

ALL'S WELL AT THE WELLHEAD

New methodologies and technologies enable upstream operators to keep on top of their equipment and well sites, writes Jonathan Sheikh-Miller



Annabel Green, chief technology officer at Tendeka.



Monish Chatterjee, vice president sales and proposals at Proserv.

For exploration and production (E&P) operators, the bullish run on the price of Brent crude since the turn of the year has been a welcome boon.

Margins may not be so tight presently, but the relative health of the oil and gas industry is always susceptible to many external and potentially turbulent factors.

For Middle Eastern upstream outfits, concerns over shifting global production levels and the constant threat from the burgeoning renewable energy sector cast a continual shadow. So the need for ever-

greater efficiencies and reduced costs remains a constant mantra.

Adopting and investing in a plethora of automated technologies is increasingly a no-brainer at every operational stage, and the wellhead is no exception.

Monish Chatterjee, vice president sales and proposals at Proserv, an oilfield services provider, says: "In our 25 years in the region, we have seen a shift, certainly in the last ten years to 'smarter' wells and 'connected' oilfields.

"Operators are investing in technology that integrates sensor and monitoring

equipment to provide real time data and conditions at the wellhead allowing control centres to make faster and more informed decisions.

"With production assurance and well integrity being a hot topic with many operators, it is critical that knowledge of what is happening at the wellhead is known, at any moment. By retrofitting old wells with smart solutions, we are making data collection safer, real time and more relevant."

Chatterjee feels supervisory control and data acquisition (SCADA) control system

architecture has provided asset owners with greater visibility and faster response times. Information at the wellhead, the first point where hydrocarbons come to the surface, is critical to understanding the condition of the well flow, temperature, pressure and annulus conditions.

According to Chatterjee, prior to the adoption of SCADA systems, such checks required time-consuming site visits to record data from analogue instruments.

Well Integrity

Well integrity is a key component of making sure the entire well system is functioning at an optimum with minimum levels of risk.

Ken Feather, the chief marketing officer of TGT Oilfield Services points to proactive integrity management explaining: "New wells are generally delivered intact with shiny new completions, but some flaws, such as leaking connections and poor cement isolation can exist at the outset, so it's important that operators conduct regular integrity diagnostics surveillance from the start.

"Then as the well ages, it's inevitable that some integrity breaches will occur and these need to be diagnosed early and cured or managed."

TGT Oilfield Services has found that its through-barrier diagnostics technology, which evaluates the entire well system from inside the tubing, has witnessed an increasing demand as E&P operators seek to eradicate inefficiencies.

But while technologies may advance, some factors, including topography, remain fixed. Wellheads and equipment need to be resilient to cope with harsh conditions, including extreme temperatures, while handling corrosive materials.

According to Proserv's Chatterjee, for instance, while onshore systems are usually single well, multi-well systems are often installed offshore due to space constraints and the need to operate in hazardous areas. These typically include a more complex 'control logic' in order to ensure process interlocking.

In the Middle East, many onshore oilfields are also situated in remote,

"AS AN INDUSTRY, WE HAVE NOT YET EMBRACED TECHNOLOGY AND AUTOMATION SUFFICIENTLY TO PROVIDE A ROBUST ALTERNATIVE TO SKILLED PERSONNEL."
ANNABEL GREEN

difficult-to-reach locations, which could jeopardise workforce safety but the need to monitor individual components at the wellhead remains a priority.

The wireless revolution

Wireless technology has been a virtual game-changer, enabling large savings in expenditure and time.

Annabel Green, the chief technology officer at Tendeka, a completion and well systems provider, says: "The wireless revolution has only just begun for production optimisation technology. In the near future, we will see wireless control from the reservoir to the desktop."

TGT Oilfield Services' Feather feels that while data collection methodologies have evolved, the crucial element lies in interpretation. "Using and extracting valuable insights from the data is now the key focus. For example, permanently installed fibre-optic distributed temperature and acoustic systems continuously generate terabytes of data, and this needs to be transformed into actionable insights. Companies that specialise in temperature and acoustic modelling are collaborating with fibre-optic deployment firms to realise these gains for operators."

Research and development

Measurement and control technologies have moved on apace in the upstream sector but research and development continues to ramp up reliability yet further.

Chatterjee sees the wellhead system moving forwards in two main areas:

smarter wells, which embrace the latest monitoring and measuring technology, and, secondly, environmentally considerate wells that require lower power consumption at site, as well as green solutions including systems that run on solar energy.

He also expects to see advances in technology related to well integrity, safety and modularisation as well as yet further developments.

"Sustained annulus monitoring systems can play a major role in improving well integrity. Bleed off systems have been introduced for the safe management of wells. Downhole chemical injection systems are being increasingly looked at to improve well integrity and prevent the corrosion of well casing," says Chatterjee.

"Several major companies are adopting modular skid components, whereby wellhead panels, chemical injection skids, cathodic protection and downstream wellhead valves are installed on an integral skid and pre-tested at the vendor's facility and then shipped to site. This reduces well site footprint, installation time by 60% to 70% and mitigates site-related delays due to multiple vendor co-ordination issues."

The human factor

The raft of new technologies being implemented at the wellhead, and the wider well system, will ultimately mean a further reduction in the need for human interaction at 'connected' oilfields in the future. Could lower headcounts and less downtime, coupled with even great efficiency and reliability, equip E&P operators to ride out oil price fluctuations and economic downturns more smoothly?

Tendeka's Green does not think that point has yet arrived. "As an industry, we have not yet embraced technology and automation sufficiently to provide a robust alternative to skilled personnel. Doing so requires both cultural change and significant investment.

"As we restructure our industry following this prolonged downturn, it provides the ideal opportunity for fundamental change, one that if embraced will help future-proof upstream operators," concludes Green. ○