Status on Barrier capacity project

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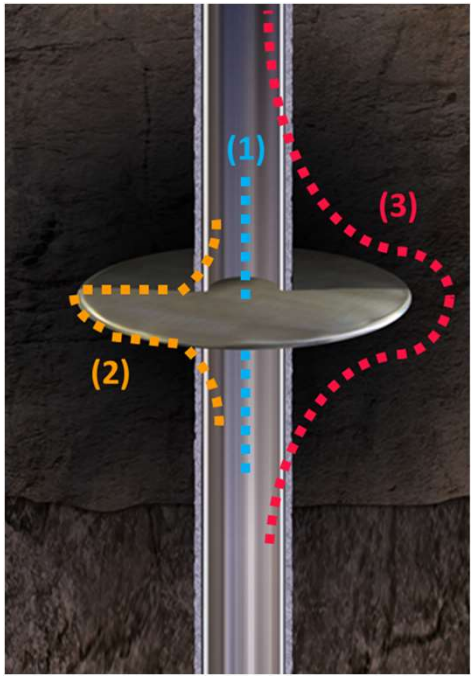
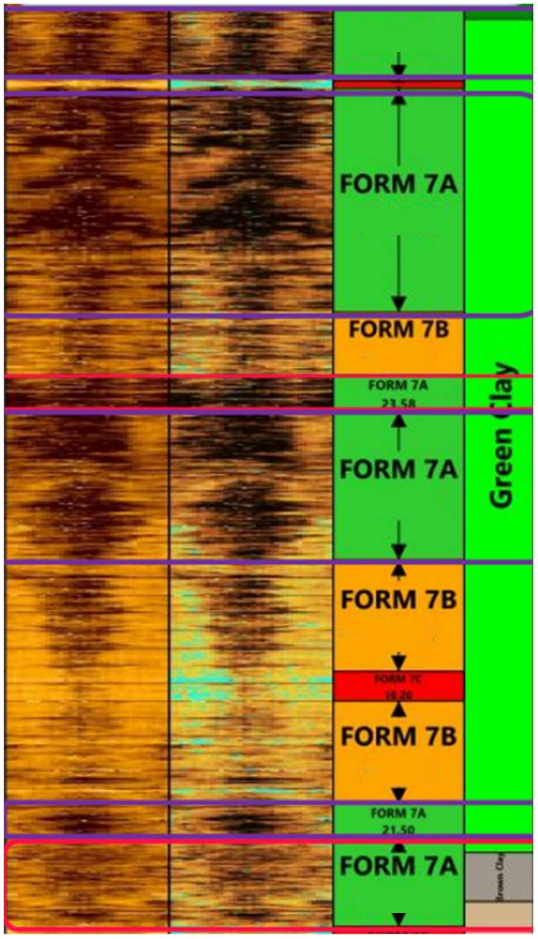
WHY?

- P&A and Slot Recovery cost.
- Assessment of shorter fm creep / cmt intervals
- New P&A solutions
- Potential accumulation of shorter intervals
- Representative field conditions not available in lab.





- **What's the barrier capacity of a short length of annulus cement or formation creep?**

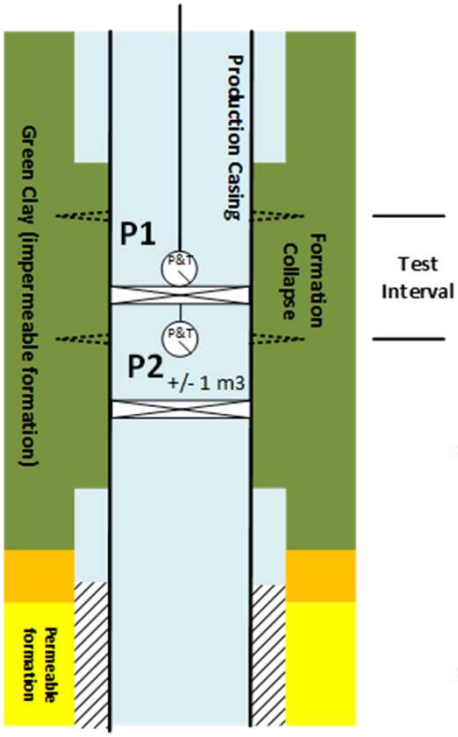
Test method – Overall principle

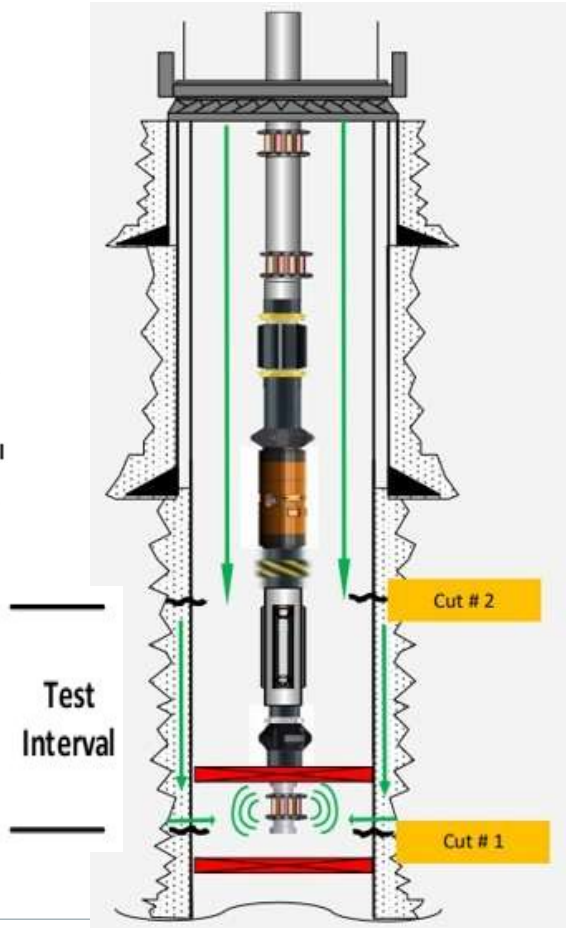
Conveyance: DP or Wireline

Sequence:
1. Bottom plug
2. Lower perforations/cut
3. Upper plug
4. Upper perforations/cut

Differential pressure applied from above, monitoring below plug.

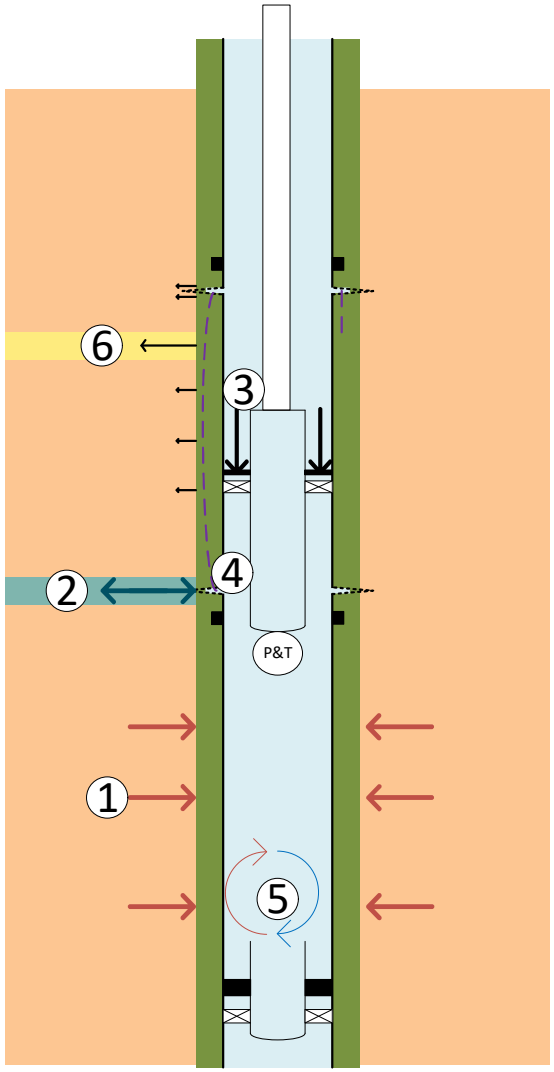
Success factor: Sensitivity





Factors affecting results

1. Heat transfer from formation to monitoring volume.
2. Formation hydraulic interaction.
3. Pressurizing plug – compression of monitoring volume.
4. Clay swelling / shrinking
5. Temperature convection within monitoring volume
6. Horizontal fluid loss along test interval

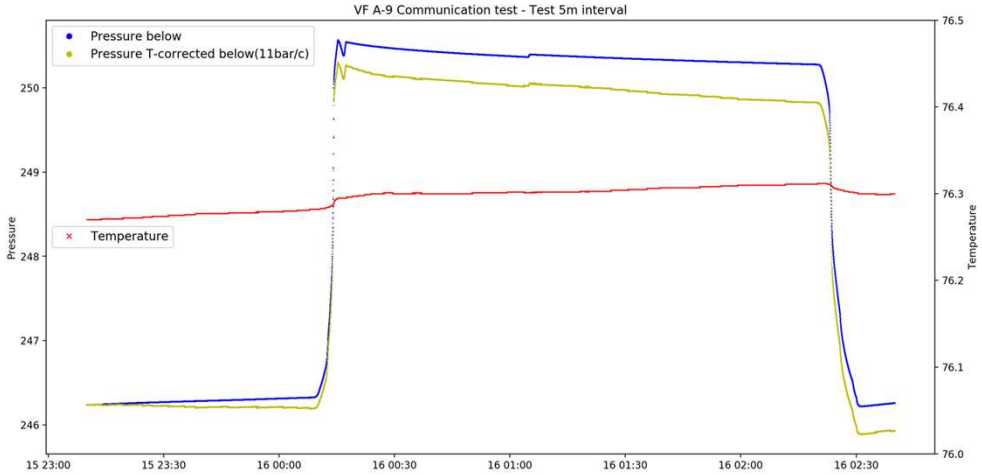


Test results

Field	Barrier length	Barrier material
Veslefrikk	10 m	Formation creep
Veslefrikk	5 m	Formation creep
Oseberg	7 m	Formation creep
Statfjord	3 m	Cement
Field X	3,5 m	Cement – Equipment failure
Field Y	4,5 m	Formation creep – Equipment failure
Field Z	3,5	Cement – Leakage observed

Where are we now!

- **Shortening the test length** is still favorable for data collection.
- Formation interaction is larger than anticipated.
- Simulation models assist in showing what cases are feasible to detect.



- **In order to improve as an industry– more data collection and sharing of learning is needed.**

- **We encourage other operators to invest in this type of testing**

QUESTIONS?