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Boas Arnon

Practical Production Geology Course:

Planned to increase the awareness of Geologist and Petroleum Engineers, on reservoir monitoring tools and techniques in **locating the remaining oil**, and in assisting with late field life, mature field development future planning.

This course is designed to provide for additional skills with regard to surveillance mapping. Cased-hole and production logging tools, cement bonds, contact mapping, water saturation, and GOR trends. Stressed are the importance of annotation of Structure and Stratigraphic maps. With use of production data, pressure data, RFT pressure plots, and the need to understand well performance given the current well spacing and drainage lengths. **Assess the remaining and future potential of mature fields, by understanding the current location of the oil and gas, and help to plan future work programs and new drill wells in a mature field.**

The course is a practical hands-on type course with a large number of exercises and examples mainly from Northern North Sea Brent reservoirs. The setting and atmosphere at the course will be informal. The handout material will be comprehensive, and progress and topics will be somewhat tailored to the attendance.

The workshop will review examples from oil and gas field developments worldwide, and will focus on reviews of oil and gas potential assessment in mature fields.

The course has been modified based on the feedback received from the attendees of the previous courses run to date.

Need to bring enthusiasm, a calculator and an open mind.

The course would be very suitable for other PE disciplines (RE's, PT's and PP's).

The material is presented in layman's terms and is based on simple hand calculation techniques. The focus is mainly on log interpretation both open hole and cased hole, the use of production performance, and reserves calculations. The theory is backed up by quite a few exercises, based on Northern North Sea and the Brent Fields.

Recommend a total of no more than 15 people.

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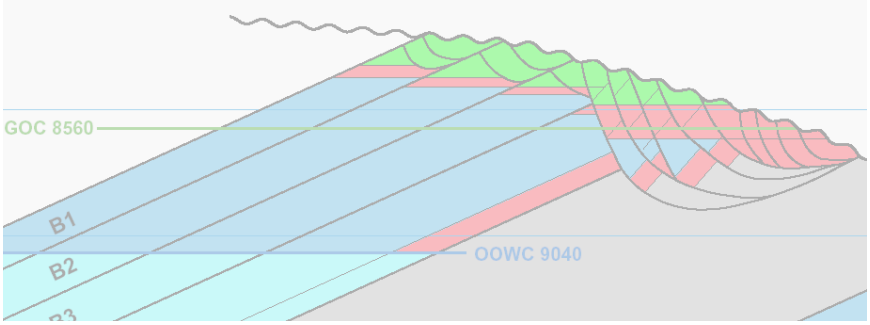


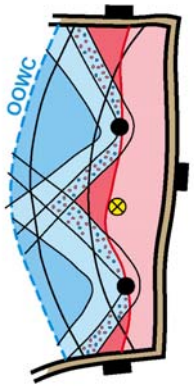
Practical Production Geology

Below is a brief outline of the topics to be covered in this course. The intent is to show Northern North Sea field examples, and work out several exercises and problems using all of the skills reviewed.

Introduction:

Contributions of Production Geologists to field development and production optimisation

Surveillance Maps and Cross Sections:



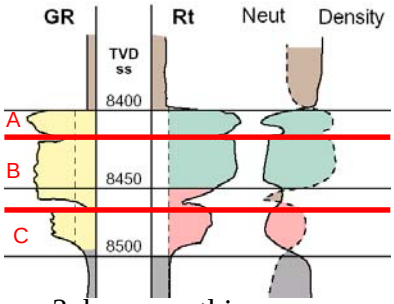
- Why's, How's, What's important.
- Structure Mapping: annotation.
- Original GOC OWC and current fluid contents annotations.
- Production Data: annotations, status, and milestones.
- Open Hole and Cased Hole Data: O/G/W, PLT, TDT, RST, Pressure data.

Surveillance Opportunity Management:

- Inventory of producing wells.
- Inventory of work-over leads.
- Inventory of drill well leads.

Logging Tools:

- Review tools and principles and pitfalls in interpretations, and data use.
- Open Hole Logs: thin beds, poor/shaley sands, gas effects, log quality.
- Log Analysis: quick review porosity, HC saturations, fluid type.
- RFT pressures, datum, gradients, and layering implications.
- Cased Hole Tools: D/N, TDT, RST.
- Cement Bond.
- Production logging: PLT, PDG.

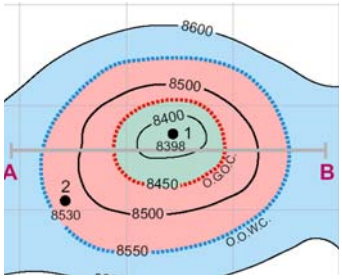


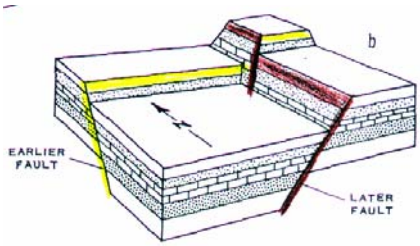
Production Data:

- Data Quality: commingled data, trends SW, GOR, what do they mean?, how can this information be used?
- Gas and water coning and cusping.
- Contact Mapping: integration and review of contact movements.

Structure Mapping Importance:

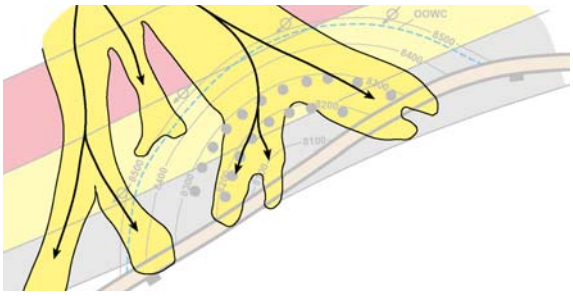
- Scale, fault patterns, juxta-positioning, simplifications.





Importance of Stratigraphic Mapping:

- Depositional patterns, porosity permeability overlay.
- Correlations.
- Fault cut-outs.
- Importance of sequence Stratigraphy.

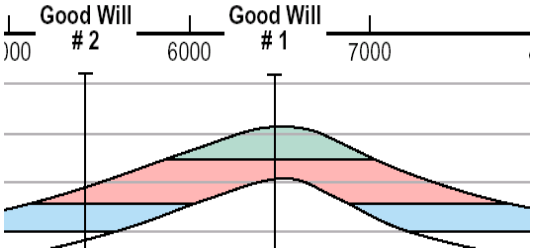


Volumetrics:

- Importance of detail, techniques.
- Shoebox approach.
- Cross section approach.
- HC isopaching, cross-contouring.

Well Spacing:

- Drainage lengths.
- Reservoir engineering considerations.



Infill Hunting techniques: