



Carbon
Catalyst



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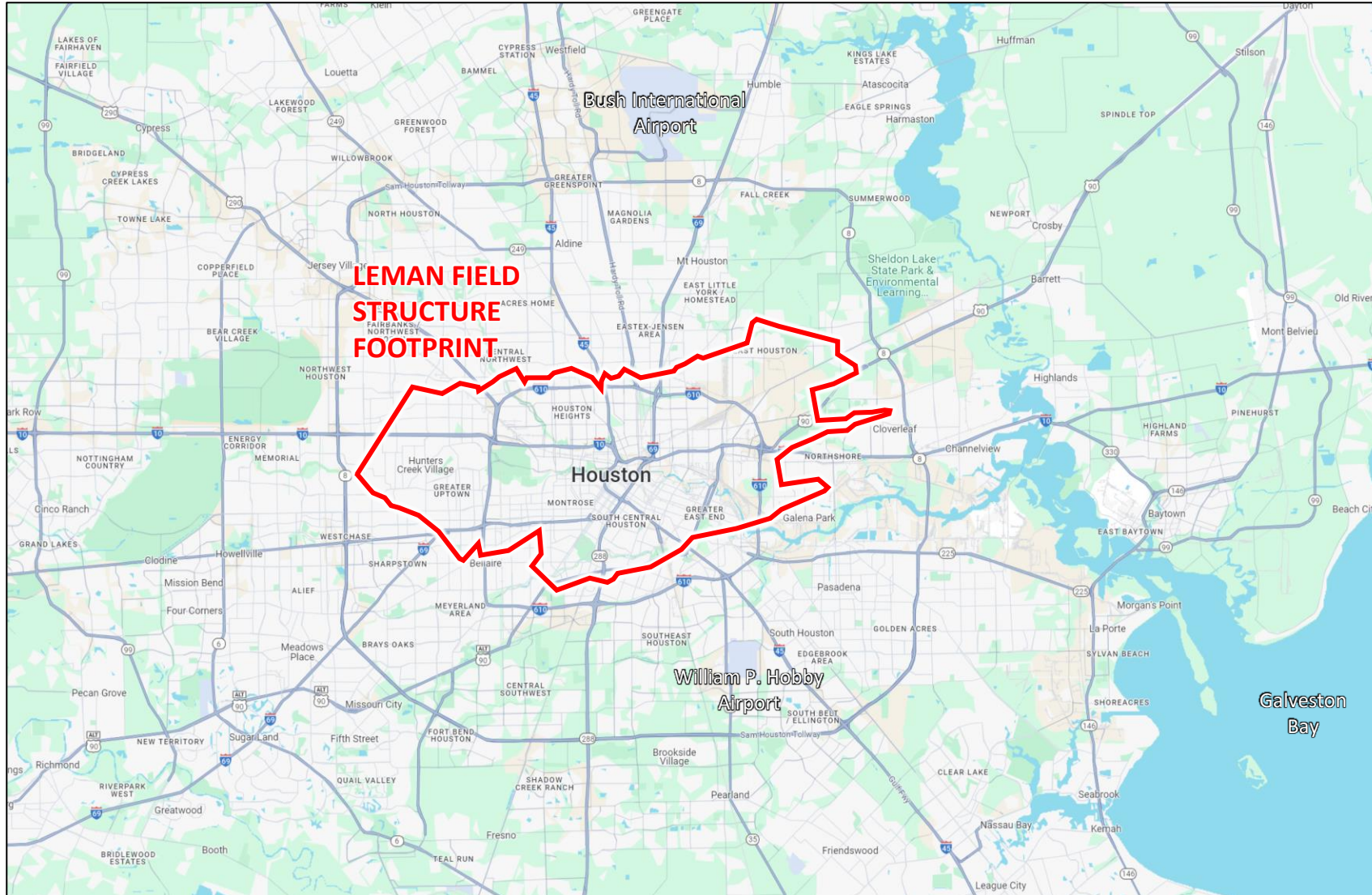
Poseidon Project - UK's first well injection test

7th International Workshop on Offshore Geologic CO₂ Storage

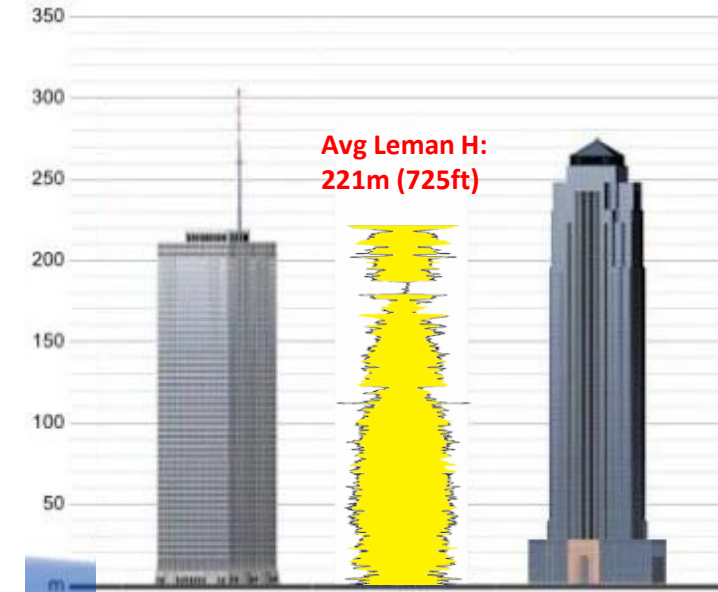
University of Texas, 17th September 2024

Poseidon Project

Leman Poseidon is located over UK's largest gas field (14.5Tcf)



Leman Reservoir thickness



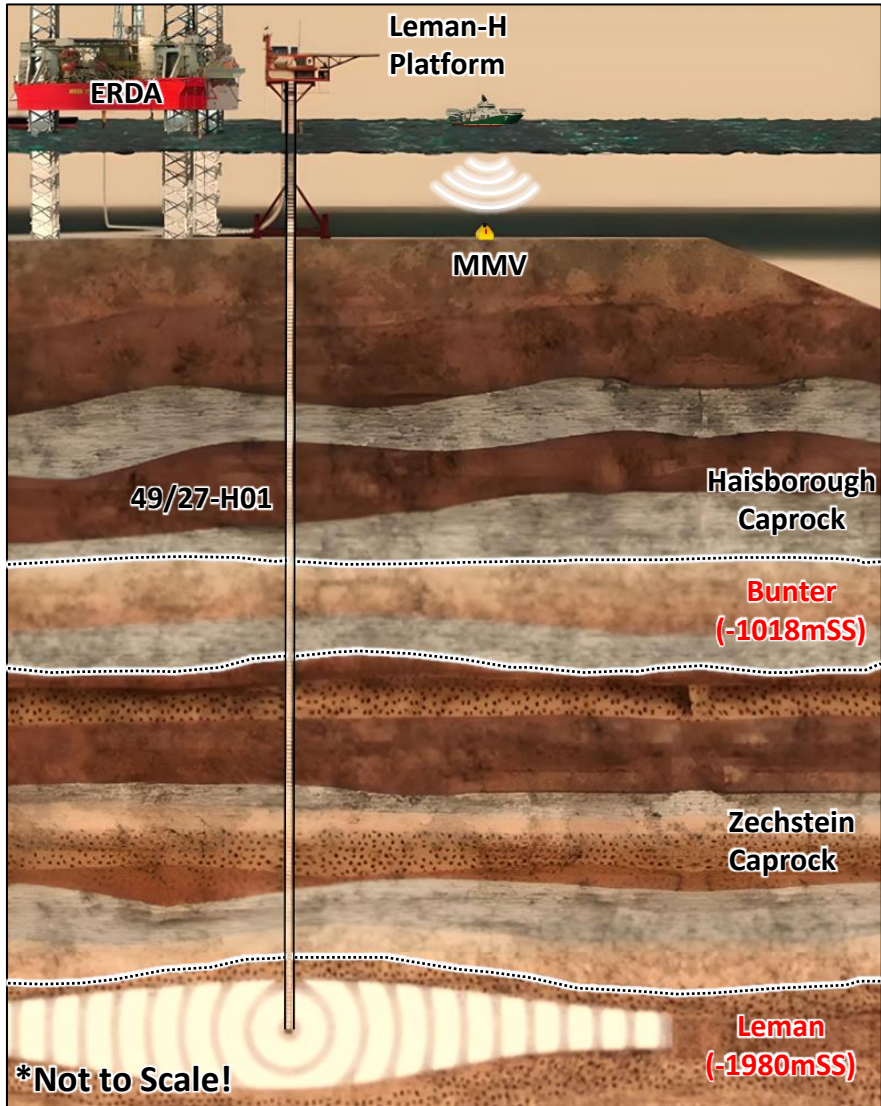
One Shell Plaza
217m (714ft)

Williams Tower
275m (901ft)

- Highly Compartmentalised
→ Option to Develop Segment-by-Segment
- Ultra Depleted <20bar

Key Early Enabler – Lemman Poseidon Injection Test

Ongoing preparation for megaton scale commercial injection



- First-of-a-kind offshore CO₂ injection test into a depleted gas reservoir
- Operations ongoing, 5-6Kt to be injected over a 90-day period
- Material R&D data acquisition programme ahead of planned project FID

WELLS

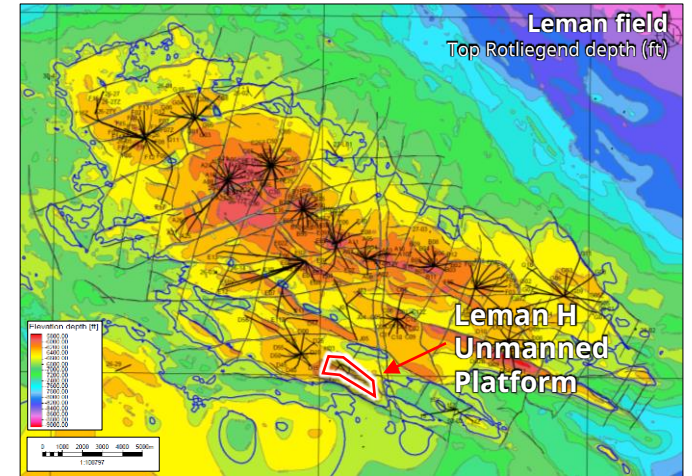
- Can Legacy Well Be Re-used?
- CO₂ Pressure & Temperature Along Well
- Cooling/Heating Effect?
- Hydrates/Halite precipitation?

RESERVOIR

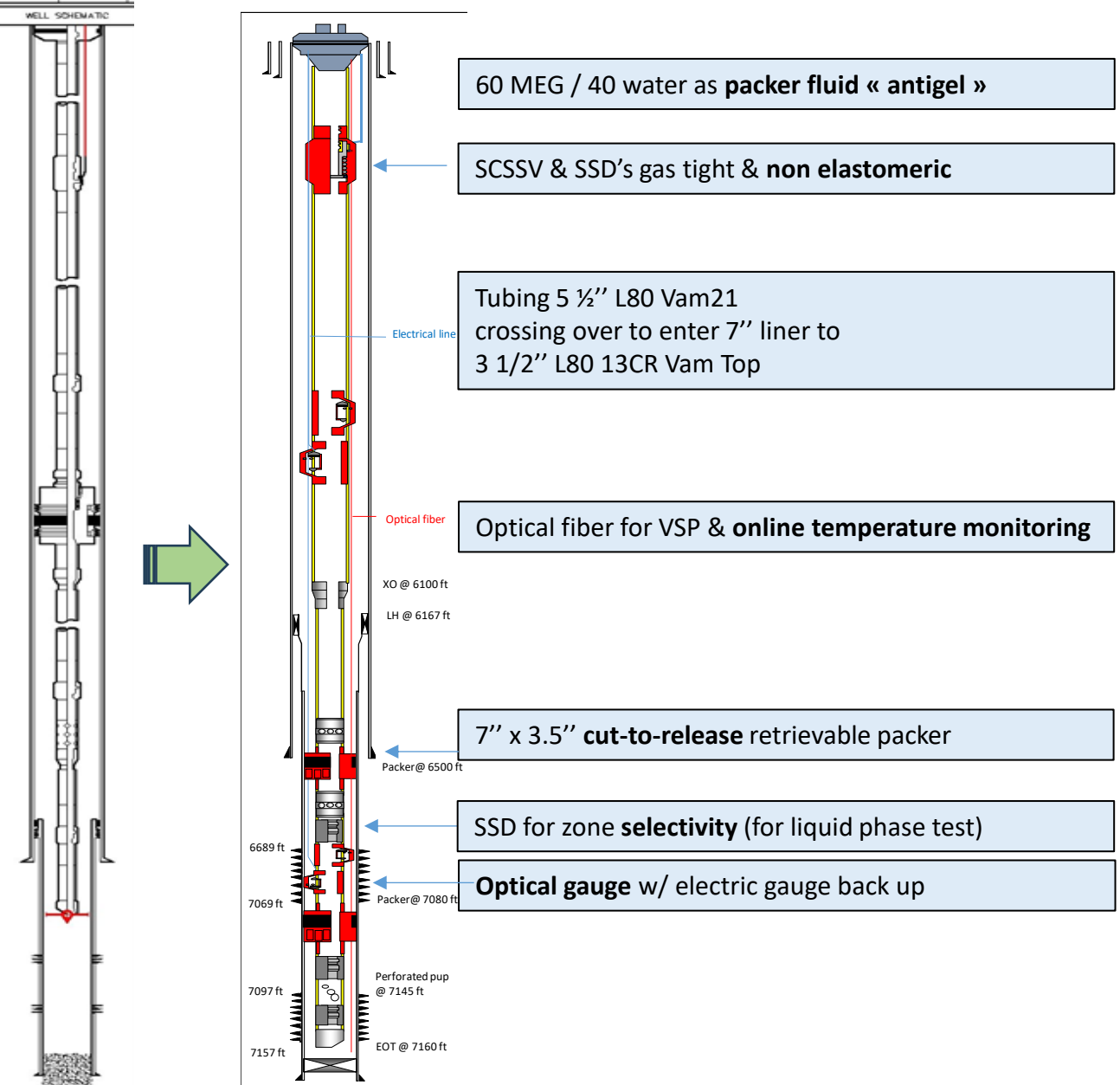
- CO₂ Injectivity & Phase Change Impact
- J-T Cooling Effect
- How Quickly Reservoir Warms?

MMV

- Pressure, Temperature & Rates
- Saturation Changes (RST)
- Well Integrity (DTS/DAS)
- Prove 4D DAS VSP or equivalent technology



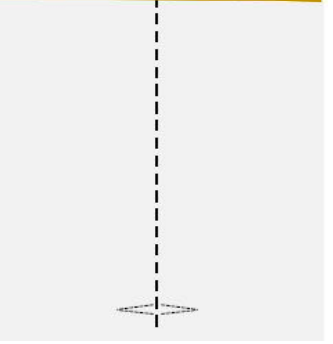
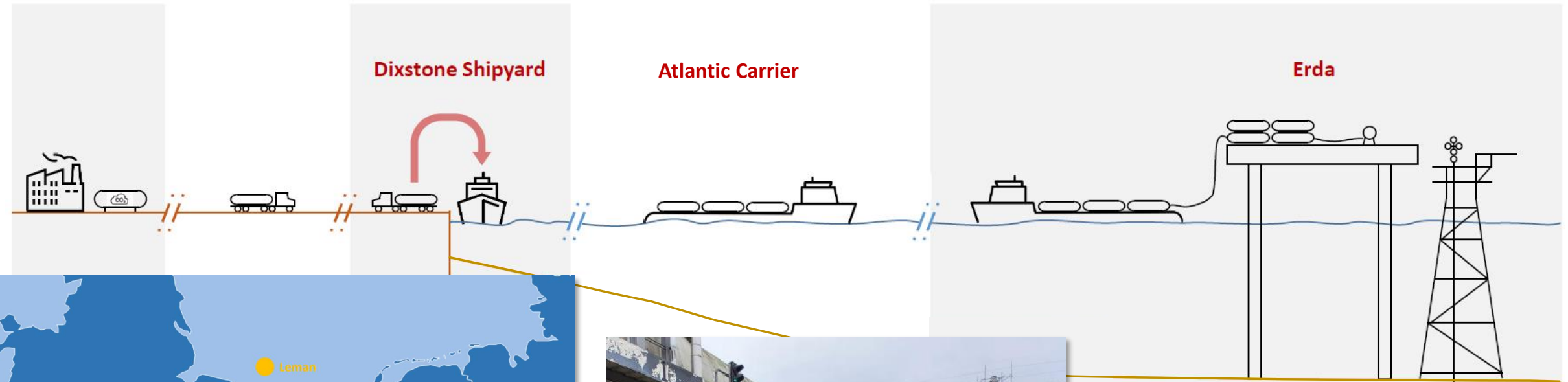
Leman Poseidon Injection Test – Workover ops ongoing



CCS Leman 27H workover (Sept 2024)

Leman Poseidon Injection Test - CO₂ supply logistics

- CO₂ shipping with 1 PSV equipped with 24 20ft Cryogenic ISO Tanks
- 1 batch of 400 tons liquid CO₂ every week (incl. weather downtime)
- 3 months operation, commencing Q4 2024 (13 batches)



Leman Poseidon Injection Test - Offshore setup

Heaters

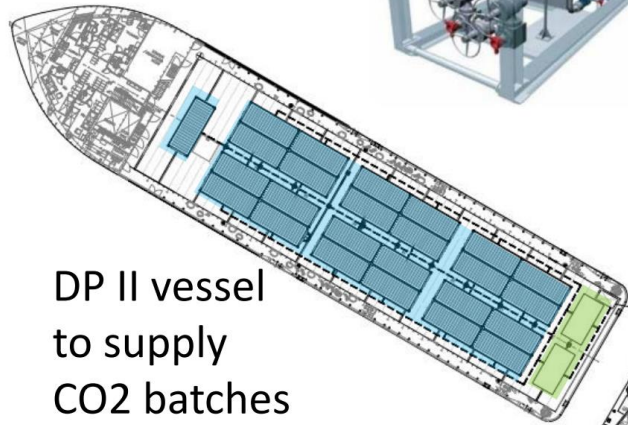


E-line

Pumps

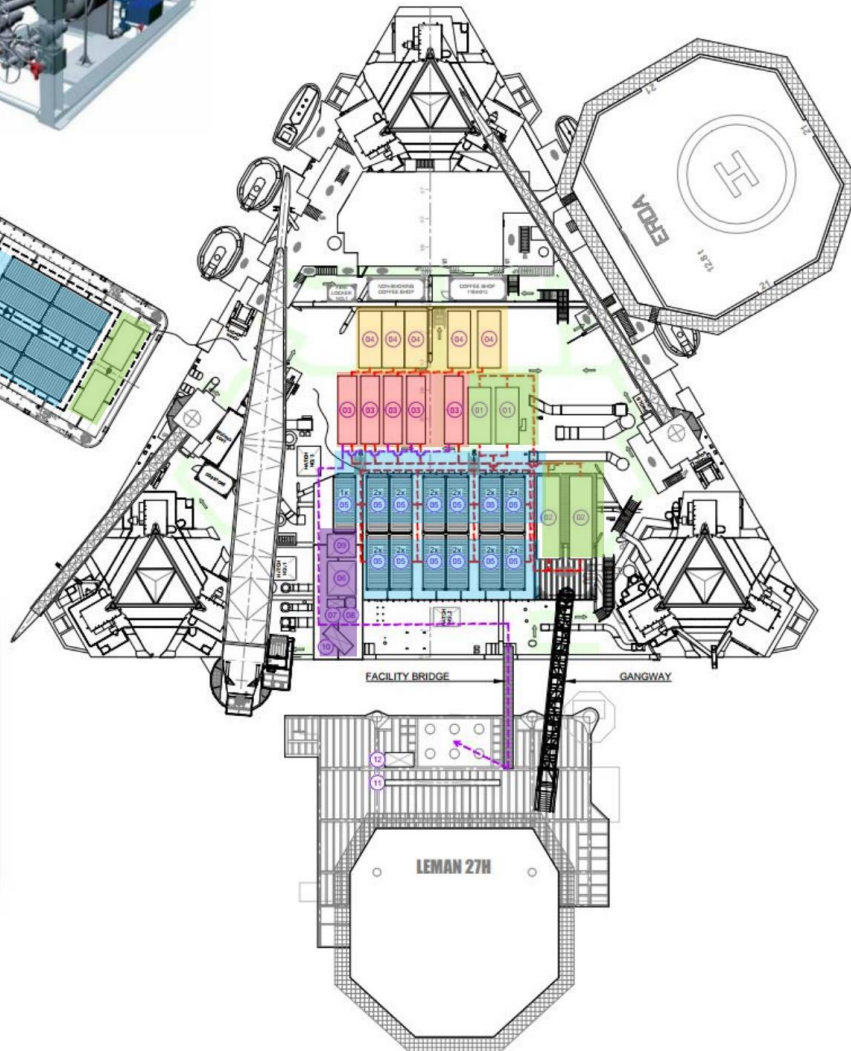


Steam



DP II vessel
to supply
CO2 batches

Cryo tanks



- 3 Months operation starting EOY 2024
- Rig combined operations with Leman platform
- Bridging document : PUK, Rig and Vessel operator
- Vessel tanks operating crew
- ERDA tanks operating crew
- Project members facilitating in HAZID & HAZOP
- Training of crews to handle CO2 tanks and transfer

~400 t_{CO2} per batch & 5-7 days refill time

1a: Calibrate wellbore & dynamic models
1b: "Safe" CO₂ Injectivity → E.g. during well start-up

2a: "Cold" CO₂ Gas Injectivity → 4°C winter sea conditions

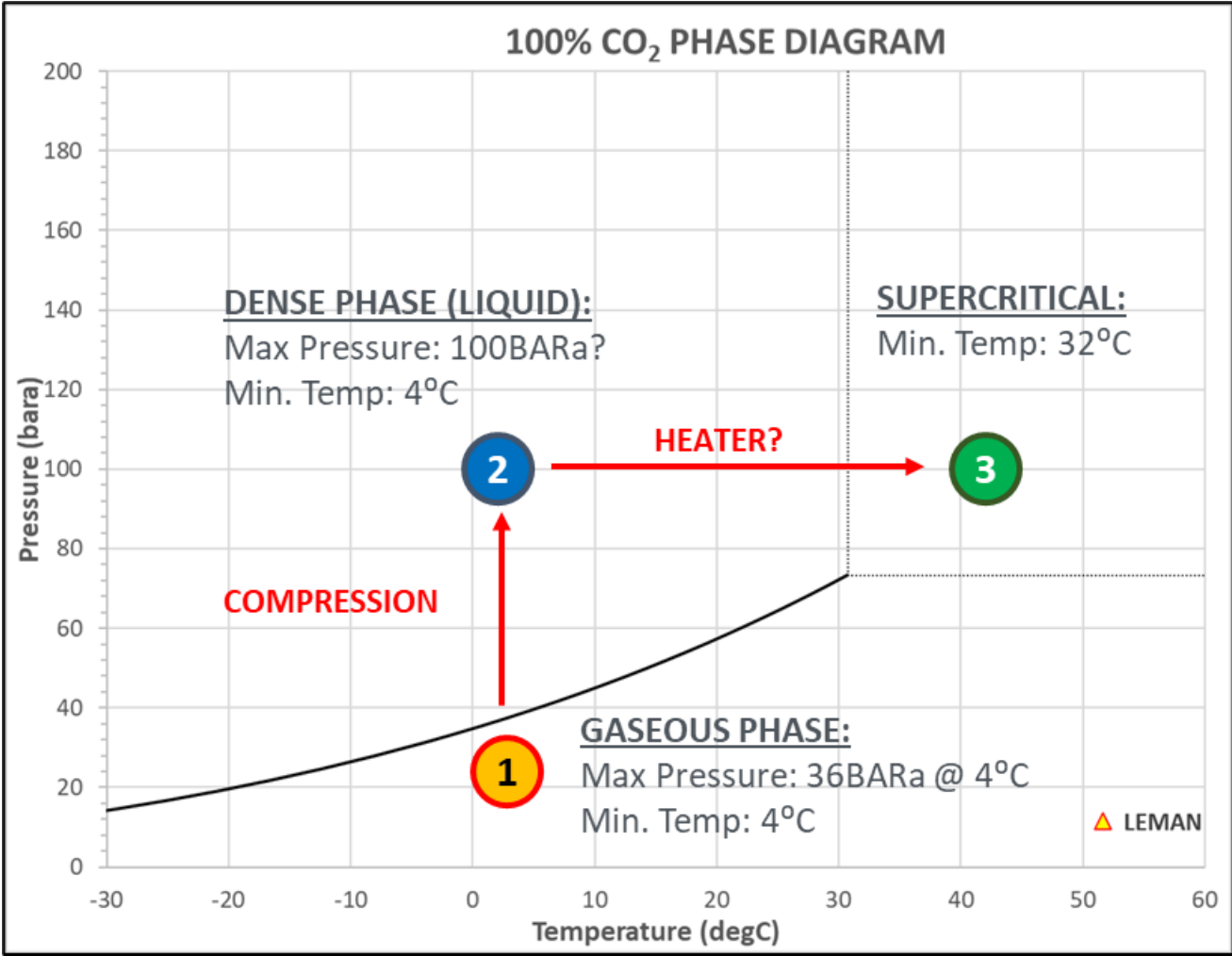
2b: Close SSD → Compare deeper 60 ft interval Gas Injectivity

3: Supercritical CO₂ Injectivity → High Pressure & High Temp

4: Liquid CO₂ Injectivity → High Pressure & Low Temp

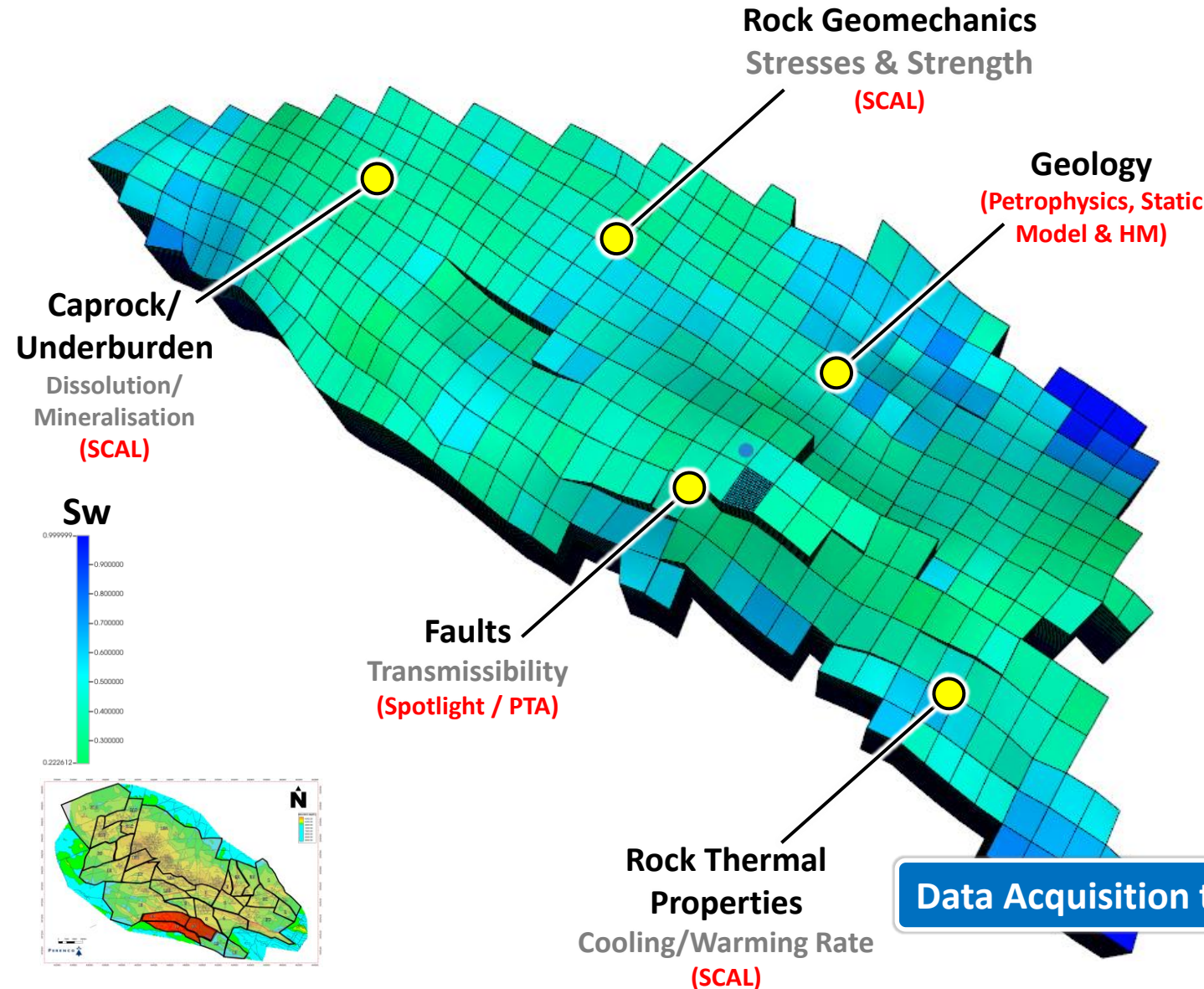
5 – 13: Repeat Liquid injection & assess MMV

Sequence designed to understand future operational envelope for Leman / CCS development

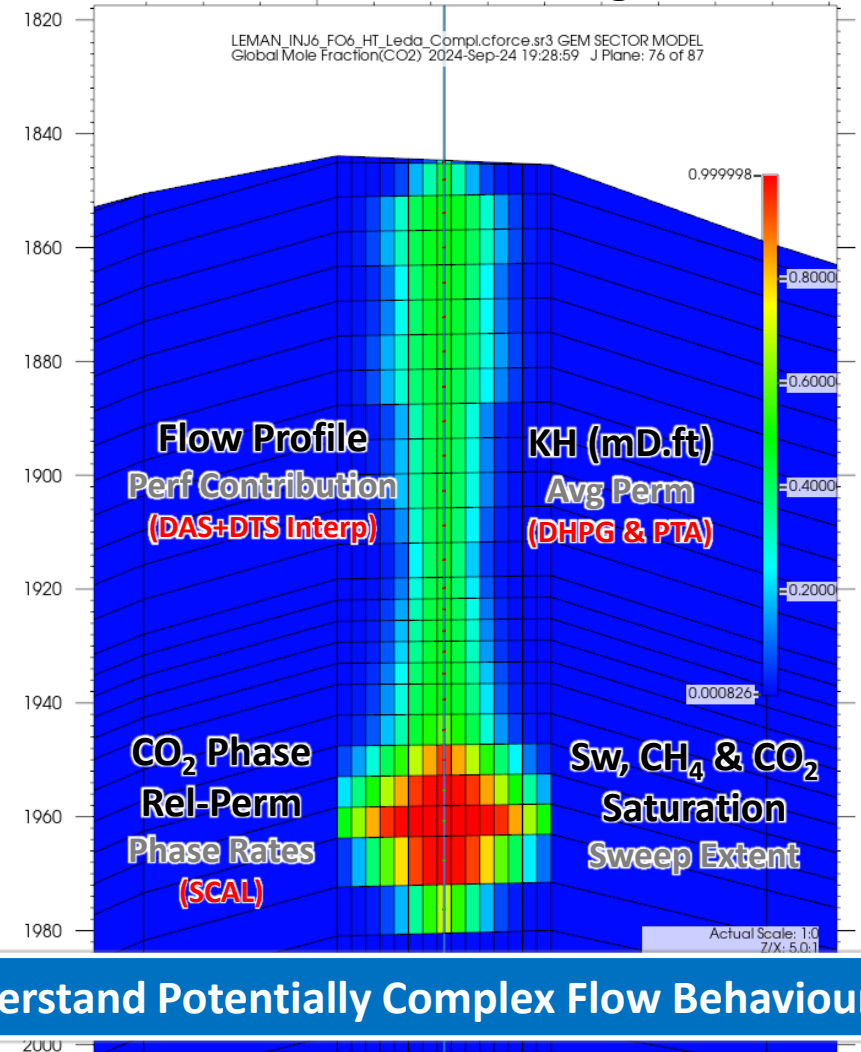


13 CO₂ Batches & 15 injection cycles expected (~5000t)

What are the Model Uncertainties & what can we Measure to Reduce it?

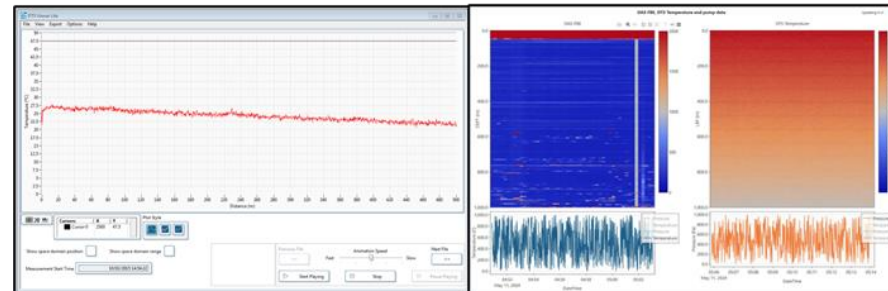
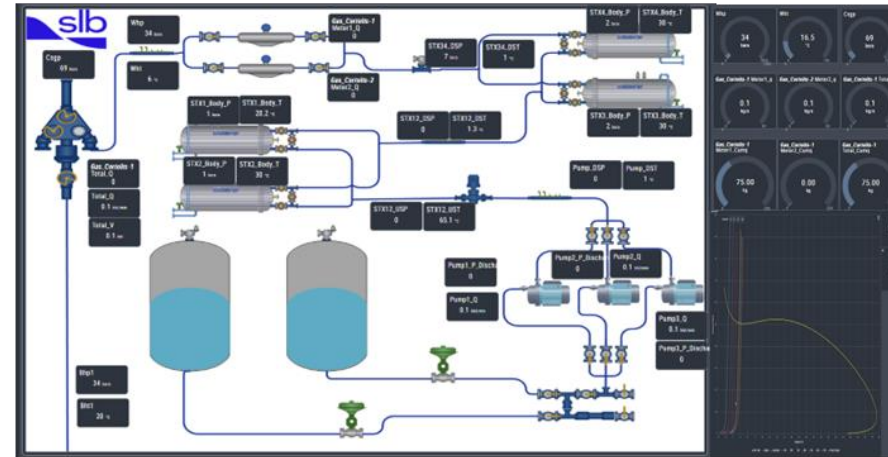
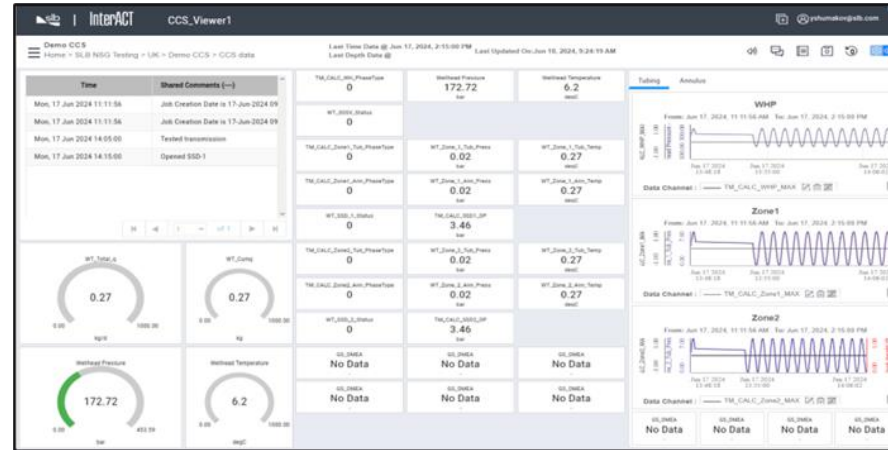
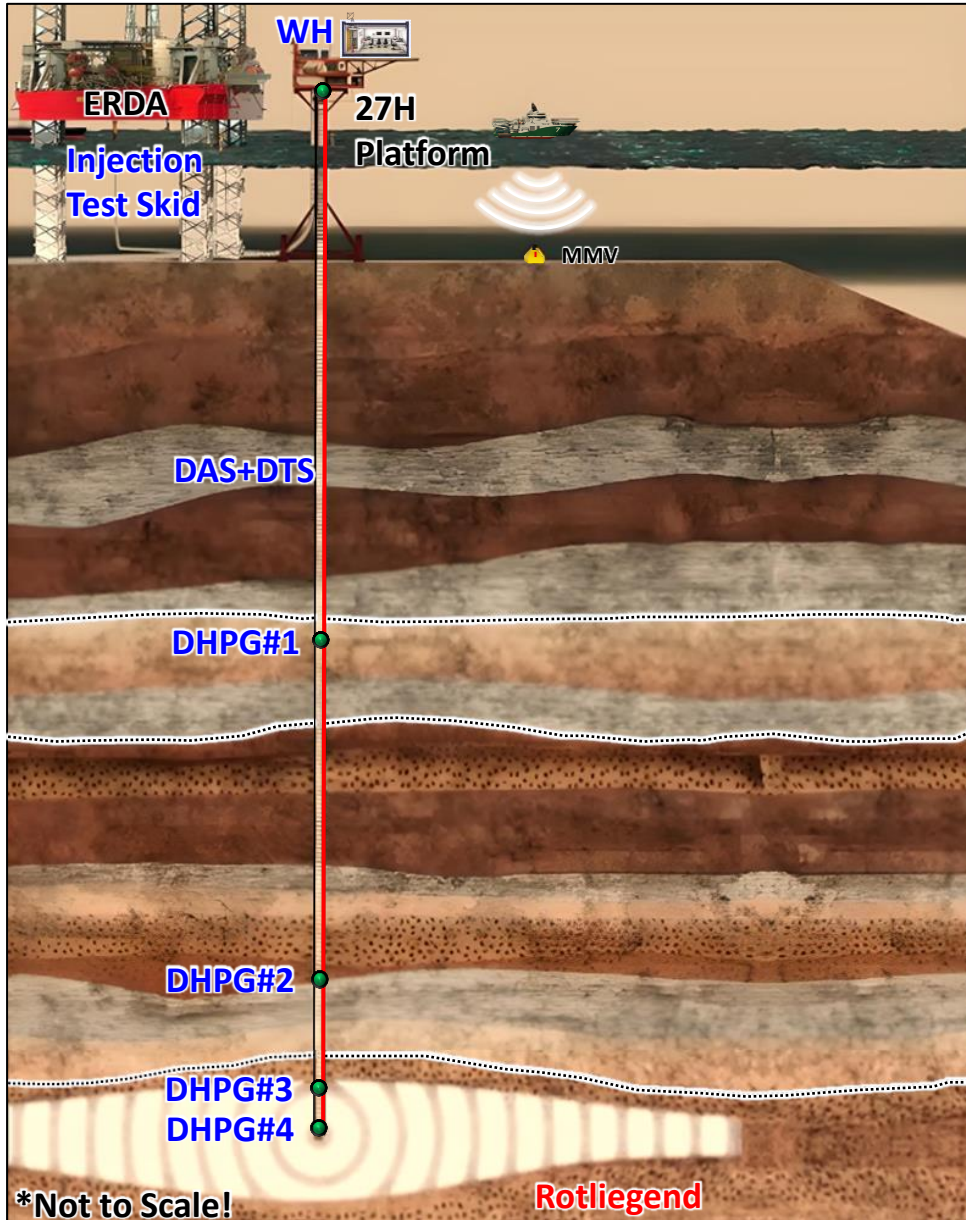


NW-SE X-Section along Well



Data Acquisition to Understand Potentially Complex Flow Behaviour

Leman Poseidon Injection Test – Planned data acquisition



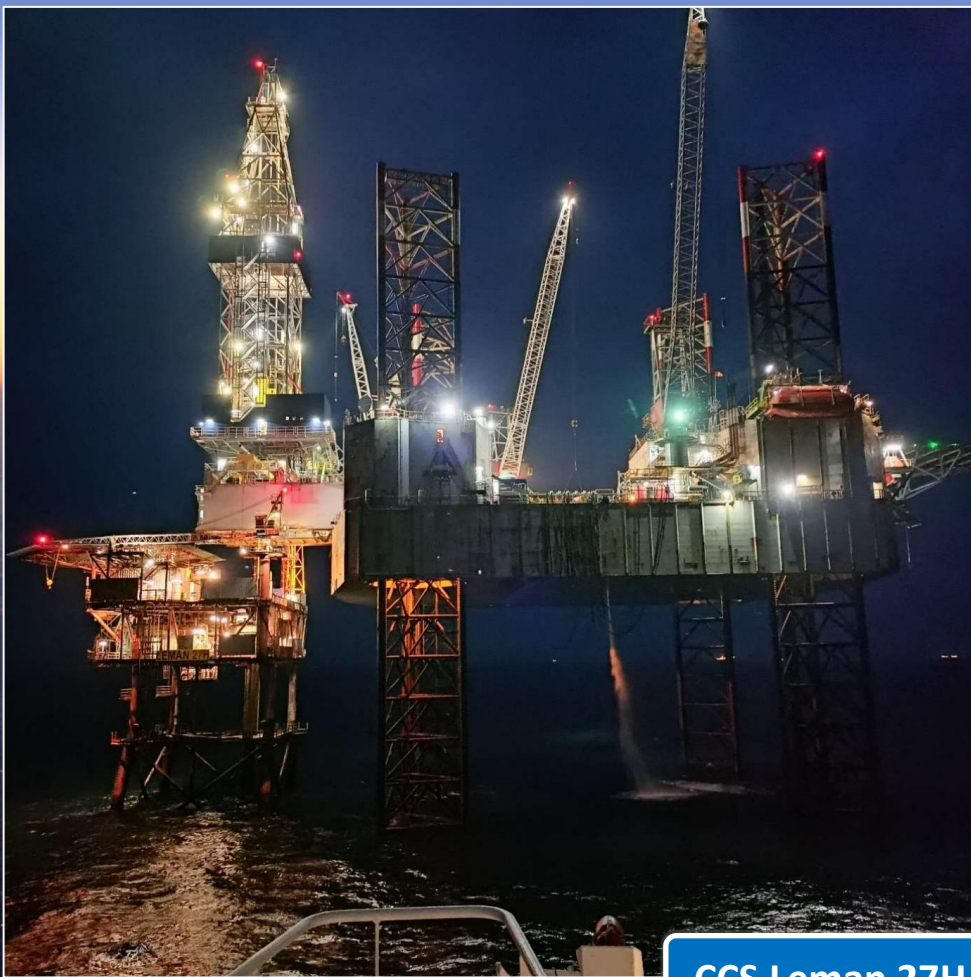
Big dataset planned :
Real-time for test decision-making /
Memory for later analysis & interpretations

P E R E N C O



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Harbour
Energy



CCS Leman 27H workover (Sept 2024)