FUNDAMENTALS OF WELL LOGGING AND PETROPHYSICS FOR NON-TECHNICAL PROFESSIONALS

December 4 - 5, 2013
Four Points by Sheraton Bakersfield
Bakersfield, CA

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

LEARNING OUTCOMES

Attendees to this course will learn to:

- Define formation evaluation
- Examine well logs
- Assess the different types of logs
- Describe the job function of a petrophysicist
- Summarize the historical development of petrophysics and well logging
- Evaluate fluid measurements and rock (core) measurements
- Analyze well log environments
- Describe well logging tools and their purposes
- Evaluate compositional and statistical analysis of well logs
- Review clay minerals as they relate to well logs
- Examine shale gas and liquids as they relate to well logs

WHO SHOULD ATTEND

- Exploration and production (E&P) personnel, in need of basic or refresher understanding of petrophysical methods, including:
  - E&P division, district and project managers
  - Geologists
  - Geophysicists
  - Completion, production and reservoir engineers
  - Reservoir simulation engineers
  - Technical specialists
  - Upstream research and development specialists
  - Energy resource specialists
- Attorneys specializing in petroleum industry transactions and operations
- Financing and accounting managers
- Support professionals
- Petroleum industry employees providing technical support
- Administrative personnel providing technical support
- Investment managers, brokers, and analysts wanting to better understand company press releases and other public documents
AGENDA

Wednesday, December 4, 2013

8:00 – 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
• Clay minerals

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
  • Routine core analysis measurements
  • Special Core Analysis Laboratory (SCAL) measurements
AGENDA

Wednesday, December 4, 2013 (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

Thursday, December 5, 2013

8:00 a.m. – 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
AGENDA

Thursday, December 5, 2013 (CONTINUED)

Well Logging Tools (Continued)

- 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
- 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, Rwa
  - Resistivity Ration Rw estimator
  - Cross-plot Rw estimators
AGENDA

Thursday, December 5, 2013 (CONTINUED)

Well Logging Tools (Continued)
- Borehole imagers
  - What are borehole imagers?
  - Acoustic borehole imagers
  - Micro-resistivity scanners
  - Acoustic vs. Micro-resistivity imaging tools
- Wireline formation testing
  - What are wireline formation testers?
  - Wireline formation tester applications
  - Pulsed neutron capture geochemical tools

Compositional and Statistical Analysis
- Linear compositional analysis
- Statistical pattern recognition
- Neural network analysis

Clay Minerals (Reprise)

Shale Gas and Liquids

Summary

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

Hands-on exercises, demonstrations, case studies and PowerPoint presentations will be used in this program.

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.

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.

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EVENT LOCATION

Four Points by Sheraton Bakersfield
5101 California Ave.
Bakersfield, CA 93309
(661) 325-9700

PROCEEDINGS

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

☐ FUNDAMENTALS OF WELL LOGGING AND PETROPHYSICS FOR NON-TECHNICAL PROFESSIONALS
DECEMBER 4-5, 2013 : US $1495
EARLY BIRD ON OR BEFORE NOVEMBER 22, 2013: US $1295

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