

Well Integrity Cased Hole Logging and Reservoir Monitoring

Enhanced your knowledge of well integrity and reservoir monitoring from the expert!

Course Level : Intermediate

30th September - 04th October 2024 at Bandung, Indonesia
18th - 22nd November 2024 at Kuala Lumpur, Malaysia



Petrosync Distinguished Instructor

Prof. Dr. Ahmed Taha

President, Godomex

International Consultant Petrophysicist

- ▶ Prof. Dr. Ahmed Taha is an expert in formation evaluation, core analysis and reservoir modeling
- ▶ He has extensive experience over 45 years in industry, principally in log analysis and formation evaluation in various technical and management around the world
- ▶ He has broad experience working with assets and providing properties for reservoir characterisation
- ▶ Strong experience with carbonate petrophysics over 15-years experience

A lot of
Practical Things,
Case Studies
and Exercises!

Who Should Attend?

- ▶ Petroleum Engineers, Production and Reservoir Engineers,
- ▶ Field Operations and supervisors,
- ▶ Geoscientists involved in field development,
- ▶ Well Logging Analysts and Petrophysicists,

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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Well Integrity-Cased Hole Logging and Reservoir Monitoring

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Course Overview

Introduction to basics of rock physics properties and the petrophysical parameters needed for the cased hole logging interpretation. Introduction to the open hole logging tools which can be used to obtain these parameters and their output data needed for cased hole logging tools interpretation. Quick Look Well Log Interpretation using these petrophysical parameters for reservoir quality evaluation.

The basic principles and interpretation of the cased hole logging tools and using the output data for the reservoir monitoring and then applying the reservoir monitoring principles to field applications. The Well Completion related to Perforation System according to the results obtained from the CBL / VDL, TDT / RST, RFT / MDT and PLT logs. The Cementing, or Remedial cementing works using CBL /VDL results related to Petrophysics and Reservoir Monitoring.

Course Objectives

- ▶ Introduction to the rock physics properties and the petrophysical parameters needed for the cased hole logging interpretation.
- ▶ They will be acquainted with the quick look well log interpretation using the petrophysical parameters for reservoir quality evaluation.
- ▶ Understanding the basic principles and interpretation of the open and cased hole logging tools and bench out the reservoir monitoring and then apply cased hole logging and reservoir monitoring principles to field applications.
- ▶ They will be acquainted with the evaluation of casing and cement quality for reservoir isolation.
- ▶ Also, they will be acquainted with the advanced knowledge on single and multiphase flows and analyzes possible flow or injection in reservoirs and analyze possible flow abnormalities in wellbore and how to remedy them.
- ▶ Reservoir formation evaluation from cased hole logging tools when missing open hole tools.
- ▶ They will be acquainted with the Well Completion related to Perforation System using the CBL / VDL, TDT / RST, RFT/ MDT and PLT log results which are related to the Petrophysical evaluation and Reservoir Monitoring.

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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Course Agenda

Day 1

- Introduction to rock physics properties and the petrophysical parameters needed for the cased hole logging interpretation.
- These petrophysical parameters include
 - ▶ Porosity,
 - ▶ Permeability and Permeability / Porosity Relationships
 - ▶ Volume of shale,
 - ▶ Fluid saturations.
- Introduction to the logging tools will be used to obtain these petrophysical parameters.
- Introduction to Lithology, Porosity and Resistivity tools.

Case study: Introducing the different types of porosities and the effect of shale volume on porosity, permeability and fluid saturations.

Exercise: Permeability / Porosity Relationships

Day 2

- Principles and interpretation of the open hole logging tools which can be run in cased holes and the open hole Logging data needed for Cased Hole Logging:
 - ▶ Open-Hole Logging tools: Definitions, Measurements, Applications, Equations
 - Lithology tools: Gamma Ray (GR) & Spectral Gamma Ray (NGT)
 - Porosity tools: Sonic and Neutron.
 - Resistivity tools.
- Quick Look Well Log Interpretation:
 - ▶ Lithology Interpretation,
 - ▶ Porosity, Vsh and Rw Calculations,
 - ▶ Water Saturation and Permeability Determination

Case study: How to calculate the petrophysical parameters from the open-hole logging tools

Exercise: To calculate the fluid saturation using these petrophysical parameters.

Day 3

- Principles and interpretation of the other open hole logging tools which can be run in case holes:
 - ▶ Repeat Formation Tester (RFT) tool
 - ▶ Modular Formation Dynamics Tester (MDT)

For:

 - Determine static reservoir pressure
 - Locate formation fluid contacts
 - Verify reservoir isolation.
 - Indicate reservoir depletion.
 - Calculate reservoir permeability.

Case study: Using the RFT / MDT log example to determine reservoir pressure, reservoir permeability, formation fluid contacts and verify reservoir isolation. Using these logs in field wide for reservoir depletion and reservoir monitoring.

Exercise: To differentiate between the different gradients of different types of fluids; Gas, Oil and water. To locate the different types of contacts Gas / Oil and Oil / Water contacts. Indicate the reservoir depletion from field study.

- ▶ RFT & MDT Log Examples

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Course Agenda Continue

- Principles and interpretation of cased hole logging tools which can be run in open holes:

- ▶ Thermal Decay Time tool (TDT)
- ▶ Reservoir Saturation tool (RST)

For:

- Monitoring Fluid Contacts
- Reservoir monitoring.

Case study: Using the TDT / RST log example to determine the formation water saturation in cased-hole. To follow up the fluid contacts raising by production in a time lapse technique. Using these tools in different times for reservoir monitoring.

Exercise: To calculate the formation water saturation (S_w) from TDT log example using open-hole logging data as porosity and volume of shale.

Day 4

- Cased-Hole Logging Tools

- ▶ Definitions, Measurements, Applications, Equations,

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- ▶ Principles and interpretation of Cement Bond (CBL) & Variable Density (VDL) tool for reservoir monitoring.
- ▶ Applications to field development

- Cement Bond (CBL) & Variable Density (VDL) log details:

- ▶ Principle of Operation
- ▶ Basic Sonic Theory
- ▶ Cement Bond Log (CBL)
- ▶ Variable Density Log (VDL)
- ▶ Quantitative Interpretation of CBL and Qualitative Interpretation of VDL using: CBL – VDL Log Example

For:

- Evaluate zone-to-zone isolation:
- Cement coverage of casing for corrosion protection, mechanical strength
- Identify cement top
- Evaluate cement repair jobs
- ▶ The Rig Cementing and Remedial cementing works using CBL /VDL results related to Petrophysics and Reservoir Monitoring.
- ▶ Well completion related to perforation intervals according CBL / VDL results

Case study: Using the CBL / VDL log example to evaluate zone-to-zone isolation, determine the good and poor cement bonds, identify cement top and evaluate the quality of cement. The decision for Rig cementing and Remedial cement job according to cement quality. Then, well completion related to perforation intervals, Petrophysics and Reservoir Monitoring.

Exercise: To determine the good and poor cement bonds. To locate the perforation intervals and top of cement by using the CBL /VDL log example.

- Production logging (PLT) log:

- ▶ Principles and interpretation of production logging tools (PLT):
- ▶ Applications to field development.

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Course Agenda Continue

- Production logging (PLT) log include:
 - ▶ Fullbore – Spinner, or continuous, or packer Flowmeters.
 - ▶ Gradiomanometer.
 - ▶ Manometer.
 - ▶ Thermometer
 - ▶ Caliper & Radioactive Tracer
 For:
 - Fullbore – Spinner, or continuous, or packer Flowmeters.
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Case study: Using the PLT log example to evaluate which perforation are plugged and which are producing or accepting. Monitoring of reservoir production. Evaluation of reservoir production or injection efficiency. Essential guidance for Remedial and Workover jobs

Exercise: To determine which perforation are plugged and which are producing or accepting and the percentage of production or injection for each perforation using the PLT log example.

Day 5

- Applications to field development
 - Case study 1:** Including: Carbonate and Clastics Reservoirs with different types of Hydrocarbons.
 - Case study 2:** Unconventional Reservoir Example from different areas in the world:
 - ▶ Low Resistivity in Shaly Sand (in Egypt)
 - Case study 3:** Unconventional Reservoir Examples with Different Types of Hydrocarbons (Oil and Gas) from different areas in the world:
 - ▶ Low Resistivity in Silt Reservoir. (In South Africa)
 - Case study 4:** Rock Typing in Carbonate Reservoir using Core Data with the Computer Processing Data. Examples with different contacts (OWC, GWC , and Gas / Oil / Water contacts)
 - Case study 5:** Reservoir Petrophysical Modeling for Carbonate and Clastics reservoirs with different Hydrocarbons (Oil and Gas) from different areas (Gulf Arab countries and Egypt). Using New Approaches and Modern Techniques.
 - Exercise:**
- Practical Training Examples:
 - ▶ Using Raw Log Data for Quick Look Interpretation and Formation Evaluation.

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Instructor Profile



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- Strong experience with carbonate petrophysics over 15-years experience

Prof. Dr. Ahmed Taha has extensive experience over 45 years in industry, principally in log analysis and Formation Evaluation in various technical and managerial positions for Gupco (Cairo, Egypt), Adco and Adnoc (Abu Dhabi, UAE), QGPC (Doha, Qatar), Apache (Cairo, Egypt), RPS Energy (in UK) and CEPISA in Egypt.

He is an instructor for Basic, Intermediate, Advanced Petrophysics, Core-Log Integration, Image Interpretation, IP software Application and LQC for Data Management training courses. He was supervised the Petrophysical studies and Wire-Line operations for Apache Egypt operated by: APACHE, QARUN and KHALDA Companies for 10 years. He did Petrophysical Evaluation projects in a few countries such as Algeria, Egypt, Yemen, Kuwait, Madrid, South Africa and East Asia.

Sample Major Project List

- The Reservoir Description Studies (RDS) for several reservoirs in several fields in Abu Dhabi using ADNOC – Schlumberger Multi Well Data Base (MWDB).
- Kuwait Oil Company (KOC) Project for several carbonate reservoirs in Kuwait with (KOC) from Dubai with Halliburton.
- Apache Oil company, Established the Data Base for all fields of Egyptian Khalda and Qarun companies in Houston.
- RPS Energy company, Petrophysical Evaluation of 4 Gas wells for Sasol company in Johannesburg, South Africa.
- Apache Oil Company, Reservoir Petrophysical Modeling for Ras Qattara Gas reservoir of the Western Desert in Egypt. Reservoir Petrophysical Modelling for the Arab-D Oil Carbonate reservoir' in the Arab Gulf Area.

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Instructor Profile - Continue

Partial Client List

- ▶ ARAMCO (Cairo)
- ▶ Petronas (Sudan)
- ▶ ADCO (UEA)
- ▶ Cairan Energy
- ▶ Cepsa (Madrid)
- ▶ Hess & Nalpetco (Cairo)
- ▶ Sasol (Cairo)
- ▶ Ganoub (Cairo)
- ▶ EGAS (Cairo)
- ▶ OXI (Oman)
- ▶ Repsol (Madrid)
- ▶ Al Furat Petroleum Co. (Syria)
- ▶ Sudapet (Sudan)
- ▶ CCED (Oman)
- ▶ BGFCL
- ▶ PetroGulf (Cairo)
- ▶ PDVSA (Venezuela)
- ▶ KPC & KOC (Kuwait)
- ▶ Cuu Long Joc, Vietnam (UK)
- ▶ RPS Energy (UK)
- ▶ Dana Gas (Cairo)
- ▶ Qatar Petroleum (Qatar)
- ▶ EGPC (Cairo)
- ▶ Petrobel (Cairo)
- ▶ Khalda (Cairo)
- ▶ Qarun (Cairo)
- ▶ KPC (Kuwait)
- ▶ OXI (Oman)

Publications

- ▶ “Estimation of Formation Characteristics From Nuclear and Other Well-Logs” M. Sc. Thesis, Faculty of Science, Ain Shams University, (Cairo, Egypt, 1986)
- ▶ “Accurate Estimation of Water Saturation in Complex Carbonate Reservoirs” presented in the “2nd Abu Dhabi Petroleum Conference”, (Abu Dhabi, April 1986)
- ▶ “Accurate Estimation of Water Saturation in Complex Carbonate Reservoirs” SPE 15714 presented in the fifth SPE Middle East oil show (Bahrain, March 1987)
- ▶ “Petrophysical Model Evaluation of Arab-D in Satah Field, Arabian Gulf, Using Modern Logs and Techniques” Ph.D. Thesis, Faculty of Science, Ain Shams University, PP. 212 (Cairo, Egypt, 1996)
- ▶ “The Use of Well Logging Analysis in Identifying The Bitumen Occurrences and Determining Their Effects on The Reservoir Characteristics in Satah Field, Arabian Gulf” presented in the “GAW-4” (Geology of Arab World), (Cairo University, Feb., 1998).
- ▶ “Lithofacies Identification in Satah Field, Arabian Gulf, Using Well Log Analysis and Modern Technique of Multi-Well Data Base” presented in the EGPC 14th Petroleum Conference (Cairo, Oct. 1998).
- ▶ “Reservoir Petrophysical Modelling of Arab-D in Satah Field, Arabian Gulf, Using Multi-Well Data Base and Modern Techniques” presented in the EGPC 14th Petroleum Conference (Cairo, Oct., 1998).
- ▶ “Application of Modern Techniques and Data Base for Reservoir Petrophysical Modelling” presented in the “MOC 2002” (Mediterranean Offshore Conference & Exhibition), (Alexandria, April 2002).
- ▶ Numerous internal studies in petrophysics were done for GUPCO (Egypt), ADCO and ADNOC (Abu Dhabi) and QGPC (Qatar).

IN-HOUSE SOLUTIONS

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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

INVESTMENT PACKAGES

Please checklist the package that you are attending!

| | Well Integrity-Cased Hole Logging and Reservoir Monitoring SCHEDULES | LOCATION | PRICE |
|--------------------------|--|------------------------|-----------|
| <input type="checkbox"/> | 30 th September - 04 th October 2024 | Bandung, Indonesia | USD 3,295 |
| <input type="checkbox"/> | 18 th - 22 nd November 2024 | Kuala Lumpur, Malaysia | USD 3,295 |

* 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 Telegraphic Transfer, client has to bear both local and oversea bank charges.

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