
- ▶ Reservoir Engineers with 0-10 Years Experience
- ▶ Drilling Engineers with 0-10 Years Experience
- ▶ Field Service Engineers with 0-10 Years Experience

### Training Methods

The course is based on a balanced combination of classroom teaching and syndicate exercises supported by case studies and exercises within the industrial environment. This course is designed in with leading industry knowledge and practical case studies discussion and analysis to provide an interactive learning environment as well as practical video clips to support the learning process. Pre & Post course tests will be conducted to evaluate learning process level.

### 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

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21<sup>st</sup> - 25<sup>th</sup> August 2023 at Kuala Lumpur, Malaysia

## Course Agenda

### Day 1

#### Pre- Course Test

#### Module1: Reservoir Characteristics, Exploration and Recovery Methods

- Definition of Reservoir
- Reservoir Heterogeneities
- Reservoir Characteristics:
  - ▶ Porosity
  - ▶ Permeability
  - ▶ Relative Permeability
  - ▶ Saturation
  - ▶ Natural Fracturing
  - ▶ Pressures
  - ▶ Reservoir Pressure
  - ▶ Basic Pressure calculations
  - ▶ Pressure Differential
  - ▶ Well Temperature
  - ▶ Drilling Fluids
  - ▶ Completion Fluids

#### Module2: Well Completions

- Definition of well completion
- Well completion Classification
- X-mas Tree
- Wellhead
- Casings
- Liners
- Production Tubing String
- Packers
- Sub-Surface Control System (SC-SSSVs)
- Wellhead Control System
- Artificial lift completions (ESP, GL)
- Smart Completions
- Impact of well completion selection on future operations in the well

#### Module3: Introduction to Formation Damage

- What is meant by formation damage?
- Causes of Formation Damage
- Effect of Formation Damage on Well's Productivity Index
- Formation Damage Indicator and Consequences
- Classification of Formation Damage Problem
- Diagnosis of Formation Damage
- Skin and impact on well productivity
- Best Practice to Avoid Formation Damage

#### Module4: Formation Damage Mechanisms

- Formation damage from drilling mud/processes
- Formation damage from perforations
- Formation damage from completion and workover fluid
- Formation damage from oil and gas production activities
- Formation damage from scales

- Formation damage from organic deposits
- Formation damage from Wettability changes
- Formation damage from Acid stimulation
- Formation damage from Injection (water injection, CO<sub>2</sub> injection, polymer flooding, steam flooding).
- Laboratory Techniques for Formation Damage Testing
  - ▶ Core flood test
  - ▶ Formation damage test
  - ▶ Screen plugging test
  - ▶ Sand retention test
  - ▶ Particle size distribution (PSD)
  - ▶ Rheological measurements
  - ▶ Compatibility tests / Emulsion stability
  - ▶ Solubility Tests

#### Case Study & Exercises

Formation damage magnitude and cost impact

Gas reservoir behaviors

Oil reservoir behavior

Sand control

Well productivity sudden decline and identifying proper treatment requirements

Production profile slope change & how to use the data in defining the problem

Utilizing production history graph to detect the damage

How to use PBU/PFO tests to identify the skin factor as indicator for the formation damage.

Partial penetration and slanted skin effect

Impact of perforation skin factor

### Day 2

#### Quizzes & recap

#### Module5: Types of Acid Systems & Acid Formulations

- Stimulation Definition and Concept
- Types of Acid and Selection
- Factors Affecting Reaction Rates
- Selection of Treatment Type
- Real-time Monitoring of Matrix Acidizing Treatments
- Well Clean-up

#### Module6: Stimulation Techniques & Candidate Selection

- Stimulation Techniques
- Chemical Stimulation without Acid
- Types of Stimulation Systems, Process and Procedures
- Stimulation Candidates Selection
- Matrix Fluid Selection
- Matrix Acidizing Operations
- Matrix Acidizing Design & Examples
- Matrix Acidizing Process and Procedures
- Matrix Acidizing Treatment Execution
- Nitrified Acid & Foamed Acid operations
- Well Stimulation technique selection, design and monitoring
- Candidate selection criteria and procedures

# Wellbore Treatment

21<sup>st</sup> - 25<sup>th</sup> August 2023 at Kuala Lumpur, Malaysia

## Module 7: Monitoring, Execution, Evaluation & Follow-Up

- Acid Fracturing
- Acid Corrosion Parameters
- Selection of Diversion Techniques
- Mechanical Diverting using Conventional Techniques
- Ball Sealers
- Viscous Fluid
- Another Diverting Method
- Potential Formation Damage Caused by Matrix Stimulation Fluid
- Stimulation Techniques and Objectives Summary
- Case Study & Exercises
- Pressure behavior during acid injection
- Offset wells comparison
- PBU tests comparison Pre, During & Post treatment
- On-site evaluation of acid treatment effectiveness

### Day 3

#### Quizzes & recap

## Module8: Stimulation of Sandstone Reservoir

- Why stimulating Sandstone reservoir?
- Sandstone reservoir description (mineralogy)
- Acid formulation and lab tests (acid response curve, compatibility test, return permeability test, etc.).
- How much overflush is required
- How to avoid fluoride precipitation in sandstone stimulation
- Case Study
- Technical concept of Sandstone stimulation

## Module9: Stimulation of Carbonate Reservoir

- Why stimulating carbonate reservoir?
- Carbonate reservoir description (mineralogy)
- Acid formulation and lab tests (acid response curve, compatibility test, return permeability test, etc.).
- What is the big deal about wormholes?
- How to ensure the best acid coverage? Open hole? Cased hole?
- Acid placement in heterogeneous reservoir? Use of diverting agents
- How to ensure the best zonal coverage?
- Practical guidelines on how to select and evaluate acid treatment

## Module10: Basics of Hydraulic Fracture Treatment, Design and Quality Control

- Introduction into Hydraulic Fracturing
- Basic principles in fracturing
- Hydraulic Fracturing Fluids and Chemicals
- Frac height prediction
- Frac height design
- Frac pressure prediction
- Completion design for Frac well candidates
- Perforation strategy
- Fluid selection,
- Proppant selection
- Hydraulic Fracture Treatment Process

- Hydraulic Fracture Operations & Stages
- Rock Mechanics
- Main Fracture Treatment Design
- Hydraulic Fracturing Candidate Selection
- Case studies & Exercises
- General Field Description
- Well History
- Candidate selection
- Design, Execution and Evaluation
- Conclusion

### Day 4

#### Quizzes & recap

## Module11: Multi-Stage Fracturing Technology

- Application in open hole horizontal well using swelling packer and stimulation sleeves.
- Application in cased hole vertical to deviated wells using composite plug technology
- Real life field case history from planning, design, completion installation, stimulation to clean-up.
- Example from carbonate reservoir

## Module12: Sand Control Completion Overview

- Sand production problem
- What are the consequences of sand production?
- Sand Detection
  - ▶ Sand monitoring
  - ▶ Measuring Sand production
- Sand Prediction and Monitoring
  - ▶ What causes sand production?
  - ▶ Types of sand failure
  - ▶ How to predict sand production in new wells
  - ▶ How to predict sand failure during well production
- Sand Control Completion
  - ▶ Selective perforation method
  - ▶ Cased hole gravel pack
  - ▶ Frack pack
  - ▶ Perforating for sand control
  - ▶ Frac pack completion: success of a frac pack, frac pack limitations,
  - ▶ Frac pack fluids, frac pack installation and treatment procedure.
  - ▶ Gravel pack / Frac pack evaluation
  - ▶ Sand Control field operations step.

#### Case histories

Analysis of sand production profile from well production history

Identifying sand production spikes and possible reasons and prevention

5 exercises

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21<sup>st</sup> - 25<sup>th</sup> August 2023 at Kuala Lumpur, Malaysia

## Module13: Production Problems

- Scales
  - ▶ Introduction to scale
  - ▶ Sources of scale deposition
  - ▶ Types of scales
  - ▶ Why scale forms?
  - ▶ Impact of scale on well productivity
  - ▶ Scale control and prevention
  - ▶ Scale treatments
- Paraffin /Wax
  - ▶ Consequences on flow assurance
  - ▶ Root cause of paraffin /wax problems
  - ▶ Preventive solutions
  - ▶ Wax removal
- Asphaltene
  - ▶ Where and why are they formed?
  - ▶ Asphaltene removal?
- Hydrates
  - ▶ Impact on productivity
  - ▶ Hydrate formation envelope
  - ▶ Hydrate prevention

Case study & Exercises

Tubing Plugging Cases (Partial, Complete)

SrSo4 project

Wireline Downhole Lost Tools

4 exercises

Hydrates common plug removal hazard

Hydrates formation in offshore pipeline

## PROGRAM SCHEDULE

09:00	Registration (Day1)
09:10 - 11:00	Session I
11:00 - 11:15	1 <sup>st</sup> 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 <sup>nd</sup> Tea Break
16:15 - 17:00	Session IV
17:00	End of Day

\*Schedule may vary for each training

## Day 5

### Module14: Excessive Water and Gas Shut-off

- Problem types
- Near wellbore flow
- Fissures to injectors
- Poor areal sweep
- High permeability layer with or without cross flow
- Gravity segregation layer
- Coning
- Diagnostics
- Data collection techniques
- Water/gas shut off techniques
- Case study & case history
- Strategy for attacking excessive water production
- Gas/water shutoff examples

### Module15: Well Intervention Operations & Wellbore Treatment Operations

- Conventional:
  - ▶ Coiled Tubing Operations
    - Well kick-off operations
    - Stimulation
    - Scale Removal
    - Cement Squeeze
    - Fishing Operations
  - ▶ Well killing & securing for well routine maintenance operations
  - ▶ Wireline (Slick, E-line)
  - ▶ Snubbing operations
  - ▶ Well Testing (PTS, MPFM)
- Non-Conventional:
  - ▶ Well Control
  - ▶ Emergency
- Impact of well completion and well intervention operations
- Post Course Test

## 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.

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

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He has 46 years of professional experience in various phases of Petroleum Engineering including Petroleum/Reservoir/Production /Drilling & Workover Engineering as well as field operations with several multi-national international companies including ARAMCO (Saudi Arabia) and ADNOC (UAE).

He has extensive professional experiences in all phases of well intervention operations including coiled tubing, especially during well emergency cases, well control and extended reach operations.

He specialized in well intervention operations, especially, during emergency cases and well blowouts. He also has extensive experiences in full field development studies, Production Enhancement for oil fields as well as various types of wells, CO2 Injection and EOR operations, IWCF & IADC certification.

### Publications

- ▶ Coiled tubing Operations Standard Procedures
- ▶ Production Engineering Operations Standard Procedures
- ▶ Recently, completed a total of 3,000 research papers in various topics of O & G industry since 2014.

### Partial Client List

- |                                   |                         |
|-----------------------------------|-------------------------|
| ▶ SHELL                           | ▶ OGS (Egypt)           |
| ▶ TOTAL (Indonesia)               | ▶ APEX (Dubai )         |
| ▶ Schlumberger (Iraq)             | ▶ Petromentor (China)   |
| ▶ EXXON - ARAMCO                  | ▶ CNPCIC (China)        |
| ▶ ADCO                            | ▶ Oman Gas              |
| ▶ Murphy                          | ▶ Oman Petrogas         |
| ▶ Sapura (Malaysia)               | ▶ Sohar Aluminum (Oman) |
| ▶ Arabian Gulf                    | ▶ Petrofac              |
| ▶ GUPCO (Egypt)                   | ▶ OXY (Oman)            |
| ▶ ARAMCO                          | ▶ Talisman              |
| ▶ Osterreichische Mineralol (OMV) |                         |

## 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](mailto:general@petrosync.com)

## COURSE DETAILS

Title : Wellbore Treatment  
Date : 21<sup>st</sup> - 25<sup>th</sup> August 2023  
Location : Kuala Lumpur, Malaysia

## INVESTMENT PACKAGES

Please checklist the package that you are attending!

Wellbore Treatment SCHEDULE	LOCATION	PRICE
<input type="checkbox"/> 21 <sup>st</sup> - 25 <sup>th</sup> August 2023	Kuala Lumpur, Malaysia	USD 2,995

\* 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 (USD)

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

All bank charges to be borne by payer. Please ensure that PetroSync Global Pte Ltd receives the full invoiced amount.

## 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  
Fax : +65 6826 4322

## 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 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.

### CERTIFICATE OF ATTENDANCE

80% attendance is required for PetroSync's Certificate of Attendance.

## DETAILS

Please accept our apologies for mail or email that is incorrectly addressed.

Please email us at registration@petrosync.com and inform us of any incorrect details. We will amend them accordingly.

### Find us on Social Media:

 PetroSync Global Pte Ltd

 PetroSync

 PetroSync

## 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.