

## N356: Production Geoscience (*Pembrokeshire, UK*)

Instructor(s): Mark Bentley

## Format and Duration

Field - 5 Days

Low Physical Demand

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### Summary

Production geoscience is a common job in E&P, but many petroleum engineers do not receive specific training in the discipline and geoscientists often receive more specific sub-discipline geoscience training. The course will integrate the specialisms of sedimentology, stratigraphy, structure and seismic interpretation into a coherent subsurface concept. That concept is then used to generate deliverables such as resource determination, well planning and input to production forecasting.

### Learning Outcomes

Participants will learn to:

1. Interpret structural environments from seismic.
2. Generate a kinematic model for a field.
3. Distinguish fracture types and use the knowledge to position in-field wells.
4. Distinguish different correlation types and apply the most appropriate one to a given development situation.
5. Interpret environments of deposition from core and log data.
6. Analyse a reservoir in terms of key subsurface components.
7. Illustrate the essentials of diagenesis and explain how this impacts on geoscience deliverables.
8. Analyse structural, sedimentological, stratigraphic and seismic interpretations and integrate these into a coherent subsurface concept.
9. Use that concept to generate resource volumes, well prognoses and input to reservoir engineering.
10. Verify the concept against new data from drilling and geophysics.

### Training Method

A five-day field course with a mix of classroom tuition and fieldwork. Case material and use of the outcrops as exercise material will be a focus of the class.

### Physical Demand

The physical demands for this course are LOW according to the Nautilus field course grading system. The outcrops comprise sea cliffs and wave-cut rocky platforms with access via cliff top paths and sandy beaches. Walks on most days will be up to 2/3 km.

### Who Should Attend

This is a cross-discipline course and is designed primarily for non-geologists working in petroleum engineering, i.e. reservoir engineers, geophysicists, petrophysicists and well engineers who do not have geoscience as their core discipline but work with geologists. The course is also of use to those providing technical support to production geoscientists, or to geologists moving into production from exploration. The course may also be of value to geologists just starting work as production geoscientists, as a practical supplement to sub-discipline-based training.

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### Course Content

Production geoscience is a common job in E&P, but many petroleum engineers do not receive specific training in the discipline. Even geology graduates will normally have received training in more specific sub-disciplines of geoscience, rather than practical application of geoscience in the production environment.

By its nature, production geoscience involves the integration of specialisms in sedimentology, stratigraphy, structure and seismic interpretation into a coherent subsurface concept. That concept is then used to generate deliverables such as resource determination, well planning and input to production forecasting. The competent geoscientist also has to be able to know when and how to update the concept for new data, notably when surprises happen.

The course is therefore about practical integration and application of diverse data and knowledge into real world petroleum engineering deliverables. The chosen field location is ideal as it offers a wide range of reservoir types in a small location, superbly exposed. This allows for a highly practical class and field event with minimal daily transport.

Topics to be studied include:

#### Structure

- Tectonic frameworks and kinematic models
- Structural environments from seismic
- Field-scale structure: dealing with faults and fault seal
- Field-scale structure: naturally fractured reservoirs

#### Stratigraphy

- Stratigraphic principles
- Correlation types (biostratigraphy chronostratigraphy lithostratigraphy sequence stratigraphy allostratigraphy and what counts in practice)
- Unifying disparate data sets

#### Sedimentology

- Lithology from logs – a petrophysical refresh
- Depositional environments from log and core
- Diagenetic overprints – practical field-scale application of very small-scale information
- Sedimentology from seismic – the glory and the limits
- Integration
- Unification of the above into a coherent subsurface concept which can be used predictively

#### Application

- Resource estimation based on the concept

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- Passing the concept forward to reservoir engineering – what needs to be known
- Well prognoses using the case study model
- Value of data
- Additional data and updating the mode

### Itinerary

Day 0 - Fly to London Heathrow and transfer to Tenby, Pembrokeshire.

Day 1 - Structure and seismic-based, outcrops in Saundersfoot.

Day 2 - Structure-based, outcrops in Stackpole.

Day 3 - Stratigraphy-based, outcrops in Freshwater West and Manorbier.

Day 4 - Sedimentology-based, outcrops in Amroth.

Day 5 - Application-based, outcrops around Tenby.

Day 6 - Transfer back to Heathrow and depart.