Next Generation Wireline Logging Technology for Modern Oil and Gas Operations

Well Integrity – New Logging Technologies
How BP Macondo Pushed Well Monitoring to the Fore
Wireline Technology Undergoes a Substantial Shakeup
The Latest Advances in Wireline Technology
Building the Technology of the Future
Next Generation Wireline Logging Technology for Modern Oil and Gas Operations

Contents

Foreword 2
Tom Cropper, Editor

Well Integrity – New Logging Technologies 3
Marvin Rourke, GOWell International, LLC

The Role of Technology
The Continuing Need for an Experienced Corrosion Log Specialist
Detecting Pipe Defects
Recent Developments
Both Proactive and Reactive Monitoring
Temperature and Noise Logs

How BP Macondo Pushed Well Monitoring to the Fore 7
Tom Cropper, Editor

BP Fallout
Addressing the Problem
Modern Challenges

Wireline Technology Undergoes a Substantial Shakeup 9
Jo Roth, Staff Writer

Deepwater Drilling
Cost Saving
Data Gathering
Logging While Drilling

The Latest Advances in Wireline Technology 11
James Butler, Staff Writer

A Changing Market
Improved Technology
Conveyancing

Building the Technology of the Future 13
Tom Cropper, Editor

Offshore Will be Hit by Lower Costs
Deepwater
Future Innovations

References 15
FOREWORD

William Cropper has produced articles and reports on various aspects of global business over the past 15 years. He has also worked as a copywriter for some of the largest corporations in the world, including ING, KPMG and the World Wildlife Fund.

William Cropper

Well Integrity – New Logging Technologies

Marvin Rourke, GOWell International, LLC

GOWell is in the business of advancing Well Integrity Solutions – Read about our latest technology offerings.

The Role of Technology

Today, software tools are available that can assist operators with Well Integrity Management by establishing monitoring and preventive maintenance programs via a well failure database and performance-based decision tools. Together, these software tools collect a vast array of relevant information from well and completion designs to well histories. Surface data includes tree inspections, SSSV & tree valve testing and tubing and casing annulus pressure measurements. Downhole data includes cement bond evaluation, tubular corrosion and deformation logs, abnormal flow and leak detection. When used effectively, these software tools can optimize preventative maintenance and reduce the overall number of problematic wells. Our industry’s growing needs are giving impetus to technology developments to provide better equipment for evaluating well integrity both at the surface and downhole.

At certain points in the lifetime of a well it is important to evaluate the tubular and annular integrity by running logs such as cement bond evaluation, production flow, and tubular inspection logs. At the well construction phase, the cement placement is evaluated by cement bond logs, and sometimes early after well completion, a baseline set of tubing and casing inspection logs are run. These baseline logs form part of a corrosion monitoring strategy which allows field-wide predictions to be made which is especially important in areas of corrosive fluid production.

The Continuing Need for an Experienced Corrosion Log Specialist

Tubing and casing integrity inspection typically consists of a combination of mechanical multi-finger caliper logs (MFC), electro-magnetic (EM) pipe thickness logs, ultrasonic casing inspection logs, and downhole cameras. The workhorse for tubing and casing inspections over the past two decades has been the multi-finger imaging caliper log. Currently, a more mature MFC data analysis workflow exists, as well as more robust reporting tools. However, these are not a substitute for a knowledgeable and experienced corrosion log specialist. Today it is common to present corrosion data with an interactive software package such as MIPSPro which allows for comprehensive visualization of the corrosion log data, together with interpreted comments and annotations. MIPSPro is now an increasingly common replacement for traditional paper logs.

Detecting Pipe Defects

Caliper logs are limited to profiling the pipe inside diameter (ID). To evaluate corrosion or pipe damage beyond the inner wall requires additional measurements. A key technology for tubing and casing inspection employs Electro-Magnetics (EM), as these measurements are...
These software tools collect a vast array of relevant information from well and completion designs to well histories.

Sensitive to pipe thickness where wall thinning is associated with corrosion or other pipe defects. Commonly used methods include Magnetic Flux Leakage (MFL) and Remote Field Eddy Current (RFEC) with a number of commercially available logging tools in the market. RFEC tools are “AC” based measurements employing a low-energy transmitter and receiver coil(s) located some distance away, typically 2-3 times the pipe diameter being inspected. The phase shift and amplitude of the received signal are sensitive to pipe properties, including thickness. Depending on the tool configuration, the EM measurements are either sensitive uniquely to the thickness of the innermost pipe or the total metal thickness of all concentric pipes in the well. For example, in a well with a tubing completion and production casing, these RFEC tools will give either a tubing-only thickness or a total combined tubing and casing thickness value. In the later case, subtracting wall loss derived from a multi-finger caliper log can give a pseudo-casing inspection log. With transmitter and receiver coils located a significant distance apart in these RFEC tools, the vertical measurement resolution can be degraded.

Recent Developments

A more recent development is to use a technique called Pulsed Eddy Current (PEC) where a short, high-energy EM pulse from a transmitter coil generates the surrounding concentric pipes. Immediately after the excitation pulse, a co-located receiver coil measures the collapsing eddy currents. Embedded within this received “decay” curve is a complex signature that is a function of the surrounding pipe’s geometry and properties. Forward modeling and simulation reveals that early part of the decay is sensitive to only the inner pipe whereas, in later time, outer pipe signals appear. By employing an inversion processing technique, the composite decay signal can be unraveled allowing for determination of multiple tubular thicknesses. In particular the identification of corrosion or defects in a second or third outside tubular is possible. The co-located transmitter and receiver coil configuration helps improve the vertical resolution compared to RFEC tools. Additionally, the identification of corrosion or defects in a second or third outside tubular is possible. The co-located transmitter and receiver coil configuration helps improve the vertical resolution compared to RFEC tools. The advantage of this technique is that casing problems can be located without the need to “pull the completion” as the slim PEC tool can be run through tubing.

To process the MTD-E data we employ a three-step process from raw data to final results. The first step is to determine by inversion the EM properties of each joint of the tubulars. A second inversion is then applied to simultaneously calculate the multiple thickness results and, finally, a set of outputs is created which allow the results to be quality controlled and interpreted. This processing workflow is incorporated into the MIPSPro package that is user-friendly and allows for interpretation and visualization of multi-finger caliper, MTD-E tool and other logging data.

Another application is the evaluation of surface casing behind the cemented production string. GOWell’s latest generation PEC tool the MTD-E is configurable for optimum data acquisition and is fully combinable with other casing inspection and logging sensors. To assist with job preparation and tool configuration, a software package called “MTD-E Job Planner” is available. Tool response to actual tubing and casing configurations can be predicted, which allows configuration for optimal acquisition and determination of the required processing parameters.

To process the MTD-E data we employ a three-step process from raw data to final results. The first step is to determine by inversion the EM properties of each joint of the tubulars. A second inversion is then applied to simultaneously calculate the multiple thickness results and, finally, a set of outputs is created which allow the results to be quality controlled and interpreted. This processing workflow is incorporated into the MIPSPro package that is user-friendly and allows for interpretation and visualization of multi-finger caliper, MTD-E tool and other logging data.

A side-by-side visualization of all Well Integrity data from different measurements is an important interpretation tool. Measurements which corroborate and complement each other increase the confidence level and reduce uncertainty of the interpreted results. A caliper-only interpretation could, for example, report pipe in good condition even where significant metal wall loss exists if scale or bitumen deposits are present. With additional information from an EM based inspection tool, this can then be resolved. The software tools for an integrated Well Integrity evaluation continue to evolve as there is a growing awareness and needs within the industry. GOWell and Epistle are working hand-in-hand to bring to the market a new software package for improved visualization of a wide range of measurements for Well Integrity evaluations.
Both Proactive and Reactive Monitoring

Surface casing vent flow is one example of a serious well integrity problem where formation fluids uncontrollably escape to the surface. Possibly failure mechanisms include channeling through poor cement placement or by degradation of cement and subsequent pipe corrosion. In such cases, if running only standard casing inspection tools, crucial information may be overlooked such as pinpointing the exact depth of the fluid entry and the flow path to drive remedial actions. This makes a distinction between casing inspection and leak detection, the latter being always in reactive mode or “after the fact” diagnoses whereas the former serves as proactive monitoring for preventive purposes. A cement bond log may serve to identify poor cement zones to corroborate results from leak detection tools.

Temperature and Noise Logs

When used regularly during a well’s lifecycle, multi-finger caliper and EM corrosion logs can be used to monitor corrosion and help mitigate serious leaks or well failures. However, in situations where a downhole problem is a fluid leak in the tubing or casing, then additional diagnostics can be used to locate the leak. Such abnormal flow conditions can be assessed by various techniques ranging from a simple temperature log to more sophisticated leak-detection noise logs. Temperature logs have been used for decades and should not be forgotten but can be tricky to interpret conclusively. Noise logs were originally acquired using a downhole hydrophone and an operator listening through a set of headphones. Today’s noise tools consist of a wide-band hydrophone with digital signal processing to produce a frequency spectrum log (spectral noise logging). However, noise logging does have its challenges. These include how to eliminate unwanted noise not associated with leaks while still having enough sensitivity to pickup minor leaks. In many cases this can only be achieved by a series of stationary measurements which are time-consuming to acquire and can completely miss the leak interval. GOWell’s next generation noise logging tool will feature a large array of acoustic sensors and employ processing that allows for a robust extraction of the small leak signals while logging continuously. It is sometimes not possible to reproduce leaks unless similar well conditions at which the leak occurs are re-created. Additionally, the leak may not clearly manifest unless a minimum pressure differential across the pipe or flow path is established. Such pressure differentials also make for sufficiently high velocities and associated noise beyond base line noise, necessary for leak detection’s discrimination. Certain temperature profiles may also lead to pipe expansion profiles and anomalies that may disappear or change when a different temperature profile develops. This is common in Steam Assisted Gravity Drainage wells (SAGD). The increasing needs of the oil and gas industry and the Well Integrity arena are driving the demand for new technologies. Logging measurements and techniques for caring and annual evaluation play an important role and are continuing to evolve. GOWell is focused on developing and deploying advanced Well Integrity solutions for the global logging industry – a partner today and in the future ready to support wherever and whenever.

Contact Details

10642 W. Little York Rd. Houston, TX 77041, USA
Tel: +1 (713) 909-2555
sales.usa@gowellpetro.com
www.gowellpetro.com

How BP Macondo Pushed Well Monitoring to the Fore

Tom Cropper, Editor

After the Gulf of Mexico disaster, the industry is finally placing the required emphasis on well integrity management.

N 2010, an explosion on board a BP oil rig in the Gulf of Mexico rocked the offshore world and changed the industry forever. Among the many learnings to have come in the wake of the disaster is an increased awareness of the importance of constant monitoring of well integrity. As infrastructure ages, and rigs delve into deeper waters, the strain on equipment is growing. Although all downhole equipment is rated with an expected service life, it is becoming increasingly difficult to account for variables. Unexpected downtime, along with the risk of catastrophic failure, are to the forefront of rig operators’ minds, which creates an imperative for change. This article will focus on the emerging challenges and demands which are spurring a search for technological innovation in well monitoring.

BP Fallout

The BP disaster was a perfect illustration of why deepwater exploration can be so dangerous. The explosion happened shortly after drilling on the deepwater well had been completed and just before the well was capped to allow a production rig to move into position. A failure in the concrete seal at the well head sparked a leak which led to an explosion, discharging an estimated 4.9 million barrels of oil into the ocean. Even as the clean-up operation was underway, the search for reasons for the blowout began. Reports into the cause of the disaster have pointed to multiple failings in procedures, safety, containment and monitoring.

The priority since the disaster has been to ensure the right lessons have been learned and that such a catastrophe will never happen again. A report published by the European Commission shortly after the accident identified failings in a fragmented regulatory framework which meant there was little assurance that risks were minimized throughout the union. This led to the establishment of the Offshore Directive, intended to establish a clearer international regulatory framework covering offshore oil. Meanwhile, the Subsea Well Containment and Control Taskforce, comprised of 30 members from 20 organizations, made a list of recommendations about how to improve well safety and to contain any hydrocarbons after a spill. However, there is still work to do in developing a comprehensive and unified global response to integrity management. While significant progress has been made in the US and Europe, other areas such as East Asia remain fragmented and reliant on self-regulation.

Addressing the Problem

The cumulative result of such learnings is that, for well integrity, monitoring is being treated as a major priority. Companies are investing substantial amounts into developing as clear a vision of conditions downhole as possible. BP, for example, reacted to the Macondo disaster by the establishment of a new organization with overall powers for well integrity, which reports directly to the CEO. Annual events such as the annual well integrity conference, which is now in its third year, illustrate the industry-wide attempts to use collaboration to identify challenges and solutions.

As a result of all this focus, technological innovation is moving apace as companies work hard to improve their well monitoring processes. According to all the available data it’s a good thing too. A study on the Norwegian Continental shelf by the Norwegian Petroleum Safety Authority found that a fifth of every well analyzed had integrity weaknesses. A 2011 SPE paper on well integrity in the Gulf of Mexico found that around 45% had sustained pressure issues.

Modern Challenges

The issue is exacerbated by the modern offshore exploration environment. Advances in technology have enabled drilling companies to extend the lifecycle of existing wells and expand into environments that would previously have been considered out of reach. Doing so, though, creates a number of additional risks.
Wireline Technology Undergoes a Substantial Shakeup

Jo Roth, Staff Writer

The oil and gas industry is coming under multiple pressures and these are reflected in the development of new downhole wireline tools.

TOUGH ECONOMIC conditions have forced oil companies to make hard choices. But for all the sacrifices and savings made, offshore oil extraction remains as a priority. In today’s safety conscious world, market by increased post-Macondo regulatory oversight, the monitoring of well integrity has become one of the primary responsibilities of E&P companies. Such demands make a fertile ground for innovation with new products coming to market promising greater costs efficiencies, superior data gathering, and the capacity to withstand unprecedentedly harsh conditions. In this article, we’ll examine the key challenges and how the industry is rising to meet them.

Deepwater Drilling

For all the commercial uncertainty surrounding the market, the future of oil production is undoubtedly in deepwater, but as these deeper wells come into play, they create a number of new obstacles. These include:

- **Tension**: These wells are often thousands of feet deep. Lowering long lengths of heavy cable exposes it to incredible levels of tension exceeding 10,000lb.
- **High pressure**: The deepest wells take drillers into ultra-high pressure environments exceeding 3000psi.
- **High temperature**: Some wells could be operating at 500 degrees Fahrenheit and more, taking it beyond the operational tolerances of most conventional systems.

In preparing equipment for these harsh conditions, developers are redesigning every component. New products, such as the Schlumberger’s new high tension conveying system, benefit from extensive development to ensure they are capable of delivering maximum performance in the harshest environments. At its heart is a high strength cable which has increased tension tolerances and can function at up to 13,000lb.

The entire conveyance system delivers a host of benefits including, increased safety in high tension environments, reduced cable maintenance, few runs and increased efficiency, which results in rig time savings.

**Cost Saving**

Offshore oil production has always been a cost-sensitive business, but the volatility surrounding the market conditions have, if anything, created an opportunity for well integrity monitoring solutions. With every hour of downtime cutting into profit margins, oil companies need to minimize the amount of time required for serious maintenance. For that reason, they need an accurate and up-to-date view of conditions in the well. Monitoring systems, therefore, assume an unprecedented level of importance in terms of oil extraction. However, while these products are required to produce the best possible results, they too must improve cost efficiency at every stage of the process. A key way to do this is to reduce wastage. One of the most important areas of advancement over the past couple of years has been in the use of digital technology. By producing digital monitoring solutions which can achieve continuous wireline monitoring, operators can extend the life of equipment. Traditional methods will see the wireline deployed for as long as is needed and then discarded afterwards irrespective of its condition. Products which can provide an enhanced view of conditions, allow the possibility of re-use which creates significant incremental savings. The overall result is to mitigate the increased risk from high tension environments while enabling tools to capture the breadth of data required at maximum efficiency.
Many of the world’s existing oilfields are extending their life well beyond their original lifecycle as oil companies find new techniques which can enhance recovery.

Data Gathering
As technology improves, the amount of data that can be captured is increasing. Logging tools routinely provide information such as tree inspections, tubing and casing pressure measurements, cement bond evaluation, corrosion assessment and detection of abnormal flow rates or leak identification. This can all be of crucial importance in alerting operators to any issues which might require attention.

Gathering this information is one thing, but displaying it is quite another. The traditional approach of storing data and presenting it in paper presentations to be analyzed is being replaced by faster realtime data gathering which can transmit information to the surface. Operators can then view the totality of information collected in real time enabling them to make prompt and effective judgements.

In delivering this functionality, companies are turning to interactive software packages which can display substantial amounts of information in real time. These can be monitored on the surface with software packages, which can seamlessly connect with the downhole logging equipment. Technology is becoming more interactive with the capacity to be accessed online from multiple sites.

This in turn allows teams and individuals to see hourly updates.

Logging While Drilling
Wireline logging technologies are the established norm in the oil and gas industry, but recent years have seen increasing use of Logging While Drilling (LWD) applications. These first arrived in the 1980s, but it is only now that they are beginning to be taken seriously. Historically, LWD tools were unable to compete with faster and more efficient wireline counterparts. Log quality, resolution and depth accuracy were inferior to wireline counterparts, but technology is developing and in many cases, they are now able to provide measurements with accuracy comparable to the more commonly used wireline technologies. In addition, the time of acquisition with LWD is shorter than wireline technologies.

Instead of one or two days, information can be available within a few hours. This is prompting many companies to incorporate LWD into their operations - but this technology is still developing. Wireline technologies are also improving and, because they are well established, operators feel more comfortable using them. There is less of an unknown element, which makes them more reliable and dependable. Ultimately, it is likely that the most forward thinking operators will adopt a combination of both elements. This requires an understanding of the characteristics of both types of products, and the benefits they can bring.

The market is in an interesting state where development is moving quickly. There are numerous providers in this space, which in turn fuels competition and promotes innovation. In developing these new generational products, though, much thought needs to be devoted to their application. Engineers and end buyers need to be clear about what they need and the environments in which they will be operating. Developers need to provide highly effective measurement and evaluation tools to identify where and how their tools can deliver the required improvements. Because these new tools are venturing into the unknown they are having to develop new testing and assessment parameters to ensure products are equipped to operate within the harshest environments. Only then are they able to assess with certainty whether products are equipped for the harsh demands of modern oil exploitation.

BPS GULF of Mexico disaster has placed well integrity at the heart of offshore oil and gas operations. As wells become deeper, monitoring multiple pieces of information is becoming a major priority. The result of this shift in emphasis has been a rapid development in the quality and sophistication available, with new techniques improving data acquisition, accuracy and efficiency. Understanding the potential this offers is crucial. This article will examine the ways in which wireline technology has developed and the ways in which it can offer real potential for oil and gas operators.

A Changing Market
The traditional wireline logging method has been to lower a logging tool or string of instruments into the borehole. Information is collected and then delivered to the surface where it is presented in paper form for later analysis. Electric logs have been used since the 20s but it is only since the Macondo disaster and the greater regulatory scrutiny it brought that oil companies have been prioritizing logging data. Today they are delivering an ever-increasing range of information to improve well management. Developers need to understand the characteristics of both types of products, and the benefits they can bring.

This information is becoming increasingly valuable, given the aging nature of much offshore equipment. The industry has become highly adept at maximizing well production in mature fields through the use of advanced oil recovery techniques. Primary and secondary techniques can extract up to 30% of an oil reserve, which potentially leaves vast resources untapped within rock formations. Recent years have seen the adoption of tertiary techniques with the reduction of surface tension through the injection of gases, chemicals and steam into the reservoir.

The effect is two-fold - firstly it increases the lifecycle of oil fields well beyond their original service date and secondly the use of chemicals and steam subjects downhole equipment to temperatures and corrosive elements which can increase decay. As a result, much of the infrastructure is ageing and in questionable condition. For the sake of safety, integrity issues must be identified well before they arise, and for the sake of profitability they must reduce the pressure on maintenance. Wireline logging has the ability to do both. Once operators are certain their rigs are in safe condition, they will be able to provide more information on production and flow rates, which enables them to better forecast the performance of the well.

Improved Technology
The demands of the market are spurring innovation in measuring equipment. Caliper logging tools, which have for so long been the mainstay of wireline logging, are limited to measuring the internal width of the tubing. To identify surface thinning and corrosion, electro-magnetic logs are used, which can provide information on pipe thickness to identify potential areas of degradation. However, even some of these are limited. Older single frequency EM logging techniques were able to provide only certain levels of information which is why operators have, in recent years, progressed to multiple frequency techniques. One of the most advanced is a technique called Pulsed Eddy Current (PEC), which measures multiple thicknesses of both the inner and outer tubing. This allows a quantitative evaluation of corrosion without having to remove any tubing. The key to using this is understanding how the tool responds to pipe thicknesses. It works by supplying pulsed current into the transmitting coil of the tool. There will then be a time-varying electromagnetic force (EMF) in the receiving coil. If there is any thickness variation, faults or flaws in the pipe string the induced EMF will be different from its expected level.
As part of the drive to extract more oil, companies have become more adept at understanding the makeup of reservoirs.

**Conveyancing**

As part of the drive to extract more oil, companies have become more adept at understanding the makeup of reservoirs. This, combined with advanced drilling techniques, contributes to a more complex wellbore. From vertical wells, the industry is expanding into deviated, s-shaped and horizontal wells. However, this makes many conventional wireline logging techniques more challenging and in some cases impossible. At a time when the acquisition of logging data is becoming even more important, obtaining that data remains a priority. Logging has possibly never been more challenging and in some ways in terms of how cheaply operations must be managed. Even so, the long term trend is clear: cost and risk. With this new technology, though, come new practices and new methodologies.

The training and skill of logging engineers remains an integral part of the process, if not more so. Understanding how these new tools work and how they can be used to deliver the data is critical. Equally, being able to accurately analyze the data and comprehend the information it is conveying will be critical across offshore operations.

The offshore industry is undergoing a time of rapid change. The goalsposts have been moved in some ways in terms of how cheaply operations must be managed. Even so, the long term trend remains a priority. Logging has possibly never had such a high priority within drilling operations. Recent years have, therefore, seen a rise in the development of innovations and technologies, but one thing is clearer than anything else – the future will almost certainly see more.

**Offshore Will be Hit by Lower Costs**

The fluctuations that hit the oil price in 2014 have a major influence on planning for the future. From highs at well over $100 per barrel in the first half of the year, they plummeted to bottom out at around $40 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events.

For example, at the time of writing, oil prices have fallen slightly to $56 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events. For example, at the time of writing, oil prices have fallen slightly to $56 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events. For example, at the time of writing, oil prices have fallen slightly to $56 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events. For example, at the time of writing, oil prices have fallen slightly to $56 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events. For example, at the time of writing, oil prices have fallen slightly to $56 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events. For example, at the time of writing, oil prices have fallen slightly to $56 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events. For example, at the time of writing, oil prices have fallen slightly to $56 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events. For example, at the time of writing, oil prices have fallen slightly to $56 per barrel. Since then they have recovered to just under $60 per barrel. However, they remain vulnerable to geopolitical events.

**Assessing the future demands of oil is no easy task and depends on a variety of factors including**

- continued production of US Shale
- OPEC’s decision to increase or lower production
- and ongoing geopolitical issues in Syria, Iraq and the rest of the Middle East. The number of imponderables is great and a look into the past shows that predictions are often cast aside by the turn of events. However, as things stand, the general industry consensus seems to be that it may be some time before prices approach the historic highs of 2014. Goldman Sachs’ current oil forecast placed Brent Crude at an average of $48 per barrel in 2015, rising to $66 in 2016. Such pressures and uncertainties have impacted the offshore market.

**Deepwater**

Deepwater expenditure has been hit by the low oil price. BP and Shell were both among major oil producing nations to slash their E&P budgets. Speaking at Northwestern University Kellogg School of Management Energy Conference, Joe Quoyeser – an advisor on oil drilling strategies – said that deepwater producers “need prices on the order of $75 to $85.” The fallout of the Deepwater Horizon disaster also has had an impact. The years after the accident saw a slowdown in deepwater exploration and an increase in costs due to increased regulatory oversight. As governments around the world seek to monitor the development of new offshore plays, that oversight is likely to become more – not less – stringent.

Even so, deepwater is surprisingly resilient. This is a long term game with up to a decade between an oil discovery and the first extraction of oil. As such, investment into exploration and production continues with several major deepwater projects coming online between 2015 and 2018. The largest, Chevron’s so-called Big Foot, is expected to start producing oil in the latter half of 2015. Exploration continues to shift into new and uncharted territories. The prospect of vast oil and gas reserves, companies are pushing for further development including the evaluation of a third pipe and increased power.
From highs at well over $100 per barrel in the first half of the year, they plummeted to bottom out at around $40 per barrel into the Arctic, despite widespread opposition from environmental groups. This, in turn, will result in increased regulatory oversight and costs. Even so, the long term needs of the industry mean oil extraction is still seen as a pressing necessity.

Future Innovations
The stage is set, therefore, for a future in which wireline technologies will become more – not less – important. Innovation will be driven by a need to manage costs, improve safety and deliver enhanced real-time information to operators on the surface.

To reduce cost, operators must extend runtime and reduce down time for maintenance. Effective data gathering is crucial for this. Already much more development is being put into the sophistication of analysis software. This provides a comprehensive overview of all the data acquired downhole to be viewed in one place. The earlier operators can gather information, the quicker they can address issues before they become critical.

This effective monitoring also aids in estimating the productivity and commercial viability of deepwater wells. Operators need to know that all well components are safe. Once they know that, they have a better chance of making accurate predictions about a well’s lifespan.

The move into deepwater is bringing operators into contact with unprecedented conditions. New plays are requiring equipment to function at temperatures of up to 500 degrees Fahrenheit and at 30,000psi. This means new technologies have to come up with groundbreaking designs which go far beyond anything the industry has ever seen. Developers are having to go further than official testing regulations with new products being tested to 450,000psi to ensure equipment can be over-rated to cope with anything deepwater can throw at it. Variabilities in environment are also growing, with expansion into extreme environments such as the Arctic.

Products will not necessarily be rated for every deepwater project, meaning operators will have to be selective about which products they use. For all the difficulties being thrown at it, the offshore market is proving to be remarkably resilient. Price volatility may be putting the squeeze on profits, but offshore oil is a long term gain. If anything, tightening profit margins mean companies will need to invest more in well integrity monitoring equipment. This, combined with the harsh environments faced by equipment operating in deepwater, means considerable investment is still needed to develop technologies for the future.

References:
3. Well integrity analysis: https://www.onepetro.org/conference-paper/SPE-142076-MS
7. Goldman Sachs sees Iran deal as downside risk: http://www.reuters.com/article/2015/07/15/us-iran-nuclear-oil-goldman-sachs-idUSKCN0PP0C120150715
Offshore Technology Reports... the leading specialist combined online research and networking resource for senior upstream oil and gas industry professionals.

• Up to the minute Industry and Technology information available to all site users on a free of charge open access basis.
• Qualified signed up members are able to access premium content Special Reports and interact with their peers using a variety of advanced online networking tools.
• Designed to help users identify new technical solutions, understand the implications of different technical choices and select the best solutions available.
• Thought Leadership – Advice and guidance from internationally recognised upstream oil and gas key opinion leaders.
• Peer Input – Contributions from senior upstream oil and gas industry professionals.
• Independent Editorial Content – Expert and authoritative analysis from award winning journalists and leading industry commentators.
• Supplier Provided Content.
• Designed to facilitate debate.
• Written to the highest professional standards

Visit http://www.offshoretechnologyreports.com/