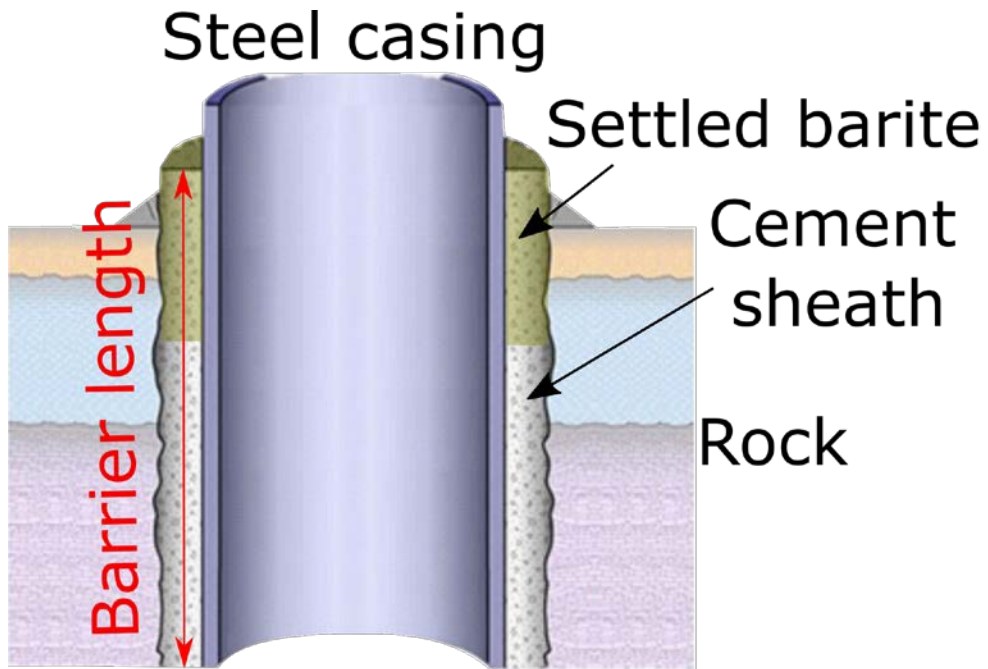# *Settled Barite as Annular Barrier – Characterization and refinement*

Plug and Abandonment Seminar 2022-10-20

Dr. Ragnhild Skorpa, ragnhild.skorpa@sintef.no
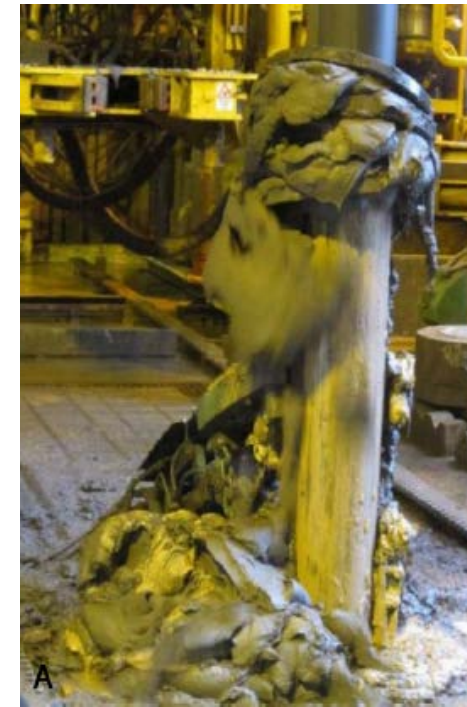*Dr. Mahmoud Khalifeh, mahmoud.khalifeh@uis.no*

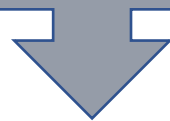# Settled barite in Plugging & Abandonment

Leave in ?? as addional barrier

Casing removal

After Vrålstad et al. 2018

SFI SWIPA – Subsurface Well Integrity and P&A

Compacted barite sediments

Free water

Thin suspension

Suspension

Gel-like sediments

Consolidated sediments
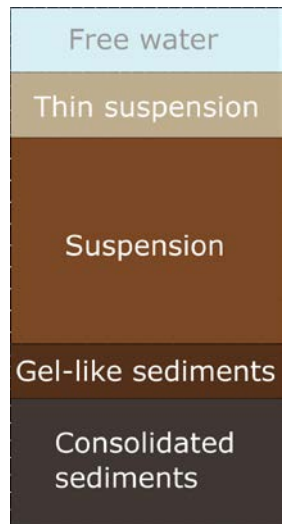
Academic perspective
compacted sediments

Water and Barite Reference — FREE FLUID — BARITE SEDIMENT

KCl/polymer WBM — SUSPENSION — BARITE SEDIMENT

Bentonite WBM — FREE FLUID — GEL-LIKE SEDIMENT — BARITE SEDIMENT
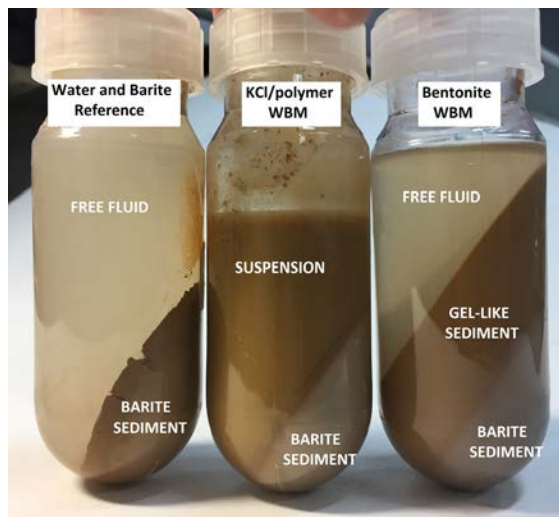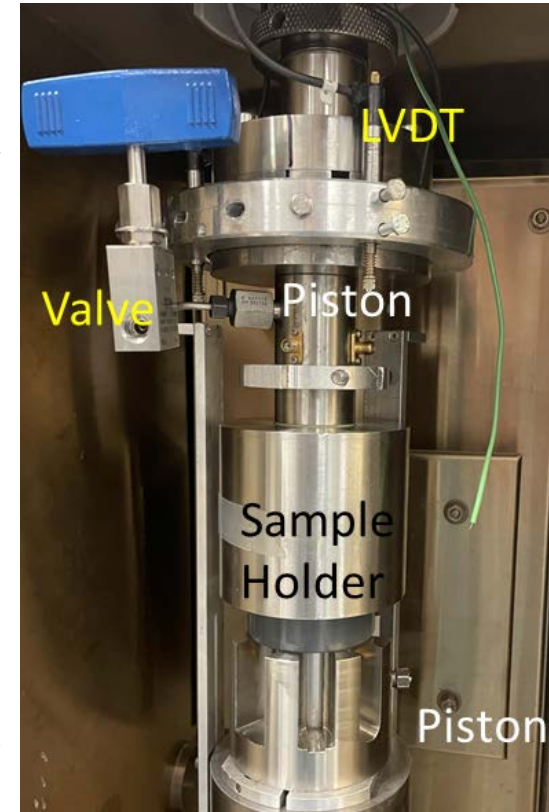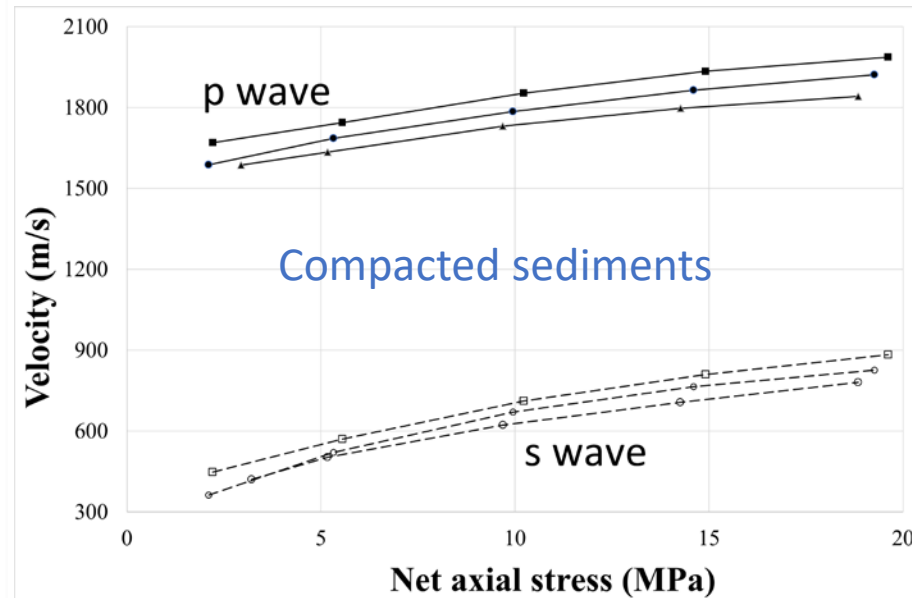
Field
Settled Drilling Fluids solids

OMAE2018-78695
Werner et al. NRS 2021
OMAE2022-81074

Characterization of sediments during compaction
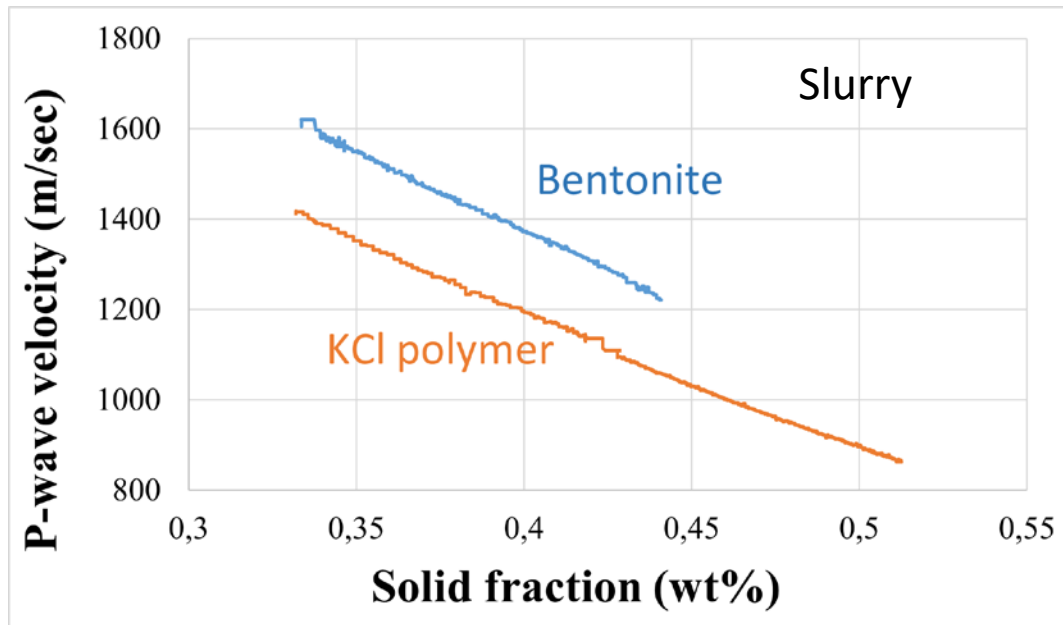
OMAE2021-65117

Pipe-pulling experiments
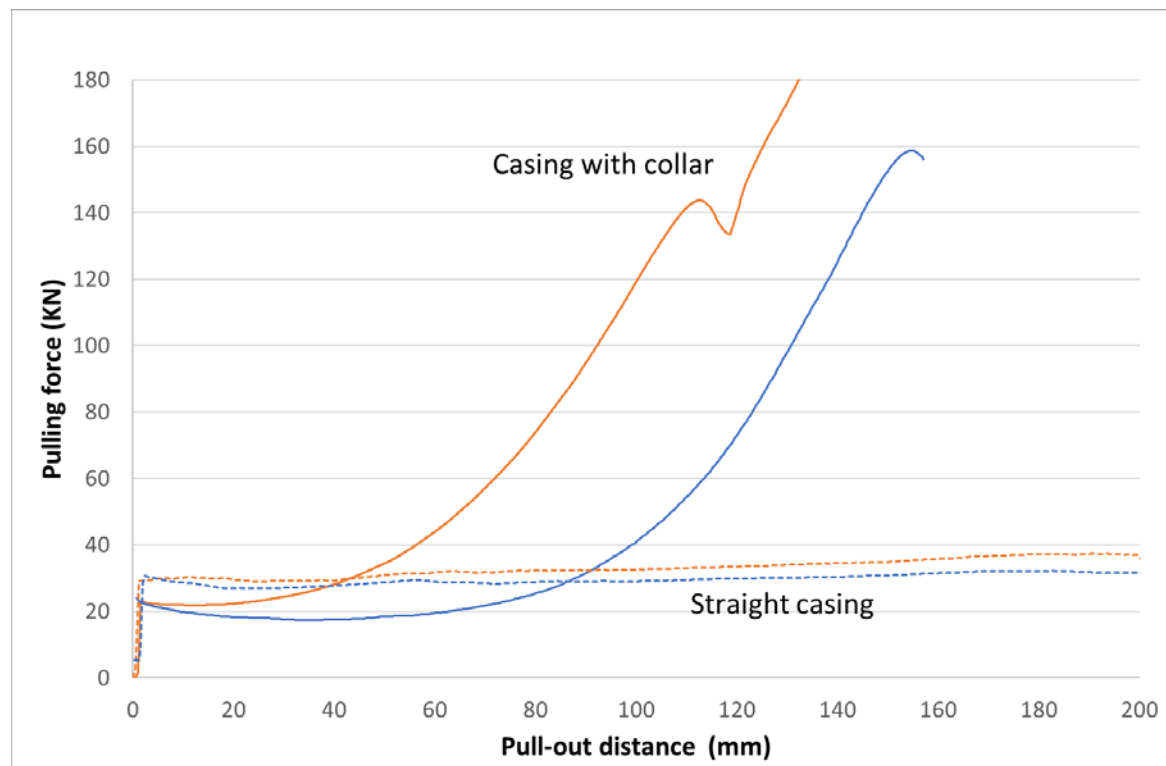
OMAE2019-96547
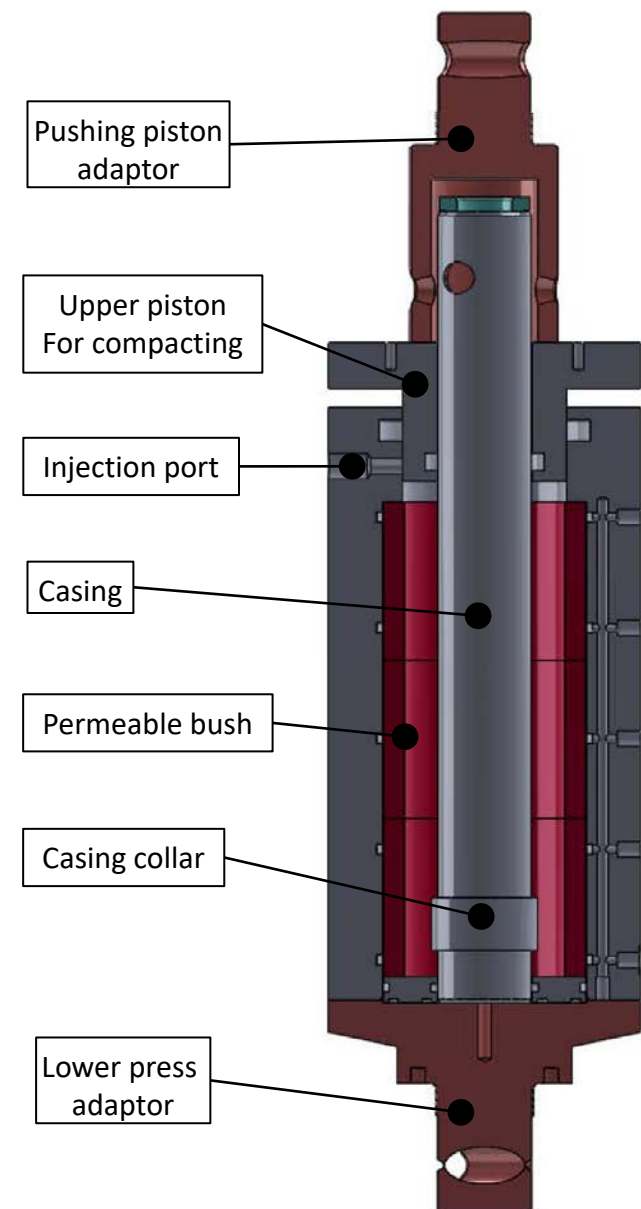
Settled Barite Adheres to Casing

SPE-209536-MS

It Resists Pressure

MSc thesis Eskild Muri Bø

How to Mitigate Cut & Pull?

Either disperse barite

Or

Qualify it as permanent annular barrier

Understand the Surface Chemistry!

How to Mitigate Cut & Pull?

Either disperse barite

Or

Qualify it as permanent annular barrier

How to Qualify

Oil&Gas UK Guideline

NORSOK D010

DNV.GL *Risk-Based*
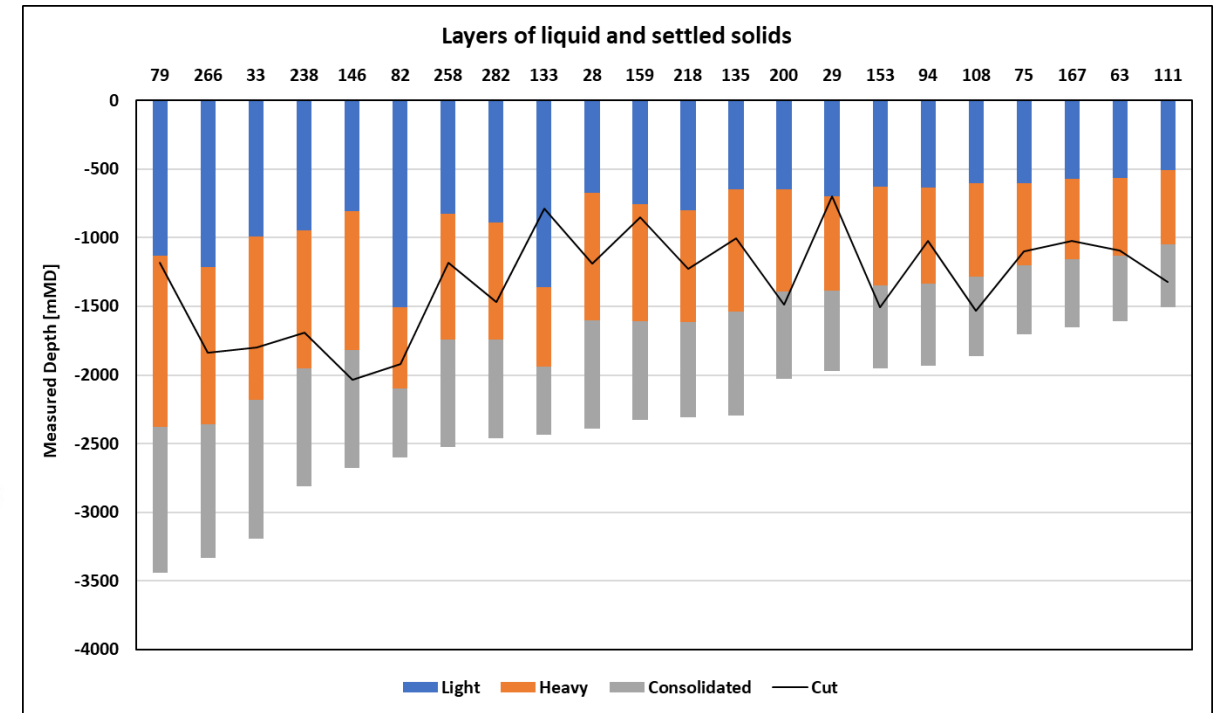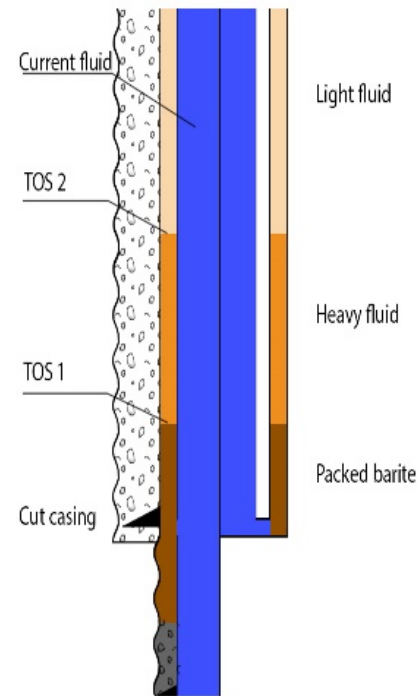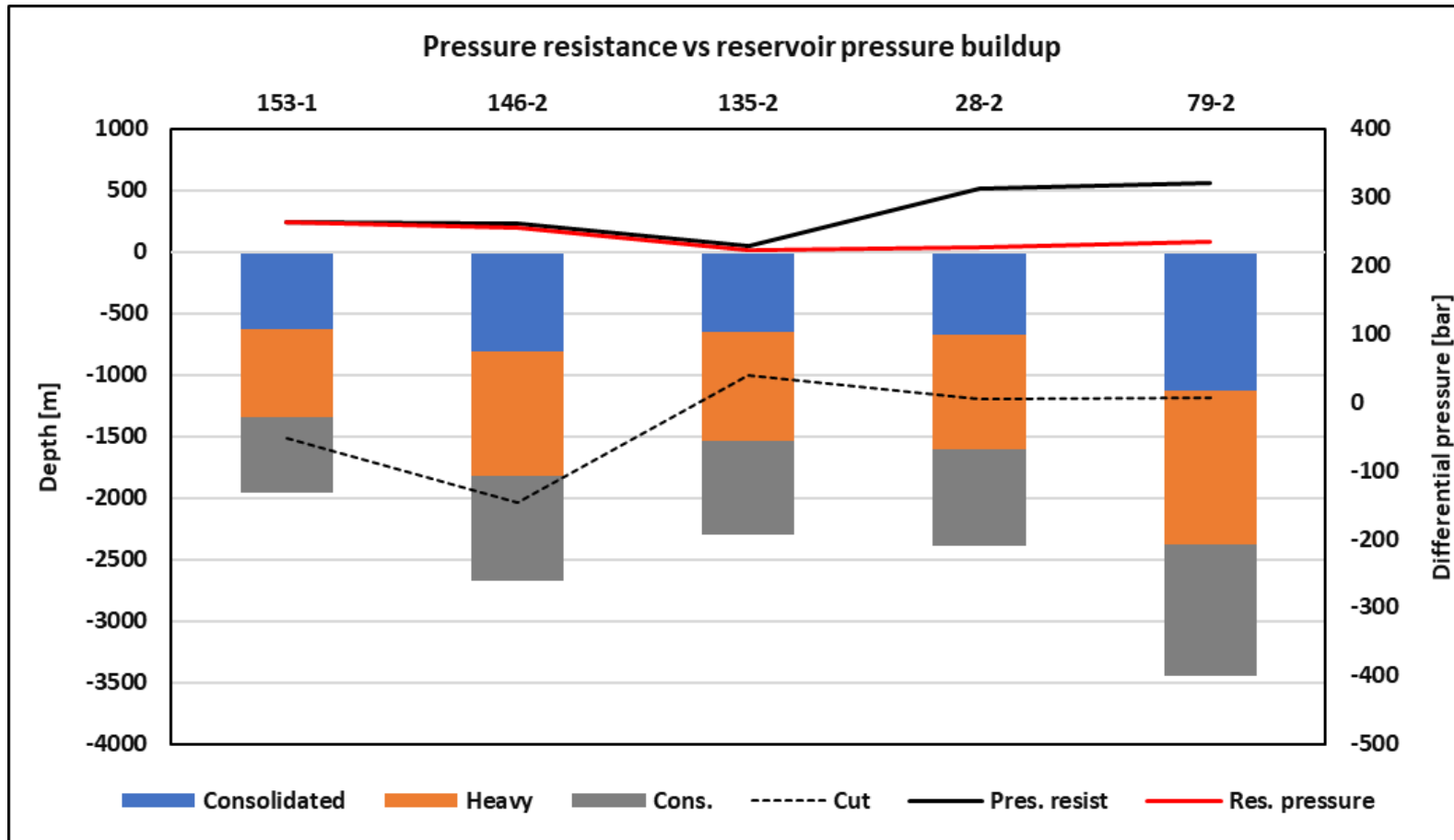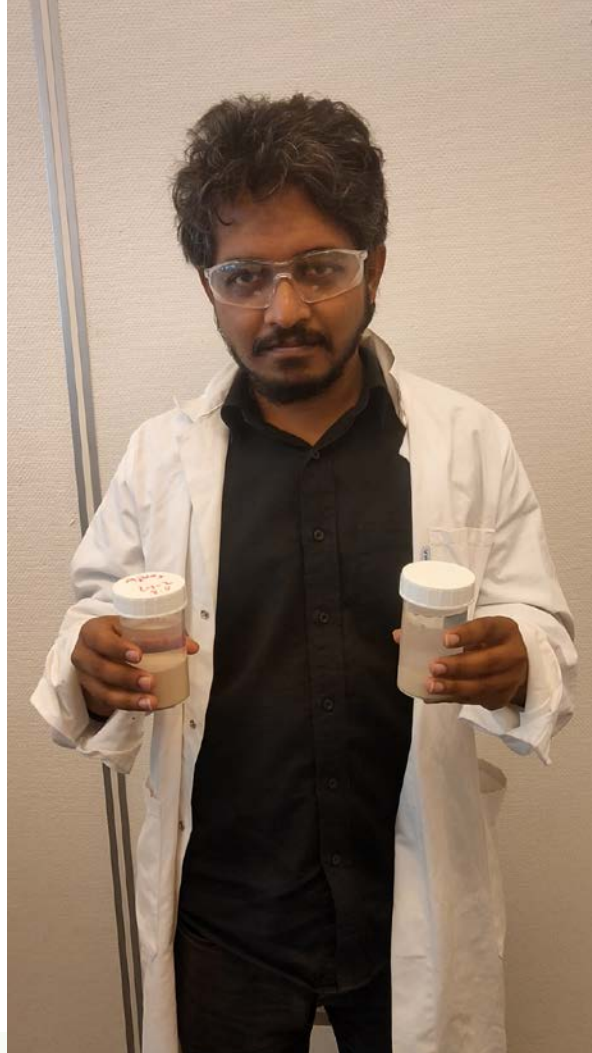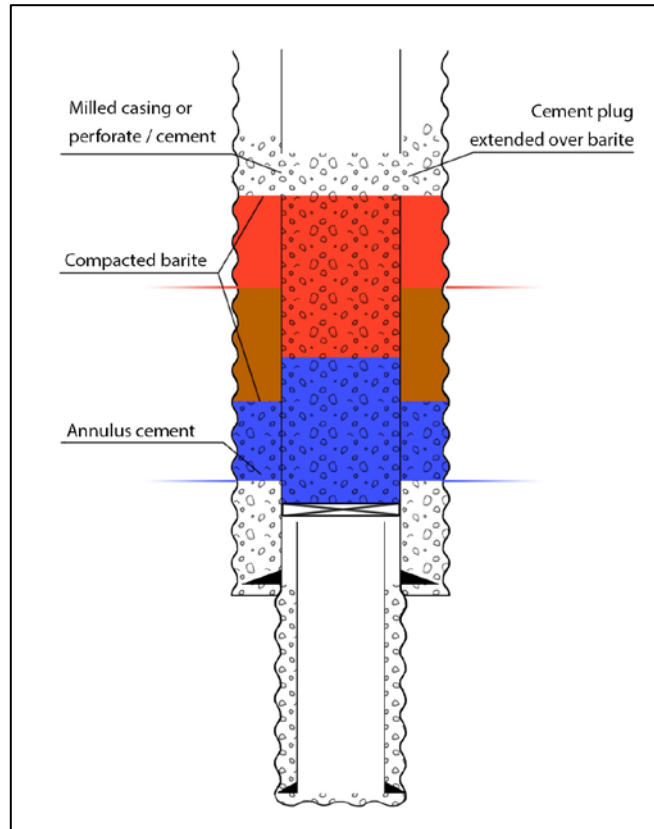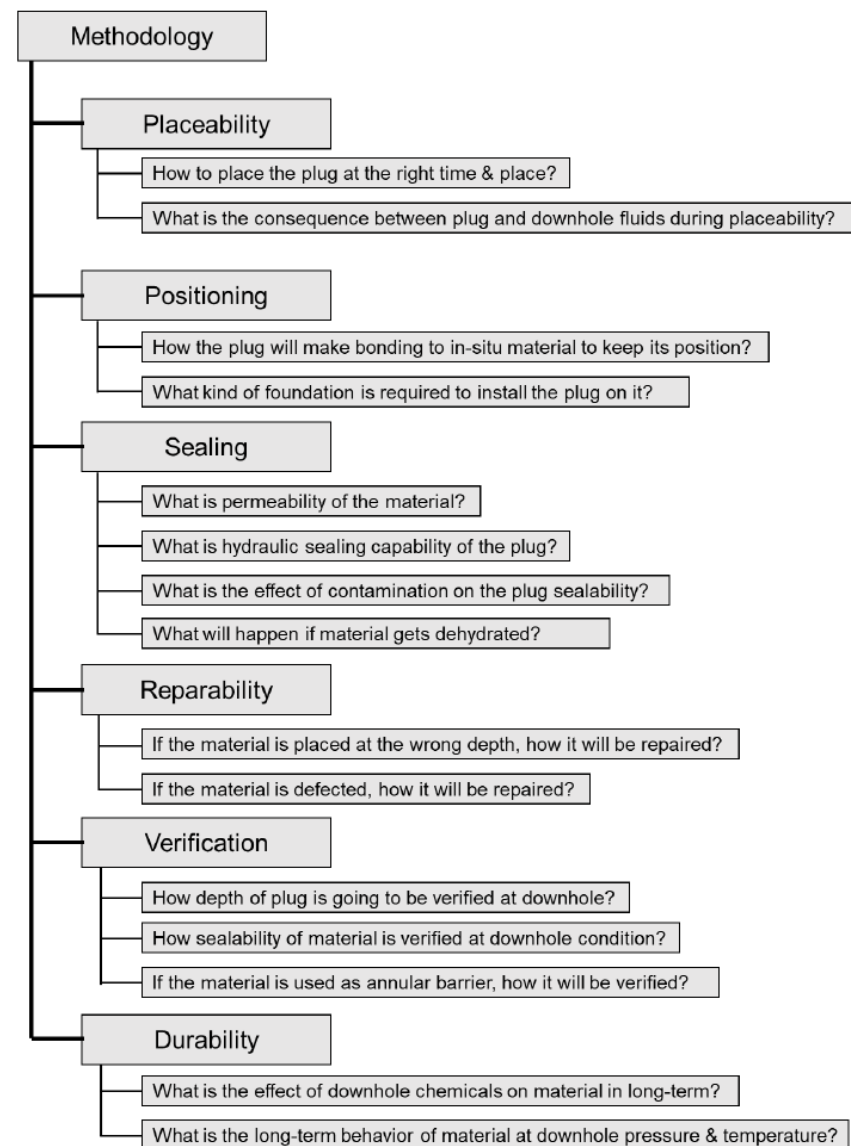

Methodology

Placeability
- How to place the plug at the right time & place?
- What is the consequence between plug and downhole fluids during placeability?

Positioning
- How the plug will make bonding to in-situ material to keep its position?
- What kind of foundation is required to install the plug on it?

Sealing
- What is permeability of the material?
- What is hydraulic sealing capability of the plug?
- What is the effect of contamination on the plug sealability?
- What will happen if material gets dehydrated?

Reparability
- If the material is placed at the wrong depth, how it will be repaired?
- If the material is defected, how it will be repaired?

Verification
- How depth of plug is going to be verified at downhole?
- How sealability of material is verified at downhole condition?
- If the material is used as annular barrier, how it will be verified?

Durability
- What is the effect of downhole chemicals on material in long-term?
- What is the long-term behavior of material at downhole pressure & temperature?

How to Qualify!

a) Sample 1 in Filter-loss cell

b) Top of the sample 1 barite plug

c) Top of the sample 2 barite plug

d) Bottom of the sample 2 barite plug

e) Sample 2 in Filter-loss cell using disc

f) Sample 2 disc after fluid loss test

How to Contact US?

To follow up the progress in

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