

Whitepaper

The challenge for us all - how low can you go?

2015

The current oil price is creating significant challenges for the global oil and gas industry. This is affecting many regions in the world including subsea brownfield developments such as those in the North Sea and the Gulf of Mexico.

A combination of maturing assets, aging infrastructure and a high cost base, which had flourished in the luxury of oil in excess of \$100 per barrel, made the industry vulnerable to the commodity price collapse which started in June 2014.

Twelve months on, with Brent crude at around \$66 a barrel, Oil and Gas UK chief executive Deirdre Michie told her organisation's annual conference in Aberdeen that: "It's not unreasonable for the North Sea to set out its stall at being sustainable in a \$60 world."

Since then, we have seen the price of Brent fall further - to below \$50 a barrel - amid suggestions by some industry analysts that it may anchor around the \$55 mark in 2016 and 2017.

In the Gulf of Mexico the situation is no better, where the low price recently impacted on the weak uptake of drilling leases.

What once seemed like a worst-case scenario of life at \$60 oil now seems optimistic. Having to do business around the \$50 per barrel mark may be our new reality for the foreseeable future.

The need to change

This poses significant challenges to our traditional processes and practices. We simply can't pretend that \$120 oil will return anytime soon and we can't run our businesses on such misguided optimism. Nor can we rely on the cyclical nature of the oil and gas sector or external market forces to breathe new life into the industry at some future point to save us once again.

Such an upturn in fortunes would only mask a root need for change in our industry that has been required for several years now. Of course we've seen downturns before, but for the North Sea, now in its twilight years, this crash is different. The industry that emerges from the current wreckage will have to look and behave differently from the one that we have been used to. The rate of internal change must exceed the rate of external change to prosper. The world is changing – can we?

A new approach

Changing our approach to how we do business will therefore be the industry's lifeline.

A high reliability of hydrocarbon production and a consistent revenue return on investment are fundamentals for any operator – and yet, many companies are failing to achieve this for a variety of reasons.

With more than 80 per cent of world energy use still reliant on fossil fuel, the maintenance and optimisation of often-aging brownfield subsea fields is critical. The industry has a moral as well as an economic obligation to maximise total production from these difficult reserves.

Proserv, the leading energy services company specialising in the provision of life-of-field solutions to the global oil and gas industry, has identified that almost half of all client engagement looking for alternative solutions is because of dissatisfaction with the reliability of their current subsea production control systems. Others are seeking to add new wells or instrumentation to an existing asset, or simply looking to extend field life.

The challenges and opportunities that the industry faces with brownfield subsea developments are varied, but all too often the industry's initial response to them is not. The frequent reaction to a problem is to call for a complete system change - to "remove the old and replace with new"- when sometimes a more flexible approach may be appropriate.

Problems with the traditional decision-making model

This 'change everything' culture could only exist in an industry that has traditionally benefitted from a high commodity price environment. An equivalent example would be if you found a damaged windscreen wiper on your car and decided to scrap the whole vehicle! But we are not in that high price environment any more, and the complete change out default option may be uneconomic and no longer sustainable.

Rather than discarding all the old technology and equipment previously in place, not all of which necessarily needs changing, a more cost effective solution might be to work with the current system, selectively removing and replacing those components where change is required, and improving performance overall.

The Proserv solution

Proserv has developed a contemporary suite of products and systems offering a proven, highly reliable and resilient solution to give operators a truly 'maintenance free' subsea production control system and deliver uninterrupted production. These include technology solutions such as the co-exist, Subsea Electronics Module (SEM) retrofit, Subsea Control Module (SCM) refurbishment and topside upgrade solutions.

Core to the Proserv offering is the notion of working round the problem to find the best solution rather than trying to address the particular issue front of face with a single restrictive product offering approach. Often, that may mean focusing on only one aspect of a technology or system that requires attention and layering on, or working alongside the existing system rather than recommending a complete change out.

Because of the added value that this approach can bring, it's important that the operator engages with the solutions provider as soon as the problem or challenge is identified, rather than suggest a solution themselves and put that scope of work out to tender. It may be, for example, that the most appropriate answer is not the obvious one. It is far better to call support in once an issue has been identified so that the right solution can be evaluated – potentially avoiding a costly, protracted and restrictive tender process which provides no economic solutions.

This approach has many benefits. By selectively offering bespoke solutions to improve or enhance existing systems only where such work is necessary, intervention time can be significantly reduced and cost savings made. If, on one project, for example, a detailed exploration of the required scope of work found intervention could be eliminated from three or four separate Xmas Trees, the reduction in diving or ROV time alone could be in the region of \$1.5 million.

As another example, bringing additional wells into an installed 'brownfield' infrastructure or expanding an aging asset to compensate for tailing production may be problematic if the original equipment manufacturer (OEM) no longer supports the technology.

Proserv's co-exist offering enables field extensions without affecting the existing installed subsea controls system. It negates the need for spare umbilical conductors and the installation of a new umbilical, therefore minimising any production downtime, and maximising the use of existing infrastructure.

Co-exist allows additional control technologies to be deployed to augment an existing system and open up a range of opportunities that were not previously available. Examples of this are the addition of control modules, wells, instrumentation or even full field extensions. As each challenge is different, so no co-exist solution is the same. Initial engagement is therefore essential to understand the issues faced and provide the optimal engineered solution.

Likewise, brownfield upgrades often require additional instrumentation to monitor aging assets for leakages, vibration or for production performance (multiphase flow, sand or erosion monitoring etc.). Older installed subsea production control systems may not have the interfaces required to support this work.

Another example of the benefits to be gained from Proserv's selective approach is in subsea system 'brain surgery', where the electronics in the control module require replacement, either because of reliability issues or in line with changes required elsewhere in the system.

The alternative to changing the electronics is to change the entire control module – which is a costly process but also introduces significant risks because of the changes made to all the external interfaces, which are often themselves obsolete. However, replacing just the electronics allows for the external interfaces to remain intact.

Such adaptations and overall simplifying of the subsea process have been made possible through the development of market-leading technologies which can be combined with legacy systems, offer increased options in expanding fields and allow for the retrofitting of a large variety of designs into existing operations.

One of the latest of these from the company has been the development of the Artemis 2G (A2G) subsea electronics module, which is a next generation subsea controls and communications technology for green and brownfield applications. It frees operators from the constraints of an existing umbilical by finding additional signal capacity to enable a cost-effective field upgrade or extension.

The technology offers high-speed, copper-based, multi-drop networks that can stand alone or piggy back on an existing system. It also maximises flexibility and optimises functionality, thereby providing more powerful communications and instrument support whilst operating alongside any legacy signals without disruption to either. The A2G can increase accessibility for remote usage through its embedded webpage interface from subsea to the desktop. It can also be used to co-exist with existing networks, is fully back compatible with existing technology and doesn't require any proprietary software for remote configuration and support.

Proserv's proven response - Ithaca Anglia A

The Anglia A is a remote unmanned platform in the North Sea which includes two subsea production wells linked to the Lincolnshire Offshore Gas Gathering System (LOGGS). The subsea control system was installed in the early 90s, and is unsupported from the OEM. The system has suffered from poor system availability, unscheduled shutdowns, and limited remote support. The continual shutdown and unreliability of the system restricted the asset uptime and production to the LOGGS system.

The challenge was to create an alternative subsea controls option and secure reliable production from the wells.

Proserv provided a retrofit solution using the existing SCM hydraulic and mechanical hardware but replacing the SEMs and master control system (MCS) with a more reliable and fully supported system. This provided a replacement solution with the incumbent SCMs and an upgrade path to improve availability and support. A number of challenges presented themselves during the project, including the use of obsolete inductive subsea connectors. The availability of spare inductive connectors and spare SCM on the project enabled Proserv to conduct upfront testing and solution verification using the Proserv SEM. The eventual SEM design included project specific power supplies and analogue drivers purpose made and qualified for this project.

An initial study was undertaken to consider the implications of SEM replacement, including the use of existing inductive couplers. The study also incorporated upfront testing and investigations using spare inductive couplers and SCMs available on the project.

Once a solution was identified, 3 SCMs were disassembled, pre tested, retrofitted and tested with new Proserv electronics. The surface control system was improved with a new MCS to replace the OEM system and provide communications to the retrofit SCMs. Final system testing and offshore installation and commissioning completed the scope and allowed production to restart on the wells.

As a result of the work, Proserv was able to convert a failing and unreliable system into a reliable and supported producing asset, with optimised uptime and remote connectivity.

How long can you afford to do nothing?

On mature brownfield assets with dwindling production, the longer it takes to make the right and cost effective decision to maximise output, the more expensive that decision becomes.

By not changing the operating model, the operator could risk the future of that asset. A subsea field asset which is losing revenue through production, against a backdrop of an increased operating list cost, is only going to become increasingly less viable to the point of shut down and decommissioning, denying the world production of a limited and valuable asset.

By thinking in a smarter way to problem solve, and breaking out from the notion that all issues require a full system upgrade, subsea operators have it within their power to prosper, even in the current economic climate.

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