The uncertainty short-list, root causes and probability trees

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'Long list' of 8 uncertainties with 256 possible combinations (figure right) is reduced by considering:

- whether the model purpose is not sensitive to some uncertainties
- whether some are interdependent and should therefore be combined and
- whether some uncertainties are the root cause of the others: in this case simply work on the root cause.

The regrouped uncertainties, now reduced to three and sketched for clarity (figure below) can be diagrammatically laid out on a probability tree (figure bottom right)

Example probability tree

$= 2^8$
(256 combinations)

Flanks *shallow deep*

NTG *high low*

Contacts *common stacked*

Sand dist. *amalgamated sheet non-amalg. channels*

Faults *sealing open*

Rel Perms *favourable unfavourable*

Fluids *single API variable API*

Injectivity *good poor*

Insensitive   Dependent   Root cause

The uncertainty 'long list' converted to a 'short list'

1 Sand dist. *amalgamated sheets non-amalg. Channels*
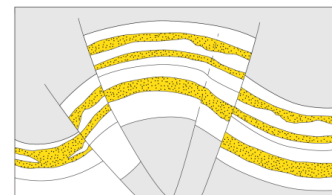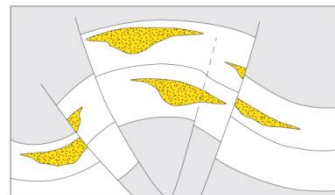
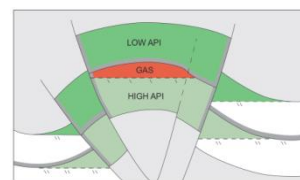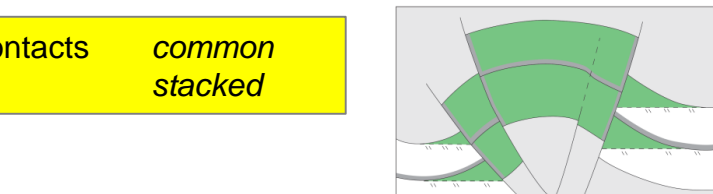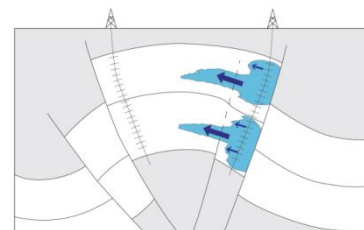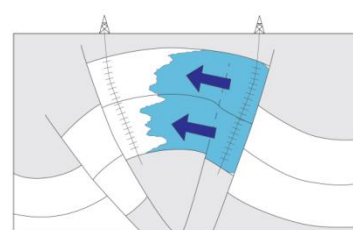**2** Faults *sealing open* — Contacts *common stacked*
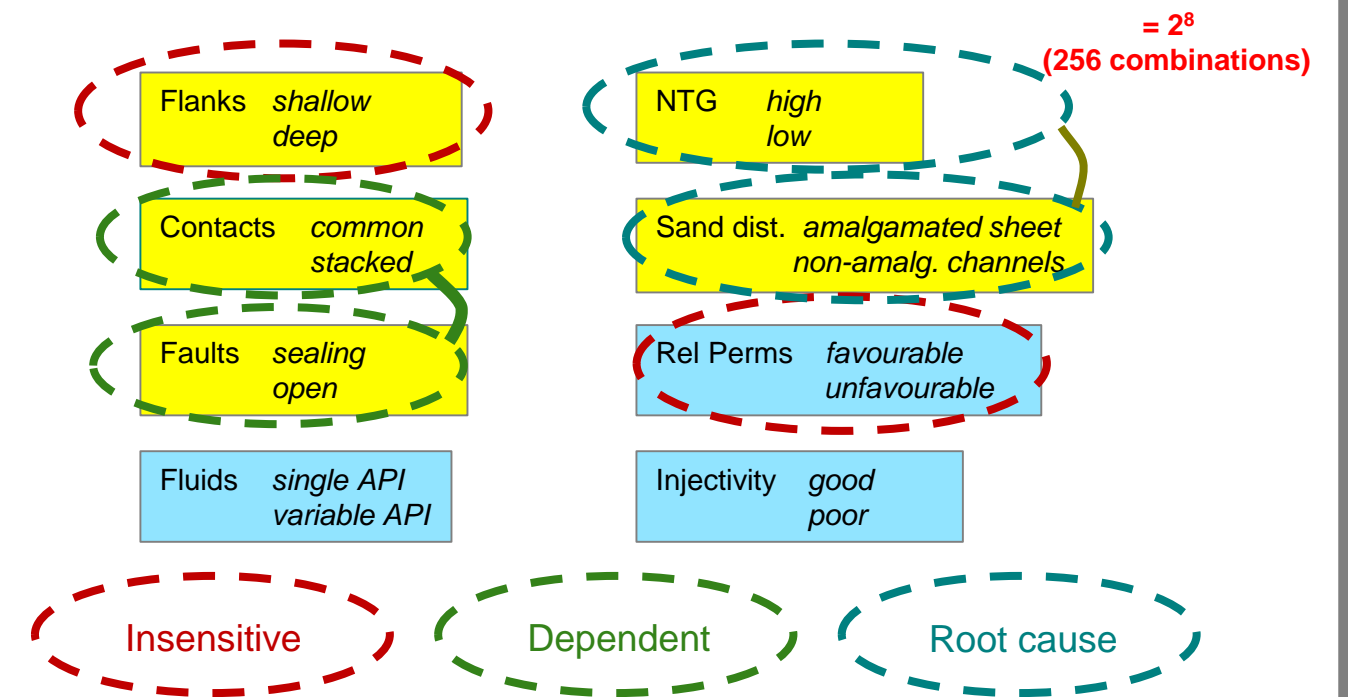
Fluids *single API variable API*

3 Injectivity *good poor*

The short list of independent uncertainties converted to a probability tree

1

amalgamated

Sand dist.

channels

2

sealing flts — stacked — single API, variable API

open flts — common — single API

sealing flts — stacked — single API, variable API

open flts — common — single API

3

good inj.
poor inj.
good inj.
poor inj.
good inj.
poor inj.
good inj.
poor inj.
good inj.
poor inj.
good inj.
poor inj.

12 models defined from a starting list of 256 possible combinations