

October 2018

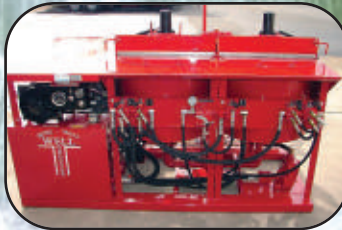
Volume 15

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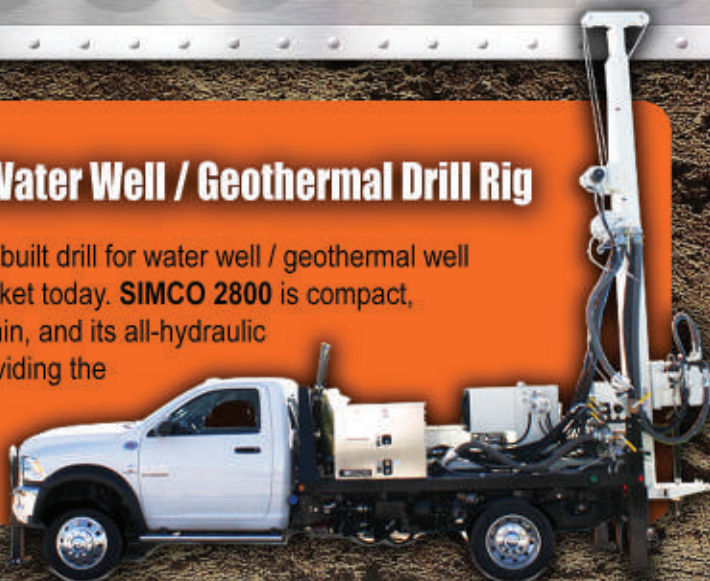


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"SHORT · SWEET and to the POINT at WWD"

It's time to shape up and plan for the winter months ahead. That means, drilling professionals need to stock up on those consumable items; bits, fluids, hammers, pipe, bolts, nuts, wire, tanks, glue, and more! Don't be caught short ~ for sure you may be called out when you least expect it, and you may have to fight the winter weather to help those who need you "NOW".

So, go ahead and check out this magazine really close - the main body has great suggestions and where to get those items; while the classified section is not shabby. It has tons of items (literally) that you use everyday and should keep in stock. Perhaps an extra rig - for the just in case my other one breaks down and needs to go to the shop time. :(

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Notes from the Groundwater Guy

by Thomas E. Ballard, P.G., C.H.G.
Southeast Hydrogeology, PLLC



Surface Water Intrusion in Water Supply Wells

We see many cases of well problems which are directly attributable to surface water intrusion into the wells. These problems can range from coliform bacteria (including E. coli), to nitrates to increases in turbidity after rainstorms. Many of these can be traced to damaged or inadequate well seals.

State regulations often specify a minimum surface seal depth for water wells. In actuality, well seals may need to be extended deeper than the minimum, due to the presence of fracture zones or other geologic conditions which can extend deeper and allow surface water to enter the well.

Groundwater Under the Direct Influence of Surface Water (GWUDI) is a category of groundwater which is directly hydraulically connected to surface water. An example would be a water supply well, screened in an alluvial aquifer immediately adjacent to a stream. In many states, GWUDI is classified as surface water, so surface water rights would apply, not groundwater rights. So how can we tell if we are dealing with a GWUDI situation? Increased levels of coliform bacteria and turbidity over a few days following a significant rain event is considered to be direct evidence for a connection to surface water. Usually where there is a surface water connection, these samples will show an initial increase in coliform bacteria after the rainfall event, tapering off as the surface water influx flushes through the system.

The same situation holds for water supply wells which have failed or have inadequate seals, and are experiencing surface water intrusion. After significant rainfall events, the presence of coliform bacteria will be noted, often accompanied by an increase in turbidity. For situations with shallow groundwater-derived contaminants such as nitrates, concentrations of these constituents may spike after a rainfall event until they taper off back to normal. Often, little monitoring is done of these situations, so the data may not be readily available to assess surface water intrusion (with the possible exception of turbidity), unless it is suspected and specifically being evaluated.

Both damaged and inadequate seals can result in surface water intrusion into the well and possible unhealthy water quality, especially after rainfall events. To determine the adequacy of the seal, a good starting place is the drilling contractor's log to determine if any shallow fractures or other geologic conditions were encountered which could lead to surface water intrusion. Tools, such as a cement bond log or gamma-gamma log, can be used to evaluate the presence of voids in the cement seal behind the casing, if a failed seal is suspected. When drilling a new well, it is important to evaluate the proper seal depth based on geologic conditions to avoid surface water intrusion and possible unhealthy well conditions.

Tom

Tom Ballard may be contacted via e-mail to michele@worldwidedrillingresource.com

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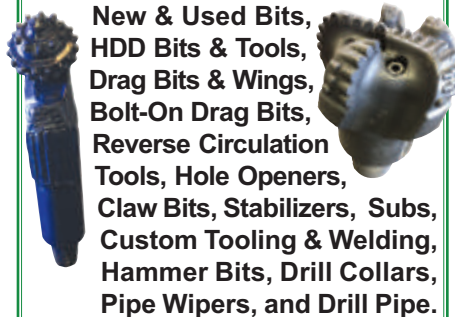
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Causing More Problems than We Solve

**by Britt Storkson
Owner, P2FlowLLC**



While I was at a friend's house, I was offered a drink of water. I was told the water dispenser was in the refrigerator. I walked over to the refrigerator and found this water and ice dispenser in the freezer door. I have never owned a refrigerator with a water or ice dispenser, so I was trying to figure out how this thing worked.

My friend, who is very bright but definitely not a computer "geek" (he refuses to use one) came over and started pushing the buttons to show me how it worked. I told him I wasn't into these newfangled gadgets and couldn't figure this one out. So, for a moment, we had reversed roles. Me, the computer controls developer being taught "computer skills" by the man who refused to use a computer.

Sometimes, new technology which claims to give an advantage in one area is a disadvantage - or even a problem - in one or more other areas. One example: A few years ago a battery manufacturer came out with a battery testing "strip" on the side of the battery. You pressed this strip and it changed color to indicate the charge level of the battery. This strip embodied all of the "simpler is better" principles I've been advocating for some time. It was simple and did what it needed to do, with a minimum of cost and components. Great idea, right?

There was a catch. The tester worked by using the battery's energy to create heat, which would change the color of the battery testing strip; and the test took so much energy (current/ampereage) to do this, it quickly drained the battery. This could happen in less than one minute. Two or three of these tests could completely drain the battery, rendering it unusable and forcing the user to discard the battery and buy another one. So maybe this wasn't such a great idea after all - at least for the battery buyer. There are a number of battery testers on the market that will test a battery without draining it, which would be a better choice.

A trend in the computer controls industry is to "add" things to "make it better".

Of course, more components make the product more expensive, so there is an element of self-interest on the part of the manufacturers. I have nothing against making anything better if it can be proven to be as simple as it can be, yet adequate for the job it must do. More often than not, added components cause more problems than they solve.

Another example: Electronic parts often dissipate heat, and provisions need to be made to remove the heat before it builds up to unacceptable levels. One way to do this is to add a cooling fan. This is fine, but what if the fan fails? Then we need to add a way to detect this failure - either by monitoring fan rotation or a heat sensor to shut down everything if things get too hot. So making one change requires two or more other changes which have to be made, to have a reliable system.

One possible solution here would be instead of using a fan, use a metal enclosure instead of a plastic one. Make sure this metal enclosure has lots of ventilation holes and attach the heat-producing component to this enclosure to use the metal as a heat sink. Then test it in real-world conditions to make sure it works as expected.

Using static, passive components like enclosure materials may be a better solution than an "active" approach where the fan rotation or enclosure temperature must be continuously monitored. There's not much that can go wrong with basic materials. The same cannot be said for systems. Systems may be (and many are) reliable, but more components equals more problem potential - and we want to avoid that.

Britt

**Britt Storkson may be contacted
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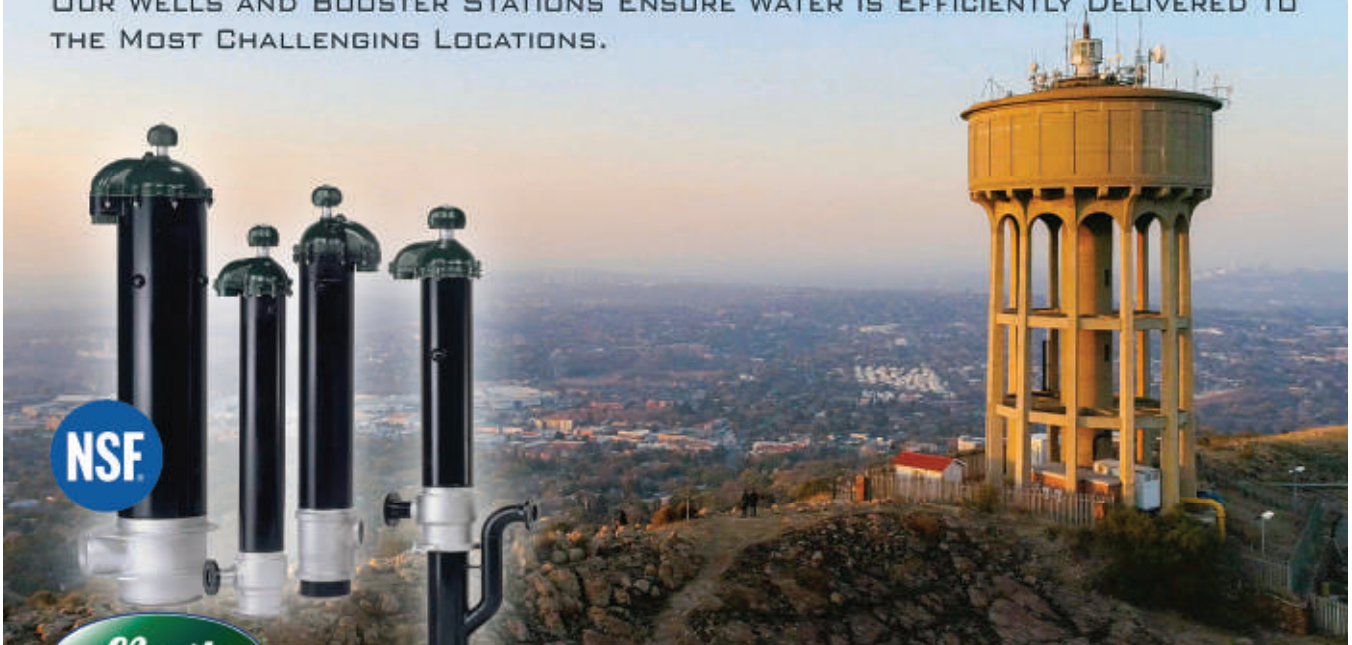
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WHO'S IN THE NEWS



John Boyette, Jr. was presented with the 2018 George M. McCall Award. Named for the *Granddaddy of the JUBILEE*, this award recognizes those who have made extraordinary contributions to the success of the water well industry.

Additional announcements from Dyno Nobel, and the American Petroleum Institute are located in our online issue:
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Do You Need to Hit the Reset Button?

by Tim Connor

You would be amazed how many people are living in a "default" mode and are in serious need of a "reset" in some area of their life. Let me clarify.

You are driving along at 70 miles per hour (mph) in cruise control and you enter a zone where the speed limit drops to 35 mph, but you just keep barreling along at your current speed. Hello! Are you ready for a speeding ticket or even worse - an accident?

So what do normal people do? They reset the cruise control to the current speed limit to avoid the above, then reset it again once they leave the slower zone and the speed limit changes. I know - a simple concept; however, imagine you have the same philosophy when it comes to life, your career, business, or a relationship. You most likely won't get a ticket if you don't "reset", but worse things can happen if you stay in "default" mode, not recognizing or accepting that some changes are necessary to live a successful, contented, joyous life.

What is "default" mode? Basically, it's operating on autopilot where all actions, decisions, and behavior are based only on previous experiences or outcomes - and fails to integrate current reality or circumstances in a rational or new way into our now. It's when we let our past drive our present without regard to how, when, why, or what we could do differently, better, smarter, or easier to have a major influence on our current actions and therefore potential better outcomes or consequences.

What is "reset" mode? Reset mode is when you learn from the past, but don't let it dictate your present or future. You are willing to let new thinking, mind-sets, and behaviors have their role or purpose in your life. It's when you are willing to accept and let new approaches, opportunities, or circumstances blend into your actions, choices, behavior, and decisions to hopefully achieve different or better results. You are not stuck in the past, regardless of whether it was negative or positive. You are open to new ways of thinking, evaluating, and considering. A reset is simply refusing to let previous choices, mistakes, failures, actions, or consequences control or determine your present behavior.

Why do so many people refuse to reset some area of their life and remain stuck in destructive habits, relationships, or behaviors that lack fulfillment, or careers where they struggle every day to achieve success or achievement, or even a certain level of satisfaction? Not to mention how many businesses need to reevaluate policies, products, services, markets, customer focus, or any number of dysfunctional traits which prevent continued and sustained growth and profits.

I could answer this with a 200-page book, but I'm sure you have better things to do, so I'll limit it to the five basics:

- 1) Fear** - The fear of consequences when making changes. Fear of the unknown, of losing control, fear of others' opinions or judgments of you, the fear you won't have the resources, time, patience, or passion to make a successful change. Get it? Some form of fear is the primary driver in your life.
- 2) Ego** - The unwillingness to accept you are not perfect; you are always right, you know best in all situations, the need to look good and appear smarter and more successful to others, a lack of humility. Get it? Self-righteousness.
- 3) Approval** - The need for the approval of others, the fear of rejection, the desire to be liked.
- 4) Control** - The need to feel you are in control of all things, all relationships, all outcomes at all times - no matter the circumstances.
- 5) Pride** - The ability to not be the smartest person in the room - whether the boardroom or bedroom, an unwillingness to accept you will never know it all, be it all, have it all.

Yes, I could go on, but I promised to stop here. So let me ask you - is there some area in your life, career, business, or a relationship that needs to be "reset"? If so, why are you waiting?

In His service,

Tim

To receive Tim's weekly FREE motivational booster articles, contact him at www.timconnor.com with "please add me to your free booster e-mail subscriber list" in the subject line. Or contact him via e-mail to michele@worldwidedrillingresource.com

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Adapted from Information by Blackadar Insurance Agency

When it comes to protecting your jobsite, insurance may not be the first thing that comes to mind, but maybe it should. Purchasing insurance allows protection to start before you even get to the jobsite.

While onsite, there are numerous valuable assets requiring protection - automotive, human, equipment, and property of others. The exposures are both aboveground and belowground, and can cause major losses.

In addition to workers' compensation, general liability, and property insurance, drilling contractors should also consider these helpful insurance coverages:

- **Installation Floater** - If a drill operator is installing a pump, and they drop it causing damage, or drop it down the hole and can't retrieve it, the installation floater pays to repair or replace the damaged pump and also includes the labor costs the contractor would experience, due to the incident.

- **Bailees Coverage** - If a contractor is responsible for pulling a pump to service or repair it and it gets dropped or damaged in transit, the contractor is responsible for the equipment in their care, custody, and control. Bailees coverage would cover this type of exposure.

- **Down the Hole** - Ever lose tools down the borehole? This coverage replaces the items lost down the hole.

- **Drill Rig Loss of Income** - Your drill rig is one of the most valuable assets and should it be damaged in an auto incident, catch on fire, be vandalized, or stolen, you will lose income generated by the rig. Since they are not easily replaced, and can take months to repair, loss of income coverage would allow you to continue operating your business during the replacement or repair process.

Understanding the complex challenges and risks involved with drilling can be difficult to those who don't know the difference between a water well and a monitoring well, or a drill rig and pump hoist. This is why it's important to work with an insurance company with knowledge about the drilling industry and how it works.



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Drilling Into Money Not Boring

by Mark E. Battersby

Who is Afraid of the IRS?

One of the more nerve-racking aspects of taxes for many drilling business owners and managers is the possibility of being audited. Surprisingly, the Internal Revenue Service's (IRS's) own figures reveal that, in general, only one or two percent of all taxpayers actually have their returns audited each year.

However, once a large and inefficient federal bureaucracy, the IRS is changing to become more streamlined and, most importantly, catching more tax offenders. The IRS enforces the tax law in a number of ways; the more common methods include correspondence (examination by mail) and field (face-to-face audit) examinations.

According to the latest figures, the majority of audits conducted during 2017, 70.8% were via correspondence. The remaining 29.2% were field audits. Of the total of all audits, almost 34,000 resulted in additional refunds totaling more than \$6.6 billion.

Agents in back offices are being replaced by computers with complex algorithms which cast a wide net, one that pulls many law-abiding people into the chaos of an audit. Any drilling business owner or manager who hopes to survive and thrive under the new algorithm-based IRS, should follow a few guidelines.

Many drilling professionals, even those with no intent to commit fraud, often fall short when it comes to documentation and paperwork. The IRS appears increasingly determined to find and audit these businesses. Once sent only to those suspected of failing to comply with the tax laws, Information Document Requests (IDRs) are being sent out in record numbers as a screening tool. Even if the drilling operation or business pays its taxes dutifully, it may be penalized for lacking documentation. After all, the law requires every taxpayer to retain the records used when preparing the tax returns. Those records generally should be kept for three years from the date the return is filed.

Unless or until the drilling company agrees with the IRS, the appeals process remains open. Most importantly, from the initial screening for accuracy that each return receives, up to the final appeal has been exhausted, mistakes in the favor of the taxpayer are discovered in about 25% of all cases.

Honesty and clarity go a long way toward preventing, dealing with, and surviving an IRS audit. Naturally, every drilling professional and every drilling operation and business should have a strategy for avoiding audits, as well as for dealing with an IRS auditor. A fall-back position should those strategies fail, should also be in place.

Mark

Mark E. Battersby may be contacted via e-mail to michele@worldwidedrillingresource.com



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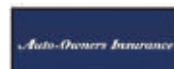
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Through the Back Door!

by Jim Kuebelbeck

EXB

Those of you who read my articles in *WorldWide* may have noticed my articles have been missing from recent issues. We've been having such a busy summer with our water locating work, my submissions too had to take a bit of a breather. The water well drilling professionals throughout Minnesota who work with us to locate satisfactory groundwater sources are keeping us especially busy. Without their support, we would not be able to do what we do.

It gets to be rather mundane and routine about many of our water locating jobs. Out of the 59 jobs we have done this 2018 season, one was on a site where the well drilling contractor called and asked for our assistance. He had just drilled a deep dry hole on a piece of property in an area noted for its difficulty in encountering a satisfactory groundwater supply. The landowner had to ration water usage from a deep well and decided to drill a new well some distance away from his existing well, hoping to encounter an additional water supply. Arriving on-site, using our dowsing methods, we located only one potential promising drilling site. The site was only about 40 feet from the deep dry hole drilled previously. Telling someone where to spend more of their hard-earned money in such situations is probably the most difficult part of our work,

and I sometimes lie awake at night until the well is drilled. Thankfully, the contractor called the next day to tell me a great water supply was encountered at 54 feet!

We also have a family life. With six married daughters and quite a number of grandchildren, we try our best to divide our time between water dowsing and keeping up with all the many family things that occur. Celebrating a recent anniversary, surrounded by our children and grandchildren, we were reminded once again just how fortunate we have been in our lives. There is no way to put a price on good times and memories. Good memories are more precious than any amount of money. As we get older, we realize more and more that life is short, and we have to make the best of whatever God steers our way. Few people get a free ride on their journey through life, and most of us do encounter some distress and troubles along the way, but how we cope with them makes us who we are as individuals. Sometimes it takes a leap of faith to deal with adversity, but if a person dwells instead on all the many good things they have in their lives, adversity can often seem less troublesome. Sharing one's good fortune with others is often far more rewarding than putting money in the bank.

Last year, Carol and I had the opportunity to take our extended family (all 28 of us) on a vacation to Cancun, Mexico. Those memories will be cherished and remembered forever by everyone, especially the two of us.

As for now, if Carol and I can help people who desperately need a satisfactory groundwater supply, we will continue to do what we do. I often tell her I couldn't do this without her help and encouragement. I have to admit it is most gratifying to receive a call from a client or well drilling contractor saying, "You did it again, Jim!"

*The statements and comments in this article are based on information and references believed to be true and factual. If you have any questions or comments, please forward them to me in care of **WWDR**.*

Jim

Jim Kuebelbeck may be contacted via e-mail to michele@worldwidedrillingresource.com

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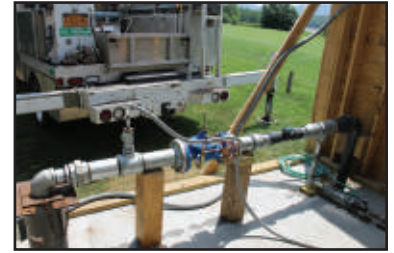
by Ed Moranski, Chief Marketing Officer

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I had the opportunity to stop by the Empire State Water Well Drillers Association Summer Meeting and Pump Expo, which was being held at Cronin's Golf Resort in Warrensburg, New York (Lake George region of the state).

The weather was clear, but the sun was hot, hot, hot. Demonstrations included a Baker pitless pump installation, RIDGID® pipe cutting, and the GEFCO 40K drill rig with hands-on participation.

Golf, meetings, good food, and catching up with friends rounded out the event.



To see all the photos from this event, go to www.worldwidedrillingresource.com or click [here](#).

JUBILEE 2018 DEALMAKERS

SIMCO® Drilling Equipment

Darren with SIMCO® Drilling Equipment of Osceola, Iowa, stands with David and Taylor of David Lucas Well Drilling of Hephzibah, Georgia, who purchased this SIMCO® 7000 rig with 300/200 air, 10-rod carousel, and 3x4 centrifugal mud pump.



Pulstar Mfg. / Preferred Pump & Equipment

Barbara and Ashley of Moretz Well & Pump Service, LLC in Hickory, North Carolina, with their new pump hoist from Albin, Randy, and Barry of Pulstar / Preferred Pump & Equipment.



Noland Drilling Equipment / Hunke Manufacturing

Joel with Hunke Manufacturing of Snyder, Nebraska, was happy to show the Hunke pump hoist purchased from Noland Drilling Equipment of Roanoke, Virginia, by Professional Pump And Well, Inc. of Florence, South Carolina.



GEFCO, Inc.



Brad, Nic, and ladies with Beinhower Bros. Drilling Company of Johnstown, Ohio, and their new GEFCO rig from Enid, Oklahoma, along with some of the GEFCO Team.

Patriot Rigs & Services, Inc.



Chris and Lisa Blanchet and family with Chesapeake Geosystems of Baltimore, Maryland, were thrilled to stand on their Schramm T450BH rig which was totally refurbished by the Patriot Rigs & Services, Inc. Team of Oxford, Pennsylvania.

Acker Drill Company



Terra Testing Inc.'s Eric, Rose, and Mike from Washington, Pennsylvania, were excited to see their new Acker Soil Scout at the 2018 JUBILEE. Matt, Joe, Mike, and Wayne with Acker Drill Company of Scranton, Pennsylvania, celebrated with them.

Mobile Drill Intl



John with Mobile Drill Intl of Indianapolis, Indiana, was pleased to arrange a rig delivery for Shauna and Duane with MLA Geotechnical of Austin, Texas.

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michele@worldwidedrillingresource.com

Environmental Monitoring

by Thomas Kwader, Ph.D., P.G.



Why Groundwater is Important to Lakes

A lake can also be thought of as a "window into our groundwater". The water level in a lake is influenced by:

- 1) How much water falls directly on the lake's surface.
- 2) How much water drains into the lake from surface creeks, streams, and rivers.
- 3) How much groundwater seeps into the lake from sediments surrounding the lake's shoreline and bottom of the lake (i.e. groundwater).

(Note: This discussion applies to lakes without a surface water outlet, such as a dam, stream, or pumping system).

How much water entering the lake from groundwater depends on many factors, including the size of the lake's surface drainage basin vs. the size of the lake. The size of the lake may easily be 1/10th, or less than the land area that contributes groundwater to the lake. This land around the lake or drainage basin acts as a large "sponge" storing groundwater which "feeds" the lake 365 days a year. During rainy seasons, the sponge fills up and stores water. The amount of groundwater in the sponge affects the long-term lake level. If groundwater levels are low due to long periods of little rainfall (droughts), the lake levels will begin to fall rapidly, especially in summer months when the evaporation is high and little seepage is contributing to the lake.

Healthy high water levels in lakes are best achieved by long periods of steady rainfall which saturates the ground for many days. These conditions tend to fill up the sponge or sediments that makeup the lake's drainage basin, which in turn, will seep groundwater into the lake for months to come. On the other hand, intense rainfall events over short periods of time tend to provide much more runoff to the lake; and rapid lake level rises do not maintain high lake levels for long periods of time because most of the rain occurs as runoff rather than seepage that recharges into the shallow groundwater.

In areas where snow accumulates, the amount of winter snowfall also directly affects long-term lake levels and groundwater. This recharge to the sediments occurs as the snow begins to melt.

Although we cannot directly impact the amount or duration of precipitation, the understanding of the factors contributing to groundwater levels helps us predict future lake and groundwater levels.

Tom

Tom Kwader may be contacted
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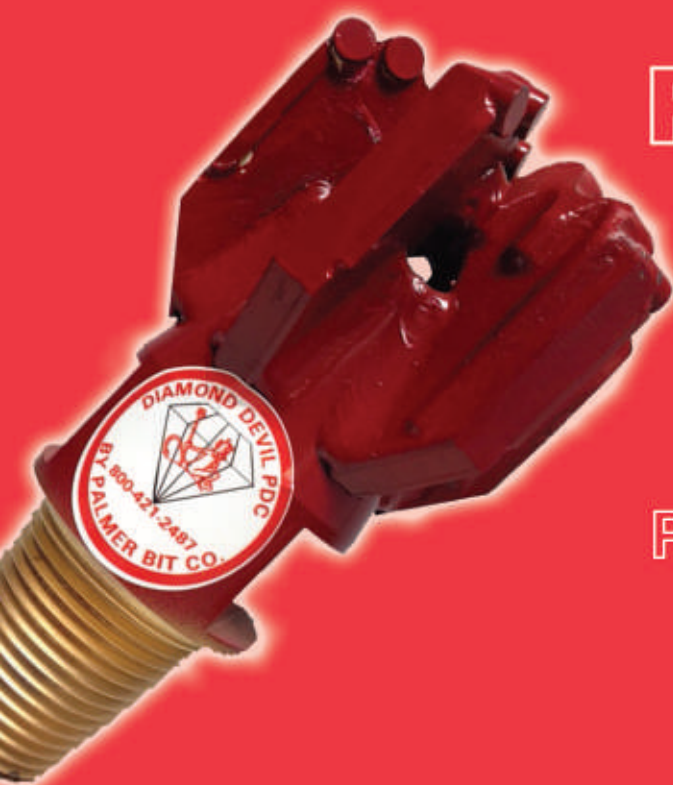
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Planned and Executed

*Adapted from Information by
Albion Drilling Group Ltd*

Albion Drilling Group LTD was awarded the design and build contract by Cuddy Group to assist in the enabling works of a housing development for Persimmon Homes in Plymstock, England, UK. The works included both presplit and bulk blasting within the old limestone quarry at Plymstock. Blasting was followed up with bolting and meshing of both the previously exposed west face, and the newly exposed north and south faces. To avoid possible difficulties in the sequencing of the works, Cuddy Group chose to combine both the blasting works and the stabilization works within the same contract.

Blasting was primarily a large-scale cut and fill operation. The stone produced from bulk blasting was transferred from one end of the quarry to the other, raising the quarry floor at its highest point by 50 feet above the initial ground level. Albion used two Atlas Copco D50 drill rigs to complete the blasting works.

On the north face of the quarry, a newly exposed face was formed using presplit blasting techniques. The company was able to form a relatively stable face at the desired 80-degree inclination. Each blast was designed by the company's on-site team of engineers, utilizing the latest available technology, to provide the best results in terms of fragmentation and efficiency. In total, there were 111 blasts from start to finish.

During stabilization works, Albion used both roped access and long reach excavators to complete the required drilling works. The west face was stabilized first in just six weeks. Works on this section included the installation of over 1300 rock bolts together with rock fall netting. Works on the other two faces had to be completed over time as the new face areas were exposed. It was essential the blasting works were coordinated to a set sequence of lifts and lengths, allowing the stabilization works to take place before continuing with the next part of the excavation. In addition to the coordination of the drilling works,

time was allowed for necessary design assessments to be completed prior to stabilization works commencing on the various sections.



Albion executed a well-thought-out management approach to complete all of the various works throughout the project in a safe and efficient manner. The company credits their team of highly skilled and dedicated employees for the project being finished on time.

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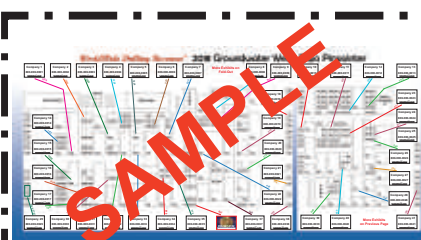
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The Un-Comfort Zone II

by Robert Evans Wilson, Jr.

Longing for Belonging

When I was a kid, everywhere I went I would see Lee, Bobby, and Tim; Debbie, Diana, and Laura; Gary and Karen; Gina and Robby; Randy and Judy; Lee Ann and Wade. At the country club pool, restaurants, beach resorts, mountain resorts, some even lived in our neighborhood. I saw them at my house and at their houses, but mostly I saw them at church. All our parents belonged to the Samaritans Sunday School class at Grace Methodist Church. My parent's entire social life revolved around being a Samaritan. Our families vacationed together, dined, played games, attended parties, went to shows together, worked in charitable service together, and sat together for worship. This was the world where I belonged until I was old enough to start school and begin to join other groups.

Family is, of course, the first group where we will belong. We don't get to choose which family we have, and the overall function or dysfunction of our immediate kin will have an impact on which groups we will be able to join in the future. If you come from a loving and supportive household, you will most likely grow up confident and self-assured. On the other hand, if you come from an emotionally unstable household, chances are you will grow up fearful and uncertain. Both will affect your social status and your long-term prospects for acceptance and even prosperity.

Remember when you were in school, how it felt when you got picked first for a kickball team . . . and how it felt when you were picked last? Selection always seemed to be based more on popularity than sports ability - which felt terribly unfair, but if you were picked first it felt good: you were important, wanted, you belonged. Being picked last felt horrible: you felt unimportant, unwanted, and unaccepted.

The desire to belong is a universal human need, found in all cultures. It's a powerful motivator which dates back to our caveman days when belonging to a clan or tribe meant the difference in whether or not you would survive. Abraham Maslow, in his hierarchy of human needs, places belonging on the third tier. He said an individual must satisfy his or her physiological and safety needs before being able to love and belong.

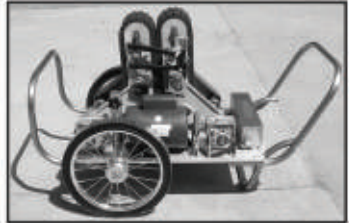
When I started attending school, I found there were many groups to choose from. I selected Scouts, band, and some others. Qualification for membership in most of these types of groups is based on common interest - if you're interested, you're in. Easy. There are other organizations or clubs you can only join by invitation or by earning a spot, such as trying out for a sports team. Then there are the social groups - a treacherous emotional landscape dotted with acceptance, joy, pride, anticipation, confusion, anxiety, envy, despair, and loneliness. It feels like there's the in-crowd, and after that . . . you and everyone else.

This makes me think of the song *Somewhere I Belong* by Linkin Park, and its sad lyrics:

*I wanna heal, I wanna feel what I thought was never real
I wanna let go of the pain I've felt so long
(Erase all the pain 'til it's gone)
I wanna heal, I wanna feel like I'm close to something real
I wanna find something I've wanted all along
Somewhere I belong*


Thank goodness most of us are able to leave it all behind when we finish school. As adults, our options for belonging are vast. People gather together because they have something in common. There are all sorts of organizations where we can belong.

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Wilson cont'd on page 32.

Making High-Temperature Drilling Safer

Adapted from Information by Drill Cool Systems, Inc.

Early geothermal drilling professionals encountered many safety risks. They experienced burn hazards and jeopardized well control due to high-temperature drilling fluid. These risks are still a problem today.



A geothermal well blowout.

In 1977, a time during geothermal drilling's vast expansion in California, a geothermal well was being drilled, and was unexpectedly hot in the upper sections. At the surface, drilling fluid was flashing, and this posed a severe safety risk to personnel. The rigs' operator turned to a fabricator named Elwood Champness for a solution to this high-temperature well risk. To control the temperature of the well, Elwood built the first Geo-Cooler™ using the resources at his fabrication shop. Reducing the surface temperature of the drilling fluid meant the operation could continue without an excessive risk to rig personnel. Total depth was reached and well temperature control continued to make these operations possible into the 1980s.

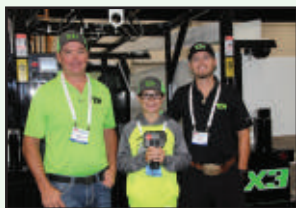
The demand for the Geo-Cooler™ grew in the high-temperature well community because it made the operation safe. By reducing the surface temperature of drilling fluid, it provided a heat sink for the returning, hot annular fluid. This meant the fluid would not flash or burn personnel as it entered the shakers. In addition, this cool annular fluid also reduced the temperature of the blowout preventer and its internal components. When elastomers are heated to high temperatures, they start to decompose and their mechanical properties deteriorate. Extrusion and cracking of the packers occurs as a result of this process, which can ultimately lead to a well control incident. So, reducing surface temperature plays an important role in well control with these kinds of operations.



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High-temperature drilling is here to stay and new technology will be needed to make it economical. Low oil prices and increased production cost has led operators to look for ways to decrease capital expenditures and maintain a high standard of safety. By protecting equipment and consumables from high temperatures, operations can be made more economical and better protect employees.

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Working Where an Endangered Reptile May Dwell

Compiled by Caleb Whitaker, Associate Editor
WorldWide Drilling Resource®

The Blueprint For Prosperity project in Ohio is underway, and will include the installation of waterlines. One of the primary goals of the project is to bring better drinking water to West Farmington, which has had challenges operating its antiquated treatment plant. DRS Enterprises was awarded two contracts totaling \$6.3 million for work in all three areas of the project, while J.S. Bova Excavating was awarded a \$2.4 million contract for work in one area.

The project will include over 120,000 linear feet of water mains, an elevated water storage tank, and a booster pump. It will also replace 288 water meters and provide necessary repairs to prevent water losses. Much of the water main construction will involve boring under the road. This will cause some disruptions of vehicle traffic, but the contractors will keep at least one lane of travel open. The water main construction is expected to be complete in April or May 2019.

A study conducted by the project's herpetologist (a specialized biologist who provides care and researches a wide variety of reptilian and amphibian species) concluded a snake labeled endangered in 1996 by Ohio, may live or travel in the area. The eastern massasauga is a small, thick-bodied rattlesnake, which has been declining over the past three decades due to loss and fragmentation of its wetland habitat. Biologists have confirmed less than half of the eastern massasauga's historical populations still exist. In Ohio, the snake was once found in 30 counties, but it remains in only 8 or 9 today.

Research shows the snake prefers an open canopy with grass and shrubs. While no snakes were seen during the site visit, areas along the fields of the planned route were found to be suitable for the snake. Six fields were studied during the survey, examining for the presence of crayfish burrows where the snake hibernates; the presence of small mammals which the snake eats, such as mice, voles, and shrews; a high water table; and migration corridors. Half of the fields met most or all of the conditions for the snake, and half were unlikely to be a good habitat for the snake.

The herpetologist will be on-site while crews work near the three fields in the half-mile corridor where the study concluded the snake may be found. If the snake is encountered, the herpetologist will assure no one harms it and it is allowed to slither away. Because the waterline will be installed with horizontal directional drilling, the possible disturbance to any snakes is expected to be minimal.



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*Adapted from Information
by Hose Solutions, Inc.*

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Due to its flexibility, this pipe "auto cleans" itself, allowing the same flow rate from day one. With rigid pipes, internal scaling causes the pump to operate for more hours a day, increasing electricity consumption. The motor also has to work against a higher head than its original design and the result is premature pump failure.

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In Memoriam

Robert Lynn Flair, Jr. (1966~2018)

Robert Lynn Flair, Jr. of Red Oak, Texas, passed away August 12, 2018. Born in Dallas, he grew up in Oak Cliff and attended Sunset High School.

He went on to create a 33-year career drilling in the environmental and geotechnical fields. A year ago, he pursued his dream of starting his own business, DrillTex Services, with great success.

Robert was a hardworking, honorable, respectable man who made numerous friends in his field, as well as his personal life. He enjoyed hunting, fishing, and camping with family and friends.

Robert is survived by his wife and best friend of 27 years Gwendolyn; their children Robbie and Dani; their furry son Mugs, and extended human family.



David Fredric Keiser (1949~2018)

David Fredric Keiser of Levering, Michigan, passed away May 2, 2018. A lifelong resident of the area, he owned and operated Keiser Well Drilling from 1971 until he retired in 1994. He enjoyed deer hunting and fishing.

He is survived by his daughter Lory; son Andrew (Elaine); grandchildren Trevor, Jordan, Kaylee, Grace, David, James, and Gary; and extended family.

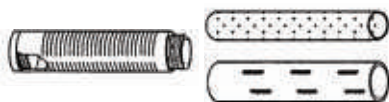


The management and staff of **WWD** extend their sympathies to Robert and David's family and friends.

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Wilson cont'd from page 27.

Again, as in school, this is mostly driven by our interests. My interests have led me to sports clubs where I've played ball; volunteered for organizations whose causes I support; even gotten involved in political groups (uh, just briefly).

We even bond to our places of employment. Have you ever worked somewhere for a while, then quit, and later went back to visit? Isn't it funny, how the place looks different even though everything is where it always was; and how it feels different even though everyone is happy to see you? This is because belonging is an emotion, and since you are no longer an insider, you can't feel the same way as you did before.

Belonging is so important that without it we can fall into loneliness and depression, which can lead to physical illness or suicide. Today, we're able to get involved with social media which simulates a sense of belonging, but it falls short. There's nothing that can replace the one-on-one bonding and friendships we form when we meet with people we enjoy in person. If you're not fulfilling your need for belonging, I encourage you to look for a group with whom you can get involved. A great place to start is by volunteering for a cause or charity you believe in. You'll meet like-minded people with whom you'll have an immediate connection, and you'll be doing good. Now that's a win-win!

Robert

Robert is an author, humorist, and innovation consultant. He works with companies that want to be more competitive and with people who want to think like innovators.

For more information on Robert, visit www.RobWilsonSpeaker.com or contact him via e-mail to michele@worldwidedrillingresource.com

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Staying Safe from Flyrock

Compiled by Caleb Whitaker, Associate Editor
WorldWide Drilling Resource®

EXB

Blasting operations come with inherent risks. One of these risks is flyrock - debris ejected from the blast site. The debris may travel through the air or along the ground, and may be rock or soil. Any size material can damage property or injure people, so flyrock control is essential.

Some of the common causes of flyrock are overloaded blastholes with excessive amounts of explosives; heavily confined charges; explosives loaded into incompetent materials; burdens and spacings which are too close together; inadequate stemming material; inadequate delay between holes in the same row or between rows; detonators firing out of sequence, deviation of blasthole detonation from the intended sequence; changing geology or rock type.

To prevent flyrock, consider mine conditions and rock strata when designing blasts. Accurately measure the burden for each blasthole, and be aware of the true burden for each hole along the free faces. Be aware of the powder factor and total charge-weight loaded, so holes are not overloaded. Always measure explosive quantities or tape the holes while loading. Use crushed stone for stemming and stem through incompetent zones. Place primer lower in the hole, increase delays between rows, and reduce burden in back rows.

It's important to keep coworkers away from the person doing the blasting. Schedule blasting between shifts or on off-shifts. The blast area should be a minimum of 1.5 times the farthest distance of any previous flyrock. Suitable blast shelters should be used for all personnel at the mine site during blasting, and restricted areas should be implemented for non-enclosed blasting operations. Barricades can be used for access routes to the blasting area to prevent the passage of personnel or vehicles.

Effective communication between the drilling crew and the blasting crew is key. This will allow the drilling crew to convey information regarding unusual conditions, such as mud seams, voids, or other weak layers during drilling. Maintain and use all available methods of communication, such as sirens and radios, to warn personnel of impending blasting operations.



In areas of steep slopes, a rock set in motion by the explosive energy may roll hundreds of feet. This rock rolled through a trailer downslope from a mine.

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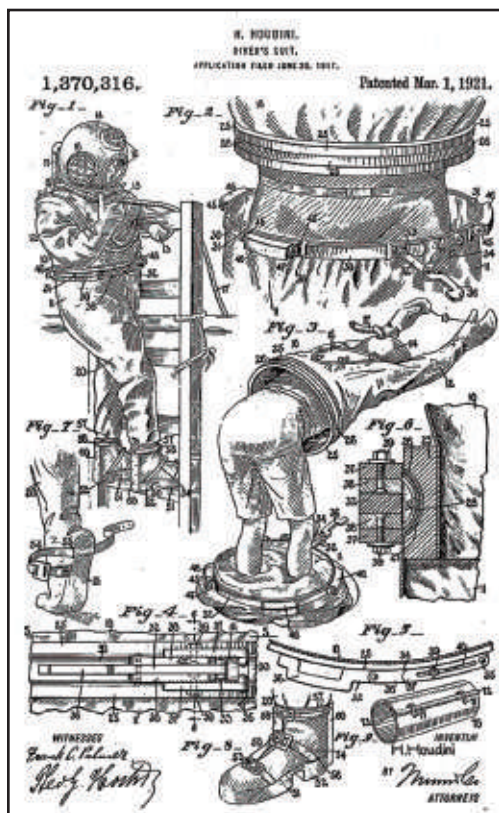
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Undersea Roughnecks

Adapted from Information by American Oil & Gas Historical Society

Deep sea diving has always presented many dangers. The perilous situations divers could encounter at the bottom of the sea prompted famed magician and escape artist Harry Houdini to patent his 1921 invention of a quick release mechanism to help divers exit their cumbersome suits.



Harry Houdini's patented diver's suit.

While a dangerous occupation in general, divers found new opportunities when petroleum exploration began off the California coast near Santa Barbara.

Kerr-McGee Corp. made petroleum history in 1947, by drilling 10 miles off the Louisiana coast. Although its Kermac 16 was a milestone in offshore drilling technology, the water was only 20 feet deep. Unlike the Gulf of Mexico with its continental shelf, the West Coast gets very deep, very quickly. Drilling in depths of 200 feet and beyond is now common in the Gulf, but once required the endurance and capabilities of experienced divers.

The pursuit of offshore oil inevitably demanded technological innovation as exploration led into deeper and more inhospitable waters. Offshore divers faced new challenges, including one hazard called "stabbing in." Inserting a drill pipe from a moving, heaving barge into the subsea wellhead was a difficult maneuver. Each time a worn drill bit had to be replaced, a diver was required. To perform the stab-in, the diver had to straddle the top of the 24-inch hole between his legs, physically pull the drill string over the target, and at just the right moment instruct the drill floor, 250 feet overhead, to let go. Modern technologies, including remotely operated vehicles, relieve divers of this dangerous task.

Since dangers were always present and divers only had a limited amount of time to spend working at the bottom, new diving technology and suits were needed. Deep sea diving companies adapted space suits designed for astronaut John Glenn. The suit utilized hot water pumped down from the surface through dive-suit tubing, which helped divers cope with the frigid water and extended time at the bottom.

An underwater welding habitat pressurized with nitrogen greatly facilitated the critical business of laying pipeline, tie-ins, and repairs. Saturation diving and decompression chambers were developed to further increase bottom times and improve safety. With deep saturation diving, every 100 feet of depth required 24 hours of decompression - and time was money.

Modern deep sea technology spares divers from many of the inherent dangers of the sea and occupation. Instead of air, divers began breathing mixtures of helium and oxygen during deep descents and carefully managed decompression ascents. Even with state-of-the-art robotics, the offshore petroleum industry and scientific needs for manned deep sea diving continue. Atmospheric Diving Systems enclose the operator at one-atmosphere pressure, regardless of depth, thereby eliminating the necessity for decompression.

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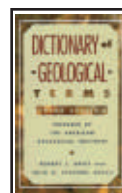




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The modern "Hardsuit 2000" with 16 rotary joints and two thrusters for mobility, bears little resemblance to its traditional ancestors. The suit can operate at depths up to 2000 feet and remain for six hours on the bottom with no decompression required.

The pursuit for oil and natural gas continues to generate new technologies just as it has in the past. Innovators continue to seek safer methods and technology for those in the industry, while deep sea divers continue to push both science and industry to new and deeper frontiers.



WWD will
continue to cover
the Frequently-Used
Geological Terms next
month!

Tales from the Field

by Jeremy C. Wire
Geoconsultants, Inc.



The Big Wheel

Sometimes we see a situation slowly unfolding before our eyes, possibly leading to a tragedy in the case of an accident, or at least an unwelcome outcome, and there is really nothing we can do to prevent it. In this instance, the setting was a large agricultural parcel under cultivation, and the means of irrigation was one of those circular pattern pivot sprinklers with very big wheels spaced at intervals along its radius assembly, including a large-diameter wheel on the end.

Our task was to survey a potential well location on the property. When we arrived, the sprinkler was operating, and since our work took us to the opposite side of the field from that being irrigated, we figured we had enough time to do our work before the sprinkler assembly came around. There was no one else in sight, but we noticed a mini-sized pickup truck parked at the edge of the irrigated area. The pickup was a type which was popular back in the day when this incident happened. We assumed it belonged to a farmhand checking something elsewhere on this large property, and the truck would eventually be moved to another location. Several hours passed by and being absorbed in our work, we did not pay much attention to anything happening around us. Suddenly, we looked up and noticed across the field that the sprinkler assembly was almost upon the truck, with the outside wheel moving inexorably toward it.

What could we do? Apparently, there was no one around to turn off the sprinkler. The farmhand was not anywhere to be seen, and we could only stand at a distance, transfixed, as the wheel moved closer and closer to the truck. Then, from what we could see, it first crushed a fender, moving steadily onward, then raked the side of the truck like a slow-moving train.

About this time, the farmhand appeared from nowhere, and we all rushed over to the scene to inspect the damage. Obviously, the side of the truck was heavily damaged, but the truck luckily was not demolished. We wondered what the insurance agent reviewing the claim for this accident would think . . . all this damage caused by a big wheel? In this case, possibly not very believable, but indeed it was to those of us witnessing this unfortunate event that day as it unfolded in slow motion.

Jeremy

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water for life

WTR

by Tim Rasmussen



One end of the Bartholomew shop is beginning to fill with material headed for Guatemala. There is medical equipment to be palletized, various tools and items for the shop, several hundred feet of white PVC pipe with fittings, and a large bin of various pipe fittings. Outside, there's a pile of casing, a generator, and parts for vehicles. Mike Phalen from Catholic Charities delivered 14 large boxes of bed sheets to go with our shipment. One by one, the things on Gary's list are checked off. It is a long list.

Gary is also contacting our supporters. Among them is Mitchell Lewis & Staver Company. For several years, they have given generously to Water For Life (WFL). They usually have Gary send them a list of the pumps, controllers, and other items we expect to need, and they do the best they can to fill the list. They often give us out-of-stock units, as well as returned and refurbished units. Many of their pumps are working every day in remote villages, making a life-and-death difference for the people. We thank them for their support.

The Water For Life Board of Directors has authorized the hire of Edgar Lopez, a local mechanic we have known for years, to increasingly work for WFL. He has been working on the trucks since last season, and we hope to have all the trucks repaired and ready for work next season. We are making plans to bring Edgar to Spokane for a month to work with Tom Richardson, but this is contingent upon Edgar being able to obtain a visa. He already has a passport, so it helps a little. We are hopeful he will be able



to make the trip.

Gary and Rod Bartholomew, Jon Hansen, Tom Richardson, and I have been planning as well as we can for the rotary rig. Some of the equipment on the rig is being refurbished and Seth Weilage is looking after it because it was his rig. The plan is to ship it this fall from Texas or Florida into Puerto Barrios, Guatemala. The customs process will be an adventure. There is no telling what will happen or how much we will be charged for the importation of the rig.

The ramp-up to support the rotary rig requires WFL to buy a large truck to carry pipe and water tanks, so we have started looking for one in Guatemala. It costs about the same to buy it there as to buy one here and ship or drive it and import it there. We will probably also need to buy another small crew cab 4X4 pickup. All of these costs seemed impossible, but the Good Lord put it into the heart of Art Fry from Sprague River, Oregon, to fund the import of the rotary machine and to provide support for the drilling. His commitment makes this possible.

Without our supporters, WFL could not do the work we are doing. We thank you on behalf of the people whose lives you are saving.

If you would like to help,
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Tim

Tim Rasmussen may be contacted
via e-mail to michele@worldwidedrillingresource.com

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Conference to Highlight the Future of Mining

Adapted from Information by Aspermont Media

The Future of Mining Americas event will connect the global mining supply chain to debate the future of the industry and discover the latest innovations and technologies spearheading mine productivity, efficiency, and safety.

The conference will take place October 29-30, 2018, in Denver, Colorado, with dedicated content focused on exploration, development, management, infrastructure, and leadership.

The agenda will ask key questions, including:

- How will mining be disrupted in the next decade? How will autonomy and technology change our view of the average miner, and how will this transformation actually happen?
- How is the mining industry raising the bar using business ecosystems to accelerate the pace of innovation?
- How can the global mining industry collectively work toward a positive culture shift; and how can mining companies prepare for the future by developing an agile talent base?
- What are the key strategies for building and maintaining relationships with governments and communities, as well as the impact of stricter regulations, tightening stakeholder engagement, and regional rights for the indigenous population?
- How are miners creating a new positive brand image, free of past industry stigmas? How can transparency and communication be used as an image builder rather than a destroyer?



Speakers delivering on these topic areas include Mike Wundenberg, VP operational technology and innovation - Newmont Mining Corporation; Gordana Slepcev, chief operating officer - Anaconda Mining; Afzal Jessa, chief digital officer - Vale; John Mullally, vice president corporate affairs and energy - Goldcorp Inc.; and Elena Mayer, president and CEO - Women Who Rock.

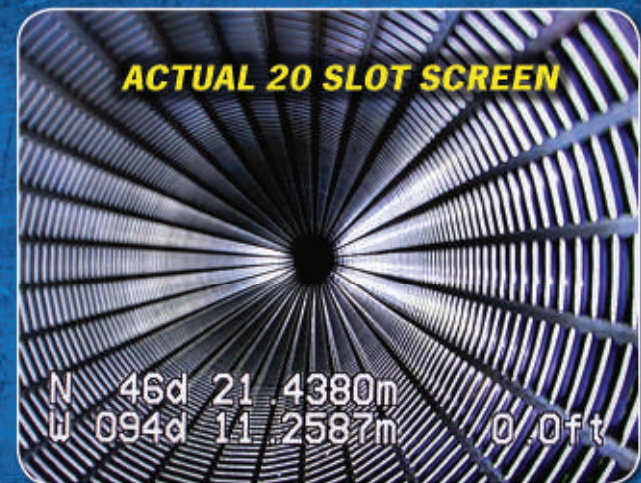
The conference is supported by mining company partner Newmont Mining Corporation, along with solution providers specializing in: operational and digital transformation, analytics, internet of things (IoT), artificial intelligence, drone solutions, and geospatial data collection including Komatsu, Proudfoot, Riivos, RIEGL, senseFly, Uptake, Commit Works, Hayward Baker, Vriify Technologies, and Earth AI.



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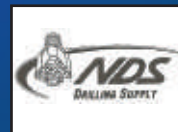
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Boring Thoughts

by Todd Tannehill
Owner, Mud & More, LLC

ENV

Safe Polymers for Water Well Drilling in Clay

This month, I thought we would look at PHPA (partially-hydrolyzed polyacrylamide) polymers and use a couple questions right from a mud school. Interesting side note: When Internet searching "PHPA", you should add the word "polymer" with it, or you may end up on the Professional Hockey Players' Association home page!

For this article, we will instead talk about the silky, light-colored polymer which is impossible to get off your hands without breaking it down with bleach. This is a personal observation from a drilling show where the men's room soap was replaced with a liquid version of the polymer. It wasn't me!

Question: What are PHPA polymers, and what are their functions?

For us in the drilling industry, PHPA polymer is a synthetic polymer which is especially good at delaying clays from swelling in drilling, grouting, and sealing situations. Depending on your application, many manufacturers offer PHPA polymers in liquid and dry formulas to get the job done. (I am using PHPA in place of brand names you most likely have on your rig today. This is to be fair, because there is not space here to list the many brand names the polymer is marketed under.)

Drilling

When drilling in clay or shale conditions, PHPA is especially helpful in coating the cuttings and inhibiting them from swelling while they are evacuated from the borehole. In nonbentonite slurries, it also helps to keep the integrity of the bore and prevent wall swelling in a clay formation.

Many brands are certified to NSF/ANSI 60 drinking water standards, making them safe and approved for drilling water wells in the U.S. They are used in many drilling applications, including ground source climate control loop installation, minerals exploration, and horizontal directional, to name a few. In drilling operations, it is important to mix the bentonite first, then add your polymers.

If using a recycling system, you will want to avoid long-chain PHPA polymers, and instead opt for a short-chain, low-viscosity type. This will reduce screen blinding and be better than a dispersant which incorporates the broken-down clay into your system and makes the mud harder to reuse.

Air rotary drill operators will also add the polymer to their drill foam to make it stiff. The polymer strengthens the foam bubbles, allowing them to carry larger or heavier cuttings to the surface.

Grouting and Sealing

Before the one-sack grouts were introduced, two-step grouts were a very common grouting material. Today, many well drilling contractors are still using the two-step grouts for many reasons.

A two-step grout is made by adding a PHPA polymer to fresh water, then slowly adding a granular sodium bentonite to the water/polymer mix until the grout is an oatmeal-like consistency. The grout is then pumped through a tremie line downhole. Different from drilling fluid, the PHPA polymer is added first to coat the incoming granular bentonite and delay it from swelling until it is put in place downhole.

Question: How do I know if the product I am using is a PHPA polymer?

Company-produced technical data sheets (TDS) are vague in identifying polymers by type - company representatives are not. They will identify their products in the field or during the polymer section of a mud school. The TDS will identify if the product is recommended for clay or shale formations. As far as long-chain or short-chain, you will need to refer to your manufacturer.

There are many other products used in clay which are not PHPA type polymers. Some work okay, and some outperform a typical PHPA in sticky clays. The downfall of these other products is they are typically not NSF certified and therefore should not be used in water well development.

Todd

Todd Tannehill may be contacted
via e-mail to michele@worldwidedrillingresource.com

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Oil/Water Exploration

by Harold White

ENV

Question: Is groundwater becoming scarce? Do you really know it is, or is this asked for some reason? Whatever the reason, maybe you want to know. So let's think about it.

Questions need to be asked. So we know what we are talking about, what is groundwater? If groundwater is rainwater from the rain cycle saturating down into the ground at an average of three to eight feet per year and you are in an area that gets a lot of rain, then the answer would be no.

If you are in an area like a desert where it does not rain much, then the answer would be the groundwater is average to the area; or no if you are in a desert area experiencing the tenth year in a drought with no rain, then how far down would the groundwater be if the saturation movement was straight downward at eight feet per year? - 80 feet down. So if there is a lake at 100 feet you are pumping out of, your pump would not even detect much of a difference in its pumping if there were no other facts to deal with.

There is osmosis. I was using the idea of an underground lake, which is one common idea of how fluids work in geologic traps, faults, domes, fractures, aquifers. The one word I could use which makes sense is aquifers, since we are writing about water aquifers, creeks, and rivers underground.

This is what I do. I detect underground creeks and rivers. I have never found an underground lake, or well pumping from an underground lake. One question I have been asked is: "What is the reserve that we read about when we read 'Protect the water reserve. Stop using so much water.' and it talks about irrigation and other waters being used."

I tell them I don't think there is a reserve. It's the rain cycle. I ask other drilling contractors and they say the reserve is the ocean.

Harold

Harold White may be contacted via e-mail to michele@worldwidedrillingresource.com

Technology Increases Safety Around Heavy Equipment

Adapted from Information from Caterpillar®

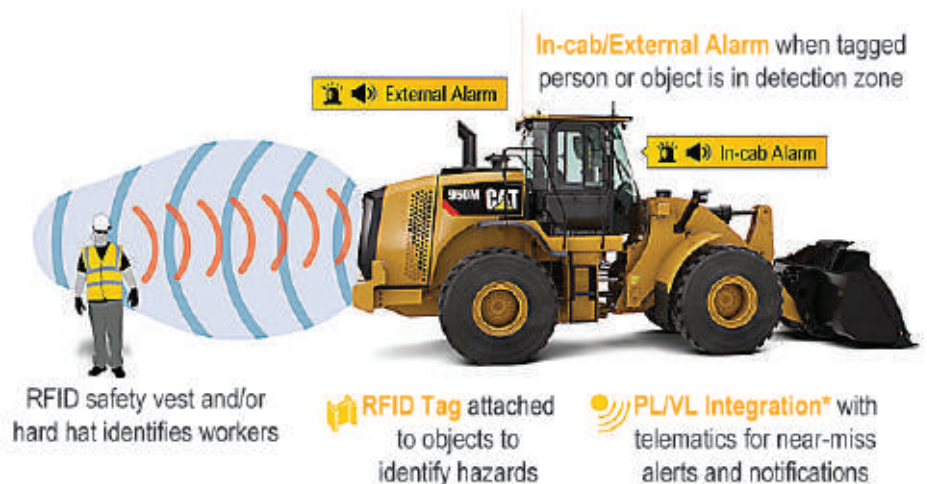
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Not only can Cat Detect protect your workers, it can also help protect your equipment. The rigid tags can be placed on any fixed object such as generators, light poles, pickup trucks, etc. to prevent equipment from striking objects. The antenna's UHF signal extends 25-30 feet out and 10-12 feet side to side / top to bottom and can detect through fog. The system can be activated upon ignition or when equipment is operated in reverse only.

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All workers deserve a safe work environment. Make sure you are taking advantage of the latest technology to ensure your crew's safety.



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The “Idiots” Corner

by “Billy Bob Smith”

Revisiting Assumptions

Assumption - Dictionary definition - “A thing that is accepted as true or as certain to happen, without proof or evidence.”

Assumption - My definition - “When someone thinks they know something, but they don’t - because they are an idiot.”

Now that we have that out of the way, do assumptions matter? Are they really stupid? Are they dangerous? Do they contribute to negatives in life? YES - to all of these and more, but I assume you have something better to do (laugh), so I won’t take too much of your time.

What I want to point out with this brief article is simply how many of us (everyone) make numerous stupid assumptions every day, but first one of my favorite quotes - by me - “Assumptions are the way idiots demonstrate how stupid they are.”

Okay, back to serious - yeah right. Ever made any of the following assumptions:

- When you vote for a politician who says they will do something, you assume they will.
- When your doctor tells you it’s not serious, that it really isn’t.
- When you check into the hotel the room, it has actually been cleaned?
- When you buy a product that says lifetime warranty the company will still be in business 30 years from now?
- When you die, people you knew will care you are gone? (Disgusting, I know).
- The plane you are on will actually make it to your destination?
- The pills you take will actually work?
- The expiration date on a product you bought is accurate?
- When your spouse says - for better or worse - they mean it?

Need I go on, because I’ve got hundreds more. Okay, your turn. Come up with a few assumptions you make every day, or most people do.

Billy Bob

Contact him via
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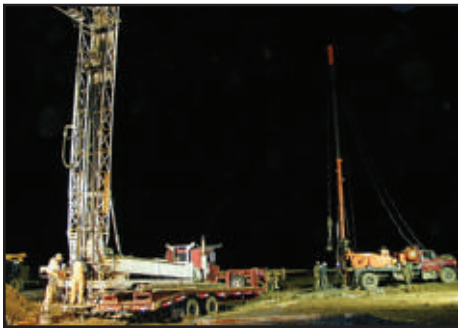
*Adapted from Information by
the Mine Safety and Health Administration*



Throughout history, miners from all walks of life have worked both aboveground and underground, confident should a disaster occur, every possible effort would be made to locate and rescue them. That's

where the nation's Mine Rescue Teams come in; when called, these rescuers do not hesitate. They undertake some of the most difficult and risky emergency response work in the country, sometimes traveling miles in dark underground mines filled with debris, as well as poisonous and explosive gases, searching for missing miners and recovering those who do not survive.

When miners find themselves in an emergency situation on the job, such as being trapped by fires, explosions, roof falls, flooding, or harmful gases, they rely on specially-trained mine rescue teams to help. A speedy and safe rescue effort can mean the difference between life and death for trapped miners. Teamwork is crucial. Rescuers must be trained, available, and ready to respond in a moment's notice. Over the years, mine rescuers have become better trained and organized, the equipment they use has also become more sophisticated.



Surface drilling of boreholes sometimes takes place during the mine rescue process.

Today, over 250 mine rescue teams are certified and equipped to perform mine rescue operations in the United States. They train and compete in mine rescue contests across the country, culminating in a national championship for coal as well as metal and nonmetal mines, so they are ready to answer the call they hope never comes. Mine rescue contests and simulations are an essential part of the training process, and ensure teams receive hands-on exposure to a range of potential hazards and mine emergency scenarios.

The Mine Act requires every operator of an underground mine assure the availability of mine rescue teams for emergency rescue and recovery of trapped or injured miners. Rescue teams must receive adequate training in accordance with 30 CFR Part 49.8 for underground metal and nonmetal mines, and 30 CFR Part 49.18 for underground coal mines.

In 2013, October 30th was declared as Mine Rescue Day to celebrate these brave champions on a national level. This Mine Rescue Day, salute the brave men and women who give their time, and risk their lives in the service of miners across the country.

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The Search for Lithium Resources Continues

Adapted from Information by MGX Minerals Inc. and Belmont Resources Inc.

Will the U.S. soon have a second lithium producer? It's beginning to look that way. According to an announcement from MGX Minerals Inc., drilling has begun at its Kibby Basin, Nevada, lithium brine property. The company selected to do the drilling was Harris Exploration Drilling & Associates Inc., a company with vast experience drilling in the Clayton Valley lithium brines.

Clayton Valley is currently home to Abermarle's Silver Peak Mine, the only U.S. lithium producer, which is located only about 30 miles south of the Kibby Basin.

Earlier, geothermal research by the Nevada Bureau of Mines and Geology (NvBMG) identified three wells and springs in the area. All three sources indicated near-surface water. Nevada is known for its abundant geothermal resources, and NvBMG has outlined areas with potential heat flow, based on surface temperatures of springs, borehole water temperatures, geothermal-related geochemical signatures, and associated geologic settings. These areas suggest zones of potential elevated heat flow.

Geologic research of Kibby Basin has indicated proximal rhyolitic flows and tuffs surrounding the basin could be a potential source of lithium brine in the Kibby Basin Playa. Regional geophysical signatures in the area revealed similar anomalies to that of Clayton Valley.



Harris Drilling is using a rotary drill for the Kibby Basin project. Photo courtesy of Belmont Resources Inc.

In January, a Quantec MT (magnetotelluric) geophysical survey was completed and eight drill targets were selected based on the results. The proposed sites will take a closer look at a large MT conductor which may represent aquifers containing lithium brines. The goal of the exploration drilling project is to determine the nature of the conductor, collect sediment samples for lithium analyses, identify aquifers, and sample the water and brines they encounter along the way. The boreholes have been designed to intercept the MT anomaly starting at depths of 1065 feet and continue to as deep as 2500 feet. Drill samples will be collected continuously in ten-foot intervals and analyzed for lithium and other elements. Water samples, collected periodically as the hole progresses, will also be analyzed. Additionally, downhole geophysical logging will be conducted to help identify permeable / aquifer zones and zones of conductivity. Aquifer water will be sampled using downhole packers to isolate aquifer intervals.

MGX partnered with Belmont Resources on the property located in the western portion of the Great Basin in Nevada. The 50/50 joint venture will utilize MGX's unique lithium extraction methods.


MGX's rapid lithium extraction technology eliminates or greatly reduces the physical footprint and investment in large,

multiphase, lake-sized, lined evaporation ponds. It also enhances the quality of extraction and recovery across a complex range of brines as compared with traditional solar evaporation. This technology can also be used with petrolithium (gas and oil wastewater), natural brine, and other brine sources such as lithium-rich mine and industrial plant wastewater.

This technology was recently chosen as winner of the Base and Specialty Metals Industry Leadership Award at the 2018 S&P Global Platts Global Metals Awards, in London.

Editor's Note: In between our print issues, the *WWD&R* Team prepares an electronic newsletter called *E-News Flash*. Based on readership, this was the most popular *E-News Flash* article of the month. Get in on the action and subscribe today at: www.worldwidedrillingresource.com

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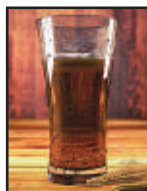
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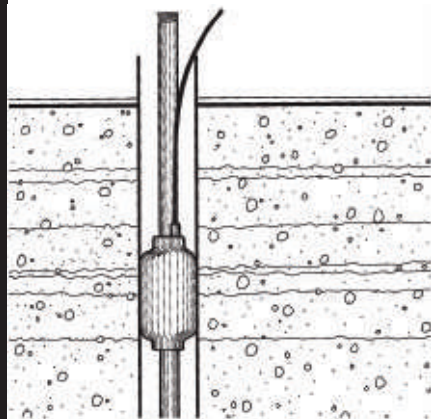
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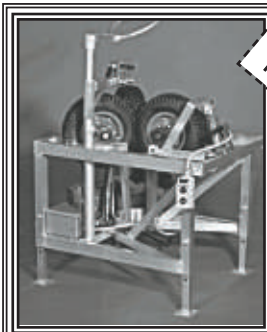
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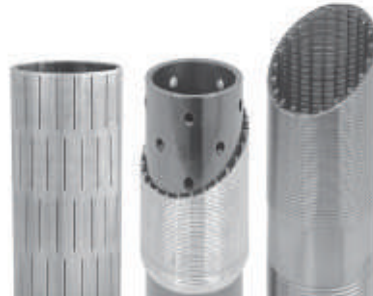
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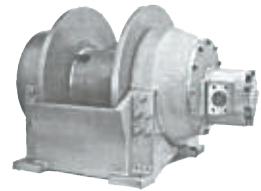
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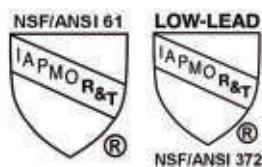
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