

Pre-Abandonment case history using inflatable solutions on Coiled Tubing

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Presentation Content

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Abandonment Strategy

- Perform pre-abandonment on coiled tubing prior to mobilising modular rig.
- Restore caprock isolation of hydrocarbon reservoir with “rock to rock ” barrier.
- Provide environmental barrier to isolate any open annulus from surface.
- Incorporate available technologies to complete P&A's most cost effectively.
- Cut and pull conductors from below sea floor.



Objective:

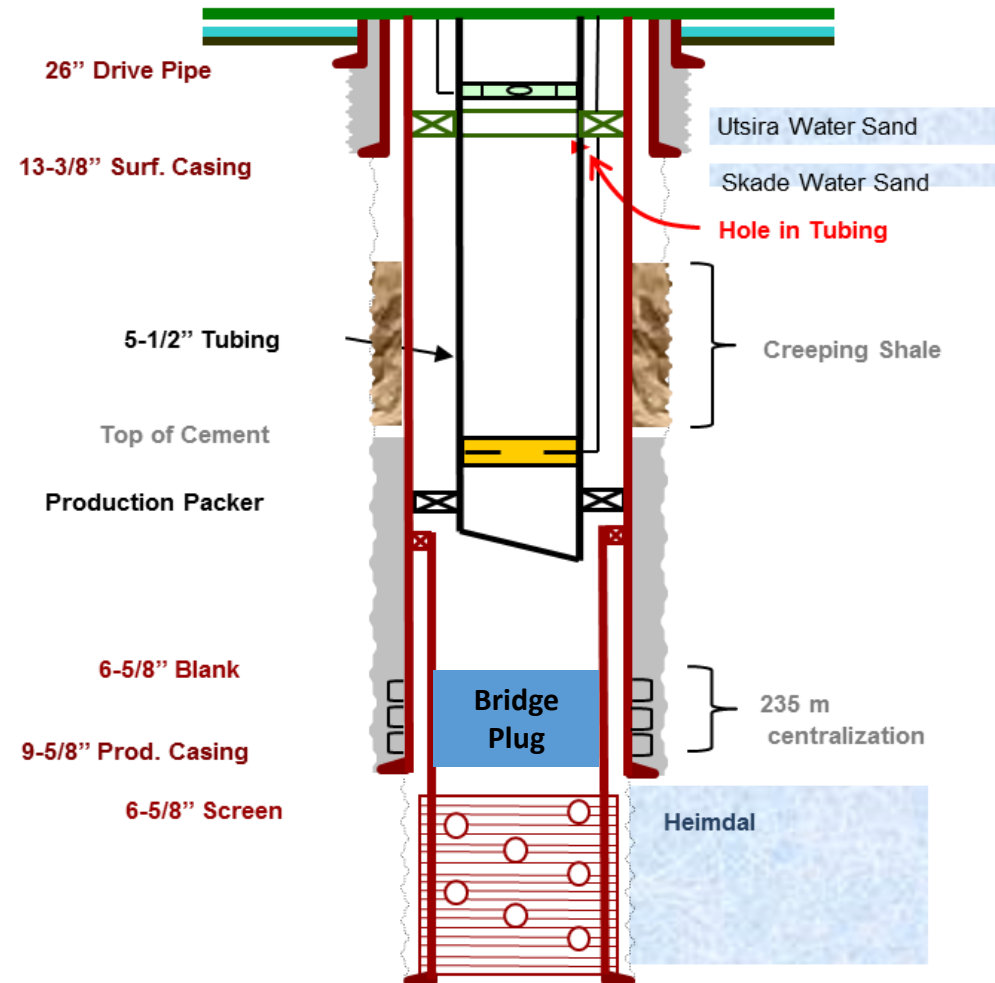
To set an Inflatable Bridge Plug in the 6-5/8" liner isolating the existing screens and screens and also provide a base to enable cement placement in the 9-5/8" annulus. 16 wells in total.

Proposed Operation:

- Run in hole with 3.75" bridge plug on 2-3/8" coiled tubing.
- Set inside liner just above top of screens.
- Disconnect either hydraulically or mechanically.
- Fill up well and pressure test.
- POOH.
- Cement on separate trip.



Typical Well Schematic Bridge Plug



Operational Challenges

- A last minute program change to the first well included a procedural change to save rig time. Customer wanted to perforate the liner prior to running TAM inflatable. This would mean packer having to run through 100m of newly perforated pipe with 24 shots per foot.
- To alleviate potential packer element damage running through the perfs, a decision was made to change out packer gauge ring from standard 3.81" od to a newly designed fluted gauge ring with a 4.41" od.
- In addition at least one 4.38" od stabilizer would be run above packer as part of the CT BHA.
- Deck space for tool storage, handling and make up.



Deck Space



Challenges for Inflatable Solutions

- Historical reputation.
- Expectations.
- Management of change.
- Perceived cost.
- Perceived risk.
- Longevity.
- Well conditions (Fluid & Temperature).
- Incomplete application data.



Results

- Successfully completed 16 wells.
- Released from plug 14 times with primary hydraulic disconnect.
- Successfully utilised back up mechanical disconnect twice due to surface pressure limits.
- Successfully retrieved running tool BHA on 15 jobs without issue.
- Running tool BHA left in hole due to difficulty pulling back into tubing on 6th well.
- Suspected knuckle joints and stabilisers causing issue.
- BHA changed to remove knuckle joints on remaining 10 wells without issue.



Additional Objective:

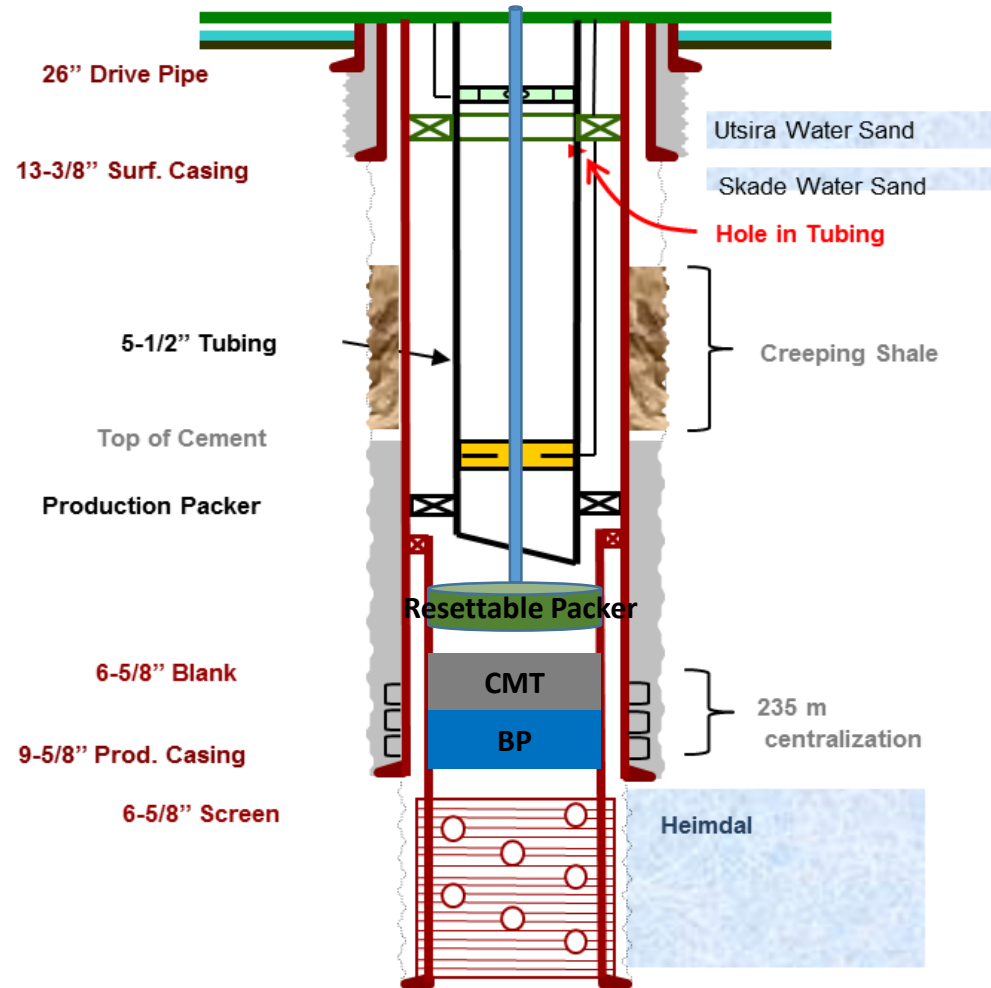
To set an Inflatable Multiset Packer in either the 6-5/8" liner or the 5-1/2 " tubing to pressure test and verify the cement plug.

Proposed Operation:

- Run in hole with 2.90" OD Resettable Packer on 2-3/8" coiled
- Set inside liner and or tubing just above top of cement.
- Fill up well and pressure test below to 850 psi.
- Test above to 850 psi.
- Reset as required.
- POOH.



Typical Well Schematic for Resettable Packer



Additional Operational Results

- Successfully set packer 8 times in 5 wells.
- Pressure tested both above and below packer successfully.
- Successfully squeezed kill pill in one well to shut off losses in the reservoir section.



Lessons Learned

- First 3.75" dual anchor element run globally within TAM.
- When running through perforations new or old, ensure stand off is sufficient to prevent element damage.
- Knuckle Joints can present issues getting in hole or during retrieval. Consider removal at low expansion ratio assuming element working pressures are sufficient with zero centralisation.
- Must run Knuckle Joints high expansion ratio requires centralisation.
- Clean packer setting areas.
- Thru-tubing Inflatable Slat Elements are primarily designed for single set operations however can be multi set dependant on operating parameters.



Summary

- Excellent collaboration and detailed planning from all the parties involved, allowed the team to deliver the pre-abandonment services in highly challenging wells at a significantly reduced cost compared to the modular rig option.
- When all conventional solutions have been exhausted inflatable technology can provide a field proven and cost effective alternative for P&A.
- Detailed well information, planning and preparation are critical to the successful deployment of inflatable technology.



**Thank You
Questions?**

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