Representative core samples

Planning phase

More data means more confidence but not more accuracy. Quality may matter more that quantity in terms of representativeness.

Core position in the reservoir is important (stratigraphic knowledge).

Optimize core availability for the analysis and define fit for purpose preservation.

Customized API40 cased on local conditions

Execution (Coring, sampling)

Importance of including coring in the drilling program, drilling fluids

Whole core is difficult to get in fractured reservoirs

Cores today are in good shape when they come to the lab when particular precautions are taken :

- speed trip to surface for saturation measurements,
- sponged, pressured, liquid trapped for EOR process.
- Drilling parameters to limit invasion. Tracers can be used in WBM and OBM to assess the invasion

No standard for cleaning, has to be adjusted to core and fluids. E.g Polar solvent needed for heavy components/alphaltenes

Plug encapsulation for unconsolidated sands

Selection of twin samples

Analysis

1 foot sampling is common practice (non biased toward good quality rock)

Scans allow looking inside not only at surface. Digital pictures allow resolving heterogeneous samples, thin bedded which bring important challenges normally.

Screening based on RQI (PHI,K) is used to define SCAL samples. But Geologist needed here to include petrology, sedimentology into the selection. Same PHI and K can be different rock.

Labs tend to develop equipment to manage different sample sizes suitable for different heterogeneities. NOP is considered.

Do not oversimplify representativity (e.g visual inspection, rule of thumbs). Today CT scan can quantify it for you.

Homogeneous media required for Pc and Kr experiments validity, especially in unsteady state.

Whole core continuous measurements of resistivity, acoustic etc.. may help to correlate to logs

Post analysis

Calibration to log is a must to further use the core analyses. Core Gamma, porosity, grain density (Nuclear spectroscopy is a log that can be used to correlate to mineralogy/grain density).

Feed-back the planning stage if any of the steps have not proven to have representative samples.