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OILMAN

THE MAGAZINE FOR LEADERS IN AMERICAN ENERGY

July / August 2018 OilmanMagazine.com



Creating a Fullstream Company



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# OILMAN

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#### LETTER FROM THE PUBLISHER



The U.S. shale market continues to excel at producing oil and gas for export around the world. Several shale plays are hotbeds of activity. However, there are oil producers dealing with critical obstacles of not being able to find skilled employees for key positions, insufficient pipeline capacity and not enough truckers to handle routine business tasks. Despite the business hiccups, the U.S. produced 10.9 million barrels a day of crude oil in June. The projected average for 2018 is 10.8 million b/d and in 2019 the EIA projects 11.8 million b/d.

Geopolitical risks are all over the oil and gas map. One in particular is Iran, which exports about 2.4 million b/d. The OPEC member will see their exports cut to zero. Buyers of Iranian crude must cut off imports by November 4 or risk sanctions. Venezuela's oil and gas market continues to decline due to political and

economic instability. Oil production by the government owned group PDVSA declined from 3.5 million b/d to 1.5 million b/d. A bright spot in South America is Guyana. The small nation has a potential huge offshore oil discovery. Although, they are in dispute with Venezuela over who owns the rights to the field.

OPEC member nations and Russia agreed to increase production by 600,000 b/d, after holding back for more than a year. The decision was based on rising oil prices, rising geopolitical risks to supply, like Iran, and shrinking global inventories. The tug of war between U.S. shale, OPEC and members outside of the oil-cartel have been a dramatic one the past three years. The saga will continue for some time as each entity forces a heavy hand in the direction of oil and gas supply worldwide.

Companies that were struggling to survive during the oil price downturn are bouncing back. It's amazing with the constant changes in the oil and gas market, small oilfield businesses, even large companies, are so resilient. During the slowdown, many companies were forced to merge, scale down or close up shop. In this issue of OILMAN, our feature is about Baker Hughes, a GE Company. On the backend of the downturn, Baker Hughes and GE merged to form the world's first full stream company. Enjoy this issue of OILMAN and most of all, enjoy your summer.

Emmanuel Sullivan, Publisher, OILMAN Magazine

#### **CONTRIBUTORS** — Biographies

#### Gifford Briggs



Gifford Briggs joined LOGA in 2007 working closely with the Louisiana Legislature. After nearly a decade serving as LOGA's Vice-President, Gifford was named President in 2018. Briggs first joined LOGA (formerly LIOGA) in 1994 while attending college at

LSU. He served as the Membership Coordinator and helped organize many firsts for LOGA, including the first annual meeting, Gulf Coast Prospect & Shale Expo, and board meetings. He later moved to Atlanta to pursue a career in restaurant management. He returned to LOGA in 2007.

#### Mark A. Stansberry



Mark A. Stansberry, Chairman of The GTD Group, is an award-winning author, columnist, film producer, radio talk show host and 2009 Western Oklahoma Hall of Fame inductee. He has been involved in the oil and gas industry for over 39 years. He is currently

serving as Chairman of the Board of the Gaylord-Pickens Museum/Oklahoma Hall of Fame, Vice Chairman of the Board of Regents of the Regional University System of Oklahoma, Board of Directors of OKC Port Authority, Board of Governors of the Recording Academy/Grammys Texas Chapter, Lifetime Trustee of Oklahoma Christian University and Board Emeritus of the Oklahoma Governor's International Team. He has served on several private and public corporate boards.

#### Jason Spiess



Jason Spiess is an award winning journalist, talk show host, publisher and executive producer. Spiess has worked in both the radio and print industry for over 20 years. All but three years of his professional experience, Spiess was involved in the overall operations

of the business as a principal partner. Spiess is a North Dakota native, Fargo North Alumni and graduate of North Dakota State University. Spiess moved to the oil patch in 2012 living and operating a food truck in the parking lot of Macís Hardware. In addition to running a food truck, Spiess hosted a daily energy lifestyle radio show from the Rolling Stove food truck. The show was one-of-a-kind in the Bakken oil fields with diverse guest ranging from U.S. Senator Mike Enzi (WY) to the traveling roadside merchant selling flags to the local high school football coach talking about this week's big game.



Joshua Robbins Josh Robbins is currently the Chief Executive Officer of Beachwood Marketing. He has consulted and provided solutions for several industries, however the majority of his consulting solutions have been in manufacturing, energy and oil and gas. Mr. Robbins has over 15 years

of excellent project leadership in business development and is experienced in all aspects of oil and gas acquisitions and divestitures. He has extensive business relationships with a demonstrated ability to conduct executive level negotiations. He has developed sustainable solutions, successfully marketing oil and natural gas properties cost effectively and efficiently.

#### Thomas G. Ciarlone, Jr. Tom is a litigation partner in the Houston office



of Kane Russell Coleman Logan PC, where he serves as the head of the firm's energy practice group. Tom is also the host of a weekly podcast on legal news and developments in the oil-and-gas industry, available at www.energylawroundup.com, and a video series on effective legal writing, available at www. theartofthebrief.com.

#### Steve Burnett



Steve Burnett has been working in the oil industry since the age of 16. He started out working construction on a pipeline crew and after retirement, finishes his career as a Pipeline Safety Compliance Inspector. He has a degree in art and watched oil and art collide in his career to form the "Crude Oil Calendars." He also taught in the same

two fields and believes that while technology has advanced, the valuable people at the core of the industry and the attributes they encompass, remain the same.

#### Phil Graves



Phil Graves has spent nearly a decade working in the oil and gas industry. He has served as Director of Sales and Director of Digital Development for a large national industry publication and has held various management positions with a completions company and was in charge of operations in the Permian Basin and Eagle Ford shale. Phil now runs a marketing

and photography company focused on providing vivid images of the industry at work in multifaceted disciplines and projects



#### JULY - AUGUST 2018

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For The Week Ending June 29, 2018

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## OILMAN

## TODAY



Photo courtesy of LLOG Exploration Company

## INTERVIEW: JIM HINCKLEY, AUTHOR, 100 THINGS TO DO ON ROUTE 66 BEFORE YOU DIE

#### By Tonae' Hamilton

Below is an interview with author Jim Ross. The interview text has been left in tact, with only minor grammatical adjustments.

### Tonae' Hamilton: What inspired you to write books about Route 66?

**Jim Ross:** When it comes to Route 66, you can pretty much cue the Twilight Zone theme music. Mostly everything in my life since 1959 is tied to Route 66 and its unique history.

#### TH: What is a favorite memory you can share regarding your experience growing up around Route 66?

**JR:** Route 66 today is more dynamic than at any time in its history. Every day I have the opportunity to make a new favorite memory. In 2016, I was honored to speak at the first European Route 66 festival and discuss Route 66 with students at a school in Germany. This became one of my favorite memories. Many people internationally are fascinated with the history of Route 66. This year, I will be heading for the second Route 66 Festival in the Czech Republic.

## TH: What specific locations would you recommend for a person to visit while traveling on Route 66?

**JR:** I'm partial to good pie and good food. With that said, I would seek out all the great restaurants Route 66 has to offer. There's plenty of wonderful, timeless restaurants and new restaurants. The FourWay in Cuba, Missouri is a new addition. The Ariston Café, a family owned business that has been operating for more than 80 years, is one great place that I like to visit. Grand Canyon Caverns in Arizona offers fine dining 200' underground! The caverns also have a lady who comes in to bake fresh homemade pies. Aside from the ones made by my wife, these are some of the best pies I ever tasted.

#### TH: From your time growing up around Route 66 to present day, have there been any significant changes around the highway (i.e. historical sites, restaurants)?

**JR:** Definitely. The most amazing thing is that Route 66 has such international popularity.

Actually, Route 66 officially ceased to exist in 1985. As a result, many thriving communities turned into ghost towns. However, Route 66 is forever changing and is currently transitioning once again.

### TH: What makes Route 66 different from other highways?

JR: Route 66 is not our most scenic or historic highway. However, from its inception, it has always had the best press and publicity. It is America's most famous highway. It is America's longest theme park and museum, a living time capsule with a Disneyland veneer. Route 66 has a very bright future ahead. In 2014, the world's only electric automobile museum opened in Kingman, Arizona.

## TH: Can you name an obscure sighting you've encountered on Route 66?

JR: I've encountered many obscure things on Route 66. You have the haunting beauty of the ruins of Two Guns trading posts on Canyon Diablo in Arizona, a German Military Cemetery in Oklahoma, and Totem Pole Park. Imagine meeting a Dutch hydraulic engineer that opened a delightful restaurant in a near ghost town in Illinois.

#### TH: You've written several books about Route 66. Can you share how they differ from one another?

**JR:** The book, *100 Things to do on Route 66 Before You Die*, is a pocket guide for travelers. It was written in response to questions about my favorite places on Route 66. Overall, the book is a bucket list for the best of the sites on Route 66. The Route 66 Encyclopedia is as the name implies. Likewise, with Ghost Towns of Route 66. The book I just finished is about the dark side of Route 66, including disasters, serial killers, and crime scenes.

## TH: What do you hope for readers to learn or discover about Route 66?

**JR:** The experience will be different for everybody. If anyone has an interest in fascinating or inspirational people, food, history, or wants to see a glimpse of the future



or the past, Route 66 is the place to do it. You will meet some of the most fascinating people traveling Route 66. I once met a French mime who tried to set a stilt walking record. I also have met a WWII veteran that made his dream trip on Route 66 with his vintage motorcycle at age 90 after his wife passed away and he was diagnosed with lung cancer. Many of the people met on Route 66 have very fascinating stories.

## TH: Are you currently writing any other books?

JR: I just finished my 19th book, which will be published this fall and debut at Cuba Fest in Cuba, Missouri. I also regularly publish stories on my website, jimhinckleysamerica.com. I currently write stories 3-4 times a week on Route 66, where I'll recommend food and tell stories about people. Besides writing on my website, I also have a Facebook page which I share content on.

## OIL AND GAS LAW: 2Q18 UPDATE

By Thomas G. Ciarlone, Jr.

The second quarter of the year has seen abundant activity at the intersection of the energy industry and the law. These are some of the highlights:

Offset Wells and Liquidated Damages as Unenforceable Penalties. Oil-and-gas leasesat least those drafted by savvy mineral ownerswill often include an offset drilling clause. Such clauses stipulate that, if a well is drilled on a neighboring tract in proximity to the leasehold, the lessee generally has three options: drill an offset well to prevent drainage; release acreage, so the lessor can drill an offset well; or pay the mineral owner the same royalties it would have received if the off-lease well had been spudded on the lease. These provisions, however, can sometimes be in tension with Texas authorities holding that liquidated damages-even when negotiated at arms' length between contracting parties with equal bargaining power-are unavailable when the actual harm is reasonably ascertainable and the contractual quantum of liquidated damages does not approximate actual damages. In a consolidated proceeding in South Texas aggregating a number of related lawsuits, Chesapeake has taken the position that the offset drilling clauses in its leases constitute unenforceable penalties since the liquidated damages-i.e., the royalties that would have been paid had the off-lease well been situated on the lease-always, as an operational reality, vastly outstrip the royalties on the oil that would not have been drained had Chesapeake drilled an offset well. For obvious reasons, operators and mineral owners alike would be wise to closely monitor the status of this litigation. The case is

In re Chesapeake Eagle Ford Royalty Litigation, Cause No. 2016-CI-22098, pending in the 224th District Court in San Antonio.

Anti-SLAPP Arrives in the Oil Patch. Codified at Chapter 27 of the Texas Civil Practice and Remedies Code, the Texas Anti-SLAPP regime-"SLAPP" being an acronym for Strategic Lawsuits Against Public Participation-is torn straight from the pages of David and Goliath. It targets powerful actors who file frivolous lawsuits aimed at intimidating their critics into keeping quiet. At the risk of oversimplifying the statute, it can be used as both a sword and a shield against those who enlist litigation as a means of curbing free speech: a successful motion under the Anti-SLAPP statute will see the coercive claim dismissed, with an award of attorneys' fees to the defendant who invoked the protections of the statute. The application of the law in the oilfield is rare, especially between mineral owners and operators. Recently, however, a Texas lessor, Lona Hills Ranch, sued its lessee for trespass when the operator drilled wells on the Ranch's land after the lease had allegedly already expired. The lessee countersued the Ranch after it issued a number of public statements critical of the operator's activities, and in response the Ranch brought the Anti-SLAPP statute to bear on the operator. In resisting application of the statute, the operator argued that it was only seeking relief against the Ranch for violating the terms of the parties' mineral lease, which required the Ranch to furnish the operator with notice of any breach, and an opportunity to cure, before commencing any litigation. The trial

court agreed, but the Austin Court of Appeals reversed in substantial part. Although it acknowledged that the Ranch had a contractual duty to give the operator notice and an opportunity to cure before suing, the appellate court ruled that the plain language of the operator's pleadings



Thomas G. Ciarlone, Jr.

showed that it was seeking relief not just for the Ranch's initiation of litigation without notice, but furthermore for the Ranch's public statements about the operator's conduct. The lesson here, perhaps, is that operators should more carefully craft their pleadings; keep them narrowly focused on the discrete acts of the lessor that represent breaches of the lease; and thereby avoid the kind of overreaching that might open the door to a troublesome Anti-SLAPP claim. The case is *Lona Hills Ranch*, *LLC v. Creative Oil & Gas Operating*, *LLC*, No. 03-17-00743-CV, pending in the Third Court of Appeals in Austin.

The Vexing Problem of Royalties Among Co-Tenants. When multiple lessees hold the mineral rights to the same tract of land, typically they will come to an agreement to jointly operate the asset. But sometimes a lessor will go it alone and drill wells without the involvement of the other lessors. In these instances, the drilling co-tenant must pay to its mineral co-tenants in the same tract their proportionate share

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of production. This is precisely what Apache recently did in Glasscock County, and there was no dispute that Apache dutifully accounted to its co-tenant, Devon, for its full share of production. Apache did, however, refuse to pay royalties to Devon's lessors, who proceeded to sue both Apache and Devon under Section 91.402 of the Texas Natural Resources Code. The trial court held that, because there is no contractual relationship between Apache and Devon's lessors, the former had no obligation to pay the latter anything-at least not pursuant to the Natural Resources Code. The ruling has the potential to leave mineral owners in a lurch, albeit only temporarily as the non-operating lessee awaits production payments from its operating co-tenant, which can then be used to fund royalty payments to the lessors of the nonoperating lessee. Naturally, there are contractual methods for forward-thinking mineral owners to draft around these delays, which would effectively require the non-operating lessee to front the money for royalty payments before it receives any funds from its operating co-tenant. This, of course, vests the risk of non-payment squarely in the non-operating lessee, which also sacrifices the time value of the money that it would more or less have to "advance" to its

lessors. The case is Devon Energy Production Company, L.P. v. Apache Corporation, No. 11-16-00105-CV, pending in the Eleventh Court of Appeals in Eastland.

#### Texas Supreme Court to Mineral

Purchasers: Buyer Beware. The facts here are straightforward: Orca leased nearly 1,000 mineral acres from the Red Crest Trust, via its trustee JPMorgan; the lease explicitly provided that Red Crest was offering no warranty of title; and, indeed, in the event title failed, the lease stated that Red Crest would nevertheless be entitled to keep the bonus money Orca had paid to the Trust. A letter of intent between Orca and Red Crest included a specific provision prohibiting Red Crest from leasing the acreage to anyone else. On the day Orca signed the lease with Red Crest, Orca's leasing representative asked Red Crest to confirm that the acreage remained "open" and unleased.

Red Crest promptly confirmed, after ostensibly consulting a computerized database, stating that "we're good to go." As it turns out, however, Red Crest had, in fact, leased the same 1,000 acres to another party six months earlier, but did not record the lease until three days after the Trust signed the mineral lease with Orca.

After discovering the earlier lease, Orca demanded that the Trust return its multimilliondollar bonus payment, and, when Red Crest refused, Orca sued for fraud, negligent misrepresentation, and breach of contract. The intermediate court of appeals sided with Orca, but the Texas Supreme Court reversed, explaining that, even though Red Crest's representations were false, Orca could not have reasonably relied on them due to the existence of so many "red flags," not the least of which was the prominent and unusual warranty disclaimer, Orca's level of sophistication, and the sheer size and scope of the transaction. The case is JPMorgan Chase Bank, N.A. v. Orca Assets G.P., LLC, No. 15-0712, pending in the Supreme Court of Texas.

Tom is a litigation partner in the Houston office of Kane Russell Coleman Logan PC, where he leads the firm's energy practice group. Tom is also the host of a weekly podcast on legal news and developments in the oil-and-gas industry, available at www.energylawroundup.com, and a video series on effective legal writing, available at www.theartofthebrief.com.

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## GOING GREEN OR GOING BROKE: High Oil Prices Uncover the Truth

By Eric R. Eissler

When we think of oil and gas companies, the environment comes to mind. However, it is in a negative way. Thinking about industry and environment usually conjures up images of vast industrial chemical plants spewing ash into the air and waste into the water, the skies are crimson and the land pitch black of night, as no living thing dares to wonder into the area or does a plant dare to grow.

Does this sound about right when we mention industry and environment in the same sentence? Despite these negative connotations, oil and gas companies are waking up and paying attention. The environment is changing, and people are finally taking accountability. Oil and gas companies are now getting involved with environmentally friendly practices and ways of doing things. Our most precious resource, water, is heavily used in almost all processes of the oil and gas extraction process.

#### Produced Water Management

Produced water is a byproduct of the extraction of oil and gas. It is usually found within the oil and gas formations. Additionally, produced water contains some of the chemical characteristics of the formation from which it was produced and from the associated hydrocarbons.

The ingredients of produced water:

- Salt Very high salt volumes where 1 gallon can weigh as much as 10 lbs. due to the salt
  - Oil and grease various levels of:
    - Free Oil easy to remove
    - Dispersed oil harder to remove
    - Dissolved oil very difficult to remove
- high associated costsInorganic and toxic compounds
- Naturally occurring radioactive material

All of these compounds range on a sliding scale on ease to remove, however no matter how easy they are to remove, they are an associated cost to a company.

On land-based rigs, most produced water is reinjected into the well to be used in conjunction with drilling or fracking techniques. At sea, nearly 80% of produced water is treated on the rig and then discharged in the sea. Non-treated discharged produced water has fallen to a low 5.6 percent. In some of the arid regions of the U.S., produced water is evaporated from onsite retention ponds.

Some water with low salinity levels is used for irrigation, dust and ice control, or repurposed into drilling or fracking fluids that have less impact on the environment.

#### Drilling and Fracking Fluids

Injected water or repurposing of the produced water, which is usually mixed with drilling and fracking fluids, which have gained much notoriety over the years as major pollutants. According to the American Petroleum Institute, 90 percent of fracking fluid is water, 9.5% is sand, and the remaining 0.5 percent is a mixture of chemicals, such as, hydrochloric acid, corrosion inhibitors, phosphonic acid salt and sodium polycarboxylate and many more. The role of the chemicals is very important to maintain the drilling and fracking process. Despite the small percentage of chemicals found in the fluids, they are called out as pollutants. While this may have been true in the past, oil and gas companies are altering the chemicals and/or using various cleaning and filtration techniques to become more environmentally friendly. Many companies are reusing the produced water, as mentioned earlier, and others are using neutral chemicals in place of the harmful ones. Some companies are even turning to solar energy to power remote machines in arid sunny locations.

#### Oil and gas really going green?

"The European companies have tended to be more active in the clean energy space," according Valentina Kretschmar, director of corporate research at Wood Mackenzie and co-author of the report entitled, "Could Renewables be the Majors next big thing?"

"That's likely because these firms are facing greater governmental pressure, and because U.S. firms are benefiting from low-cost unconventional oil and gas production, and don't feel the same sense of urgency to invest in new businesses." That has been pretty much the case, but we are now starting to see more and more investment in renewables. Not only because they are good for the environment, but because they are good for the environment, but because they save money! Cost savings is everything in the energy business because the margins are so thin. With the dramatic price climb over the second quarter of 2018, the oil and gas companies are entering the golden era again. The industry is starting to light up and with



Photo Credit: Napat Polchoke - www.123RF.com

all the cost-cutting techniques employed since the downturn in 2014, producers are going to get even more bang for their buck.

When *OILMAN Magazine* spoke to JJ Miller at Halliburton earlier this year, he spoke about a process that turns drill cuttings into nutrients that can be used in farming and returned to the earth. "The bioremediation process was born into a declining industry back in 2014, it sounds kind of like old technology that has been all but abandoned," Miller said. With the rise in oil prices, there is a good chance that this technology is going to possibly see a resurgence of life. Presently, the bioremediation technologies and services market is highly fragmented owing to the involvement of many established and new entrants in this industry.

#### Going Green out of necessity?

Over the past five years or so, there has been more and more emphasis on the environment, in part due to governmental regulation, some instances out of necessity due to falling prices forced many companies to seek alternative cost cutting means, while some, like the Europeanbased companies lead the "green charge" of their own accord. Either way, the oil and gas industry is moving towards being more "green" and more environmentally conscious of what they do. This has been beneficial for all parties involved and the planet as well. Environmentalist will only hope that this trend continues to grow as more companies join the movement. However, with the sudden upswing in oil prices, we could see a rally that throws the oil and gas industry back into a getthe-oil-out-at-any-cost mode. Such that, instead of fixing compressors (to save money), just buy a new one (to make the most of the high price). If this old way of doing business resurfaces, it would put the environment on the backburner until another crash comes, that is.

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## Overcoming the Challenges of Cognitive Technologies to Optimize Land Management

Augmented Intelligence is the Next Wave of Operational Excellence for Oil and Gas

#### By Kyle Vorndran

In today's digital age, advanced technologies have the capabilities to enhance the entire lifecycle of managing land assets, from acquisition to disposition. Taking advantage of the latest software innovations can save upstream oil and gas companies time, money, and the headache associated with manual processes.

For example, software optimized for mobile devices allows land professionals to collect and sync data with real-time connections between workers in the field and in the office, helping to secure ownership in the best exploration areas faster. GIS mapping lets land professionals see, analyze, and understand geospatial data with technology that offers real-time insight into leasing and title activity, while advanced reporting capabilities allow the entire company to share the data and gain insight into important land assets.

These technologies along with other capabilities make up the modern energy workplace, which can drive increased productivity and efficiency in land departments. However, changing market conditions are driving oil and gas companies to continuously adapt to the constant evolution of digital technology. Continuous learning and the ability to adapt is key when it comes to meeting the demands of the changing workforce, as well as supporting business development and growth through maximizing productivity.

It's no wonder cognitive technologies have emerged as the next wave of operational excellence in the digital transformation journey for oil and gas. These advanced capabilities, such as machine learning, robotic process automation, computer vision, and natural language processing, can help oil and gas companies work smarter, more efficiently, and be more operationally and financially compliant. Unlike traditional artificial intelligence systems, which seek to replace humans with machines, AI (augmented intelligence) extends users' human decisionmaking and cognitive abilities with powerful machine intelligence to create real solutions

## that improve strategy, decision-making, and execution.

In fact, an average of 40-75 percent cost savings can be achieved by implementing intelligent automation for relevant functions, according to findings from KPMG. Gartner forecasts \$2.9 trillion in new business value opportunities by 2021, as well as the ability to recover 6.2 billion hours of worker productivity.

For example, AI technology embedded into land management software can help accelerate lease acquisitions. Landmen and brokers need the ability to capture critical land data quickly so they can execute agreements and secure rights before anyone else. With AI technology like intelligent ingest, land departments can input and organize agreement data quicker and with comprehensive detail. With seamless GIS mapping integration and easier collaboration, lease analysts and land managers can review and approve executed agreements while tracking broker's progress in real time. Speaking of lease analysts, AI can also improve data accuracy with the ability to validate lease analyst's data entry versus what is recorded in the actual lease. It also gives you the ability to monitor lease analyst's performance and ensure that data is being entered correctly and accurately.

By reducing manual input hours, improving data validation and quality, and improving system and user training, AI capabilities can allow land professionals to quickly and easily uncover the most critical information to make better, more strategic decisions.

Currently, the energy industry is in the early stages of transforming key processes by adapting cognitive technologies. According to IDC, "Within two years, 25 percent of large oil and gas companies will have implemented a platform to develop, analyze, model, and simulate best practices in a cognitive-based continuous learning environment."

Despite the promise of benefits for the oil and gas industry, skepticism around integration,

cost, scarcity of cognitive experience, and rethinking implementation strategies have created obstacles in adopting modern cognitive solutions. According to survey data from Deloitte,



Kyle Vorndran

47 percent of executives say integrating cognitive projects with existing process and systems is an obstacle to AI, while 50 percent of executives indicate that the expense of technologies and expertise is one of the top challenges with cognitive technology.

Quorum Software is a company that is eliminating the two key challenges to AI – integration and expertise. By leveraging 20 years of experience and expertise in oil and gas and applying research-backed best practices and design thinking, Quorum's platform-first approach allows the industry to think beyond these obstacles, so companies can capitalize on the benefits of AI.

Unlike AI tools that do not integrate with the existing processes and systems, Quorum's AI technology is embedded seamlessly into the myQuorum platform that powers software applications to support land management and the entire energy value chain. Quorum also bridges the expertise gap by prioritizing how energy companies actually use cognitive technologies to solve real-world problems. The software can deliver smarter insights because it is built specifically for the industry.

Cognitive technologies like AI can help us unlock new approaches to solving problems, while learning and adapting to business changes. Oil and gas companies must continue to evolve if they want to drive success and stay competitive in an increasingly digital environment, and the future is AI.

After years of gaining valuable insight into upstream at one of the top oil and gas service companies, Kyle joined Quorum Software as the Product Marketing Manager of Land where he works to help operators better understand the power of software and how it can streamline upstream operations.

## CRITICAL LIFELINES FOR DEEPWATER OIL AND GAS

#### By Sarah Skinner

An umbilical is generally thought of as a lifeline. Most often, a lifeline from a fetus to a mother or a deep sea diver to oxygen. Within umbilicals such as these, are the vital components that are needed for humans to survive and thrive. Although these may be the most common examples of umbilicals, there is an innovative technology that now uses umbilicals to link surface and sea floor oil and gas equipment, providing the absolute essentials that are needed for them to operate effectively.

Umbilicals are the lifeline of subsea equipment, providing things such as electric and fiberoptic signals, electrical power and hydraulic and chemical injection fluids to a subsea unit. They are specifically designed to withstand seabed temperatures and harsh environments. Enclosed within an outer ring specially designed for their environment, the inside is specifically designed for the intended client, whether it be an integrated umbilical or a hybrid umbilical. Integrated umbilicals house multiple connections, while hybrid umbilicals contain flowlines.

LLOG Exploration Company, based out of Covington, LA is the largest privately owned oil producer in the United States, grossing over 49 million barrels of oil production last year. LLOG primarily uses umbilicals on their development and production side of business, as they exclusively use wet trees, so every one of their developments has at least one umbilical. They are run from the host facility, where production is processed, to the wells, which could range anywhere between 3 and 34 miles away. LLOG's umbilicals have steel tubes (typically 1/2 - 1 inch diameter) that provide hydraulic power/control or production chemicals, such as corrosion, paraffin, asphaltene or hydrate inhibitors. These are injected into the well or flowline. Nearly all of LLOG's umbilicals have copper wire (with insulation) to provide power for well controls or receive signals from the wells. Some of the umbilicals also use fiber optics which provide better data transmission.

LLOG generally bids out for their umbilical fabrication, so they have had several manufacturers. Aker Solutions is one of the

companies that is supplying the production and gas lift umbilicals on LLOG's Buckskin project. Buckskin is the first development for LLOG in the Lower Tertiary Wilcox trend and is located on Keathley Canyon blocks 785, 828, 829, 830, 871 and 872 in approximately 6,800 ft. of water. It is large in size and anticipated to bring in 5 billion barrels of oil in-place. In the first phase, they will drill and complete two development wells in Keathley Canyon 829 and then have a six mile tie-back to the Lucius platform in Keathley Canyon 875. After completion of the first phase, there will possibly be as many as 12 additional wells that are needed and will all be tied-in using umbilicals.

Umbilicals are a dependable and valuable asset for LLOG. "LLOG's umbilicals have worked well. Occasionally, individual tubes have clogged or we lose signal on an individual wire. These individual failures are generally not a problem since we put spare tubes and wires into every umbilical and we have never been forced to replace an entire umbilical," says Rick Fowler, LLOG's vice president of deepwater projects.

Aker Solutions has delivered more than 550 umbilicals worldwide, over a span of 20 years. Their special system for packaging tubes and cases minimizes longitudinal forces, while offering greater internal and external strength, high fatigue capacities and with no restrictions on geometry. They offer Power Umbilicals and Cables, Steel Tube Umbilicals, Steel Tube Flying Leads, Direct Electrical Heating Systems and Integrated Production Umbilicals. "The umbilical process is fascinating," says Fowler.

Aker Solutions' Power Umbilical Cables are a highly advanced way of providing power and controls to subsea processing and boosting systems. They are well suited to either fixed platforms or floating units. The Steel Tube Umbilical designs provide a reliable and durable way of connecting onshore or offshore hosts with subsea facilities. They typically provide hydraulic fluid for control, various



Image Left: Delta House Umbilical Cross Section Image Right: BWOLF Dynamic Umbilical

chemical fluids for injection into the flowline, electrical power and electrical or fiberoptical signal transmission. The Steel Tube Flying Leads are loose bundle type and umbilical type flying leads with soft profiles to enhance flexibility. The Electrical Heating Systems are designed for use in flow-lines and pipelines to prevent the formation of wax and hydrates, which could slow the stream of hydrocarbons. Integrated Production Umbilicals (IPU) combine the umbilical function and the flowline and offers an alternative flow heating solution.

"LLOG also uses umbilicals during some drilling and well operations to send signals/ power from the rig to the well. These umbilicals are used temporarily and have much shorter distances (about the water depth or 1,000 to 7,000 feet). LLOG would not own these umbilicals as they would be owned by the rig/intervention companies," says Fowler.

Whether umbilicals are used temporarily or for long-term, for short distances or long distances, for one function or several, one thing is certain: umbilicals are a critical link to deep sea oil and gas exploration and production. The efficiency and accuracy that they provide is invaluable to the companies that utilize them and the industry as a whole.



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## Permian Basin Doomsday? Sell-off Overdone

#### By Joe Dancy

Energy investors have become concerned about the effect of rapidly growing Permian Basin crude oil and natural gas liquid production and how the ballooning volumes will be transported to market. The Permian Basin is supplying roughly one-half of the increased volumes needed to meet rising global demand, so the volumes are material to the global marketplace.

The International Energy Agency, in their latest forecast, expects oil demand to increase by 1.4 million barrels per day in 2018. We think this estimate is low and expect global oil demand to grow by 1.7 million barrels per day, if not a bit more, due to the surging global economy. Add in potential production disruptions in Venezuela, Iran, Libya and elsewhere and the excess capacity available to meet growing demand becomes quite thin, increasing the value of Permian production.

Attending a midstream conference in Midland recently, we were able to network with a number of producers, analysts, and pipeline operators to get a feel for the extent of the Permian Basin transportation problem, how long it might last, and how it will be solved.

It was clear that the Permian Basin production had grown much faster than some expected. The potential transportation shortfall in the second half of 2018 was expected to be 200,000 barrels per day. As a result, the price for Midland Basin crude oil is expected to be roughly \$10 to \$25 a barrel below that of crude oil located on the Gulf of Mexico.

When a price gap of this magnitude occurs, the economics tend to provide solutions, sometimes much quicker than many expect. One solution that was suggested was to truck the oil from Midland to the Gulf of Mexico markets. This solution is inherently expensive, risky, and inefficient.

This is especially true due to the fact that the trucking of sand and water has created a substantial demand for experienced drivers and equipment. Nonetheless, some experts expect some Permian oil will be trucked to markets due to the economics. Some mentioned that even with a driver making \$200,000 a year, the economics would work, assuming the gap between Midland crude prices and Gulf Coast prices was maintained. A second solution was to increase the rail shipments from the Permian Basin. This solution, while more expensive than pipeline transportation, seems to make more sense than trucking. The problem is that many of the rail facilities are committed to transporting the ever increasing amount of frack sand to the area, which limits oil take away capacity. That said, experts were of the opinion that train shipments from the area would increase, possibly substantially.

A third solution was to increase storage facilities in the Permian Basin. This would be a temporary solution. Many expect the transportation bottleneck to be solved within the next two years. We saw a number of massive storage tanks under construction outside of Midland.

Many experts noted that while the price gap between Permian Basin crude and Brent is large and growing, it will benefit local refineries, chemical plants, as well as any entity involved in crude oil transport or export. The spread between West Texas Intermediate and Brent on the Gulf Coast means exported products and crude will find attractive buyers and robust demand.

Solving the transportation problem with pipeline and gathering system buildouts will take 18 to 24 months, according to many. The relatively short period of the transportation shortfall will probably limit the amount of capital trucking or railroad companies will be willing to invest to address the problem.

Several other issues are limiting Permian oil production. One is the fact that natural gas takeaway capacity is also short. Regulators and mineral owners are becoming more stringent with regard to proposed flaring activities. This natural gas transportation shortfall is expected to be addressed in the near future.

Another issue that has limited production, or has the potential to, is the lack of water resources for hydraulic fracturing operations. Experts noted that water is much more complex an issue than processing natural gas liquids or crude oil. Mixing water can substantially impact its quality and effectiveness in a completion operation. Operators noted after spending \$7 million to drill, well developers want to ensure the completion goes as efficiently as possible. Water will remain an issue for the foreseeable future, as a short term fix is not in the cards.

When building out the pipeline system to add capacity, one of the issues that caught suppliers by surprise was the substantial increases being seen in the steel market. We were told that roughly twenty-five percent of the cost of a transmission line is the cost of steel.

Due to steel tariffs the price of rolled steel has increased by 50 percent since the first of the year. Costs are passed along by the pipe manufacturers. Those who did not lock in steel or pipe prices have seen the economics of their projects deteriorate significantly with each price increase. Steel pipe manufacturers should do very well over the next year, and even PVC piping is in short supply due to the lingering impact of the fall hurricane that shut down Houston's manufacturing plants.

With all the attention on the transportation bottlenecks and the price gap between Permian oil and that produced elsewhere, is the substantial underperformance by Permian Basin producer and service company stocks warranted?

Our answer is no. The one to two year gap where Permian Basin crude oil is substantially undervalued, when inserted in the standard cash flow model, reduces the fair value of most enterprises by less than five percent. Many Permian Basin stocks have been adversely impacted by three to four times that amount, a substantial overreaction.

In our opinion Permian Basin producers and service companies are selling at a substantial discount to fair value if the models are an accurate reflection of reality. Over the next two years, refiners, chemical plants, and transportation firms using Permian crude will perform well. As it becomes apparent that the transportation shortfall will solve itself in relatively short manner, Permian Basin producers and service companies will also recover in what we expect to be a robust rally.

## Petroleum Graduate Programs



## TIPS FOR REDUCING YOUR TOTAL COST OF RISK

#### By Parker Rains

The oil and gas industry is one of the most dangerous in the country, if not the world, according to data from OSHA. Unfortunately, that means the risk of workplace injuries – and associated insurance claims – is ever present. As companies look for ways to keep their employees safe, decrease their risk and control costs, it's important to focus on the TCOR (Total Cost of Risk) which recognizes that a claim has more impact on a company's bottom line than just the insurance premium and the cost of the claim.

TCOR is a quantifiable number that can be identified and reduced. It is the total cost of your company's deductibles, uninsured losses, risk control costs and related ancillary costs, which may include things like claims reporting, investigations and fines, additional training and loss of reputation. By recognizing and understanding these costs, companies can establish and implement risk management strategies to reduce them and their TCOR.

There are three main areas to focus on when looking to lower your TCOR:

#### **Claims Data**

The mass amount of data collected about a company's claims can be invaluable – if you know what to do with it. This data can give you a glimpse into the biggest risks your company faces. By analyzing the type, severity and frequency of your claims, you can determine the problem areas and make smarter decisions to mitigate those risks. For example, let's say that in mining your claims data from the last five years you notice a high rate of workers' compensation claims related to back injuries. With that information in hand, you can then take steps to correct the problem, like conducting specific training programs to teach employees the proper ways to lift heavy materials.

If the new training program doesn't seem to be reducing the number of claims related to back injuries, perhaps you need to redesign the job itself so that lifting becomes less hazardous. Or maybe you have the wrong employees handling the lifting. Doctors offer a kinetics test that assesses employees' physical strengths and weaknesses so that you can determine the job for which they are best suited.

Data can help you make multiple decisions like these that can improve your business. At the same time, the constant monitoring and analyzing can be time consuming. Consider working with your insurance broker, who can analyze this data for you and help identify the proper steps to reduce the severity or frequency of these claims, thereby positively impacting your bottom line.

#### Loss Control

Loss control visits are typically done by your insurance carrier, who comes to your facility or jobsite to evaluate your safety programs and level of risk. It's a good policy to involve your broker prior to these visits so he can seek out and help you mitigate any risks likely to stand out to the carrier.

Essentially, you want a broker who will - either personally or via his loss control specialists - regularly perform his own loss control visits. He should look at things like whether all employees are wearing the necessary protective gear, how well employees are following safety rules and what your organization is doing to go above and beyond in terms of safety. Doing so allows you to lower the number of accidents and injuries, thereby minimizing the cost of insurance and the loss of productivity that such incidents cause. Investing in ongoing safety improvements pays off - studies have shown that for every \$1 invested in injury prevention, you will see an ROI (Return on Investment) between \$2 and \$6.

#### Indemnity Clauses in E&P Contracts

Because the oil and gas industry can be so dangerous, exploration and production (E&P) companies like to spread the risk out as much as possible with their subcontractors. That's why indemnity is typically handled knock-for-knock, which is unique to the industry. Knockfor-knock indemnity is reciprocal in nature – each party accepts risk based on ownership



Parker Rains

of property and personnel rather than on fault.

Indemnity clauses must be clear and unambiguous. When reviewing a contract, be sure that the wording expressly states the liabilities and damages that the parties intend to cover. For example, contracts need to include some verbiage around additional insurance endorsements for oilfield service contractors. The wrong wording can cost your company millions of dollars. I've seen it.

Companies often have hundreds of contracts out there at a time. That's a lot of potential risk. Your first line of defense is your insurance contract – make sure you're covered and confirm that each contract is structured correctly so that it backs up what you've committed to.

By understanding their TCOR and focusing on the areas outlined above, oil and gas companies can not only improve their bottom line, but also significantly mitigate their risk.

Parker Rains is senior vice president of Fisher Brown Bottrell Insurance and head of the middle market business insurance firm's Nashville regional office. Rains was recently named to Insurance Business magazine's 2017 Young Guns list, a list of 55 top insurance professionals under the age of 35. You can reach him at prains@fbbins.com or 615-761-6332.



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## Demand for LNG Creates New Technologies to Speed Construction and Transfers

#### BY ERIC R. EISSLER

LNG is growing at a rapid pace because it is seen as a more environmentally friendly alternative to produce electricity. This is because it is cleaner burning than other fossil fuels and more infrastructure, such as import/export terminals, has been built in the U.S. and in other countries, namely energy hungry China, to facilitate its use.

To get a better idea of what is going on in the hot LNG sector, *OILMAN Magazine* had the opportunity to speak to Vincent Lagarrigue Director of oil and marine hoses operations at Trelleborg AB, a Swedish engineering company that works across a variety of verticals with a strong presence in polymer technology.

### OILMAN Magazine: In terms of technology, what is new on the LNG scene?

Vincent Lagarrigue: In the last few years we've seen an increasing need to respond to changing demand patterns in the market. The most notable of these is the growing need for flexible, often small-scale LNG infrastructure, particularly in Asia.

In China for example, last winter LNG demand hit an all-time high after it was leveraged to combat smog, setting the country on course to take over from Korea as the top importer in the region. Elsewhere in Asia, new demand is growing fast in regions that have not traditionally been major LNG importers. Recently, Mangesh Patankar, head of business development at Galway Group, predicted that by 2025 demand for LNG in Asia will reach 290M tons per year (mta). Buyers in the region, such as Indonesia, Thailand, Malaysia, Singapore and Pakistan, are expected to import a total of 60 mta in 2025, making up 79% of Asia's LNG imports, compared with 21% from the region's traditional buyers China, India, Japan, South Korea and Taiwan. This demand must be met by infrastructure that is flexible and in line with the needs of locations that will often require power generation infrastructure to be located away from major import hubs.

While demand is growing, and gas is readily available, the cost of developing transfer infrastructure risks reducing feasibility of power generation and terminal projects. For example, it might be necessary to conduct transfers in water depths that would either be too shallow for carriers, or too deep for jetties to be constructed.

To solve these challenges, cryogenic floating hose technology can be employed because it can create turnkey infrastructure projects that reduce the capital expenditures and the environmental impact of LNG import infrastructure. In many locations, jetty construction may be unfeasible, either due to harsh conditions, or the depth of the water. The water depth might be either too deep to allow construction, or too shallow to allow vessels to come alongside.

Secondly, floating hoses offer new possibilities for ship-to-ship transfer. Transfer between a carrier and FSRU, for example, has traditionally needed to be behind breakwaters, due to the complexity of handling side-by-side transfer. However, floating hoses in tandem configuration mean that transfer can occur in a far greater range of locations. This configuration increases the distance between vessels, ensuring safety, while the flow rates of 12,000 m3/h achievable, lessen the time window - both of which are important factors in safe transfer. This greatly increases the range of potential FSRU locations, opening up stretches of coastline where previously wave conditions would have prevented transfer.

## OM: Could you go into deeper detail on transfer technology for LNG?

VL: The floating hoses feature a unique hosein-hose design. It consists of an inner cryogenic hose, which uses multiple polymeric film and woven fabric layers encapsulated between two stainless-steel-wire helices to provide resistance to internal pressure, and an outer hose, which provides protection from the environment. Fibre-optic technology is incorporated into the insulation material of the hose to ensure realtime monitoring of the LNG transfer.

The Universal Transfer System (UTS) is 'plug and play', requiring no modifications on the LNG supply vessel. By bringing the infrastructure to the carrier, the need for extra construction can be reduced, while also enabling transfer in areas that would be otherwise unsuitable. It also allows transfer infrastructure to be relocated when out of use, or for maintenance, or brought into port to avoid damage from adverse weather. This also frees up space and time in busy ports.

The short installation time also adds to the success of the UTS. The initial test project took only six months to set up, which is up to six times faster than a jetty, and up to 80 percent cheaper compared to traditional, fixed infrastructure.

#### OM: In order to keep up with the high demand of exports, what kind of shift in technology/process does the U.S. need to follow?

VL: As demand for exports increases, we need to think about how we can address infrastructure challenges in a more agile way that allows faster construction and lower capital expenditures. At the same time, we need to focus on increasing operability, increasing resilience, and where possible, how we can go about augmenting existing infrastructure rather than reinventing the wheel. In these instances, it makes sense to think about alternatives to traditional transfer infrastructure based on jetties and loading arms, which may not suit all environments.

#### OM: What technologies will increase the efficiency of LNG transport? How is Trelleborg contributing to this technology? What are the main challenges faced in offshore LNG transfer and how to tackle these issues?

**VL:** Our 40 years of experience in the industry have taught us many things, and it's important to us that we build on our previous successes to create new solutions that solve the problems of today. There's no silver bullet to improving LNG transfer, and every piece of tech needs to function effectively within the wider digital and physical infrastructure network. It's not about riding the wave of ongoing digitalization just for the sake of it; it's about combining our insight with all of the tools we have at our disposal to come up with the best product for our customers. We need to think about how we can underpin digital innovations with infrastructure that's specifically designed to meet the needs of the changing market. <sup>2</sup>

#### FEATURE



Photo Credit (upper left): Jonathan Weiss - www.123RF.com

## CREATING A FULLSTREAM COMPANY: How BHGE Offers Value for E&P

For the past year, the energy world has eagerly followed a historic event in the oil and gas industry involving the first coalescence of all three oil and gas sectors (upstream, midstream and downstream) under one services industry roof.

On July 3, 2017, GE Oil and Gas combined with Baker Hughes, a GE company, to create a new entity: BHGE. By merging the

#### By Samuel Cook

downstream operations held by GE with the upstream and midstream operations already handled by Baker Hughes, BHGE officially became the world's first and only fullstream company.

## Oil and Gas: A Difficult Industry to Service

The oil industry has always been complex.

For as long as there has been an industry in the U.S. and abroad, there have typically been three distinct sectors of production. Upstream, midstream, and downstream are categorized separately specifically because each sector has different needs which cannot easily be satisfied using all of the same types of techniques, equipment, or technologies. One certainly has no need of drill bits in the

#### FEATURE

downstream, while there you aren't likely to find refining capabilities occurring in the upstream (at least not yet—we won't count out the advancement of E&P technology).

With but a few exceptions, companies that operate in these sectors, whether in oil and gas production or in oil industry services, typically specialize their operations in one, or at most two, sectors. Additionally, across those three sectors, companies have vied to out-produce and out-innovate each other, all while keeping an eye on the sometimes dramatic market shifts in oil and gas.

But behind all of it, oil and gas producers have relied heavily on service providers to offer support. Everything from seismic testing of untapped shale plays to storing and refining raw materials, the oil and gas services industry has quietly ensured that those who take on the challenge to produce America's primary energy sources can do so effectively and as inexpensively as possible.

Even as the oil and gas producers had to tighten their belts for the past several years, leading to massive layoffs and significant slow-downs in productivity, oil and gas services took even larger hits to their operations while still trying to effectively provide support for the industry.

Of the 450,000 workers laid off across the oil industry in the past decade, the services industry took the brunt of the damage. According to Rystad Energy, 300,000 oil and gas services workers were laid off between 2014-2016.

These are, of course, among the many risks involved with working in a massive and multiplex commodity-based industry. The smaller and more niche a services company is, the harder it is for that company to survive in a down market. Across the industry, most services companies do indeed specialize to the extent that disruptions can be costly. A select few have managed to branch out their operations across multiple sectors and weather the various storms in the market that have heavily impacted other companies.

Halliburton and Schlumberger, for example, notably offer extensive services for upstream and downstream operations, but companies of their size and caliber are tremendously difficult to create and manage. Unlike smaller services companies, larger, integrated services companies are likely to have the resources on hand to survive when a down market does occur.

When the market goes up, so does the number of companies offering services. According to an analysis by Deloitte, the midstream, in particular, is set to explode as demand for transportation infrastructure skyrockets. Additionally, data from the U.S. Energy Information Administration reveals that natural gas flaring, or burning off excess gas which cannot be sold to market due to a lack of infrastructure to handle it, dropped down to 10 percent in 2016 after reaching above 35 percent in 2014, highlighting the fact that there was a noticeable delay in how long the services industry can take to catch up to the production side of the industry, especially immediately following a down market when resources are tight.

This is just one example of the difficulties both E&P and the services industry currently face. It takes some time for the services industry to recover from a down market after severe layoffs and the rolling back on services and infrastructure projects. By the time companies have recovered, including new companies rising to take the place of those that shut down in the interim, the market may again shift back down again.

#### How a Fullstream Company May Reap Benefits in the Market

For decades, different companies have developed specialized processes for each level of production. Among the three, we usually hear the most about the production activity in the upstream. Upstream operations are certainly no more or less important than the other two sectors. However, upstream has always been the biggest hotbed for technological innovations and changes in the industry, mostly by necessity. The sector also garners the most fascination from those outside of the oil and gas industry, from the iconic 1960s TV show, *The Beverly Hillbillies*, to the cult classic 2007 film, *There Will be Blood*.

Baker Hughes has a long and successful history as an upstream company. In the early 1900s, the company was founded as a tools manufacturer, with one of its key founders, Howard R. Hughes, Sr., holding the patent to the first rolling cutter drill bit to find success in the market. Over the years, Baker Hughes has grown in size and specialization, as it moved from an upstream company to an integrated oil and gas company offering services in both the upstream and midstream sectors.

Part of what made BHGE possible, however, is the fact that upstream operations inevitably blend directly into the midstream and downstream sectors. What's more, these sectors must merge together as seamlessly as possible to avoid major interruptions in service and quality, forcing sometimes disparate corporations from across the globe to work together to provide services effectively.

For that reason, E&P companies are more likely to seek out integrated oil and gas services that operate in multiple sectors, as integrated services allow for a far more seamless transition between getting product out of the ground to getting it into the market for consumers.

#### Baker Hughes in the Midstream

While often overlooked in importance, midstream operations are the backbone of the industry as a whole and in many ways is undeniably important to the U.S. and international economies. Oil transportation may be regularly ignored or misunderstood, but it is also usually more likely to be maligned once something goes wrong (such as a pipeline or tanker oil spills). Still, the midstream is a sector experiencing a shocking level of growth right alongside the upstream thanks in no small part to the development of shale drilling and exploration operations in the Bakken, Eagle Ford, Haynesville and Marcellus shale plays.

Midstream is also an area where Baker Hughes acquired specialization. Over the years, the company has offered midstream applications through pipelines, transportation, gas plants, terminals and technologies necessary for effective midstream operations.

As a sector, the midstream has seen rapid growth in the past two decades. The U.S. oil pipeline infrastructure is larger than ever,

Continued on next page...

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and new, durable pipeline materials have resulted in safer transportation of oil over land.

Transportation by oil tank trucks also continues to be a necessary function in the American economy in the midstream. A surge in fracking activity and the continued importance of oil tank trucks is also playing a large part in the high demand for trucking jobs, which as an industry, is facing a shortage of around 200,000 workers.

#### An Eye on the Downstream

In the apex that is the downstream sector, companies have learned how to effectively and efficiently refine their core products (petroleum, natural gas), making them ready and usable. New technologies have allowed downstream companies to become ever more adept at squeezing more functional product from the refining process, while also utilizing fewer resources and making a significantly smaller environmental impact. Across all three sectors, an increase in oil production has led to the first new refinery in the U.S. in 40 years moving rapidly through the planning and permitting phases.

It's in the downstream where GE sought to build a unique, tech-centered business, focused around supplying much-needed equipment and services. When GE launched Downstream Technology Solutions in 2014, then President and CEO of GE Oil and Gas, Lorenzo Simonelli, stated in a press release, "By launching our new Downstream Technology Solutions business, GE can help our customers optimize their operations and accelerate their own growth in this opportunity-filled sector."

In joining GE's downstream with Baker Hughes' expertise in the upstream and midstream services, BHGE effectively promises a fullstream approach that is built upon the joint experience and success of the two companies.

#### BHGE's Fullstream May Help Weather Unpredictable Markets

However, BHGE stands to transform how quickly services industries can step in when markets become chaotic, or even during longer sustained periods with oil and gas selling at below \$50 a barrel. As a fullstream oil industry services provider, BHGE can extend its operative arm across the entire sector, providing a streamline for E&P from upstream to downstream. For BHGE, this may mean a more sustainable model in any market, and for E&P, it could mean important cost savings that can help ensure the best prices without the hassle or worry of an important services provider going out of business during key moments in down markets.

According to the Haynes and Boone Oilfield Services Bankruptcy Tracker, over 160 oil services companies went under between 2015-2018, holding an aggregate \$55.5 billion in secured and unsecured debts. The Haynes and Boone tracker also indicates that the number of bankruptcies in the services industry are growing significantly. In 2015, there were almost no oil industry services going under. Secured and unsecured debts were at near zero at that time as well.

As such, BHGE and its newly-crafted fullstream operation are well-time in the market. The company stands poised to offer the technology and streamlined approach necessary for increasing and sustained operations in the oilfield to maximize the potential of their drilling and production and get their oil to the market.

Among the many benefits BHGE promises from their fullstream operation, the company believes they will:

- Create new sources of value for E&P
- Improve productivity and reduce costs through integrated equipment and services
- Significantly reduce downtime through integrated digital and physical operations
- Simultaneously reduce risks and increase productivity
- Utilize technology and a store of knowledge and experience to innovate and bring new solutions to market faster

According to its 2017 press release announcing the finalization of the joint operation, Simonelli, now President and CEO of Baker Hughes, a GE company, stated, "We created BHGE because oil and gas customers need to withstand volatility, work smarter and bring energy to more people." The CEO of GE, Jeffrey Immelt, added that the new company will be able to help customers "be more productive in any cycle."

Current trends in the oil market may be pointing toward a period of stability not seen in the past decade. However, oil and gas producers learned a hard lesson in the past decade. There is no free lunch, and it's impossible to effectively rely on oil sustaining high prices and high demand in the long term.

Even still, production declines do not mean an end to the necessity for services and infrastructure. Indeed, it may point even more toward the demand for innovative approaches, something that a fullstream company may be able to provide in a way unseen before in the industry.

#### A Baker Hughes without GE?

As of June of this year, GE is officially looking to divest itself of various business units in order to more streamline its operations. The company is not only looking to spin off its healthcare wing, but is hoping to completely shed itself of Baker Hughes. According to several reports, GE wants to sell its stake in Baker Hughes, of which the conglomerate owns a two-thirds share.

This is not the first time GE has considered selling its stake in Baker Hughes. However, it is the first time GE has confirmed its intentions to sell. Earlier this year, GE denied claims that it planned to sell its share Baker Hughes. At a Barclays conference in February, GE's CFO, Jamie Miller, stated, "At this point in time, we have no intent to change anything or execute prior to the expiration of any of the lockup periods."

What GE's divestiture of its stake in Baker Hughes would mean for BHGE is still unclear. Given GE already rolled its oil and gas services arm into the new BHGE company, it appears GE may be trying to completely sell off its entire fullstream operation to potential buyers. We don't market to test the waters, we hit the market to make waves.

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## Optimizing IIoT Edge-to-Enterprise Connectivity in Oil and Gas Production

Like many industrial areas, the oil and gas industry is in the midst of an Industrial Internet of Things (IIoT) evolution. Every oil and gas producer is connected to their assets, but not all are fully connected from edge to enterprise. Even fewer are able to easily integrate their legacy implementations with new IoT deployments.

The IIoT evolution enables scalability, and stresses interoperability, creating an interconnected, rapidly evolving ecosystem of solutions and analytics that enable better process control and broader business insights to emerge. Gathering data from industrial devices at the edge (sensors, alarms, controllers, equipment, valves and actuators) is key to unlocking these insights. The edge data is pushed up to the cloud, independent from legacy systems like SCADA (Supervisory Control and Data Acquisition), then interconnected with data pulled from SCADA, permitting a broader, system-wide application of analytics to occur.

#### Getting Big Data Can Pose Big Challenges

Oil and gas executives can definitely get on board with having access to better analytics generated from industrial IoT big data. But frequently system-wide implementation can pose serious issues, which until resolved, will slow or impede moving forward with a full plant IIoT application. Some of the more important concerns regarding implementing plant-wide IIoT are these questions:

- a. Will our systems that have gotten us to where we are today need to be undone?
- b. Will our hardware need to be replaced, and if so, at what cost?
- c. Will our existing SCADA functionality be interrupted?
- d. Will custom embedded solutions need to be reengineered for each of our thousands of edge devices to make them IoT compatible?

These are tough questions for those charged with transitioning their plants' legacy systems to full IIoT connectivity, largely because the answer to each of these questions is 'yes'. That is, if conventional IoT approaches to enterprise/edge connectivity are being implemented.

Recently released application gateway technology,

#### By John Geiger

however, has now diffused these issues for oil and gas production, enabling highly-scalable enterprise infrastructures with plug-and-play simplicity, that maintain existing SCADA functionality, and without the need to replace existing hardware.

#### Application Gateway Technology

The emergence of IIoT platforms – such as the OPC Unified Architecture (OPC UA) widely adopted by oil and gas producers – and the use of application gateways are enabling the collection of more data in a timely fashion.

The new IIoT application gateways costeffectively provide wireless and wired connectivity that enable the unification of modern webbased applications and traditional SCADA infrastructure.

They also virtually eliminate the need for costly new equipment.

Here's an overview of how these new gateways support oil and gas producers.

#### High-Volume Edge Data Collection

In traditional oil and gas applications, specific data from a single operation is monitored and collected by SCADA, which then issues commands to control that single operation.

For example, well data is used to optimize the output of a single well. With today's IIoT platforms, that same well data can be used in several applications including overall equipment effectiveness (OEE), loss, waste, production efficiency, and even identifying if differences of efficiency exist between wells on the pad.

Within this framework, data should no longer be polled just for a specific application. It should be collected to a big-data cloud database which is designed to efficiently provide information to different applications that are requesting data. This means that as much higher resolution data as feasible should be gathered from the oil pad and made available in a common format, to allow for broader usage and analytics.

Application gateways are enabling this highvolume collection of edge data, in addition to uninterrupted SCADA polls. With the gateway, control can be initiated from SCADA, the cloud or from a tablet in a mobile field force. This applies to remote configuration and management updates as well.

## No Interruption of SCADA



Traditional SCADA uses centralized back office systems to gather information from remote devices. These systems use polled architectures on serial connections developed 30 years ago, before the advent of the Internet and high-performance processing, that is taken for granted today. New IIo'T architectures are removing the limitations of these older polled systems, and bridging existing devices to leverage IIo'T systems that move intelligence to the network edge.

New application gateway technologies collect data locally by polling the device, and maintaining device connectivity with existing SCADA systems. Such gateways constantly poll devices at the edge, assessing the system state every second, compared to a traditional 15 minute or longer SCADA polling interval. The data gathered is used to create a data model that can be easily understood by other applications and translated to other protocols, allowing the data to be shared in real time with the ecosystem of emerging IIoT applications.

#### Plug-and-Play at the Edge

As opposed to traditional approaches for industrial edge connectivity, which are based on developing custom embedded solutions that require reengineering for each device, application gateways leverage the new high-performance hardware platforms using a hardware-independent Android/Linux-based software platform. Application gateways simultaneously leverage chip/module-based connectivity solutions that are lowering wireless connectivity costs.

These gateways provide many features that simplify the development of edge applications by reducing the time to create and integrate them, reducing development time from months or years, to weeks or even days. This enables innovative edge applications to be created and rapidly integrated to existing infrastructure and IIoT

#### **OILMAN COLUMN**

applications. In addition, new applications and business models can be continuously created over the life of the system.

#### Improved Security

SCADA systems that tie together decentralized facilities, such as oil and gas, were designed to be open, robust, and easily operated and repaired, but not necessarily secure. Concerns about SCADA systems being vulnerable to cyberwarfare and cyberterrorism attacks have increased the need for heightened security within the IIo'T.

In October 2017, the U.S. Department of Homeland Security and the Federal Bureau of Investigation issued a rare warning that sophisticated hackers were targeting energy and industrial firms. Some of the attacks against nuclear, energy, aviation, water and critical manufacturing industries had successfully obtained credentials for accessing the computer networks of their targets. Application gateways, being based on Android technology, have defense-in-depth security built across the layers of the communications stack all the way up to the application layer. Consequently, they implement the best practices of IT security, considerably exceeding that provided by SCADA systems.

The most advanced application gateway technologies are built from the ground up with security in mind. Their platforms have a secure sandbox for different applications, each with its own crypto-technology for data and sharing of data between applications. Importantly, however, the security built into these gateways does not put a heavy burden on the system.

#### **Embracing Connectivity**

In the oil and gas industry, the challenge to enable connectivity and convergence is largely dependent upon the acceptance, implementation and performance of industrial IoT platforms and the new application gateways. These open the door to simpler IoT accessibility from edge to enterprise, with improved asset utilization, higher process efficiency and productivity, and lower cost of operation.

John Geiger is the VP of Business Development and a founding member of Machfu. He has 30+ years of experience and subject-matter expertise in developing innovative M2M & IoT solutions. John has held multiple senior roles including General Manager of Adaptive Broadband, VP of Engineering and Product Management at MDS and Wireless COE leader at GE Digital Energy. He was part of the management team that sold MDS to GE in 2007. He has proven commercial track record in the Utility, Oil & Gas, Water/ Waste Water, Traffic, Rail, Heavy Industrial and Commercial markets.

## Let the Free Market Rule

#### BY GIFFORD BRIGGS

The cover that was keeping the Austin Chalk quiet has been blown off. The play spanning across most of central Louisiana, stretching from Lake Pontchartrain to the Texas border is getting a lot of attention. At first it was a few undisclosed investor's drilling test wells; now companies like Marathon Oil, ConocoPhillips, PetroQuest Energy, EOG Resources, and BlackBrush Oil & Gas have all jumped in to see what can be made of the Austin Chalk.

This increase in interest fits the narrative of what's happening across the United States in regards to the oil and gas industry. We are experiencing an uptick in oil prices, America is taking claim of more global market share due to shale production, and our nation has an uptick in rig activity. In what has become the norm in Louisiana, we fall well below that national increase in rig activity.

New activity in the Austin Chalk would give Louisiana a fighting chance to change the narrative, but unfortunately, we continue to shoot ourselves in the foot. As a new opportunity develops, it is important to create a regulatory environment that welcomes investment; unfortunately a recent decision made by the Office of Mineral resources has moved our state away from the free market and into an area of growing regulation.

The State Mineral Board is responsible for managing the state's minerals and lands and from time to time, putting those minerals up for lease. The process for the leasing of the minerals traditionally involves companies making blind bids that include mineral bonuses they would like to offer for the lease and a royalty percentage they are willing to pay the state for the minerals produced. The bonus and royalty that would be paid to the state is in addition to the severance that is owed to the state on all minerals produced in Louisiana.

On occasion, particularly on lands that are managed by the Department of Wildlife of Fisheries, certain minimums on royalty and bonuses are used; however, it is far from common practice. The challenge that minimum bids bring is that it completely upsets the free-market by essentially establishing a floor for surrounding, non-state leases in the area. In the event of minimums being used on an entire play, such as the Austin Chalk or Haynesville Shale, millions of acres could be affected just by setting a minimum on a few hundred acres.

The State Mineral Board in a recent lease sale has unfortunately, taken this very action. They decided to set a minimum on the leases in the Austin Chalk and have abandoned the freemarket bid approach that it has embraced for so long. The impact of such a decision will take some time to spread across the play, but continued reliance on minimum bids and a movement away from the free market will only hasten the



Gifford Briggs

damage that could be done. Higher leases mean less investment and less investment means less payments to individuals, local government, and the state.

The movement of any government body to replace the rule of the free market with the rule of bureaucracy, is a move that the governed are sure to lose. No person has explained this better than the great Ronald Reagan when he said, "The most terrifying words in the English language are: I'm from the government and I'm here to help." The oil and gas industry continues to be a resilient and beneficial industry partner for Louisiana. In order to realize its full economic potential, there must be a regulatory, judicial, and fiscal environment that allows the hardworking men and women of the oil and gas sector to succeed.

## How to Successfully Deploy Data Visualization for Your Oil and Gas Company

#### By Lee Nagel

## Data Visualization Can Help Your Oil and Gas Company

The oil and gas industry goes through many changes over the decades. This is because the industry involves heavy amounts of data, research, and need for reporting, it may be quite challenging to compile this information and make it digestible and transferrable to stakeholders. It is difficult to simply access information in order to perform our goals. As a solution, data visualization can help bridge the gap in this problem.

We can notice that the business model of oil and gas companies presents its outstanding features. Unlike retail or small businesses, oil and gas industry relies on big capital investments. When we look at conventional ways to gather data, it may be difficult to retrieve the pertinent information that we need to help us address the industry's needs.

Data visualization is a great way to help aggregate the important information needed, for data to be disseminated across several multimedia forms more efficiently, and to help improve business processes without affecting safety. Through the use of images, the oil and gas industry can easily benefit from infographics and other pictures that can help stakeholders understand large amounts of data in a comprehensive format.

They say that most people are visual learners and this why it is important to deploy visual data to help in your business. When you present meaningful information using engaging graphics, you are able to present the information in a more understandable manner.

Lee Nagel, the Vice President of Izenda Business Analytics, helps us understand how to incorporate data visualization in your oil and gas company.

#### How to Successfully Deploy Data Visualization for Your Oil and Gas Company

### 1. Find access to your main database of information

The first step in creating great data visualization for your oil and gas company is to get access to your database. Your database of information should ideally be centralized, to help you save time getting all the information you need across several departments.

In an oil and gas company, you may have particular teams (i.e. engineering, maintenance, security, research, ventures, administration, etc.) that operate within the system. Having a centralized form of access throughout your company's data helps you to get all the information you need. Otherwise, you may have to get information from each department separately.

## 2. Create an outline of the information you need

The second step is creating an outline of the information that you need. From getting information across all your departments, what information is useful for you to include in your data visualization plan. Does it include statistics about your recent ventures? Does it contain how much percentage of returns have you been getting in the last 5-10 years? Do you want to include the data about your current resource retrieval system?



Lee Nagel

Whichever data you want to include, it may be helpful to place all this information using an outline. Numerical data is important so that your data visualization can be made using charts and graphs when it comes to quantitative variables.

You can hire a data analyst to help in this task, or if you already have a data analysis team employed, they will be able to do this efficiently on your given deadline.

## 3. Present this information to a data visualization company

A great way to save time to create visual data for your oil and gas company is presenting information to a data visualization company. Companies who are experts in data visualization know how to best portray the data through graphics and compile the given information in a single image.

The best part about hiring data visualization companies is that they have the right tools to make the process quickly and efficiently. It is known that the oil and gas industry requires a lot of research,



#### **OILMAN COLUMN**

and as a consequence, there is a lot of data that needs to be sifted through, categorized, and organized.

Some of these may be difficult to comprehend especially if you want to convince investors, and data visualization companies can help you do this by presenting your information in an engaging way.

### 4. State which data visualization types you need based on categories

After you present the information to be visualized, you need to decide which categories you want to include in your infographics.

For example, you want to place percentages of oil and gas retrieved per location. The data visualizers may be able to include a chart that shows each location as a bar that rises up and down depending on the percentages they yield over an annual period.

Additionally, you can also create data visualization by making cycle charts that show how you start an oil and gas research venture. You can make use of this chart to help explain your ventures to potential investors more efficiently.

5. You can also create your own simple data visualization through the use of data visualization software

Additionally, there is also data visualization software that you can use to help you create graphics for the information you placed. Izenda, a business analytics platform, helps create data visualization for your company using quick and efficient analytic results based on the data you wish to present.

Data visualization software is one of the quickest and most accurate ways to help make comprehensive infographics for your business. It incorporates the use of machine learning and other automated processes to fill in your company's needs.

Another benefit of data visualization software is its consistent use of systems to interpret data.

The problem of doing data visualization manually is the potential for human error. When you deploy software, there is a lesser risk to create errors, and the outputs are done in a consistent quality.

## 6. Your infographic is ready to use in reports, blog posts, conventions, seminars, and other meaningful purposes

After getting the output of your desired data visualization source, you can now use these graphics for many purposes.

The most common uses of data visualization

are by presenting them in reports. Most of these reports are presented to investors and venture capitalists. It is important to pitch ideas efficiently if you are constantly looking for partnerships in your business.

Presenting the information in a vague manner is detrimental to your stakeholder's comprehension, thus making them uninterested with your business pitches.

Data visualization is a powerful tool that can help your oil and gas company grow. Not only will it help you easily access the information that you need, you will also gain better experiences in presenting pertinent information for people who might be interested in networking with your business.

Lee Nagel is the Vice President of Izenda. He is responsible for marketing Izenda's products and services for many corporate and industrial businesses. He is the expert in creating opportunities for Izenda to reach the global market, coordinate with companies, present Izenda's goals in conferences, as well as creating demand for business analytics. Mr. Nagel has an entrepreneurial and determined spirit, and he is known for his vast experience in helping Fortune 500 companies to succeed.

## THE OILFIELD AUCTION CULTURE

#### By Josh Robbins

For years, the option to sell your oil and gas property was to bring it to auction. The mentality is that with more bidders, the better price you receive for your property. Also, the auction company marketed the auction, so all you had to do was bring the information about your wells, geographic area, etc. And for the last 40 years, this has been the primary way to buy and sell wells.

This has built an oilfield auction culture that, from the outside looking in, looks backwards. As a company focused on off-market deals, we go right to the source. We find exactly what we are looking for and want to know if the operator would be interested in selling. The current culture forces the operator to, instead of talking with the interested party, to see how many other parties are interested in the same property. In real estate terms, that's like someone coming to your door and offering you money for your house and you calling a realtor to put it on the market. You add in fees, time and may not get any more money for the property (or could end up losing the deal entirely).

As we visit with different companies and individuals, we hear the same problems at every meeting: "We see all of the same properties that appear on these bid sites, but those properties aren't what we are looking for. And, on the off chance they are, we have to fight with 25 other companies to get the property. We refuse to overpay for assets, so we end up losing out on these opportunities. How can we find oil and gas properties that fit our acquisition profile, and not have to worry about our competition forcing the price up? How can we build our company operations without spending hours in data rooms, only to find that the property we want has a low NRI or astronomical expenses?"

This auction culture is slowly dying. The people that are transacting aren't going through this bidder process, they are finding a way around it. In the same way that "roaming charges" was a fee based service – many of the millennial readers won't even recognize that term – the "online marketing" of your property via email blast is slowly becoming a service that no one sees value in.

As we enter into Q4 of 2018, the trait that will define the quarter (and 2018) will be: steady. In quarter three we saw deal

flow increase tenfold. However, the majority of these deals have been sitting on a shelf since the first quarter of 2015, waiting patiently for the price of oil to rise. These deals will continue to splash around, but the targeted acquisitions will be the cash flowing assets with development upside. Those won't be marketed, or on any bid sites. Those you have to uncover. And in this healthy 2019 market, you'll be able to transact consistently. You just have to have the right team finding those off-market deals.

Josh Robbins

## STOPPING CORROSION UNDER INSULATION IN GLOBAL OIL AND GAS FACILITIES

#### By Del Williams

Corrosion Under Insulation (CUI) is the root cause of many of the global petrochemical industry's most serious problems including forced shutdowns, lost production, early repair and replacement, as well as safety and environmental consequences that can cost millions of dollars per incident.

CUI, which involves the corrosion of vessels or piping beneath insulation due to water penetration, is insidious because it can remain undetected until the insulation is removed for inspection or leaks occur. Water penetration can result from many causes including monsoons, rain, flooding, wash downs, and sprinkler systems, as well as exposure to steam, humidity, or frequent condensation and evaporation of atmospheric moisture.

From upstream wells, risers, drilling rigs, or offshore platforms, to midstream pipelines, storage, and LNG (liquefied natural gas) terminals, to downstream refineries, fighting CUI and major corrosion has been an uphill battle and a major cost in the operation of oil and gas facilities, according to NACE International's IMPACT (International Measures of Prevention, Application and Economics of Corrosion Technology) study.

Fortunately, even when traditional coatings have allowed CUI and corrosion to occur, a new approach can stop the corrosion to dramatically extend facility and equipment life in oil and gas industry applications.

#### Stopping Existing Corrosion and CUI

Traditional corrosion protection typically involves applying polymer paints and rubber-type coatings. Such methods create a physical barrier to keep corrosion promoters such as water and oxygen away from steel substrates. However, this only works until the paint is scratched, chipped, or breached and corrosion promoters enter the gap between the substrate and coating. Then the coating can act like a greenhouse – trapping water, oxygen and other corrosion promoters – which allows the corrosion to spread.

Some of the world's largest petrochemical companies, including China Petroleum & Chemical



Corroded Storage Container Before EonCoat Application

Corporation (aka Sinopec Corp.), are finding success with a new approach toward stopping CUI and corrosion.

China Petroleum & Chemical Corporation, is one of the largest integrated energy and chemical companies in the world, with upstream, midstream and downstream operations. In Sinopec's Jianghan Oilfield projects, located in China's Jianghan Plain in Hubei province, there are numerous facilities for oil and gas extraction, transport, and storage.

However, with Hubei's sub-tropical monsoon climate, CUI and corrosion are serious issues that shorten equipment life and require excessive maintenance. In this environment, traditional coatings have been ineffective, and stopping corrosion that is already underway is often the last resort.

To extend production and the service life of assets already experiencing serious CUI or major corrosion, on two sample projects Sinopec turned to EonCoat, a spray applied inorganic coating from the Raleigh, North Carolina-based company of the same name. EonCoat represents a new category of tough, CBPCs (Chemically Bonded Phosphate Ceramics) that can stop the corrosion, ease application, and reduce production downtime even in very wet, humid, monsoon prone conditions.

In contrast to traditional polymer coatings that sit on top of the substrate, the corrosion resistant CBPC coating bonds through a chemical reaction with the substrate, and slight surface oxidation actually improves the reaction. The surface of steel is passivated as an alloy layer is formed. This

Storage Container After EonCoat Application

makes it impossible for corrosion promoters like oxygen and humidity to get behind the coating the way they can with ordinary paints.

Although traditional polymer coatings mechanically bond to substrates that have been extensively prepared, if gouged, moisture and oxygen will migrate under the coating's film from all sides of the gouge.

By contrast, the same damage to the ceramic coated substrate will not spread corrosion because the carbon steel's surface has been chemically transformed into an alloy of stable oxides. Once the steel's surface is stable (the way noble metals like gold and silver are stable) it will no longer react with the environment and therefore cannot corrode.

Visible in scanning electron microscope photography, EonCoat does not leave a gap between the steel and the coating because the bond is chemical rather than mechanical. Since there is no gap, even if moisture was to get through to the steel due to a gouge, there is nowhere for the moisture to travel. This effectively stops atmospheric corrosion and CUI on carbon steel assets.

The corrosion barrier is covered by a ceramic layer that further resists corrosion, water, fire, abrasion, impact, chemicals, and temperatures up to 400 °F. Beyond this, the ceramic serves a unique role that helps to end the costly maintenance cycle of replacing typical barrier type coatings every few years.

"CUI is the silent killer," explains Merrick Alpert,"

#### **OILMAN COLUMN**

President of EonCoat. "The insulation creates a terrarium on the steel in which corrosion is guaranteed to occur if traditional coatings are used. And the insulation then hides the corrosion from being detected until it's too late."

Sinopec's first sample project using the CBPC coating involved addressing CUI on a 500 cubic meter petroleum storage tank in an oil-extraction facility in the Jianghan Oilfield.

While the storage tank's original coatings were wrapped beneath a mineral wool insulating layer, due to rain, condensation, and moisture invasion through the damaged insulating layer, these coatings had failed, allowing CUI in a number of areas.

After peeling off the insulating layer, the metal surface underneath was prepared by sandblasting, then the CBPC coating was applied. The application has effectively stopped the CUI issue and is expected to extend the storage tank's functional life for years to come.

After the success of the first project, Sinopec opted to utilize the CBPC coating to address serious corrosion on a container-type water injection pumping station in another Jianghan Oilfield facility. Because of the pumping station's outdoor location with very high saline alkali content soil, along with a very humid container environment, shutdown for corrosion maintenance was typically required every three years.

A traditional three coat system was routinely used to maintain corrosion protection for the pumping station, so coating application took at least three days to allow drying time for each layer. Including surface preparation, total required maintenance downtime was at least seven days, which hindered production.

One of the greatest benefits of the CBPC coating, however, is the quick return to service that minimizes facility downtime. The time saved on an anti-corrosion coating project with the ceramic coating comes both from simplified surface preparation and expedited curing time.

With a typical corrosion coating, near white metal blast cleaning (NACE 2 / SSPC-SP 10) is required to prepare the surface. But with the ceramic coating, only a NACE 3 / SSPC-SP 6 commercial blast is typically necessary.

With traditional coatings, extensive surface preparation is required and done a little at a time to avoid surface oxidation, commonly known as 'flash rust', which then requires re-blasting. But with the CBPC coating, the flash rust is actually desirable. There is no need to 'hold the blast'. The reason for this unique CBPC characteristic is due to the presence of iron in the rust, which helps to create the magnesium iron phosphate alloy layer. It is this alloy layer that allows CBPCs to so effectively protect carbon steel from corrosion.

In contrast, a corrosion resistant coating for carbon steel utilizing the ceramic coating in a single coat requires almost no curing time. Return to service can be achieved in as little as one hour, which can potentially save hundreds of thousands of dollars per day in reduced oil and gas facility downtime.

Because of these unique properties, total coating application including surface preparation of the Sinopec pumping station will take two days and the asset can be put into service immediately.

With CUI and corrosion a perennial problem for oil and gas facilities with massive carbon steel structures, utilizing CBPC coatings that can control corrosion for decades and reduce downtime will only help the bottom line.

Del Williams is a technical writer based in Torrance, California. 🖸

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## DRIVERS WANTED: HOW A SHORTAGE OF TRUCKERS COULD CONSTRAIN THE GROWTH OF U.S. OIL PRODUCTION

#### By Trip Rodgers

In some circles, a career as a truck driver comes attached with a certain stigma. Long hours on the road, eating alone at highway diners, mediocre pay, and a stationary job with no company in the cabin but an AM/FM radio. Enter today's developing

and a stationary job with no company in the cabin but an AM/FM radio. Enter today's developing crisis regarding a nationwide shortage of truck drivers and resulting trucker pay in many cases of \$100k+/year with signing bonuses. Suddenly, that stigma quickly dissipates.

Possibly nowhere in the economy is the 17year low in the U.S. unemployment rate best exemplified as the trucking sector. Moreover, with unemployment rates even lower than average in the major oil basins and given the immense number of trucks required in shale oil production, the shortage of truck drivers may serve as a critical constraint to the upcoming growth of U.S. oil production. The intensifying shortage of drivers is the result of several key issues relating to supply, demand, and new regulations.

#### **Rising Demand for Drivers**

The demand for truck drivers serving the energy sector has naturally risen as the U.S. has approximately doubled its total oil production over the past decade to currently 10 million barrels/day (mmbl/d). Expectations are that U.S. production will continue to rise, possibly reaching as high as 14-15 mmbl/d over the next decade. Still, it's not simply the number of wells being drilled that has driven the increased oil-related trucking needs, but also several other key factors:

Greater sand intensity per well. Key to the increased efficiency of U.S. oil producers in recent years has been a major rise in the amount of proppant (or fracking sand) used per foot of horizontal length. In turn, a rather obvious consequence is a greater number of trucks required to haul the sand to the well, either directly from an in-basin mine or from a rail terminal. For an example, an average well that consumes 10,000 tons of sand during the fracking period of a well (many wells use substantially more) equates to roughly 400 truckloads of sand to be delivered to the wellsite. Assuming 10-15 days for the completion stage of an average well, this implies 27-40 sand truckloads per day to each individual well (not considering proppant storage systems, where sand delivery may be spread out over more days). For the Permian Basin alone, this amounts to an estimated 5,000 to 6,000 trucking round trips per day in the region just for sand delivery.

**Increased water cuts.** The disposal of flowback water is a critical issue with horizontal fracking. The amount of flowback water differs considerably by region with the rapidly growing Permian Basin possessing some of the highest water cuts. Again, the clear implication is a greater number of trucks (and truck drivers) being required to dispose of the water. With the normal truck capable of holding 120 barrels of water, an average well typically requires 30-60 truckloads per day during initial production. Wells in the Delaware Basin within the Permian tend to produce the most water and are likely to be on the high-end or exceeding this range. Given



Trip Rodgers

these trends, it is not surprising that drivers for water disposal trucks are in high demand.

Shortage of takeaway capacity. The near-term shortage of pipes to gather and transport oil out of the Permian Basin has caused many producers to look to less optimal sources for transport such as trucking. However, with truck drivers already on short supply, this option seems quite limited. To illustrate, transporting 100,000 barrels via a two-day trip to the Gulf Coast from the Permian requires roughly 1,000 trucks. As expressed by Phillips 66 on its 1Q conference call in April, "It's not really realistic to expect to move 100,000 barrels a day or 200,000 barrels a day [by truck]. It's just not really practical."

*New Electronic Logging Device (ELD) requirement.* On December 18, 2017, a new regulation by the FMCSA (Federal Motor Safety



#### **OILMAN COLUMN**

Administration) went into effect, requiring that all commercial trucks maintain ELDs in the truck cabin to monitor driver hours. The new requirement was intended to significantly reduce cheating on HOS (hours of service) requirements, in turn enhancing highway safety. In many cases, the resulting truck utilization is expected to fall from 16+ hours/day to a compliant 11 hours per day on the road. FMCSA's HOS regulations also include a weekly cap of 70 hours after which a driver must take a 24-hour break. Various trucking companies have confirmed that the ELD mandate has already had a major impact by forcing some small operators out of the market and by boosting the need for additional drivers.

#### A Shrinking Pool of Truck Drivers

Aging Driver Workforce. Unfortunately, the trucking industry seems ill prepared to meet the increasing need for drivers, particularly in the oil sector. A key problem is the aging demographic of the U.S. supply pool of truck drivers. In a 2014 study performed by the American Transportation Research Institute (ATRI), more than 29 percent of trucking employees were in the 45-54 age group, the highest figure of any age category. This compares to less than 16 percent for the 25-34 age category. Obviously, the industry has not done an

adequate job at recruiting Millennials and is at risk of a contracting labor supply as Baby Boomers enter retirement.

Issues with Recruitment. In addition to the persistent need for more drivers within a fragmented industry, there are additional headwinds that the trucking industry is facing that has made trucker recruitment difficult, particularly regarding younger drivers. Those include (1) Commercial Drivers License (CDL) requirements, where attaining a CDL can be costly and time consuming and requires holders to be 21 years or older; (2) health considerations regarding a job generally not considered to promote one's overall physical wellbeing; (3) competition from other sectors needing drivers, such as Uber and Lyft; and (4) drug testing, which has become more accurate with follicle testing and is sadly a major impediment for many job seekers.

#### Impact on Oil Prices

The impact of driver shortages could have two primary impacts leading to higher oil prices:

#### Applying upward cost pressure for oil producers. In most cases, the resulting higher wage costs from truck driver shortages should

ultimately be passed on to oil producers, partially offsetting recent improvements in well efficiencies and effectively raising their marginal cost of production. This in turn should increase the oil price required for producers to bring additional barrels to market.

#### Constraining the growth of U.S. oil

**production.** Driver shortages should act as a meaningful constraint to the growth of U.S. shale oil production, a major factor to the global supply-demand balance for crude oil. The expansion in U.S. shale production is likely to continue and, most importantly, is needed in today's environment of strong global demand growth and either falling or stagnating output among several key oil producing countries. However, real-world oilfield constraints, like shortages of truck drivers, could limit that growth to more conservative levels than widely anticipated. The expected result would be an extension of the ongoing tightening of global crude supplies, applying intermediate-term support for oil prices.

Trip Rodgers, CFA, Portfolio Manager, joined BP Capital Fund Advisors in January 2017, where he serves as a member of the Investment Committee and a Portfolio Manager of the BP Capital TwinLine Energy Fund. <sup>(2)</sup>

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## Automation, Business Intelligence Vital to O&G Innovation & Skills Gap Challenges

As jobless numbers decrease and companies within nearly every industry tout the ability to hire new talent, the oil and gas industry is still feeling the pains of not being able to fill vital industry positions.

Recent research by Goldman Sachs indicates the industry needs to hire tens of thousands of employees within the next few years in order to keep up with demand and industry growth.

As those performing vital roles become retiring age or leave the industry for new opportunities, irreplaceable expertise leaves with them. And most of the time, it is before critical institutional knowledge, coupled with unparalleled experience can be shared with the rising workforce.

HR departments are working diligently to put more steam behind strong college recruitment plans for graduates receiving STEM-related degrees, but oil and gas IT is also exploring its options, in an attempt to find technologies that can perform critical tasks with little to no human interactions.

Automation is making its mark across nearly every industry — sparking widespread panic in the workforce over job loss. But in instances where the needed expertise can't seem to be found, technology is constantly being developed and perfected to perform these necessary tasks.

For instance, currently, O&G is producing way more data — more than five zettabytes on average — that needs to be stored and accessed. This astronomical amount of data is painstakingly sifted through in search of important operational information that has direct impact on business operations. But in these situations, when the data provided is en masse, it is easy to overlook critical issues buried deep in the data.

Advanced business intelligence, coupled with smart automation and analytics can process, parse and interpret this data in record time, with little to no errors. This data can then be passed on to necessary stakeholders for real-time business decisions, adding a level of efficiency that is somewhat lacking when the entire process is managed by employees lost in mounds and mounds of data.

Business intelligence, automation, and other digital advancements finally allow the industry to

#### By Deanna M. Murray

prioritize its hiring needs and close the skills and knowledge gap the retiring oil field workforce has generated. These automated operations that can now support and perform tasks critical through the entire process lifecycle and finally address the inevitable demographic shifts that occur when a new generation becomes employable.

Automated technology is also proving to have a profound effect within safety and regulatory compliance. Listed as one of the top three concerns on the minds of O&G CEOs, the industry has been plagued in years passed by regulations — only to comply and then have the regulation shift. This has cost the industry a significant amount of pain as fines literally threaten the overall operation and production abilities of specific oil and gas operations. Even though we are currently seeing regulatory relief, the industry can't let down its guard when it comes to staying on top of compliance and safety practices.

Automated error systems, activated immediately when a potential problem presents itself are enabling organizations to get in front of safety situations and possible regulation violations that could otherwise trigger compounding fines and/ or dangerous work conditions. These error alerts offer pinpoint precision as to their location and cause and allow those tasked with safety and regulatory oversight to get ahead of it before damage ensues.

Chatbots and other forms of automated messaging tools, built on top of an organization's internal or mobile communications systems (including email and messaging apps) are also making it easier to keep track of systems remotely —reducing the need to have 24/7 observation of certain operations. These implementations have little to no ramp-up time as their adoption is built into technologies already heavily utilized by organization employees - meaning, once implemented they are nearly already at 100 percent adoption.

The industry is also seeing a huge push in mobile application use. As within every other industry, mobile is changing the way businesses think about their processes and their internal communications. With smart dashboards, available at the swipe of a screen and vital data appearing on command, split-second, precise decisions, and adjustments can be made remotely or sent immediately to necessary personnel. Mobile is also playing a vital role in asset moves via the tracking of equipment and its installation as it pertains to the setup or removal of drilling sites or even office location moves.



Deanna M. Murray

But all of this costs money, right? Automation, advanced business intelligence, advanced alerting systems and mobile technology not only take an IT division that is forward thinking and willing to take a chance on new and developing technology, it requires a capital investment some organizations are prone to shy away from. For instance, in 2017, it was reported that a little over 2 percent of overall O&G industry profit was invested back into advanced technology. Of that 2 percent, 39 percent of CTOs in the industry reported they had increased their innovative technology budgets. Spends this small, coupled with low corporate buy-in do nothing to necessarily advance the much-needed updates the industry needs to spawn growth — it simply provides patchwork fixes to already outdated systems and processes.

As technology continues to play a larger role in operations and the necessity for advancement becomes more directly tied to profits and growth, it is logical the industry will begin to understand that the upfront investment in automation, business intelligence, and mobile technology may be costly, but will provide longterm gains that strategically position forwardthinking O&G companies to dominate globally.

Deanna Murray is the Industry Insights Manager at Digital Intelligence Systems, LLC - a managed services and staffing firm based in McLean, Va. specializing in Oil and Gas Industry solutions and staffing. As its longest-standing practice, DISYS utilizes its Automated Center of Excellence (ACE) and proven recruiting practices to partner with O&G clients who seek to increase efficiency, reduce costs and lead the industry in innovation and growth **2** 

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## OIL AND GAS FLEETS CONTINUE TO GEAR UP VEHICLE ORDERS

BY JAMES SPERA

As the price of crude oil dropped through the mid part of the decade, oil and gas companies understandably had to cinch their purse strings a little tighter in many aspects of their operations. This especially rang true in their fleet budgets.



James Spera

In the oil and gas industry, fleet is a key contributor to revenue and plays a large role in daily energy operations. North American energy companies operate approximately 300,000 vehicles, the majority of which are light-duty pick-up trucks. As with most mission-critical tools that help generate positive financial results, maintaining the fleet accounts for a significant portion of company expenses. Operating the fleet, including maintenance, repairs, fuel, insurance and other costs, generally ranks among the top five expenses at an oil and gas company.

#### Impact of the Downturn

Although fleet vehicles are essential to operations, many companies opted to delay vehicle replacements during the industry downturn for financial reasons. While those decisions deferred the major costs associated with purchasing or leasing new vehicles in the short-term, the typical long-term outcome is a significant increase in maintenance and fuel costs. This can cost companies more money over time since they are spending more in operating costs instead of investing in an asset with value.

We surveyed a population of energy companies regarding the number of vehicles they ordered in recent years. 8,776 new vehicles were ordered in 2014, when the cost of a barrel of crude was \$96.29. Oil prices plummeted in 2015 and 2016, when it bottomed out at \$40.68. Vehicle orders closely followed this trend: companies ordered 3,708 units in 2015 and only 3,041 in 2016.

#### Oil and Gas Fleet Replacement Strategy Survey

40%

of surveyed oil and gas fleets replace vehicles between 101,000 and 150,000 miles



While the decline in production rates also meant that energy companies used their vehicles less intensely during those years, keeping a fleet vehicle in service longer than desired has a negative impact on its resale value and overall total cost of ownership.

## What the Rebound Means for Replacements

When oil prices rebounded in 2017, fleet managers took the opportunity to integrate newer vehicles to lower the overall average age of the fleet and corresponding operating costs. Oil rose approximately \$12 per barrel over the previous year to \$52.51, but vehicle orders increased by a stunning 140 percent to 7,300 units.

If oil continues to hold between \$60 and \$70 per barrel for the duration of 2018, we expect to see another 40 to 50 percent increase in vehicle replacements topping out at approximately 10,000 units. Assuming oil prices remain strong, we anticipate that the vehicle order momentum to mirror the same trend for another two to three years until energy companies are back in the rhythm of ideal replacement cycles.

#### Fleet Replacement Strategy Pointers

We advise our oil and gas industry clients to replace light-duty trucks at approximately 135,000 miles. While these trucks generally last longer in normal conditions, the conditions an energy truck faces while on the job shortens its useful life considerably.

A smart replacement strategy takes into account additional factors beyond vehicle model year and mileage. One example is engine hours. The safety regulations that dictate trucks remain running in an active oil field (the spark caused by an engine ignition can be dangerous) have an inadvertent negative impact on vehicle longevity due to idling. An hour of idling equates to approximately 30 miles of engine wear and tear not reflected in the odometer reading. Cycling out vehicles in the energy industry at smaller odometer readings can help potentially avoid expensive repairs.

Speaking with energy companies regarding their fleet replacement cycling, we found that 40 percent plan to replace a vehicle between 101,000-150,000 miles, which aligns with ARI's recommendations. Sixteen percent of the companies surveyed plan to replace vehicles when they hit 50,000-100,000 miles, while 12 percent will replace a vehicle between 151,000-200,000 miles. Eight percent of energy fleets push their vehicles to 201,000-250,000 miles. Twenty-four percent of these companies have no planned replacement cycle. While there may be internal reasons for this approach, it likely has a long-term negative impact on their budgets. A positive trend emerging over the past 18 months as energy companies tackle their replacements is a strategic focus on their overall bottom line. Many fleets are consolidating to a single manufacturer, which means their buying power can potentially decrease the cost per unit through increased incentives. Additionally, fleets are standardizing their specs and leveraging the fact that OEMs are offering more standard features to satisfy consumer demand. In newer model years, base models are coming equipped with more desired features, which can eliminate the need to order a more expensive trim level.

#### What's on the Horizon?

In light of market changes, oil and gas companies are in the midst of making significant fleet investments to avoid higher operating expenses and downtime associated with older vehicles. Rather than simply playing catch-up, many energy companies are approaching their replacement strategy thoughtfully and with a bottom-line focus. As one of the larger expense categories, effective management of fleet-related assets and operating costs can be a financial boon that better positions the company for whatever the future brings.

Based in ARI's Houston office, James Spera builds partnerships with complex vocational fleets by developing customized fleet management solutions that help organizations increase productivity and minimize operating costs. He has established a diverse breadth of strategic leadership and project management experience through his work with some of ARI's largest customers across the energy industry and plays an integral role in ARI's client engagement efforts.

## **GLOBAL ENERGY OUTLOOK & GEOPOLITICS**

#### BY MARK A. STANSBERRY

At the 2004 International Energy Policy Conference in Tulsa, OK, the main focus was on the subject of geopolitics. Fourteen years later, the focus is on the global energy outlook with an emphasis on geopolitics.

As of the week of May 7, 2018, oil prices reached  $3 \frac{1}{2}$  year highs. During the same time frame, regional tensions were heightened in the Middle East.

Geopolitical tensions impact all of us. OPEC (the Organization of Petroleum Exporting Countries) has made a "pact" to limit production and that could all change at the upcoming OPEC meeting to be held on June 22. By the time that you read this column, the meeting will have occurred.

Russia and Iraq are among the countries that want a stronger share of the market. Saudi Arabia appears to be leaning towards extending the OPEC agreement.

It is believed by many energy experts that Saudi Arabia wants the prices to go higher than current prices especially as it prepares for an IPO (Initial Public Offering) of its state-owned oil and gas company, Saudi Arabian Oil Co. Issues that could impact the global market such as the possible tariffs by and between the U.S. and PR China. The U.S. Administration has invoked Section 232 of the Trade Expansion Act of 1962 which authorizes trade restrictions on imported products especially if they involve national security. An analysis by the U.S. Department of Commerce concluded that the current levels of steel imports, for example, posed a threat to national security.

With all the geopolitical uncertainty, it makes it difficult for energy companies to develop strategic plans. Will prices stabilize? Will the prices fall or rise dramatically?

As a recent article by Lingling Wei (WSJ) states that the U.S. and the People's Republic of China alone, "differences suggest that rather than a breakthrough, Washington and Beijing are likely in for a long haul of recurring talks, economists and analysts in both countries said."

The potential negotiations between North and South Korea as well as the U.S. could be of major significance in the world's energy future. Peace between North and South Korea could bring economic development opportunities for the U.S. especially for the energy industry. On the U.S. home front: During the last week of May, 2018, there was a plan proposed to "rescue" nuclear and coal-fired power plants regarding market share. The proposal by the U.S. Department of Energy is being reviewed by the White House. How will



Mark A. Stansberry

the proposal impact demand for natural gas?

The current energy outlook is best summed up by Sarah McFarlane (WSJ), "OPEC and its ability to move prices isn't a new factor. But the addition of U.S. oil exports has added another large supply stream that can respond to price signals. Shale producers can react to price moves within months, whereas other sources of crude—such as deep water oil fields—can take years."

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## INTERVIEW: RAGEN BOREL, CEO, MAP OIL TOOLS

By Tonae' Hamiton

The following is an interview with Ragen Borel, CEO, MAP Oil Tools. The interview text has been left in tact, with only minor grammatical adjustments.

## Tonae' Hamilton: How did you become the CEO of MAP Oil Tools?

**Ragen Borel:** I started working for Serva Group in Wichita Falls, TX, parent company of Map Oil Tools, in 1994 as a warehouseman, basically doing whatever they would let me do. That included sorting O-rings, organizing inventory, filing schematics, light assembly, sandblasting, etc. I was eager to learn as much as possible, working after school and during the summers. I gradually assumed more responsibilities in planning and logistics and eventually took over warehouse operations for Serva's centrifugal pump facility once I graduated high school.

In 2003, Serva decided to eliminate the Map Oil Tools product line. My father, Glen Holcomb, who had started as a salesman in the early 90's, was the president of Serva at that time. We both liked the Map line and, rather than see it go, decided to buy the line and move operations from Texas to Louisiana to service the Gulf of Mexico.

We started from zero in 2004 with a two year non-compete, using that time to build clientele and inventory. In 2006 we geared up operations in New Iberia, LA. We've since grown to supply 200 service companies and distributors in 70 countries. We have transitioned from a standard downhole tool manufacturing company to developing some of the most cutting-edge technology in the market today for downhole tool activation.

Because I spent time in every department as the company grew, my typical work day can involve Operations, Purchasing, R&D, Corporate Sales, Marketing, and Supply Chain Management. The diversity in my day to day is one of the things I love about what I do. My primary objectives are to ensure that the culture of quality is well maintained within our organization and to deliver profitable results during what is still a very challenging time in the industry. I also work very hard to promote our new technologies and support our engineering team in testing on site and in the field.

#### TH: What would you say is the goal/mission of MAP Oil Tools?

#### **RB:** Quality

manufacturing has always been our goal. When we first started, manufacturers built tools out of any material and very few companies employed quality control measures. In 1996, we received certification from ISO and have maintained an audited QMS ever since. We set the bar for mid-size manufacturing when the only companies who were interested in quality control at the time was "The Big Four." We delved into Lean Enterprise systems with

a tremendous focus on managing our supply chain and creating a culture of quality that started with material suppliers and continued to service after the sale.

## TH: In what ways have the products offered by MAP Oil Tools transformed the oil industry?

**RB:** We have historically been a standard service tool company. We manufacture what you could call the "hammers and screwdrivers" of downhole equipment. We provide legacy products and the best possible standard tools. When the downturn hit, we invested a lot in research and development and are now deploying some of the most exciting new technology in the field now. We want to continue moving forward in the next level in downhole tool development,



Ragen Borel

with remote activation and communication downhole. Everyone wants a tool that lowers operating costs, is safer to run, and minimizes environmental risks and we plan to continue our R&D to bring tools like that to market.

#### TH: You recently launched a new onetrip hydraulic and cementing tool. What impact do you think this tool will have on the oil industry?

**RB:** The one-trip setting tool saves time, especially in deep water applications. It can save up to 24 hours in service time. Once the tool is deployed, you can just cement through the setting tool instead of making two trips. Whenever you're looking at offshore applications, that's big money and our tool saves on those costs.

#### **OILMAN COLUMN**

#### TH: Aside from the one-trip tool, are there any other new tools or products you have been working on?

**RB:** Our electronic system, Bluepoint, is installed on a multizone stimulation tool called eValve and that is a tool we have been working on currently. It is a high-profile product we deployed in the field with success. We are going to keep going on the route of electronic development, with our next product being a remotely activated stimulation sleeve.

## TH: What sets the one-trip tool or any of your company's other tools apart from other oil product companies?

**RB:** Our tool is more compact, which is a big deal when deploying tools. We also ship all over the world and the tools we offer are safer to handle and aren't bulky. There are just a few companies that offer similar systems, however, those are primarily cumbersome, complex, and costly. Therefore, our tools are much more simple, efficient, and easy to handle.

TH: How does your role as CEO, inspire other women to seek higher positions in the oil industry or other male-dominated industries? **RB:** I think the best thing I can do is to demonstrate the importance of upward mobility for women and other minorities present in industries like the energy industry. I demonstrate that culture at my company and embrace the education and development of all kinds of people.

It is important for us to not take for granted that the same face we're used to is the best face for the industry. There is a tremendous amount of diversity nowadays and the training that we make available for people while promoting from within, creates opportunities that didn't exist for people like me and others just a few years ago.

## TH: What challenges, if there are any, have you faced being the CEO of an oil-based company?

**RB:** I took over as CEO for Map Oil Tools in 2015 at the start of the most dramatic downturn in the energy industry in recent memory. Nothing could have prepared me for the sacrifices that would have to be made, the tough decisions that had to made, affecting families in our supply chain around the world. Ultimately, those lessons have been more valuable than other experience I've shared with my colleagues.

## TH: As CEO of MAP Oil Tools, do you have any plans for growth or expansion of your company?

**RB:** Always. Of course, for the past three years have been about survival, not just for us but for everyone. That doesn't stop us from investing in R&D, which was important in this environment. We expanded our manufacturing facility during the downturn, when space was more affordable, which has allowed us to be responsive once the demand picks back up. Expanding our product design capabilities is where we are at in terms of growth for the next few years.

#### TH: In the future, what improvements or new developments would you like to see happen in the oil industry?

**RB:** I would like to see continued growth of accountability for operations, safety, and product validation within the energy industry. I think accountability for operations no matter where they happen in the world is important. Maintaining environmental and safety guidelines is important for every country.



## Crude Blessings Demonstrates Ethics and Grit in Oil and Gas

When Roe Patterson began thinking about documenting a slice of his father's (Glenn Patterson) legacy, he knew it would be something more than a traditional father-son homage.

"My dad was kind of a pioneer in the oil and gas industry. He built a drilling company back in the late 70's starting with one rig," Patterson said. "Today that company has almost 300 rigs and is worth over \$4 billion in market cap."

Glenn Patterson is considered by many, if not most, one of the titans in energy. He is one of the founders of Patterson-UTI Energy and his one rig-to-riches story is often talked about by many aspiring entrepreneurs and energy enthusiasts. He passed away in 2015 at the age of 68.

"I found the book therapeutic, a lot of tears," Patterson said. "I lost dad in 2015 to Alzheimer's after a nine year battle, I miss him greatly running a company today."

Roe continued lamenting about his father and how he mentored him in life and business.

"I wish I had his ear and his advice. He always had such good advice and kept you grounded and back to your roots of doing what is right and making sure that is first and foremost the thought in your process," Patterson recalls. "When dad faced an obstacle he just pursued it with an unbelievable amount of passion and hard work. Never giving up on his principals or his values of doing the right thing, he would just grind it out until he succeeded."

The book Crude Blessings is summarized as a "compelling narrative about a family patriarch who embodied the best qualities of the Greatest Generation, which inspired and powered the success of America."

Roe believes his father's story is being shared at the right time in our nation's history. An increased polarization in society is creating new friction in so many areas of life.

"This mantra of always doing the right thing is a little bit lost in today's society," Patterson said. "I don't hear as much of that integrity and morality talk that I used to hear when I was growing up."

Stories about treating people with respect and using the Golden Rule as a basic guideline appear to be missing from today's conversation.

#### By Jason Spiess

Crude Blessings is one way Patterson can tell his father's ethical anecdotes.

"If you can treat people ethically at work and you can do that in your business, than you know it will follow you into your personal life too," Patterson said. "You

hear about the cutthroat, edgy Roe Patterson business practices out there and not a lot of comradery or what is good for everyone."

Another inspiration and motivation behind Crude Blessings was Roe's children. The book became another way for Glenn's legacy to be told and add layers of context.

"Dad's life was full of trials and tribulations. For all the success, there was lots of hurdles and failures too," Patterson said. "You probably learn more from the failures than anything else."

Channeling his father's actions through words, Roe shares a short story about his father's competitive behavior in oil and gas.

"It didn't matter if dad was dealing with customers, vendors or competitors or his employees who were so important to him, he treated them all the same way," Roe said. "I remember one of my dad's competitors showing up in his yard needing a vital piece of equipment and was in a huge bind. The vendors were out and he knew my dad had an extra piece and my dad loaned it to him without thinking twice. Here's a competitor and my dad just gave it to him to use."

Those are the types of stories Roe wanted his children, and others, to know.

Roe then transitioned into one of the tough topics of the book is Roe's remembrance of his father's faith.

"For my dad, faith was a tough thing. He didn't come to faith until the end of his life," Patterson said.

Patterson explained further how his fight with Alzheimer's became his path towards finding a relationship with God.

"It shouldn't take a disease to break you down, you should want to find your faith and



relationship with God earlier than that. It did for dad," Patterson said.

Patterson added many industries look away from discussions of faith, however, he believes it is so prevalent and accepted in the oil and gas industry, his father's path will resonate throughout.

"But there were a lot of laughs too while putting the book together," Patterson said.

In the end, Roe hopes people understand that this is not only a book about business. It's a book about life, it's a book about being a father, and it's a book about ethics and faith.

"It doesn't matter if you are in the oilfield or any field, all of these core principles are important," Patterson said. "I hope when people read it, it is just a good story. I hope it is inspirational that there is nothing in your life that is going to keep you from facing a new day. No matter how hard the trials are, there's tribulation around the corner if you just keep your nose down and get back to work."

Crude Blessings: The Amazing Life Story of Glenn Patterson, American Oilman, can be purchased at www.crudeblessings.com or on Amazon.com 2





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