



**LIGHT ON ITS FEET:** The NU-SIFT concept has some features in common with Arup's Normally Unattended ACE (NU-ACE) self-installing and re-locatable platform. Pictured is the Maari wellhead platform in the Taranaki basin off New Zealand.

Photo: Arup

# Pooled resources

The prolonged oil price crisis has further complicated the already difficult task of making marginal hydrocarbon production economical. **Rob Watts** reports on a collaborative effort to control costs and ease access to stranded North Sea resources.

The collapse in the price of oil, from above \$100 per barrel in the summer of 2014 to below \$30 recently, has refocused the minds of an entire industry.

However, even before the start of crude's unexpected slide, many in the sector were urging operators to take a more open-minded approach to project development, with less reliance on traditional models in favour of smarter and cheaper ways to get oil out of the ground. The crisis, many argue, has now brought that need into even

sharper relief. One such company is Marginal Field Development Company (MFDevCo), formerly ABT Oil & Gas, based in Manchester, UK. The company is a specialist in development solutions for so-called marginal or stranded fields, those dismissed by operators as having little or no commercial interest due to their size, location or technical difficulty.

Convincing an often conservative sector that more pragmatism could help access millions of barrels of previously marooned resources has never

been an easy task, according to Alison Pegram, MFDevCo's managing director.

"With oil prices the way they have been for the last 10 or 15 years operators have not had to think in new ways," Pegram says. "Operators were making very good money rolling out the same conventional solutions and using the same conventional approaches."

However, with oil recently hitting 12-year lows and likely to be in the doldrums for some time, she adds: "We feel that is changing."

MFDevCo is developing

technical solutions it believes can help drive down capital and operational costs, as well as free operators from a dependency on existing infrastructure, therefore bringing previously stranded fields into play.

One concept is the Normally Unattended Self-Installing Fixed Tower, or NU-SIFT, developed in conjunction with engineering consultancy Apollo Offshore Engineering.

A second is the Normally Unattended ACE, or NU-ACE, using Arup's tried and tested

**“There has been a sea change in perception of, and focus on, stranded or marginal fields.”**

*Alison Pegram,  
MFDevCo*



self-installing and re-locatable ACE platform concept.

Both, the company says, are cost-effective, standalone production systems capable of redeployment that operate independently of existing facilities. Crucially for operating expenditure, as their names suggest, both can operate normally unattended.

As far as capital expenditure is concerned, they have the advantage of being relatively simple to build and rely less on expensive installation vessels. Another key to keeping costs down is the use of dry trees.

“We see being normally unattended as key to the cost savings. But these solutions will also be easy to install, easy to redeploy and have limited decommissioning costs,” Pegram says. The NU-SIFT is capable of multi-field processing, which primarily, but not exclusively, targets oil and gas fields in 50 metres to 150 metres of water.

It comprises structural columns fixed via foundations to the seabed, which support topsides containing the necessary process, utilities and ancillary facilities.

Crude can be stored within

the columns, while additional oil storage cells can be located between the structural columns, if necessary. The crude may then be exported via shuttle tanker, making the platforms independent from pipelines and host infrastructure.

To give an idea of size, a NU-SIFT designed for the Fyne field off the UK had 130,000 barrels of storage capacity, liquid production capacity of 16,000 barrels per day and a topsides wet weight of about 5500 tonnes.

This was to be the first NU-SIFT to be developed but is no longer being pursued following the drop in oil price.

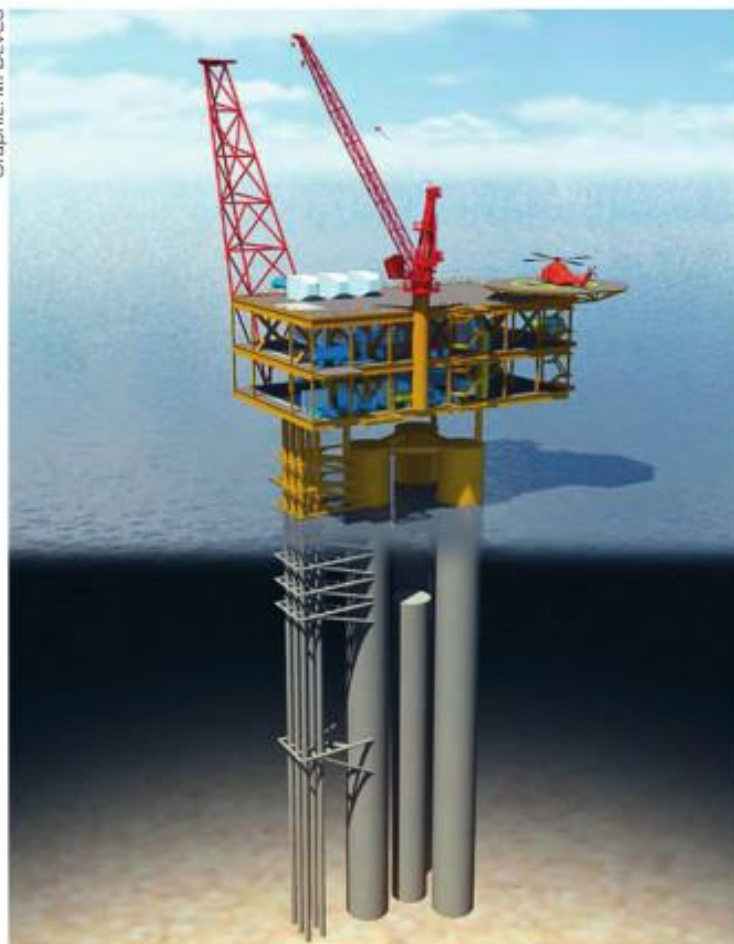
#### **Unmanned advantage**

Neither the NU-SIFT nor the NU-ACE concepts, admittedly, are new in themselves. However, MFDevCo is keen to point out that it believes it is using and combining technologies in novel ways.

Key to both concepts will be the use of normally unattended topsides that MFDevCo is developing in conjunction with process specialist Frames and Kongsberg Maritime, along with risk management expert RMRI.

Modelling and simulation

Graphic: MFDevCo



**COST CONSCIOUS:** The Normally Unattended Self-Installing Fixed Tower, or NU-SIFT, is especially suited to oil and gas fields in water depths of 50 to 150 metres.

**PREVIOUS EXPERIENCE:** Shell used Arup's self-installing design for the depletion compression platform at the Malampaya phase three project off the Philippines.



by Frames and Kongsberg, combined with analysis by RMRI, is being used to confirm the most appropriate way to deliver a process system that is as easy as possible to manage remotely and will require minimal intervention, while delivering the highest safety and environmental standards.

The overriding philosophy behind the topsides concept, the company says, is to achieve the right balance between production rates, uptime and reliability, with the frequency and cost of any visits to the installation.

Pegram says: "We are working... to design the process specifically to be operated normally unattended. Minimising the need for intervention has been one of the key criteria from the earliest stages of design and we achieve this by, for example, equipment and material selection as well as by removing unnecessary complexity and designing in redundancy where appropriate.

"By combining appropriate process design with materials that will minimise fabric

maintenance, we are able to reduce the amount of manual intervention required. This will deliver the levels of reliability and uptime required."

Of course, even normally attended installations have to be operated remotely from a control room. The solution to this will be Kongsberg's proven monitoring, control and communications equipment.

MFDevCo officials believe that technology can only be part of the answer to maximising the potential of marginal fields. They are advocating new models of collaboration between companies with expertise in specialist but complementary areas.

The company is at the head of a recently formed consortium that includes Arup, Kongsberg, Apollo, Frames and RMRI, as well as drilling management specialist AGR and Braemar ACM Shipbroking, which will assist in sourcing financing, asset negotiations and shipyard negotiations.

In February, oil services heavyweight Aibel became the latest company to join the consortium, which will fulfil a project management and

engineering, procurement and construction contractor role.

"We do not think that someone just providing a structure is going to be the answer," says Pegram. "So we are looking at the whole picture – the solutions, the technology, the financing, how you can put projects together to make marginal fields work.

"The technology reduces the capex and opex to a point where the decision is easier, but in many ways it can only go so far."

The consortium comprises companies with specific expertise in different areas, as opposed to the large engineering, procurement and construction contractors that typically have some capability but not necessarily specific expertise in all areas, Pegram says.

"Yes, there are technologies that can help reduce both capex and opex, but unless you have an engineering approach and are working with companies that are used on delivering solutions in the most cost-effective manner, then it is very easy to lose the technological benefits." »

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» **New models**

Many fields considered marginal or stranded often contain relatively large volumes of conventionally recoverable, oil-rich reserves that elsewhere might have been profitable to develop. However, their limited output and short productive lives may not justify the capital or operating expense of conventional production methods, especially from a unit cost perspective.

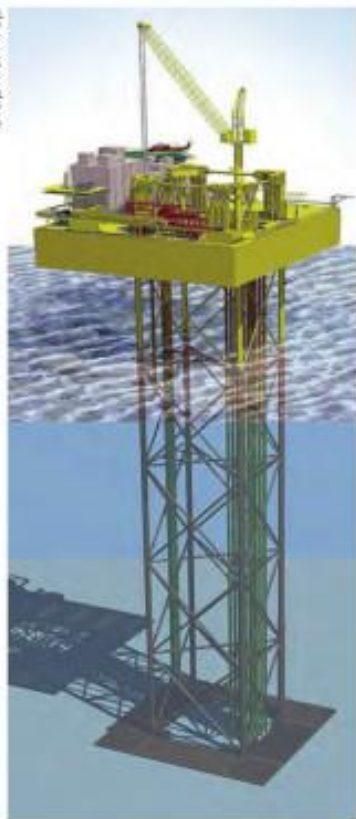
Even at higher oil prices, many such fields — particularly in mature regions such as the UK North Sea — fail to make it through companies' economic thresholds, a situation that is only intensifying as the oil price stays low.

Before the oil crash, RMRI identified 105 marginal fields on the UK continental shelf, each containing between 3 million and 30 million barrels of oil equivalent, with collective reserves of 1.25 billion barrels of oil equivalent.

"We are not doing this in reaction to the fall in oil price, we have been advocating a new approach for several years," Pegram says.

"However, the fall in oil price, coupled with the recent regulatory changes in the UK through the Wood Review, has, we feel, made us even more relevant and made the potential market where these solutions

Graphic: Arup



**TOUCH DOWN:** A rendering shows the Maari wellhead platform with legs fully extended.

can offer a real opportunity an awful lot bigger."

The established development model for the UK continental shelf has generally seen the installation of large platforms to develop huge fields — for example Brent or Forties — followed by dendron-like clusters

of platforms tied back to these central hubs, which in turn are connected to arterial export pipeline systems.

For fields within tie-back reach of host platforms this has proved cost effective.

However, because tie-back costs increase with distance, developments and exploration activity have generally been confined to the catchment areas of existing facilities.

More crucially in the maturing basin, small projects, already economically vulnerable, continue to be linked to an increasingly costly, ageing infrastructure, including the major platforms, where primary fields are severely depleted and where the future is insecure.

Many production facilities require increased throughput from satellite fields to remain economic. Unless several robust projects are within geographical reach, the security of the host, and therefore all its dependent fields, will be threatened, according to a study by RMRI.

Floating production, storage and offloading vessels provide a means of sidestepping these difficulties.

However, most were designed for medium-to-large accumulations, need round-the-clock crewing and have high

upfront capex, which is reflected in lease rates.


Leasing fixed installations is a diversion from the traditional industry approach but MFDevCo believes this model could be applied to its concepts. Pegram says the company is getting an increasing number of inquiries from operators.

"There has been a sea change in perception of, and focus on, stranded or marginal fields from the industry and government, who all recognise that they contain resources which we cannot afford to lose. There is universal agreement that new solutions and approaches are needed to achieve this," she says.

"We've received very strong interest from a wide range of potential clients and expect to conclude agreements on a number of projects in the near future."

Conversations are even ongoing with one supermajor, she says, although she declines to reveal which one.

How these talks develop, and whether MFDevCo's solutions will be implemented, remains to be seen. "It was always very easy to kill a project, even in the good times," says Pegram.


However, MFDevCo hopes that a change in mindset will instead breathe life into a host of marginal schemes. 

## OGA: 'Significant potential' in marginal fields

The UK Oil & Gas Authority (OGA) recognises the "significant potential" of bringing the UK North Sea's "considerable existing, yet undeveloped, discoveries into production", according to a spokesperson for the new regulatory agency.

"OGA is working with industry to bring up to 3 billion barrels of already discovered oil and gas into production. For example, there are hundreds of 'small pools' — discoveries of oil or gas

accumulations smaller than 15 million barrels of oil equivalent, thought to hold 1.5 billion boe — which are often challenged by high development and operating costs.

"A focus on reducing these costs is essential to help unlock many of these small pools. Near-term, this may include standardisation and building in scale of existing technology. Longer term, this will include more efficient development concepts based on currently experimental technology." 



**FOCUS:** Andy Samuel, chief executive of the UK Oil & Gas Authority  
Photo: OGA