



Statoil

# Verification of annulus barriers for P&A - Examples

13.06.2013

# Cement logs challenges

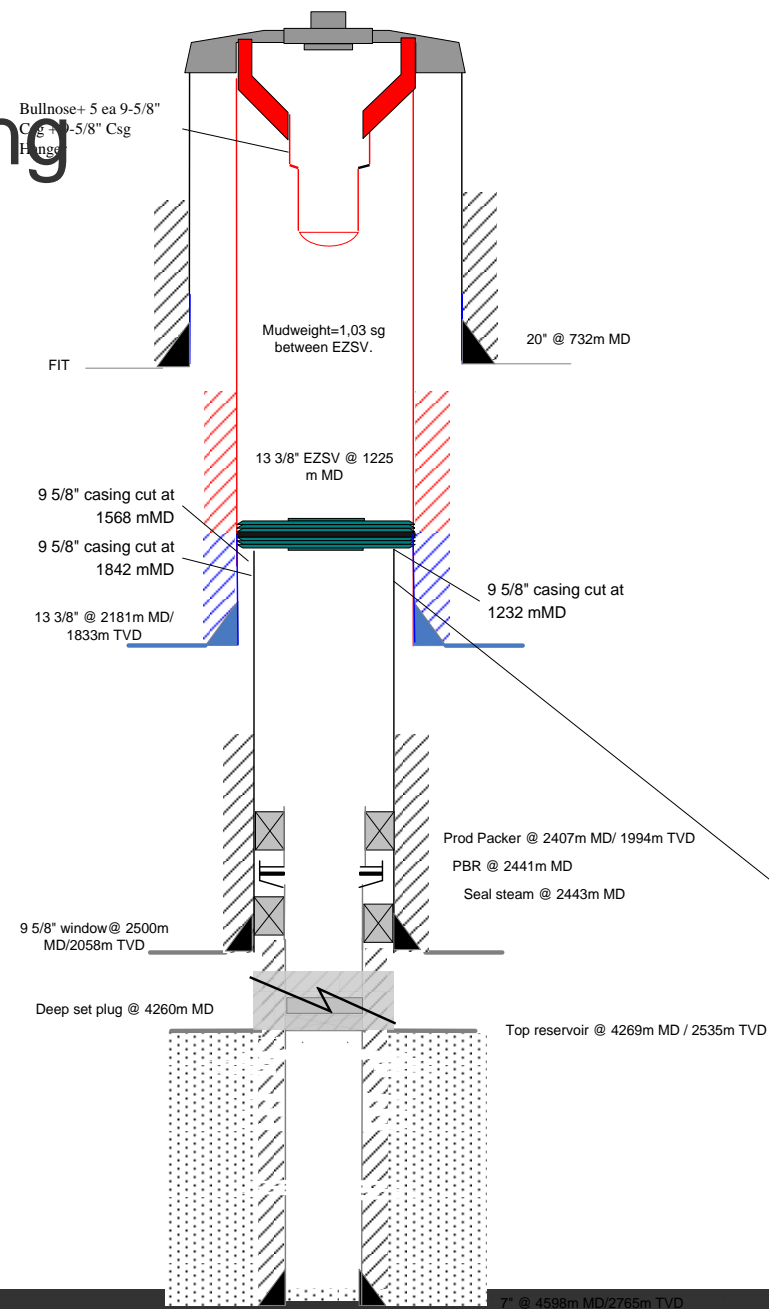
- Result can differ depending on who does the interpretation
  - «Cased hole logging group»
- Difficult to get clear answers on bonding
  - «most likely, probably, possibly»
- Calibrating
- Scale
- Not possible to log through more than one casing

4075	4092	Poor	no
4092	4099	Moderate +	Probably
4099	4117	Moderate	Possibly
4117	4127	Moderate +	Probably

# Testing as alternative to logging

## 33/9-A-36 A

- Plugged against the reservoir in 2011
- Started to cut and pull 9 5/8" casing.
  - Pulled short pieces in the end.
- Logged for cement behind 13 3/8" casing to 1200 mMD → no good cement
- Decided to leave the well temporary
- In the mean time it was verified that Lista Fm. contains a thin, oil filled sand layer on SFA. → need to set the barrier deeper.

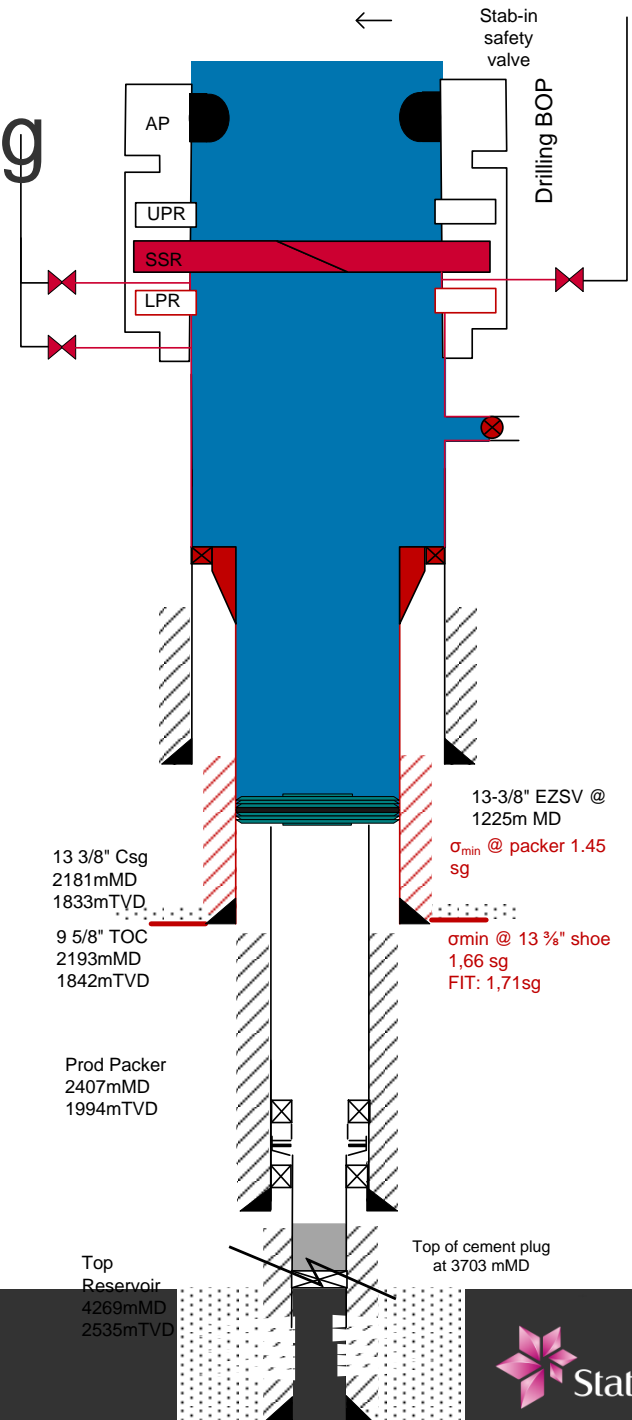


# Testing as alternative to logging

## 33/9-A-36 A

- Challenge

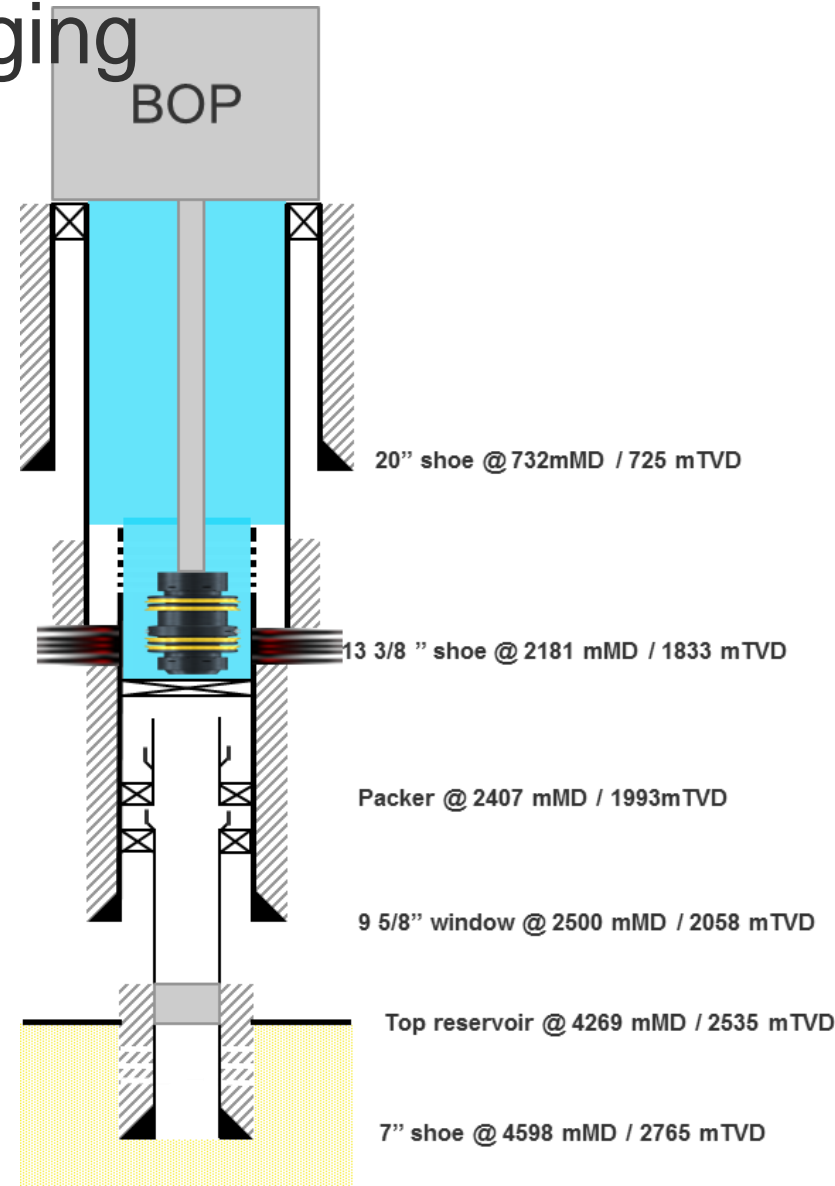
- Shallowest plug setting depth at 1645 mMD
- 2 centralizers/joint on 13 3/8" casing up to 1980 mMD
- No cement log for 13 3/8" casing below 1200 mMD
- Old cement log of 9 5/8" casing shows TOC ~ 13 3/8" casing shoe
- Not able to acquire cement log in the overlapping area.



# Testing as alternative to logging

## 33/9-A-36 A

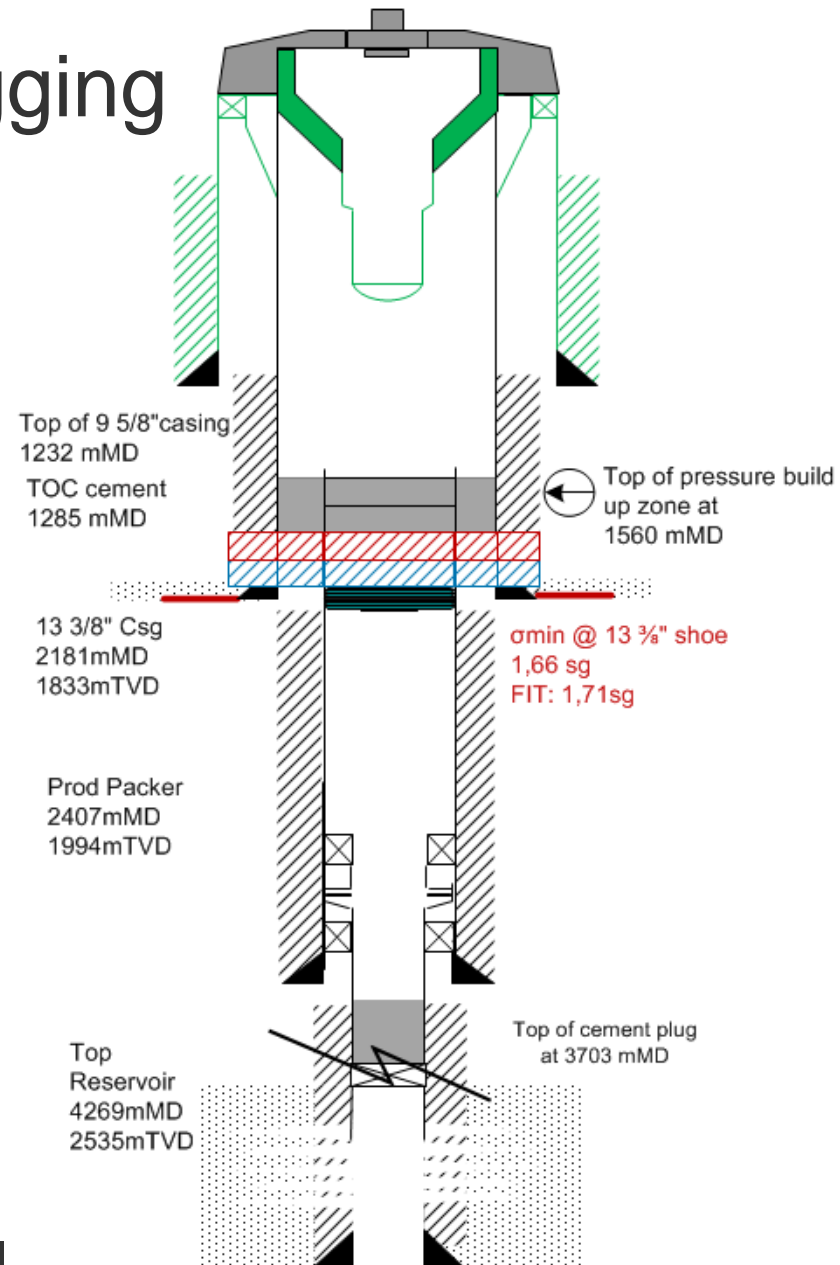
- Decided to verify hydraulic sealing by perforating through both 9 5/8" and 13 3/8" casing and pressure test 16 m intervals
- Displaced well to brine prior to perforating well
- Pressure tested perforations with Archer PWT
- Pressure tested each interval to min. horizontal stress.



# Testing as alternative to logging

## 33/9-A-36 A

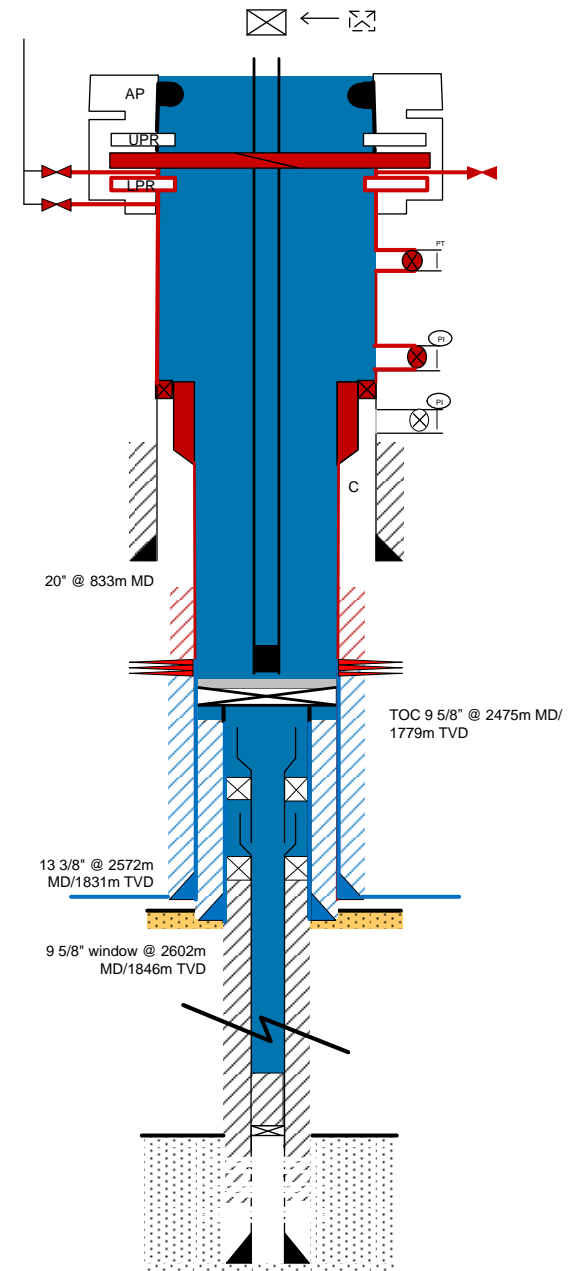
- Conclusions:
  - No communication to surface during the tests.
  - Difference in Pressure vs time plots for testing in casing and testing of perforations confirms contact with the formation
  - Good tests!
  - Placed three cement plugs of 250 m each.
  - Left well temporarily with 9 5/8” “dummy hanger”
  - Pressure will now be monitored to evaluate to do the remaining work without BOP (Rigless)



# Hordaland as barrier

## 33/9-C-30 A

- Logging of 13 3/8" casing showed collapsed formation and possible hydraulic isolation.
- Hordaland not qualified as barrier on Statfjord before.
- A pressure test was conducted through a cut in the 13 3/8" casing.
- Pressured up until LOT.
- No pressure increase observed at surface.
- Successful qualification of Hordaland as formation barrier.



There's never been a better  
time for **good ideas**

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