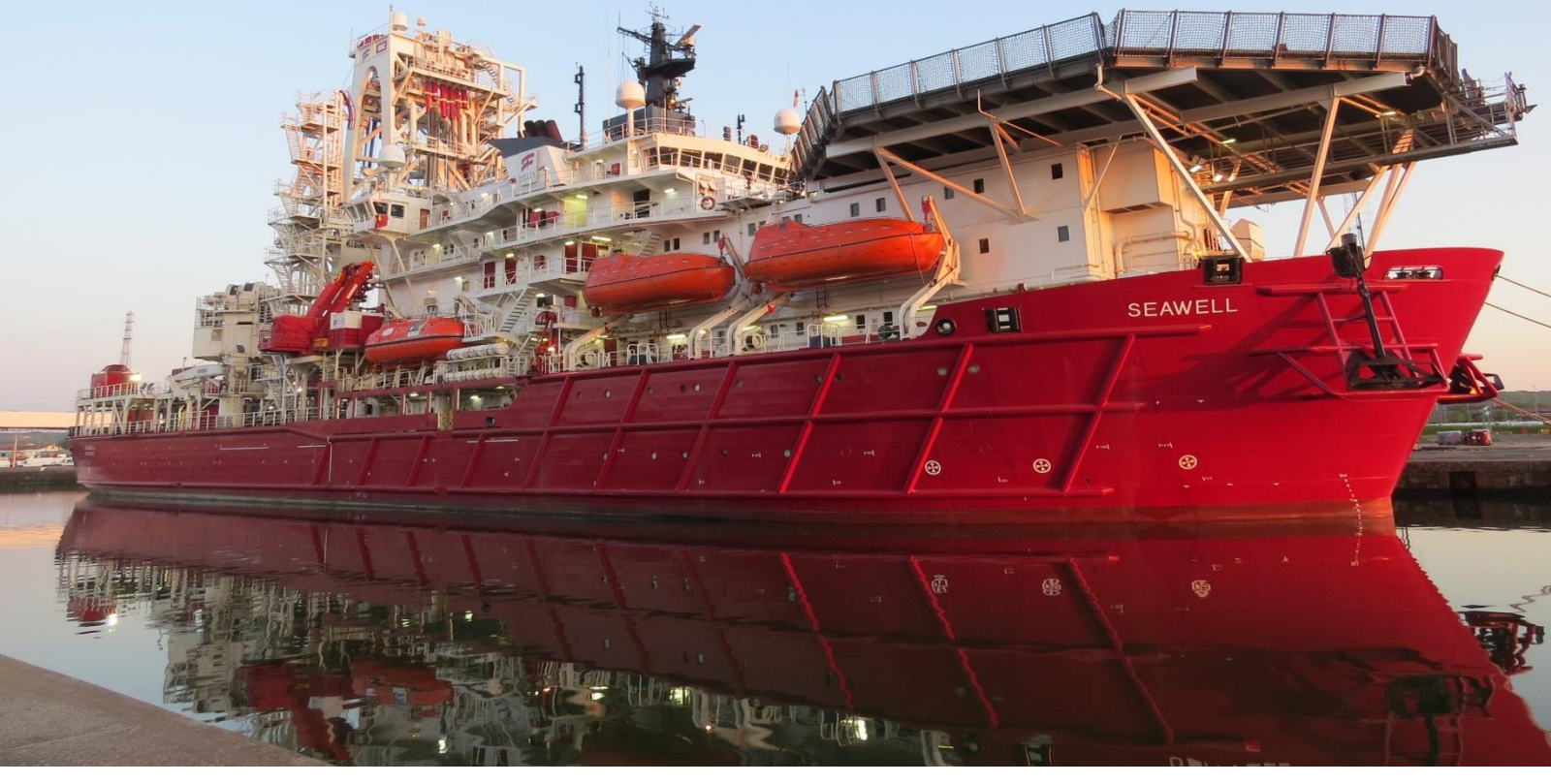
HELIX
ENERGY SOLUTIONS

WellOps
P&A Case Study



Navigating the present, *focusing on the future*

AGENDA

- A brief history of the well
- P&A Options
- Technical Challenges

LOCATION

East Shetland Basin

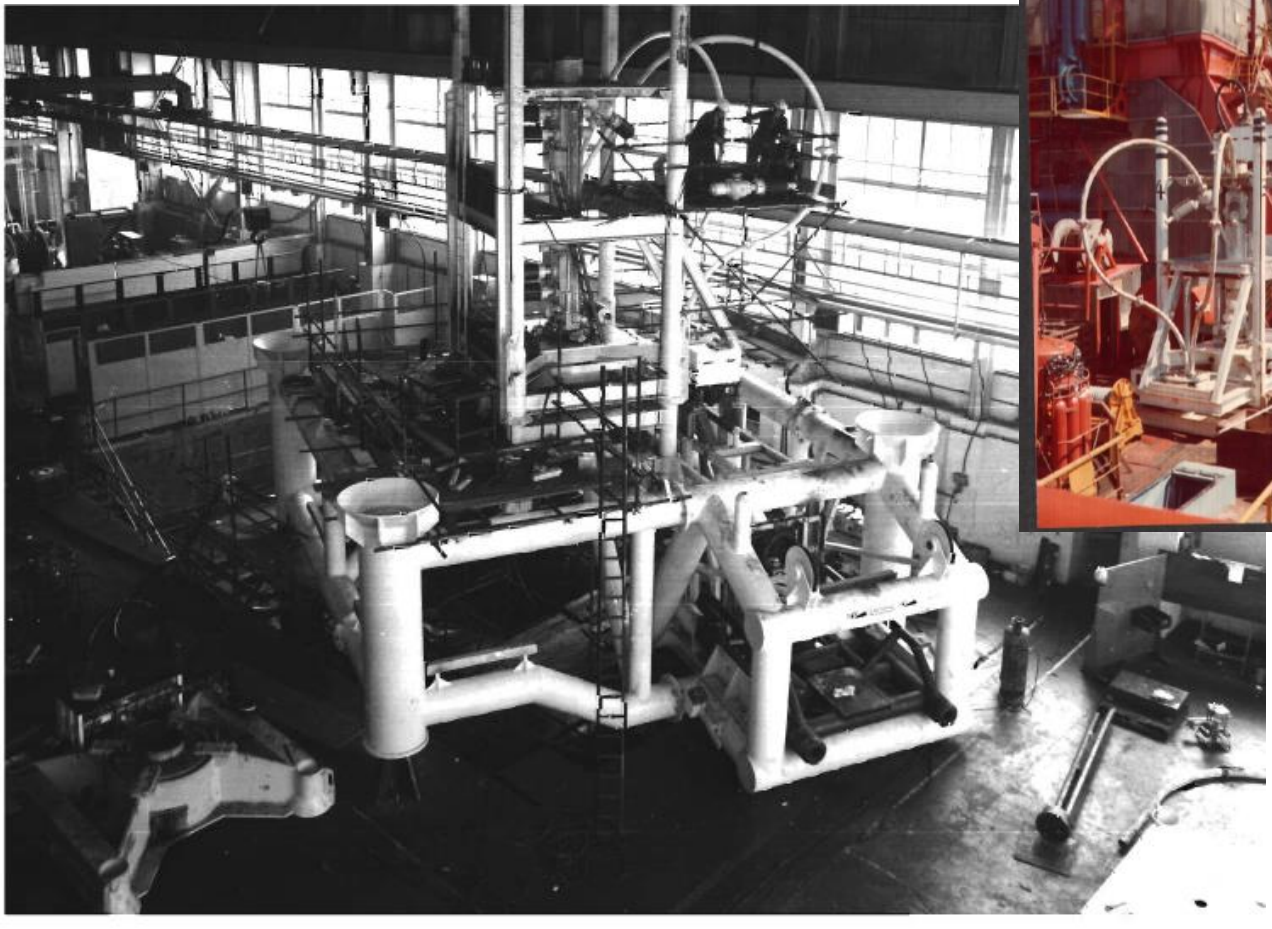
WELL HISTORY

The well was drilled in mid 70's
Unique:

- First ever early production system-tie
- First ever Through Flow Line design

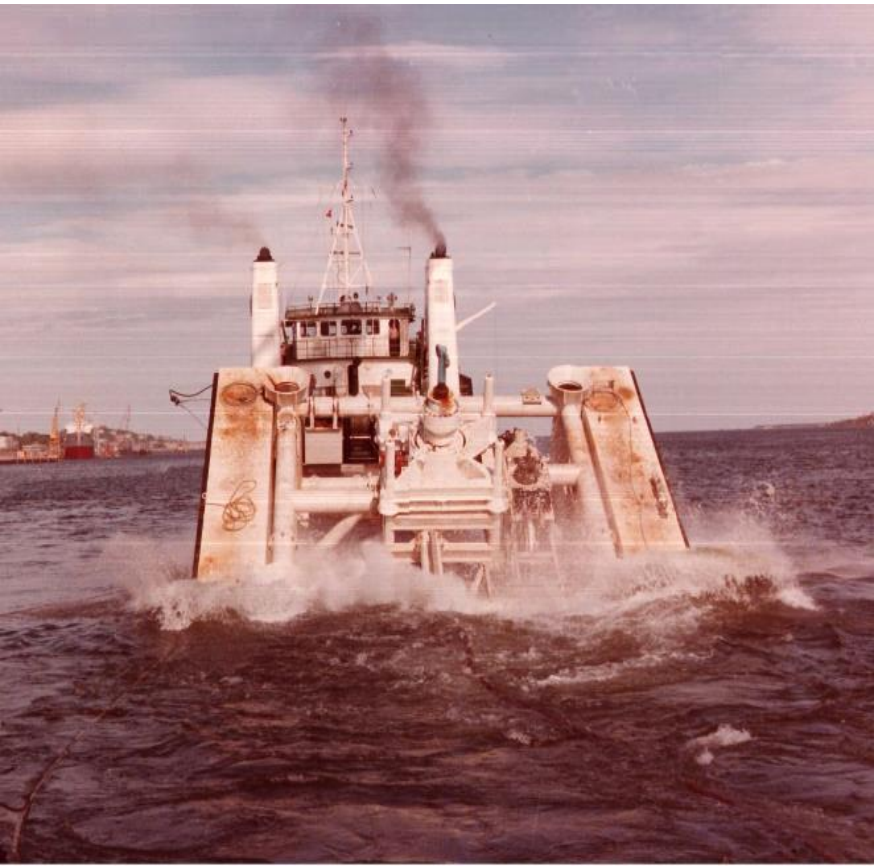
Shut in for 36 years, untouched.

SUBSEA STRUCTURE

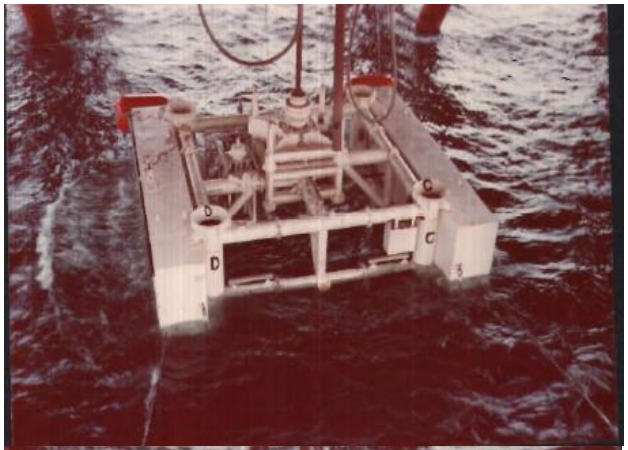


SUBSEA STRUCTURE LAUNCH

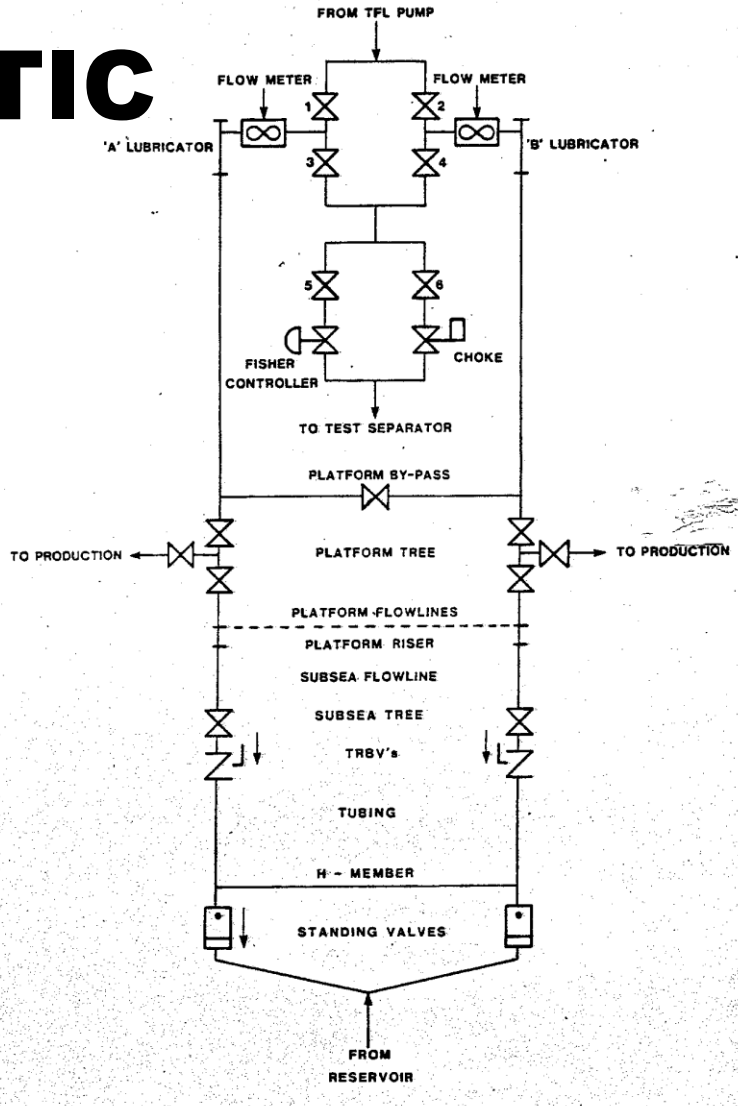
Testing in the River Tay



MODU Launch



TFL SCHEMATIC



Space frame

P&A OPTIONS

Rig would require:

- BOP support (weak wellhead)
- No 13-5/8” BOP available
- No Dual Bore Riser available
- DSV support required before and possibly during

Q. Could an LWIV c/w DSV achieve the required outcome?

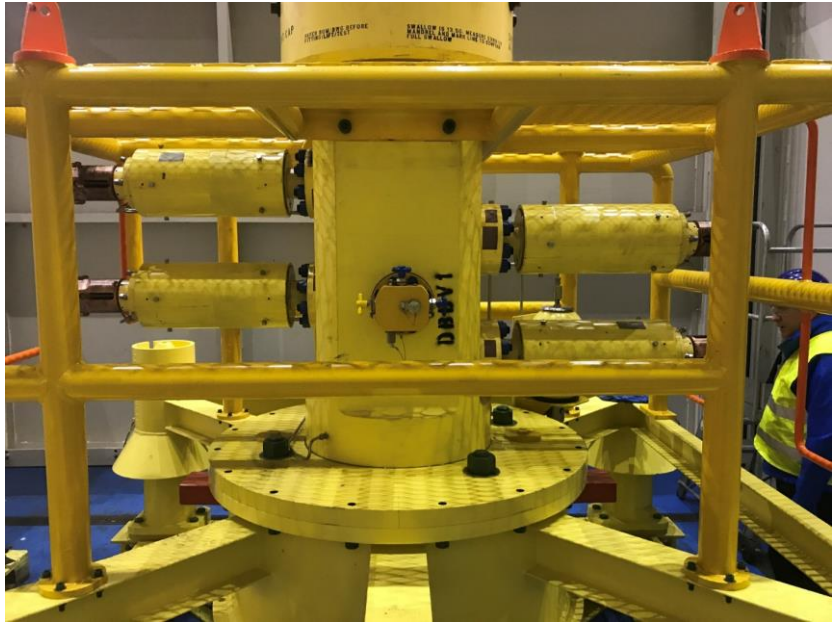
Technical Challenges

- Assured barrier integrity

Safety Valve Package designed and fabricated to supplement or replace tree valves as well barriers.

Tree valves open or partially opening.
Milled out as required

LMV's opened hydraulically without any issue. But locked open with SVP as back up.



Diverter removal

Wireline retrievable Diverters set above PMV's to direct the pumped through toolstring into the well

Downhole

Lock open SSSV due to control line leak

Fishing

- This was removed from the well (PDBV)

Standing valves couldn't be pulled but allowed hydraulic access

Multiple wireline runs in the end- c. 40 v minimum 14

Abandonment plugs

Balanced cement plug 800ft combination in the annulus and tubing just above the reservoir

Another similar length of plug was set in the tubing and annulus higher up in the well

Tree removal

- 140Te from AHC Tower
- 2000 psi in both bores
- Powerjacks

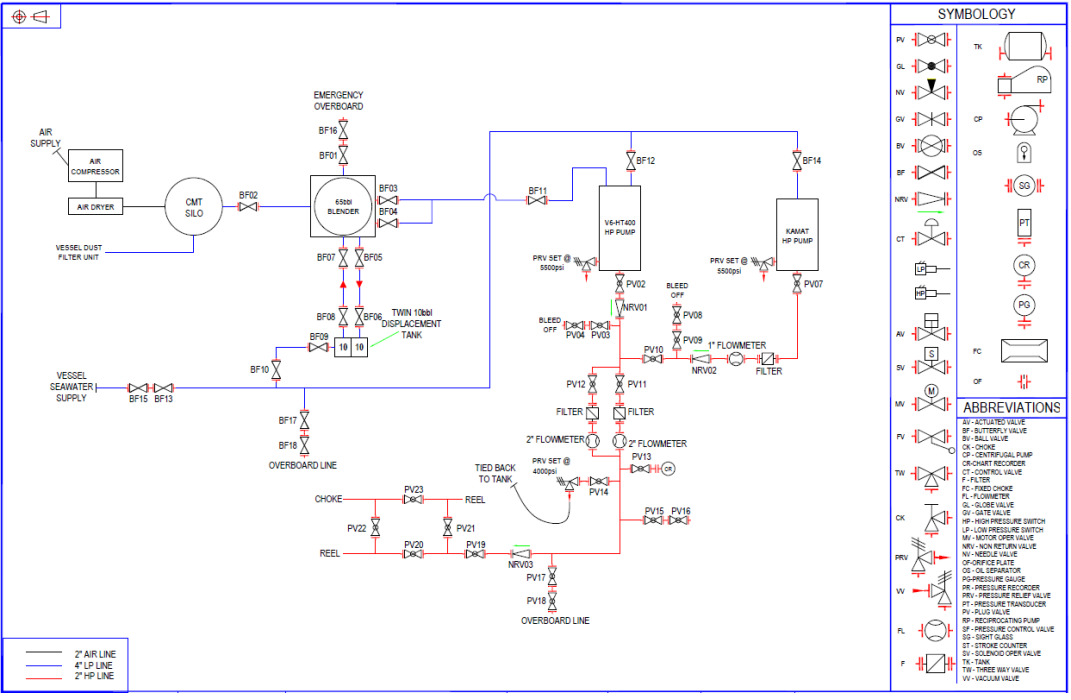
=440Te lift to unseat tree from wellhead

Tubing removal

Open water cut of two strings.
THERT tool c/w 5Te clump weight for set down
Pulled open water 2 x 300’ of pre-cut tubing in tandem and laid on seabed for later recovery along with flowline removal scope.

NB Cleanliness

Fluids handling, filtration and cleaning, disposal



Fluids were treated and over-boarded <30ppm.

Any oil kept for onshore disposal

Synergies / collaboration

Working with Operator and its subsea removal contractor collaboratively in scope allocation to optimise cost efficiency of the overall decommissioning project

Helix performs P&A
Recovers tree
Unlatches TH and removes tubing
Tubing laid down for later collection
Wet stored towhead buoyancy tanks both for later pick up by CSV contractor along with flowline recovery.

3rd party will conduct the environmental plug setting and wellhead severance

Summary

Using LWIV, mitigations in place for all anticipated technical challenges, innovations where appropriate and collaborative allocation of scope between P&A and facilities removal …..

A complex, technically challenging well has been plug and abandoned safely

Thank you

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