BRENT e-news

SHELL BRENT FIELD DECOMMISSIONING PROJECT

ISSUE #22 FEBRUARY 2021

IN THIS ISSUE:

UPDATE FROM ROB MAXWELL

Welcome to issue #22 of Brent e-news.

This edition will focus on an update of the progress of the Brent Decommissioning Programmes, a review of the project activities in 2020, and a lookahead to 2021.

Brent Field current status

BRENT DECOMMISSIONING PROJECT

The Brent Decommissioning Project has now entered its 15th year, and I continue to be very proud of the progression of the execution plan and the team's achievements. 2020 was without doubt the most challenging period that the Project has faced, with the uncertainties and impacts of COVID-19, the lockdowns, home working, necessary restrictions offshore, and the planned delivery of major lift operations for Brent Alpha. In this issue, William Lindsay reports on the highly successful execution of the topside and upper jacket lift, and the progress with Attic Oil Recovery.

This progress could not have been achieved without years of planning, and the commitment, dedication and resilience of everyone involved in offshore and onshore support and execution. The close cooperation and collaboration with the supply chain, and adopting a 'One Team' approach, contributed to the safeguarding of the offshore teams on Brent Charlie, the successful single lift and load-in of the Alpha Topside with Allseas, and Able UK, and the record breaking single lift and load-in of the Alpha Upper Jacket by Heerema and AF Decom. Dismantling of both Brent Bravo and Delta topsides is complete, with over 97% recycled.

Brent Charlie continued in production, with simultaneous operations to progress the well's Plug and Make Safe campaign, and a planned maintenance shut down. During a 100 day vessel campaign in the summer of 2020, DeepOcean A.S. and Enpro Subsea Ltd successfully recovered the attic oil and interphase material from the Brent Bravo concrete Gravity Based Structure (GBS) transferring it to one receiver cell in preparation for later retrieval.

I was delighted when at the end of 2020 this Project was shortlisted in the OGUK Awards highly-competitive 'Excellence in Decommissioning' category. It is always encouraging for everyone involved to receive industry recognition and acknowledgement of the technical innovation and professional execution required to validate a concept and deliver a result.

Despite the many restrictions imposed by COVID-19 in 2020, oil and gas industry organisations were able to deliver a range of 'virtual' conferences, and we were pleased to continue to support the important decommissioning sector through sharing lessons learned. This included face to face presentations on Onshore Demolition Safety at the annual Norway Decom Conference in March, the Decom North Sea Offshore Conference in August, and the OGUK Onshore dismantling safety workshop in November. In December, we contributed to the Association of Project Managers East of England webinar, and an Opportunity North East / Scottish Enterprise Decommissioning Supply Chain Event in November. We continued to support Aberdeen's University's MSc in Decommissioning program with a lecture.

DECOMMISSIONING PROGRAMMES UPDATE

Following the OSPAR Special Consultative Meeting in October 2019, the UK Regulator agreed to deepen their engagement with key countries who still have concerns on the recommendations in the Brent Field Decommissioning Programme (DP), to achieve a common understanding ahead of any decision. We supported this in the spirit of the OSPAR framework, despite the formal consultation process having concluded. This continues to be a UK Government-led process as the decision maker, and during 2020 they engaged in bilateral meetings with OSPAR representatives from The Netherlands and Germany, and responded to letters from Greenpeace. Shell also responded to letters from Greenpeace objecting to the Leaving in Place (LiP) of the GBS – legs and cells – and the cell contents. We remain convinced that the LiP recommendation for the GBS is, on balance, the safest, most technically achievable, environmental and socially sound solution.

From Shell's perspective we have welcomed the opportunity to listen further and engage with key stakeholders, and we look forward to the decision from the UK Regulator in the near future.

During this extended period of engagement, in order to proceed with execution activities efficiently, we were pleased that the UK Regulator approved two separate Decommissioning Programmes covering the Pipelines, and the Brent Alpha Jacket.

The Alpha Jacket DP included approval for Leaving in Place the jacket footings, which is an OSPAR derogation given the size and weight of the footings, and the removal of the upper jacket. Subsequently, we were able to progress with the removal of the Alpha topside, and the world-record lift of the upper jacket and conductors. Copies of the interim Alpha Topside DP and Alpha Jacket DP Progress Reports are now available on the Brent website.

LOOKING AHEAD

As we enter 2021 the most significant milestone for the Brent Project will undoubtedly be the final Cessation of Production (CoP) on Brent Charlie. CoP will not only mark the end of production on Charlie, the last of the four massive Brent platforms, but the final closure of the iconic Brent Field, which was discovered in 1971, and remarkably started to produce only five years later in 1976. Originally the field was expected to be depleted in 25 years, and it is a testament to the technical expertise, innovation and determination of the teams over the years that it has remained in production for 45 years.

Following CoP, the focus on the platform will be completing the Plug and Make Safe of the final wells, the engineering required to have Charlie ready for topside removal, and the subsea programme of work, including attic oil recovery.

Thank you for your continued interest in the Brent Decommissioning Project.

Rob Maxwell
Brent Asset Manager

ONE-TO-ONE ENGAGEMENT

If you would like to be briefed one-to-one on any aspect of the Brent decommissioning project developments, or would like to raise any particular queries or issues with the project team, please contact us at www.shell.co.uk/brentdecomm

You can also get in touch with the team via the Contact Us link on the website or simply click here.

ACTIVITY UPDATE

FROM WILLIAM LINDSAY

Common with society at large 2020 was an extremely challenging year for the Brent Decommissioning Team, but despite the restrictions of COVID, we successfully delivered major project milestones, including: removal of the Brent Alpha topside and upper jacket; completion of Brent Bravo topside dismantling and recycling; and the Brent Bravo Attic Oil Recovery programme.

We sustained our support for the supply chain by continuing activity as planned and awarding key contracts such as a major multi-year subsea infrastructure decommissioning contract.

One of the benefits of having four platforms to decommission is we have been able to learn and improve every time we do it. Brent Delta topside removal was first in 2017, Bravo in 2019 and Alpha in 2020. Every time we decommission one of these platforms, we do it better. Offshore exposure is reduced, efficiency is greater, and the costs are reduced as well.

The standout activity of 2020 was the single-lift removals of both the 17,000-tonne Brent Alpha topsides before transfer to Able UK's dismantling yard in Hartlepool, and its 10,000 tonne upper jacket delivered to Norway for dismantling. Given the disruption caused by the coronavirus pandemic, the fact these activities were progressed and safely realised is an enormous achievement.

We can link the successes in both cost reduction and execution to our flexible approach to contracting across the project. Our contractor partners have been given large windows of time in which to execute their work scopes, allowing them to plan multiple campaigns of work (often for multiple clients) with greater efficiencies.

That flexibility enabled Allseas to take on four platform removals across the North Sea over the summer of 2020. All used the same vessel – the record-breaking Pioneering Spirit – and similar lift setups, meaning significant reductions in preparation, transport time, and therefore cost. This serves as an excellent example of the benefits from 'campaigning' in the decommissioning industry.

For Alpha's jacket we worked with Heerema Marine Contractors (HMC) and another massive, record-breaking vessel, the Sleipnir. In addition to being the world's largest crane vessel, it is also the first of its type with dual-fuel capabilities, running entirely on clean LNG for the three week campaign which significantly lowered emissions. Equipped with two 10,000-tonne revolving cranes,

> **"ONE OF THE BENEFITS OF HAVING FOUR PLATFORMS TO DECOMMISSION IS WE HAVE BEEN ABLE TO LEARN AND IMPROVE EVERY TIME WE DO IT."**

Pioneering Spirit single lift of Brent Alpha topside

Sleipnir allowed the team to lift the 10,000-tonne Alpha jacket vertically, complete with the well conductors secured inside, saving a considerable amount of time and exposure hours offshore. It was the first time this has been done on this scale. Brent Alpha was disconnected, prepared, lifted and removed without the need for divers.

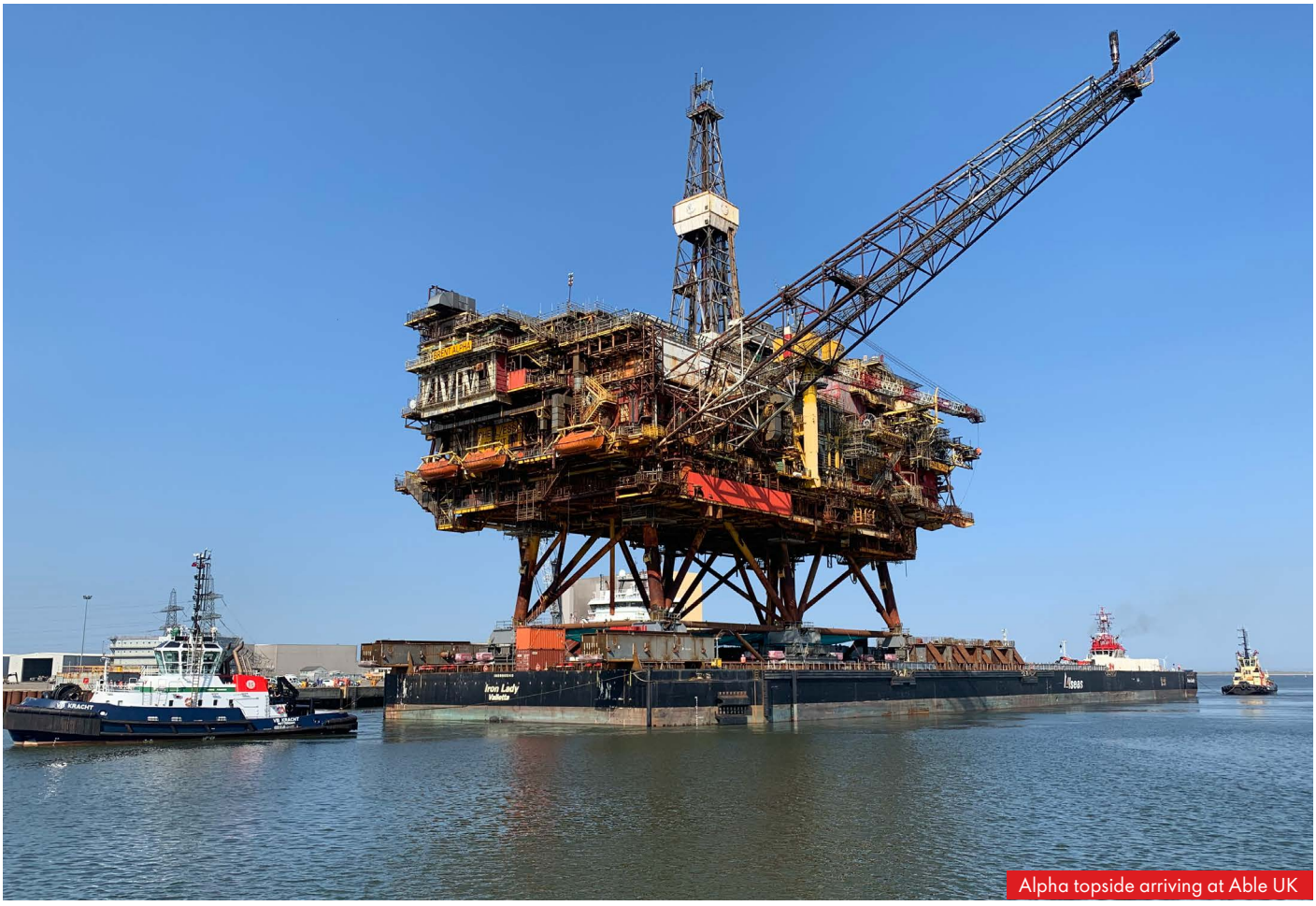
With the Bravo platform still being dismantled, and with social distancing requirements in place, Able UK upped the pace to make room for the incoming Alpha topsides – any delays here may have affected the lift schedule throughout the rest of the project. This was achieved largely with more staff hours on site, but also through increased mechanisation, as Able invested in new machinery which sped up the process whilst maintaining rigorous COVID controls. Able has successfully recycled over 97% of the Bravo topside.

> **THE STANDOUT ACTIVITY OF 2020 WAS THE SINGLE-LIFT REMOVALS OF BOTH THE 17,000-TONNE BRENT ALPHA TOPSIDES BEFORE TRANSFER TO ABLE UK'S DISMANTLING YARD IN HARTLEPOOL, AND ITS 10,000 TONNE UPPER JACKET DELIVERED TO NORWAY FOR DISMANTLING.**

There was a highly choreographed schedule about which we were very transparent – the Brent project team has set out to be transparent in our planning and open about the challenges. This openness reduces any surprises for all parties involved.

The time Pioneering Spirit has spent in the field for each lift has reduced from two and half days for Delta to less than 24 hours for Alpha. The topsides preparation work for those lifts has also reduced – with Bravo it was 60% less than Delta and Alpha 30% less again. These are not incremental changes but significant reductions in offshore exposure, and the valuable time saving and significant reduction in risk exposure, while out in the changeable North Sea, is the result ongoing of careful planning, collaboration and safety preparations

William Lindsay
Brent Project Director

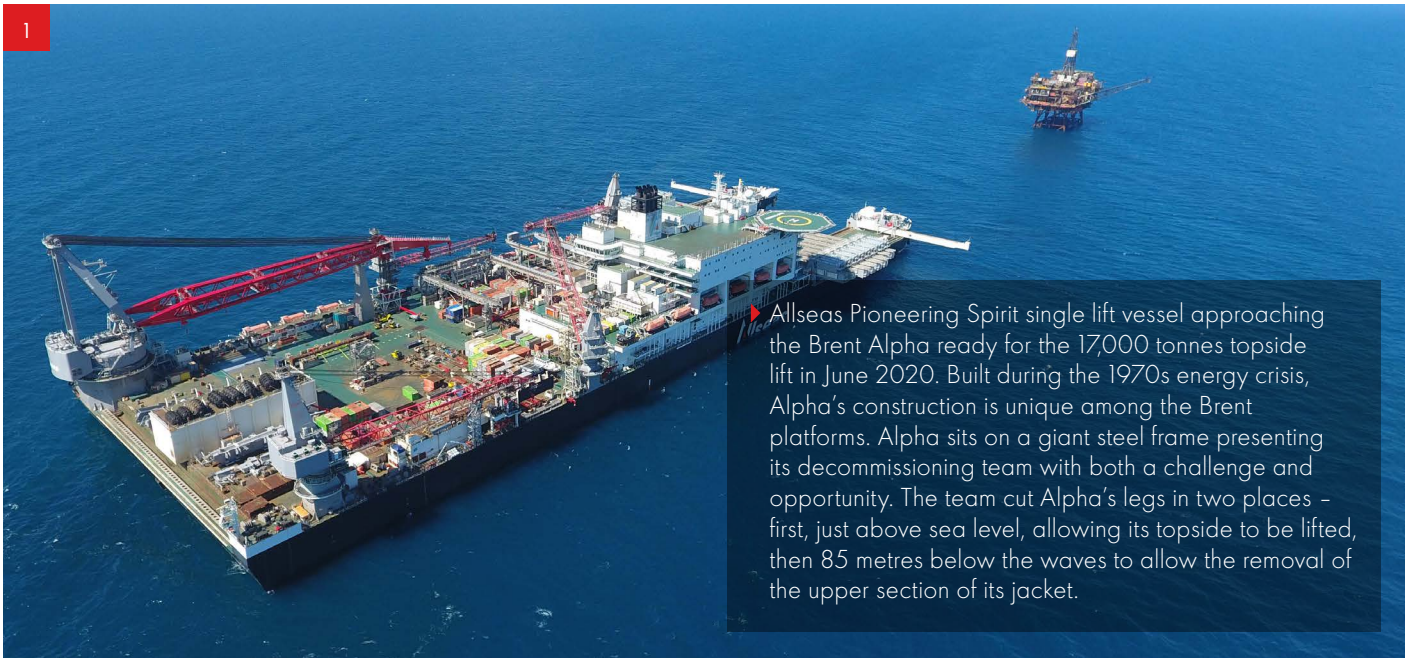


Alpha topside arriving at Able UK

ALPHA TOPSIDE LIFT

ANOTHER MILESTONE LIFT FOR BRENT

1



Allseas Pioneering Spirit single lift vessel approaching the Brent Alpha ready for the 17,000 tonnes topside lift in June 2020. Built during the 1970s energy crisis, Alpha's construction is unique among the Brent platforms. Alpha sits on a giant steel frame presenting its decommissioning team with both a challenge and opportunity. The team cut Alpha's legs in two places – first, just above sea level, allowing its topside to be lifted, then 85 metres below the waves to allow the removal of the upper section of its jacket.

2

With Bravo and Delta, we lifted the topsides by lifting underneath the deck. Alpha's different because we're cutting the legs much nearer the sea level and we're using the legs to lift the whole topsides. As Alpha had been downmanned the team needed access the platform via a safe walkway from the support vessel.

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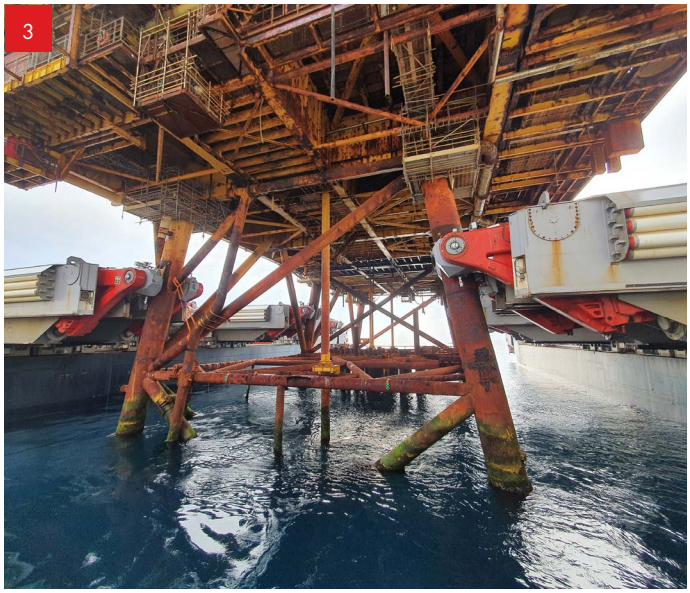

To tackle the lift Pioneering Spirit is equipped with a giant set of clamps designed to clasp Alpha's legs at newly installed lifting points. The topside lift system uses the grey horseshoes inside the red lifting leavers which extend and grip onto the Brent Alpha platform for the lift.

ALPHA TOPSIDE LIFT CONTINUED

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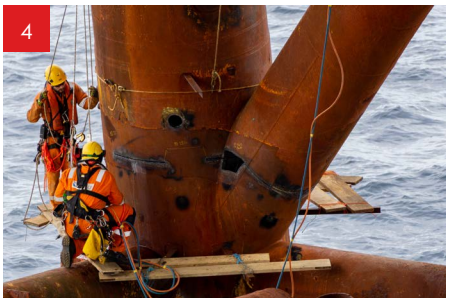

To get to the legs of the Brent Alpha Jacket and cut them, we used rope access techniques. This is a very technically challenging specialised skillset which allows a safe access to some very hard to reach places. Simple horizontal cuts don't provide enough resistance against the force of storm waves. We made castellated cuts to ensure that the topsides can not slip off the legs.

The most challenging part of the lift was connecting all the horseshoes with the platform lifting points on the legs that has not been done before and the lift itself would be the moment of truth.

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After the successful nine-second fast lift, the Alpha topside was transported to Hartlepool on the Pioneering Spirit, transfered to the Iron Lady barge, and towed into Able UK's recycling facility. It will be dismantled, and over 97% will be recycled.

VIEW OUR FILM

To view the film of the full story of the Alpha topside lift please click here

ALPHA UPPER JACKET LIFT

A WORLD RECORD JACKET LIFT

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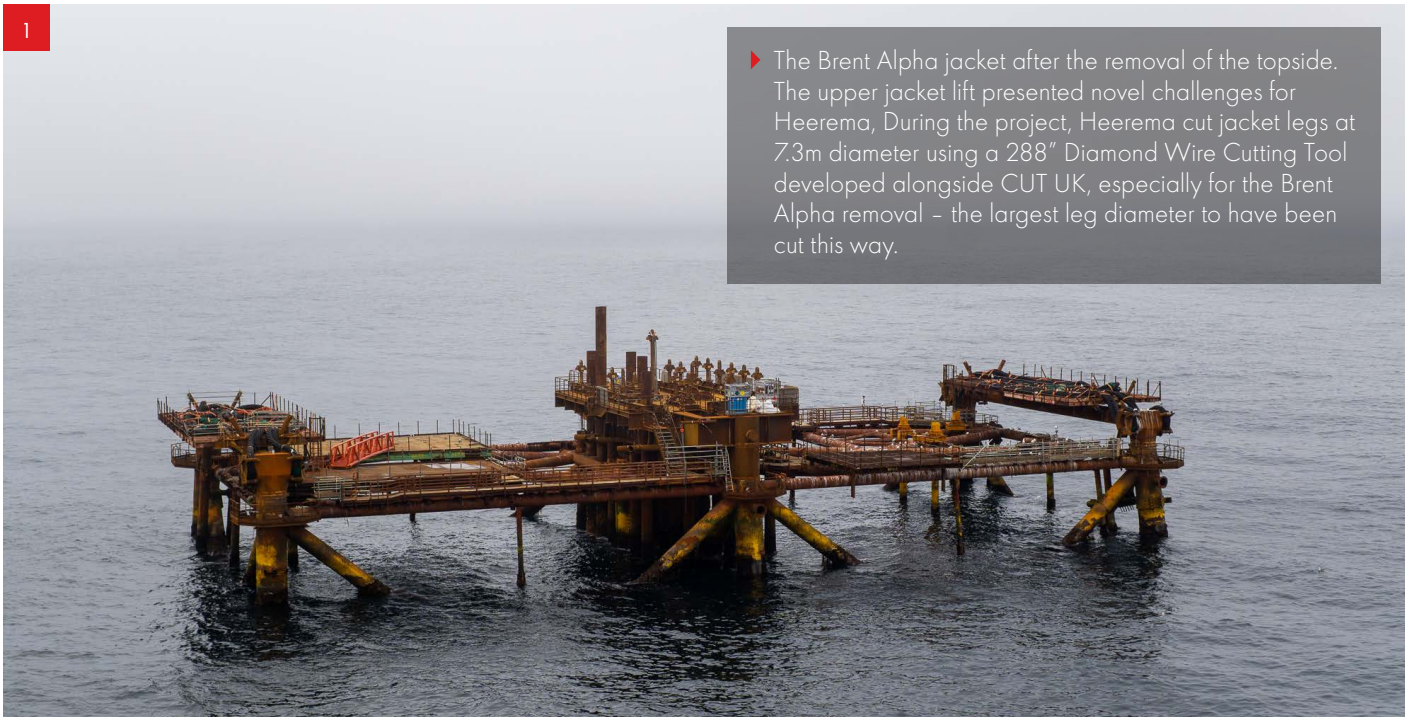

The Brent Alpha jacket after the removal of the topside. The upper jacket lift presented novel challenges for Heerema, During the project, Heerema cut jacket legs at 7.3m diameter using a 288" Diamond Wire Cutting Tool developed alongside CUT UK, especially for the Brent Alpha removal – the largest leg diameter to have been cut this way.

In place 85 metres below the water, the ROV cutter loops a thin steel wire – over 7-metres long – around each segment. The cutter was encrusted with industrial diamonds, one of the toughest synthetic substances known.

2

3

The Sleipnir is the largest crane vessel in the world. Prior to the Alpha upper jacket lift, her 114-meter-long cranes held the record for the heaviest single jacket removal at 8,100 metric tonnes. Sleipnir is the world's most sustainable SSCV and during the project, the vessel performed the full removal operations while running on emission-reducing LNG fuel. Using LNG, Sleipnir reduces CO_2 emissions by 25%, reduces NOx emissions by 92%, reduces SOx emissions by 99%, and Particulate Matters by around 99% compared to traditional Marine Gas Oil crane vessels.

ALPHA UPPPER JACKET LIFT CONTINUED

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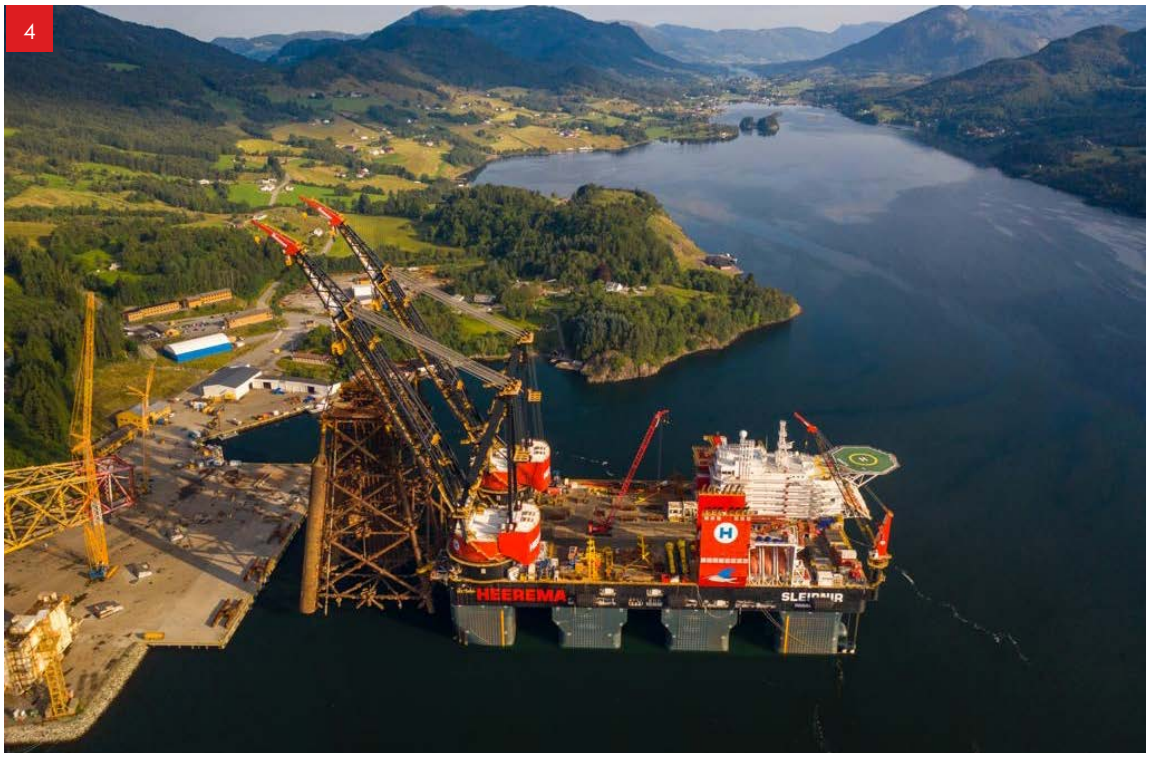

The impressive Sleipnir arrives at the spectacular AF Decom facility in VATS, Norway in August 2020, with the Alpha upper jacket and conductors suspended from the massive cranes. The conductors were hooked on to a Heerema Fabrication Group built Conductor Hang-off Frame made for this project.

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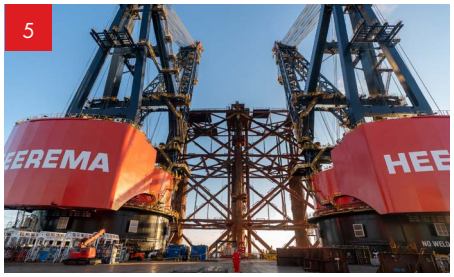

80 metres is a staggeringly high structure. Only when the jacket arrives into port can the scale of this engineering achievement be fully appreciated. Project Manager Pieter Hendricks looks at the upper jacket as it sits suspended between the cranes.

VIEW OUR FILM

To view the film of the full story of the Alpha upper jacket lift please click here

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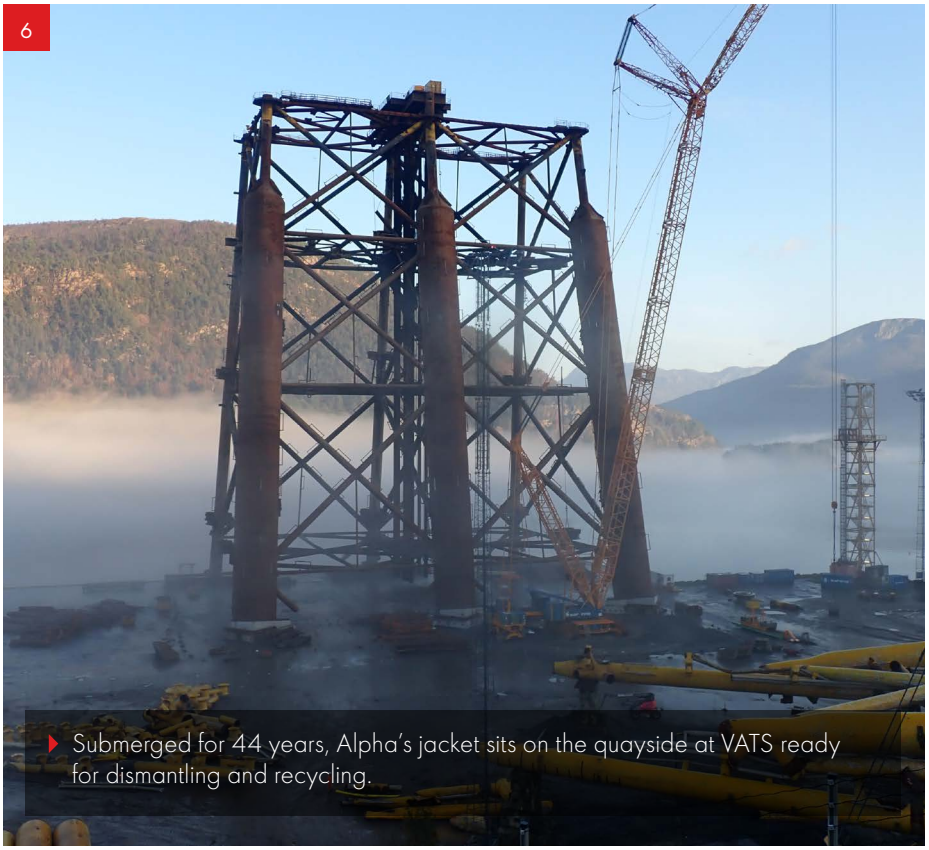
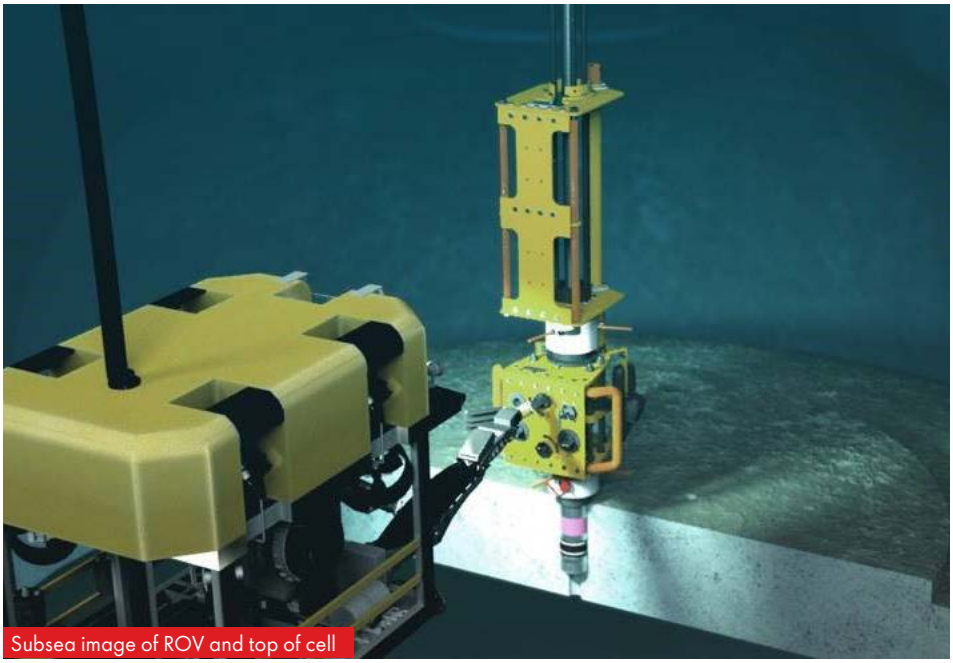
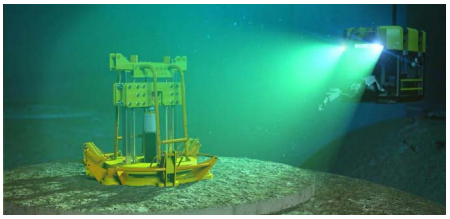
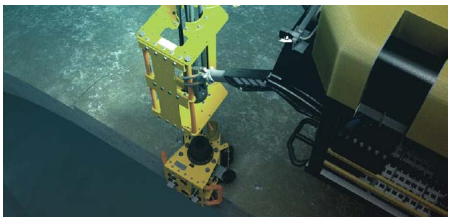


Submerged for 44 years, Alpha's jacket sits on the quayside at VATS ready for dismantling and recycling.



Subsea image of ROV and top of cell





BRENT BRAVO ATTIC OIL RECOVERY

WORLD'S FIRST AT-SCALE SUBSEA ATTIC OIL RECOVERY

During a 100-day campaign in summer 2020, Shell, working with DeepOcean A.S. and Enpro Subsea Ltd succeeded in recovering attic oil and interphase material from the Brent Bravo Gravity Based Structure (GBS).

All attic oil has been pumped into one receiver cell for later retrieval. This project was the culmination of many years of Research & Development (R&D) and collaborative partnerships to develop the technology to access fluids trapped in the metre-thick concrete Brent storage cells.

This has provided a world-first blueprint for repeatable execution of subsea Attic Oil Recovery (AOR), with implications for Shell's remaining structures and the options available to the wider industry.

From 2006 the Brent Decommissioning Programme has been committed to removing Attic Oil and Interphase Material from the three Brent GBS, each made up of clusters of between 16 and 32 concrete cells, 20m diameter and 60m tall, with 1m thick concrete walls, used originally for production storage and produced water flow. This was a significant execution challenge: most cells are not reliably accessible from internal pipework, and the subsea technology to access them externally in 90 metres below sea level did not exist.

Brent took an innovative and multi-staged approach to solving this challenge, first deploying a novel sonar probe, developed in conjunction with NASA, into an internally accessible cell. This helped build up a picture of the inside of the cells, not seen since construction in the late 1970s, and provided crucial samples of the fluids to be removed. We have learned during the decommission project that the actual 'found situation' can be different from drawings from the 1970s.

In 2014, Enpro Subsea Ltd (then Cansco) developed a system to reliably, repeatably access the GBS cells from the outside – without the need for divers, sample fluids,

Deployment of ROV in calm sea

and pump the attic oil from the remaining "donor cells" to a single receiving cell from where it could ultimately be removed and transported to shore for processing.

Two years of R&D from 2016-2018 delivered a novel system of modular tooling which was successfully trialed offshore, taking the low-cost opportunity to deploy equipment from the topsides of Brent Delta and Bravo. Cells had a permanent Enpro "Anchor Hub" installed into the top of the concrete cells, which connected the rest of the equipment, allowing fluid sampling and test cells to be pumped clear of attic oil, proving the concept. The challenge was to scale up the technology to be able to perform the same operations multiple times efficiently for the field-wide campaign.

For the 2020 campaign, involving over 160,000 offshore exposure hours, addressed Brent Bravo's 12 remaining cells – and this time from a vessel. With their expertise in subsea construction and maintenance, DeepOcean, whilst learning how to implement COVID controls onboard a vessel, coupled the proven concept with their expertise in efficient subsea tooling deployment. The team ultimately delivered a highly-successful dual Remotely Operated Vehicles (ROV) vessel campaign, beating the schedule estimates and delivering safely. Despite the water depth, weather and technical complexity no attic oil was released to the environment.


Maersk Forza at Bravo

In 2021 DeepOcean and Enpro will recover fluids at Brent Delta, taking learnings from the 2020 campaign to deliver a reduced cost per cell, through schedule optimisation and shared expertise. ■

> "DESPITE THE WATER DEPTH, WEATHER AND TECHNICAL COMPLEXITY NO ATTIC OIL WAS RELEASED TO THE ENVIRONMENT."

CONTACT US

For further information on the project, please visit www.shell.co.uk/brentdecomm

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