REPSOL SINOPEC
Resources UK

Decommissioning High Risk Wells
TARTAN SUBSEA WELL ABANDONMENTS
TS15 Subsea Well Abandonment

2023 Decom Week

Thursday 18th May 1200hrs

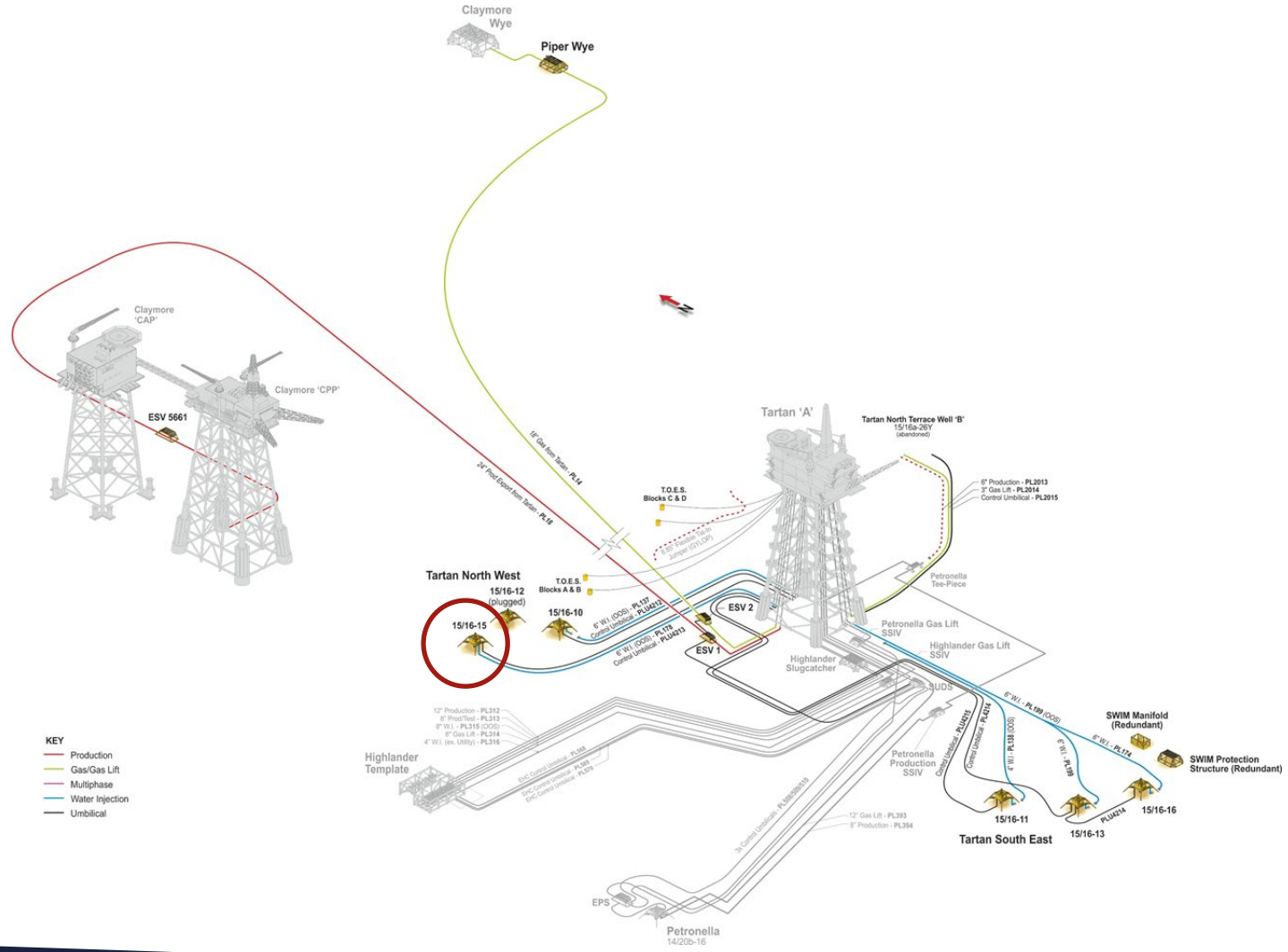
Tartan TS15 Well Abandonment

Agenda

- Tartan TS Location
  - TS15 Well History & Current Status
- Risk Summary
- Engineering Studies
  - XT Strengthening, Hot Tapping,
  - Wellhead Strengthening, Tethering
  - Wellhead Suspension Cap
- Abandonment Philosophy
- Conclusions

Tartan TS15 Well Abandonment

TS15 Well Location



- Tartan oil field is located in Block 15/16, some 190km northeast of Aberdeen in the Outer Moray Firth area of the UK Sector of the North Sea.
- Originally tied back to Tartan Alpha platform – TS15 still has a water injection flowline installed however is air gapped at surface.
- Limited workovers / LWIV's over the lifespan of the well.
- Previous LWIV suspension campaign using the Helix Seawell in 2017 proved unsuccessful in suspending TS15.

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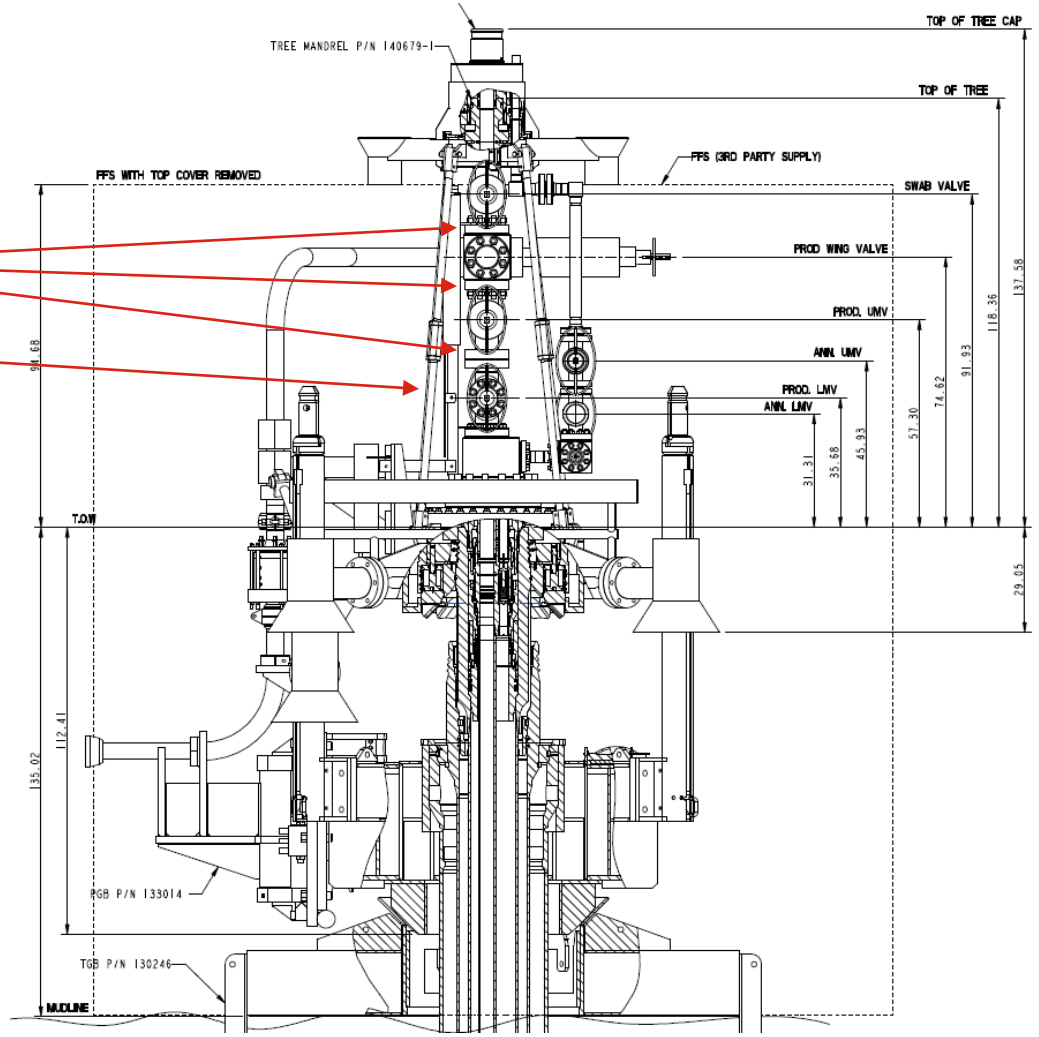
TS15 Xmas Tree

Vetco Gray Vertical Tree

- *TS15 was drilled and completed as an oil producer in 1982, recompleted as a water injector in 1987, shut-in since 2003*
- *Bolted flange construction, essentially a surface tree made wet*
- *The small amount of rigidity it does have comes from 4 x tie rods (condition unknown)*
- *XMT too weak to withstand mechanical intervention without additional strengthening / support*
- *No mechanical annulus access (by design)*
- *No functioning / sealing barriers in tree bore*
- *Tree cap access needle valve closed and stem sheared*
- *No XOV i.e. no access to tubing via annulus*
- ***Flowline/Injection line still connected to the Tartan Platform***



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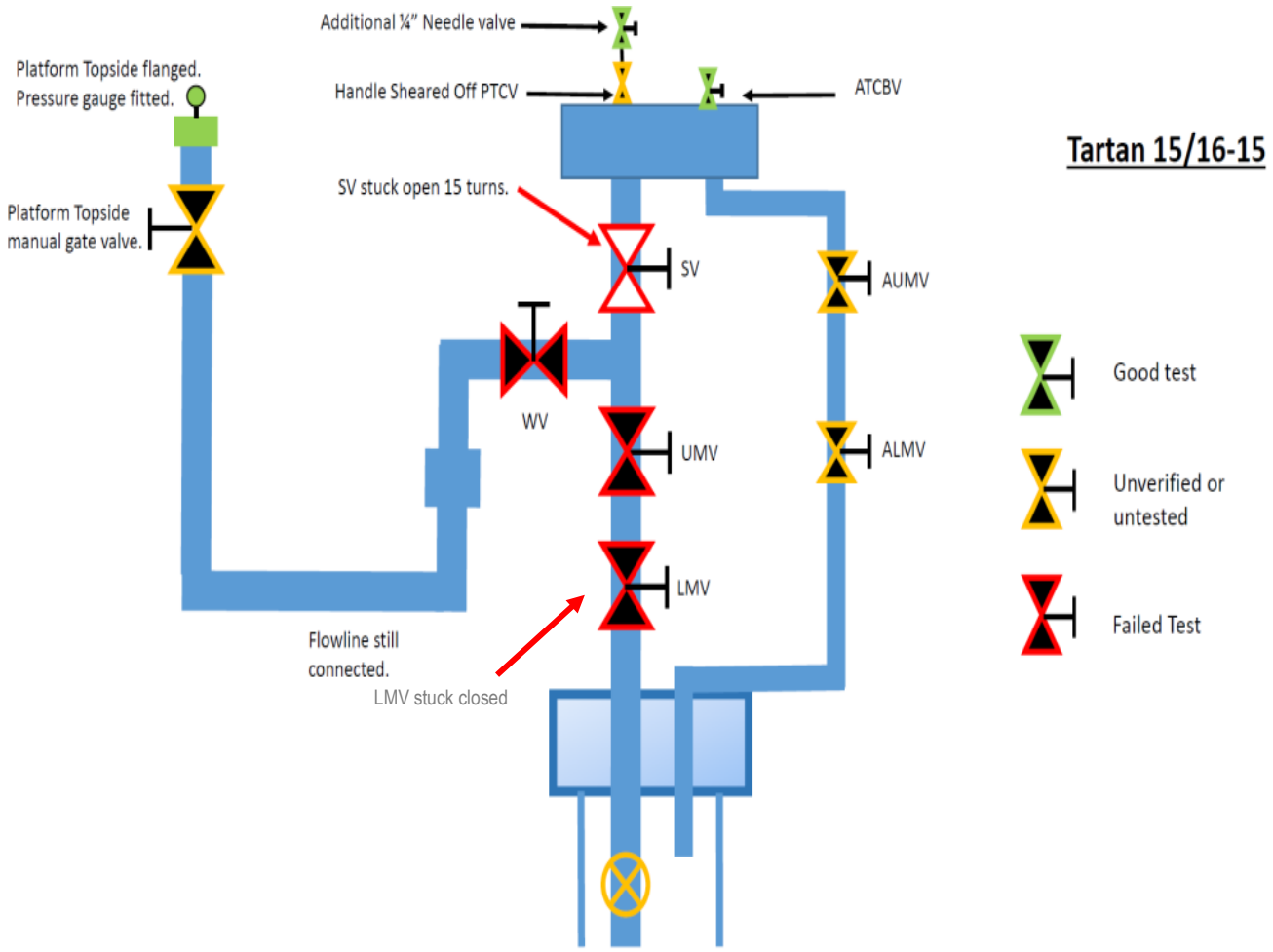
TS15 Well History and Status

- No access to tree cavity from tree cap due to sheared needle valve
- XT Valve integrity compromised
  - SV known to be stuck 70% open and LMV high risk of being stuck fully closed
- Inherently weak tree design, unable to run conventional intervention equipment
- Water Injection flowline still connected from well to topside – although air gapped topside.
  - Flowline is beyond design life
- No useable barriers on Xmas Tree to be able to remove Tree Cap, hence the requirement for novel solutions such as Hot Tapping the Tree Cap
- Wellhead too weak to take a modern 18-3/4" BOP (wells were drilled and completed with a much lighter 13-5/8" BOP)
- Wellhead Strengthening Frame & BOP Tethering planned



Tartan TS15 Well Abandonment

Engineering Studies

XT Strengthening

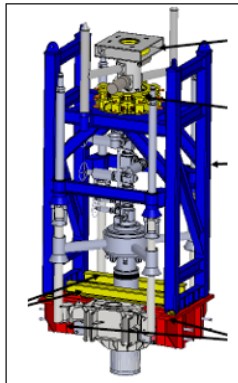


Fig 13 – Full concept model

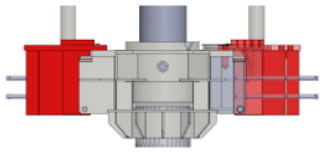


Fig 14 – Guidebase Pedestals Installed

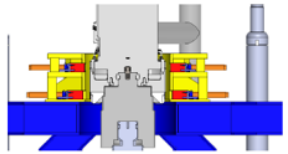


Fig 15 – Frame interface with Barrier assembly

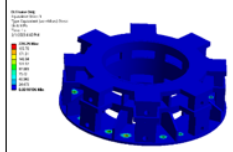


Fig 16 – Clamp Weldment Stress Detail

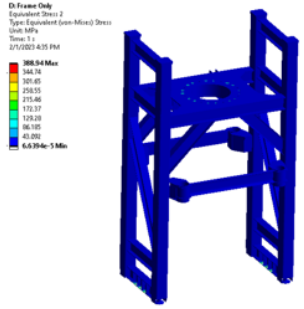


Fig 17 – Frame Stress Detail

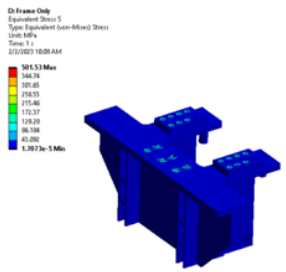


Fig 18 – Frame interface with Barrier assembly

- Design by TVO
- Design had to be compatible for double valve block assembly and hot tap tool
- Will be bolted onto guidebase with the aid of divers

Hot Tapping

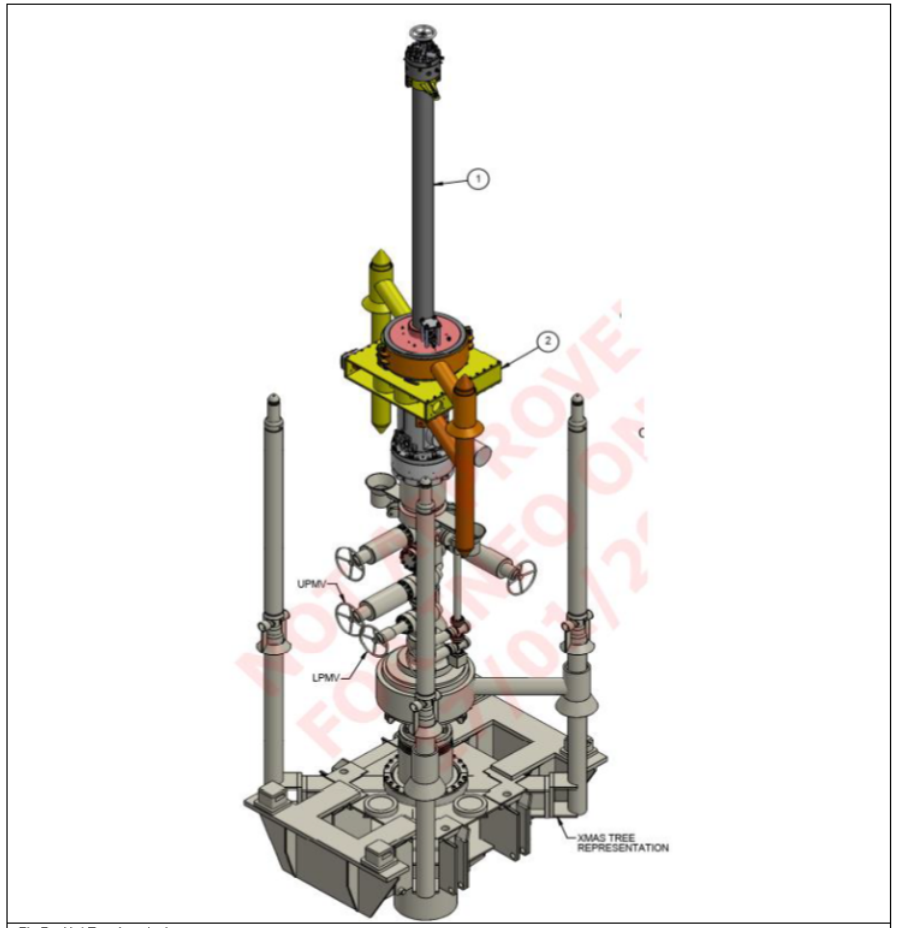


Fig 7 – Hot Tapping stack-up

- Design by Claxton
- Modifying an existing tool that has been used on surface XT's
- Double valve block assembly will be installed first to aid with well control
- Multiple cutters / drill bits to be used depending on what stage

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Engineering Studies Cont.

Wellhead Strengthening

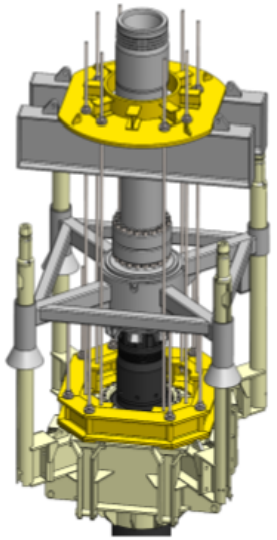


Fig 10 – Full concept model

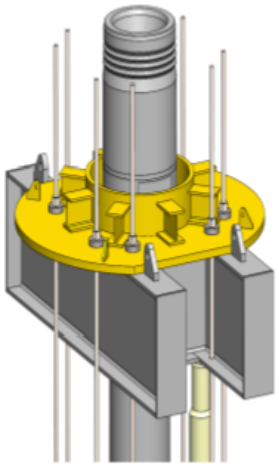


Fig 11 – Upper support frame on WCA

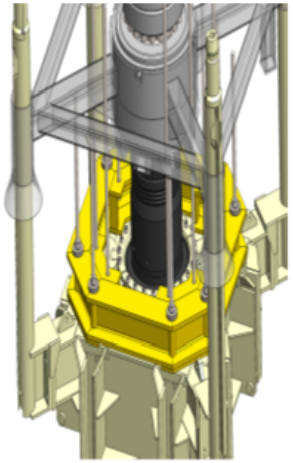
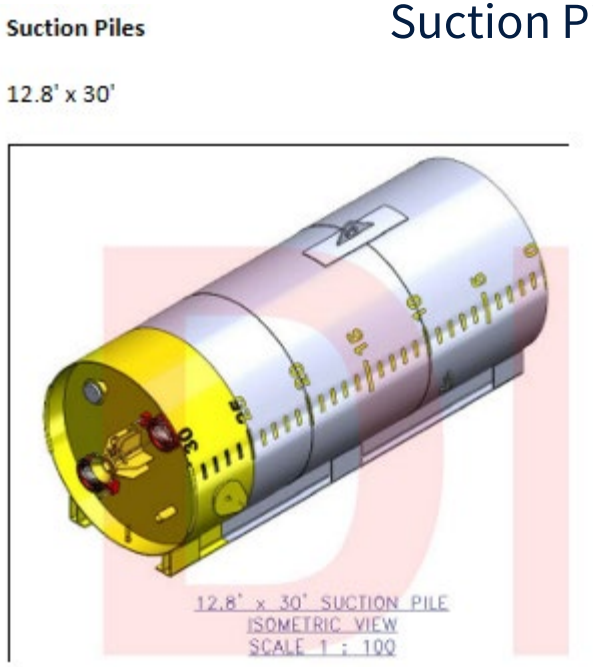


Fig 12 – Guide base support structure

- Design by MMA
- Design had to be compatible with a wellhead extension spool that is required to be installed post XT recovery
- This will allow a 18-3/4” BOP to be landed without clashing with the over-trawlable structure
- Divers will be utilised to torque up the strengthening rods

Suction Piles (Tethering)



- Design by TVO
- Due to the soft soils at the TS location, standard gravity bases are not compatible
- Bespoke suction piles are currently being manufactured in Holland and specialised winches designed / modified by TVO will be run

Wellhead Suspension Cap

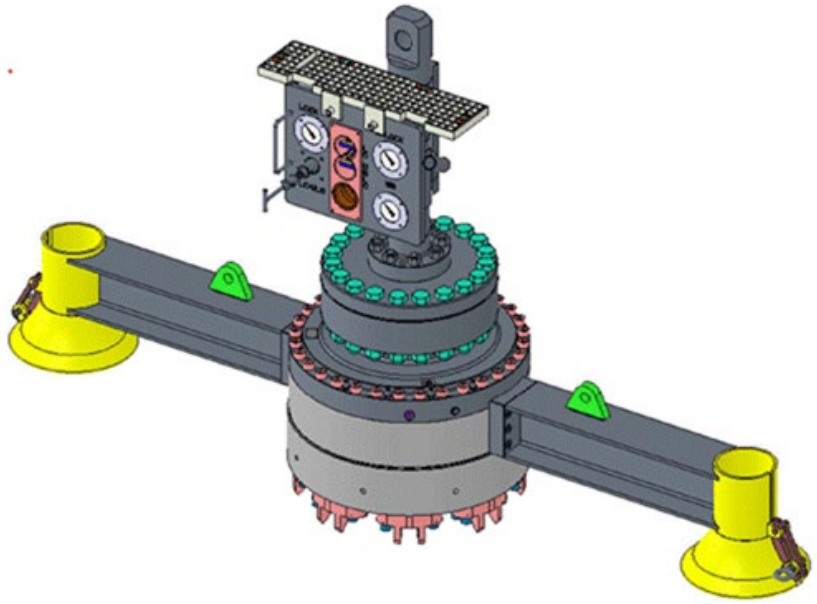


Figure 1 Assembly IZO view

- Utilising a connector off a spare TS XT
- ROV panel c/w PT gauges will allow pressure readings to be read prior to BOP deployment
- Reduce risk if rig arrival was to be delayed post LWIV and XT recovery

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Planned TS15 Abandonment Philosophy

LWIV (First Campaign)

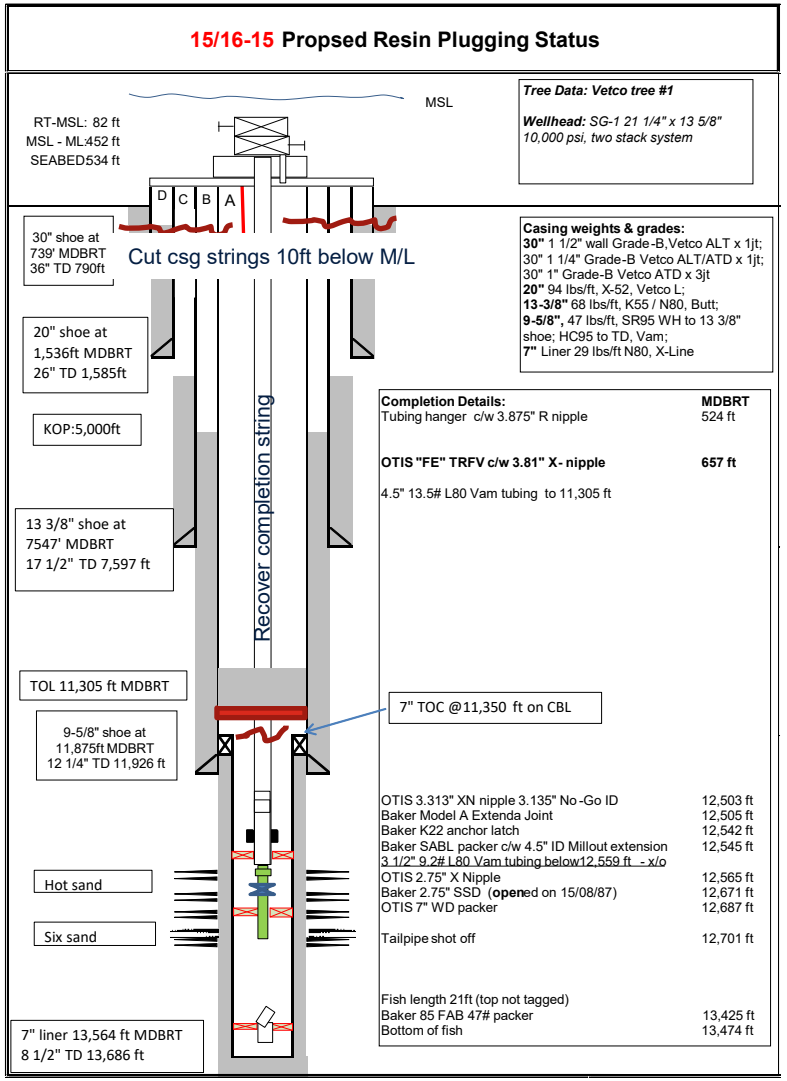
- Install Tree Strengthening Frame
- Install Double Valve Block c/w Hot Tap Assembly & complete hot tap operations

LWIV (Second Campaign)

- Install light weight SIL and set shallow barriers within tubing
- Remove and blank off WI pipeline
- Complete remaining d/hole scope in preparation for XT recovery
- Recover XT and install Wellhead strengthening frame

MODU

- Run BOP and tether to Suction Piles
- Complete Phase 1 Abandonment
- Disconnect tethers, recover BOP
- Cut 13-3/8”, 20” and 30” conductor 10 ft below seabed
- As left and move over to next location



Conclusions

- Very challenging well
- Various novel engineering “firsts”
- Thinking outside the box
- Deliver 23