

North Sea investment

The current energy crisis has placed a renewed emphasis for oil and gas operators to increase production from the North Sea.

According to a 2021 report produced by the Oil and Gas Authority, the known reserves of oil and gas in the North Sea at the end of 2020 amounted to 4.4 billion barrels of oil equivalent (BOE). However, exploration is an ongoing business and the Oil and Gas Authority's Vision 2035 report, taking into account future exploration, estimates that 14.9 billion BOE could be available for extraction between now and 2035.

North Sea operators, from large established organisations including Harbour Energy, Total, BP, and Shell, to new entrants, such as PD&MS, Katoni and Three60 Energy, are together planning to invest tens of billions of pounds to bring this energy ashore. Exploration and production takes time however, and the need to increase capacity from the North Sea is immediate, which means operators are looking at how quickly they can increase production from existing brownfield assets.

Quickly increasing production

There are three established ways to increase production from existing brownfield assets at the pace required:

Capacity Expansion:

This is expanding the current infrastructure of the asset to increase the production of oil or gas from existing fields. It may involve replacing equipment to increase throughput of existing processes or the addition of new infrastructure and equipment within the existing asset.

Lifetime Extension:

With well decommissioning accounting for 45% of the forecast expenditure for oil and gas companies over the next ten years, lifetime extension pushes back existing decommissioning dates of assets and invests some of that money

in extending operating life and productivity. This can be achieved by refurbishing existing equipment or replacing it with new equipment that is compatible with the current processes.

Enhanced Oil Recovery:

This entails the extraction of crude oil from a field that cannot be extracted through conventional means, usually by injecting gas, water, or chemicals at high pressure and temperatures into the wells. This can yield 30% to 60% or more of a reservoir's oil compared to just 20% to 40% using primary and secondary methods.

Seeking UK suppliers

North Sea operators, whether established or new, are seeking companies based in the United Kingdom to support these aims. Specifically, suppliers:

- with the agility to provide bespoke solutions on short lead times that can meet their needs,
- that can leverage modern technologies to cost-effectively increase production from aging assets, and
- that closely align with the operators' own net-zero goals.

For decades, Amarith has been undertaking challenging pumping projects including for offshore platforms and Floating Production Storage and Offloading (FPSO) vessels. The company is now at the forefront of providing pumping solutions to increase oil and gas production from North Sea brownfield assets.

Working with the world's major oil and gas producers, both established and new entrants, Amarith is successfully delivering bespoke pumping solutions on extremely short lead times enabling operators to quickly and cost effectively increase yields from existing fields or extend the working life of assets.

Turn over to read three case studies...



For decades, Amarith has been delivering pumping solutions to the world's oil and gas operators, frequently for challenging projects in the most arduous of conditions.

The energy crisis has placed a renewed emphasis for western sourced oil and gas with operators looking to increase production from the North Sea.

Operators are seeking leading suppliers based in the United Kingdom and Amarith is working closely with both established North Sea oil and gas operators and new entrants to quickly and cost-effectively help them to increase production from existing brownfield assets whilst minimising the cost of modifications to plant and processes.

Case studies of the Seagull development, Chrysaor platform and Catcher FPSO introduce how Amarith has successfully increased production through pumping solutions that facilitate Capacity Expansion, Lifetime Extension and Enhanced Oil Recovery.

Seagull – a capacity expansion project

The Seagull development, operated by Neptune Energy, is a field 17km south of the BP operated Eastern Trough Area Project (ETAP) Central Processing Facility (CPF) in the Central North Sea and has gross reserves estimated at 50 million boe.

Production from the four subsea wells will be delivered via a new subsea pipeline to the existing Heron pipeline system connected to the ETAP CPF. Gas from the development will come onshore at the CATS processing terminal at Teesside, while oil will come onshore through the Forties Pipeline System to the Kinneil Terminal, Grangemouth.

Neptune planned to double the throughput of the existing infrastructure, however the original pumps for the process were supplied by Girdlestone and are now obsolete. As identical pumps could not be purchased, Amarith was tasked with supplying bespoke pumps to modern API 610 standards but which matched the hydraulic performance of the existing Girdlestone pumps.

Amarinth designed and supplied two duplex feed booster pumps and two stainless steel CIP pumps which were all delivered in just 28 weeks. These were installed alongside the existing Girdlestone pumps to double the throughput of the existing processes. The new Amarith pumps were both hydraulically and dimensionally identical to the original Girdlestone pumps, significantly minimising the cost and time that would otherwise have been required to make changes to the existing infrastructure or processes.

Chrysaor – a lifetime extension project

Chrysaor (UK) Britannia Limited operates the Brodgar gas condensate field which lies 143km north-east of Aberdeen, Scotland, in the North Sea, in water depths of about 146m. The field has been developed as a subsea satellite with a tie-back to the Britannia Bridge Linked Platform.

When Chrysaor looked to extend the life of the assets, it found that the original pumps, supplied by Girdlestone, were nearing end-of-life. However, as Girdlestone is no longer in business, there were no direct replacements or OEM support.

Chrysaor turned to Amarith for its proven track record of supplying dimensionally and hydraulically interchangeable replacement pumps for Girdlestone and other OEMs along with spares and ongoing support. The agreed solution was that Amarith would design a standby bare shaft pump that was dimensionally and hydraulically equivalent to the Girdlestone pump and so could replace the existing pump immediately should any issues be detected without any change to associated equipment or the process parameters. Furthermore, as the existing pump could not be removed or production stopped, all the analysis of the existing Girdlestone pump for the design of the new one had to be completed whilst the pump was operating in-situ.

Amarinth successfully delivered the replacement bare shaft pump in 18 weeks from order. The new pump will have a minimum working life of 25 years, in line with the planned lifetime extension for the asset.

Catcher FPSO – an enhanced oil recovery project

The Catcher field is in the North Sea some 170km east of Aberdeen and is operated by Premier Oil. The area produces oil from 18 subsea wells, Catcher, Varadero and Burgman, which are a combination of production and water injection wells tied back to the Floating Production Storage and Offloading (FPSO) vessel Catcher. First oil was delivered from Catcher in December 2017.

During the original build of Catcher FPSO, Amarith had supplied six API 610 high pressure, high flow, low-shear duplex pumps. The large pumps delivered an 80m head with a high flow rate of 920m³ per hour using impeller sizes of over 0.5m.

FPSO Catcher has proven to be very efficient and profitable vessel and so an enhanced oil recovery project was established to increase capacity. The requirements demanded six new high-pressure pumps but to minimise modifications to pipework and associated equipment these larger capacity pumps had to fit the same footprint as the existing pumps.

Amarinth designed and delivered two larger replacement skimming pumps that not only fit the existing footprint but also used the existing Plan 53B seal support systems, thereby reducing overall cost of the new equipment and keeping delivery timescales to a minimum.

The other four pumps were upgraded by Amarith with new casings and increased diameter impellers to increase the working pressure, again minimising any modifications required to existing pipework.

The new and upgraded pumps were all delivered in 22 weeks enabling FPSO Catcher to quickly begin extracting more capacity from the existing wells.

The successful capacity boost provided by the new pumps has led to further discussions with Amarith to identify other pumps on the FPSO that could be upgraded to provide similar improvements.

