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ASSOCIATION, INC.**

*Providing & Protecting
Wisconsin's Groundwater*

WELL LOG

A PUBLICATION OF THE WISCONSIN WATER WELL ASSOCIATION

Spring 2019

IN THIS ISSUE

Letter from the President.....	1
Board of Directors.....	2
WPWS Report.....	2
Executive Director's Message	3
Lobbyist Report: Government Relations Update.....	4, 7
WWWA Board Visits the Capitol.....	7
WWWA Update.....	8
Vice President Downhole Humor.....	8
Proposal for a Session Form.....	9
2020 Wisconsin Groundwater Conference Call for Presentations	9
Scholarship Form	11
Conference Sponsor Spotlight.....	12
Manufacturer Spotlight.....	12
The Baraboo Ranges: Drilling Wells in the Baraboo Ranges.....	13-16
Marketing Matters	17
Loss Control Insights: Are Your First Aid Kits Up to Snuff?.....	18-19
WWWA Newsletter Advertising Rates	19
Water Quality Update	20
Member Listing	22-26
In Memoriam: James Meyers.....	27
WWWA Calendar of Events.....	28

LETTER FROM THE PRESIDENT

By Rick Peterson, WWWA President

Greetings everyone,

After every WI Groundwater Conference, I am always extremely proud of the Board of Directors, Conference Committee, WWWA members and staff who volunteer their time to put this event together. Although in the middle of winter and during our slowest season, the conference never fails to provide inspiration and motivation to all attendees.

However, as much as I enjoy and appreciate the camaraderie, I know that there is always an opportunity to make it better. As we enter our busiest season, I'm trying to keep this in mind.

Throughout the years, educational sessions have always been a point of contention. The concern we hear most often from attendees is relevancy. As a result, the Conference Committee is working to provide more specialized educational sessions across two days at the 2020 annual conference.

The WWWA is currently seeking speaker proposals for our 2020 continuing education sessions. Please email any class or speaker suggestions to info@wisconsinwaterwell.com.

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • Water Well Drilling Codes & Methods • Water Well Filling & Sealing Code or Methods • Heat Exchange Drilling Code or Methods • Heat Exchange Drilling Filling and Sealing Codes or Methods • Complying Well Locations • Pump Installations Codes or Methods • Existing Installations Code or Methods | <ul style="list-style-type: none"> • Property Transfer Well Inspections • Water Sampling Code Requirements • Water Sampling Procedures • Groundwater Quality or Contamination • Disinfecting Wells & Water Systems • Geology or Hydrogeology • Water System Maintenance • Water Quality and Health • Drilling Technology | <ul style="list-style-type: none"> • Water Treatment • Safety for Drillers • Confirmed Space Entry • Trenching Safety • Laboratory Testing Procedures • Annular Space Seals Code or Methods • High Capacity Well Construction • High Capacity Pump Installation • Heat Exchange Calculations • Heat Exchange Systems |
|---|---|--|

The WWWA will continue improving our class selections but we cannot do it without your help. Please consider submitting a proposal or suggestion for a session. The form can be found on page 9. 💧

Enjoy and be safe,

Rick Peterson, Clean Water Testing
920-841-3904, rick@water-right.com



Find us on

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WPWS REPORT

By Jeff Beiriger, WPWS Executive Director

WPWS Elects Directors, Officers for 2019

Congratulations to the following who were elected/reelected to a two-year term (2019-2021) as a Director of the WPWS during the association's Annual Meeting in January:

- Tom Beran (Preferred Pump)
- Scott O'Brien (Pentair)
- Wyatt Buttke (First Supply)
- Marty Taylor (Burton-Anderson)
- Jerry Ellis (Rundle-Spence)
- Perry Will (Rep-Rite Burk)

Congratulations also go to the following who were elected/reelected Officers for 2019:

- Tim Nelesen (Franklin Electric) – President
- Perry Will (Rep Rite Burk) – Vice President
- Ben Longenecker (JFL Marketing) – Secretary/Treasurer

WPWS Holds Spring Golf Outing, Raises Additional Money for Uganda Well

The Wisconsin Pump & Well Suppliers held its Spring Golf Outing on Tuesday, May 14 at Trappers Turn in Wisconsin Dells. Following a box lunch, 47 golfers took to the links on a gorgeous Spring day. When the round was over, the results were:

First Place (-9)

- Rob Spence
- Perry Lemon
- Joe Baron
- Dan Krecklow

Average Score (Even)

- Jamison Seuser
- Alan Smith
- Jayson Cratsenberg
- Jake Reddiker

High Score (+14)

- Natasha Johnson
- Terry Marshall
- Dana Marshall
- Tara Schessler

Flag Events were won by the following:

- Rob Gingles
- Mike Callaway
- Ryan Bailey
- Lucas Antonioni
- Steve Tesmer
- Mike Abel

When the final tally is done, the event will raise more than \$2,000.00 toward the construction of another well in Uganda.

WPWS Announces Fall Golf Outing Dates for 2019, 2020 & Clays Event

The Wisconsin Pump & Well Suppliers will host its Fall Golf Outing for 2019 at Trappers Turn in Wisconsin Dells on Thursday, September 19. The Fall Golf Outing for 2020 will also be held at Trappers Turn, September 17, 2020.

In the Spring of 2020, the WPWS will be hosting a Sporting Clays event at Triple J Gun Club in Brillion. The exact date of the event is still to be determined. Stay tuned for more information! Like the golf outings the association holds, the sporting clays event will serve as a fundraiser for the group's well construction projects. 💧

EXECUTIVE DIRECTOR MESSAGE: YOUR VOICE MATTERS!

By Jennifer Rzepka, CAE, WWSA Executive Director

Attend Groundwater Week 2019 and Serve as a Member of WWWA's Delegation

The National Ground Water Association (NGWA) State Affiliate Organization Program provides a vital link from the national level to the grassroots level of the groundwater industry, and in turn the State Affiliates help drive and guide the national organization through involvement at the Annual Business Meeting on Wednesday evening of Groundwater Week (GWW).

All GWW attendees are welcome and encouraged to attend:

- Hear the 'state of the state' update by NGWA and the Groundwater Foundation;
- Participate in the elections of national leadership;
- Vote on any bylaws changes;
- Represent Wisconsin at the national level.

Up to ten (10) attendees from Wisconsin will be identified to sit at the Delegate table and vote on behalf of WWSA in decisions made at GWW this year. Please sign-up today to attend, and let the office know if you'd like to be identified as one of the WWSA Delegates in 2019.

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Groundwater Week 2019

December 3-5, 2019

Las Vegas Convention Center

3150 Paradise Road, Las Vegas, NV 89109

Registration

Conference registration includes all workshops, scientific sessions, networking events, and exhibit hall.

Rates on or before November 1, 2019

- NGWA member or member's spouse — \$175
- Non-member or non-member's spouse — \$300
- Student — full-time (ID required) — \$75
- First person from non-exhibiting mfg company — \$1,200
- Additional person from non-exhibiting mfg company — \$400

Hotel

Rooms are on a first-come, first-served basis, and rates are valid until the November 8, 2019 cutoff date unless the room block has been filled before then. A \$25 resort fee per night will be added to all rooms. Book your room online at <https://book.passkey.com/go/SNGW9R> or call (800) 635-7711 and provide the group code SNGW9R.

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Sincerely,



Jennifer Rzepka, CAE
Executive Director

Please feel welcome to contact the office with any questions or recommendation on ways to continue this exciting growth and expansion of your great association!

877-947-9837 / info@wisconsinwaterwell.com

LOBBYIST REPORT: GOVERNMENT RELATIONS UPDATE

By Jeff Beiriger, WWSA Government Relations Advisor



Budget Deliberation

The highlight of the first six months of any two-year legislative session is the budget. What makes it so all-consuming is that the budget is the financial representation of the State's direction for the next two years and possibly longer. To give you an idea of how large a shadow the budget casts, only 5 bills have been signed into law since January 1, hardly a blistering pace.

2019 marks the first legislative session since 2008 when a single party didn't control the governor's office and both chambers of the state legislature. That fact will certainly complicate completion of the budget and the number of legislative proposals that make their way into law. The budget will likely not be done by July 1. The number of bills passed this session will be a quarter or a third as many as sessions over the past 12 years.

Governor Evers submitted his budget to the legislature in February and it was declared as "dead on arrival" by Assembly and Senate leaders. Their objections? Too much new spending and not enough revenue to support the level of spending. In addition, there are strong differences on the policy initiatives that would be funded by the state budget.

The Joint Finance Committee has adopted a few provisions from the Governor's budget, but by and large, they will amend these provisions into their own version of a budget bill, something we expect to see before too long. Given the situation, it doesn't make sense to look too deeply at the Governor's budget as a predictor for what will happen. The best approach is to see what Republican legislators have in mind, since theirs will be the more likely version to advance and, ultimately, get approved, vetoed in total, or line-item vetoed by the governor. Republicans are looking at options to limit the potential impacts of a line-item veto of their version of the budget and may look at "splitting" the budget bill to minimize the potential impact of gubernatorial vetoes.

Whatever happens, don't expect it to happen fast. The parties are poised for a showdown and, because nothing really bad happens until November, when local budgets are set, based on anticipated funding levels from the State, there's plenty of time. But even as the budget process is delayed, so too is work on most other legislative proposals, so a completed budget in November leaves only a few months for the Wisconsin legislature to advance non-fiscal bills, decreasing the likelihood that much of anything will pass.

What's not in the Governor's budget is any proposal to affect occupational licenses, something we've been watching for two or more years now. We don't expect it to show up in the legislature's version of the budget either, as this issue seems to have taken a back burner and it would likely be vetoed by the Governor if it were to emerge as an issue.

NR 812 Revisions

For several months now, we have been providing testimony and feedback to the DNR regarding the proposed modifications to NR 812. WWSA continues to be opposed to several provisions of the code as currently drafted.

In late May, the Natural Resources Board met to hear testimony on NR 812 and to deliberate/decide on the fate of the rule as drafted. WWSA was well-represented at the NR Board hearing. I testified for WWSA and Terry Marshall and Bruce Walker each testified as individuals. Jason Hintzke also attended the hearing. Liesa Lehmann presented the rule draft on behalf of the DNR staff.

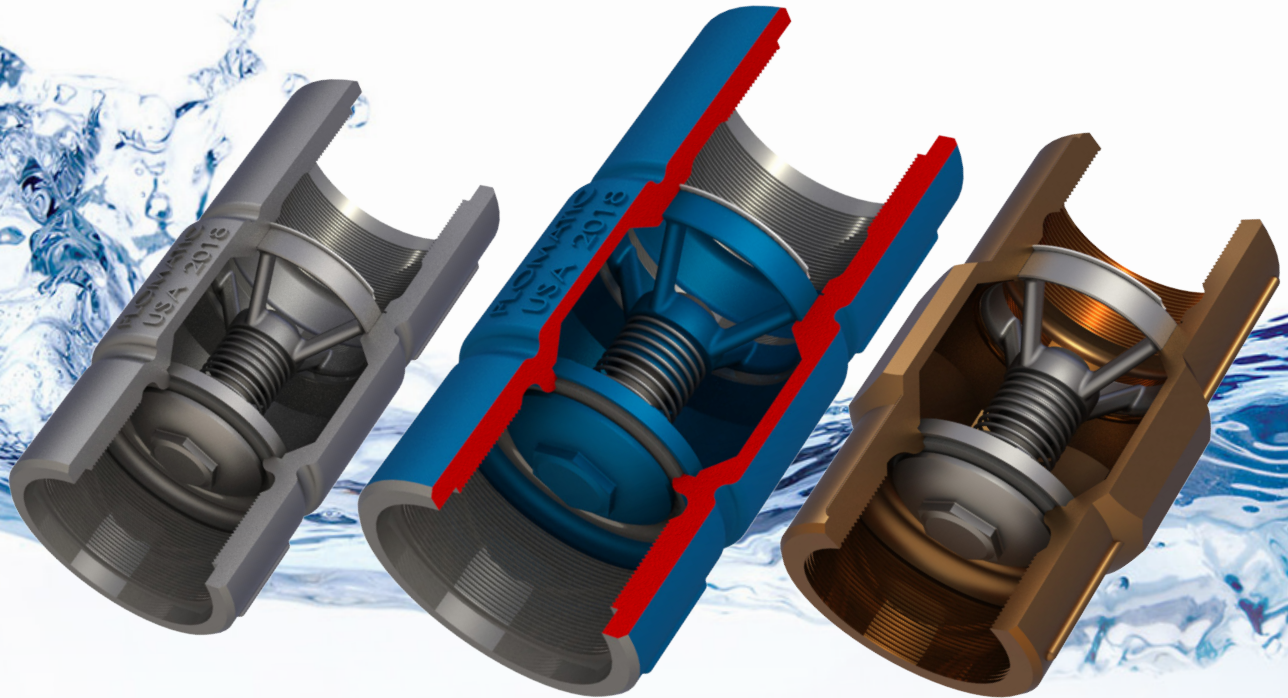
Following our presentations, there were several questions directed at each of the speakers, a good sign that the Board had heard something to give them pause before simply advancing the rule. One member of the NR Board, Greg Kazmierski, is a former well driller, and he asked several particularly good questions that demonstrated his knowledge of the current and proposed rule and the "real world" side of the business.

When the questions concluded, a motion was made to send the rule back to the agency to reconsider each of the objections we raised – 60-foot casing depth, flowing wells and PVC/neat cement. The motion was seconded and additional discussion followed. During those discussions, several NR Board members seemed to reconsider their position and the motion ultimately failed. A follow-up motion was made to approve the rule as presented with one stipulation, and that's a directive that the DNR Secretary begin work on a follow-up to address language regarding construction standards for flowing wells, casing requirements in limestone and dolomite, and the use of PVC piping and neat cement grout.

Lobbyists Report continued on page 7

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WWWA BOARD VISITS THE CAPITOL

By Ashley Reum, WWWA Account Coordinator

In March 2019, the WWWA Board had the opportunity to meet several key legislators and public officials in the WI groundwater industry. The Board met with Senator Patrick Testin about his bill that would provide funding for counties to conduct nitrate testing programs for high risk citizens. The Board was invited to work on an amendment to ensure the private sector is still given the opportunity to participate in the testing process.

The Board also met with the DNR Deputy Secretary and Bureau Director to discuss the state budget, the relationship between the WWWA and the DNR, and the NR 812 rewrite. Lastly, the Board attended a meeting with Representative Todd Novak, who also chairs the Clean Water Task Force. Representative Novak invited the WWWA to testify at two hearings. The first in Green



Bay to discuss water quality and testing. The second is in Stevens Point to address drilling issues.

The WWWA Board looks forward to building a stronger relationship with legislators and the WI DNR to ensure clean and safe groundwater remains a priority. If interested in joining the Legislative Committee, please contact the WWWA office. 💧

Lobbyists Report continued from previous page

Rule-making is a lengthy process, and there are still several places we will be going to argue our case that the modifications we are seeking should be addressed now and not later. We'll work with the Governor's office, but we'll also work with the members of the Senate and Assembly Natural Resources Committees as well as the Joint Committee for Review of Administrative Rules.

There are some time marks that need to be met, so things will need to progress quickly for changes to be made now. The projection is still for a revised rule by January 1, 2020, but prolonged negotiations could force that date out again, possibly by a year or two. More as it develops....

Water Quality Task Force

Earlier this year, Speaker Vos created a Water Quality Task Force and appointed a bipartisan group of legislators to meet with interested parties and the general public to hear testimony about ways that we can provide and protect our water resources in a way that addresses public health and safety. The initial hearing included representatives from several agencies that have an interest in clean water – Health, Natural Resources, and Agriculture, for instant. The follow-up hearing began a series of meetings in different areas of the State, each focusing on a different topic surrounding water quality.

In total, there will be a dozen hearings and they will move from the south to the north. WWWA is slated to speak at two meetings – in Stevens Point and in Green Bay. At the meeting in Stevens Point, we will be talking about well drilling. At the meeting in Green Bay, we will be talking about pump installing, well testing, laboratories, and more.

While the Task Force meets, the expectation is that there will be very little water-related legislation considered so as to give the Task Force time to hear from everyone, deliberate, and recommend a package of changes at one time. Throughout that process, WWWA will continue to provide a voice for the industry in those discussions. It's unclear what the timeline will be, but the likelihood is that any proposals coming out of the Task Force will more likely be considered in the 2021-2022 legislative session, and not the current (2019-2020) session.

If you have ideas about the upcoming legislative session, please share them by contacting Jeff Beiriger, WWWA Government Relations Advisor, at jeff@assocmgmtservices.com or 414/331-2059. 💧

WWWA BOARD UPDATE

By Ashley Reum, WWWA Account Coordinator

Please join the WWWA in welcoming our newly appointed Board members: Michael Hanten, Perry Will and Tim Nelesen.

Michael Hanten

Michael Hanten is the lab director of Clean Water Testing; a state certified drinking water lab that provides water testing services to the entire state of Wisconsin, and is the General Manager of Water-Right's Clean Water Center, a water treatment company serving Northeast Wisconsin. Michael has served in this multifaceted position for the last 16 years.

Over the last 16 years Michael has been an active member with the Wisconsin Water Well Association, and has been a part of numerous committees including the Code committee which works hand in hand with the DNR on NR812 (well construction and pump installation). Michael is currently the Co-Chair of the DNR Advisory Committee, and is a member of the Wisconsin Water Quality Association.

Michael has given hundreds of water related presentation to professionals in Wisconsin and across the country. Michael has helped raise the awareness and understanding of water issues like bacteria, nitrates, arsenic, and lead. Thanks in part to Michael's diverse background and multifaceted business experiences; he provides valuable insight into the complex water issues Wisconsin faces today.

Perry Will

Perry Will lives in Eagan, MN and started at Rep Rite Burk and Associates 7 years ago, working part time in the

warehouse. From there he moved to full time and helped with customer service and inside sales, where he was able to learn a lot about the industry and assist customers, depending on their specific needs. For the last 2 years, he has been working as an outside salesman in the Minnesota, Wisconsin, Northern Illinois, and Upper Peninsula territories, where he supports the wholesale distributors and professional contractors with their industry needs.

He has also been involved in continuing education training with SJE Rhombus, over the last 2 years, for professional contractors and has thoroughly enjoyed the experiences and knowledge he's gained from the classes. As one of the younger individuals in the industry, he is eager to help and support the industry in any way he can.

Tim Nelesen

Tim lives in Madison, WI and has been a territory manager for Franklin Electric since May of 2014. Tim has been a manufacturer's representative since 2003 with experience in water well, plumbing, heating, wastewater and pipe, valves & fittings. He is in his second term as the president of the Wisconsin Pump & Well Suppliers and has been on the their board for more than 12 years. He also served on the DNR Advisory Council for the WPWS from 2009 to 2018.

The Association would also like to thank our departing Board members, Rob Spence and Jerry Ellis for their service and dedication as our WPWS representatives. If interested in serving on the Board or one of our committees, please contact us at the WWWA office for more information. 💧

VICE PRESIDENT DOWNHOLE HUMOR

By Jason Hintzke, WWWA Vice President

So I was out test pumping a well and got this awesome bucket from Northern tool. It has 1/2 gallon markings on it for low production wells to determine the GPM.

When I looked on the other side and this is what I seen. Really??? Did someone put this on and something went wrong to put this on a bucket?! Wow! 💧



CALL FOR PRESENTATIONS

2020 WISCONSIN GROUNDWATER CONFERENCE

January 8-10, 2020

Kalahari Resort and Convention
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~ and ~

CONTINUING EDUCATION SESSIONS

Early 2020

Various locations
throughout the state

The Wisconsin Water Well Association annual conference showcases problem-solving, technologies, and the latest in products for the water well industry.

We are seeking suggestions from members for presentations, and abstracts from those interested in providing your expertise in multiple areas.

Members, please submit your suggestions for topics directly to the WWSA office via email to info@wisconsinwaterwell.com.

Potential presenters, please submit your abstract submissions no later than July 31, 2019 to info@wisconsinwaterwell.com using the form below or go to wisconsinwaterwell.com.

If you would like to be considered to be a speaker for the 2020 Wisconsin Groundwater Conference, please complete the following:

Company: _____

Name: _____

Title: _____

Address: _____

Phone: _____ Email: _____

Length of Presentation: _____

Track (choose all that apply):

- | | | |
|---|---------------------------------------|---|
| <input type="checkbox"/> Well Driller | <input type="checkbox"/> Rig Operator | <input type="checkbox"/> Business Management |
| <input type="checkbox"/> Pump Installer | <input type="checkbox"/> Geo-Thermal | <input type="checkbox"/> Legislative/Regulatory |

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SCHOLARSHIP APPLICATION

EDWIN HUNTOON SCHOLARSHIP

Edwin W. Huntoon (1917-2011)

Ed Huntoon served the WWWW as Editor of the newsletter, and was a proponent of the water well industry throughout the world. He started in the industry as a driller in the rock quarries, then for the US Army during WWII and on water supply projects around the world. Ed was a licensed pump installer, master plumber, and journeyman plumber. He was the recipient of the NGWA Life Member Award in 1991, and the NGWA Oliver Award in 1995 for outstanding contributions to the groundwater industry. He served as the Waupaca County Wellhead Protection Committee Chairman until his passing at the age of 93.



OWEN WILLIAMS SCHOLARSHIP

Owen W. Williams (1922-2014)

Owen Williams served the WWWW as Executive Secretary, and represented the Association at many conferences, meetings, and legislative sessions. He served in the Navy aboard the USS Barb during World War II, and served as State President of the US Submarine Veterans. He devoted significant time and energy in the formation of the Wisconsin Water Well Guild, creation of continuing education classes, and promotion of Association membership. He encouraged others to "make greater strides to meet the challenge of protecting the environment."



EDWIN HUNTOON ELIGIBILITY

- 2.6 grade point average or above
- Must be child or grandchild of a current WWWW member
- Must be applying to or enrolled in a post-secondary institute (college), as a full time student

OWEN WILLIAMS ELIGIBILITY

- 2.6 grade point average or above
- Must be child or grandchild of a current WWWW member
- Must be applying to or enrolled in a technical/trade/vocational institution, as a full time student

APPLICATION PROCEDURES

- Applications should be submitted to the Association by December 1, 2019. No exceptions.
- Applications should include written essay and two letters or recommendations.

APPLICATION SELECTION PROCESS

Personal information is removed from each application and is assigned a number. Applications are then sent to a review committee. The committee makes their choices based solely on the information provided by the applicant and the references submitted. The WWWW will notify the scholarship winners prior to January 1, 2020 by email.

Awards are presented at the Annual Wisconsin GroundWater Conference. Current college students will be presented the scholarship at the conference, while high school students will receive the scholarship after the completion of their first semester. Verification of current enrollment is required.

INSTRUCTIONS FOR COMPLETING SCHOLARSHIP APPLICATIONS

- Download the application or complete the form online at: wisconsinwaterwell.com
- Fill out the application, respond to both essay questions, and submit two letters of recommendation from persons who can attest to your character and assess academic ability
- Submit the form online or send to the WWWW office

CONFERENCE SPONSOR SPOTLIGHT

FLINT & WALLING

The WWSA appreciates the support of Flint and Walling who generously sponsored the tote bags at the 2019 Annual Conference. Operating since 1866, Flint and Walling began their legacy by building hand-operated water pumps and the Flint & Walling windmill. Today, their product line includes submersible pumps, centrifugal pumps, jet pumps and booster pumps for home, farm and industry.

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For more information:

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Johnson Screens offers a complete line of Vee-Wire stainless steel and PVC well screens, slotted PVC screens, PVC drop pipe, casings and accessories. Other offerings include pre-packed Muni-Pak well screens, and NuWell well rehabilitation chemicals. Johnson Screens is also the producer of the industry standard Groundwater and Wells books. ♦

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THE BARABOO RANGES: DRILLING WELLS IN THE BARABOO RANGES

By Tom Riewe

Due to their undulating topography the Baraboo Ranges are not well suited to intensive agriculture. Today, for the most part, these ridges remain forested and sparsely populated so the number of wells that exist across their landscapes is relatively low. (Photo 1) Most of these are residential, having been constructed over many decades by the drillers of this area. Constructing a well into this hard dense crystalline bedrock is not usually accomplished quickly or easily.

Large fractures like those found in sedimentary bedrocks (like sandstone and limestone) do not typically exist in quartzite or other igneous and metamorphic bedrocks (like granite or rhyolite). Baraboo Quartzite is essentially impermeable so groundwater cannot move through the rock mass. On the other hand, in sedimentary bedrock aquifers, groundwater can move directly through the rock mass, albeit slowly. It can also course more readily through randomly oriented fractures and the bedding planes that lie between the individual bedrock layers. In some formations, especially karst-type limestones, water can flow much like a stream through large solution channels and caverns.

In Baraboo Quartzite groundwater can only seep through minor fractures in the rock. At depth, what few fractures do exist are usually hairline in width and not regularly spaced throughout the rock mass. Water moves only with significant difficulty through these minor pathways. The porosity and permeability (hydraulic conductivity) in quartzite is typically so low that development of a well within this dense bedrock is not always possible.

To obtain enough groundwater for a residential water supply, quartzite wells must often be drilled to depths of hundreds of feet. A well must be extended to a depth such that the open bedrock drillhole intersects enough water-producing fractures to obtain an adequate yield. Even then a typical well in quartzite produces no more than a few gallons per minute. In many cases the yield can be limited to mere gallons per hour. Sometimes an attempt to complete a well ends up being nothing but a 'dry hole' – one that produces no water at all. Chances of developing a high capacity well in this bedrock are virtually nonexistent. This is in sharp contrast to sedimentary bedrock aquifers in which wells can often have yields in tens or even hundreds of gallons per minute.

Wells are also constructed to significant depths into igneous and metamorphic bedrocks for another useful reason. In order to adapt a water supply to a low sustained



Photo 1. The forested ridges of the Baraboo Ranges. (Photo by the author)

yield a deep open drillhole can function as an extra 'reservoir'. This is possible because – with a six-inch diameter well – each hundred-foot column of open drillhole can provide 150 gallons of storage, much more than a typical pressure tank holds.

Overnight, when there is little or no demand, there is usually enough 'down time' for the water table to completely recover within the drillhole – if the yield is adequate to do so. This extra storage may provide enough water for most residential needs in the morning – and throughout the day. In order to facilitate the use of this storage the submersible pump must be set to the bottom of the open drillhole. This makes the entire water column available for those times when there is significant demand. If the well has typical low yield the electrical system for the pump must be configured such that the pump will shut off if the entire water column is pumped out during periods of high demand. If not so configured and the water level drops below the pump intake, the pump can burn itself out.

Baraboo Quartzite is very hard and abrasive so drilling a hole into it can often be a slow and tedious process. It is usually also very hard on drilling bits. Granite typically breaks at the junctions of the large tightly-packed quartz and feldspar crystals that make up the rock. Quartzite, on the other hand, has a much smaller crystalline structure made up of tiny interlocking quartz grains. This makes the rock more dense, massive and tough. It must be broken *through* the grains rather than along the boundaries between them.

Drilling Methods

Before the late 1950s, when large rotary drilling rigs came onto the scene in Wisconsin, traditional cable-tool rigs were used to construct most wells, including those in igneous and

The Baraboo Ranges continued on next page

metamorphic bedrocks. With this percussion method the reciprocating action of the rig repeatedly raises and drops a heavy blunt 'chisel-type' bit into the bottom of the hole. At the end of each stroke the "left-hand-lay" cable stretches, causing the bit to rotate slightly clockwise, then, as the bit is raised, counter-clockwise. This constant rotation of the bit creates a nearly perfect circular hole. After the hole is deepened several feet the penetration rate slows so the drill cuttings have to be bailed out of the hole before drilling can be resumed. (Figure 1)

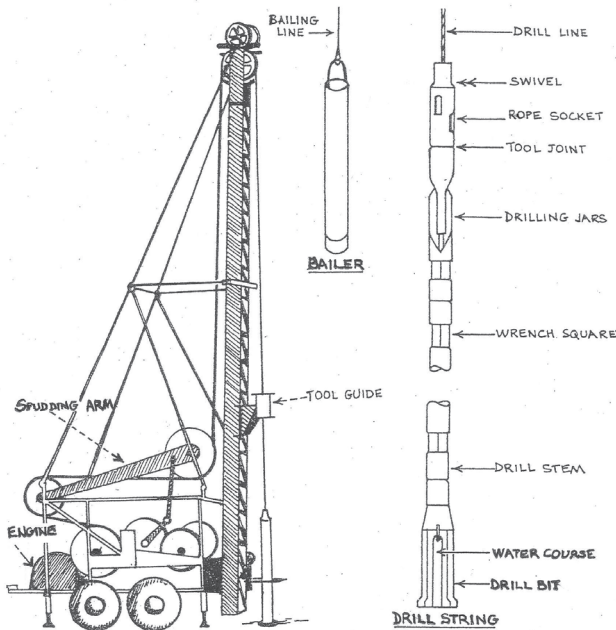


Figure 1. A diagram of the cable-tool drilling method. (Original source unknown)

This two-part process is more time consuming than drilling a hole with one of the large rotary rigs commonly used today in Wisconsin. Completing a well in quartzite with a cable-tool rig usually takes days, weeks or even months to complete. However, with either method the final well product is essentially the same. In fact, when used correctly, a cable-tool rig can drill a very straight hole, with proper plumbness and alignment. In recent decades this method has been speeded up with the use of modern cable-tool bits that are imbedded with tungsten-carbide buttons. (Photo 2)

Most drilling firms now construct quartzite wells with large air-rotary rigs (Figure 2), using a down-the-hole hammer (DTH) and its associated bit. Although these rigs are rotary machines, drilling with a down-the-hole hammer is essentially a



Photo 2. A modern cable-tool bit with tungsten-carbide buttons. (Ramp Company)

percussion method.* The piston inside these pneumatic hammers repeatedly applies a very rapid impact force at the face of the bit – similar to the action of a jack-hammer. (Photo 3) As a result the dense quartzite gets fractured conchoidally – breaking up into small chips. The drill cuttings are removed continuously by the high volume of compressed air being circulated in and out of the hole. These features allow the hole to be advanced more rapidly than it would be using the rotary functions of the rig and a tri-cone bit. (Photo 3)

*When using a DTH, the drill string does rotate but typically at a lower rpm than when using true rotary methods.

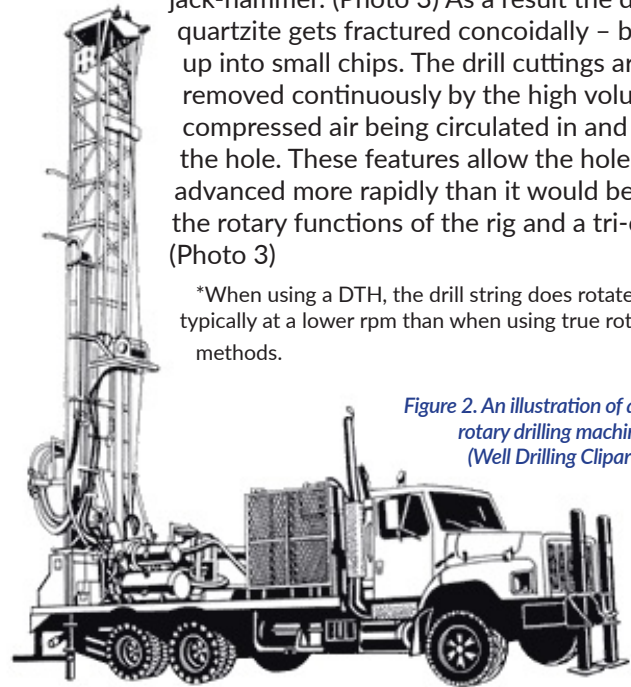


Figure 2. An illustration of a modern rotary drilling machine. (Well Drilling Clipart)

With down-the-hole hammer drilling, the penetration rate into granite is usually more rapid than drilling into quartzite. However quartzite tends to be more abrasive on the bit. It wears down the tungsten-carbide buttons more aggressively, especially the buttons on the outside of the bit. Some DTH bits now have diamond inserts. The use of these bits can increase the rate of penetration but are more expensive. The diamond inserts are also brittle and can fracture off when the bit encounters a fracture in the rock.



Photo 3. A down-the-hole hammer and its associated bit. (Atlas Copco - Secoroc/Epiroc) (Note: in Wisconsin these bits must be a minimum of 6-inches in diameter to construct the lower open drillhole.)

When advancing a hole into any crystalline bedrock a driller typically changes out a hammer bit when the penetration rate slows significantly or, in some cases, stops. This change-over can slow down the drilling process because of the extra down time it takes to 'trip' the drill string in and out of the hole. A new 6-inch diameter bit can be used to drill up to 2,500 feet



Photo 4. A rotary tri-cone bit. (Baker Hughes Company.)

of hole in some formations but much less is hard abrasive ones. Due to wear, the inevitable drop in the diameter of the bit becomes a problem. A reduced-diameter drillhole can sometimes be reamed out to full diameter using the rotary capabilities of the rig and a tri-cone bit. (Photo 4)

Hydrofracturing Methods

Since the early 1980s hydrofracturing (hydroflushing) methods have been used in Wisconsin to increase the yield of low-producing bedrock wells. These methods have been especially successful in increasing the production of water from very low yielding wells completed in igneous and metamorphic bedrocks.

This process involves the insertion of an inflatable packer into the bedrock drillhole – a safe distance below the bottom of the casing string. (Figure 3) Once the packer is inflated and pressure-stabilized in the hole hundreds of gallons of water are injected into the well, typically at a rate of 50 to 100 gallons per minute.[†] The water is pumped from a water truck or trailer tank through the pipe that has been extended through the packer – down into the open bedrock drillhole. (Photo 5)

[†]Hydrofracturing pumps are akin to household pressure-washers – but scaled up to much larger sizes and capacities.

As water is being pumped in, the pressure on the water rises within the hole. The greater the volume injected, the



Photo 5. A hydrofracturing pump and its associated equipment. (Courtesy Dean Funk, Rhinelander Well Drilling)

higher the pressure. This is because: a) water is essentially incompressible, and b) a tight bedrock formation will increasingly resist any additional water being pumped into it. Hydrofracturing pumps used for water wells are typically operated with water pressures ranging from 500 up to 3,000 psi.

After a given volume of water has been pumped into the hole the pressure is released – and then starts to drop. As it drops the well takes on additional water more easily. This usually indicates the fractures and shale lenses have opened up and are being flushed out. The greater the drop in pressure, the higher the chances are for an increase in yield. After the process has been completed, the packer is removed from the well and the water and sediment are pumped out.

Another method (*zone fracking*) involves the use of two packers – usually set from 20 to 60 feet apart – with a perforated pipe extending between them. The packers are installed to a depth near the bottom of the drillhole and, after they are inflated, water is injected through the perforated pipe into the formation. After a specified volume of water has been pumped in, the packers are deflated and moved up to another depth zone within the hole. This process is repeated several times, all the way up to a safe distance below the bottom of the casing string. This method can better focus the water pressure and flush out fractures that might otherwise have remained plugged following the completion of the single-packer method.

Hydrofracturing methods can increase the yield of water from 200 to 1,000 times, although increases can vary significantly from well to well. Most wells that require hydrofracturing have an initial yield of 15 gallons-per-hour or less. After the process they typically yield between one and five gallons per minute (gpm). However some can produce up to 20 or more gpm. Even wells that are initially dry holes have a reasonably good chance of being made into adequate producers.

[This is the sixth and last article in the Baraboo Ranges series.]

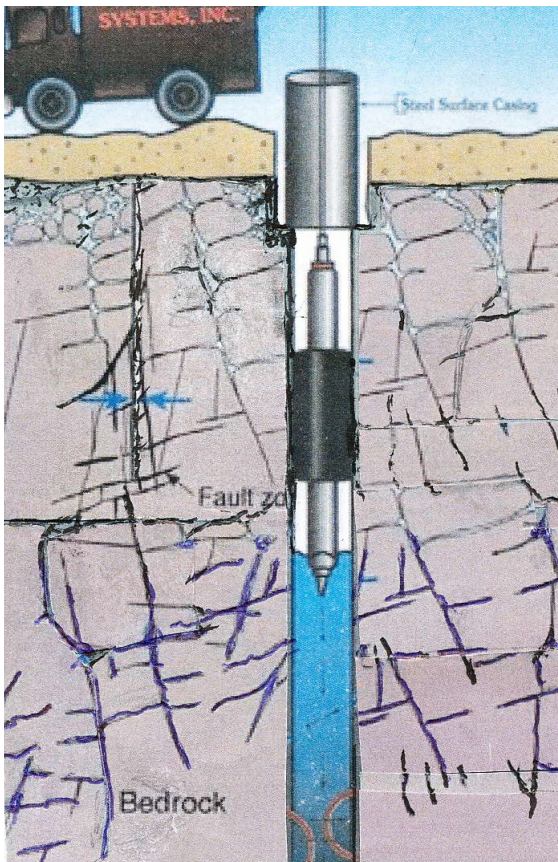


Figure 3. A diagram illustrating the single-packer hydrofracturing process. (After Suffolk University)

The Baraboo Ranges continued from previous page

Authors note: The following individuals reviewed this article and provided many useful comments and suggestions, for which I am very grateful:

Bruce A. Brown, Wisconsin Geological & Natural History Survey (Ret.); Madison, Wisconsin.

Roger Lang, Lang Well Drilling; Wausau, Wisconsin

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Dave Haupt, Haupt Well & Pump Company; Auburndale, Wisconsin

Brad Webster, Brad Webster & Sons Well Drilling Company; Poynette, Wisconsin

Dean Funk, Rhinelander Well Drilling, Inc.; Rhinelander, Wisconsin

Web informational sources:

<http://www.geology.com/>

<http://www.oldweb.uwp.edu/academic/geology/workshop/baraboo/index.html>

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<http://www.wellsincus.com/water-well-services/hydro-fracking>

Tom Riewe is a retired DNR Hydrogeologist who spent his entire career in the Private Water Supply Section working with Wisconsin's Licensed Well Drillers and Pump Installers. A native of northeastern Wisconsin, he now spends his time dog-sitting, falling off bicycles and slipping & falling on hazardous hiking trails.

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MARKETING MATTERS: WHY DO YOU DO WHAT YOU DO?

By Tara Schessler, *In Time Creative*

In previous editions of Marketing Matters I've written about the various mediums available to place your advertising and marketing dollars; i.e. media distribution. I've talked about who you're talking to, or your targeted demographic and the perfect prospective client profile information. We've also reviewed the importance of recruitment and how to incorporate that into your marketing materials. In this edition of Marketing Matters I'd like to focus on Brand Awareness.

First, let me ask you this question... Why do you do what you do? What makes you get out of bed every morning? What makes your business tick?

For some of you, I bet, it's been a while since you've thought about it. Perhaps nobody has ever asked you this question. However, this has everything to do with the brand of your company, doesn't it? What you stand for, why you do what you do, it matters to your overall brand and how you market yourself.

So, I'll ask again. Mr. or Mrs. Business Owner, Marketing Manager, Business Administrator, "Why do you do what you do?" Forgive me for assuming, but I'd say 95% of the answers to that question will more than likely revolve around this: a passion for helping those in need. Serving those needing your products or services. In essence... customer service, right?

I had the pleasure of listening to a national speaker recently who told me this, "Amazon didn't kill retail, poor customer service did." Wouldn't you agree? Does this mean I want you to make sure to put a line of "Best customer service this side of the Mississippi" on all your marketing materials? Not at all, that's a line of blah, blah, blah that anyone can claim. I want you to solve a problem that your perfect prospective customer never realized they had!

Example: Expandable, Flexible Garden Hoses. This product is just a hose, right? Right, until the manufacturer presented the problem that we all didn't realize we had. Regular garden hoses are bulky, take up too much space and are a pain to wrap and store. Introducing, expandable, flexible hoses that expand when used and shrink back to a much more manageable size for storage. This business replaced millions of garden hoses by purely presenting the problem nobody realized they had. They didn't talk about quality, they didn't talk about price, they sold based on solution.



So, what problems do you solve for your customers? Do they know they have a problem? Example: If I'm a new homeowner, never owned a home or lived in a home with a private water well system, do I know my water should be tested and my system be inspected? How often should I do this? If I'm experiencing color, odor, taste or pressure issues, shouldn't I just call the Culligan Man? Oh, I know, I'll go to Sam's Club or Cosco and start buying bottled water. That's easy.

Stay with me, I'm bringing it home.

The Water Well Inspection is what I like to call the oil change. It's the point of entry for most of the businesses and those reading this right now. Brand your business through the bread and butter of the company, the point of entry, the customer service, the oil change. Then, sell the air filter! Solve their problem and present them with a solution to a problem they didn't know they had. Perhaps that entire system is out of date. Leave them happy, satisfied with excellent customer service and ta-dah! Positive word of mouth galore that you are the best in the biz!

People move every day. Twenty-three percent of the market left yesterday. That means if you've been in business for 30 years, guess what, it's a whole new world and competition is fierce. Just being the good guy that everyone knows isn't going to win you the Google Search. Brand your business with effective advertising using mass media outlets. Solve the problem and leave them so satisfied they can't help but tell everyone they know.

Thanks for reading! Until next time! 💡

Sincerely,

Tara Schessler

Have marketing questions? E-mail me anytime at tschessler@waow.com. My ideas are free!

LOSS CONTROL INSIGHTS: ARE YOUR FIRST AID KITS UP TO SNUFF?

By Nolan Insurance



No one wants an employee to be injured on the job. But accidents happen and when they do, immediate treatment is often essential. A nearby first aid kit helps you cope with these basic needs during an emergency.

Not only is preparing for accidents a commonsense practice, having the right first aid supplies on hand also meets OSHA (29 CFR.1910.151(b) requirements and ANSI/ISEA (Z308.1.2015) guidelines.

Class A vs. Class B Kits

A good starting point is to check out the 2015 ANSI standards. The organization has researched common injuries and made suggestions for types and quantities of first aid supplies best suited to most organizations. The recommendations offer guidance based on the complexity of the workplace environment with two categories of kits: Class A and Class B. Kits can be purchased prestocked with items, or you can stock your own supplies using the lists of recommended items.

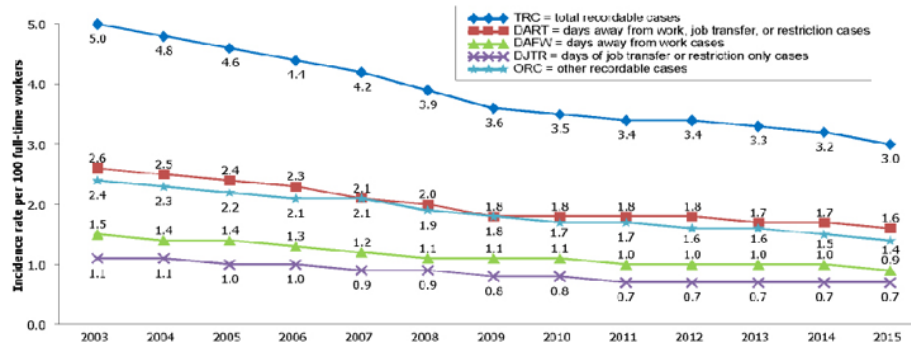
Class A kits include fewer items and are best for handling common injuries, such as minor cuts, sprains and eye injuries. In some industries, this kit supplies everything needed. Class B kits contain what's needed to treat those common injuries, plus additional supplies to treat injuries that may occur in more complex or potentially dangerous workplaces, such as manufacturing plants. Below is a chart that lists the items necessary for both Class A and Class B kits.

Within each of the two classes, there are four types of containers. The type you choose depends on where the kit will be located:

- Type I is usually mounted on a wall
- Type II is portable for indoor use

Loss Control Insights continued on next page

OSHA reports there were nearly 3 million nonfatal workplace injuries and illnesses in 2015



ANSI Z308.1-2015, TABLE 1: CLASSES OF FIRST AID KITS & REQUIRED SUPPLIES

First Aid Supply	Minimum Quantity		Minimum Size or Volume	
	Class A Kits	Class B Kits	(U.S.)	(Metric)
Adhesive Bandage	16	50	1 x 3 in.	2.5 x 7.5cm
Adhesive Tape	1	2	2.5 yd. (total)	2.3m
Antibiotic Application	10	25	1/57 oz.	0.5g
Antiseptic	10	50	1/57 oz.	0.5g
Breathing Barrier	1	1		
Burn Dressing (Gel Soaked)	1	2	4 x 4 in.	10 x 10cm
Burn Treatment	10	25	1/32 oz.	0.9g
Cold Pack	1	2	4 x 5 in.	10 x 12.5cm
Eye Covering (with Means of Attachment)	2	2	2.9 sq. in.	19 sq. cm
Eye/Skin Wash	1 fl. oz. total			29.6mL
		4 fl. oz. total		118.3mL
First Aid Guide	1	1	N/A	N/A
Hand Sanitizer	6	10	1/32 oz.	0.9g
Medical Exam Gloves	2 pair	4 pair	N/A	N/A
Roller Bandage (2 inch)	1	2	2 in. x 4 yd.	5cm x 3.66m
Roller Bandage (4 inch)	0	1	4 in. x 4 yd.	10cm x 3.66m
Scissors	1	1	N/A	N/A
Splint	0	1	4.0 x 24 in.	10.2 x 61cm
Sterile Pad	2	4	3 x 3 in.	7.5 x 7.5cm
Tourniquet	0	1	1 in. (width)	2.5cm (width)
Trauma Pad	2	4	5 x 9 in.	12.7 x 22.9cm
Triangular Bandage	1	2	40 x 40 x 56 in.	101 x 101 x 142cm

- Type III is portable and designed for both indoor and outdoor use; it can also be mounted
- Type IV is for outdoor use in areas where the kit might receive rough handling or be exposed to water

Personalize Your Kits

While choosing between a Class A or Class B kit, you'll want to also delve into whether you might need any additional specialized items unique to your industry or your company.

Take these steps to help you personalize your kits:

- Review your loss data, OSHA logs, incident reports and other internal records to find the most common types of accidents that occur at your workplace
- Conduct a survey and identify any additional dangers your workers face
- Evaluate the number of kits you'll need based on the number of employees, the work environment, how remote the location is from professional medical care and the risk of a particular injury occurring
- Consult with local fire and rescue or emergency medical professionals for additional suggestions, and consider

asking them to assist with your survey and evaluation processes

Safety Is More Than a Kit

The best batch of supplies and equipment is worthless if no one knows what to do with them in an emergency situation. That's why you'll also need to include basic first aid training as part of your safety program.

The level and type of training needed depends on the dangers that exist within your workplace. Most everyone knows how to apply disinfectant and a bandage for a minor cut, but more skills are essential for dealing with burns, sprains or other more serious injuries. As part of the education process, it's important for employees to understand what actions they should take and those that are outside of their skill set.

It's also critical to have a plan for coping with emergencies beyond the scope of the training your employees receive. As part of your emergency action plan, have emergency numbers posted and make sure employees know where the nearest hospital or emergency clinic is located.

And finally, check your kits monthly and replenish supplies as necessary. After all, if you need a bandage or splint and one's not available, your entire emergency plan is at risk. ♦

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Quarter page	3 3/4" 4 3/4"	N/A	

WATER QUALITY UPDATE: HELP HOMEOWNERS PROTECT THEIR GROUNDWATER THIS SUMMER

By WWA Office

Data from the Census Bureau showed over one million wells were affected by flooding and late snowmelt in over 300 counties across the Midwest. With snowstorms as recent as April, homeowners can finally breath a sigh of relief as Wisconsin welcomes a long awaited and well deserved summer season.

Although heavy rain and flooding might be in the rearview mirror, it's important for licensed professionals to work with homeowners on summer-related issues that might affect their well water.

Warm Weather

With the rise in temperature, Wisconsinites may begin to see an influx of insects, spiders and small animals. Check to ensure their well has up-to-date vermin-proof well caps and seals and that they have not been compromised. Instruct the homeowner to remove any debris or vegetation near the well casing to reduce risk of infestation.

In addition to pests, bacteria tend to thrive in high temperature environments. Licensed professionals should follow proper sanitary practices so the water pump does not experience contamination prior to or during installation.

Household Chemicals

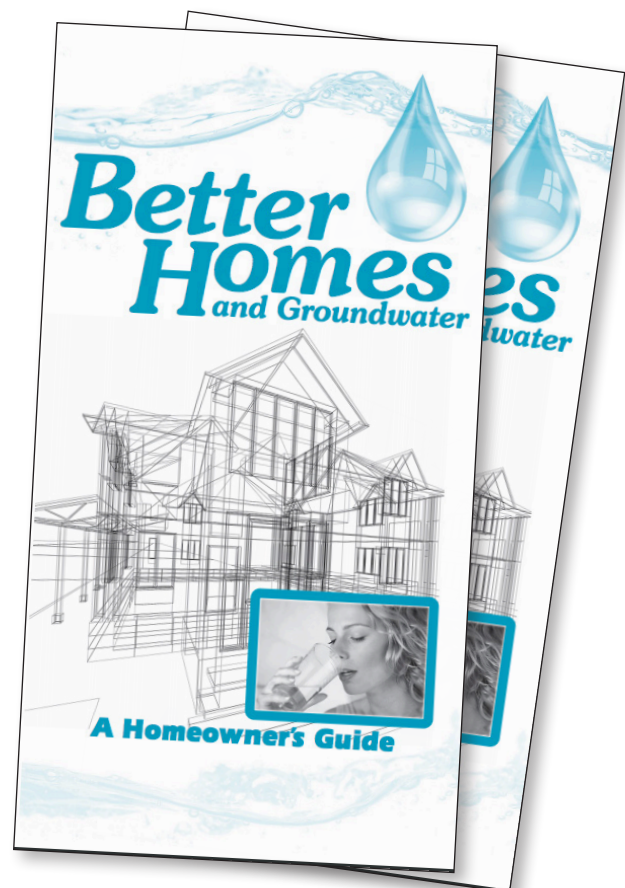
With summer only lasting a few short months, homeowners are eager to get to work outside. They may know to look out for bacterial contaminants, but household chemicals might be a little less obvious. Whether they are cleaning the pool, changing their oil or painting their home, all property owners should be educated on the proper storage and disposal methods of these items.

Swimming pool cleaners, paint, oil and gasoline are all household items that can be detrimental if leaked into the soil. The United States Geological Survey suggests keeping these items away from the leach field as these chemicals can accumulate in the aquifer and make their way to their groundwater. The DNR recommends storing these items on a concrete floor away from the well and furnace.

Yard and Garden

While many of us may strive for a beautiful and lush garden this summer, it's important to understand the affects fertilizer and other lawn care chemicals might have on our water supply. Ingredients such as nitrogen, phosphorus and chloride are important for a healthy lawn, but have the potential to contaminate groundwater. Consider recommending a water insoluble nitrogen fertilizer to your customers. It releases slowly and reduces the potential for contamination.

Ultimately it's the responsibility of the homeowner to ensure their well is producing clean, safe water. However, it's up to you as a licensed professional to determine the type of care, knowledge and quality you want to provide to your customers. Additional homeowner tips can be found in the [WI DNR's Better Homes and Groundwater: A Homeowners Guide](#).





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Jay Hintzke

Hintzke Well Drilling Inc.
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John Hintzke

Hintzke Well Drilling Inc.
New London, WI

John Hintzke

Hintzke Well Drilling Inc.
New London, WI

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Nelson Hinz Pump &
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Kirk Hischer Well Drilling
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Josh Huemann & Sons
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Tyler Hyink

Hyink Well Drilling
Sheboygan, WI

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“**The SQ is better to install because of the 3” diameter, and the pump weighs less than 15 lbs.**”

Roger Powell
Patuxent Pump & Well



The Grundfos 3” SQ submersible pump is composed of stainless steel pump housing and features floating impellers and tungsten carbide/ceramic bearings. The design ensures high-wear resistance to sand while reducing the pump’s weight to less than 15 lbs. – making installation simple.

Most conventional 4” pumps weigh more than 25 lbs. and can be challenging to install in restricted wells or applications with mineral build-up.

Another reason to use the Grundfos 3” SQ.

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GRUNDFOS 

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Todd Roos
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Brian Zink

Marshfield Plbg & Htg LLC
Marshfield, WI

IN MEMORIAM



JAMES MEYERS

James Meyers, 50, died Sunday evening, February 17, 2019 as the result of a snowmobile accident in Bayfield County. The oldest of four children, James was born December 18, 1968 to Ken and Yvonne (Luisier) Meyers in Oconto Falls. James grew up in the Town of Spruce where he attended

elementary school at the Spruce School House until the fifth grade and then attended Washington Middle School in Oconto Falls. He graduated from Oconto Falls High School with the class of 1987. While growing up, James worked in the family well drilling business.

On July 18, 1987 he married Stephanie Parsons at St. Paul Lutheran Church in Oconto Falls. The couple has lived in Oconto Falls their entire married lives where they have owned and operated Luisier Drilling Inc. as third generation family owners since 2003. James will be fondly remembered for his zest for life while boating, snowmobiling, golfing, riding his Harley and following all Wisconsin sports teams, especially the Packers as a season ticket holder. He was a longtime member of River Island Golf Club in Oconto Falls

where he sponsored his own league team and volunteered equipment and his time to improve the course. James enjoyed his six-day-a-week Bod-e Bootcamp in Howard to stay in shape, and be a part of the Bod-e Bootcamp Family. Providing for his family meant a lot to James as well as vacationing with his wife, Stephanie.

Survivors are his wife Stephanie Meyers, Oconto Falls; their two children, Gregory (Stacey) Meyers, West De Pere; Morgan Meyers, Oconto Falls; his two granddaughters who he dearly loved, Stella James Bailey and Macy Janelle Meyers; his parents, Ken and Yvonne Meyers, Spruce; his siblings, Chris (Sarah) Meyers, Madison; Suzanne (Ryan) Verhagen and Megan (Zach) Jensen, all of Spruce; his mother-in-law, Rosalind Parsons, Pontiac, IL; brothers-in-law and sisters-in-law, Sue (Bill) Elliott, Saunemin, IL; Chuck Parsons, Green Bay; Blake (Lisa) Parsons, Pontiac, IL; many aunts, uncles, cousins, nieces, nephews and good friends.

He was preceded in death by his father-in-law, Charles Parsons.

Visitation was held on Friday, February 22, 2019 at Grace Lutheran Church, 501 S. Main St. Oconto Falls. Visitation continued Saturday, February 23, 2019 at the church until the time of service at 10:30 am with Pastor Gary Olson officiating. The burial followed in Pine Hill Cemetery in the Town of Spruce. 💧



SAVE THE DATE!

2019 Wisconsin Groundwater Conference
January 8-10, 2020
Kalahari Resort and Convention Center
Wisconsin Dells, WI

The image shows the exterior of the Kalahari Resort and Convention Center, a large, multi-story building with a colorful facade of yellow, green, and red. The name 'Kalahari' is prominently displayed in large, red, stylized letters on the upper part of the building. The sky is blue with some clouds. The text 'SAVE THE DATE!' is written in large, bold, blue letters on the right side of the image. Below the image, the conference details are listed in white text on a dark blue background.



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WWWA CALENDAR OF EVENTS

AUGUST 6-7, 2019

**Groundwater Solutions: Innovating
to Address Emerging Issues for
Groundwater Resources Conference**
Arlington, VA

SEPTEMBER 19, 2019

WPWS Fall Golf Outing
Trappers Turn Golf Club
Wisconsin Dells, WI

SEPTEMBER 23-24, 2019

**2019 NGWA Conference on
Fractured Rock and Groundwater**
Burlington, VT

NOVEMBER 7, 2019

Rothschild Continuing Education
Central WI Convention + Expo Center
10101 Market Street
Rothschild, WI 54474

DECEMBER 3-5, 2019

2019 NGWA
Groundwater Week
Las Vegas, Nevada

JANUARY 8-10, 2020

**2020 Wisconsin Groundwater
Conference**
Kalahari Resorts & Conventions
Wisconsin Dells, WI