

# Applied Drilling and Well Engineering

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

Course Level : Basic

30<sup>th</sup> September - 04<sup>th</sup> October 2024 at Bandung, Indonesia  
25<sup>th</sup> - 29<sup>th</sup> November 2024 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 was originally designed for young graduate or trainee well engineer. These are the fundamentals of well engineering and are targeted at participants that want to understand the well engineering fundamentals.

#### Training Methods

The course method will be a combination of the following;

- ▶ The course method will be a combination of the following;
- ▶ Lectures (presentation)
- ▶ Discussions and exercises
- ▶ Real/field case and Demonstration

Broken down as follows;

- ▶ 35% Lectures
- ▶ 10% Discussions
- ▶ 55% 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](mailto:general@petrosync.com)

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## Course Overview

The objective of this 5 days Applied Well Engineering course is to provide well engineers with an advanced and practical insight into the Well Design and Well Construction process. This course approaches well construction as a design process. In doing so each topic is addressed by the participants by defining objectives and creating a basis of design. Once this has been completed the detailed design process is addressed.

The course is scheduled around an actual well and it is combined with practical examples to enhance the theoretical and practical knowledge of the candidates. As the course progresses, complexity is increased, requiring the candidates to re-evaluate objectives as new conditions are introduced. The course addresses all aspects of well design and well operations including aspects that are generally conducted by contractors.

Each of the participants will work and create a detailed drilling program, which will include costs, timings, risk assessments and contingency planning. Once the well design is completed the program will be used to review operational management and optimization opportunities.

## Course Objectives

At the end of the course, the participants will understand and be competent in:

- ▶ Participants gain a solid understanding of understanding objectives and creating a basis of design for each activity before working the details of their well program.
- ▶ Participants are made aware of the complexities and interaction between various components of well design and the subsequent well operations.
- ▶ Participants will gain a good understanding of well design aspects provided by contractors, they will also gain an understanding of the data requirements for the contractor work scopes.
- ▶ Participants gain a better understanding of the operational management, the risk management and mitigation aspects of well design and well operations and the influence these have on well objectives.
- ▶ Participants can go back to their operational roles after the course with a better understanding of the well design process.

## PROGRAM SCHEDULE

08:00	Registration (Day1)
08:10 – 10:00	Session I
10:00 – 10:15	1 <sup>st</sup> 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 <sup>nd</sup> 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 to Well Planning and Formation Temperatures

The first day introduces the well planning process, Objectives and Basis of Design as well as the general standards and guidelines that need to be referenced. Introducing the objectives of the well to be designed and working through the basis of design including first pass of drilling times and costs. From the initial well proposal, we add the understanding of pore, fracture pressures and the temperatures as they are provided to the well engineer. The objectives are to incorporate the formation pressures and temperatures into the basis of design and understand the implications. Various methods for pressure determination and potential variations in pressure predictions will be introduced

- ▶ Welcome and Introductions
- ▶ Well Types
- ▶ Well Planning
  - ▶ Objectives
  - ▶ Basis of Design
  - ▶ Standards and Guidelines
  - ▶ Data Requirements for Well Planning
  - ▶ Considerations in well planning
  - ▶ Offset wells
  - ▶ Drilling program
- ▶ Risk Analysis
- ▶ Estimating Drilling Duration
- ▶ Estimating Well Costs
- ▶ Pore Pressures
- ▶ Fracture Pressures
- ▶ Temperatures

**Exercises:** Well Objectives, Basis of Design for the well, Drilling program contents, Time and Cost estimates, Pressure safety margins, Effects of Pressures and temperatures related to the well design.

### Day 2

#### Directional Planning

This part introduces the understanding of directional planning and downhole targets. Directional calculations and the basis of design for trajectory planning will be addressed. With the trajectory directional plan designed tool and survey requirements, anti-collision and Torque and Drag calculations are conducted

- ▶ Well Trajectory Directional Planning
  - ▶ Reference Systems
  - ▶ Trajectory Planning
- ▶ Directional Tools
- ▶ Directional Control
- ▶ Torque and Drag
- ▶ Tortuosity
- ▶ Anti-Collision

**Exercises:** Trajectory planning and anti-collision calculations

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### Day 3

#### Casing Design

Casing design on the proposed well will be introduced. The principles of casing design, casing properties and connections will be introduced. Conductor design for a jackup rig and the wellhead types and selection of the wellheads will be introduced.

- ▶ Casing Design
  - ▶ Selecting Setting Depths
  - ▶ Casing Properties
  - ▶ Load Cases Design Factors
  - ▶ Coupling and Connectors
  - ▶ Material Selection
- ▶ Conductor Design
- ▶ Wellheads
- ▶ Casing running Operations

**Exercises:** Casing Design setting depth selections and tensional, burst and collapse

### Day 4

#### Cementing and Drilling Fluids

Introducing the objectives and basis of design for cementing. Cement slurries and additives are introduced with testing requirements for the cement recipes. Cementing programs for the casing strings in the well will be completed and potential cementing problems are introduced.

Introducing the objectives and basis of design for drilling fluids. Selection criteria for water based and oil based fluids. Introducing testing of drilling fluids and data gained from mud reports. Introducing rheology, fluid types and hydraulics and pressure loss calculations. Hydraulics optimization and solids control. Surge and swab pressures.

- ▶ Cementing
  - ▶ Cement Slurries
  - ▶ Cement additives
  - ▶ Cement Testing
  - ▶ Cement Placement
    - ▶ Cementing Problems
    - ▶ Remedial Cementing
- ▶ Managing Cementing Operations
- ▶ Drilling Fluids
  - ▶ Water based Fluids
  - ▶ Oil Based Fluids
  - ▶ Fluid Properties
  - ▶ Testing of Drilling Fluids

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### Course Agenda - Continue

- ▶ Solids Control
- ▶ Hydraulics
  - ▶ Rheology
  - ▶ Pressure Losses
  - ▶ Hydraulics Optimization
  - ▶ Hole Cleaning
- ▶ Surge & Swab

**Exercises:** Casing primary cement calculations, basic hydraulic calculations, pressure losses and hydraulics optimization. Calculations for hole cleaning

### Day 5

#### Drilling Challenges and Well Control

Introducing drilling challenges and the remedial options for these challenges. Address mitigations and drilling program requirements for these challenges. Introduce equipment requirements to mitigate the drilling challenges. Introducing well control challenges and objectives and basis of design for well control. Introducing the concept of well control barriers and general pressure barriers. Introducing kick tolerance calculations. Introducing blowout contingency planning and relief well planning.

- ▶ Drilling Challenges
- ▶ Shallow Gas
- ▶ Down Hole Equipment Failures
- ▶ Surface Equipment Failures
- ▶ Stuck Pipe
- ▶ Losses
- ▶ Drillstring Failures
- ▶ Hole collapse
- ▶ Well Control
- ▶ Barriers
- ▶ Kick Tolerance
- ▶ Primary Well Control
  - ▶ Kick Detection
- ▶ Secondary Well Control
  - ▶ Kick Circulation
- ▶ Non-Conventional Well Control
  - ▶ Bullheading
  - ▶ Losses and Kicks
  - ▶ Plugged Equipment
- ▶ Tertiary Well Control
  - ▶ Blowouts
  - ▶ Relief Wells

**Exercises:** Kick tolerance and relief well calculations.

#### Notes:

For offline training candidates are required to bring their own laptops with excel and must have the ability to use excel for this course. No programming knowledge is required but complex formulas and graphs are used together with spreadsheets during the course.

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### Instructor Profile



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- ▶ 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](mailto: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

Please checklist the package that you are attending!

Applied Drilling and Well Engineering SCHEDULES	LOCATION	PRICE
<input type="checkbox"/> 30 <sup>th</sup> September - 04 <sup>th</sup> October 2024	Bandung, Indonesia	USD 3,550
<input type="checkbox"/> 25 <sup>th</sup> - 29 <sup>th</sup> November 2024	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 : 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

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.

### Find us on Social Media:

 PetroSync Global Pte Ltd

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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.