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Being in Two Places **At One Time**

Today's oil and gas industry demands technically sophisticated and customized solutions for increasingly complex drilling and production environments. At the same time, the industry is experiencing a growing shortage of qualified personnel. As a result, the reliance on information technology and remote communication to leverage expertise across the globe is growing. Digital technology is having a profound impact in the oil field. It brings new levels of real-time collaboration to the fields by providing the ability to connect all aspects of downhole and surface operations at remote wellsites to offices and technology centers located in any part of the world.

Innovative mobile video-collaboration technology improves oil field operational performance.



Librestream mobile video device is used to analyze a polycrystalline diamond compact drill bit as part of BHI's BEACON Onsite program.

Baker Hughes (BHI; Houston) is committed to leveraging digital technology to maintain its competitive advantage in the oil field services industry. BHI relies on BEACON, an enterprise-level platform designed to facilitate remote operations and collaboration across geographies and product lines. Field personnel can communicate with their operational bases through a shared and collaborative environment where people work and exchange information. It also delivers other benefits such as reduction in Health, Safety & Environment (HS&E) exposure, higher customer

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satisfaction, improved productivity, reduction in operating costs, and higher employee satisfaction.

The BEACON team emphasizes new and innovative solutions to provide faster, more accurate and cost-effective service to BHI customers. It has recently launched a new capability called BEACON Onsight. It enables mobile video collaboration between field personnel and technical experts located anywhere in the world via real-time video, voice, and tele-illustration capabilities. Using this technology, the field workers can call off-site experts via a hand-held, wireless video device that allows them to show tools and equipment, highlight problem areas by drawing on the camera screen, and have a conversation to quickly resolve the issues.

BHI started experimenting with a mobile video collaboration technology to support operations in Africa in 2006. The solution demanded the transmission of high-quality video images in a secure and flexible bandwidth environment with simplicity of use. In 2008, the BEACON team started testing the Tandberg FieldView solution—developed and manufactured by Librestream Technologies (Winnipeg, MB, Canada) under the Onsight brand—to ensure that this solution was compatible with the Baker Hughes global VideoNet infrastructure. After it was technically approved by the BHI Unified Communications, the team launched a pilot project by deploying it in six repair facilities. The objective was to perfect the system in a controlled setting; therefore, sites were carefully selected to have sufficient bandwidth and wireless connectivity.



Video of the inspection of an electrical submersible pump (ESP) is sent from Centrilift repair workshop in Leduc, AB, Canada, to a remote facility.

by launching a WebEx session. All Onsight sessions can be recorded on an SD card located in the device or on a PC for future reference and training purposes. This feature is quite useful in situations when the network connection is suddenly interrupted or is temporarily not available.

One of the first locations to have received this technology was the BHI Centrilift repair workshop in Leduc, AB, Canada. The application required BHI customers to be able to remotely witness the disassembly and inspection of electrical submersible pumping systems when returned from the field. Previously, it took about 4 hrs per job, but for the customers it meant an additional 8 hrs to undertake the 600-km round trip to and from the repair facility. With the new solution, customers witness the entire job remotely while sitting in the BHI city office in Calgary. BEACON Onsight enables them to directly speak to the technicians and engineers and to draw and highlight on the PC screen. The need for customers to travel to the field workshop is a thing of the past.

There are many advantages to this new approach—faster disposition of tools, higher levels of collaboration with customers, and reduced exposure to driving-related safety hazards. HS&E is a top priority at BHI, and this capability helps in fulfilling this requirement for both customers and employees.

James Fitzpatrick, reliability engineer at Baker Hughes Canada, has been using this capability for more than six months. He notes, “Our customers like this experience. Before

Digital technology is **having a profound impact** in the oil field.

BEACON Onsight consists of the Onsight device, Onsight Expert software, Onsight Management Suite, and a video communication infrastructure for traversal and nontraversal communications. With the help of Onsight Expert, remote experts are able to view, talk, and share live images with the device operator in a fully secure environment. They can bring in additional participants to join the live session on demand by simply calling Onsight Expert on a pre-installed PC or

we had BEACON Onsight, we would typically have our customers travel to our location to execute the teardown. Now they are able to sit in the relaxing environment of their offices rather than being on the hustle-bustle of our workshop floors. They enjoy the fact that we are able to provide the information to them in a fast and efficient manner.”

In another application in the Leduc workshop, the BHI engineering staff collaborates with product and design

engineers based in Claremore, OK. To get input from global teams and share their findings, they are invited to live BEACON Onsite sessions. In a recent instance, product engineers wanted to test a specially designed mechanical seal in the field. After the pump was pulled and the seals were removed, the engineers in Claremore were able to view the condition of seals without having to travel to Canada. Prior to BEACON Onsite, they would have had to rely on a few

Even in facilities such as the BHI repair shops, bandwidth availability is sometimes constrained. However, BHI was able to overcome these challenges by using the flexible media configuration capabilities in the BEACON Onsite system. By reducing frame rate and video resolution, BHI was able to complete a good quality video session at 128 kbps. The detailed macro focus ability of the camera delivered high overall picture quality even at these low media settings.

Field workers can call off-site experts via a **handheld, wireless video device.**

digital pictures and discussion over the phone. But now, several engineers were able to watch the removal and inspection of the seals simultaneously, and within 45 min the test results were discussed and documented.

Another BHI facility in Nigeria recently deployed BEACON Onsite in the repair facility in Port Harcourt. The power of this capability was demonstrated shortly after the camera was deployed. Four electronic components used in the rotary steerable drilling assembly had developed the same faults during configuration at the field location, and successive attempts to troubleshoot over the phone were unsuccessful. As the deadline to deploy the tools approached, the technical support team in Aberdeen, Scotland, connected via the Onsite Expert application to observe the tool as it was being tested in Port Harcourt. Through remote witnessing, Aberdeen technical support identified the cause of the problems and directed immediate corrective action. The tools were deployed as planned for the ensuing batch drilling program. Knowledge transfer during the collaboration session will help in preventing such occurrences in the future.

A technical support participant commented, "It was like looking over the shoulder of the technician." This engagement illustrates the power of combining remote witnessing with real-time collaboration.

BEACON Onsite is being deployed at all major repair workshops in every geographic market, and personnel are receiving training every week and are gaining familiarity with the functionality. The ultimate goal is to improve overall productivity, reduce operating costs, increase reliability, and enhance customer satisfaction. Even though BHI is in the early deployment stage, its customers and staff are pleased with the results.

Implementing a mobile video collaboration system like BEACON Onsite requires strong leadership as well as technical infrastructure. An IP network is a core requirement for the Onsite device operator to provide the live link to the expert.

With the initial phase of the project largely complete, BHI is now focusing on developing other use cases. This includes remote collaboration across the BHI firewall that will allow deployment of BEACON Onsite devices on offshore rigs and production platforms where the cost of downtime can be tens



Onsite 2000 device can operate in temperatures as low as -10°C, has a chemical resistant exterior, and is able to withstand multiple 4' (1.2-m) drops to steel or concrete.

of thousands of dollars per hour, and where the necessity for experts to travel to these sites can cause long delays. In field deployments, BHI expects to use a combination of remote communication options such as WiFi, VSAT, and 3G cellular networks to connect the Onsite device with the off-site experts. Initial tests are underway to complete testing within these more challenging environments.

The initial objectives for BEACON Onsite are already being achieved at BHI. This innovative capability truly differentiates BHI from its competitors and is driving immediate returns for employees and its customers. ⚡