FUNDAMENTALS OF PETROPHYSICS AND WELL-LOGGING FOR NON-TECHNICAL PROFESSIONALS

March 20-21, 2014
Denver Marriott Tech Center
Denver, CO
OVERVIEW

The “Fundamentals of Petrophysics for Non-Technical Professionals” short course will remove some of the mystique surrounding petrophysical methods for identifying and quantifying hydrocarbon reserves for resource evaluation, asset review, development planning, and reserves reporting.

Over the course of one and a half days, the instructor will cover:

• The background and development of petrophysical laboratory, wireline, and MWD/LWD methods
• The need for petrophysical analyses and petrophysicists to do them
• The various common petrophysical measurements and why it takes so many of them to support reserves estimates
• Special purpose petrophysical measurements and why they might be needed
• Both open-hole and cased hole log measurements
• The logging environment and the need for client product quality control
• Various interpretation techniques
• Unconventional resource techniques

Attendees should bring their own hand calculators (smart phone calculators should be sufficient).

WHO SHOULD ATTEND

• Managers of exploration and production companies
• Non-technical personnel who want to better understand well-logging and petrophysics
• Project managers and directors
• Geoscientists and engineers with less than twelve months experience using petrophysical data
• Technical staff at all experience levels wanting a fundamental background in the petrophysics discipline

LEARNING OUTCOMES

• Describe formation evaluation
• Define well logs
• Discuss petrophysicists and what their job entails
• Identify the various uses of well logs
• Describe who petrophysicists are and what they do
• Determine the use of well logs
• Address the historical developments of petrophysics and well logging
• Recognize laboratory measurements
• Identify various well logging environments
• Describe well logging tools
AGENDA

Thursday, March 20, 2014

8:00 a.m. – 8:30 a.m.  Registration and Continental Breakfast

8:30 a.m. – 5:00 p.m.  Course Timing

12:00 – 1:00 p.m.  Group Luncheon

Introduction
- What is formation evaluation?
- The need and purpose of formation evaluation
- Laboratory vs. well bore measurements

Well Logs
- What are well logs?
- Driller’s logs
- Wellsite geologist’s sample description “Strip Logs”
- Mud logs
- Wireline logs
- MWD/LWD logs
- Who uses well logs?
- What is desired vs. what is measured
- How wireline and MWD/LWD logs are acquired

What are Petrophysicists and How Do They Work?

Uses of Well Logs

Petrophysics and Well Logging: Historical Development
- The Schlumberger Brothers & Pros
- The Pechelbronn Well
- Archie’s equations
- Continuous velocity logs and Jessie Wylie’s relationship
- Improvements in recording the results
- Development of formation evaluation

Laboratory Measurements
- Fluid measurements
- Rock (core) measurements
  o Routine core analysis measurements
  o Special core analysis laboratory (SCAL) measurements
AGENDA

Thursday, March 20, 2014 (CONTINUED)

Well Logging Environments
- Wellsite
- Logging operations
- Well logs
  - Log header
  - Measurement tracks
  - Tool stacks, trips, runs, and suites
  - Calibration data and logging program data
- Borehole model
  - Borehole diameter
  - Borehole fluids
  - Mud cake
  - Flushed zone
  - Invaded zone
  - Uninvaded zone
- Subsurface temperatures
  - Geothermal model
  - Thermal disturbances due to drilling

Friday, March 21, 2014

8:00 – 8:30 a.m.  Continental Breakfast

8:30 a.m. – 12:00 p.m.  Course Timing

Well Logging Tools
- Porosity tools
  - What are porosity tools?
  - Resistivity (Conductivity) logs
  - Acoustic (Sonic) logs
    - Measurement of Acoustic Interval Transit Time
    - Acoustic (sonic) logging tool
    - Acoustic (sonic) porosity
  - Density logs
    - Borehole measurement of bulk density
    - Y-Y density logging tool
    - Density porosity
  - Neutron porosity logs
    - Measurement of hydrogen index
    - Neutron porosity tool
    - Neutron porosity
  - Advantages and liabilities of radioactive porosity tools
  - Nuclear magnetic resonance (NRM) logs
    - Measurement of nuclear magnetic resonance (NMR)
    - Nuclear magnetic resonance logging (NML) tool
    - Nuclear magnetic resonance porosity and permeability
    - Nuclear magnetic resonance and lithology
    - NMR vs. Conventional porosity tools
AGENDA

Friday, March 21, 2014 (CONTINUED)

Well Logging Tools (CONTINUED)

- Lithology tools
  - What are lithology tools?
  - Single tool methods
    - Natural gamma ray logs
    - Spontaneous potential (SP) logs
    - Photoelectric factor (PEF)
  - Multiple tool methods
    - Multiple porosity tools
    - Matrix identification (MID) plots
- Saturation tools
  - What are saturation tools?
    - Electrode tools
    - Micro-electrode tools
    - Coil (induction) tools
    - Antenna (dielectric) tools
    - Nuclear magnetic resonance saturation
- Environmental corrections
- Salinity (Rw) tools
  - Wet chemistry
  - Spontaneous polarization, SP
  - Apparent water resistivity, Rw
  - Resistivity ratio Rw estimator
  - Cross-plot Rw estimators
- Other useful measurements
  - Array tools
  - Borehole imagers
  - Wireline formation testing
  - Pulsed neutron capture (PNC) measurements
  - Cased hole resistivity
  - Cross-well tomography
- Unconventional resources
- Well log calibration and quality control

Q&A

Evaluations and Conclusion

INSTRUCTOR

Donald G. Hill, Ph.D. / Consulting Petrophysicist, Adjunct Professor / University of Southern California

Dr. Donald G. Hill has spent over 35 years’ experience implementing innovative petrophysical solutions to petroleum, geothermal, and mining exploration E&P projects, as well as environmental, water resource, and civil engineering projects. His projects have spanned 22 U.S. states, 3 Canadian provinces and 32 countries, exclusive of North America.

He attended Michigan State University (MSU) and The University of Minnesota, completing a Ph.D., at MSU, in geology, with an exploration geophysics option and a petrophysics dissertation problem. Dr. Hill is currently a consulting petrophysicist. He is also an adjunct professor of petrophysics in the Petroleum Engineering Program at the University of Southern California. His clients have included major multi-national petroleum companies, independent oil and gas producers, oilfield service companies, geothermal developers, technology developers, national laboratories, and government agencies.
INSTRUCTIONAL METHODS

Case studies, PowerPoint presentations and group discussion will be used in this event.

REQUIREMENTS FOR SUCCESSFUL COMPLETION OF PROGRAM

Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

IACET CREDITS

EUCI has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. In obtaining this approval, EUCI has demonstrated that it complies with the ANSI/IACET Standards, which are widely recognized as standards of good practice internationally.

As a result of its Authorized Provider membership status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standards.

EUCI is authorized by IACET to offer 1.0 CEUs for the course.

EVENT LOCATION

A room block has been reserved at the Denver Marriott Tech Center, 4900 S. Syracuse Street, Denver, CO 80237, for the nights of March 19-20, 2014. Room rates are $189, plus applicable tax. Call 303-779-1100 for reservations and mention the EUCI course to get the group rate. The cutoff date to receive the group rate is February 17, 2014, but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

PROCEEDINGS

The proceedings of the course will be published, and one copy will be distributed to each registrant at the course.
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PLEASE REGISTER THE FOLLOWING

☐ FUNDAMENTALS OF PETROPHYSICS AND WELL-LOGGING FOR NON-TECHNICAL PROFESSIONALS
MARCH 20-21, 2013: US $1395
EARLY BIRD ON OR BEFORE MARCH 7, 2014: US $1195

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All cancellations received on or before February 14, 2014, will be subject to a US $195 processing fee. Written cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event or publication. This credit will be good for six months. In case of event cancellation, EUCI’s liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at (201) 871-0474. EUCI reserves the right to alter this program without prior notice.