A02 Fluid Sampling and Analysis
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Why are fluid properties so important?
- Exploration is required to give an estimate for reserves, and economic valuations requires knowledge of fluid type and quality
- WTI assumes a slightly compressible fluid, and special methods are required for gases, and possibly very volatile oils.
- WTI determines \( kh/\mu \) so a reliable value of viscosity is needed to obtain permeability.

How do we identify the type of fluid?
- Before we drill a well - possibly from seismic, or data from an offset well, or else from correlations
- During drilling – from mud logs (interpretations vary)
- From wireline formation testers – pressure gradients, simple analyses, some properties downhole; problems of contamination; sample analysis
- From well tests – surface measurements such as GOR, oil gravity and colour (but rules are arbitrary, and vary)
- Laboratory studies of samples – most accurate, but takes weeks or months.

How are important properties measured in the laboratory?
- Saturation pressure (\( P_b \) or \( P_d \))
- Oil formation volume factor
- Viscosity
- Increasing use of EOS modelling

Which are the big challenges?
- Getting representative samples of the reservoir fluids
- Many reservoirs have compositional gradients
- Production damage caused by reservoir fluids such as scales or asphaltene deposits
- Measuring concentrations of reactive or trace components

What are the risks if fluid properties are wrong?
- Reserve estimates and economic models will be erroneous
- Extra wells or increased pipeline capacity may be required
- Plant design may not be compatible
- Sales contracts may nor be met
- Government rules may not allow production