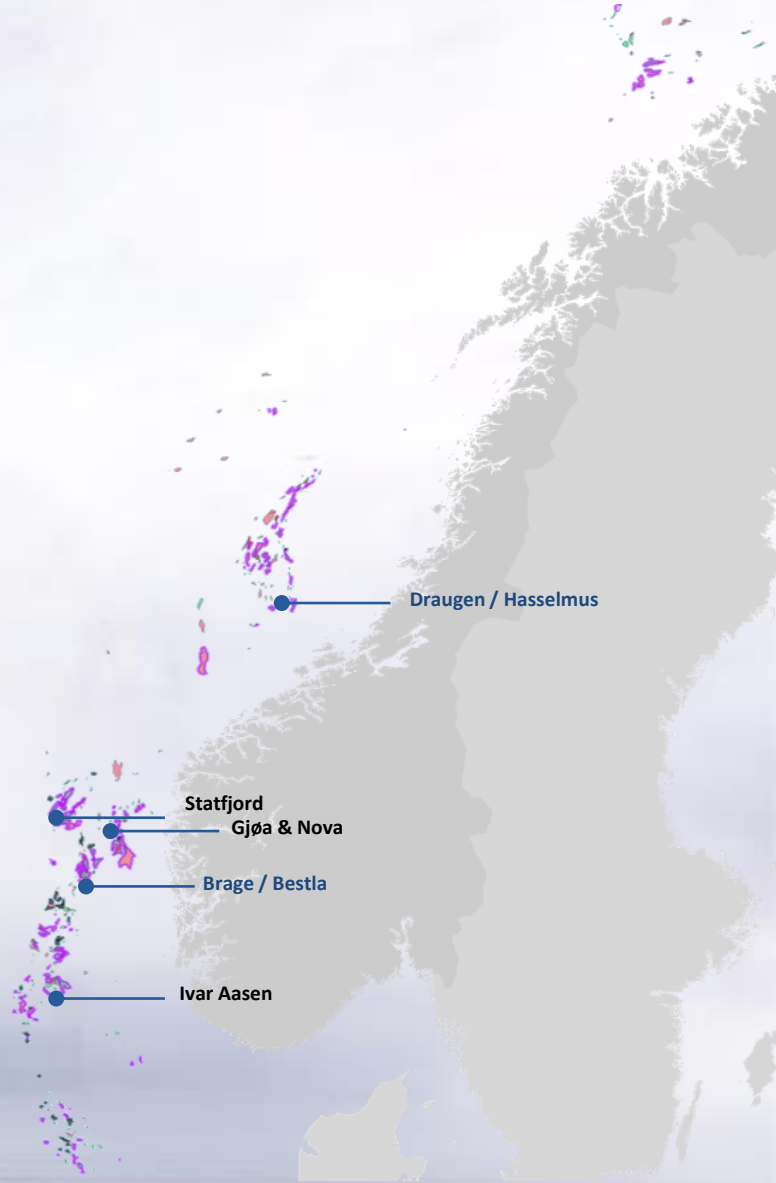
Bore- og brønnfagdag 2025

Trondheim

13.11.2025

OKEA at a glance



Brage : Pushing the boundaries

AGENDA

Tematisk fokus

Dagen vil ha særlig fokus på:

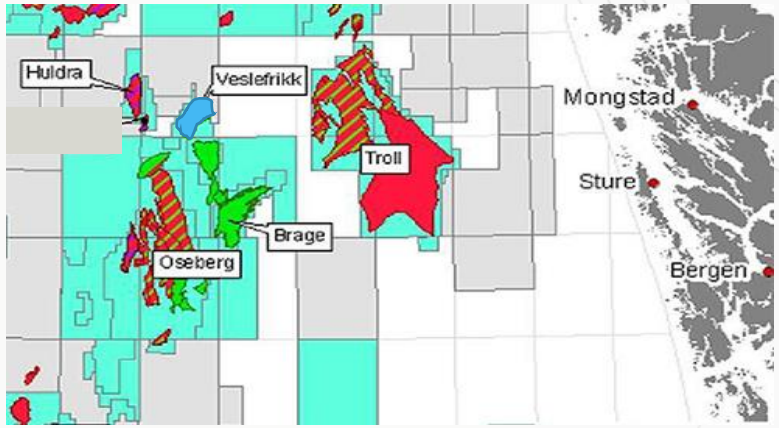
- Brønnkontroll
- Brønnintegritet
- Plugging og forlating (P&A)
- Risikostyring
- Erfaringsdeling

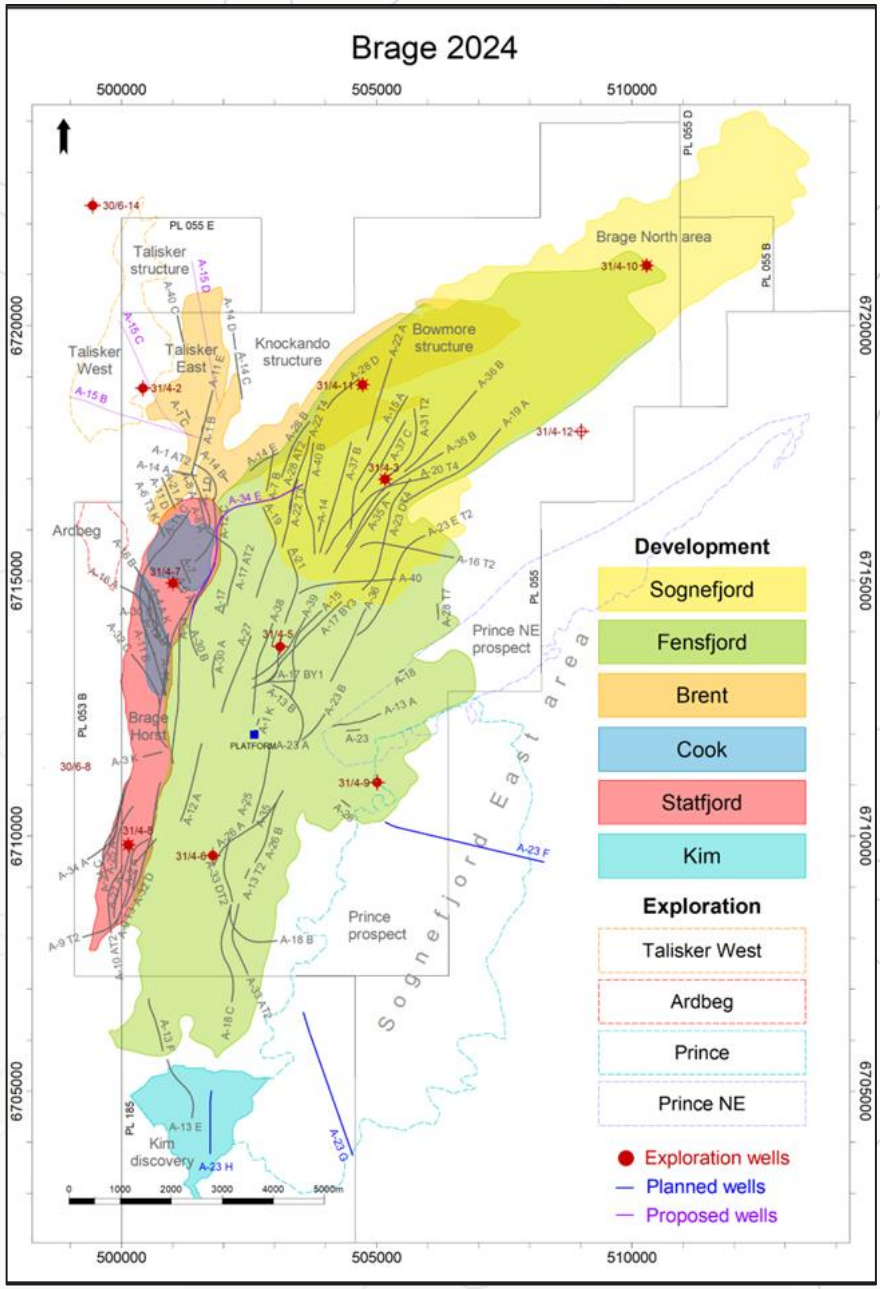
1. The Brage Field
   - Infill & Piloting Strategy
   - Example Wells from Brage
2. Focus areas for Brage future development
3. A-15 B/C/D – Typical Challenges for Brage Operations
   - ERD vs Rig Capacities
   - Anti Collision
   - Uncertainties in Geology (Prognosis vs Observations)
   - Plug & Abandonment of deep reservoirs
4. Experience Transfer
   - Enablers (what has worked for Brage)

Brage Field

Introduction

- Oil and gas production
- Located 120 km West of Bergen
- Owners:
  - OKEA ASA 35.2%
  - Lime Petroleum AS 33.8%
  - DNO Norge AS 14.3%
  - Petrolia NOCO AS 12.3%
  - M Vest Energy AS 4.4%
- The overall strategy for Brage is:
  - maintaining production through **infill drilling**
  - unlocking upside potential through drilling **pilots** to significantly contribute to future production



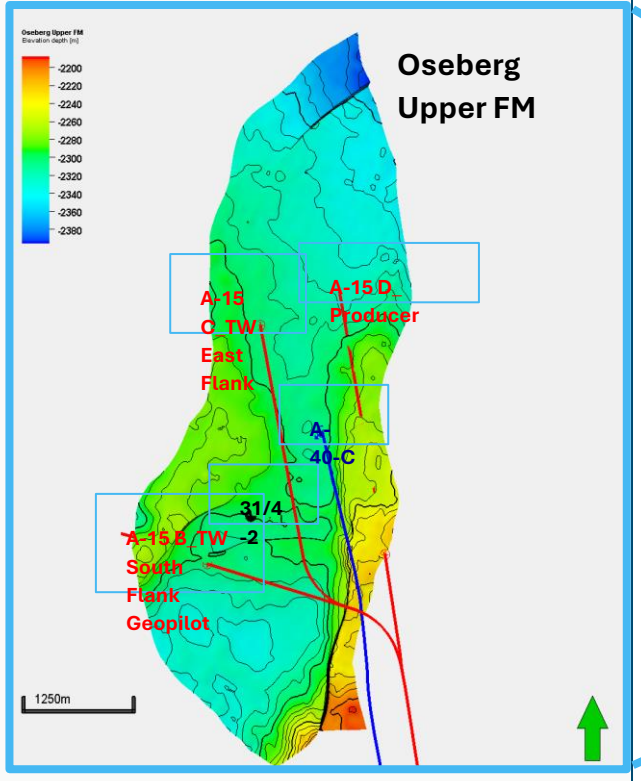


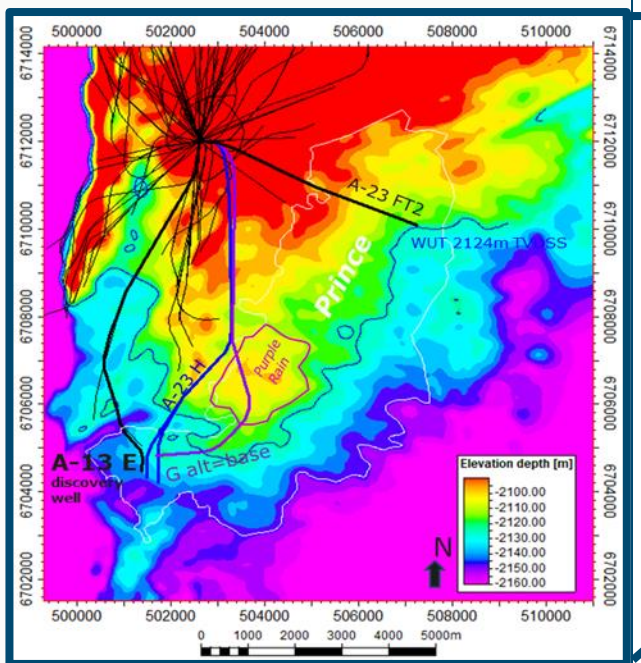
OKEA D&W

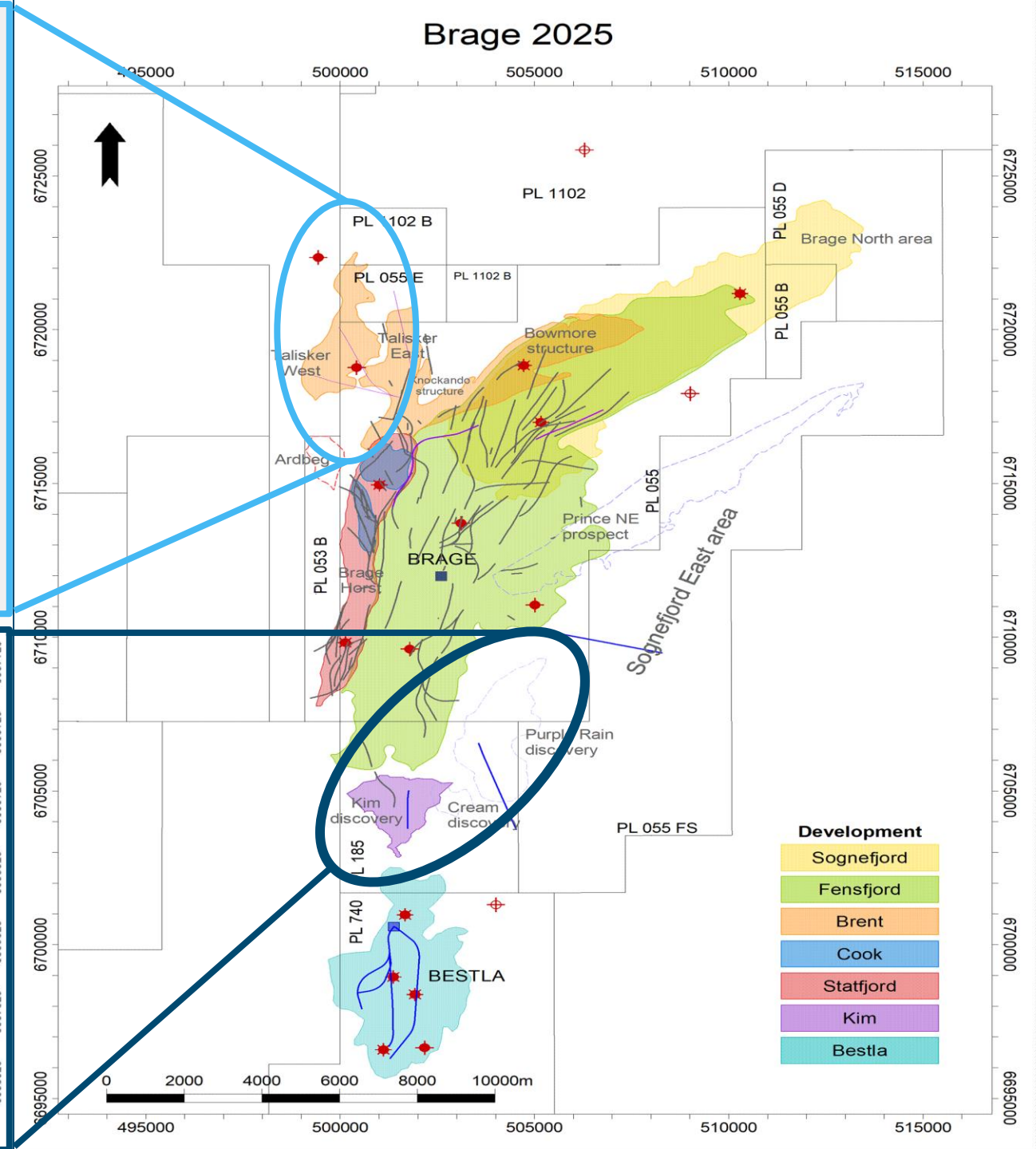
Piloting Strategy

- **Multiple wellbores from same slot**
- **A-23 F/G/H**
  - ✓ Exploration Well (A-23 F)
  - ✓ Appraisal Well (A-23 G)
  - ✓ Production Well (A-23 H)
- **A-15 B/C/D**
  - ✓ Exploration Well (A-15 B)
  - ✓ Appraisal Well (A-15 C)
  - ✓ Production Well (A-15 D)

- **Extended reach drilling operations (ERD)**
  - ✓ 2 important areas for future development
  - ✓ Talisker area
  - ✓ Sognefjord East area







Extended Reach Drilling

Focus area for future Brage development

OKEA D&W

Brage Operations

- **NCS Experience**
  - Brage is on the top 20 longest wells

The 10 longest wells on the NCS

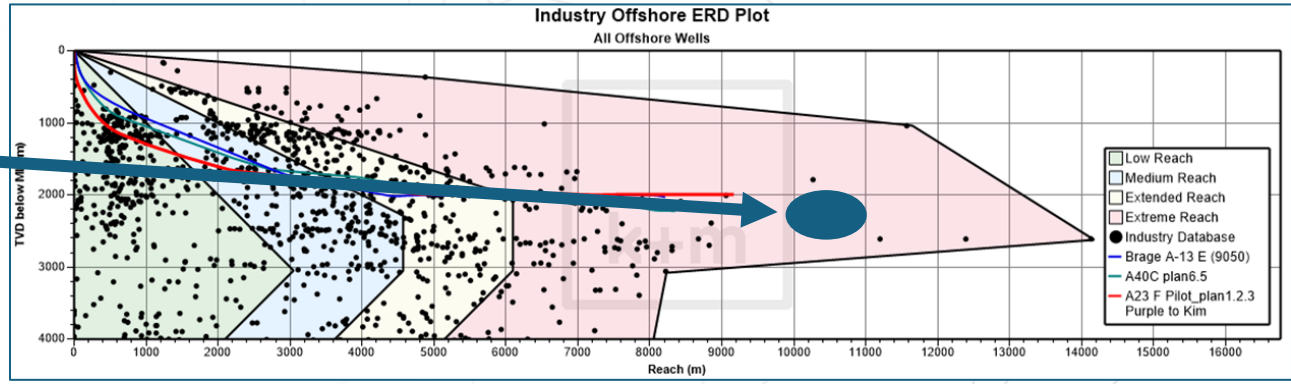
Including platform, semi and jackup.

Updated: 150925

Source: sodir.no

Rank	Well	Operator	Field	Year	mMD	Drilling facility
1	31/2-A-15C	OKEA ASA	BRAGE	2025	10895	BRAGE
2	25/1-14 C	Aker BP ASA	FRIGG	2025	10666	DEEPSEA STAVANGER
3	25/1-14 A	Aker BP ASA	FRIGG	2025	10410	DEEPSEA STAVANGER
4	31/2-A-15B	OKEA ASA	BRAGE	2025	10223	BRAGE
5	31/2-D-6 BY3H	Equinor Energy AS	TROLL	2023	10200	TRANSOCEAN ENDURANCE
6	31/3-S-23 CY3H	Equinor Energy AS	TROLL	2021	10042	TRANSOCEAN ENDURANCE
7	25/1-14 D	Aker BP ASA	FRIGG	2025	10065	DEEPSEA STAVANGER
8	31/4-A-23 G	OKEA ASA	BRAGE	2025	10023	BRAGE
9	31/2-P-14 DY2H	Equinor Energy AS	TROLL	2022	10014	TRANSOCEAN EQUINOX
10	30/9-B-47	Equinor Energy AS	OSEBERG	2004	10007	OSEBERG B

- **Industry experience**
  - Brage is working in the «Extreme Reach» category (with good margine)



OKEA D&W

Brage Operations – The Challenge

The 10 longest wells on the NCS

Including platform, semi and jackup.

Updated: 150925

Source: sodir.no

Rank	Well	Operator	Field	Year	mMD	Drilling facility
1	31/2-A-15C	OKEA ASA	BRAGE	2025	10895	BRAGE
2	25/1-14 C	Aker BP ASA	FRIGG	2025	10666	DEEPSEA STAVANGER
3	25/1-14 A	Aker BP ASA	FRIGG	2025	10410	DEEPSEA STAVANGER
4	31/2-A-15B	OKEA ASA	BRAGE	2025	10223	BRAGE
5	31/2-D-6 BY3H	Equinor Energy AS	TROLL	2023	10200	TRANSOCEAN ENDURANCE
6	31/3-S-23 CY3H	Equinor Energy AS	TROLL	2021	10042	TRANSOCEAN ENDURANCE
7	25/1-14 D	Aker BP ASA	FRIGG	2025	10065	DEEPSEA STAVANGER
8	31/4-A-23 G	OKEA ASA	BRAGE	2025	10023	BRAGE
9	31/2-P-14 DY2H	Equinor Energy AS	TROLL	2022	10014	TRANSOCEAN EQUINOX
10	30/9-B-47	Equinor Energy AS	OSEBERG	2004	10007	OSEBERG B

- **Mud Storage:** Brage has about **30% of modern semisub's capacity** on the tank top and around **7% of the capacity in the storage tanks** — meaning logistics are much more demanding, especially when it comes to displacement operations (OBM to Brine).
  This also presents a greater challenge in terms of well control (losses).

- Pump capacity: **Capacity and Pressure are among our major limitations** — something that's not really a concern on a modern semi.

- **Drilling torque:** when we are operating around 72 kNm, we are right at the limit for hole cleaning at 120 rpm. At that point, we are likely to be running thin on pressure, so increasing the pump rate is unlikely. Modern semisub, on the other hand, can comfortably run 150 rpm at a max of 92 kNm.

- **Max pull:** we are at **about 70% of a modern semisub** capability.

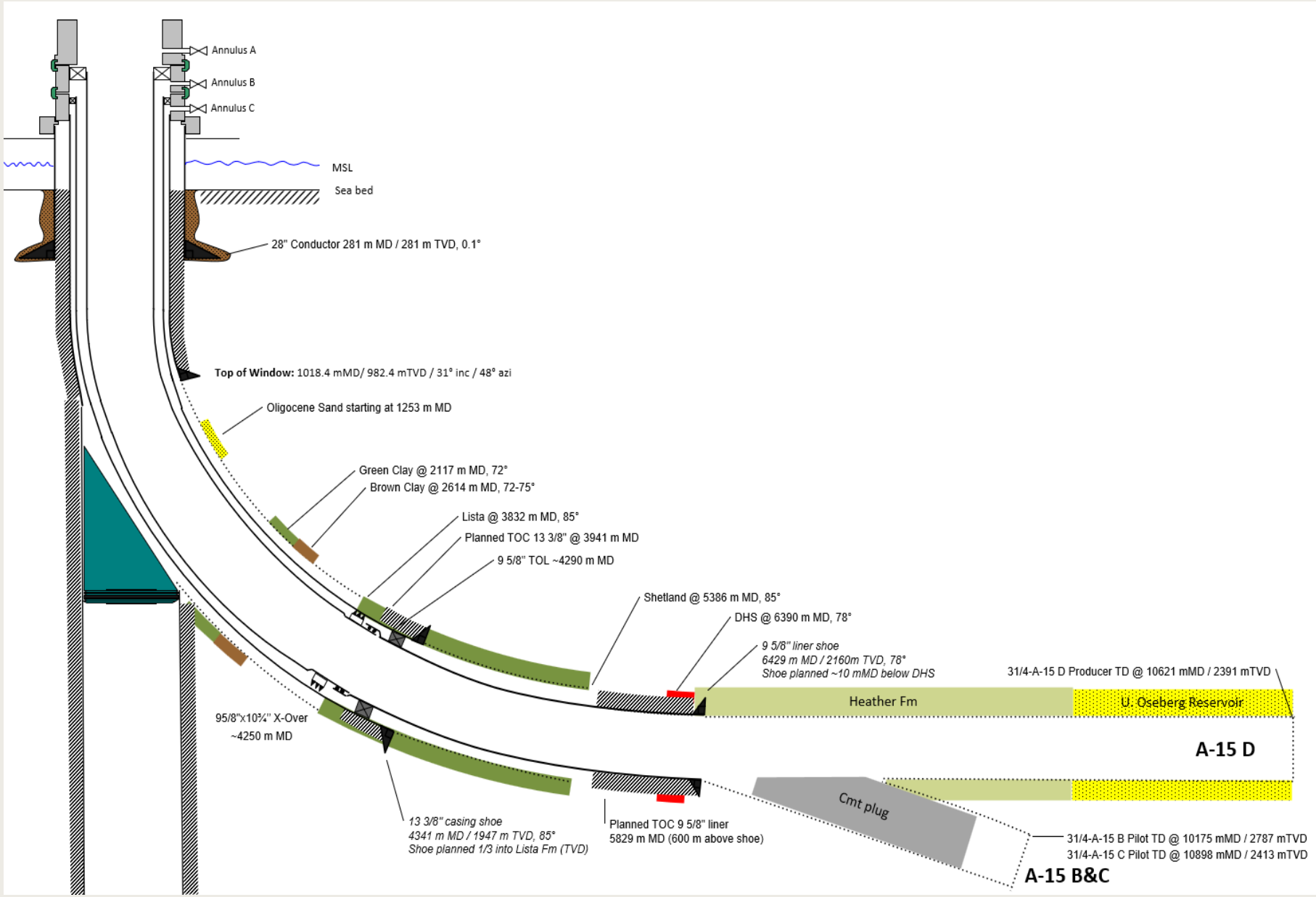
- **Tubulars Handling:** to drill a well like A-15C down to 10,895 meters, we would need to **pick up and lay down at least 4400 meters of drill pipe** — modern semisub can have this in the derrick.
  The DRK capacity will also impact the open hole exposure time.

A-15 B/C/D

Typical Challenges to Brage Operations

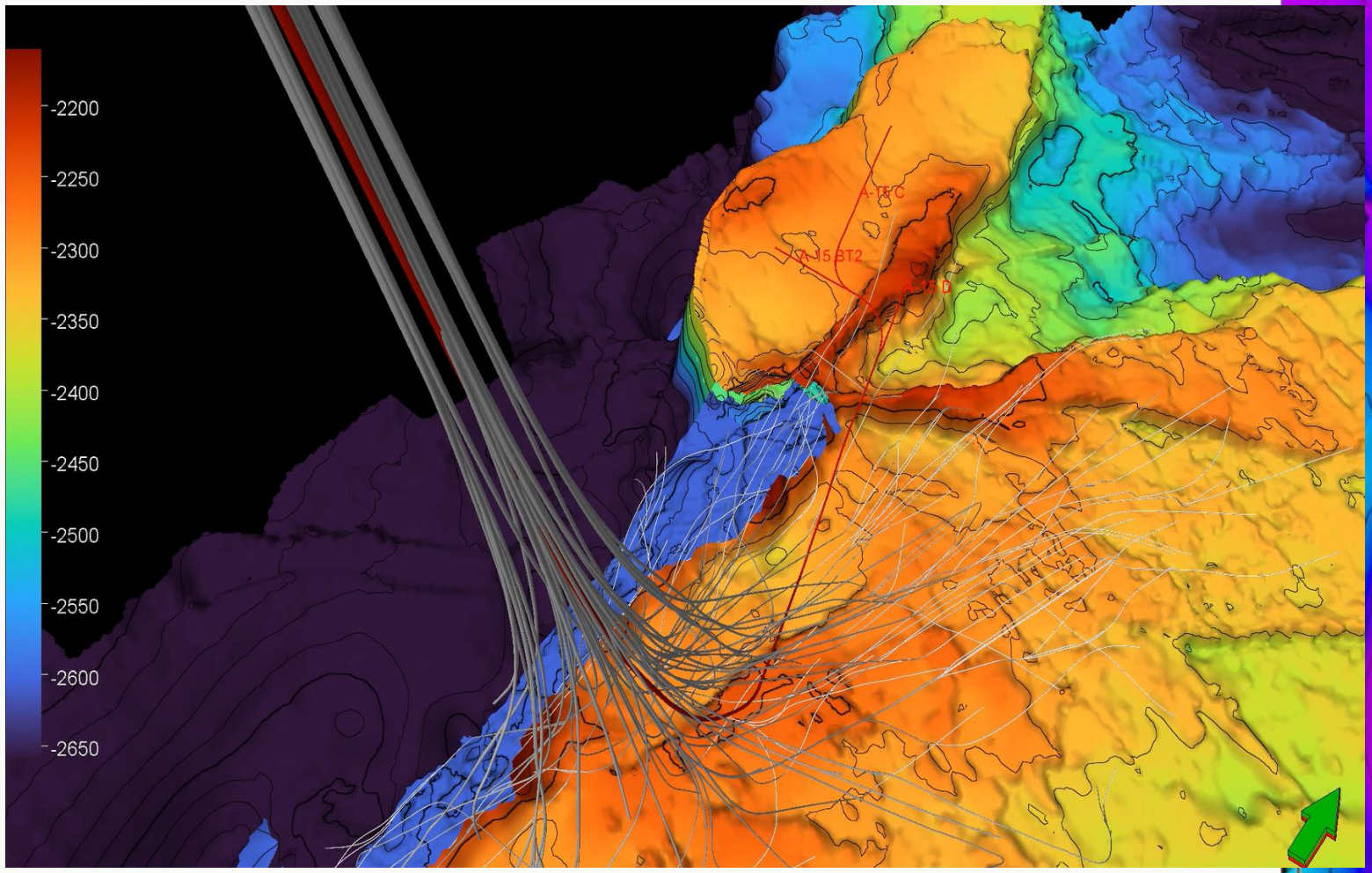
Brage A-15 B/C/D

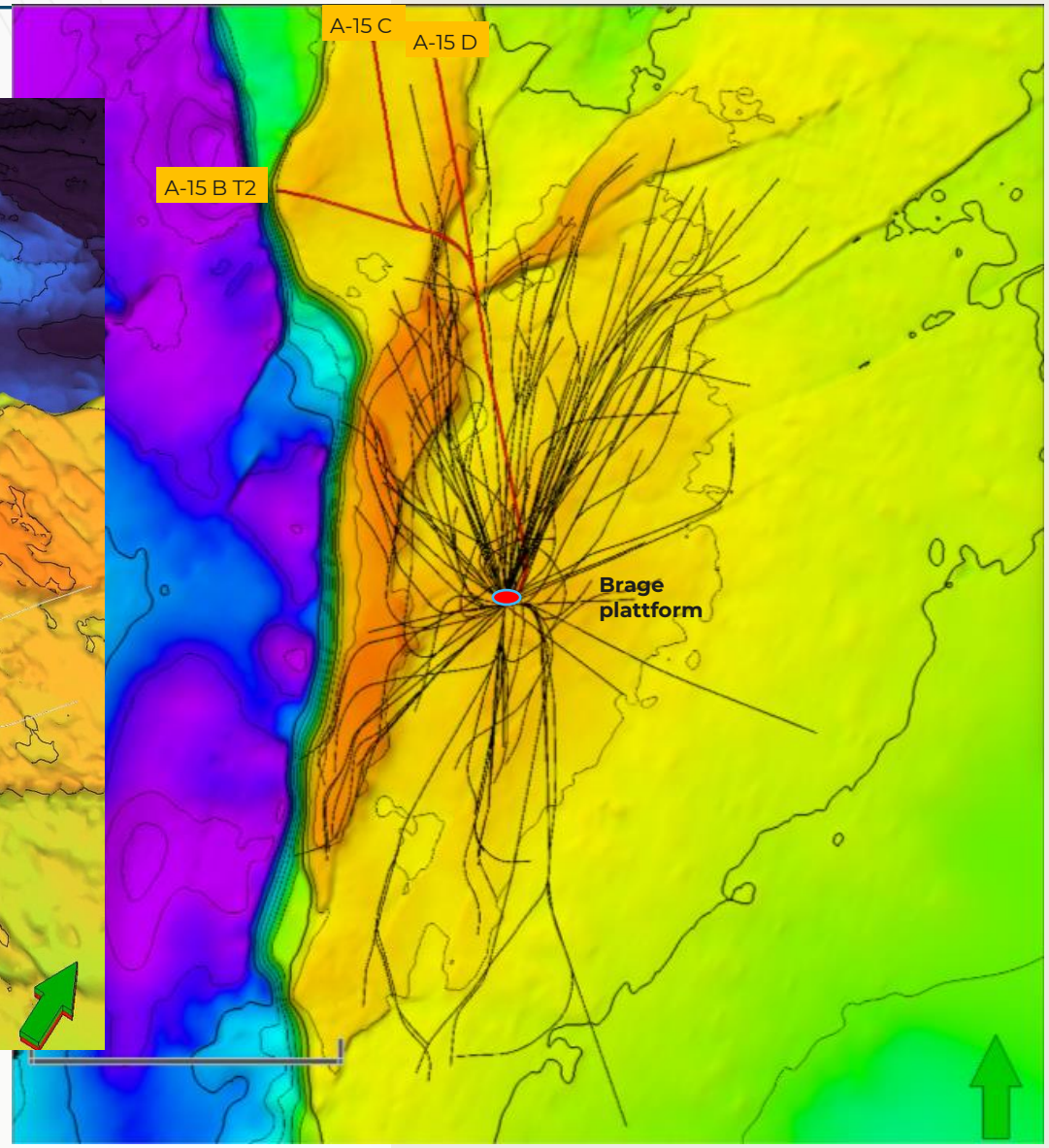
Highlights



Anticollision and interference challenges

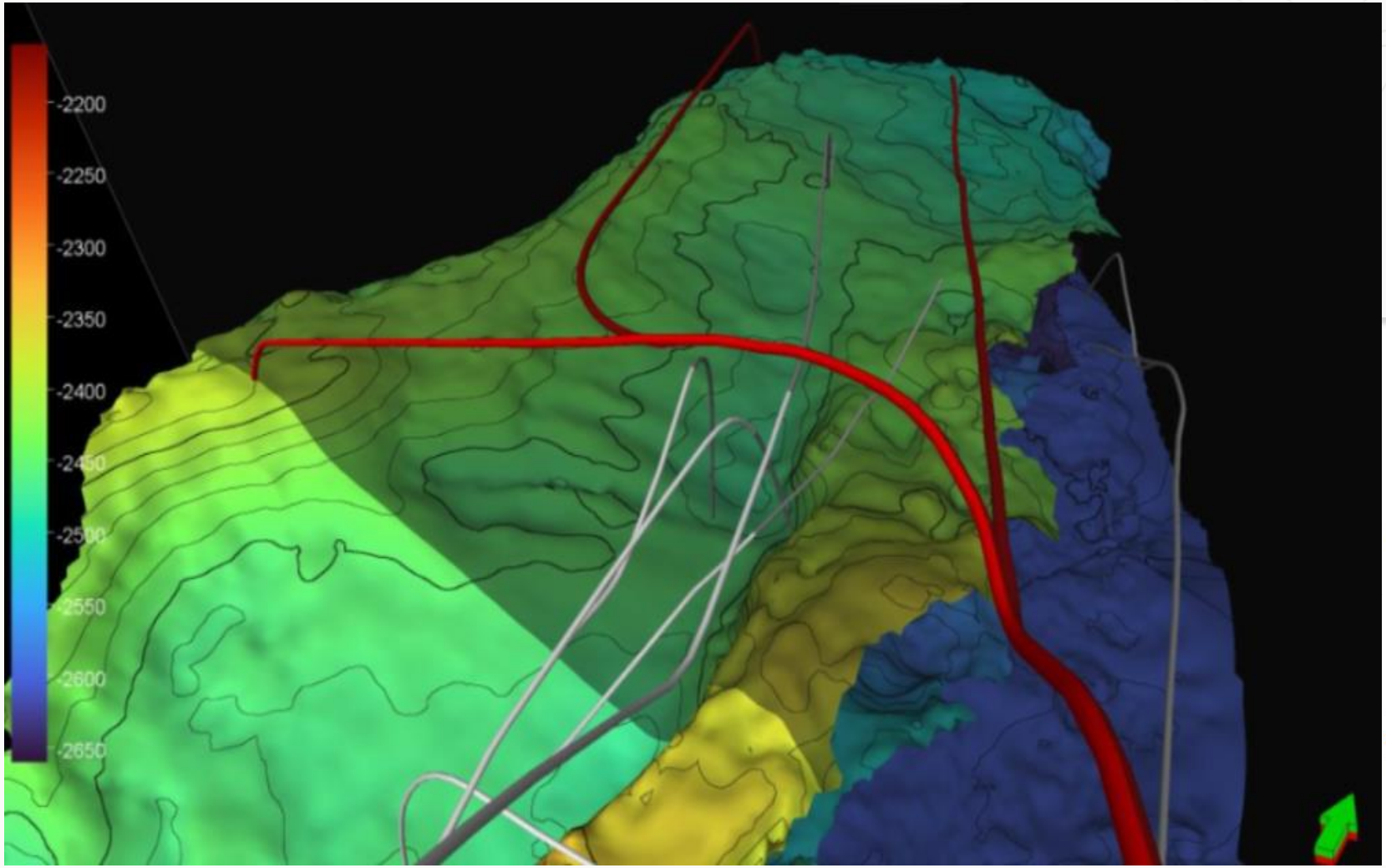
A-15 B/C/D Specific

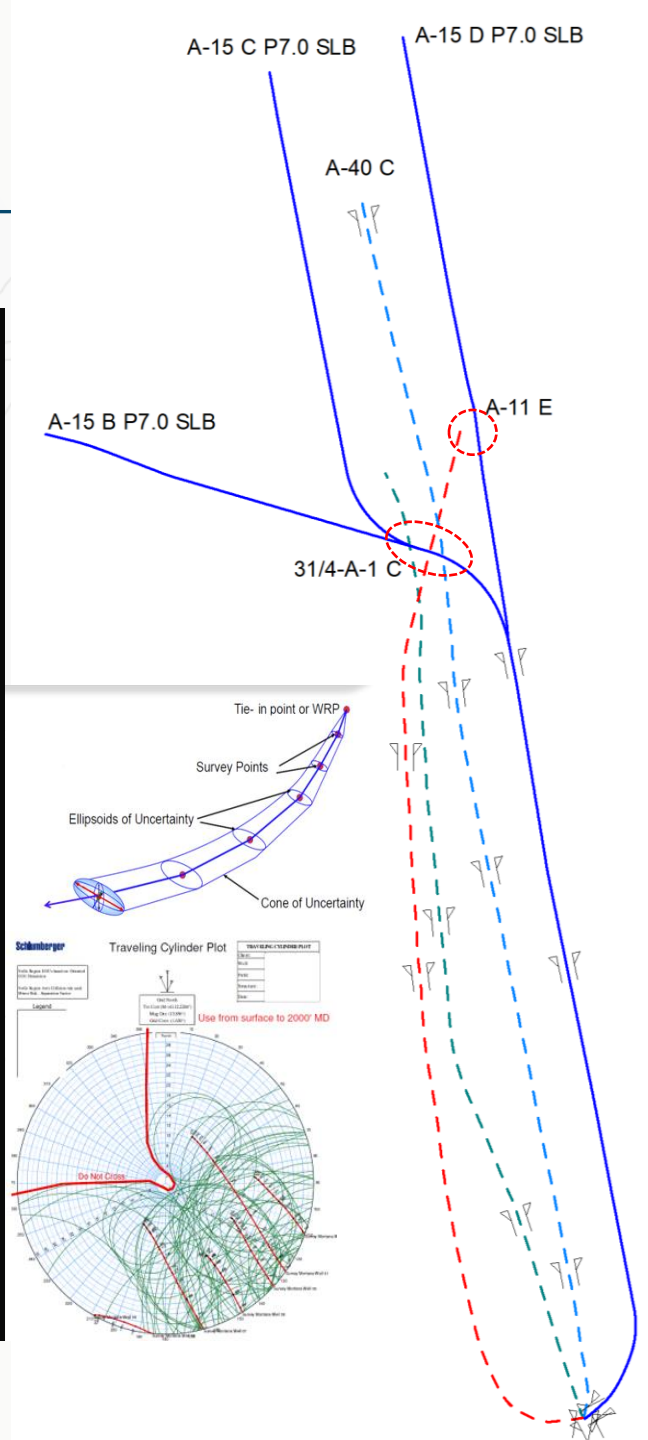




Anticollision and interference challenges

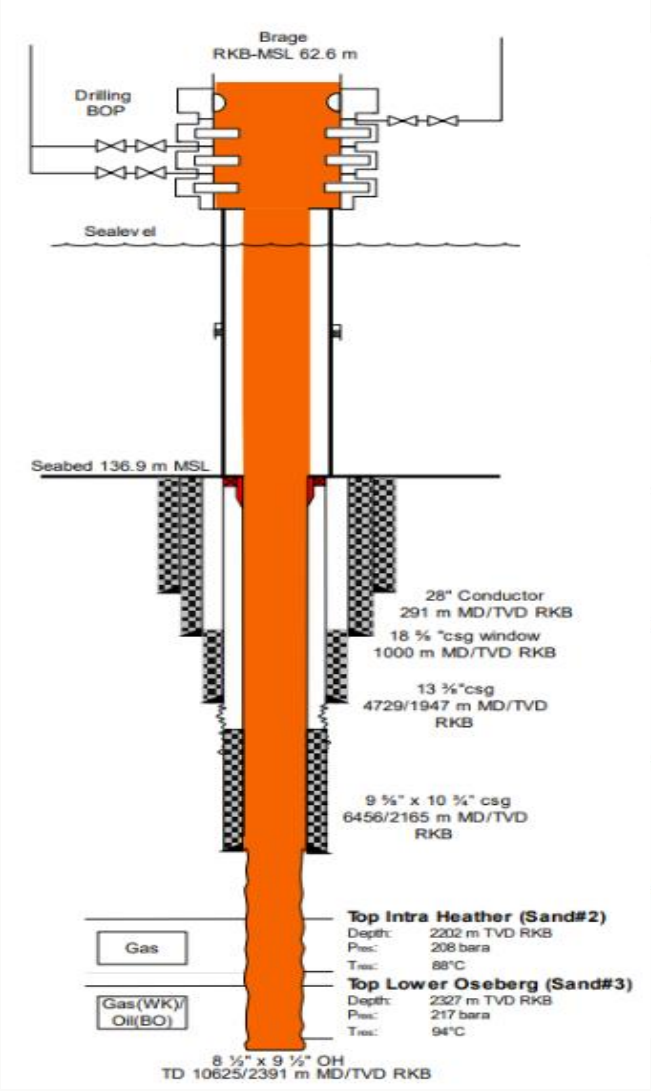
A-15 B/C/D Specific

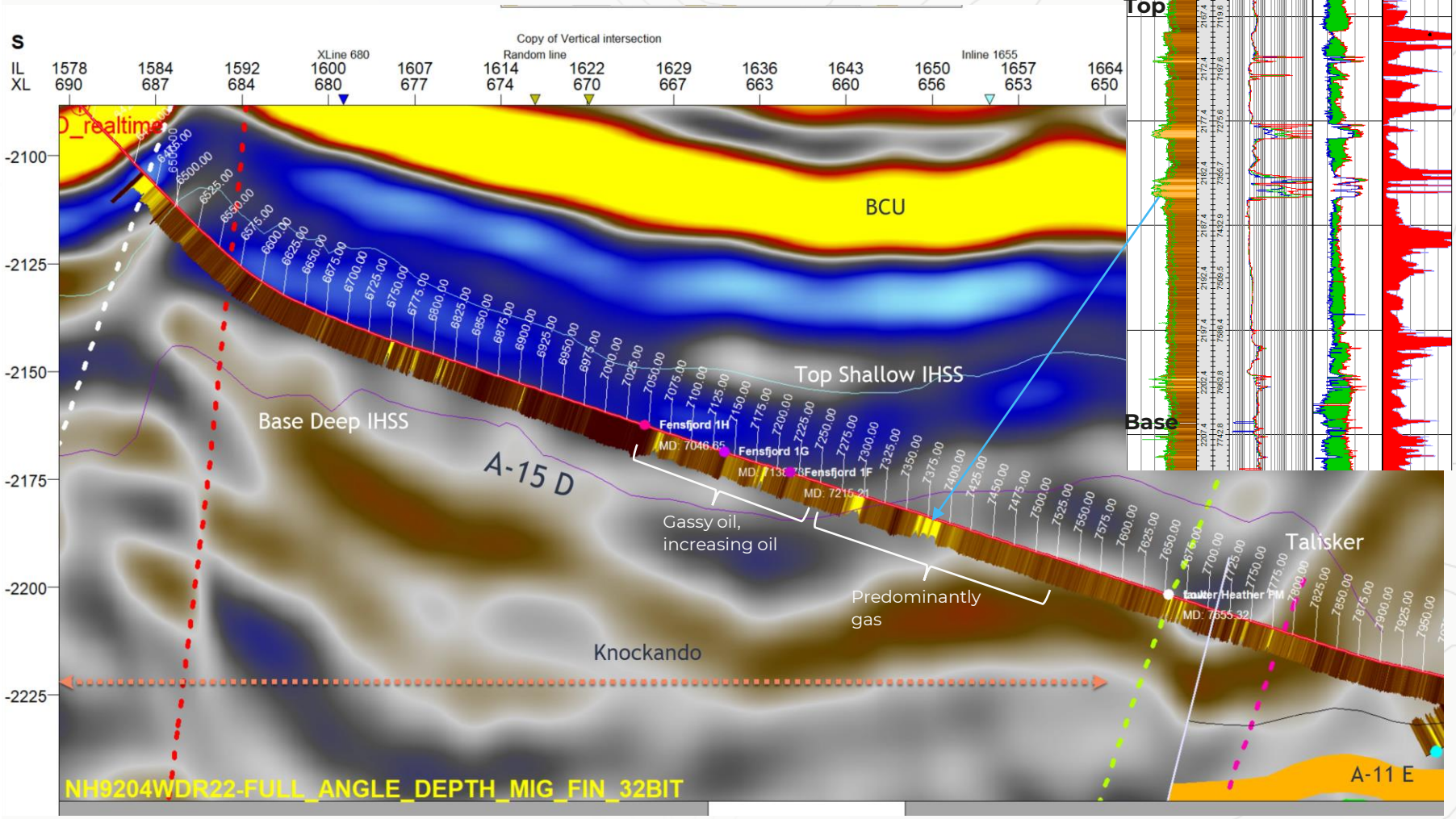




A-15 D Blowout and kill

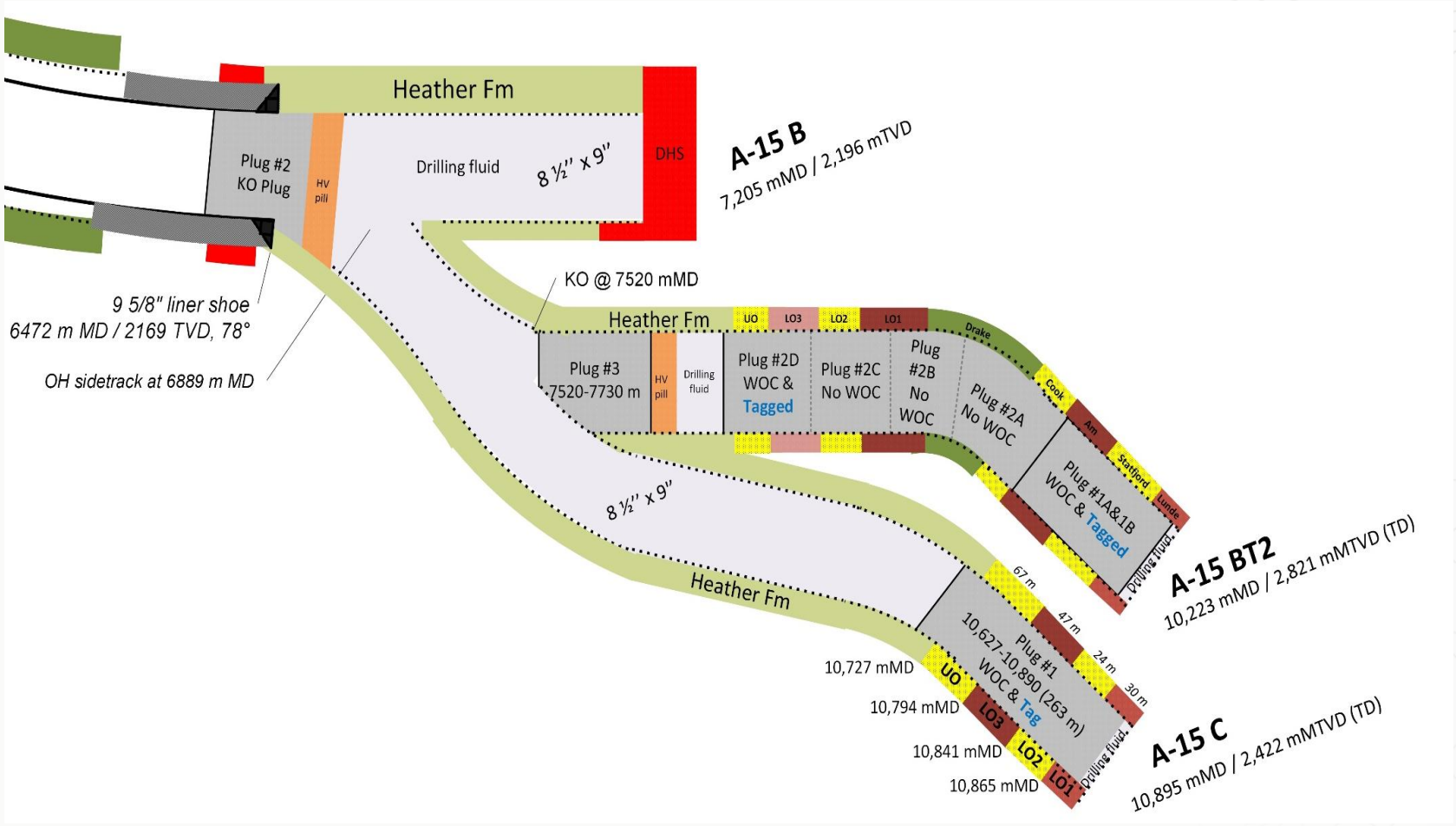
Live update – risk assess





Plug and abandonment

Plugging back A-15 B / BT2 and A-15 C – deepest P&A on NCS?



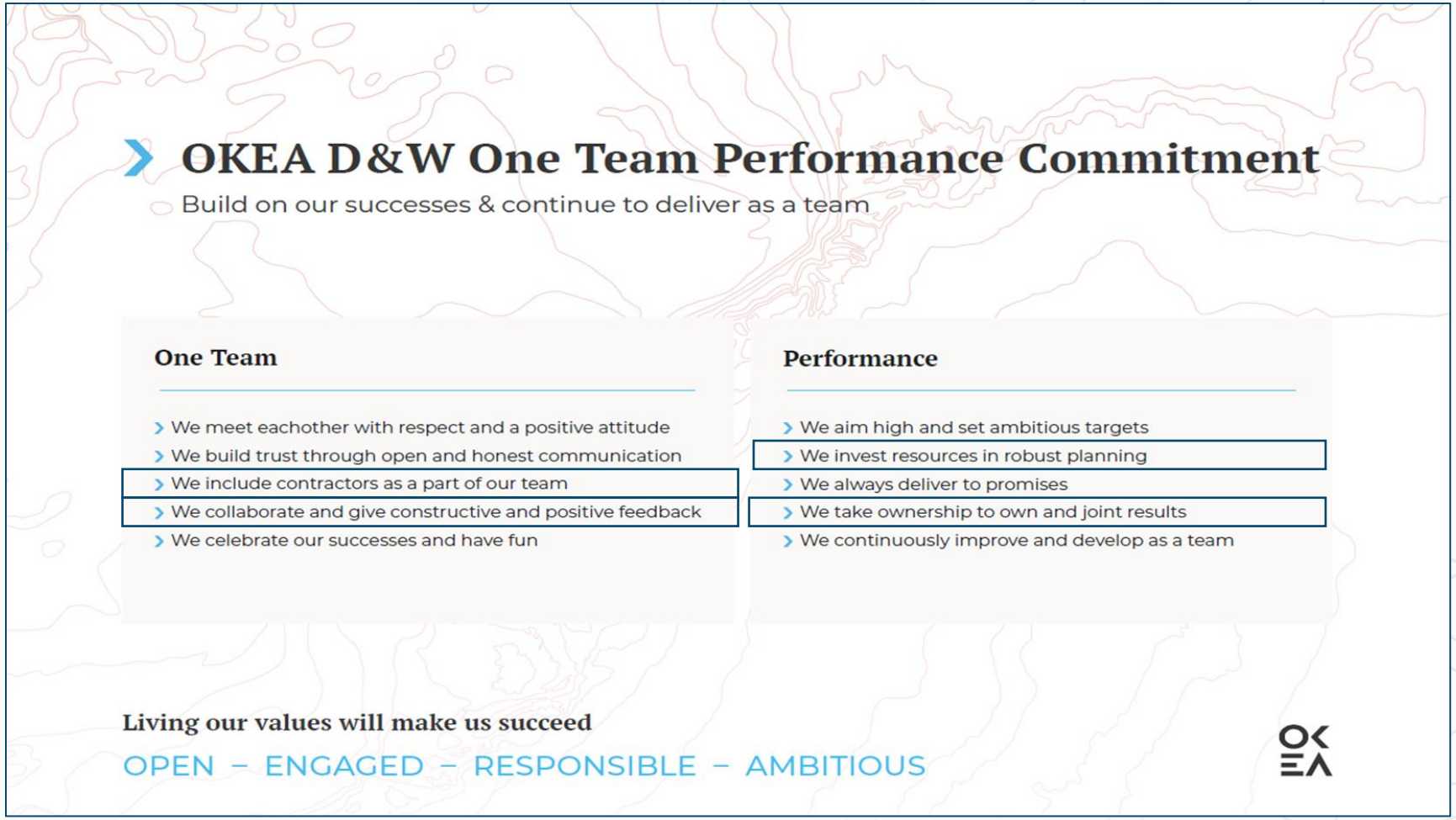
Experience Transfer

What has worked for Brage

Experience Transfer – What has worked for Brage

Enablers - Organisational

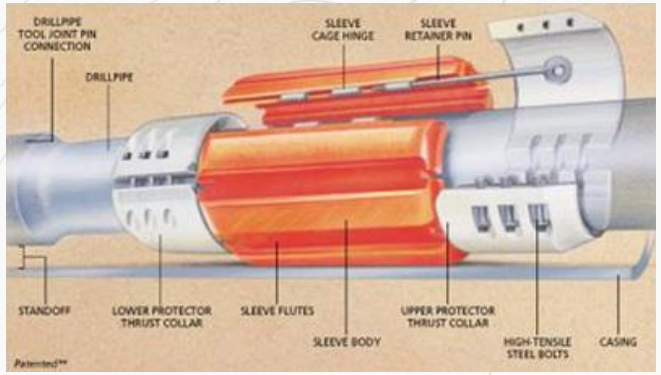
- OKEA as company: Not limited to what we have done before when it comes to well planning and drilling
  - ✓ Use and trust in results from Well Planning and execute operations while monitoring actual limitations
  - ✓ Use 3rd party ERD simulation tools and specialists actively (K&M)
- OKEA one team
  - ✓ Building on close cooperation with service providers
  - ✓ Same team for the last 3-4 years. Follow operation closely (OKEA internally and service providers)
- Driving Brage with known limits
  - ✓ Same team Planning and Executing the wells

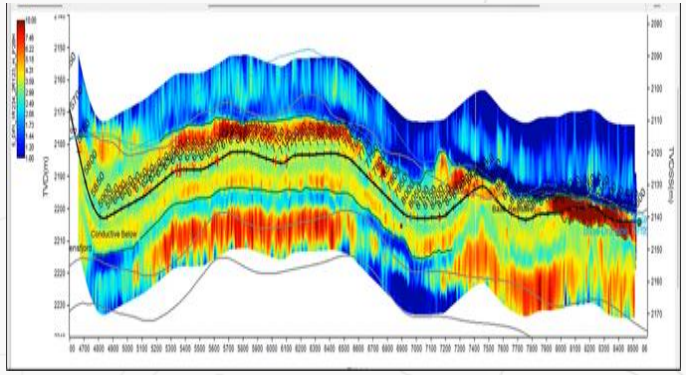


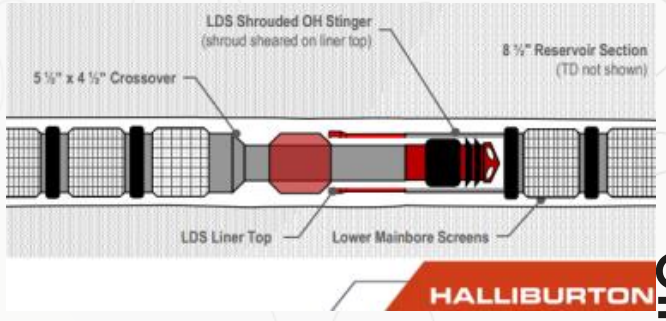
Experience Transfer – What has worked for Brage

Enablers - Technical

- SLB Rheguard Prime OBM
  - Flat rheology - improves ECD/pump pressure, TnD, wellbore stability and mitigates sag
  - New Lube 1017 OB was available during drilling in case additional friction reduction was needed (added to active system prior lower completion run)
- Drill pipe with non-rotating protectors (NRP) from WWT/TFS on Drillpipe
  - Lower drilling torque (DP with NRPs used last ~3500 m towards TD and kept rotation torque constant / prevented torque increase)
- SLB Stream (AI empowered telemetry) Comb. w/ TruLink
  - Stream™ high-speed intelligent telemetry enabled ROP up to 50 m/hr
  - Enabled reliable and high-resolution Geosphere HD data transfer while geosteering
- SLB OptiDrill: Real-time drilling intelligence service monitoring BHA and drilling parameters
- Thermo cutters enabled single bit runs reservoir sections.
- FlairFlex real-time formation evaluation and reservoir characterization supported geosteering.
- SLB DOT Stinger – Enables cement placement, tagging, and dressing in one run – P&A of pilots
- Coretrax HyPR ByPass – opportunity to clear debris from the well and mitigate a potential stuck pipe scenario, however, should the string become stuck is also provides a secondary circulating path.
- Rotation swivels for liners and lower completion
  - Enabling overcoming friction in the wellbore by rotating the landing string
- Halliburton Liner deployment system (LDS)
  - Enable to run lower completion string in two or more sections
- VAM TallyVision – Ready to Run OCTG / Digital Tally
  - Faster to Lay out and Tally OCTG, Improved working environment on deck (Reduced S.O.W on Pipe Deck)
- SLB K&M ERA simulation software
  - The increase in Brage's drilling range/envelope was planned with ERA as OKEAs main TnD simulation software.







Experience Transfer – What has worked for Brage

Enablers - Operational

- Technical Limitations
  - ✓ Plan wells within the known limitations (have some margins)
  - ✓ Seek ways of limiting exposure/strain to equipment
    - NRDPP to reduce Torque
    - 2 Top Drives alternating between operation and overhaul
    - Drill string design, Limit flow, Limit ROP
    - Optimize well trajectory planning to minimize Torque & Drag
- Operational Limitations
  - ✓ Take time to maintain equipment in between sections
  - ✓ Reduce ROP as required
  - ✓ Evaluate time exposure and effect vs ability to drill sections to TD
- Logistical Limitations
  - ✓ Accept that operation need to adhere to limitations in capacities
    - Seek to reduce DP handling by re-use between sections and operational phases (e.g. Drilling – Completion)
    - Take onboard casing in batches to have a safe deck logistics and operation. Stop in shoe and re-fill / tally next batch
    - Allow time to handle DP logistics in a safe way. Split batches as required and plan deck logistics for safe working conditions
    - Perform wellbore clean out and displacement to completion fluid in 2 steps to have volume control

Creating value where others divest

www.okea.no