

Advanced HPHT Well Engineering

Enhance your HPHT Well Engineering Facilities Knowledge and Skill by Learning Practical Things from the Expert!

Course Level : Intermediate

21st - 25th April 2025 at Bandung, Indonesia
27th - 31st October 2025 at Kuala Lumpur, Malaysia

A lot of
Practical Things,
Case Studies
and Exercises!



Petrosync Distinguished Instructor Steve Nas

Well Engineering Consultant and Instructor

- Technical advisor for MPD-HPHT Hazop and DWOP for drilling operations & deepwater wells
- Technical advisor and subject matter expert for aerated geothermal drilling operations
- Independent reviewer of well abandonment campaigns and programs in various countries around the world

Who Should Attend?

This course is intended for drilling engineers, completion engineers, service providers that are about to be exposed to HPHT drilling operations and are trying to better understand the complexities.

Training Methods

The course method will be a combination of the following;

- Lectures (presentation)
- Discussions and exercises
- Real/field case and Demonstration

Broken down as follows;

- 40% Lectures
- 10% Discussions
- 50% Case Studies & Practical Exercises

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

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Course Overview

This course is delivered as a scenario-based course to provide knowledge of High-Pressure and High Temperature (HPHT) well design, drilling and completion operations to drilling and completion engineers. The course is specifically designed to provide an understanding of the challenges associated with the design and construction of HPHT wells. The course starts with an HPHT pressure profile and geology. Participants work through the various well design aspects. Working on a real case allows the participants to learn not only theory, technicalities and practicalities of drilling and completing HPHT wells but it also ensures that participants gain real experience in understanding the HPHT issues. If this course is provided to participants from a single client the course scenario can be provided by the client. This allows participants a real insight into the HPHT challenges from their own well.

Course Outcome

Objectives of this course are to provide the participants with an understanding of the complexities associated with HPHT well design and associated drilling operations. All the topics in this course relate to high pressures and high temperatures. It is assumed that participants understand conventional well design and drilling operations. At the end of the course, the participants will understand and be competent in:

- ▶ Narrow Drilling Margins and effects on Kick tolerance
- ▶ Predictions of Pore pressures and the challenges
- ▶ The impact of both high pressures and temperatures and significant changes in temperatures on the observed behavior of the well
- ▶ Understand the impact of temperatures and pressures on primary and secondary well barriers
- ▶ Well design requirements for HPHT
- ▶ Understand Operational Planning and Operational Challenges associated with HPHT
- ▶ Rig equipment requirements
- ▶ Understand Well Delivery, fingerprinting, well bore breathing, high-reliability drilling practices
- ▶ Well Control – practical well control for on bottom, off bottom and out of whole well control, kicks and losses

PROGRAM SCHEDULE

08:00	Registration (Day1)
08:10 – 10:00	Session I
10:00 – 10:15	1 st Tea Break
10:15 – 12:30	Session II
12:30 – 13:30	Lunch Break
13:30 – 15:00	Session III
15:00 – 15:15	2 nd Tea Break
15:15 – 16:00	Session IV
16:00	End of Day

*Schedule may vary for each training

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Course Agenda

Day 1

Introduction

The course starts with an introduction to the HPHT environment and how it is defined. The course introduces the geological aspects of an HPHT environment and the course then presents a detailed look at the behaviors of the various components of a well with elevated pressures and temperatures.

- ▶ Welcome and Introductions
- ▶ Defining the HPHT Environment
- ▶ History of HPHT Drilling Operations
- ▶ Geological & Geophysical Aspects of Abnormal Pressures
- ▶ Challenges in HPHT Wells
- ▶ Behavior of Gasses with elevated pressures and temperatures
- ▶ Behavior of Liquids with elevated pressures and temperatures
- ▶ Behavior of Metals with elevated pressures and temperatures
- ▶ Behavior of Elastomers with elevated pressures and temperatures

Exercises: Gas calculations, Density Calculations

Day 2

Well Design

The second day of the course starts with a look at well design standards, well design for HPHT wells.

- ▶ Applicable well design, drilling standards, procedures and guidelines
- ▶ Well Design Basis of Design
- ▶ Pore and Fracture Pressures and pressure ramps
- ▶ Well trajectories
- ▶ Casing Design and their connections
- ▶ Well control aspects associated with casing design
- ▶ Wellheads and wellhead growth
- ▶ Primary Cementing / Remedial Cementing
- ▶ Drilling Fluids (Oil Based / Water Based / Formate Brines)
- ▶ HPHT Drill string Design
- ▶ HPHT Data Collection (LWD / MWD Tools / Drilling Data)
- ▶ Contingency Planning

Exercises: Tubular expansion, Drill string design, Fluid challenges.

Day 3

Rig Equipment

The third day of the course starts with rig requirements for HPHT operations. This part of the course presents the surface equipment requirements for HPHT drilling.

- ▶ Rig and equipment requirements for HPHT Operations
- ▶ BOP specifications and test requirements
- ▶ HPHT Choke Manifolds
- ▶ Mud Gas Separator Sizing
- ▶ Temperature safety aspects
- ▶ Mud Coolers
- ▶ Mud Testing Requirements
- ▶ Hydraulics and ECD
- ▶ Barite mixing requirements
- ▶ Solids Control and Barite Sag

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Course Agenda - Continue

- ▶ Pit Discipline
- ▶ Finger Printing the well
- ▶ Fluid compressibility & density
- ▶ Gas Solubility

Exercises: Temperatures, Barite requirements, barite sag, Gas solubility

Day 4

Well Operations

In the fourth day of the course the operational aspects of drilling an HPHT well are presented to the candidates.

- ▶ Well control for HPHT and differences with conventional wells
- ▶ Well Control Operations and challenges, Barriers
- ▶ Ballooning, wellbore breathing and super charging
- ▶ Temperature Monitoring
- ▶ Drilling and Tripping Operations
- ▶ Data Collection and MWD/LWD
- ▶ Casing and Cementing Operations
- ▶ Well Integrity
 - ▶ Well integrity standards.
 - ▶ Integrity specifications for HPHT
 - ▶ Barriers and Barrier Elements
 - ▶ Leaks
 - ▶ Corrosion
 - ▶ Annular Pressure
 - ▶ Integrity Failures
 - ▶ Failure analysis and FMECA
 - ▶ Managed Pressure Drilling

Exercises: Well control, Dual Gradient Calculations

Day 5

Testing and Completions

The last day of the course covers well testing and completion operations on HPHT wells.

- ▶ HPHT Well Evaluation Logging and coring operations
 - ▶ Mud Logging
 - ▶ Wireline logging
 - ▶ MWD – LWD Tools
 - ▶ HPHT coring operations
- ▶ Well Testing Practices
- ▶ Material selection and metallurgy for tubing and wellheads
- ▶ Wellhead Seals
- ▶ Well testing well control aspects
- ▶ HPHT completions
- ▶ Tubing Movement
- ▶ Corrosion
- ▶ Flow Control Equipment
- ▶ Sand Production
- ▶ Reservoir Depletion
- ▶ Workovers

Exercises: Material Selection, Reservoir Depletion, Workovers.

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Instructor Profile



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- Technical advisor for MPD-HPHT Hazop and DWOP for drilling operations & deepwater wells
- Technical advisor and subject matter expert for aerated geothermal drilling operations
- Independent reviewer of well abandonment campaigns and programs in various countries around the world

Experienced well engineer and well engineering instructor with an MSc in Drilling Engineering and over 40 years of drilling and well engineering experience. Skilled in many facets of advanced well engineering such as Deepwater Managed Pressure Drilling, High Pressure – High Temperature, Geothermal, Well Integrity, Well Control and Well Abandonment operations. Experience working for operators, drilling contractors and service providers delivering a wide range of engineering solutions for complex wells.

Developed and presented numerous training courses related to well design, managed pressure drilling, high pressure high temperature operations, casing design, advanced well control, well control emergency response planning and well abandonment.

Skilled in thermal and multiphase hydraulic modelling for geothermal and underbalanced drilling and blowout kill calculations. Experienced in engineering solutions for well abandonment, relief well planning and coiled tubing drilling. Coauthored several SPE books and numerous SPE papers and Member of SPE, ICOTA, IADC, IWCF, Energy Institute.

Sample Major Project List

- Delivered numerous courses in HPHT operations for offshore and onshore wells.
- Wellspec, Singapore - Technical advisor for MPD-HPHT drilling operations. Providing HPHT / MPD rig requirements, procedures and providing both office based and rig based guidance during drilling operations.
- Wellspec, Singapore - Completed onsite inspections and reviews of multiple deepwater HPHT/MPD systems including all the associated HPHT and MPD procedures, personnel competency, and drawings on drilling contractor owned and operated MPD equipment.
- Myanmar - MPD subject matter expert for deepwater, HPHT MPD operations where MPD equipment was installed a semisubmersible rig using a below tension ring system for multiple HPHT exploration wells in water depths as deep as 2400m.
- Philippines - HPHT and MPD advisor for multiple HAZOP and DWOP workshops for deepwater Wells.
- Schlumberger, Malaysia - Completed hydraulics, well control and temperature modelling on numerous HPHT well programs.
- Weatherford - Conducted the first pressurized mud cap drilling (PMCD) operations from floating rigs in SE Asia back in 2004. From there successfully implemented the first ultra deepwater MPD systems and contributed significantly to the successful application of MPD technology for HPHT and depleted reservoir wells.
- Australia - Conducted advanced thermal modelling for deepwater HPHT operations

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

- ▶ Petronas
- ▶ Pertamina
- ▶ Petrofac
- ▶ CNOOC
- ▶ Saudi Aramco
- ▶ Neptune Energy
- ▶ Santos
- ▶ Medco Energy
- ▶ Woodside
- ▶ Woodside
- ▶ Petrovietnam
- ▶ Kepco
- ▶ ENI
- ▶ Total Indonesia
- ▶ Hess Malaysia
- ▶ DTEK
- ▶ COS
- ▶ Many more.

Publications

- ▶ 2013, Joy Oyovwevotu, SPE, Senergy Ltd; Eric Low, SPE, Bowleven; Steve Nas, SPE, Schlumberger, “Improving Drilling Operations Efficiency on an Ultra-Narrow Margin HPHT MPD Well with use of a Mud Cap.” SPE paper 167985 prepared for presentation at the 2014 IADC/SPE Drilling conference in Fort Worth, Texas.
- ▶ 2012, Noor Azree B Nordin, Lawrence Umar, Intan Azian Bt A Aziz, Petronas Carigali, Steve Nas, Wing Keat Woo, SPT Group, “Dynamic Modeling of Wellbore Pressures Allows Successful Drilling of a Narrow Margin HPHT Exploration Well in Malaysia.”, SPE paper 155580, presented at the 2012 IADC/SPE DrillingTechnology Conference and Exhibition in Tianjin, China.
- ▶ 2011, Ardia Karnugroho, Steve Nas, Julmar Shaun S. Toralde / Weatherford, Tutuko Prajogo Ph. D. /Swiss German University, “Mechatronics Technology in Drilling Operations Used to Enhance Safety”, SPE paper 143838 presented at the SPE Digital Energy Conference and Exhibition, 19-21 April 2011, The Woodlands, Texas, USA.
- ▶ 2011, Steve Nas., “Kick Detection and Well Control in a Closed Wellbore”. SPE paper 143099, presented at the 2011 Managed Pressure Drilling and Underbalanced Operations Conference and Exhibition in Denver Colorado.

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

INVESTMENT PACKAGES

Advanced HPHT Well Engineering SCHEDULES	LOCATION	PRICE
<input type="checkbox"/> 21 st - 25 th April 2025	Bandung, Indonesia	USD 3,550
<input type="checkbox"/> 27 th - 31 st October 2025	Kuala Lumpur, Malaysia	USD 3,550

* 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: _____

4th 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 : DBSSGSGXXX • 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

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

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.

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CHARGES & FEE(S)

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

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