**Practical Thing** 

**Case Studies** 

and Exercises



# Advanced Well Log Analysis and Interpretation

Improved techniques in effective petrophysics input & integration to maximize oil recovery Course Level: Advance

19th - 23rd May 2025 at Kuala Lumpur, Malaysia | 16th - 20th June 2025 at Bandung, Indonesia 14th - 18th July 2025 at Bangkok, Thailand | 24th - 28th November 2025 at Kuala Lumpur, Malaysia 01st - 05th December 2025 at Bali, Indonesia



# **Petrosync Distinguished Instructor** Prof. Dr. Ahmed Taha

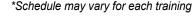
# President, Godomex **International Consultant Petrophysicist**

- 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

# Who Should Attend?

- Well Logging Analysts and Petrophysicists,
- Petroleum, Production and Reservoir Engineers,
- Field Operations and supervisors,
- Geoscientists involved in field development and other E & P professionals.

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				













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#### **Course Overview**

Well logs are detailed record of the geologic formations by a borehole. These are comprehensive and important data gathered in any phase of a well's history to identify petrophysical properties which in turn defines the economic value of a reservoir. The techniques in analysis and interpretation of well logs are therefore essential in identification of oil recovery.

In the E&P business, integrated petroleum engineering studies and field development plans are management tools which are used to maximize economic recovery of hydrocarbons. Petrophysical engineers fulfill a key role in analyzing and interpreting subsurface reservoir data, which form the basis for reservoir models. E&P technical staff and team leaders involved in integrated studies require more than general skills in petrophysical and interpretation techniques to produce quality input to development plans.

The trainer will provide understanding of practical and new techniques and tools in well logging with the support of case studies. At the end of the course, participants will be able to quantitatively identify the reservoir quality, measure the storage capacity of the reservoir through integrating the reservoir and petrophysical data and to improve oil recovery.

# Course Objectives

- Drive a consistent and effective Petrophysics inputs to improve oil recovery
- Understand rock properties and pore geometry
- Capitalize on integration reservoir and petrophysical data to maximize economic recovery of hydrocarbons
- Attain the knowledge and practical use of total and effective porosity calculation
- Determine and understand new techniques and tools in well logging
- Acquire knowledge on permeability and rock quality interpretation
- Learn and practice integration of core analysis and open-hole logs

# **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 Petrophysics

The Rock Physical properties and the petrophysical parameters.

These petrophysical parameters include:

- Porosity,
- Permeability
- Volume of shale.
- Fluid saturations.

Well Logging Tools include:

- Open-Hole Logging Tools.
- Logging While Drilling (LWD) Tools.
- Cased-Hole Logging Tools.

# Open-Hole Logging Tools

- Definition, measurements, application, equations of the following
- Lithology Tools: Gamma Ray, Spectral Gamma Ray, Spontaneous Potential Tools
- Porosity Tools: Sonic, Density, Neutron Tools
- Resistivity Tools: Dual-Latero, Dual-Induction, Micro-Spherical Resistivity Tools

Case study: The effect of shale volume

Exercise: Determination of petrophysical parameters

#### Day 2

#### Logging Operations and Quality Control

- Logging Tools Operations
- Log Quality Control

Introduction to Logging While Drilling (LWD)

- Lithology Tools
- Resistivity Tools
- Porosity Tools

# Quick Look Well Log Interpretation:

- Lithology interpretation
- Porosity calculations
- Rw determination and Petrophysical parameters (a,m,n)
- Vshale estimation
- Fluid Saturation
- Permeability
- Permeability & Porosity relationship

# Formation Evaluation

- Porosity Types
- Total Porosity and Lithology Interpretation
- Rw determination methods and Petrophysical parameters (a,m,n)
- Effective Porosity and Vsh Determination
- Fluid Saturation, Archie's Relationship and other Saturation Equations.
- Permeability.

Case study: Calculation of the petrophysical parameters

**Exercise:** Calculation the fluid saturation

# <u>Day 3</u>

# Other Open-Hole Logging Tools:

- Definition, measurements, application:
- Electromagnetic Propagation Time Tool and Dipmeter.

Case study: EPT log example

Exercise: Calculate Variable 'm' from EPT equation

#### Recent and Advanced Tools:

- Geological Tools: FMS, FMI
- Magnetic Resonance Tools: NMR, CMR

Case study: FMI log example

Exercise: Differentiate between these different structural elements.

Case study: CMR log

Exercise: Define free hydrocarbon and away from the bound fluid

Open and Cased-Hole Logging Tools:

Pressure Tools

- Principles and interpretation of the other open hole logging tools which can be run in cased 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: RFT / MDT log example

Exercise: Differentiate between the different gradients of different types of fluids

# Open and Cased-Hole Logging Tools:

- 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: TDT / RST log example

Exercise: TDT log example using open-hole logging data

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#### Day 4

# Cased-Hole Logging Tools

- Definitions, Measurements, Applications, Equations,
  - Cement Bond (CBL) & Variable Density (VDL) log:
    - Principles and interpretation of Cement Bond (CBL) & variable Density (VDL) tool for zone-to-zone isolation and 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: CBL / VDL log example

**Exercise:** 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.
- Production logging (PLT) log include:
  - Fullbore Spinner, or continuous, or packer Flowmeters.
  - Gradiomanometer.
  - Manometer.
  - Thermometer
  - Caliper & Radioactive Tracer

# For:

- Evaluation of completion efficiency.
- Detailed information on 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

Case study: PLT log example

Exercise: Determine the perforation

# <u>Day 5</u>

#### Advanced Formation Evaluation

- Reservoir Petrophysical Model Evaluation:
- Reservoir Characteristics:
- Modern Approaches and Techniques in Petrophysics
- Multi-Well Bases Study Using:
  - Multi-Well Data-Base
  - Key Well Study
  - Data Normalization
  - Variable Petrophysical Parameter values
  - Standardization of Petrophysical Parameter
- Lithology Determination
  - Lithology Model
  - Lithological Parameters
- Petrophysical Parameters Determination
  - Archie's Parameters
  - Most Problematic Parameters
  - Old Methods (Constant Value)
  - New Methods (Variable Values)
- Introduction to Computer Processed Interpretation using:
- Practical Training Exercises for:
  - Hydrocarbon Quality
  - Fluid Contacts (GOC-GWC-OWC-ODT-WUT-FWL)
  - Reservoir Summations
- Applications to field Development

# **Cases Studies Including:**

- Carbonate reservoir (Limestone)
- Clastics reservoir (Sandstone)
- Gas Sandstone reservoir

#### **Cases studies:**

Including: Carbonate and Clastics Reservoirs

#### Case study – 1:

Reservoir Petrophysical Modeling

# Case study – 2:

Unconventional Reservoir Example

#### Case study – 3:

Unconventional Reservoir Examples

# Case study - 4:

**Rock Typing** 

Examples with different contacts (OWC, GWC, and Gas / Oil / Water contacts)

#### **Exercises**

#### **Practical Training Examples:**

Raw Log Data for Quick Look Interpretation and Formation Evaluation.

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# Instructor Profile



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# President, Godomex

# **International Consultant Petrophysicist**

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- He has broad experience working with assets and providing properties for reservoir characterisation
- 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 CEPSA 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).
- Nuwait 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.

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Please checklist the package that you are attending!

	Advanced Well Log Analysis & Interpretation SCHEDULES	LOCATION	PRICE	
	19 <sup>th</sup> - 23 <sup>rd</sup> May 2025	Kuala Lumpur, Malaysia	USD 3,295	
	16 <sup>th</sup> - 20 <sup>th</sup> June 2025	Bandung, Indonesia	USD 3,295	
_	14 <sup>th</sup> - 18 <sup>th</sup> July 2025	Bangkok, Thailand	USD 3,295	
	24 <sup>th</sup> - 28 <sup>th</sup> November 2025	Kuala Lumpur, Malaysia	USD 3,295	
	01 <sup>st</sup> - 05 <sup>th</sup> December 2025	Bali, Indonesia	USD 3,495	

<sup>\*</sup> 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.

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#### **PROGRAMME CONSULTANT**

Contact : Cay Aagen

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#### TERMS AND CONDITIONS

#### **DISCLAIMER**

Please note that trainers and topics were confirmed at 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.

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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.

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#### **CERTIFICATE OF ATTENDANCE**

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

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

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

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

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Authorized Signature	:			

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