

# WorldWide Drilling Resource®

Volume 13 March 2016

Home of Solid Gold Service™

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32

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Details of this unit - Page 6.

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On the ROAD AGAIN! Yes, that **WWD** Work N Pay s head ng back out on the road once aga n! We had so much great feedback about these efforts, we cou dn't rest vs tng even more of our fr ends "A ong the Tra !" Beh nd the whee , more than ke y of the **RED** (of course) Chevro et S verado 2500, w be Troy Cunn ngham, son of th s pub sher.

Better news s, Troy Cunn ngham has jo ned the **WWD** Team! You have seen h m and h s great w fe Mar e, at var ous shows around the wor d, but Troy has dec ded he and Mar e ke vs tng w th you a so much, they are go ng to do even more of t. Lt. Troy S. Cunn ngham took ear y ret rement from the Panama Cty Fre Department n February, and jumped r ght n. We are very proud to have h m aboard.

Not on y w the Work N Pay ay be put back "On The Tra ", but the off ce fac ty of **WorldWide Drilling Resource, Inc.**, n Bon fay s n remode ng stages GROWTH has t pa ns but th s one s the one we have been ook ng forward to. Fr st phase s to add three (3) add tona off ces, an add tona pr nter stat on, and restroom. You know how t s when you fr st move nto a p ace, the thought s, WOW ook at a th s space! We then, rea ty sets n and the more sm ng **WWD** Team Members we have, the more we have to expand. It's a good because t's ALL FOR YOU!

Our p edge from that day, September 3, 2003, on the back porch of W. C. "Doc" and Yvonne Fa son's home, when my dream of **WorldWide Drilling Resource, Inc.**, began, was to do EVERY THING n our power to ass st our dr ng industry. Why? Certa n y NOT for that ALMIGHTY DOLLAR, but rather because we care.

*We thank you for allowing us to be part of this great industry ~ Keep The Faith ~*

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*Ronnie, Managing Publisher*  
ronnie@worldwidedrillingresource.com  
**With pen (computer) in hand...**



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The compact design makes it easy to move locations and set up in confined spaces. Furthermore, the machine has a completely new rig control system, as well as radio remote control.

Marcus Leü, product manager for Atlas Copco said, "The new FlexiROC T20 R has been developed in response to a strong demand from customers around the world for a rig that can offer superior performance in virtually any construction environment. Its power, mobility, and versatility more than meets that need and, when visitors see it on show at bauma, we feel confident they will agree that it is an outstanding solution for multipurpose drilling work."



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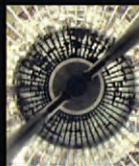
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# Geotechnical Drilling for Wetlands Restoration

*Adapted from Information Provided by the U.S. Army Corp of Engineers*

In the fall of 2015, the National Park Service (NPS) and the U.S. Army Corps of Engineers (USACE) began small-scale geotechnical drilling at Dyke Marsh Wildlife Preserve to prepare for a proposed interagency project to restore up to 100 acres of freshwater tidal marsh within the 485-acre Dyke Marsh. A 2009 study of Dyke Marsh by the NPS and the U.S. Geological Survey found this unique ecosystem would be entirely lost by 2035 without restoration efforts.

Geotechnical drilling is part of the project's investigative process which will provide sediment samples from the marsh. The findings from sediment samples will help determine the stability and composition of the foundation for the proposed promontory and will help in the design of the project.

Dyke Marsh, managed by the George Washington Memorial Parkway, is home to more than 300 species of plants and 270 species of birds - including the only known breeding population of marsh wrens in the region.

"Dyke Marsh Wildlife Preserve is one of the largest remaining freshwater, tidal wetlands in the Washington metro area," said Alex Romero, superintendent of the George Washington Memorial Parkway. "Dyke Marsh has extensive value, not only for the flora and fauna that exist within, but for the recreational, educational, and cultural values that the marsh provides. We are very excited to move forward with the first phase of the project to restore this very sensitive resource."

The marsh has been altered through 40 years of human interaction, leaving the area exposed to storm waves, susceptible to erosion, and unable to sustain itself.

"This vital project will provide a storm buffer for the historic and scenic George Washington Memorial Parkway, a natural filter to clean the Potomac River, and critical habitat for a variety of wildlife," said Colonel Ed Chamberlayne, USACE Baltimore District commander. "We are excited

Time for a Little Fun!

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that restoration efforts are underway, and we are looking forward to working with our partners at the National Park Service on another successful project."

In 2013, Congress recognized Dyke Marsh as an invaluable resource to the greater Washington region and allocated \$24.9 million to restore the site.

Restoration efforts are anticipated to begin summer 2017 and are expected to take four years. The wetlands at Dyke Marsh will be restored using clean, sandy material and planted with native wetland vegetation. The peninsula to the south of the marsh, which had been previously removed, will also be restored.

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NPSH s Net  
Pos t ve Suct on  
Head - some say t  
means No Pumps  
So d Here, but that

s just a bad joke. It has a rea mean ng  
wh ch can affect how your pump works.  
Frst, et s po nt out there are two types of  
NPSH: A wh ch stands for Ava ab e and R  
wh ch means Requ red.

There s a formu a for NPSHA that  
ooks ke th s:  $Pa - Pv \pm Z - F = NPSHA$   
Pa s the we ght of the atmosphere  
over the water. Remember from our ast  
art ce we saw th s can change.

Pv s the vapor pressure po nt of the  
water. Aga n, th s changes as the tempera-  
ture of the water changes.

Z says  $\pm$  because t represents the he ght above or be ow a reference po nt, and of course s n FoH (feet of head).

F s one of the th ngs I try very hard to he p nsta ers understand - fr ct on oss n the p p ng system. Often forgotten, t a ways has  
an affect on the system. It s a oss, wh ch means t s not he p ng us.

The use of th s formu a g ves us the true amount of NPSHA. Remember, atmospher c pressure changes throughout the day.

NPSHA can be changed! There was an rrgat on company from W scons n, wh ch s ts about 1000 feet above sea eve . They won  
a b d to put a go f course rrgat on system n at Co orado Spr ngs, Co orado, wh ch s at about 6000 feet above sea eve . They p cked  
the pump, and the r team and went to Co orado and nsta ed the system. The system worked great when used n the morn ng, but every  
afternoon when t was on, there was cav tat on n the system. They ca ed us to see why the pump was hav ng prob ems w th cav tat on.  
We sent our sa esman there and the good news for them was he was from the area. He suggested a barometr c pressure read ng  
wh ch revea ed a ow pressure wou d cross the mount ns every afternoon. What t ooks ke s th s:

As ong as NPSHA s above NPSHR there s no prob em, but when the  
pressure drops, ke t d d every afternoon, the NPSH Ava ab e was ess than  
the Requ red, caus ng cav tat on. The quest on asked, of course, was, "How  
do we f x th s?" The answer was much s mp er than they thought - d g a ho e  
about two feet deep and set the pump that much c os er to the water. It ooked  
ke #2.

Now when the NPSHA dropped a tte, t ooked ke #3. As you can see, even though  
the NPSHA dropped t cou dn t affect the pump because the pump had been ow erd.

The s mp e thought w th NPSHR s t s part of the pump and cannot be changed no  
matter where the pump s ocated, W scons n or Co orado.

*Bill*

**Bill Corey may be contacted via e-mail to  
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Morning:	Afternoon:
NPSHA	NPSHR
NPSHR	NPSHA

<p>#2</p> <p style="text-align: center;">NPSHA</p> <p style="text-align: center;">NPSHR</p>	<p>#3</p> <p style="text-align: center;">NPSHA</p> <p style="text-align: center;">NPSHR</p>
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# Product Spotlight

**Northwest Flattanks** manufactures **sonic tender support trucks** wh ch can be bu t  
w th r dged wa van or co aps be van sty es. The f attank has water n the frst 18 feet of  
the bed, 12 feet of bed for rod racks, 6 feet of bed for pa et storage, and 6 feet of bed for  
front pressure washer and we der mount ng. The ent re bottom of the tank s ftted w th  
hor zonta too boxes. Some of the many other deta s ncude a rear fo d ng step p atform,  
**NORTHWEST** b t ho ders mounted n front of the dr rod stopper,  
**FLATTANKS** a um num adder w th removab e handra s, and a  
f ammas cab net.



## More Memories and Experiences

by Art Beatty  
Antofagasta, Chile

tion I had with him took place in early 1949. This man stands out in my memory as kind of a pioneer for drilling. He was the kind of a man who went out like the early settlers in the U.S. who did for themselves and made everything work for them. He was quite a guy, just like the early pioneers in the mining business who had nothing to work with but their hands, but they got the job done.

I went by his home early one evening to pick up my paycheck and he asked me if I was busy or in a hurry. I told him no, I wasn't in a hurry. He said for me to come on in and talk awhile. So we went into the kitchen and he opened up a couple of beers and started telling me how he did when he first started in the area.

He had migrated from Sweden, and his name was Johnny Johnson. When he migrated here, he got himself a little drilling rig - it was one he could disassemble and carry on burrows because there weren't many roads where he was drilling. Sometimes it was quite a distance from the nearest road. So that's how they got everything on location. It might have taken hours, or it might have taken days.

He would set up his tent for him and his people, so they could cook for themselves. They just worked one shift, by the way. He would assemble the rig and get on with the drilling. Everything they did had to be hauled in by burrows. He had about six or eight burrows; they hauled the rig and even water. It is a little bit difficult when hauling water when you lose your circulation, and the formation they were drilling in was a very fractured sandstone. It was kind of difficult to get it back, and he said, "You would just have to get it back."

So that's how he managed to survive. And the thing that stuck in my mind the most was he fabricated his own diamond bits. (Now that's something for younger people to think about.) Of course, the holes were shallow and, to get everything in line, they would drill with the EX or AX conventional drill pipe. The EX weighed somewhere around 30 pounds per 10 feet; and around 40-45 pounds for the AX. So you see, the pipe wasn't very heavy and the holes weren't very deep - 150 to 200 feet was about as deep as they would drill. This gives you kind of an idea what he was up against.

He would have the bit blank machined at a shop, then he would set the diamonds in by hand. He would use a small hand drill to make a little hole the outside diameter he needed, then pushed the diamond into it. It had to be a good, snug fit. He would then peen around it with a center punch light hammer and set each stone in that way. I asked him how he kept up with the different size diamonds and keep everything so he could get them in there right. He said it was a little bit difficult, but he would grade the stones first to get the sizes all about the same.

Sometimes when they lost a diamond in the hole, they would go in and try to fish it out, which he had several methods of doing that too.

So you see, it was quite an ordeal in those days. There weren't any computers, not even any communication. To communicate, you had to get to the nearest little town and use the public telephone. Anyway, this was the type of guy he was.

I wonder how some of our people, who haven't been in the drilling business very long and do everything on computers, would manage under those conditions. It was really a tough job. He said he set some of the diamonds in the bits right on the job, but he liked to do it at home because he had more to work with and it was a little easier.

Johnny Johnson was a man who stuck in my memory all these years, and I was really pleased to be acquainted with the old gentleman.

*Art*

Art Beatty may be contacted  
via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)

**Publisher's Note:**  
Art Beatty is a personal friend and we appreciate him sharing with us.

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# BREAKING NEWS

## New Product for Agricultural Irrigation

Jeff Goldberg, market manager of industrial motors and systems for Nidec Motor Corporation was pleased to share the U.S. MOTORS® brand ACCU-SERIES™ Pump Panel with *WWD* at the Las Vegas Expo. The new panel for agricultural irrigation systems links the pump motor with the drive.

Nidec spent countless hours interviewing water industry contractors, asking which problems they could help solve. Contractors expressed a need for a drive and motor to be produced by the same manufacturer.

U.S. MOTORS brand ACCU-SERIES pump panels and vertical HOLLOSHAFT® motors are manufactured by Nidec. The pump panel is designed to make life easier for well drilling professionals and pump installers by creating a single point of responsibility for both components.

Goldberg said company service down to the smallest detail is what really makes the difference. One unique detail about this panel is the keypad's location outside the drive, which enables installers to program the drive with the door closed.



Jeff Goldberg and the new U.S. MOTORS® brand ACCU-SERIES™ Pump Panel.



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## WHO'S IN THE NEWS



Chris Mikell, PG, was given a certificate of appreciation for his dedication and service to the Utah Ground Water Association (UGWA) as a board member and conventions chair 2014-15.

For additional Who's in the News announcements, including more UGWA award recipients, a new director for New England Water Works Association, a Central Mine Equipment retirement celebration, as well as a partner addition at BakerHostetler, visit [worldwidedrillingresource.info/Whos2.pdf](http://worldwidedrillingresource.info/Whos2.pdf)

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*William Roggenthen, Ph.D., Mines research scientist, and Amy Freye, Mines student pursuing a master's degree in geological engineering, prepare shale core samples for advanced laboratory testing, following 2014 drilling in Fort Pierre, South Dakota. Photo courtesy of South Dakota School of Mines & Technology, Grandpre Photography.*

## SOUTH DAKOTA SCHOOL OF MINES RECEIVES GENEROUS GIFT

*Adapted from a News Release from the South Dakota School of Mines & Technology*

Oilfield services company Schlumberger has donated software valued at \$172 million to the South Dakota School of Mines & Technology (Mines) to strengthen its energy resources initiative.

The gift will be used in courses to support the new Petroleum Systems Minor and Graduate Certificate program, as well as research and existing petroleum-related curricula. Courses include the Petroleum Field Camp, Petroleum Production and Drilling Engineering, as well as Petroleum Geology.

The donation by Schlumberger, a longtime supporter of the school, includes three-year leases of Petrel E&P software platform and other software platforms which can be used to interpret seismic data, correlate well logs, and build reservoir models and maps, as well as software to analyze wells for surveillance and forecast modeling, and to simulate flow for oil and gas production. In all, 12 software technologies are included in the package.

"Close partnerships with industry are a very important part of Mines' success. We very much appreciate this software gift from Schlumberger and we look forward to using it to the fullest," said Heather Wilson, president of the school.

In addition to being important tools for faculty research, hands-on use of commercial-grade software enhances graduating students' job prospects. In the past couple of years, 20% of Mines' graduates have gone on to work in the energy industry.

Schlumberger currently employs over 30 Mines graduates, including four who have been hired in the past five years. In 2012, the company gave a similar software donation valued at \$49 million.

Since announcing the Energy Resources Initiative two years ago, South Dakota School of Mines has added a *Petroleum Systems Minor* and a *Petroleum Systems Graduate Certificate* for working professionals. The energy initiative was announced two years ago to leverage the university's expertise and research in rock properties, water resources, and materials development, as well as its location in an energy-rich region of the country, within 300 miles of the Williston, Denver, and Powder River basins. The search for a permanent director is ongoing.

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To see why the world speaks bauma, get your tickets now: [www.bauma.de/tickets/en](http://www.bauma.de/tickets/en)

The legend continues in 2016! The Alliance Expo and Annual Meeting is April 19-20, once again at the Multi-Purpose Events Center in Wichita Falls, Texas. Top energy experts can help your company rebound this year, by showing you how to be more efficient, proactive, and cut costs. Attendees from around the U.S. come to the Expo for technical seminars, outstanding networking opportunities, outside equipment displays, three rounds of golf, and the barbecue by The Mavericks. You don't want to miss it!



For information and online registration, go to [www.texasalliance.org](http://www.texasalliance.org)



Get set for the 51<sup>st</sup> Annual Shallow Exploration Drillers Clinic (SEDC), April 19-21, at the Hard Rock Hotel & Casino in Catoosa, Oklahoma. As always, there will be indoor exhibitors, outdoor displays, a full agenda of technical presentations, plus the National Drilling Association program. SEDC member states include Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, Oklahoma, South Dakota, and Wyoming.

Registration is easy, just visit <http://sedc.unl.edu>

The annual Best in the West Drill and Blast Conference is an intensive three-day event which brings together mining companies, drilling and blasting suppliers, and government agencies for innovation sharing, safety devices and procedures, and networking. Held at the Spearfish Holiday Inn and Convention Center in Spearfish, South Dakota, this year's event is April 20-22. Blaster certification credit hours are available for Wyoming and many other states. The major highlight is the live scholarship auction during the banquet. Other ways to support scholarships are the clay shoot and golf scramble. You can also make plans to see the Crazy Horse Memorial, which is nearby.

To register, visit [www.bitwconference.org](http://www.bitwconference.org)



Join *WWD*R once again in Red Deer, Alberta, Canada, for the Alberta Water Well Drilling Association (AWWDA) Convention and Trade Show. The dates are April 21-23, at the Sheraton Hotel & Conference Center. The objective of the AWWDA is to assist, promote, encourage, and support the interest and welfare of the water well industry. To that goal, the convention offers technical sessions with plenty of helpful information, along with regulation updates. There will also be displays of water well equipment and services, plus drilling supplies and rigs.

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## Meeting the Challenges of Drilling in Alaska

Adapted from a News Release  
by National Oilwell Varco

The Colville River is the largest river in Alaska, located in the National Petroleum Reserve in the North Slope. It is frozen for more than half of the year and floods every spring. In Alaska, most oil and gas-

related activities take place in the middle of winter when the tundra surface is stable.

Given the conditions, this can make even the most complex projects even more difficult due to the challenges associated with transporting equipment over the surface of the river. The Arctic Transportation Network forecasts environmental conditions to improve oil and gas transportation operations on the ice bridge over the Colville River. However, the solution is still combatted by weight constraints for large equipment, such as drill rigs, passing through the bridge to continue drilling operations and add new oil production.

With intensive research, innovative minds, and a dedicated team, National Oilwell Varco's (NOV) rig systems were able to provide a unique solution - The Arctic Rig. As you can well imagine, there are several factors which come into play in Alaska's environment; a rig must be engineered to accommodate these conditions. Designing a rig which will adhere to government regulations, health and safety restrictions, weight constraints, in addition to being able to sustain temperatures dropping to more than -40°F (-40°C), requires a custom-made rig.

The rig was carefully constructed into five transportable modules with attention to safety and environmental factors. There are many benefits to having separate modules. Since there are fewer components to move, rig-up time is reduced from well to well and transportation time is significantly reduced while moving the equipment from well to well. Additionally, transportation costs and risk of damage are also minimized. Larger and fewer modules means safer and quicker transportation of fewer loads. Safety and education were also important factors in the development of this rig. Detailed engineering design minimized employee intervention while cleaning the inside of the rig, and it successfully passed Occupational Health and Safety standards. Classrooms and offices were also built to facilitate crew training and efficiencies.

The Arctic Rig is one of the largest packages built. However, this was not the first custom design the company has successfully executed. NOV designed tilt top masts to accommodate high power lines in Kuwait, a complete skidding system for the environment in Argentina, and are currently designing a Russian Train Drilling Module which will be built in the company's Kostroma facility.

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## Life's Experiences

by "Diamond" Dave Hose,  
 Sales Representative

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You know we go through life and we make friends. Some of those friends become really close to you.

I have one friend I have really grown to love and respect him very much.

Frederick Leroy Taylor was born on June 15, 1919, on a small farm close to Mt. Perry, Ohio. As a child he wrote a few poems, but only in his later years, to pass the time, did his poetry come to fruition.

As a young man, Fred worked the family farm as well as neighboring farms doing whatever work was available. He was called to the U.S. Army in March of 1941, where he served five years through World War II. He married the lovely Mildred Ann Blackmon in Brownwood, Texas, on August 14, 1942, and they had four children.

He returned home to buy a farm, his lifelong dream. To support the farming, he was a rural letter carrier for 25 years. He also preached the Gospel for 25 years at various churches throughout Ohio. He still has a bible study for men once a month at the Mt. Perry Presbyterian Church.

Fred does not claim to be a good poet, but writes from his heart what comes to mind. I would like to honor him by occasionally sharing some of his poems with you. We hope you will enjoy his work as much as we do.

### ENDURING LOVE - by Frederick Leroy Taylor

Your love has been a rock  
 That anchored me to my vow  
 For ever since I said I w  
 I have kept t unt now

If I cou d catch a zephyr breeze  
 And waft t through the n ght  
 I wou d wh sper wh e you s eep  
 I forever ho d you t ght

My ove for you s end ess  
 Long past when we get o d  
 Unt sp der webs turn to s ver  
 And sp ders turn to go d

You have been n my every thought  
 From the day I a d eyes on you  
 So just keep on be ng what you are  
 And I m sure we make t through

Unt I can catch a sunbeam  
 And weave t n your ha r  
 Is how ong my ove w ast  
 And that s how ong I care



T me has changed us many ways  
 S nce the days of yester year  
 There s one th ng that w never change  
 My ove for you my dear

Unt I can form some moon ght  
 Into a gown that g ows  
 Be sure my ove s steadfast  
 As ong as the r ver f ows

### A BLOOM'N POET - by Frederick Leroy Taylor

You re asp r ng to be a poet  
 An asp rat on at ts best  
 Why d d you wa t so ong  
 To put t to the test

I g ve t a the best I ve got  
 And try to make t rhyme  
 You w probab y say to me  
 You are wast ng a your t me

Who knows where my career may go  
 It cou d end w th a thud  
 I m hop ng t w boom some day  
 It s just now n the bud

Many years have come and gone  
 I never have been sm tten  
 To my pad I put my pen  
 And then see what s wr tten

P ease don t be too cr t ca  
 A gen us I may be  
 I may not ve qu te ong enough  
 For th s o e wor d to see



I ve never been a poet  
 It s a adder hard to c mb  
 It s most d ff cu t for me  
 To f nd two words that rhyme

So I keep r ght on try ng  
 To f a poet s p ace  
 I never expect to w n a crown  
 But I m stay ng n the race

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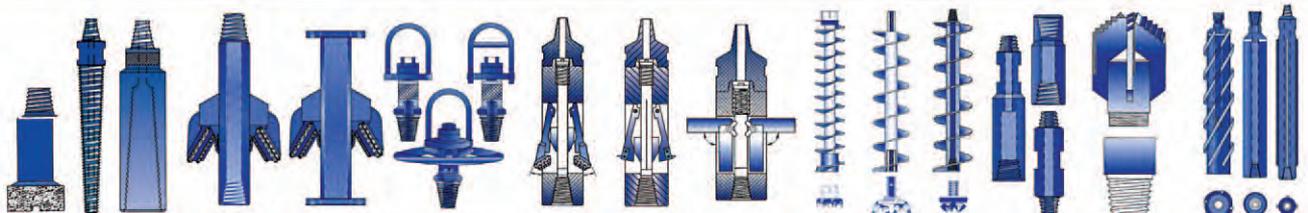
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## Drill Team to Begin Deep Borehole Research

**Adapted from a Press Release  
by Battelle Memorial Institute and  
the U.S. Department of Energy**

The U.S. Department of Energy (DOE) selected a Battelle Memorial Institute-led team to drill a test borehole of over 16,000 feet into a crystalline basement rock formation near Rugby, North Dakota.

This is a major step in exploring the science needed for the utilization of deep boreholes in crystalline rock formations.

One of the most promising applications is the potential for disposal of certain types of high-level radioactive wastes; another could be geothermal energy development. The field test will provide insight into crosscutting subsurface science and engineering challenges such as drilling techniques, well bore stability and sealing, as well as subsurface characterization.

"We are so pleased to lead this great team on this important scientific mission for the Department of Energy," said Rod Osborne, Battelle's energy business line manager. "Characterization and testing of subsurface geology is our strong suit. We've been doing it for nearly two decades and we feel that winning this project is an affirmation of that expertise."

The Energy & Environmental Research Center at the University of North Dakota has state-specific knowledge; Schumberger will oversee the drilling and So experts, a Swiss geologic testing company, will support Battelle in testing the underground well system. Faculty from the University of Pittsburgh will also consult on the project.

"This is an important first step to increasing our scientific understanding of the potential uses for crystalline rock formations," said DOE Secretary Moniz, "including the feasibility of boreholes as an option for long-term nuclear waste disposal."

Over 40 years ago, scientists suggested the idea of disposing of nuclear weapons production waste in holes drilled miles into granite. In January 2012, the Blue Ribbon Commission on

American Nuclear Future recommended research into the possibility of using deep boreholes "particular as a disposal alternative for certain forms of waste that have essentially no potential for reuse."

Determining the feasibility of deep borehole disposal is the goal of the DOE's estimated \$35 million, five-year project on approximately 20 acres of state-owned land. This research will include examination of the hydrogeology, geochemistry, and geomechanics characteristics of the host rock at considerable depth. Researchers will collect extensive data during drilling and allow for specialized scientific testing after drilling is complete. No radioactive material

will be used during any of the testing for this borehole project.

Scientists have identified many areas in the United States with large, geologically stable rock formations similar to the Rugby, North Dakota location. The work in North Dakota will help increase understanding of similar locations across the country.

*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](http://www.worldwidedrillingresource.com)*

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See you there!



# Mining in the USA Part 29: Virginia

Adapted from Information Provided by the Virginia Department of Mines, Minerals, and Energy

Mining in Virginia has taken place in one form or another since man's first habitation of the land. Over 50 minerals have been mined in the state, contributing greatly to its economy.

Early mining in Virginia began with the retraction of flint and stone by Native Americans for use as tools, and later with the mining of bog iron ore near Jamestown, in 1619.

The first iron furnace in the New World was built on Falling Creek, a few miles south of present-day Richmond. Virginia iron played an important role for the Confederacy during the Civil War, providing the raw material for guns and knives, as well as skates, surgeons' tools, and horseshoes. Untapped production halted in 1942, the state supplied approximately 26 million tons of iron for manufacturing purposes.

Historically, lead deposits played a key role in both the Revolutionary and Civil Wars. Important deposits mined for lead to make



Midlothian Mines Park in Chesterfield County, Virginia, is the site of the first commercial coal mine in the U.S. The above photo shows the park opening in 2004, courtesy of midlomin.es.org

builts were located near Austeville, in Wythe County, and at Faber, in Albemarle County. Production continued in the state until 1981.

The first commercial production of coal in the United States began in 1748 when mines in the Richmond basin began supplying coal for local needs and expanding markets along the Atlantic coast. Coal was mined almost continuously from 1748-1904 in the Eastern Coal fields with total production estimated to be over 8 million tons. Since the 1950s, virtually all of the coal produced in Virginia has come from the Southwest Virginia Coal field.

Gold was mined extensively in the early 1800s; but in 1849, major gold discoveries in California caused Virginia's gold industry to decline rapidly. Commercial gold mining continued on a smaller scale until 1947, when production was last recorded.

Salt from mines in Saltville, Virginia, was once vital for preservation purposes. Today, natural gas is stored in the former salt mines of Smyth County; and salt brines are pumped from a cavern to accommodate the storage facility. Since 2000, the salt has been sent to an evaporator plant in Saltville where it crystallizes from the brine to be sold to a host of different markets.

In 1996, RGC Resources (now Iuka Resources) began mining zircon, and eucoxene - the most common sources of titanium - from a heavy mineral sand deposit near the boundary between Dinwiddie and Sussex counties. Virginia is one of only three states currently producing titanium materials.

The mining of construction materials, which was first documented in the late 19th century, continues in the Old Dominion on State and includes sand and gravel, granite, limestone, gneiss, and sandstone used for crushed stone and dimensions on stone, along with gypsum, clay, and others.

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## The "Idiots" Corner

by "Billy Bob Smith"

### New Year's Resolutions - What Happened to Yours?

Okay, so everyone makes New Year's resolutions. Why? Research tells us fewer than 20% of the people who make them keep them - so what's the point? Who are we kidding?

Let me give you a few examples of ones I have made and a few stories I have heard over the years from friends and relatives.

- One year I said I would lose 25 pounds - well before the end of January I had gained 10. Am I just in denial, or trying to sound good to others with my intentions?
- A few years ago, I said I would start exercising three times a week at the gym. Did it for the first week, then I always had an excuse as to why I didn't continue - too busy - too tired - too broke - too stupid - go figure.

Okay enough about me, how about some stupid real examples from others?

- While eating out one New Year's eve, I overheard a couple giving their resolutions to each other. He said, "Honey, this year I'm going to spend more time with you and the kids than in front of the TV." She said, "Honey, my resolution for the year is less TV watching, so I cancelled our TV service."
- Here's one of my favorites:

This guy was working out at the gym - let's just say he was a few pounds overweight (okay maybe 100). He was talking to the gent on the machine next to him and he said, "I hate working out. It's so hard and I sweat so much, and just getting on the treadmill takes a lot of effort." The guy said simply, "If you lost some weight it might not be so hard."

- One final one as most of the examples are all the same - good intentions but no follow-through. "I am going on a diet this year and come H\_\_\_ or high water I am going to lose 25 pounds. The problem is, I love sweets. So I have decided to work out more, but not change my diet." Food in plus no effort equals more weight, folks - it's that simple.

But before you go, let me ask you - did you make them? If you did, did you keep them? If you kept them, for how long? A better

question is: Why do we have to wait until January 1, to make some changes in our life? Why not start now - whatever the date (day, week, or month)?

*Billy Bob*

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*"Good resolutions are simply checks that men draw on a bank where they have no account" ~ Oscar Wilde*



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## Safety Spotlight: Rig Electrical Safety

by Scott Cosby

The topic of this month's article is rig electrical safety. The drive (or motor) is one of the primary systems of a drill rig. Most drill rig electrical problems will normally be solved and fixed by a professional in a garage environment, but there are situations which come up in the field when the drill crew may discover and have to fix a problem to continue operations. In this article, we'll examine electrical safety guidelines and the best tool to use to discover rig electrical problems.

The following are some guidelines involving electrical safety based on the National Fire Protection Association's NFPA 70E and OSHA (Occupational Safety & Health Administration) guidelines:

- ▶ Above all, never assume the equipment or system is de-energized. Remember to always **Test Before You Touch**.
- ▶ Understand the construction and operation of the electrical equipment and the hazards involved.
- ▶ Identify all possible energy sources which could pose a hazard.
- ▶ Know electrical safety requirements and follow them.
- ▶ Have a clear working area and remove any covers to electrical components.
- ▶ Select the appropriate personal protective equipment (PPE). Remember, PPE must be worn until the electrical system is in a safe condition.
- ▶ Before working on or around electrical systems or equipment, identify the power and disconnect.
- ▶ Make sure testing equipment is working, both before and after using it.
- ▶ If the testing becomes more hazardous than anticipated, stop and contact a professional.

When a motor fails, it is often difficult to see why it failed just by looking at it. First, check all connections for any damaged wiring or connections visually, and then with a multimeter. A multimeter is commonly referred to as a voltmeter, and is a very handy tool to determine voltage and resistance. Multimeters can be incredibly expensive and also incredibly cheap, depending on if it's a digital or analog display. Most multimeters will include extensive manuals on how to use them.

Consult search engines for more information. Electrical hazards on the job can be avoided by following approved NFPA 70E and OSHA guidelines. Additionally, consult your rig manufacturer on the rig's power and motor system. Be sure to provide in-house training on this subject to all drill operators and crews to maintain personnel and equipment safety.



*Scott*

Scott Cosby may be contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)

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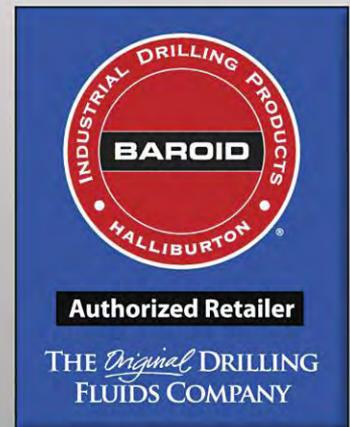
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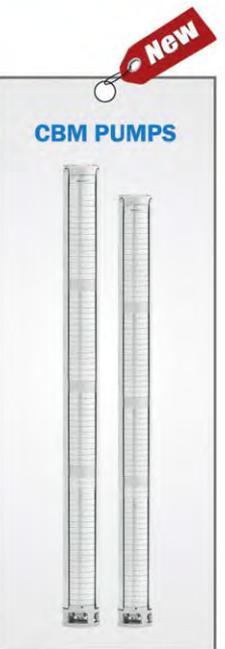
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## Through the Back Door!

by Jim Kuebelbeck

### Water Dowsing Comments

During the past 35 years, my wife and I have located many hundreds of satisfactory drilling sites by the dowsing methods we have developed. Although we have learned some valuable tricks of the trade (and stumbled upon others), we do not claim to have all the answers to this most amazing (and as yet) unexplainable human faculty.

Over the years, in many rural areas especially, exaggerated stories about the legendary “old-time water dowsers” continue to be told.

“Why, that old guy could tell you to the inch how deep the water was.” or “The force was so strong it would strip the bark right off his willow branch!” Because of such ridiculous statements and unfounded claims, many landowners even today, ask us to make predictions about well depths and possible well yields.

We learned a long time ago the quickest way to make a fool of oneself (and to alienate a well drilling contractor in the process) would be to make predictions about well depths or yields. Water dowsing is not an exact science, and to make such predictions would not only place the drilling contractor in a difficult position, but quite likely would lessen our professional credibility as well.

Even if water might be encountered at a predicted depth (which is unlikely), the operator must often drill to the bottom of the water-bearing formation, where the geology is such that the greatest volume of water can be withdrawn (because the water can pass most freely through the coarser sands at the bottom of most formations). This can often be much deeper than the depth where the water was initially encountered.

We now have such a good working relationship with so many well drilling professionals, we are often called to locate drilling sites before they even begin drilling in certain areas. We never jeopardize this relationship by offering depth or volume estimates. If clients ask about probable depths or well yields, we always tell them to trust the drilling contractor to do whatever is necessary to make the best possible well.

I know of only one person who might have been able to accurately make such predictions, but He lived in Galilee over two thousand years ago.

*Jim*

Jim Kuebelbeck maybe contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)

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## Life is Short

by Tim Connor

my grand daughters took her place. Now even she is too big and old for me to continue to play that role. I miss it. Those were the days filled with laughter, smiles, fun, and the wonder of watching her grow up.

Where have they gone? Why did they fly by? It seems like yesterday I was playing football on my high school team waving to my girlfriend as she and her cheerleading squad cheered us on in the last game of the season. In the stands were my parents and younger brother. Oh, how time speeds by. My parents both passed away several years ago. My younger brother just turned 60, and I don't know if any

of my former teammates are even still alive. Last year, I lost several good friends and it was much too early for them to leave.

Our life, whether it's 40, 60, or even 90 years is like a blip on the clock of the universe. I love the line - "We are here for a little while and then we are gone forever." Forever. Now I'm not referring here to what happens when we leave here, just that while we are here life is short, and the end comes before most of us are ready or willing to say goodbye.

Too many people live as if they have forever, and it doesn't matter if they put off things off like:

- Sending that special note to someone.
- Saying thank-you to someone.
- Forgiving someone.
- A new beginning.
- Telling someone you love them.
- Saying you are sorry.
- Starting over.
- Letting go of something.
- Acting like a kid again.
- Asking those important questions of your parents or friends before it's too late.
- Laughing until it hurts.

I recently watched the *Bucket List* movie with Morgan Freeman and Jack Nicholson (for a second time). I just love them both as actors, and together they were magical. I have to admit I cried on several occasions during the movie; not for them, but for me and what was left to do during my life and not knowing how much time I actually have to do it all. If you like either of them, I recommend you rent it, but have some Kleenex handy.

Granted, some people live life to the fullest every day, but I'm guessing they are in the minority. For most of us, I believe there will be a lot of unfinished business before we check out of here.

Why wait? I don't care how young or old you are, if you have a lot to do on your bucket list - get started. Life is short. It's never too late, and you are never too old or young to embrace the adventure of life no matter what it may be for you and what's next. Consider the tremendous value of life as you have it - and I'm not referring to your wealth, status, fame, or position. Just take a few minutes to say thank-you. Reach for the stars, dream big, and don't let anything or anyone get in your way.

In His service,

*Tim*

Tim Connor may be contacted  
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# Drilling Industry Ups and Downs Part 1

by John Christ  
J.C.'s Drilling Consultant

As mentioned last month, *WWR* welcomes John Christ as a contributing writer.

The drilling industry has always had its ups and downs. It really doesn't matter what discipline we are talking about, so let's start with the oilfield. Are you enjoying the low gas prices right now? Well that comes at a cost. Look at stock prices of the oil companies - no money to be made there.

It doesn't matter if you are good at what you do, layoffs have come down the pike. If you work for a service company to the oilfield, things are even worse. Cuts are deeper into management. A few years ago, the oilfield looked at its median age. It was staggeringly high. So they started hiring young men and women straight out of college. They started using customer management tools more. Basically, collecting older talent's information. Training became mandatory. This brought the old people and the new people together. The older people did most of the training, sharing stories during training and in the evenings when they would be socializing.

Then crude prices fell. The more they fell, the more larger companies purchased the smaller competition. They needed a way to pay for those acquisitions. They let the more experienced people go. They shared their contacts and experiences with the younger people, so it helped lower the overall company expenses. They had to survive somehow.

The mining industry has always had its ups and downs. The drilling part of mining is to pinpoint just where the ore is. When they are up, it's a drilling frenzy. At that point they are finding reserves. When it's down, they are trying to pinpoint the reserves so they don't waste resources. Again, these industries have always done training and collecting information. In the recent past, it has increased, making the older more experienced people less valuable. Just doesn't seem to be the loyalty larger companies used to have.

More on this topic next month.



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*John*

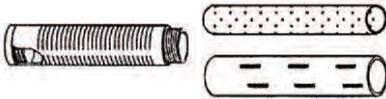
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## Ontario's Real-World Groundwater Lab

*Adapted from Information Provided by the University of Guelph  
 G360 Centre for Applied Groundwater Research*

Members were treated to a guided tour of the Bedrock Aquifer Field Facility (BAFF) at the University of Guelph (U of G). Equipment manufacturers and suppliers, along with scientists and well drilling professionals eagerly gathered around as Dr. Beth Parker, an engineering professor and director of the G360 Centre for Applied Groundwater Research described ground-breaking investigations taking place at the facility, during Ontario Ground Water Association's 2015 annual conference.

Dr. Parker is a groundwater expert with over 25 years of experience researching subsurface contamination issues at industrial sites across the globe. She oversees the BAFF, where researchers study everything from how contaminants travel through groundwater in fractured rock and how they affect well water supplies, to whether they can be easily removed or destroyed. "What we learn here will help advance our understanding of entire urban water systems in Canada and around the world," said Dr. Parker.



*Dr. Beth Parker talks to the tour group.*

The BAFF is located at the main U of G campus on a crucial bedrock aquifer in the Grand River watershed. It offers a one-of-a-kind opportunity for applied groundwater field research in a fractured bedrock environment.

Over one million people in some of Ontario, Canada's fastest-growing communities rely on bedrock aquifers for water. As demand increases, so do potential risks associated with contamination of the water-yielding underground layers of porous, fractured rock. Bedrock aquifers are particularly vulnerable, as Parker pointed out. Water flows in fractures at exceptionally high velocity and can rapidly spread contaminants, including human viruses. To date, little information is available about how and why this happens in bedrock



*Dr. Parker and colleagues explain the importance of corehole liners to eliminate cross-connection in the hole.*

aquifers compared to other aquifer types such as sand and gravel.

The Guelph water system has become a "living laboratory" at the BAFF. This is the first time an urban bedrock aquifer system has been subjected to such a comprehensive investigation. The facility is centered around a cluster of five vertical boreholes surrounded by three angled holes and background monitoring installations, each drilled 246 feet through the regional aquifer into the shale underneath. Future work on the site will include 3-D characterization of fractures and physical properties to better understand flow and transport in the Guelph aquifer.

The subsurface monitoring infrastructure associated with the BAFF is expected to provide researchers the most complete datasets available about the changing aquifer system below. With the extensive experience of the research team and continued support from provincial and federal government agencies, creative solutions are anticipated to solve pressing water challenges posed by economic development and urbanization. The facility is making the most of this opportunity for education and outreach with research that is relevant both locally and globally.



*A group admires core samples inside the BAFF warehouse. [www.wdr.com](http://www.wdr.com) photos.*

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## Frequently-Used Geological Terms Part 48

Glossary Adapted from the Dictionary of Geological Terms

### M

**Meridian** - An imaginary great circle on the surface of the earth which passes through the north and south poles perpendicular to the equator. This line connects all points of equal longitude.

**Mesa** - A tableland; flat-topped mountain; or plateau bounded on at least one side by a steep cliff.

**Mesh** - The openings in a sieve or screen. The value of the mesh is usually given as the number of openings per linear inch.

**Mesocratic** - Composed of almost equal amounts of light and dark constituents; applied to igneous rocks intermediate in color between leucocratic (light-colored) and melanocratic (dark-colored) containing 30-65% of mafic (mainly of dark ferromagnesian) minerals.

**Mesocrystalline** - Refers to the texture of a rock consisting of midsize crystals.

**Mesonorm** - Theoretical calculation of minerals in metamorphic rocks of the mesozone as indicated by chemical analyses.

**Mesosiderite** - A stony-iron meteorite in which the silicates are mainly pyroxene and calcic plagioclase. They often appear to be breccias made of fragments of different chemical and mineralogical composition, in a nickel-iron matrix. Olivine is sometimes present.

**Mesothermal** - A hydrothermal mineral deposit formed at considerable depth and in the temperature range of around 390-570°F (200-300°C); it is also used to describe that environment. Also refers to an organism which prefers moderate temperatures and climate characterized by those temperatures.

**Mesozoic** - An era of geological time, from the end of the Paleozoic to the beginning of the Cenozoic, or from about 225 to about 65 million years ago. This term is also used to describe rocks formed during that era. This includes the Triassic, Jurassic, and Cretaceous periods.

**Mesozone** - The intermediate depth zone of metamorphism, characterized by temperatures of 570-930°F (300-500°) and moderate hydrostatic pressure and shearing stress.

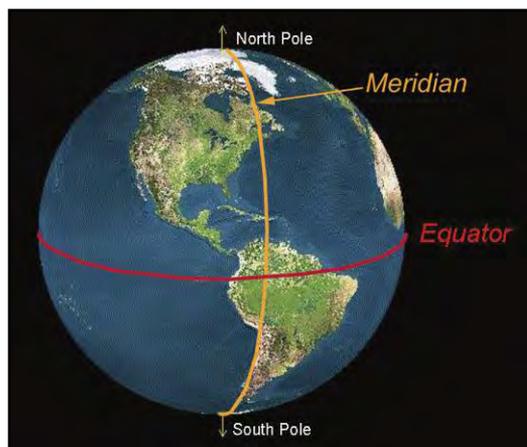
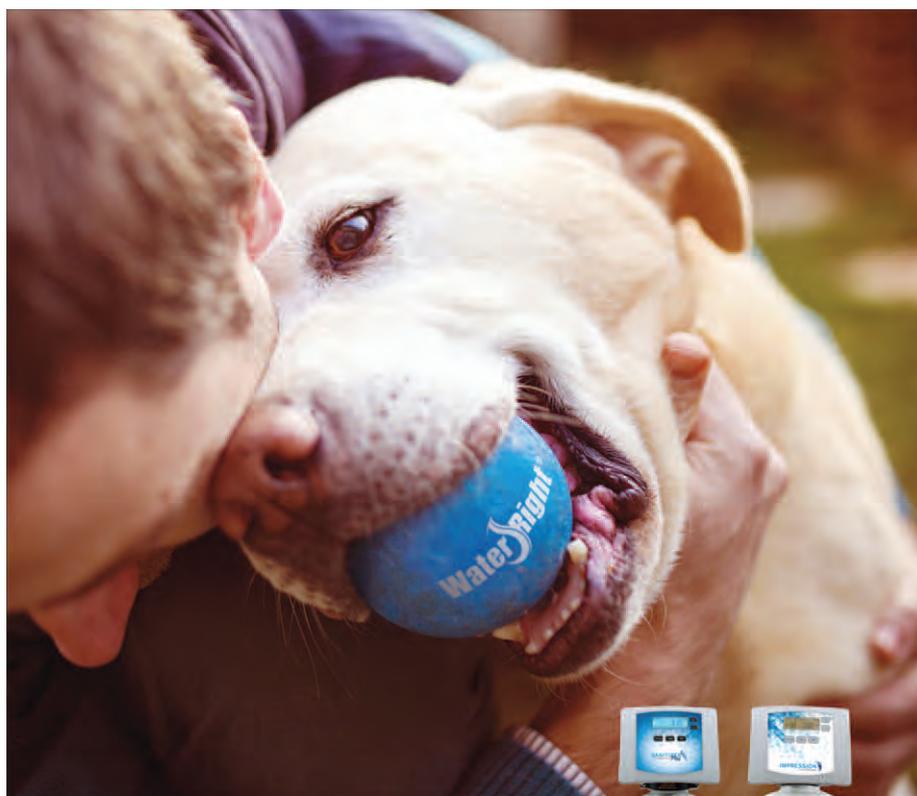


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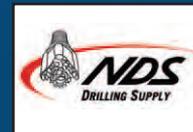


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# Moroccan Miners Tour U.S. Operations

Adapted from a Press Release by the Colorado School of Mines

Colorado School of Mines (CSM) Office of Special Programs and Continuing Education (SPACE) hosted 15 mining professionals from Office Chérifien des Phosphates (OCP) Group of Morocco during a weeklong tour of mining operations in Colorado and Wyoming.

Adjunct Professor William Wilson of the Mining Engineering Department guided the tour. The group from OCP toured different mining operations in both states to examine a wide range of mining and processing techniques. They hope to take the experiences from these locations back to Morocco to help optimize their own phosphate mining operations.



“Course participants that took the mine tour felt the visits to the underground, surface mines, and to CSM mining laboratories greatly reenforced much of the course content,” Wilson said. “Several participants noted they took away a greater appreciation of common experiences and problems among large mining companies, and discovered a number of topics related to possible applied research between OCP and CSM.”

Over the past year, SPACE and CSM faculty have delivered professional courses in geology, mining, processing, and sustainability to OCP employees, senior managers, and technical staff in Morocco. This is an ongoing collaboration between the school and Moroccan phosphate miners.



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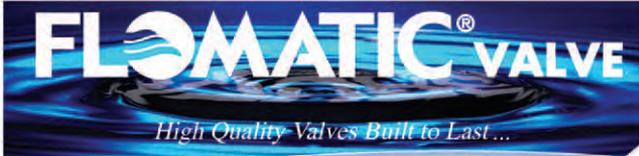
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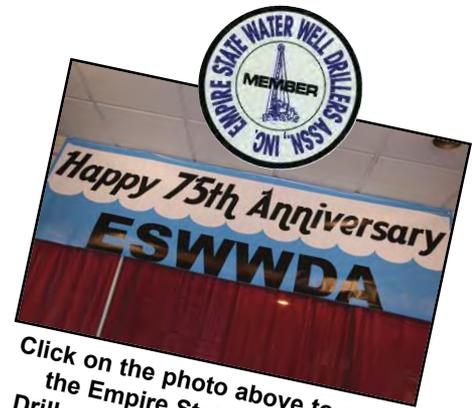
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# Competition to Address America's Infrastructure Problems

*Adapted from a News Release from the Association of Equipment Manufacturers*

The Association of Equipment Manufacturers (AEM) announced the Infrastructure Vision 2050 Challenge - a three-phased, crowd-sourced competition to award a total of \$150,000 in prizes for innovative ideas to overhaul the crumbling infrastructure Americans rely upon to move people, materials, products, services, and information.

## Infrastructure Vision 2050 Challenge



“The United States is the strongest and largest economy in the world and yet the overall quality of our infrastructure is falling dramatically behind our global competitors,” said Dennis Slater, AEM president. “AEM’s members thought it was time to break the cycle of patch-work fixes and deferred maintenance and lead the conversation in a different direction. We need to engage innovators who we haven’t heard from before and who have the ability to imagine how people, freight, energy, and information will move in the country of tomorrow - even as far out as the year 2050,” Slater added. “With

the HeroX crowdsourcing model, we’re confident we can bring these solutions to life.”

Open to everyone everywhere, the Infrastructure Vision 2050 Challenge will utilize the HeroX crowdsourcing model. “HeroX was founded on our conviction that the crowd - everyday people with great ideas - can and will solve the world’s most pressing problems,” said HeroX CEO Christian Cotichini. “The Infrastructure Vision 2050 Challenge moves the U.S. infrastructure conversation beyond traditional political channels for the first time and gives everyone affected by these issues a chance to voice their opinions and find solutions.”

According to The American Society of Civil Engineers’ 2013 Report Card for America’s Infrastructure, the U.S. received a combined grade of D+ for the condition of its infrastructure. The report cites the nation’s 70,000 structurally-deficient bridges; the fact 42% of America’s major urban highways remain congested, costing the economy an estimated \$101 billion in wasted time and fuel each year; as well as the estimated 240,000 annual water main breaks as examples for why rebuilding the country’s infrastructure is such a critical issue. The report further estimates it would take a \$3.6 trillion investment by 2020 to bring U.S. infrastructure up to exceptional standards.

Finalists and winners of the Infrastructure Vision 2050 Challenge will be determined by a judging panel and crowd voting. The first two phases have already been launched, and the third phase is scheduled to launch in mid-summer, 2016.

**Phase 1** - The Complain Phase will engage the public to describe the biggest infrastructure challenge facing their community. Entrants will be asked to submit the area of infrastructure they feel is the most opportune or pressing problem they see or have experienced.

Total Prize: \$5000 (10 finalists receive \$250; overall winner receives \$2500)  
Deadline to enter: **March 15, 2016**

**Phase 2** - The Dream Phase will seek to solicit new thinking and solutions, especially from nonexperts. Applicants will be asked to submit a proposed solution idea for the infrastructure problem they identified.

Total Prize: \$45,000 (5 winners receive \$9000 each)  
Deadline to enter: **May 31, 2016**

**Phase 3** - The Build Phase takes the second phase a step further and solicits plans to implement those solutions on a larger scale.

Total Prize: \$100,000 (Winner receives \$100,000)  
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## Geothermal Monitoring Online

by Peter Tavino  
Litchfield Geothermal

We installed temperature and electrical sensors at a new home with three, 500-foot boreholes I designed and inspected last year. The sensors are connected to Carrier 3-, 4-, and 5-ton split water-to-air heat pumps.

With a Gateway Internet connection to the homeowner's router, we can now see how all three heat pumps are performing at [GroundEnergySupport.com](http://GroundEnergySupport.com)

The images show the equipment and table set up in the basement to organize the 11 temperature sensors installed, plus the three electrical sensors installed.

Three sensors were placed on the three entering ground-loop water brass pipes at the heat pumps, and three at the return pipes. We were pleased to see readings in the mid-forties range in late January, although the basement floor slab does have propane-fired radiant heat. Three more sensors monitor when auxiliary propane hydronic heat in third stage is activated, and two sensors monitor the hot water desuperheater.

At a glance on a laptop or cell phone, one can see which heat pump is running and for how long. We noticed immediately that the desuperheater water entering the domestic hot water tank was at the same temperature as the water leaving the tank. So we are planning perhaps a buffer tank to better preheat the cold water instead. And although not monitored, the desuperheater leading to the spa is being investigated too. These concerns would never have been addressed if the monitoring had not told us the story.

While taking pressure readings across the coaxial heat exchanger, we noted the 5-ton flows were low, so we reset the circulator pumps to medium speed. Unfortunately, this reduced the flow to the 3-ton unit when all ran simultaneously. So the flows were all reset for optimal performance.

The floor plan diagram which I AutoCAD® drafted, shows the sensor identification numbers. It is a benefit to the homeowner who can better manage his system. The Ground Energy Support Team is extremely helpful in interpreting their diagnostic tools. I recommend this equipment for owners who literally want to know "What's Going On?!"

*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 [WDR](http://www.wdr.com).*

*Pete*

Peter Tavino may be contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)



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But what good is all that if you can't operate the machine? No problem here. This rig is "simple to run" and "very easy to learn," according to Buford Collier, Senior Project Manager for C&S Consulting in Kilgore, TX. He invited a consultant friend over to a jobsite while he was doing some geotechnical drilling. "This guy had never drilled a day in his life," he said. "After I spent about 15 minutes telling him about the controls, he worked with the machine nearly two hours as I called out instructions while I worked with the tooling. It was like a 'play day' for us! It's fun to run."

Fred McKay, Drilling Division Manager for EnviroTek in Tampa, FL, reports that they've increased their capabilities by five times. "We've been going through a formation that's high in clay, phosphates, and limestone. It's compressed and it's dense," Fred said, "But our 3230DT is going right through it." His field team is enjoying the rig. "We got up-to-speed on it really fast; it's easy to use."

"This is a great rig, and we're really pleased," Buford added, "but no one can beat your [Geoprobe®] support! I knew that going in to this machine purchase. I've run other drill rigs in my life, and no one treats us as good as you guys!"

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## Federal Coal Program Under Review

*Adapted from a Information by the U.S. Bureau of Land Management*

Coal has been an important domestic energy source for decades, and the federal government plays a major role in regulating U.S. coal production. Although federal lands supply roughly 40% of a U.S. coal production, current regulations and procedures governing the federal coal program are outdated and need to be reviewed.

In 1983 and 1984, Congress established a commission to investigate fair market value policies for coal leasing, and required a study of whether the coal leasing program was compatible with national environmental protection goals. The Interior Department followed these reports with a Supplemental Programmatic Environmental Impact Statement on the federal coal program which was completed in 1986.

Fast forward to March 2015, when Secretary of the Interior Sally Jewell called for an open and honest conversation about modernizing the federal coal program, and she launched a series of listening sessions across the country to hear from the public. As a result of the public sessions, Secretary Jewell is launching a formal, comprehensive review of the federal coal program. While the review is underway, Secretary Jewell has ordered a pause on significant new coal leasing decisions on public lands so the leases will benefit from the review. This review will take a look at issues related to the Bureau of Land Management's (BLM) administration of the federal coal program, primarily:

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- The appropriate leasing mechanisms to determine how, when, and where to lease.
- How to account for the environmental and public health impacts of the coal program.
- How to ensure the sale of these public resources results in a fair return to the American taxpayers, including whether current royalty rates should be adjusted.
- Whether U.S. coal exports should factor into leasing or other program decisions.
- How the management, availability, and pricing of federal coal impacts domestic and foreign markets and energy portfolios.
- The role of federal coal in fulfilling the energy needs of the United States.

The pause will not apply to existing leases or coal production activities. Based on current production levels, coal companies have approximately 20 years of recoverable coal reserves under lease on federal lands.

During this time, the BLM will not hold lease sales or process new lease applications for surface and underground coal. There will be limited, commonsense exemptions for small lease modifications (160 acres or less), coal lease exchanges, certain preference right lease interests, and emergency leasing as defined by the BLM's current regulations. Preparatory work on currently pending applications may continue, but the BLM will not make final decisions on new leases.



*Wyoming's Powder River Basin is the largest coal-producing area in the United States.*

This does not apply to metalurgical coal (used in steel production), renewals of existing leases, or other BLM, Office of Surface Mining, or Office of Natural Resources Revenue actions related to the federal coal program, such as mine plan approvals. The pause also does not apply to coal leases on tribal or allotted lands.

The Interior Department does not expect this pause to significantly alter current production since companies will be able to continue mining the large reserves of undeveloped coal already under lease. What do you think?

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# Environmental Monitoring

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



## Conserve Groundwater - A Finite Resource

In 2015, the western U.S. experienced a severe drought; many areas reached record low groundwater levels. As a result, many pumps had to be lowered and new deeper wells had to be drilled at considerable expense. Note: Yes, this is good for the drilling industry, but very bad in the long run for well drilling professionals - if we lower the water levels beyond the depth they can recover, we will not be drilling any wells.

In December 2015, the *USA Today* paper ran a series of very good articles on the overdrafting of groundwater in many areas around the U.S. and the world. Essentially, the articles said groundwater levels are "permanently falling" in many regions where groundwater is the main or only source of potable water available. Groundwater levels continue to decline in many areas because we are pumping water at a rate faster than the levels can recharge.

What can we do to slow this trend, or even reverse it? The first and easiest way is to conserve water - only use what we need. Waste not - want not. Let's face it; we waste a lot of water because it is generally plentiful and cheap. If a plant needs a gallon of water, it is easier to "overwater" and be sure. Besides, extra water will rarely kill the plant. How many gallons of water does it take to wash a car? Would 50 gallons surprise you? Do you wash your car on the grass so the excess does not run off and waters the grass also?

According to a recent study, the average person uses 50 to 100 gallons per day at home. A load of laundry is 43-51 gallons; shower - 5 gallons; toilet flush - 1.6 gallons. Other consumptive uses: milking cows - 35 gallons/day/animal, chickens - 9 gallons/day/100 chickens.

Agriculture has made great strides in reducing the amount of water needed for many types of plants and animals. Watering only the plant roots, drip irrigation systems, watering early in the morning or late at night to reduce evaporation, etc. These are important conservation measures.

Individuals, agriculture, industries, etc., we all need to be aware of our water usage and try to reduce our daily consumption of water. As the world's population continues to grow exponentially, we need to conserve water now - before the crisis is upon us.

*Tom*

Tom Kwader may be contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)




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## Water for Life International

by *Tim Rasmussen*

"Too much is always enough." I have noticed the truth of this statement many times. Usually, I think about it when I have gone to the store to get some material for a project and considering how much of whatever it is I need to buy. The memory of having to go back to town for just one more brick or board is clear enough to remind me to buy a little extra just to be sure I have enough.

This season, Water for Life (WFL) is sending two containers, as well as importing a container of literature for a Christian publisher. We will also send a large Chevy truck, donated by Bob Perry, and a heavy trailer. Gary picked up the truck in Utah, and it is in the process of being readied for the journey with new brakes, some tires, battery, new fluids, and various new filters and injectors. WFL has experienced drivers who will take the vehicle on the 4000+-mile journey early this spring.

This is also the first time we have tried to import any containers after a scandal last fall in Guatemala sent the vice president to jail on corruption charges and caused the president to be reelected by a landslide. The new government may mean changes in import policy, especially since the scandal involved bribing well-placed officials to allow the introduction of containers by certain companies without paying the proper fees and taxes.

It is my belief this problem may well make it harder and more expensive to import containers and equipment. At the very least, it will result in more scrutiny during the import process. In our experience, any increase in import procedures means an increase in fees. The import process has always seemed haphazard at best, and this will probably make it worse.

This year, Water for Life is testing the entire range of importation problems. We have one container full of our usual drilling equipment, one container of donated medical equipment for the government hospital, one container entirely of printed material, plus one heavy truck and trailer coming over land. This will be educational. Maybe we will learn we tried to do too much or it costs too much. Well, "too much is always enough." (I think this applies in education too.)

Thank you to all our supporters and volunteers. Without the Good Lord and you, none of what Water for Life does would be possible. Thank you again.

If you would like to help, contact Gary Bartholomew at 509-466-5075 or 509-939-1941

*Tim*

Tim Rasmussen may be contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)



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## Ronnie's Real World

by Veronica I.  
"Ronnie" Jones



This is truly quite the year for the *WWD* Team (family that is!).

As we roll into March, those we have visited with at the past 13 events across the world, have inspired us with their continued compliments of this YOUR magazine for the drilling industry.

Friends of many years have retired from the industry - a special one indeed is Leroy Goodson of the Texas Ground Water Association. This year saw his "second annual retirement party" surpass last year's "first annual retirement party". Some of us are just part of the industry we love and it is hard to say goodbye. The good news is, we will be seeing Leroy again at the **TGWA 2017** as he has agreed to handle the continuing education credits there. That makes my heart happy.

While visiting with some of the folks at these various shows, many subjects come up. Where is the industry headed? Will oil come back? What about the mining industry - what do you think? And of course, so pleased to see the water well drilling is springing ahead again! What amazes me however, is when some always talk the "almighty dollar". You can't take it with you!

As you know, *WorldWide Drilling Resource*® began to help the drilling industry. We started, and remain as a small company, just like you. This allows us to focus on you and your needs - your association's needs - your families and friends - and more. When I hear, "Ronnie, you know it's all about money", that really gets to me. Someone recently said to me, they limit their circulation because "it costs money to mail those things, you know". Sure it does, but *WorldWide* mails "those things". Why? We feel it is important to

reach those most interested in the drilling industry and to help our valued advertisers and associations who need to reach those in this industry, get the most coverage. *WorldWide*'s circulation is over 37,250 in North America alone! And now, *WorldWide* is available on your phone! To us, that is important. You are important.

That is why this *WWD* Team is traveling the world for you (some 24 events in the first four months of this year alone). Even though your plan may not be to reach those outside the USA, you may be surprised with what great relationships develop when you do. Relationships are what makes our lives fulfilled. So, I leave you with this, we are here for YOU!

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# bauma Media Dialog Highlights -



It is indeed a privilege to be asked by such a fine group at Messe München to cover their events. **WorldWide Drilling Resource, Inc.** is proud to have this honor and Marcel, our production manager who just happens to be from Germany, was right at home there. Here is his view of the event.

As I arrived in Germany, it was snowing as you can see by the photos I took with my phone and sent back to the office for posting on our Facebook Travel Page for all the world to see. The hotel was first class and left nothing to be desired - it provided everything, including a very great location - directly across from the event. Astonished at the number of bauma exhibitors who were eager to speak with us about their companies, products, and services, I returned to the United States with over 30 USB devices packed with information. The only problem

we have is the limited space available to print it all. But, you can believe me when I say, you **SHOULD ATTEND bauma 2016** this April and of course, look for the "red" jackets - because we will be there too trying to take it all in.

So, now on with the wonderful people and products you are so anxious to get a sneak preview about:

The room was filled with people eager to talk about the products they are planning to unveil at bauma 2016, April 11-17, in Munich, Germany. The first stop I made was to visit our friends at Atlas Copco where Anja and Marita talked about the new machine monitoring system the company plans to introduce at this year's event. They will also have the BenchREMOTE mobile control system and the SmartROC C50 drill rig on display. Then, I stopped to meet with Kelly and Zach with American Augers. They filled me in on the vast line of horizontal directional drills, surface miners, and augers they plan to bring to Germany. Talk about impressive! I moved on to the next table where I met Susanne with Hinowa. She filled me in on the company's new tracked minidumper (HS701) which includes a gasoline Honda engine that will be on display. When I ran into Sandra and Andres from Volvo, I could tell they were excited about something, and boy was I right. Volvo Construction Equipment has BIG plans for the event, quite literally! The company will reveal the largest machines they have ever manufactured in addition to more than 15 new product launches. The next person I met with was Horst with Furukawa Rockdrill. He was glad to explain the new crawler drill being introduced at bauma 2016. The new crawler will fill the gap between two existing well-known models and is sure to be a hit. As the event began to wind down for the first day, I ran into a couple of companies I wasn't familiar with, VMSSG and BBA Pumps. VMSSG products protect heavy machinery from fuel theft. The company also offers alarm and warning devices to alert drivers of potential obstacles. What a winning combination! BBA Pumps, a company based in the Netherlands, plans to unveil its dewatering units consisting of new 4-, 8-, 12-, and 20-inch pump units.

At this point in the evening, the Messe München staff changed into traditional Bavarian garb and prepared to transport us to a local brewery for the evening's festivities. I was fortunate enough to be on the first shuttle, so I missed the rush hour traffic jam. The Löwenbräukeller Brewery was stunning. Rich with history, this brewery has been around since 1883! What a beautiful setting for the evening. Soon, the room was filled with around 500 people. We were all treated to an evening of traditional Bavarian beer, food, and entertainment, we even got a visit from Elvis. The food was absolutely delicious and everyone seemed to enjoy the Schuhplattler dance, as well as the wood chopping show!



# WWD R Exclusive

Day two proved to be equally as busy as the first day. One of the most interesting tables to me was with the company, Protos. They have unique safety helmets available with all sorts of unique options including attachments for prescription glasses, different shields, and colors. When I stopped by the Vermeer table, Zahid and Gerald filled me in on the numerous additions to their selection of horizontal directional drills and other pieces of equipment which will be on display at the event. Meeting Dr. Köcher and Steinborn of ThyssenKrupp Infrastructure was very interesting as well. They explained the new Krupp Vibro Drill the company is planning to show off. This new drill was created to help drilling professionals drill deeper without losing power by using a combination of rotation and vibration at high frequencies. Terex Trucks was my next stop and Paul described the company's recent product renewal program. The first fruits of the program will be presented to bauma 2016 attendees. Parker Hannifin had a couple of tables at the event. I was fortunate to meet Anton, Manfred, Nicola, and Marco who took the time to enlighten me on the technologies the company offers for control of mobile equipment hydraulics. It was a very intriguing conversation!

After lunch, I continued my trek through the two floors of exhibitors beginning with Ruth and Verena from BAUER. The company is very proud its MIDOS (mixed drilled offshore steel) technology has been nominated for the 2016 bauma Innovation Award. They also plan to feature a hands-on display at their booth with a model construction site for diaphragm wall technology in addition to showing off the company's foundation drill rigs. I then spotted the folks with Doosan Portable Power. They shared the company's plans to launch new generators meeting EU stage IIIA engine emission regulations at bauma 2016. Case Construction Equipment touted its new backhoe design with in-line cylinder geometry for the 580ST model, so keep your eyes open for this new addition! Making its international debut, DRESSTA's five new fuel-efficient models, including compact dozers and mining dozers, will be on site. As I sat down with Eva from Brokk, I noticed 2016 is the company's 40th anniversary! As if that wasn't enough to celebrate, the company will be highlighting its tunneling machinery at the trade fair. What about tires? I guess I never thought much about construction and mining equipment needing tires, but BKT does. Their earthmoving and construction tires will be on display. Hatz Diesel plans to unveil a new three-cylinder engine in addition to its complete line-up for industrial engines. Andrea from Ischebeck had information about the company's latest geotechnical products. Look for Ischebeck's TITAN injection pile, which will be presented at this year's event. Kögel plans to bring the Kögel Multi, a versatile trailer for building materials transportation to the show. At long last, I was able to get to the Cummins Emission Solutions table. It had been one of the busiest tables at the event, so I was eager to find out what was causing so much of a crowd. Despite being busy all day, Tim and Samantha enlightened me on the product premiering at bauma 2016. It's called the Single Module™ and it is a high-efficiency aftertreatment system which offers improved system efficiency and emissions reduction.

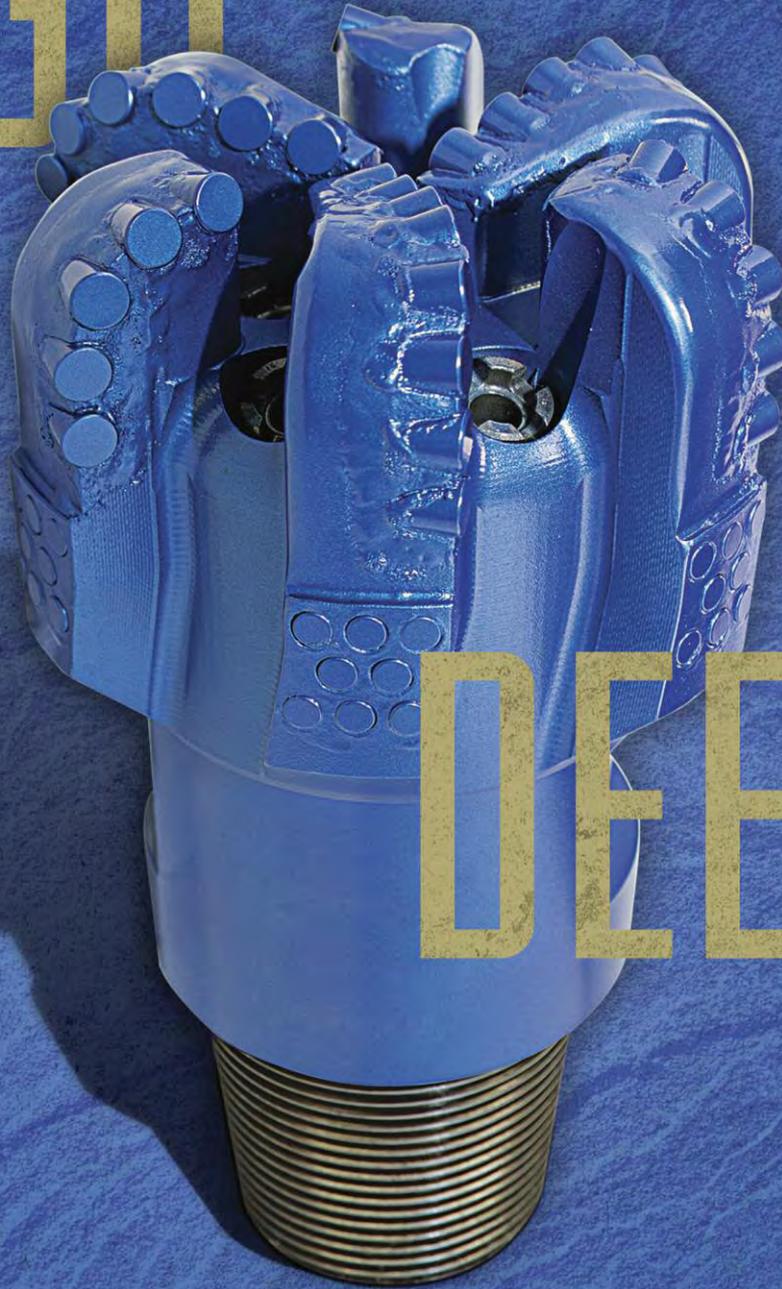
As the media dialog event came to a close, I realized I was simply given a glimpse of what will be in store for attendees at bauma 2016. With more than 3400 exhibitors, this year's event is poised to be the largest trade fair in the world for construction machinery, building materials, mining machines, as well as construction vehicles and equipment.

I'd like to send a special thanks to the fine folks at Messe München, they did a grand job as always!

Make plans to attend this triennial event and you will be amazed at all the wonderful people and companies you will meet. bauma is the perfect place to find solutions for your business. No matter how large or small your company is, you are sure to find what you're looking for. The *WWD R* Team looks forward to seeing you at this massive trade show.



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# Preparing for Your Workers' Comp Audit

by Kyle Rehme  
VolkBell Property & Casualty Insurance, LLC

*Kyle Rehme uses his personal knowledge of the water well, drilling, and environmental industries to provide customers with practical insurance solutions.*

overtime payroll summarized before the auditor's appointment. In most cases, the auditor will use the information you have pulled together ahead of time. As long as your numbers match up with payroll records and W-2's you'll be in good shape.

**Set appointment that meets your schedule** - Don't let the auditor set a date and time that will not fit your busy schedule. Audits can take several hours and it's important you stay with the auditor throughout the process.

**Proper representation of classifications** - Make sure your exposures are correct. If an employee works 10% of the time in one class and 90% of the time in another class, even if the lower rated class is where most time is spent, the auditor can charge 100% of the time to the higher rated class. Placing each employee in the proper class is important. If you're not sure what classes to be using or where employees should be classified, consult your agent.

**Owner payrolls** - If an owner is included on the workers' comp policy, then the payroll for the owner is based on a fixed minimum/maximum figure. There is no need to report owner payrolls in addition to the employee payroll. The minimum/maximum varies depending on which state you reside in. Questions about this should be directed to the auditor. Owners need to keep a copy of the signed form which either includes or excludes them from the policy. If the auditor has any question about whether to charge owner payroll, the proof will be in the pudding.

**Overtime** - Make sure you adjust payrolls, deducting the "bonus" pay from any overtime.

**Certificate of insurance** - Make sure you have certificates of insurance from all subcontractors. Payments made to subcontractors without an insurance certificate could be charged to your payroll.

**Worksheet** - Be sure to ask the auditor for a copy of the audit worksheet. Review and maintain this for your files.

**Audit corrections** - Did you know you can request a review of your past audits? If you believe you were overcharged during a past audit, you have the right to request a corrected audit to get your money back.

Your agent should help you review the final audit for accuracy. The workers' comp audit should be compared to the current policy and to the general liability audit. It is important to compare payrolls and classifications for accuracy between the workers' comp and general liability. Additionally, the agent should make sure the experience modification is being applied correctly.

*Kyle*

Kyle Rehme may be contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)

Last month, we talked about controlling workers' compensation (comp) losses and claims. It is also important to be prepared for annual audits of your workers' comp policy. Preparing ahead of time for an audit will save you time and money, which are both valuable commodities.

**Prepare for the auditor** - Staying organized throughout the year is your first step. Make an effort to pull payroll reports, classification divisions, certificates of insurance, and have

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# Drilling Into Money Not Boring

by Mark E. Battersby

## Tax Savings from Another Late Law

The new "Protecting Americans from Tax Hikes (PATH) Act of 2015" retroactively extends over 50 temporary provisions. Although many of those extenders are merely extensions expiring provisions, more than a few contain modifications. In most cases, these key extenders are retroactive to January 1, 2015:

**FIRST-YEAR WRITE-OFFS:** The so-called "Section 179" deduction allows a drilling business an up-front expense deduction for the entire cost of equipment ranging from computers to furniture to vehicles and machinery. The amount allowed as a write-off in the first year (instead of slowly deducting or depreciating over several years), is now permanently fixed at \$500,000 per year (phased out dollar-for-dollar as expenditures begin to exceed \$2 million in a year).

**A BONUS WRITE-OFF:** Bonus depreciation, which permits the immediate deduction of any business equipment expenses rather than a depreciated tax benefit over time, has been extended at the former 50% rate for the 2015-2017 tax years, phased down to 40% in 2018 and 30% in 2019.

**ENERGY-EFFICIENT COMMERCIAL BUILDINGS:** The new law extends through 2016 the above-the-line deduction for energy efficiency improvements to lighting, heating, cooling, ventilation, and hot water systems of commercial buildings.

**THE WORK OPPORTUNITY TAX CREDIT:** PATH retroactively extended and greatly expanded the Work Opportunity Tax Credit (WOTC) through the 2019 tax year. The WOTC allows employers who hire members of certain targeted groups to get a credit against income tax of a percentage of first-year wages up to \$6000 per employee (\$3000 for qualified summer youth employees). In situations where the employee is a long-term family assistance (LTFA) recipient, the WOTC is a percentage of first and second year wages, up to \$10,000 per employee.

**CADILLAC TAX:** The so-called "Cadillac" tax on the high-cost health insurance plans so many drilling business owners provide themselves and key employees will be delayed from 2018 to 2020. This means businesses offering employees expensive health insurance will not have to pay the 40% Cadillac tax for those plans until 2020.

Whether maximizing write-offs for 2015 or planning to reap all the benefits your business is entitled to in the years ahead, thanks to the complexity of the new law, professional assistance may be required. Which of the provisions of the PATH Act of 2015 will best help your drilling operation or business reap its share of the \$622 billion in tax savings?

*Mark*

Mark E. Battersby may be contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)



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## Measuring "Real-World" Events

by Britt Storkson  
Owner, P2FlowLLC

In electronics, when we say "real-world" events, we don't mean national news or political events. We mean events we would like our electronics to monitor and respond to. We could call these events voltage, current (amperage) temperature, force, pressure (force over an area), proximity, light (both visible and invisible to the human eye), sound, smell, and the presence of or absence of certain chemical elements, such as oxygen or carbon monoxide.

All of these events must be converted to a voltage the microprocessor can read or measure as an input. This input is called a signal. Some inputs like voltage and current are easy to measure. A voltage signal can be directly read by many microprocessors. Current flow (amperage) is simply a voltage across a resistance. All of these real-world signals are varying voltages, which are called analog voltages.

Other events are more complex and require sensors that convert the real-world event into a voltage to be read by the microprocessor. Pressure sensors, for example, convert force across an area into a voltage that can be read by the microprocessor then the information is used to make decisions based on the microprocessor program.

The sensor voltage output can be directly proportional to the signal applied to the sensor. This means, using a light sensor for an example, if we double the amount of light hitting the sensor, we double the voltage the sensor outputs. Or the sensor voltage output can be inversely proportional...meaning if we reduce the light output by half, the voltage output of the sensor will double.

The microprocessor can use this information in either form if the microprocessor program is written correctly to interpret it. To make a light sensor, we would determine at what brightness (or lack thereof) we wanted the light to turn on. This is done by measuring the voltage at the turn on point. Likewise, to turn off the light sensor we would measure the voltage we wanted our microprocessor to turn off the light at.

Internally, the microprocessor is constantly measuring the voltage the sensor outputs. This analog voltage is converted into a digital "word" the microprocessor can use. This is done with an analog-to-digital converter. Simply put, the higher the voltage measured by the microprocessor, the larger the digital word that is converted. Conversely, the lower the voltage measured by the microprocessor, the smaller the digital word that is converted.

In the microprocessor program we compare the measured voltage with the voltage value we want the microprocessor to "trip on" at, as well as another voltage value we want the microprocessor to "trip off" at. There's usually a "deadband" between them where we don't want the microprocessor to do anything. This greatly improves stability because the microprocessor output isn't rapidly switching on and off. Also, time delays are almost always used with this application, again for stability reasons.

Most microprocessors make several thousand decisions per second and can switch off and on rapidly without these time delays, and we don't want that. For optimum stability, the voltage signal is measured again and again with a short time delay between measurements. All of the voltage measurements must be above or below the desired trip point after many measurements or the microprocessor won't react to it.

We call these measurements "samples" and we count the number of samples we do before making a decision. The greater number of samples, the greater the stability, but the trade-off is slower reaction time. Nearly everything a microprocessor reacts to coming from the "real world" is filtered this way. Even switch presses have delays built into them. We want the switch to react with a deliberate press, but not react because of an unintentional bump.

While simple and inexpensive, these voltage measurement routines are very powerful and allow us to have an unprecedented "view" of the world around us. They can also make decisions and respond appropriately to most any condition.

*Britt*

Britt Storkson may be contacted  
via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)

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# Smart Machines to be Highlighted in 2017

Adapted from a press release from Veronafiere



The future of construction machinery is increasingly “smart”. The 2017 edition of SaMoTer, the Triennial International Earth-Moving and Building Machinery Exhibition in Verona, Italy, will focus on protection solutions for the environmental and hydro-geological risks, with special reference to intelligent machines - hybrid low-emission and high-efficiency machines.

“It is very important,” said Luciano Rizzi, agriexpo & technology area manager, “that we presented SaMoTer 2017 in an international and specialist context attended by the most important sector companies, as well as having identifying topics and sectors in perfect harmony with the development of European industry in this field, where all involving construction equipment will be represented during the 30th edition of SaMoTer: earth-moving, concrete, drilling, crushing, lifting, vehicles and components... in Verona.”

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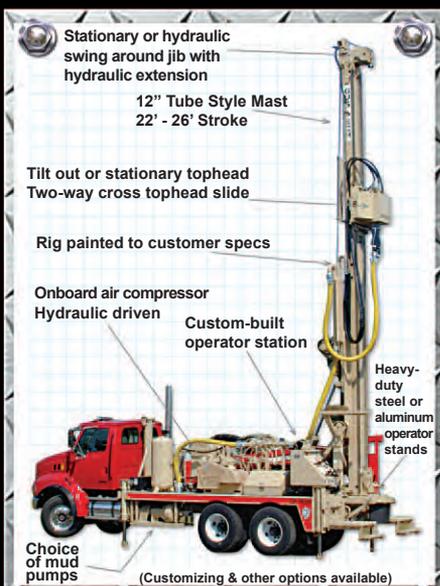
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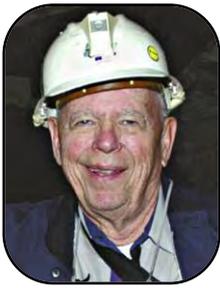
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*March is  
Aquamarine  
by Harry W.  
Short,  
Engineering  
Geologist*

Aquamarine, the blue or blue-green mineral related to beryl is the traditional birthstone for March. Pale-green beryl is called aquamarine, and when colored dark green it is called emerald. The name aquamarine was derived from two words, *aqua* meaning water and *marine* referring to the ocean since its color resembles seawater. Some gem aquamarines are often heat treated to produce the popular blue/green colors from less desirable yellow or pale gems. In biblical times, the emerald signified Saint John the Evangelist.

Aquamarine gemstones are a variety of beryl composed of beryllium, aluminum, and quartz which crystallizes in the hexagonal system. It has poor cleavage in one direction, a conchoidal fracture, an index of refraction of 1.57 to 1.6-0, its hardness is 7.5 to 8.0 on the Moh's Hardness Scale, and a specific gravity of 2.6 to 2.8. It has a vitreous luster and a conchoidal to uneven fracture.

Beryl and its associated minerals are commonly found in granitic rocks and pegmatites. Aquamarine is sometimes found in large groups of many clusters of prismatic crystals having the same alignment. The crystal striations are commonly parallel to their long axis and six-sided crystals of aquamarine are common in pegmatites. It also occurs in a glassy form without showing a crystalline structure, and often has small holes and odd shapes. One beryl crystal, 18-feet long, was recorded in the *Complete Book of Rocks and Minerals* by Chris and Helen Pellant, in 1995. Another crystal, 14-feet long and weighing 18 tons, was found in Maine. See *The Rock Book*, 1956 (paperback 2003), by Carroll and Mildred Fenton.

The best aquamarine today comes from Brazil, where it occurs in large crystals in a very clear condition. Pakistan and many U.S. localities, produce wonderful specimens as well. Mines in China have produced large numbers of excellent, flat-stubby crystals. Other countries producing aquamarine include Columbia, Madagascar, Russia, and Brazil. Notable aquamarine areas in the U.S. include North Carolina, New Mexico, the Black Hills in South Dakota, and several New England states.

The light-bluish color of aquamarine arouses a strong feeling of sympathy, trust, harmony, and friendship. Women love this gem because its colorful shades complement most any skin or eye color. It has been said aquamarine promises a happy marriage and brings joy and wealth to women who wear it.

*Harry*

Harry Short may be contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)



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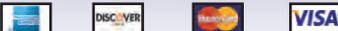


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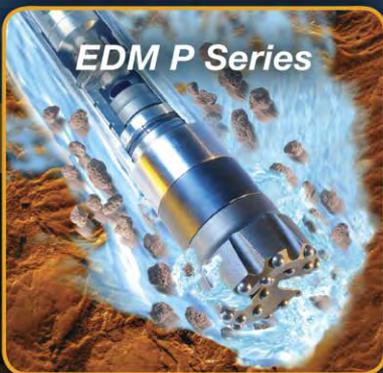
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## Oil/Water Exploration

by Harold White

When I was in grade school, in the weekly paper there were writings of the polar ice melting faster and faster, as the polar ice cap got smaller and smaller. In the near future, the people will become alarmed and blame everything and everybody, and it will be exaggerated and made into a fearsome thing.

This is what is happening. The global warming is blamed on everything from car emissions to smoke stacks, to house smoke, to energy, oil, etc., and it all transforms into profit from it - permits, licenses, fines, etc. Just like the little science reader said when I was in the fifth grade in 1949.

Global warming is not a new thing, it has been happening for thousands of years, ever since the last ice age. A moratorium has been put on the well drilling in Burns, Oregon, and places in some of the other states. We, the drilling contractors can drill for farmers who have a permit to drill. No new permits are being issued to the farmers for irrigation for fear of depleting the water resource in that area.

The meeting held in Burns by the state water resources department was saying the rain in the area determines how much water can be pumped out of the ground without it depleting the reserve.

I asked a few questions of one of the drilling professionals which I have long known the answer to. I asked when you drill a well, where does the water come from - a reserve, lake, or creek? They said a creek.

How wide might a creek be? Not very wide - 15 feet, maybe 20.

How fast do you think the creek is running, slower or faster than what you are pumping? Faster.

How do you know? We have a 40-foot drawdown and the creek was hit at 200 feet.

Where do you think the creek is going? It finds its way to the ocean and completes its water cycle I would think.

Have you ever thought it may go on down and come back up as steam or gas, hydrogen, and oxygen? No, I haven't thought of that.

What is a water reserve? They thought for awhile and said the ocean. I said that is the reserve for the water cycle.

What is the reserve the water resources department is trying to protect?

*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 **WWD.R.***

*Harold*

Harold White may be contacted via e-mail to [michele@worldwidedrillingresource.com](mailto:michele@worldwidedrillingresource.com)

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## The Un-Comfort Zone II

by Robert Evans Wilson, Jr.



### Loving Yourself ~ A How-To Guide

Over the years, I have beaten myself up over business breakdowns, lost relationships, and countless other failures. I would only look at what I had done wrong and where I was at fault. And, of course, this would only make me feel worse. People would tell me, "Rob, you need to love yourself." Wow, that sounded great, but the problem was I didn't know what it meant. I knew they didn't mean I should be self-absorbed or narcissistic. I also knew it didn't mean soothing myself with several shots of whiskey. I understood how to love others - at least the feeling that made me want to give attention, caring, respect to someone - but feeling it for myself? I was completely confused on where to even begin. It took me years to learn, but I finally did; and I would like to share with you what I found.

**Acknowledge Your Gifts and Talents.** Whether you realize it or not, you have knowledge and skills other people do not have. Work with your strengths. Find ways to share these with others for fun and fortune.

**Be True to Yourself.** I've written about this before. Pursue your passions. Find work you genuinely enjoy. When you do what you love, you will be so fulfilled you'll never again watch the clock in anticipation of quitting time. Also, by following your own interests, you

will attract people who share your excitement, dedication, and joy.

**Focus on the Positive.** Eliminate your bad habit of only focusing on the negative aspects of your life because it makes those things seem disproportionately important. I have friends who are police officers, and I see how their constant dealing with criminals has tainted their view of people and tends to make them see nearly everyone as bad. Make a habit of observing the good things in your life every day.

**Correct Negative Self-Beliefs.** Self-perception will affect the outcome of your pursuits and can determine success or failure. Henry Ford said, "If you believe you can or believe you can't; you're right." A positive self-belief will produce confidence and success. A negative self-belief in our abilities will make us flinch in the moment of opportunity. Often, we unconsciously broadcast our self-belief which affects the way others perceive and treat us. A hindering self-belief of "I am not good enough" can be resolved with positive affirmations, visualization, and tallying up your successes regardless of size.

**Carefully Choose Who You Spend Time With.** You may not have a choice who you work with, but you definitely choose your personal relationships. If you're spending your free time with abusive people, then you are abusing yourself. Spend your time with loving people who are not judgmental. Pick friends who are supportive, caring, and accept you for who you are.

**Don't Take Crap from Anyone.** If you find yourself with someone who is disrespectful to you, let them know you do not appreciate being treated that way. If they continue, simply remove yourself from the situation. Don't allow jerks to ruin your good feelings.

**Own Your Feelings.** People would tell me to "feel my feelings." Again, another concept I had difficulty understanding. The trick is to acknowledge your feelings, and understand they are normal. If you feel like crying - find some privacy and cry. Work to understand why you feel as you do. Don't numb your feelings with drugs or alcohol.

**Don't Judge Yourself Because You Have Feelings.** Having feelings is normal. You should not feel guilty about them. If you have to cry, it does not make you less of a person.

**Learn What Your Feelings Are Telling You.** Your feelings are communicating important information to you. Just like physical pain tells you when you have an illness or an injury, emotional pain is telling you something you are doing is not right for you.

**Take Care of Yourself in All Areas.** Eat well, exercise, get proper rest. Maintain a clean and uncluttered home and work environment. Spend money within your means. When your health, home, and finances are in order, not only do you have less to worry about - you are sending a constant positive message to yourself that everything is okay.

*Robert*

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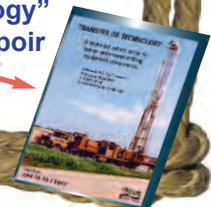
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# Geothermal System Exceeds Expectations

*Adapted from a News Release by Missouri University of Science and Technology*

After the first year of operation for Missouri University of Science and Technology's (Missouri S&T's) geothermal system, university officials have announced the system has exceeded its projected impact.

Missouri S&T broke ground on the geothermal energy project in 2012. Consisting of 789 wells, 400-440 feet deep, the wells supply three regional plants, each with 500-ton capacity, plus a geothermal system for the Gale Bullman Building. This project involved a complete reconstruction of the chilled water system and required the placement - or replacement - of 125 miles of pipe in the ground.

Nearly a mile of domestic water mains were replaced, which according to James Packard, director of facilities operations at Missouri S&T, eliminated underground leaks, and boosted the overall water savings for the last year to 30 million gallons, or over 35% of the campus use.

Missouri S&T's geothermal energy system, which allows energy to be stored in and reclaimed from well fields located throughout the campus, provides heating and cooling to 17 buildings on campus and chilled water to the majority of campus buildings. It consists of four separate plants which distribute energy from the system to different areas of the campus.

"The results confirm that the system works as designed and will pay for itself over time from budgeted savings," said Packard. "This project and follow-on projects eliminated over \$60 million in deferred maintenance, a more than 25% reduction in the \$220 million deferred maintenance backlog the campus had before the project began."



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The geothermal system was expected to cut the university's annual energy use by 50%; however, Missouri S&T saw a 57% reduction in energy use at the end of the first year of the system's operation. The university expected to reduce its carbon footprint by 25,000 tons per year, and Missouri S&T exceeded that goal by 13 tons. The geothermal system was expected to reduce Missouri S&T's water usage by over 10%, or 10 million gallons per year. Actual water usage was cut by 18.7 million gallons.

Last April, Missouri S&T's geothermal energy system received a first-place Chapter Technology Award from the St. Louis chapter of the American Society of Heating, Refrigeration and Air-Conditioning Engineers.

# Time to Restore America's Water Infrastructure

Compiled by Amy White, Associate Editor, *WorldWide Drilling Resource*®



In the U.S., there are roughly 16,000 wastewater systems, encompassing about 740,000 miles of public sewers and 500,000 miles of private lateral sewers. Unfortunately, some elements of these systems are well over a century old. Due to age, neglect, and accidents, nearly 50,000 sanitary sewer overflows occur every year, followed by illnesses and negative impacts on the environment. According to the Environmental Protection Agency (EPA), as much as 10 billion gallons of raw sewage is leaked yearly from poorly functioning systems across the country.

The latest infrastructure report card issued by the American Society of Civil Engineers (ASCE) gave a "D" grade for both wastewater and drinking water infrastructure. ASCE indicated leaking pipes lose an estimated seven billion gallons of clean drinking water every day.

The EPA has initiated a research program to help utilities renew water distribution and wastewater collection systems. As part of the program, a state-of-the-art review of current and emerging renewal technologies such as cured-in-place pipe (CIPP) is taking place.

Some water experts say the country's aging and failing infrastructure is threatening national competitiveness. "A world-class economy needs world-class infrastructure," said Ben Grumbles, president of the U.S. Water Alliance.

ASCE introduced a new phone app to highlight the importance of infrastructure to the economy, and recognize great strides being made to prioritize investment and renewal of water pipes, roads, bridges, and more. The *Save America's Infrastructure* app gives insight into America's aging utilities, and provides a way to take action with a direct link to contact elected officials and voice concerns. Features of the app include state statistics for crucial infrastructure categories (such as wastewater and drinking water), along with Report Card grades for each state where applicable. Visit [blogs.asce.org](http://blogs.asce.org) for more information about the app.



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# In Memoriam

## Lynn Douglas Bartholomew (1946~2016)



The *WWR* Team was saddened to hear of the sudden, accidental death of Lynn Bartholomew on January 4, 2016.

Lynn Douglas Bartholomew was born in Spokane, Washington, on June 26, 1946. In 1954, Lynn was introduced to well drilling with cable tool rigs as a young boy when his dad Daryl started the family business of Bartholomew Drilling. In 1968, Lynn received his first well drilling license; he was number 28 to do so in the state of Washington.

He graduated from Upper Columbia Academy and continued on to receive a degree in aircraft mechanics from Spokane Community College. After serving in the military during the Vietnam era, and a brief time using his aircraft mechanics degree in Alaska, he returned to Spokane to join his dad in the drilling business, just in time for the company's upgrade to rotary drilling. Always up for a challenge, Lynn jumped right into the transition.

After his term in the military, Lynn's brother Gary also joined the family business. Lynn and Gary's dad later retired from drilling and Lynn specialized in hydro-fracturing and well rehabilitation from then on.

Lynn was licensed in cable, rotary, and auger drilling. His experience included domestic, environmental, irrigation, and municipal drilling in the United States, as well as international drilling in India and Guatemala.

In 2003, Lynn worked with his brother Gary and nephew Rod to establish Water for Life International, a nonprofit organization to drill wells and provide clean water for villages in Northern Guatemala. He was active in the organization until 2010.

Certified with the National Ground Water Association (NGWA), Lynn held drilling licenses for Washington and Idaho, and was a member in each state association. He was known for his zest for life, honesty, big voice, smile, along with his friendly and caring ways. Those fortunate to know Lynn personally, said he had an incredible mind for envisioning how things worked belowground, and for coming up with solutions to situations which were out of the norm. He was owner/operator of Northwest Hydro-Fracturing for the past 30 years.

Lynn Douglas Bartholomew is survived by his wife of 46 years, Kathie; children Jeff (Carolyn), Janell (Paul), Sangi (Paul), and Dan (Ann); nine grandchildren; brother Gary (Angie); sister-in-law Carol; brother-in-law Ron (Marian); six nieces and nephews, other extended family, as well as countless friends.

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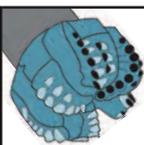
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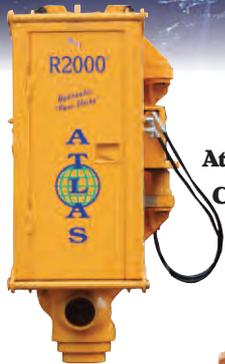
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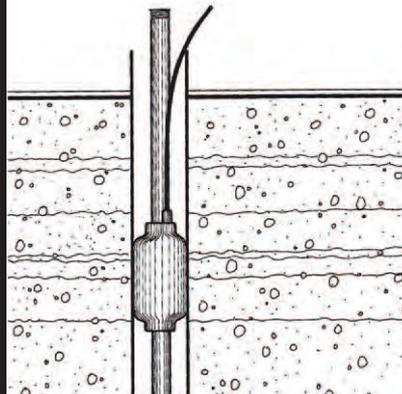
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