WELL-SAFE SOLUTIONS

New P&A Technologies and Techniques Verification of Natural Barriers

Schooner Decommissioning Project

Chris McIlroy

Well Abandonment Engineer

Agenda

- Introduction to Schooner Decommissioning Project
- Description of challenges and implemented opportunities
- Detailed overview of techniques and technologies
- Conclusions

Project details

- Schooner platform
- UK Southern North Sea
- Gas Reservoirs
- Future CCS plans
- Un-common casing & well architecture
- Opportunity to utilize natural processes as barriers

WELL-SAFE SOLUTIONS

Challenges and Opportunities

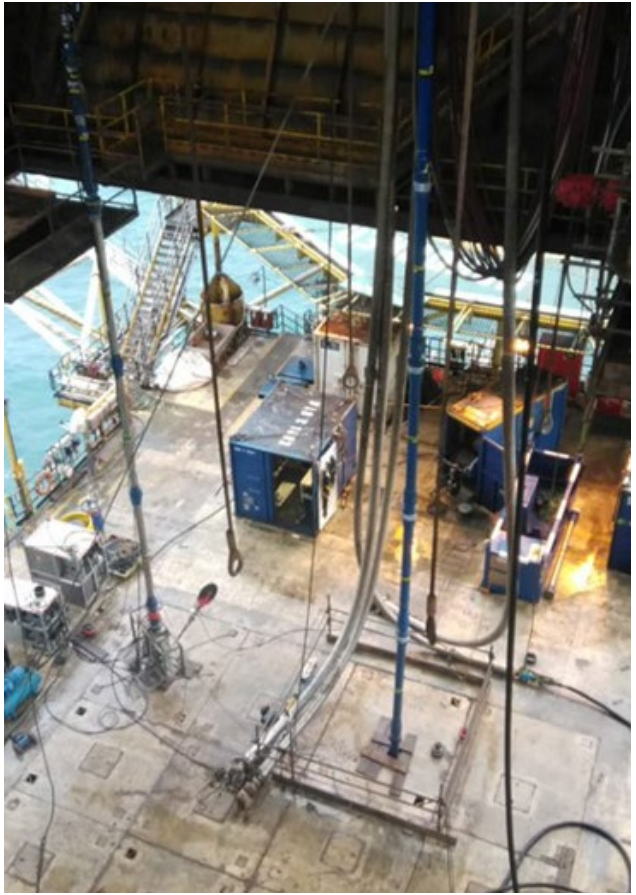
Challenge	Realised Opportunity
HD Wireline Fishing required on one of the wells to recover LIH items from previous intervention work.	SIMOPS campaign to complete the wireline suspension phase of the well abandonment offline whilst the HD fishing campaign was progressing.
Poor cement behind annulus casing – Potential requirement for remediation	Formation squeeze on the casing identified on the isolation scanner log. This formation squeeze was tested and confirmed as a sufficient abandonment barrier, negating the requirement for remediation.

Batched wireline campaign

- Main wireline unit situated on rig to complete HD Fishing, secondary wireline unit situated on Schooner platform.

- Wireline sheaves hung off purpose-built spreader beams attached onto the skid beams beneath the rig floor

- Once operations were complete to the end of AB0 (well suspension), the wireline PCE and Lubricator could be moved laterally onto the next well without having to skid the rig



Batched wireline campaign – Performance

- Full Phase 0 workscope completed in 44 days
  - 6 wells with wireline unit on Schooner Platform completed offline with 2 further wells converted to donor wells
  - 3 wells with the rig through the rotary table

Calculation Method

$$Time\ Savings = \left(\frac{Total\ Operational\ Time}{2}\right) - Simops\ Conflict\ Time$$

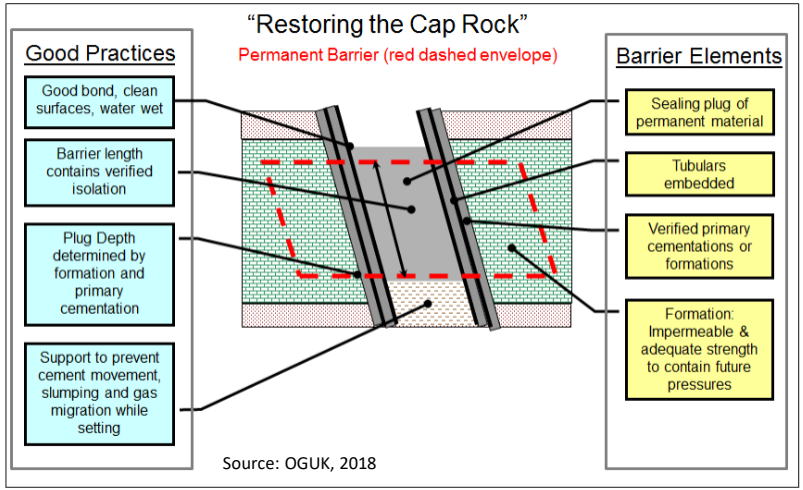
Calculation

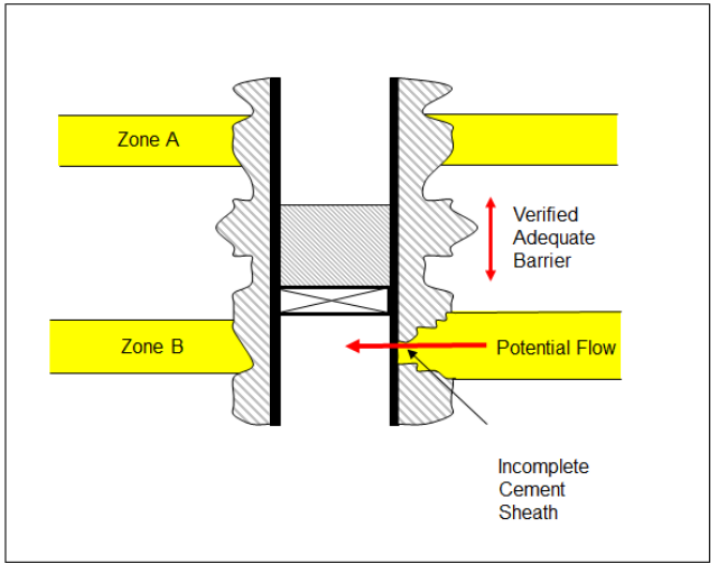
$$Time\ Savings = \left(\frac{2112\ hrs}{2}\right) - 353hrs$$

$$\boldsymbol{Time\ Savings = 703\ hrs\ (29.3\ days)}$$

WELL-SAFE SOLUTIONS

Challenge – Poor Cement isolation behind casing



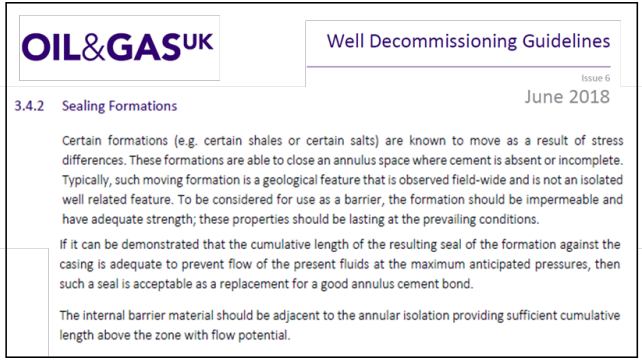


When historical casing cement is poor or non-existent, what's the plan?

WELL-SAFE SOLUTIONS

Salt to the rescue

- Local examples from offset operators
- Industry accepted technique
- Empirically proven in the local area



OIL&GAS UK

Well Decommissioning Guidelines

Issue 6

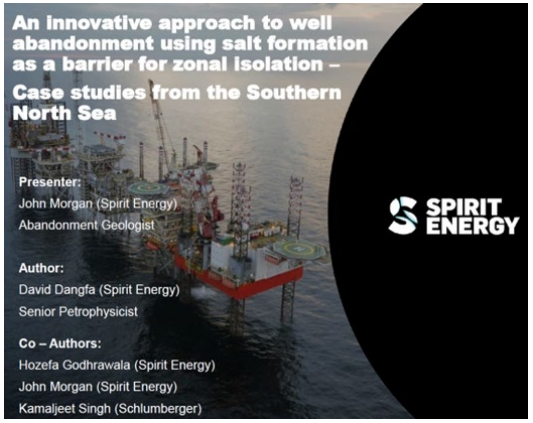
June 2018

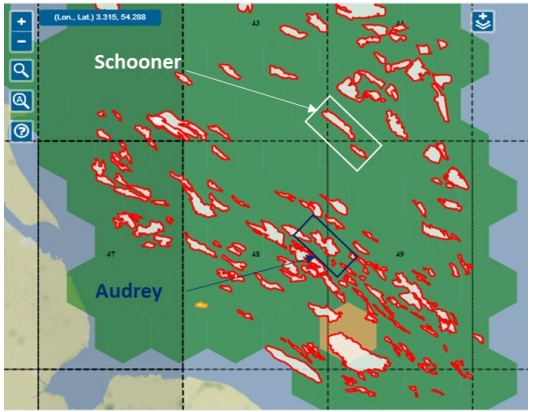
3.4.2 Sealing Formations

Certain formations (e.g. certain shales or certain salts) are known to move as a result of stress differences. These formations are able to close an annulus space where cement is absent or incomplete. Typically, such moving formation is a geological feature that is observed field-wide and is not an isolated well related feature. To be considered for use as a barrier, the formation should be impermeable and have adequate strength; these properties should be lasting at the prevailing conditions.

If it can be demonstrated that the cumulative length of the resulting seal of the formation against the casing is adequate to prevent flow of the present fluids at the maximum anticipated pressures, then such a seal is acceptable as a replacement for a good annulus cement bond.

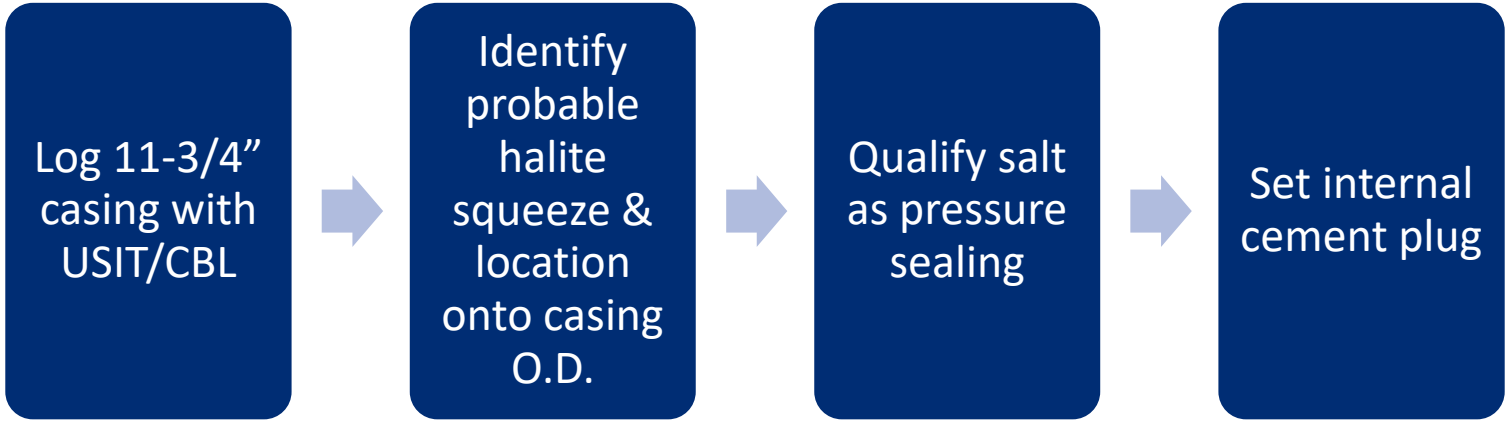
The internal barrier material should be adjacent to the annular isolation providing sufficient cumulative length above the zone with flow potential.





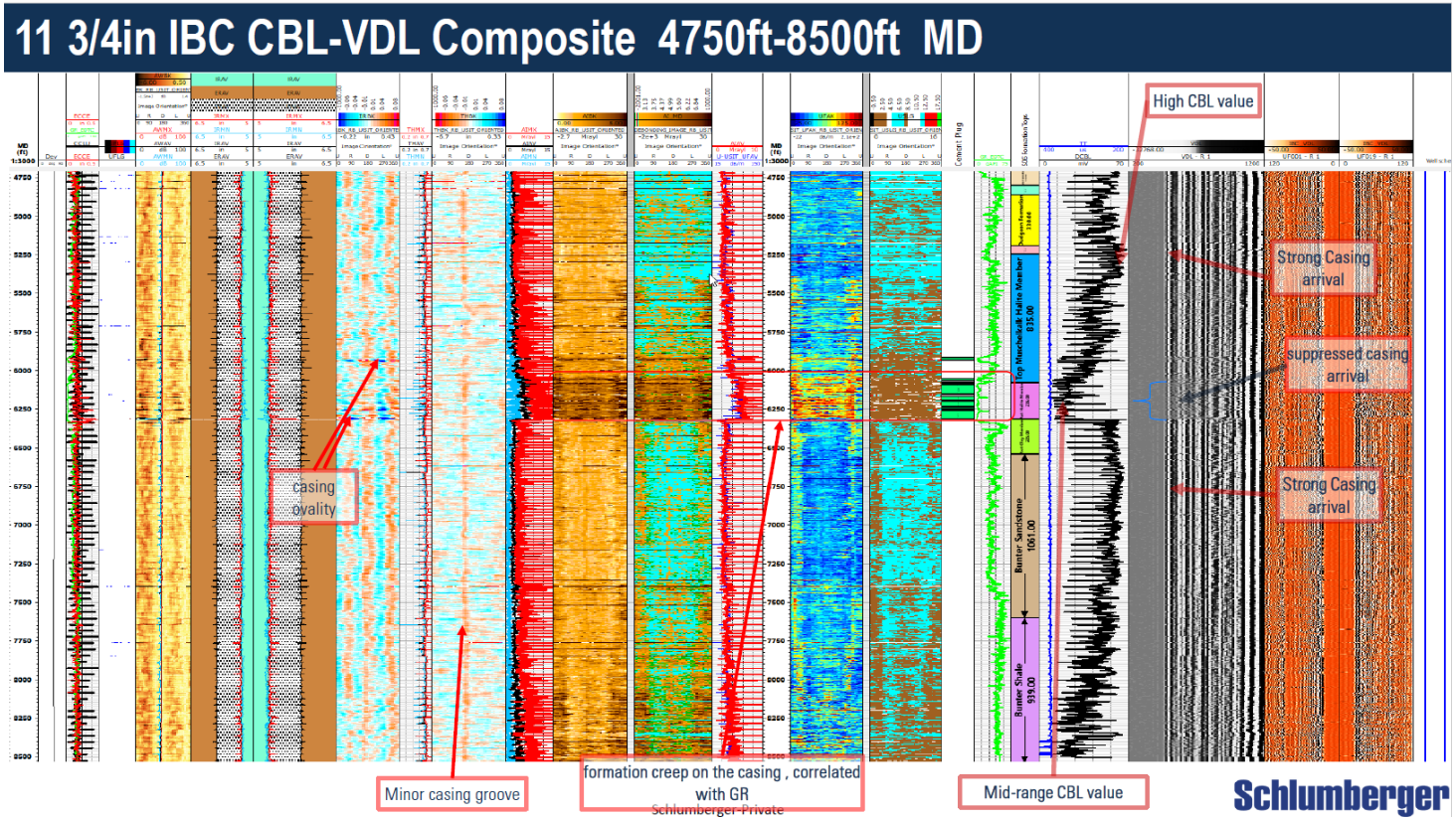
WELL-SAFE SOLUTIONS

Verification process



WELL-SAFE SOLUTIONS

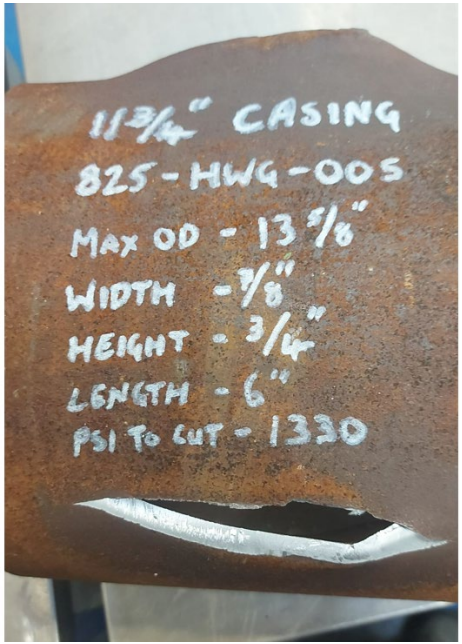
Locating the creep



WELL-SAFE SOLUTIONS

Verification

- Casing perforations required to apply a pressure test to the annulus
- Gator tool selected
- Perforations made either side of creeping formation



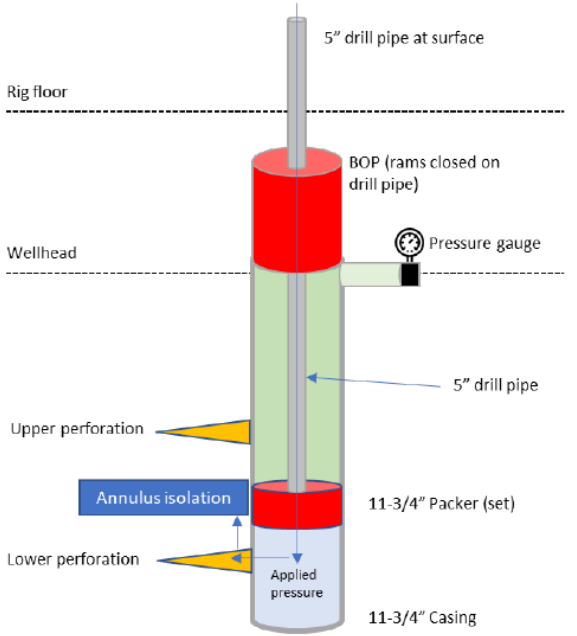
WELL-SAFE SOLUTIONS

Verification

Operational steps

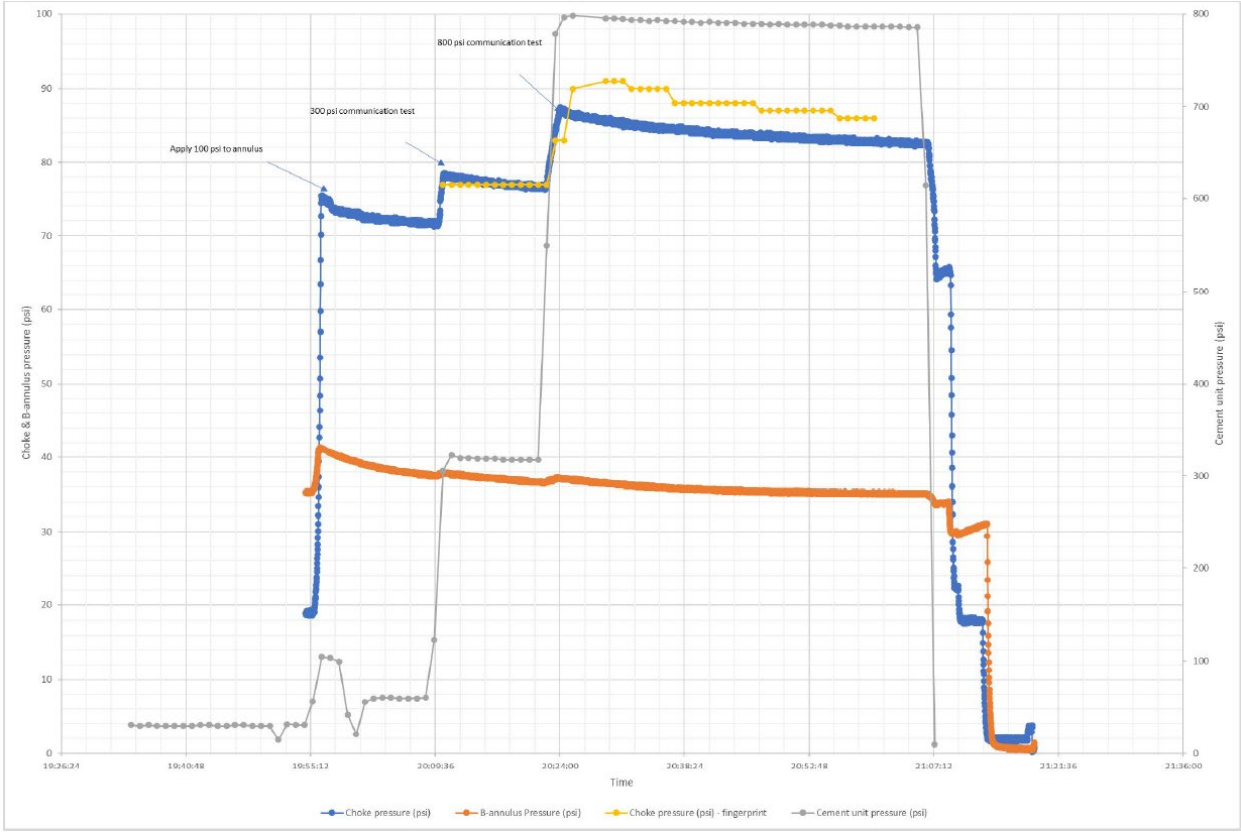
- Displace well to suitable fluid to maintain overbalance
- Run in with Gator & perforate 11-3/4” casing above & below halite creep
- Set a test packer between perforations
- Apply pressure down the drill pipe
  - Pressure acts through lower perforation and upwards against the halite squeeze
- Monitor the closed wellbore above the test packer for any indications of a leak

Idealized Schematic – Communication Test



WELL-SAFE SOLUTIONS

Results



WELL-SAFE SOLUTIONS

Conclusions

- Halite creep demonstrated elsewhere in the SNS is capable of being utilised as a barrier at Schooner
- Utilising natural processes rather than default remediation strategies saves time, money and CO_2 emissions!
- Total savings for the Schooner project to date are in the region of 15 – 20 days (increasing with each well)
- Once verified, log data alone can be used to qualify natural isolation, further increasing efficiency

Thank you!

WELL-SAFE SOLUTIONS