

Returning a Subsea Dual-lateral oil producer to production using leak detection and sand detection logging from a LWI vessel

Minh Hoan Pham and Timothy A. Griffin

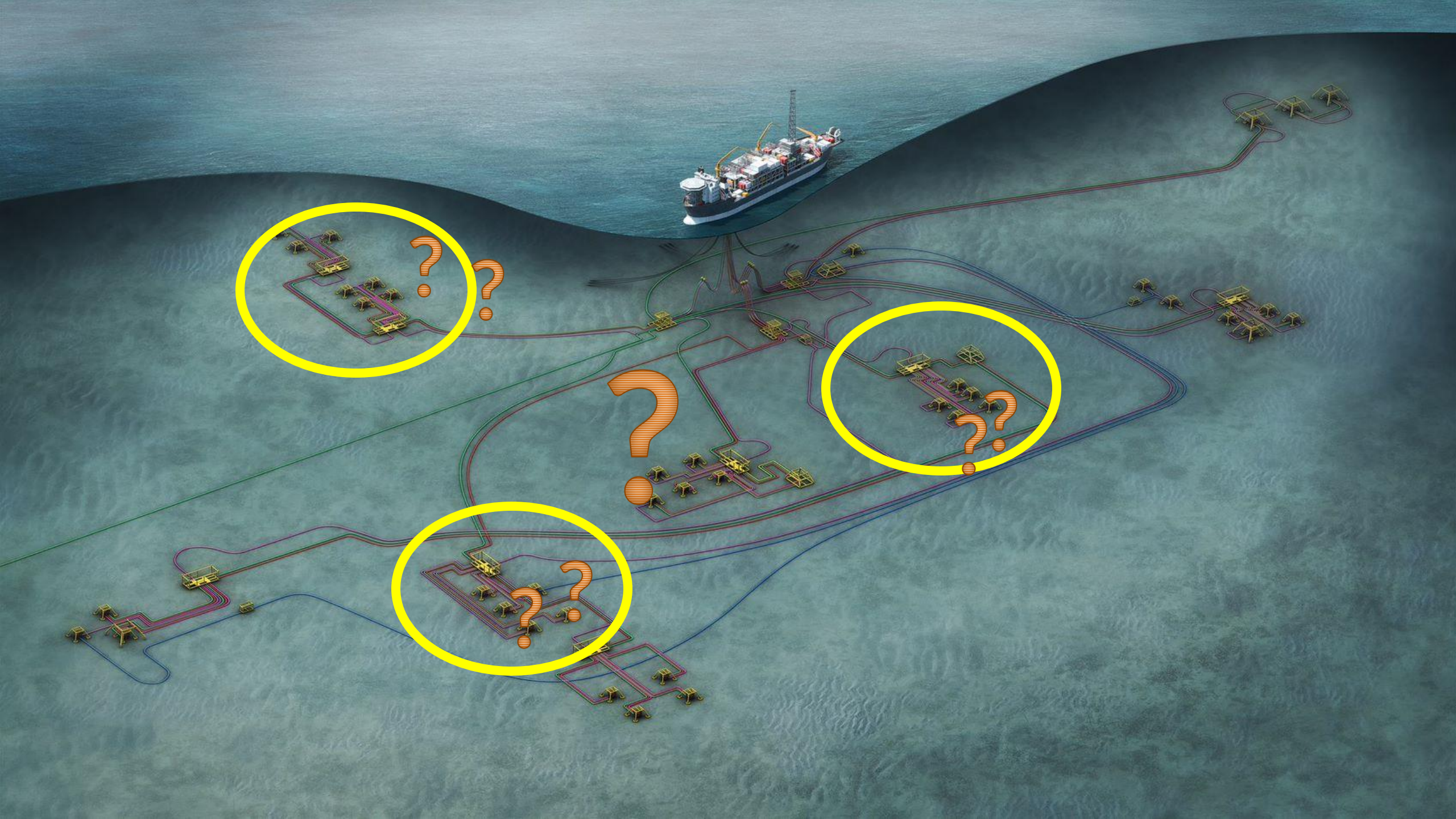
First obvious symptom





Presentation Outline

- Background
- Well design and objective
- Well intervention operation
- Method selection
- Lessons learned



Well symptoms - failing well barriers

- Gas lift valve
- Down hole safety valve

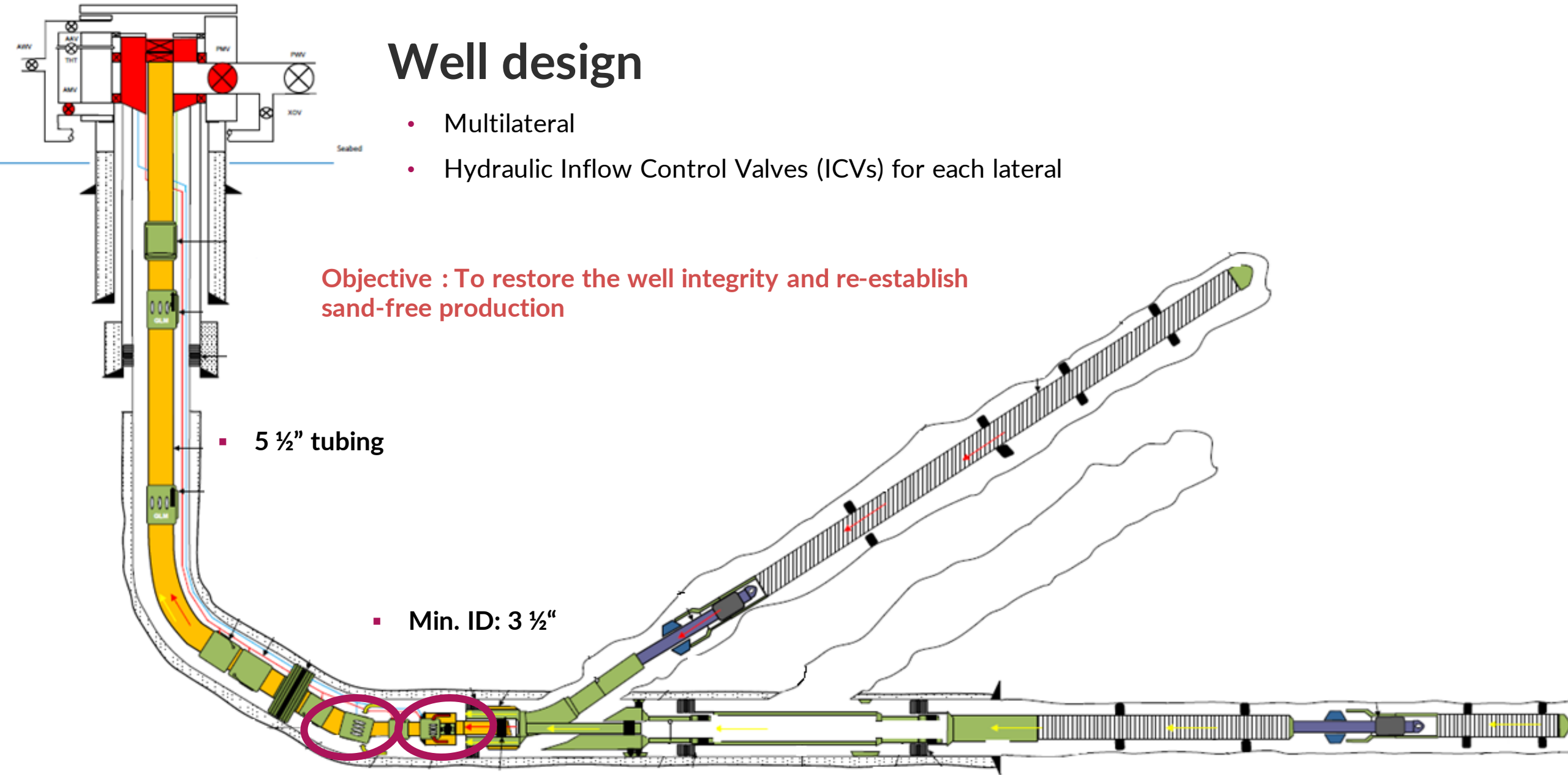
Well design

- Multilateral
- Hydraulic Inflow Control Valves (ICVs) for each lateral

Objective : To restore the well integrity and re-establish sand-free production

▪ 5 ½" tubing

▪ Min. ID: 3 ½"



Operational Steps

Phase 1: identify leak and restore

- Drift
- Ran leak detection
- Change out GLVs

▪ From production packer and up

▪ To first joint of 3 ½" at 2674 mMD

GOOD



POOR

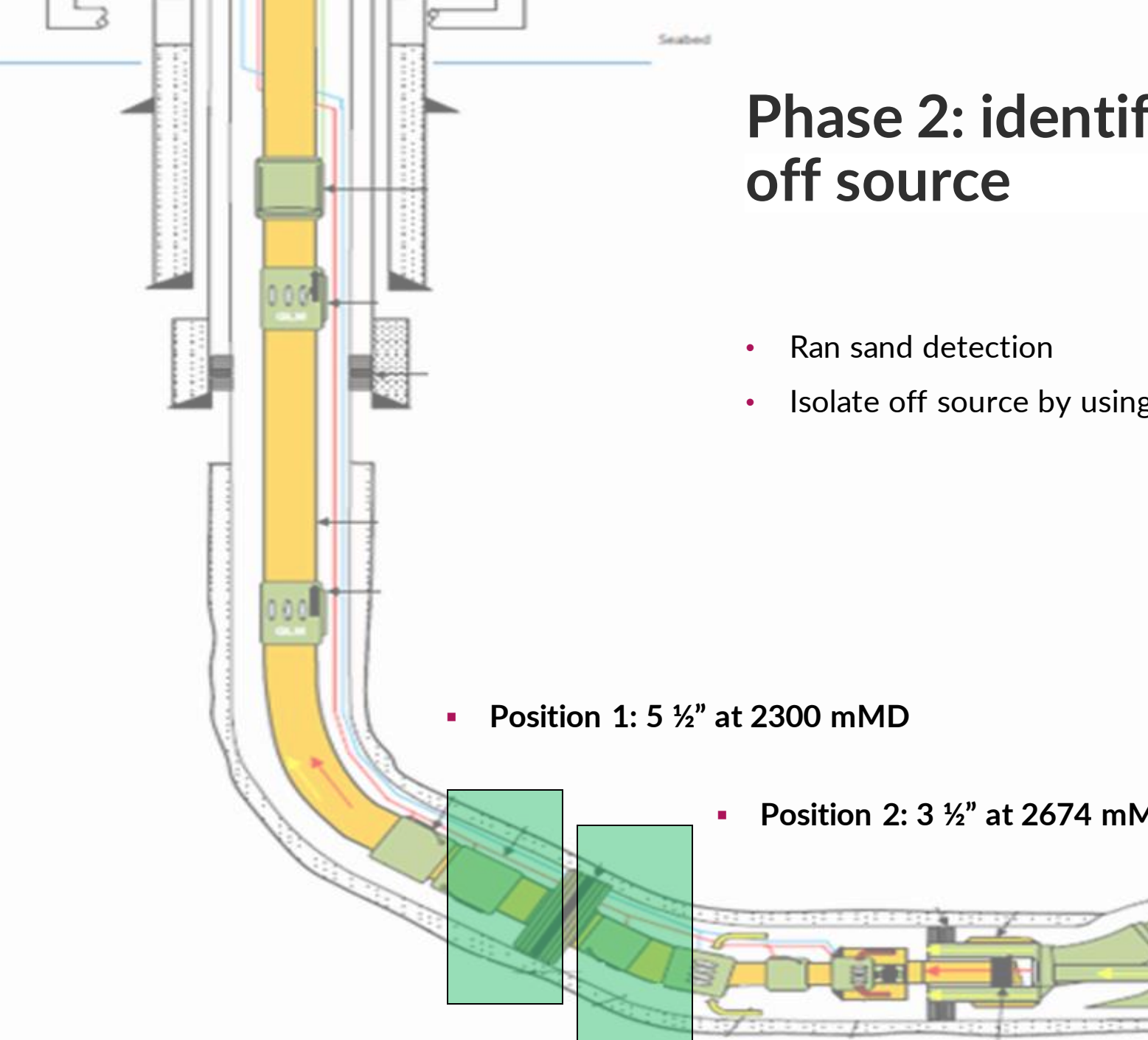


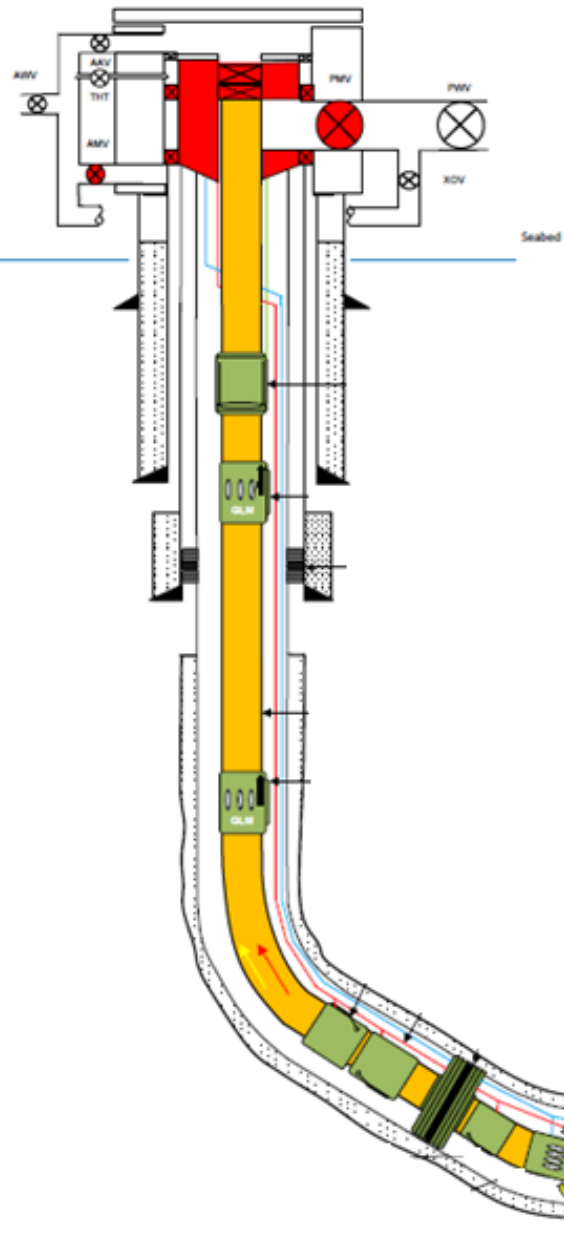
Phase 2: identify sand and isolate off source

- Ran sand detection
- Isolate off source by using hydraulically controlled ICVs

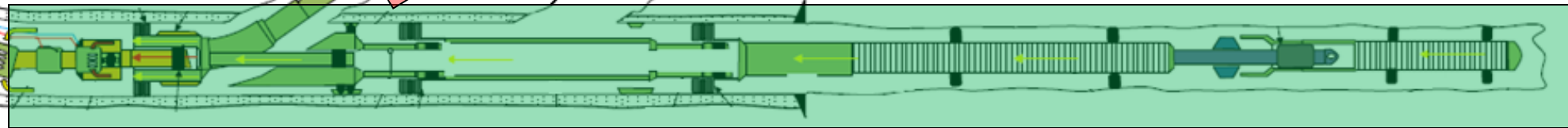
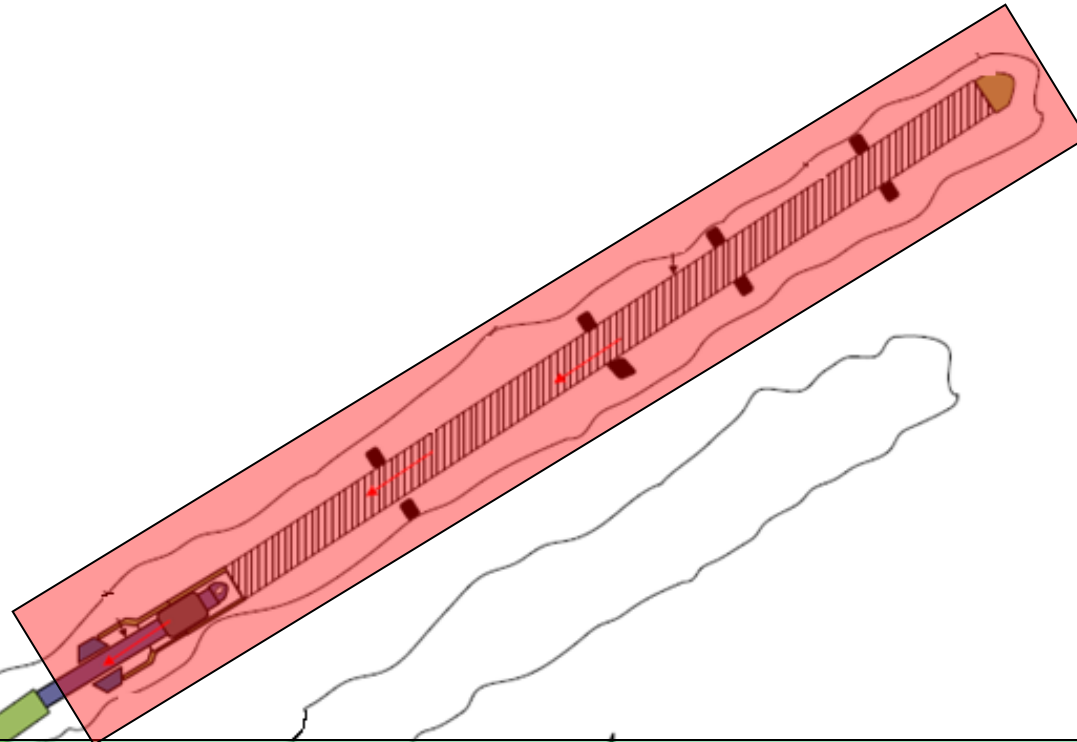
▪ Position 1: 5 ½" at 2300 mMD

▪ Position 2: 3 ½" at 2674 mMD



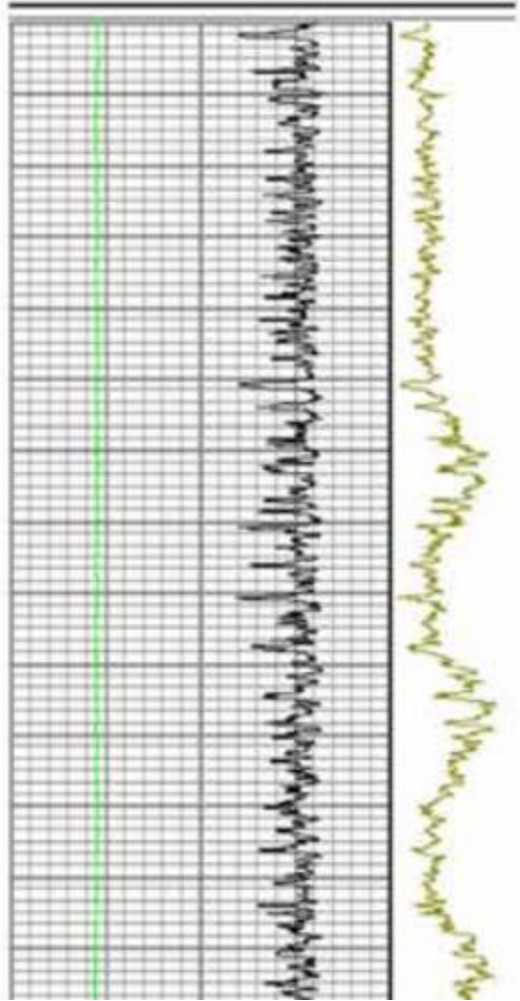


- Y1H: Produce
- Y3H: Close lateral

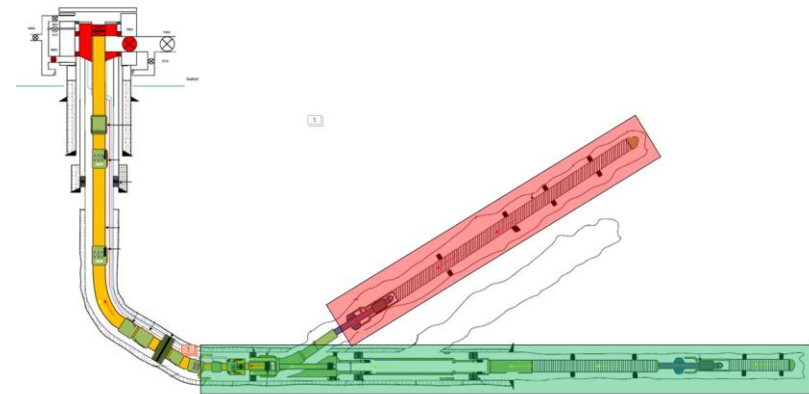


Y1H 100% Y3H closed – 1032m3/d

25	CPS (psi)	25	29000	CNH (psi)	33000	01_OC_F3_THQ4	
						0	800

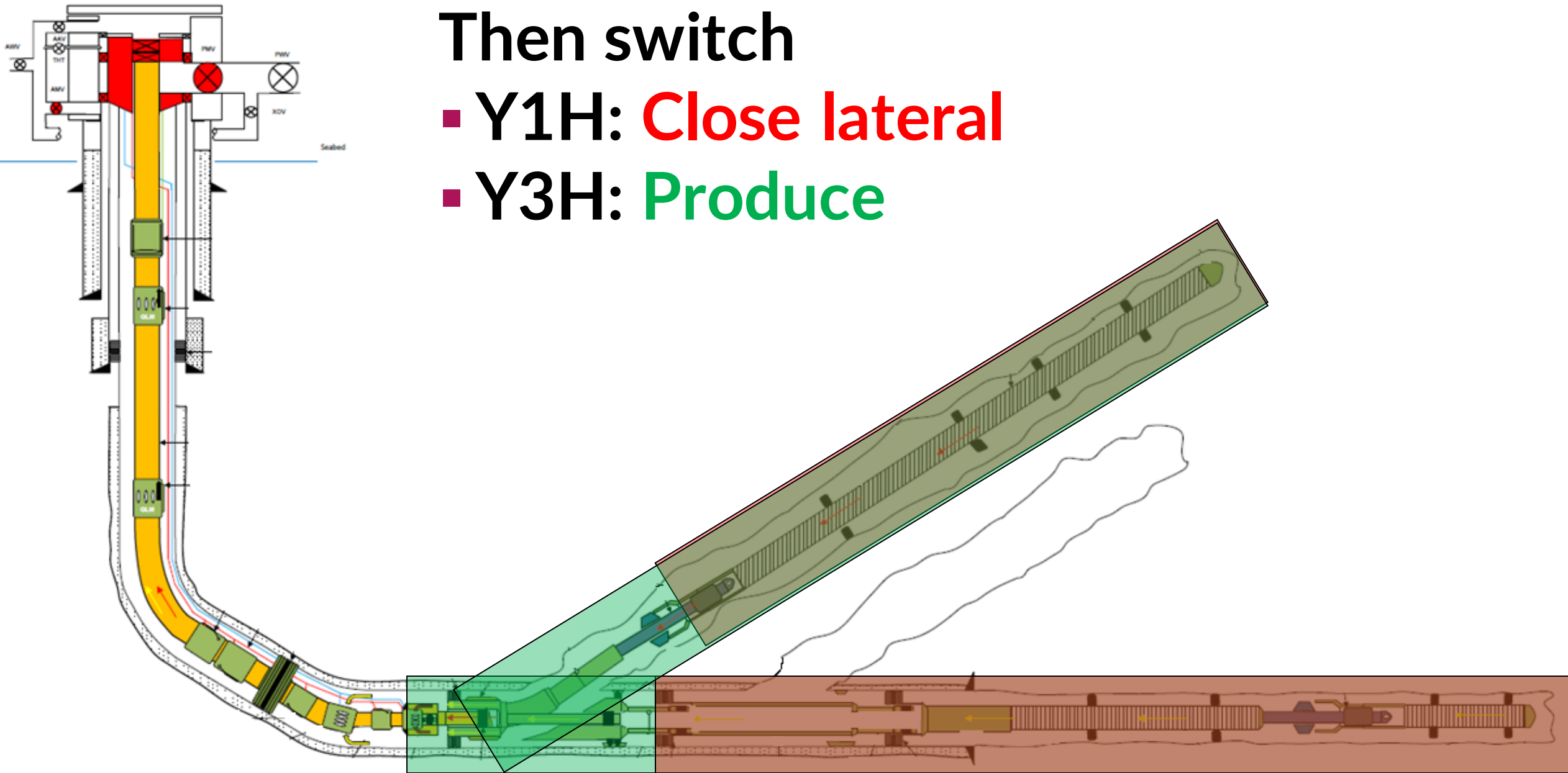


- Sand detected
- 312 count per second (CPS)



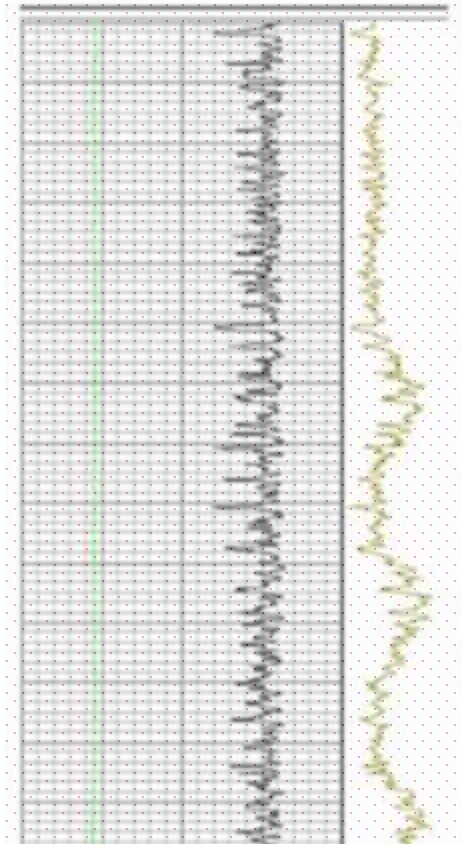
Then switch

- Y1H: **Close lateral**
- Y3H: **Produce**



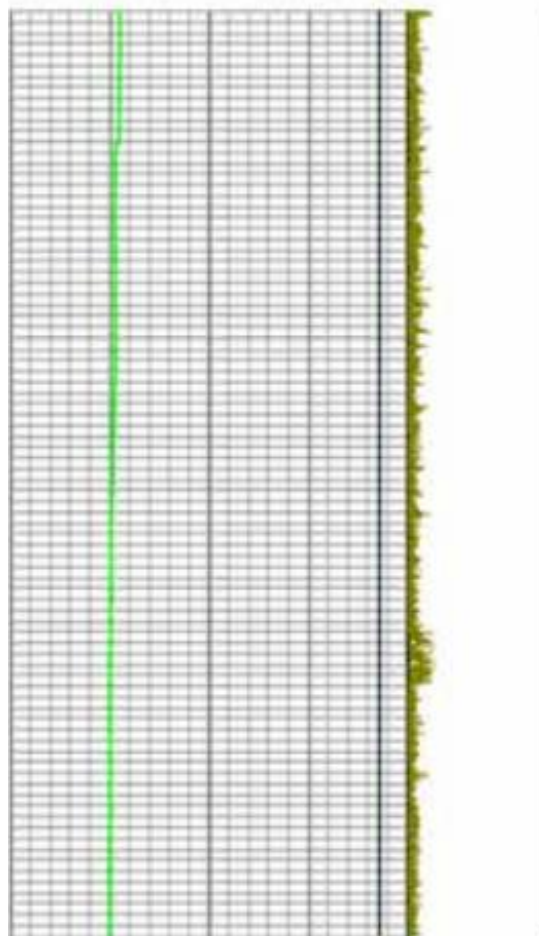
Y1H 100% Y3H closed - 1032m3/d

25	CFS (psd)	25	29000	CWH (psd)	33000	01_SC_F3_TH27
						0

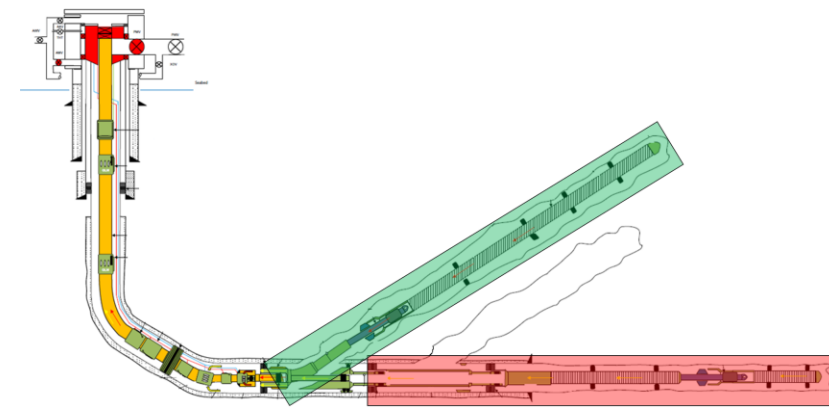


Y1H closed Y3H 100% - 1032m3/d

25	CFS (psd)	25	29000	CWH (psd)	33000	01_SC_F3_TH27
						0
						50



- In comparison, no sand
- 1,64 CPS



Method Selection

Logging Tool Selection

	Vendor X	Vendor Y	Vendor Z
<i>Leak and sand detection, single run</i>	Green	Green	Green
<i>Axial detection</i>	Red	Green	Green
<i>Track record</i>	Green	Yellow	Yellow
<i>Surface readout</i>	Green	Yellow	Green

Lessons learned

- Internet
- Communication
- An unreliable acoustic sand detector on well (retrofit)

Acknowledgements

- Duncan Troup, James Brighton, and Andrew Primarolo from Archer
- AkerBP and Vår Energi for permission to present the material



www.akerbp.com