





D003: Geological Interpretation of Well Logs (*Distance Learning*)

Tutor(s): Jenny Garnham / Martin Kennedy

5 Days	Competence Level: Basic Application
 Virtual Course	
 Computer Usage	

Summary

Business Impact: The ultimate objectives of this course are to be able to use sets of well logs to establish robust **correlation schemes**, **guide well placement** and **derive property inputs** for geological modelling. These skills will enable participants to **reduce risk**, understand **uncertainty**, improve **success rates**, and **reduce costs** throughout the E&P life cycle.

This course is an introduction to the principles and applications of conventional well logs. It shows how combinations of logs can be used to interpret mineralogy, lithology, facies, depositional environments and key sequence stratigraphic markers such as flooding surfaces. Sessions start by considering the individual measurements but as the course progresses there is an increasing emphasis on combinations of measurements and the trends with depth. The climax of the course is an exercise to produce a robust correlation scheme using data from three wells. The correlation scheme is then used to choose the location for a fourth well designed to intersect the best developed reservoir.

Learning Outcomes

Participants will learn how to:

1. Differentiate the functions, physical principles, and limitations of logging tools used in a standard logging suite and their applications for geological interpretation.
2. Demonstrate the differences between logs acquired using wireline conveyance and logs acquired whilst drilling.
3. Use well logs to determine lithologies, interpret facies, and stratigraphic and structural features.
4. Determine shale volume, porosity, and water saturation from well logs.
5. Correlate between wells using well logs, integrating other available down-hole data.
6. Analyse well logs and cores, together with other available data, to produce a coherent geological evaluation.
7. Employ dipmeter and borehole imaging tools and analyse their interpretation patterns to indicate structural and stratigraphic features.

Duration and Training Method

A virtual classroom course divided into 10 three-hour webinar sessions (equivalent to a five-day classroom course), comprising lectures, discussion, case studies, and practical exercises to be completed by participants during and between sessions.

Participants receive a complete set of lecture notes and a copy of the text book “Geological Interpretation of Well Logs” by Malcolm Rider and Martin Kennedy.

Who Should Attend

This course best suits those beginning to acquaint themselves with logs or those who do not use logs all the time and need a refresher. The course is aimed primarily at inexperienced Geologists and



D003: Geological Interpretation of Well Logs (*Distance Learning*)

Tutor(s): Jenny Garnham / Martin Kennedy

5 Days

Competence Level:
Basic Application



Virtual Course



Computer Usage

Geophysicists, whether in exploration or exploitation, but is also good for Technologists, Reservoir and Petroleum Engineers and new-hire Petrophysicists.

Prerequisites and Linking Courses

The D003 course is considered essential for all geoscientists to attend, due to its nature and direct relevance to all key aspects of the Oil and Gas industry. There are no formal prerequisites for the class, however it is advantageous to have a basic knowledge of Geology and Petroleum Systems.

For an entry-level petrophysics class, see D083 (Introduction to Petrophysics and Reservoir Evaluation (Distance Learning)) and for a more petrophysical view of the interpretation of well logs, see course N121 (Modern Petrophysical Well Log Interpretation).

To build on the learnings of D003, it is recommended to follow with D517 (Well Log Sequence Stratigraphy for Exploration and Production (Distance Learning)), N451 (Practical Oil-Finders Guide to Siliciclastic Sequence Stratigraphy (Wyoming)), or N011 (High Resolution Sequence Stratigraphy: Reservoir Applications (Utah)). For those interested in carbonates, D073 (Integration of Sedimentology, Petrophysics and Seismic Interpretation for Exploration and Production of Carbonate Systems (Distance Learning)) would be a suitable follow-up class.

Course Content

In this class, each individual logging tool is described in terms of basic functions, physical principles and geological interpretation. Log data is then used as a complementary set for lithology interpretation, facies recognition, log sequence analysis and correlation. The following timetable is only a guide and may vary depending on the tutor and experience level of the class.

Topic 1:

- Introduction
- Logging Environment
- Introductory Worksession
- Simple Gamma Ray
- Worksession: Caliper and Gamma
- Spectral Gamma Ray

Topic 2:

- Worksession: Spectral Gamma Ray
- Resistivity – Theory and Tools
- Worksession: Resistivity
- Resistivity – Geology
- Sonic Logging
- Worksession: Sonic
- Well tying and Modern Sonic Logs



D003: Geological Interpretation of Well Logs (*Distance Learning*)

Tutor(s): Jenny Garnham / Martin Kennedy

5 Days

Competence Level:
Basic Application



Virtual Course



Computer Usage

Topic 3:

- Density Logs
- Worksession: Density
- Neutron Logs
- Density Neutron Combination
- Lithology
- Worksession: Lithology
- Dipmeter

Topic 4:

- Core Photos – log comparison
- Image Logs
- Worksession: Image logs
- Facies and Sequences from Logs
- Worksession: Sequence Analysis
- Correlation

Topic 5:

- Stratigraphy and Correlation with logs
- Worksession: Correlation
- NMR
- Basic Petrophysics
- Worksession: Basic petrophysical workflow