

Bore- og riggkonferansen
Clarion Hotel Air – Sola
26. – 27. oktober 2021

THOR LØVOLL, DIRECTOR D&W

NEPTUNE ENERGY NORGE

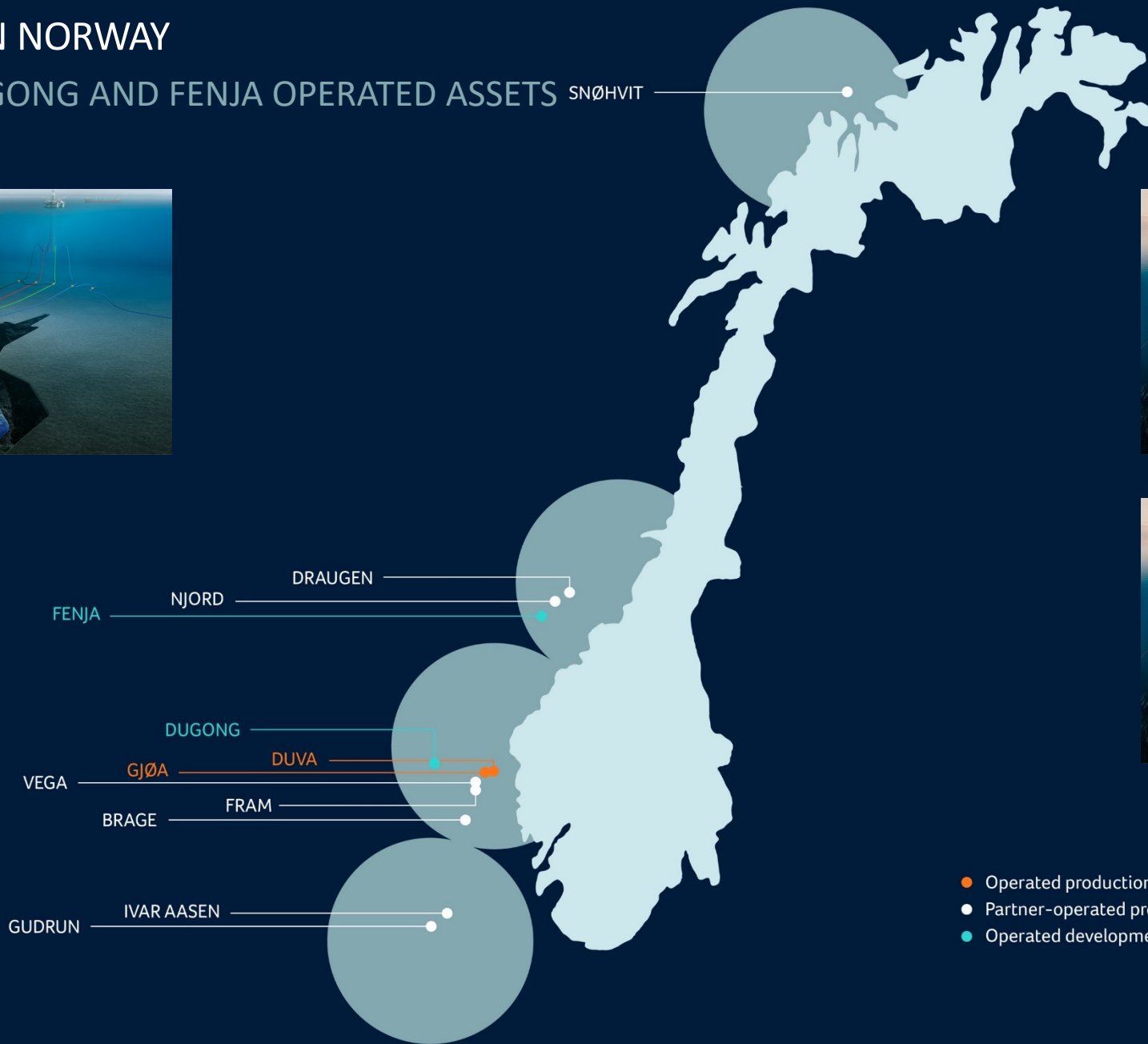
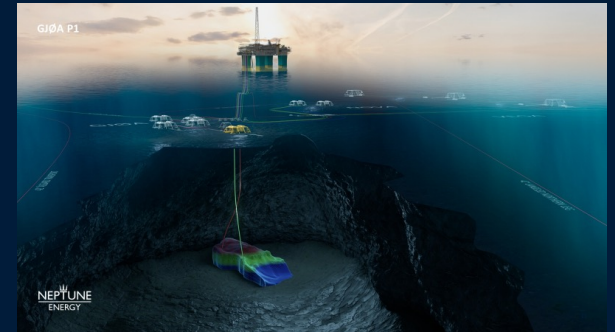
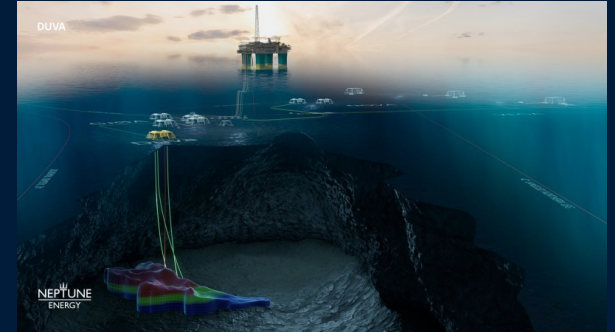
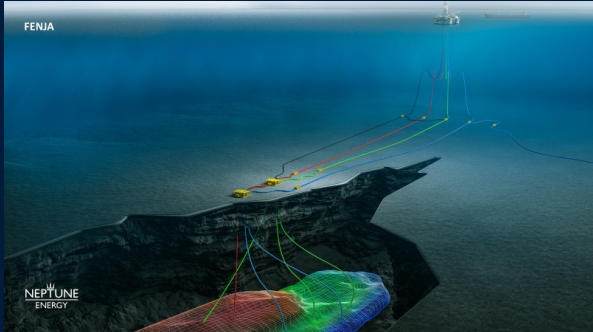
**CONTINUOUS IMPROVEMENT THROUGH
INTEGRATION AND COOPERATION – INTERNAL
AND EXTERNAL**





OUR PRESENCE IN NORWAY

- GJØA, DUVA, DUGONG AND FENJA OPERATED ASSETS SNØHVIT



- Operated production
- Partner-operated production
- Operated development projects

WHO WE ARE – OUR COMPANY VALUES

- WE BELIEVE THAT ZERO IS POSSIBLE – DELIVERED BY PEOPLE, FOCUS AND LEADERSHIP



Excellence
in HSE



Integrity



Accountability



Teamwork

WAY WE WORK – DRILLING & WELLS

- KEY STRATEGIC ENABLERS DELIVER OUR VISION TO BECOME THE LEADING INDEPENDENT

Rig Strategy
 Deliver best in class wells safely, on time and cost

Technology Strategy
 A fast follower on technology implementation

Digitalisation Strategy
 Expose value with digital tools, data analysis and optimisation

Contracting and Procurement Strategy
 Collaborate with our suppliers maximising value for all parties



Well Integrity Strategy
 Deliver and maintain wells with lifecycle technical integrity

JV Strategy
 Protect Neptune's interests via see-to-duty and gain learnings

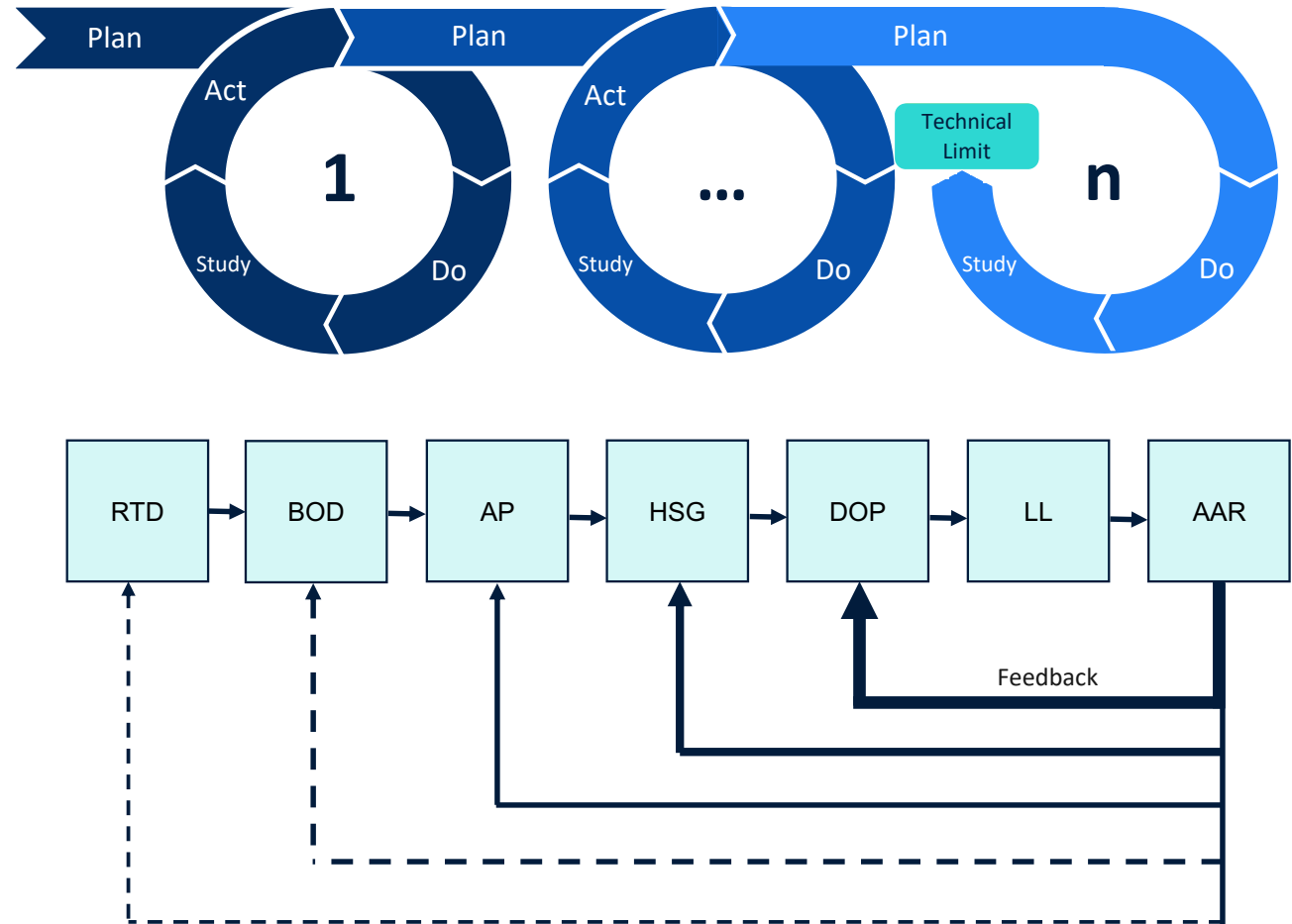
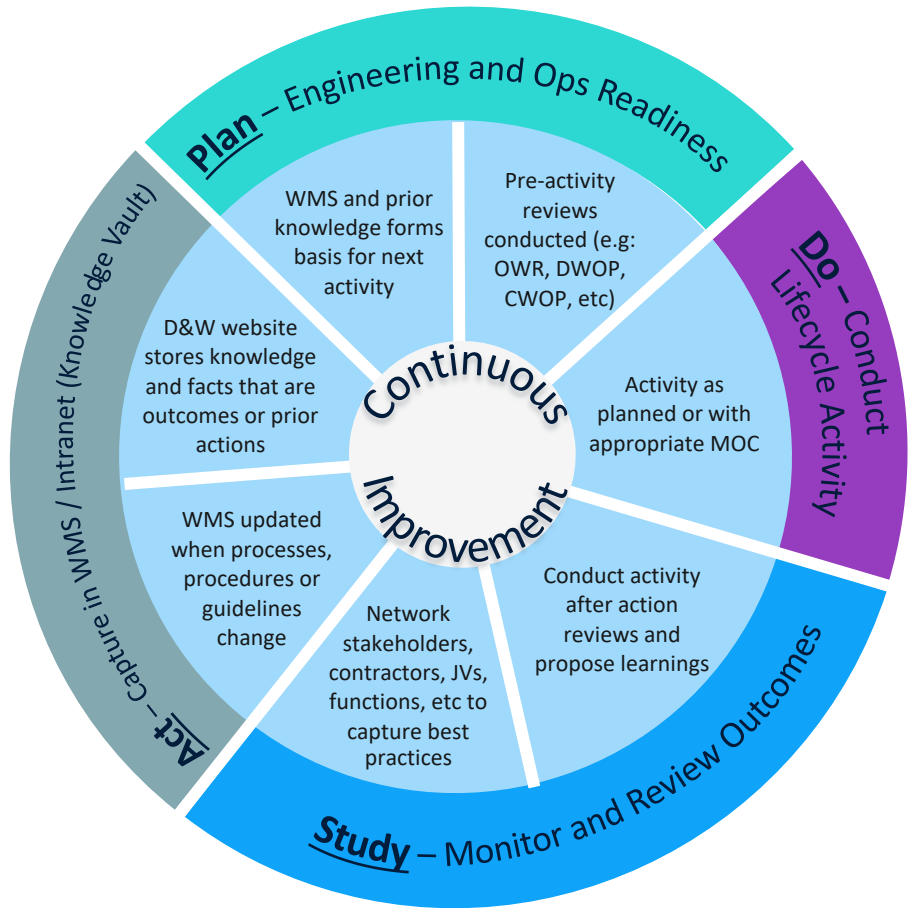
Sustainability Strategy
 Perform our activities safely, sustainably and responsibly

Organisation Strategy
 Deliver best in class wells with quality people and flexibility

Learning and Competence Strategy
 Nurture competency and invest in continuous learning for all

D&W PERFORMANCE MANAGEMENT

- PLAN, DO, STUDY, ACT – CONTINUOUS IMPROVEMENT- THE ENGINE THAT APPLIES TO ALL

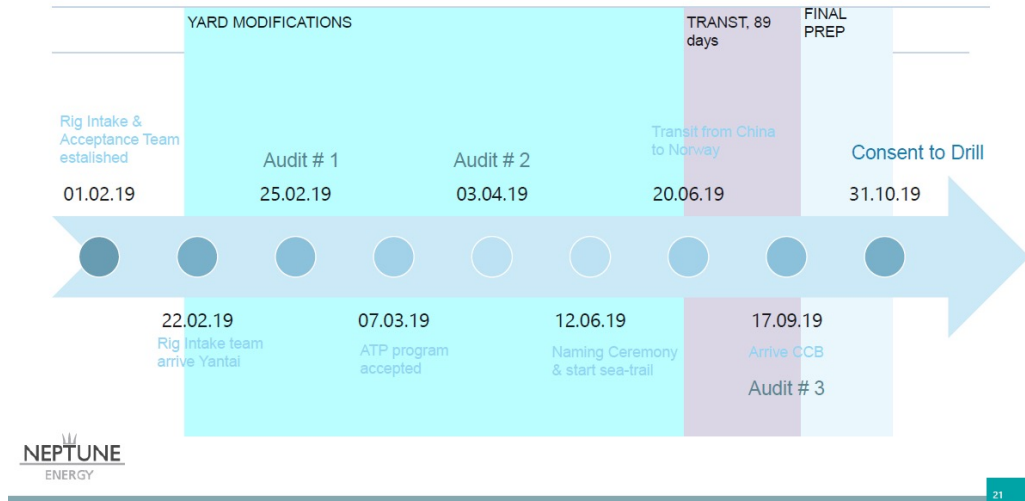


NEPTUNE RIG INTAKE SUCCESS – DEEPSEA YANTAI

- DEEPSEA YANTAI NEW BUILT IN OPERATION LESS THAN 9 MONTHS AFTER CONTRACT AWARD



TIMELINE*



- Record breaking rig start up
- Aligned vision, One team, One process, full TRUST applied
- Deepsea Yantai probably best performing rig in NCS from a total cost of ownership perspective – lower cost and similar performance as best in class

Deepsea Yantai

- Derrick capacity 1 500 000 lbs.
- NOV Drilling package
 - 3 x 14-P 220 HP Mud Pumps
 - 1 x HPS-03 Top drive
 - 1 x AHD 750 Draw works
 - 1 x 5 Ram 2 Annular BOP
 - Stand building elevator with powered mousehole.
- Kongsberg DP 3 system.
- NOV 8 point mooring system.
- 6 x 5,535kW Bergen diesel engines.
- Rolls Royce thrusters.
- 130 NORSOK standard single cabins.
- Active mud 675m³, Storage mud 640m³, Shaker pits 39m³.

ODFJELL DRILLING
for Decades

UNCONVENTIONAL INSTALLING OF ENHANCED HORIZONTAL SUBSEA TREE SYSTEMS ON DUVA FIELD

- NEPTUNE STANDARD FOR XT INSTALLATIONS - REDUCING INSTALLATION TIME, COSTS AND OPERATIONAL EMISSIONS



- Installation of subsea equipment by vessel rather than a rig.
- Reducing costs by \$12m and slashing carbon emissions by more than 60%.
- Deployed on template wellheads over an 18-hour period
 - total installation and subsea system testing completed within eight days.



2 K IN A DAY SUCCESS ON DUGONG – AN EXAMPLE OF CONTINUOUS IMPROVEMENT

- SUCCESS ONLY POSSIBLE WITH INTERNAL ALIGNMENT, COLLABORATION AND FOCUS

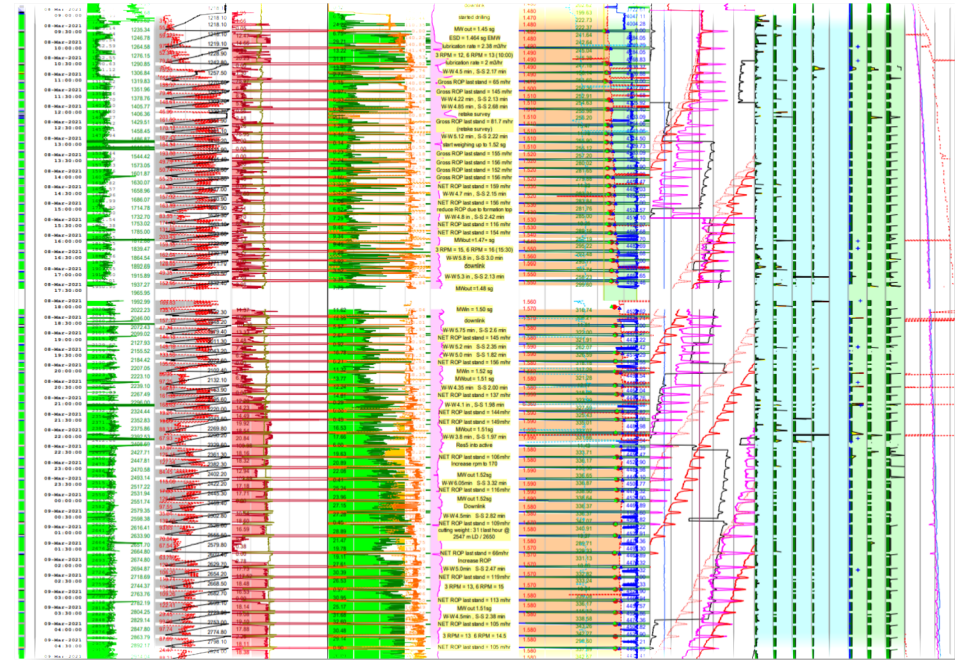


Challenge

- Continue learning curve after great historic performance
- W2W , Zero-time survey, ROP performance, Bit design, BHA design, Where to increase ROP, Cuttings handling limitations, Hole cleaning improvement, T&D measurements, Casing running, Communication

Results

- English mile (1610 meter) achieved in 17:50 hrs
- Nautical mile (1852 meter) achieved in 21:24 hrs
- 2033 meter achieved in 24 hrs
- Max drilling capacity of Deepsea Yantai was not reached, No bottlenecks were identified



LEARNING FROM INCIDENTS – WALKING THE TALK CHALLENGE

- CRITICAL TEST OF ONE TEAM PHILOSOPHY – BUT BRINGING THE PARTIES CLOSER TOGETHER



NEPTUNE ENERGY NORWAY PL153 (Gjøa) – 35/9-G4H

12 ¼" SECTION DRILLING INCIDENT REVIEW – PARTED DRILLSTRING

LEARNING FROM INCIDENT – THE MAJOR INCIDENT (TWIST OFF) WITHIN THE INCIDENT (STUCK BHA) 5" DSTI CONNECTION IN 187 M IDENTIFIED TO BE FIRST CONNECTION THAT TWISTED OFF DUE ERRATIC DOWNHOLE MAKE-UP



- SIGNIFICANT DOWNHOLE MAKE UP FROM COMBINATION OF HITTING MAX TORQUE LIMIT, RPM FLUCTUATIONS AND STALL OUT
- SIGNIFICANT OVER-TORQUED NC50 CONNECTIONS DUE TO WRONG MAKE UP TORQUE APPLIED AND COMMUNICATED.
- TWIST OFF AT 187 M
- MAX TORQUE AND TENSION COMBINATION RESULTED IN ADDITIONAL FISH FROM BACK OFF AT 37M
- CONSEQUENCE AND RESULT WAS COMPLEX FISHING OPERATION WITH TWO STRINGS ACROSS BOP

The Wellbore Drawing shows the depth of the incident at 187m. Photographs show the twisted connections at various depths: 187m, 188m, and 37m.

Safety Alert

HSE Lessons Learned	
Event ID:	18229
Date occurred:	20.09.2020
Asset:	Deepsea Yantai
Responsible Department / Location:	NE Norway O&W
Type of event:	High actual commercial impact
Actual severity:	High, approx. 60 days NPT / 360 mln NCK
Potential risk level:	Well Control Incident

Title: Erratic downhole torque

Description: Worked the string through tight spots, and constantly ran into torque limit setting of the top drive (string still out). Continued to increase torque limit setting until reaching make-up torque of the high torque connectors in use.

Causes: The high energy in the system in combination with repeatedly hitting the torque limit (string stall out) induced high torsional vibrations effects, causing severe downhole make-up and damage to drill pipe connection.

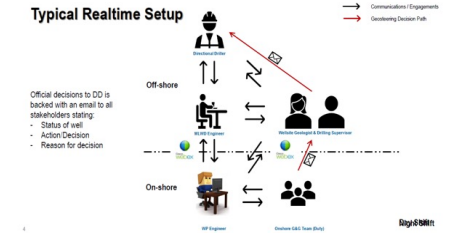
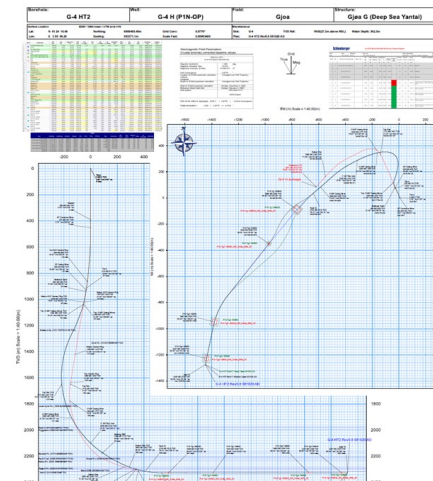
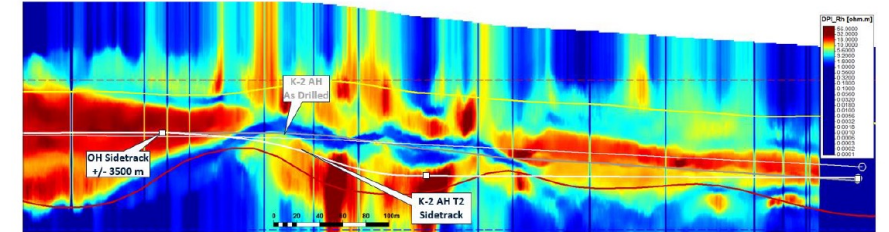
General advice to all assets of Neptune Energy: When getting stuck, attempt low energy options and focus on circulation, if possible – use low rpm setting and avoid combination of high rpm and high torque limit settings. Carefully monitor parameters for signs of downhole make-up / torsional vibrations (i.e. hitting the torque limit setting with subsequent fluctuations in rpm)

Key Takeaways:
 A lower torque limit setting will reduce dynamic loading effects if torque limit hit
 A lower rpm setting will reduce dynamic loading effects if torque limit hit

The graph shows a sharp increase in torque and RPM fluctuations, coinciding with a 'Hit torque limit' event. A red 'STOP' sign icon is placed over the peak of the graph.

DUVA – SUCCESSFUL EARLY PRODUCTION WITH NEW TECHNOLOGY ENHANCED PERFORMANCE

- A SUCCESS STORY OF INTEGRATED DELIVERY



Drilling:

- TruLinkMWD
- ED Projects Fixed Blade Stabiliser
- Well ID Frac View

Completions:

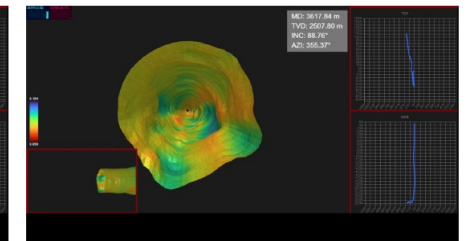
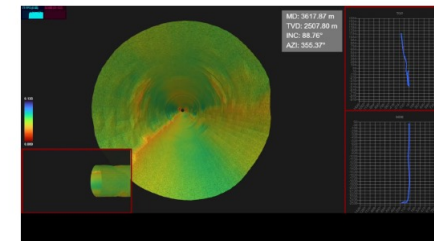
- InterwellCannSeal
- 2 x Metrolgauge stations in open hole
- Baker Inflow Control Valve(ICV) choke down hole

Subsea:

- HXT on wire with wear bushing pulling in open water
- Well Partner Well Safe Enabler
- Blafro:wireline Pressure Control Equipment rig
- Neptune: wax injection on subsea tree –hot line (mitigate wax issues in work over riser and surface equipment)
- Neptune: work over control system

Drilling

POOH



Thanks to: Schlumberger, ED Projects, Well ID, Interwell/ Cannseal, Metrol, TFMC, WellPartner, Blafro

NEPTUNE DW NORWAY DIGITALIZATION

– A SUCCESS STORY FOR COLLABORATION AND NEW BUSINESS MODELS



Design

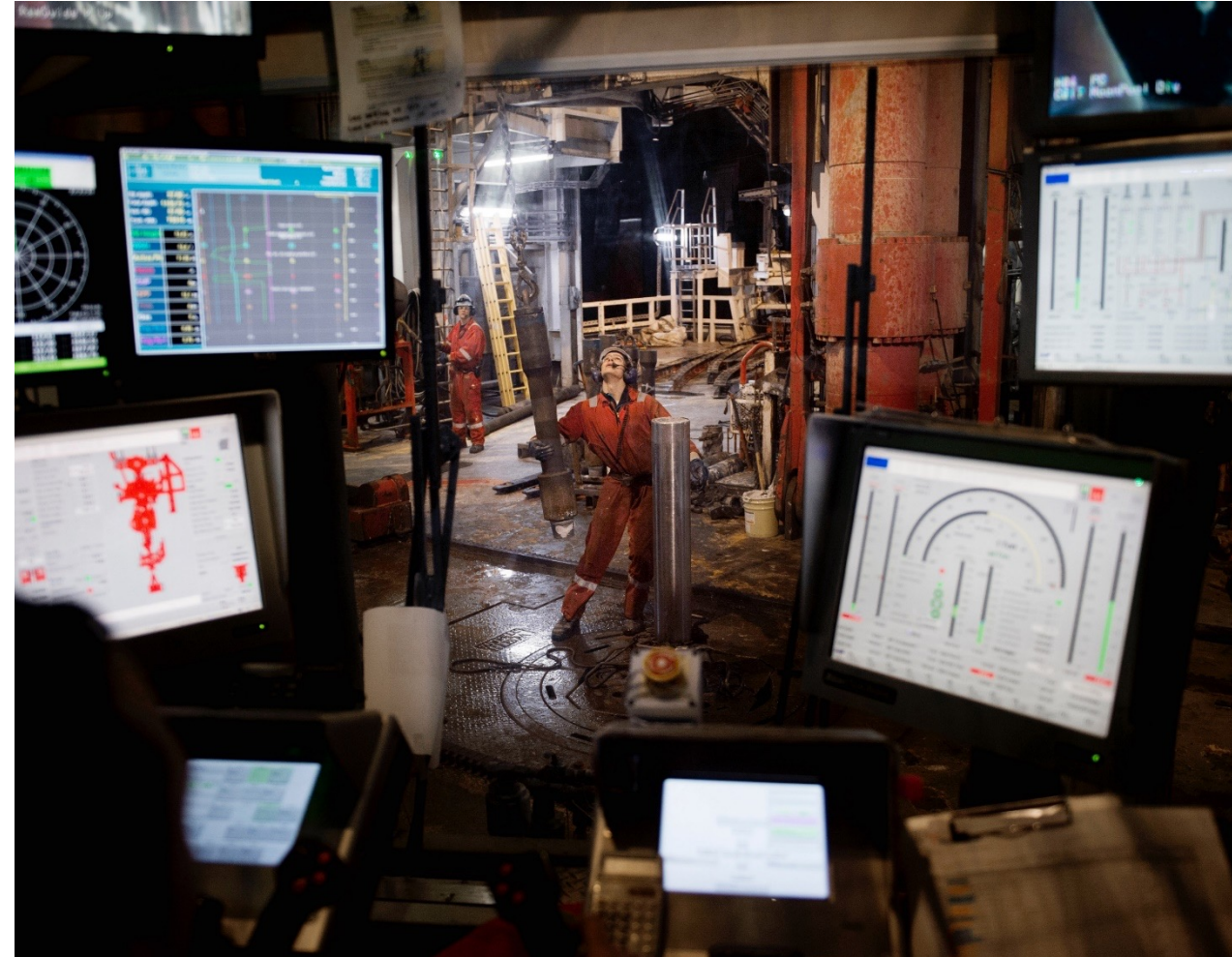
- New, modern architecture NEPTUNE WELL MODEL established in 12 weeks
- Connecting subsurface data input with WE Toolkit applications
- Ways of working and work process competitive edge for Neptune
- Data liberation, full push pull capability required for any 3rd party application to work for Neptune
- All 3rd party applications focus on what they do best

Results

- Well design in 15 minutes including loading input data on initial iteration
- Update of well design in 6 seconds when changing input data with rule based design and automation

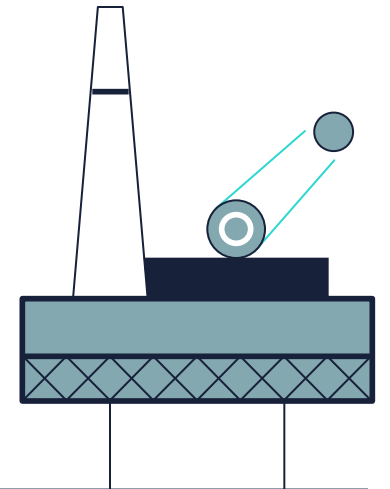
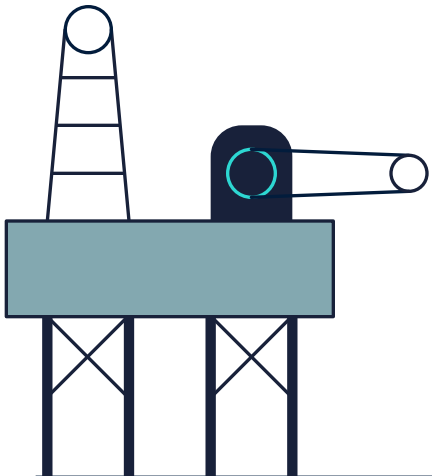
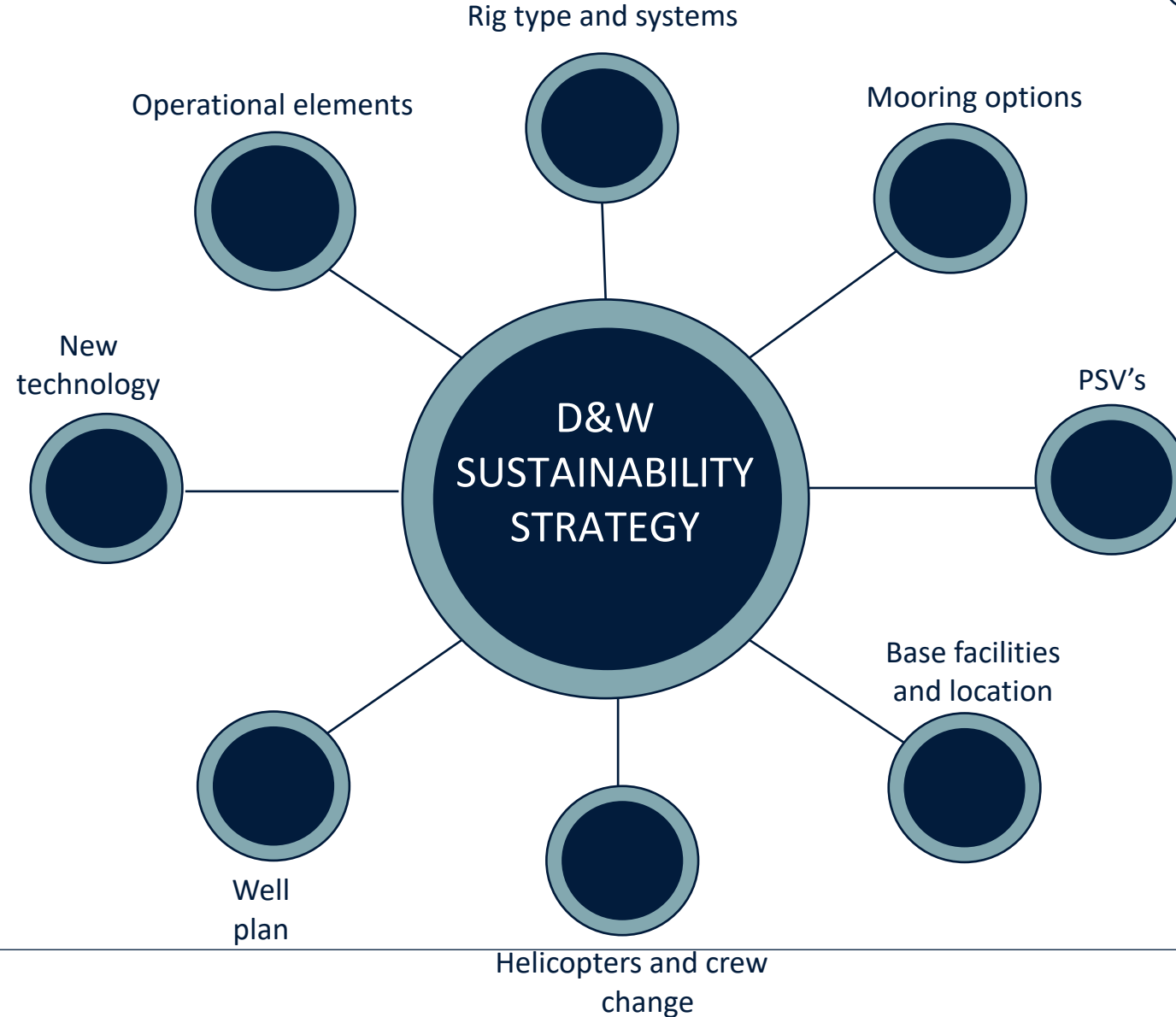
Impact

- Significantly limiting number of 3rd party application interfaces and data management issues
- Simple commercial and data liability agreements with all suppliers, simplified commercial models, liberated data, optimized work flow,



FOCUS AREAS FOR DELIVERING D&W SUSTAINABILITY AMBITIONS

- DIRECT AND INDIRECT INCENTIVES TO DELIVER ON OUR PROMISE

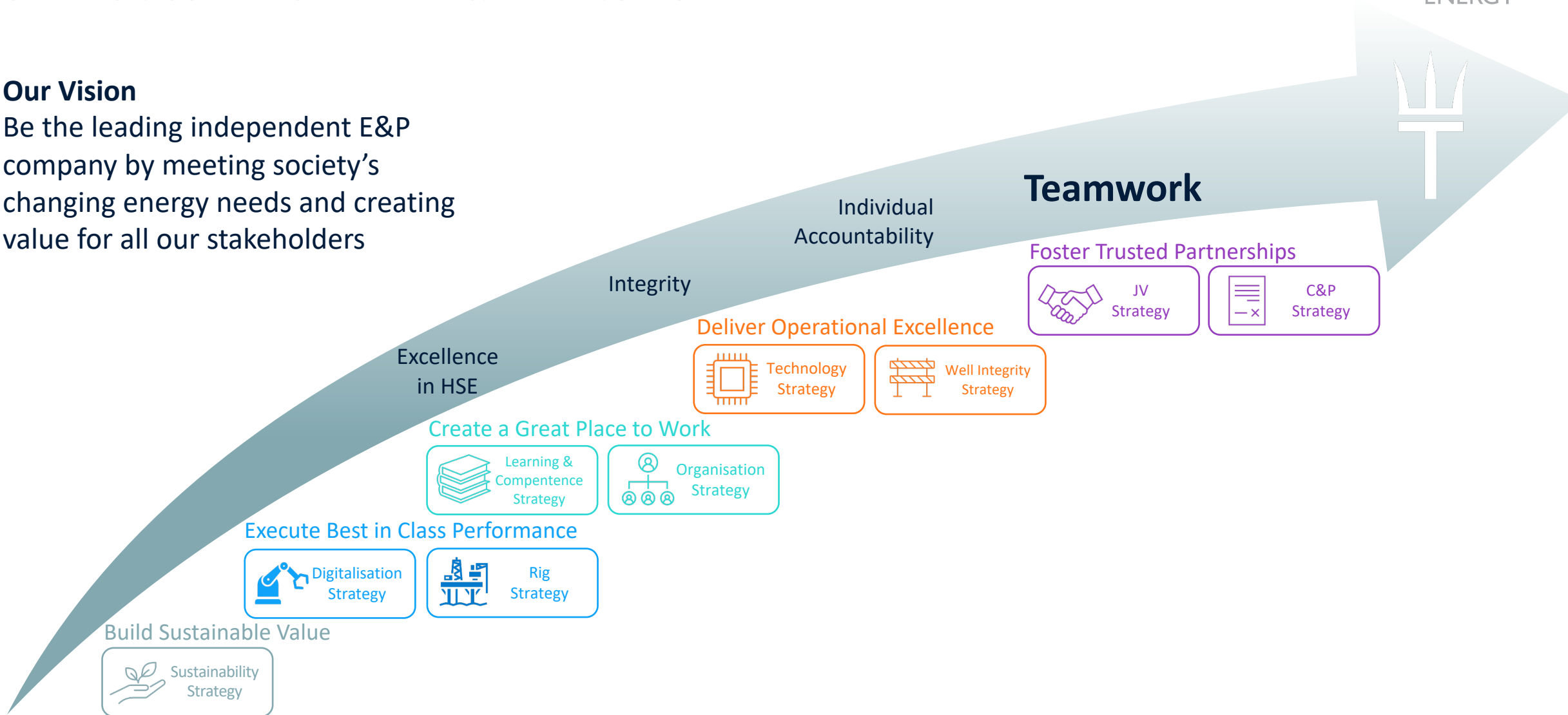


WAY WE WORK – DRILLING & WELLS

STRATEGIC GOAL ALIGNMENT – D&W AND CORPORATE

Our Vision

Be the leading independent E&P company by meeting society's changing energy needs and creating value for all our stakeholders



Q&A

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**KONTINUERLIG FORBEDRING GJENNOM
INTEGRERING OG SAMARBEID – INTERNT OG
EKSTERNT**

