Making Connections

The Official Publication of the Louisiana Ground Water Association
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From the Executive Director's Desk

What a difference a year makes! Last year, we were concerned as to whether we could put on our annual convention at all, because of COVID-19 and all its variants. Today, we are steadily planning a full convention, seeing growth in the number of exhibitors, and hoping for an increase in the number of our water well and environmental drillers.

The Paragon Casino awaits us with a new sports betting venue added to their usual table games and wide variety of slot machines. Hopefully, the buffet will be fully open and we can take advantage of it for our lunch. In any case, I will see to it that we enjoy a good, tasty meal (no sandwiches).

Please plan to join us for our "night before convention activities". We have a lot of fun at the cocktail hour, prime rib dinner, and bingo with lots of very nice prizes for the winners. I don't think you can find a better bargain anywhere, even if you don't win a bingo prize. I am told there is even some side betting on the bingo numbers, if that interests you.

We have not committed to a make-up convention at this time. The make-up session is very expensive to provide with no exhibitors to help cover the costs of meeting rooms, meals, etc.

The LGWA is in talks with the DNR (Department of Natural Resources); we asked for their help and made some suggestions as to what we can do to increase attendance at the make-up session and still keep it an enjoyable event where we can attend at an affordable cost.

We have not received an answer from the DNR yet, but continue to work on the issue.

Please make every effort possible to attend the January convention. It is likely your slowest time of the year, it is a 3-4 hour drive for most everyone, your fellow drillers will be there, manufacturers and distributors might have some new equipment to show you, and you just might win a bingo prize.

Our Paragon Room Discount Code is: GWAJ11G

If You Plan to Attend the Night Before Convention Events, We Need Your Paid Confirmation by December 15th. We Cannot Guarantee We Will Have Enough Meals Otherwise.

I'll see you at the convention!

Joel

Joel Walton
LGWA Executive Director

Inside this issue:

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LSU Professor Develops Groundwater Management Model

LSU Civil and Environmental Engineering Professor Frank Tsai recently received an $800,000 grant from the National Science Foundation's Established Program to Stimulate Competitive Research (NSF EPSCoR) to conduct integrated groundwater management for the Gulf region. The grant is part of a $6 million multi-university project between Louisiana, Mississippi, and Alabama.

"LSU's role here is very important because we are leading the development of a regional-scale groundwater model across multiple states," said Tsai. "Then we will study groundwater availability impacted by anthropogenic pumping, climate change, and droughts. The goal of this project is institutional capacity building and collaborations among EPSCoR jurisdictional states."

Professor Frank Tsai.

Tsai serves as director of the Louisiana Water Resources Research Institute in LSU's Patrick F. Taylor Hall, and dedicates his time to groundwater studies. He has compiled hundreds of thousands of well logs in the Lower Mississippi-Gulf region showing complex groundwater systems made over millions of years. In working with Southern University, the University of Mississippi, and the University of Alabama, Tsai hopes to create an unprecedented high-fidelity groundwater model and better water resource management for the Gulf region.

"We are fortunate to have abundant groundwater resources in Louisiana that you do not often see in other states," added Tsai. "We're going to build a unified hydrogeologic framework and a lithofacies model [of different types of sediments created by gravity, water, ice, or wind] across multiple states, which has never been done before." The project has great potential to make significant contributions to the region. Tsai is hopeful the results will generate future research and collaboration between multiple states.

As part of a $1.9 million collaborative project led by the Water Institute of the Gulf, Tsai also received a $569,000 grant from the Capital Area Groundwater Conservation District of Louisiana for the Capital Area Ground Water Conservation Commission (CAGWCC) Phase 2 project. He has been studying saltwater intrusion in the Southern Hills aquifer system in five parishes - East and West Baton Rouge, Point Coupee, and East and West Feliciana. LSU's role in this project is to develop a scientific modeling tool - a Capital Area groundwater availability model - to provide to CAGWCC for groundwater planning and management.

"The Phase 2 project aims to integrate the LSU model with other water management strategies, such as alternative water sources from rivers, wastewater, and stormwater, including social and economic analyses," said Tsai. "Because we have groundwater issues right now, especially in the Baton Rouge area, the project is looking into reducing groundwater pumping." Possibilities for decreasing groundwater use include transitioning to more reclaimed water or surface water from the Mississippi River. If a viable alternative can be found to decrease groundwater withdrawal, Tsai is confident the groundwater level in Baton Rouge can recover, and saltwater intrusion and land subsidence in the area can be mitigated.

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Membership in the Louisiana Ground Water Association (LGWA) is open to water well and geotechnical drilling professionals. LGWA and its members are active throughout the State of Louisiana.

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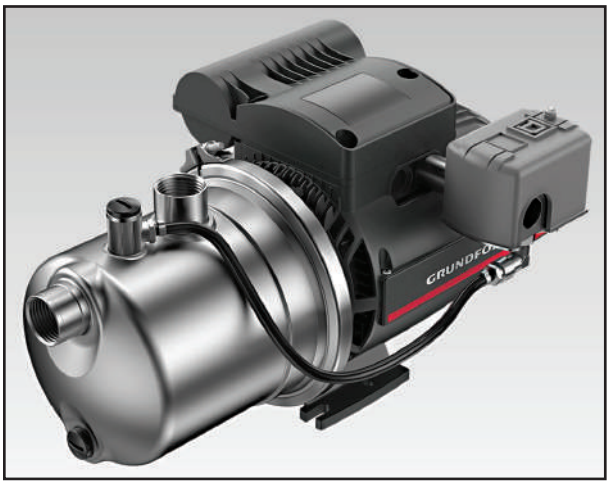
Jet Pumps

In the 1930s, jet pumps came into existence. Until then, if you wanted water with a pump, you had to be within 25 feet of the source. With the invention of the jet or packer, which is a pump all by itself, we now had the opportunity to draw water from 100 feet or more! Using Bernoulli's Law, there are three simple parts to a jet - the body, nozzle, and venturi.



The body is what directs the water coming from the pump, known as the drive water, to the back or inlet of the nozzle. It also takes the water from the venturi tube and moves it to the inlet or suction of the pump. There is also a hole connecting the well to what we call the mixing chamber.

There are three chambers in the body - one being connected to the drive pipe and ends with the water being forced through the nozzle. The nozzle is actually conical in shape. The big hole is where the drive water enters the nozzle, and in a very short distance the hole becomes much smaller. This is where Bernoulli takes over and forces the water through the smaller hole causing it to speed up.

The reason we want this to happen is because on the outlet of the nozzle - the mixing chamber - the water velocity increases. Higher velocity means lower pressure. The pressure drops to the point it causes the well water to be pulled into the mixing chamber. Just on the outlet of the nozzle is also the venturi tube. The hole in it collects the mixture of well water and nozzle water, hence the name mixing chamber, and pushes it through the venturi. As the water moves through the venturi, the tube itself opens wider at the discharge, which allows the water to slow down. As it slows, it converts the high velocity into higher pressure and pushes the water out of the body into the pipe leading to the suction.

It is the hole size both in the nozzle and venturi which allows different amounts of water or pressure. Most single-stage horizontal pumps can go between 40-100 feet down. Back in the 30s, this was amazing. When you add more stages, you also allow for a deeper depth to water. Remember, the deeper you go the less water you get, but it still works.

Studying the Impact of Hurricane Ida on Groundwater

Adapted from Information by Tulane University

The National Science Foundation has awarded a Tulane University researcher a RAPID (Rural Agricultural Productivity Improvement and Development) grant to study how pollutants from flooding caused by Hurricane Ida may have affected groundwater and water systems in south Louisiana.

Louisiana and other coastal states face hazards like superstorms and hurricanes which can expose groundwater and water systems to chemical or microbial contaminants with potententially serious implications on human health.

Samendra Sherchan, associate professor of environmental health sciences at Tulane University School of Public Health and Tropical Medicine, will lead a team collecting water samples at more than 150 sites in Houma, LaPlace, Slidell, and other areas at different time intervals to gain a better understanding of the impacts of extreme flooding on water quality and the mobilization of contaminants in coastal groundwater systems. Ida made landfall as a major Category 4 storm near Port Fourchon, Louisiana, on August 29, 2021, bringing coastal storm surges, heavy rainfall, and catastrophic flooding in many rural areas in Southern Louisiana.

"Such large-scale flooding has the potential to transport chemical agents and microbial pathogens and contaminate groundwater," Sherchan said. "This project is a time-sensitive and unique opportunity to collect perishable data and improve understanding of the extent of contamination in floodwaters from inland areas to groundwater. A lot of these cities close to Louisiana have manufacturing and chemical facilities, so there's a possibility that water could have been contaminated during the storm."

The research team has already started to collect hundreds of samples to determine potential sources of fecal pollution, heavy metals, and other contaminants. They will also use genetic testing to characterize how the storm may have affected the microbial community in groundwater. Over the next year, the team will also map the spatial distribution of chemical and microbial contamination to identify households at risk of toxic contaminant exposure following Hurricane Ida.

"Some households have wells that are private and are not regulated like public systems," Sherchan said. "People who have private wells are responsible for maintaining their water quality, and after extreme weather events, some might not be able to, or know how to, disinfect and recover, so this project will address that too."

Sherchan and his team plan to educate residents near the wells testing positive for chemical or microbial contamination about what resources are available to them and how they should address maintaining their wells after extreme flooding events.

The findings from this study will also aid in future research projects such as evaluation and development of small disinfection technologies for the control and treatment of contaminants in groundwater.

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Protect Your Hearing Around the Drilling Site

Many of us grew up not taking proper care of our hearing. What most of us don't know is hearing loss can occur with a single event, such as an explosion; or by years of exposure to moderate levels of noise, such as loud music, machinery, firearms, motorcycles, race cars, or jet engines to name a few.

The two most common types of hearing protection used in the drilling industry are foam earplugs and earmuffs. To achieve maximum benefit from either of these hearing protection devices, they must be worn properly.

Sound is measured in decibels (db) - 75 decibels, or less will probably not cause hearing loss even over long periods of time. Above 75 decibels is cause for concern, and the longer the exposure, the greater the danger of at least some hearing loss. Other decibel measurements include:

Heavy city traffic - 85 db
Sirens - 120 db
Motorcycles - 95 db
Firecrackers and firearms - 140+ db

Hearing loss may be temporary and less damaging if you can shorten your exposure time, get farther away from the source, and/or reduce the severity with appropriate hearing protection (earplugs or earmuffs).

At drilling sites, the loudest noises are the engines, split-spoon hammers, and drill rods (metal on metal) hitting together. Everyone working at the drill rig should have hearing protection on when the rig is drilling. All engines should have good mufflers to minimize their exhaust noise. Drilling crews need to develop a consistent set of hand signals to communicate in the noisy environment. Get in the habit of wearing the appropriate protection and limit your exposure.

Developing Wells with Compressed Air

Developing wells is an important task all well drilling professionals should do before they complete any type of well. Development "repairs or restores" the damage done during the drilling of a well, often associated with smearing, compacting, and plugging the borehole wall. A properly developed well will create more water and clearer water than an undeveloped well. If a well is primarily used for supply, the amount of money saved in energy costs due to development, over the life of the well can be more than the price of the well.

There are many methods of well development, including: surge block, bailing, rawhiding, overpumping, sonic-bursts, jetting, and compressed air. With each of these methods, their effectiveness will depend on the actual well construction, depth, and physical characteristics. The best way of developing a well involves stressing it by pumping out the well with an occasional surge or a slug of water flowing into the borehole formation. This "surging" action allows for clearing the passageways (or screen slots) at and near the borehole wall. If the water is only pumped out of the well, bridging will occur in the formation or screen, and will tend to plug the openings. The flow must be reversed occasionally to "break the bridges" for subsequent removal of the particles from the well.

Development by air alone is generally not effective. Assuming an airline is placed near the bottom of the well and a pulse of air is suddenly released, the column of water will begin to rise from the bottom and actually force water out of the well at higher elevations, below the bottom of the casing, decreasing the velocity and volume upwards. In larger wells, the air bubbles may "train" along one side of the casing, lifting very little water (and sediment) out of the well. At the top of the well it may look like a lot of development is taking place, but actually it is not. Pulsing the air will allow the water to fall and have some reversal of flow or surging. It is recommended to alternate air bursts with a surge block (snug-fitting disc) to break the bridges by forcing water back into the formation, then hitting it with air again, to create the surging action.

Louisiana Ground Water Association Scholarship Application

March 31st is the final day scholarship applications will be accepted.

Unless all items required by this application are completed as stipulated, the application may be eliminated for consideration.

The Louisiana Ground Water Association (LGWA) will award up to two scholarships to qualified applicants.

To be considered, you must be an immediate family member of an LGWA member, or an LGWA member's employee. Applicants must be high school seniors intending to start, or be currently enrolled in a two- or four-year college program.

Completed applications must be accompanied by an official copy of the student's high school or college transcript, class rank, and SAT / ACT scores.

Award recipients will be required to maintain a 2.0 grade point average. The scholarship provides the first payment of $1250 once the association receives a copy of the recipient's fall semester grades, and an additional $1250 will be awarded for the spring semester once a copy of the spring semester grades are received, for a total of $2500 for each recipient.

Student's Name _____

LGWA Member Name _____

Student's Relationship to LGWA Member _____

Address _____

City _____ State _____ Zip _____

Phone _____ Date of Birth _____

Planned Graduation Date (high school) _____ (College) _____

College Major (if Declared) _____

LGWA Member Company Name _____

Company Address _____

City _____ State _____ Zip _____

Phone _____

Name of High School / College _____

School Address _____

City _____ State _____ Zip _____

In addition to this application, please include:

- List all high school honors and awards (attach to a separate sheet).
- List all extracurricular activities (attach to a separate sheet).
- Describe, in 150 words or fewer, an event in your life that has made you the person you are today and how it has affected your goals (attach on a separate sheet).

ALL ITEMS ABOVE MUST BE SUBMITTED.

Signature of Applicant _____ Date _____

Signature of Parent _____ Date _____

Please return the application and all additional items, to:
Joel Walton, PO Box 202, Prairieville, LA 70769-0202

Louisiana Ground Water Association Convention & Trade Show

Membership and Convention **Registration**

January 11-12, 2022 Paragon Casino Marksville, LA

Company: _____ WW Contractor License Number : _____

Address: _____ City, ST, Zip: _____

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Payments:

Annual Dues: **$100**	
Member Convention Registration Per Person: **$35**	
Nonmember Convention Registration: **$165**	
Student and Government Employee Dues and Registration: **$65**	
Banquet Fee Per Person: **$15**	
Late Fee (if paid after December 15, 2021): **$15**	
Total Due	

Please return this form with your check made payable to LGWA, P.O. Box 202, Prairieville, LA 70769 Phone: 225-744-4554

Tabletop Exhibitor **Application**

Company: _____ Address: _____

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Representative Name: _____ Company e-mail: _____

Personal e-mail: _____ Company Phone : _____

Cell: _____

Payments:

Exhibit Fee (includes membership for current year): **$300**	
Night before convention dinner (per person): **$15**	
Total Due	

Name Badges Should Appear as Follows:

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The Key to Using Synthetic Turf with High Groundwater Tables

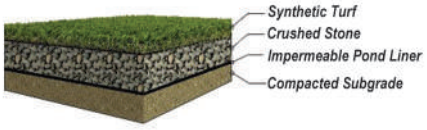
Adapted from Information by the Texas Association of School Business Officials

When it comes to Louisiana and its football games, you'd be hard-pressed to find someone who is not a fan. However, when it comes to maintaining a football field, the state's high rainfall amounts and high groundwater tables can be just as difficult to tackle as any rival team. Waterlogged, flooded fields can lead to costly repairs and injure players.

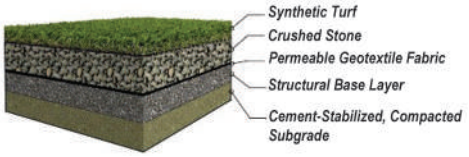
Back in 2019, when a high school in Vidor, Texas, faced water-related issues with their football field, they researched different solutions. With a very soft subgrade and a high groundwater table, the District decided to use granular-infill synthetic turf to provide a more reliable stadium field. The standard design for this type of turf involves drying and compacting the subgrade soils and capping them with an impermeable pond liner to prevent water from reaching the subgrade. Unfortunately, this design works by preventing water from reaching the subgrade from the surface. In low-lying areas, the possibility of the groundwater table rising from beneath is not only common, it's anticipated when flooding occurs. The field needed a subgrade that could breathe while allowing groundwater to rise and lower without trapping water beneath a pond liner. An issue neighboring stadiums in Louisiana, have also dealt with.

Louisiana's McNeese State University, the University of Louisiana at Lafayette, and other stadiums with field surfaces lower than the water table, used a unique configuration of materials to provide a firm and safe playing area. They applied a slightly modified design using rock structural base layers with cement-stabilized subgrade layers, capped with a permeable geotextile fabric. This provided a subgrade that does not lose strength when saturated, and permeable, to allow groundwater to rise and recede naturally without trapping water.

Standard Synthetic Turf Design



Louisiana's Synthetic Turf Design



This wasn't quite enough for the Texas High School. Hurricane Harvey made it clear, the field also needed to be able to survive a flood. A permeable subgrade design would enable the foundation to weather such a storm. To provide a stable surface, the project incorporated granular-infill synthetic turf, BB-sized particles of crumb rubber, and sand which is prone to displacement when submerged.

Together with the breathable subgrade, Vidor's field would be able to weather any storm. Less than two weeks after completion, Tropical Storm Imelda would put it to the test. Although the storm was not as far reaching as Harvey, the impact was the same or even worse. Much of Vidor, including the stadium, was underwater. Just one day after the floodwaters receded, the football team was able to resume use of the field with no substantial issues or damage. School officials were able to place their focus where it belonged - on their campuses and community thanks to the knowledge gained from Louisiana football fields.

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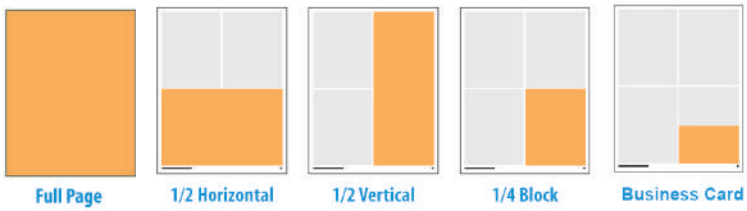
1/4-Page	3.75 x 4.75	$375	$310
Business Card	3.5 x 2.0	$100	$100



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Bit Options

Choosing the right bit is a critical decision in the drilling process. Since the early part of the last century, a number of innovations have increased bit options. Let's look at some of the more common choices.

Tricone Bit

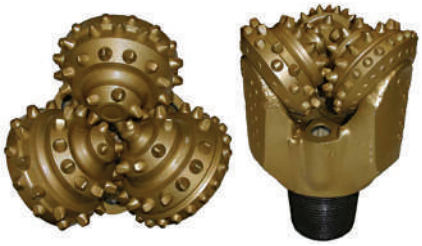


Photo courtesy of Moab Bit & Tool Co.

This bit has three cone-shaped rollers containing diamond-tipped cutters or milled-steel teeth. It comes in multiple forms which differ by bit material, teeth milling, and bearing type. Different configurations make this type of drill bit useful in medium and hard formations.

Claw Bit

This type of bit has a number of large fingers, tipped by interchangeable bullet-shaped cutters protruding from the base at an angle. It works best in soft or medium unconsolidated formations like sandstone, gravel, or shale.

Photo courtesy of Moab Bit & Tool Co.

Drag Bit

Photo courtesy of Bit Brokers International.

A drag bit uses stem rotation action to drag the bit over the surface of formation surface. With softer formations, like sand, clay, or soft rock, a drag bit loosens material sufficiently for the drilling process to proceed. This bit does not work well on layers with coarse gravel or hard rock formations.

Hammer Bit

This bit performs two actions. It hammers into the surface of a formation to break it up, while dragging diamond-tipped cutters through the broken material to pulverize it. A hammer bit works well in harder formations like dolomite, sandstone, granite, and limestone.

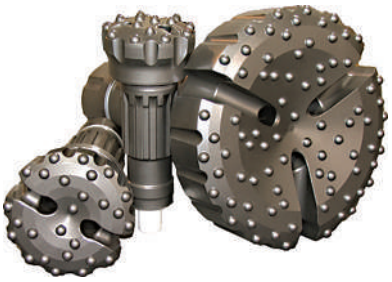
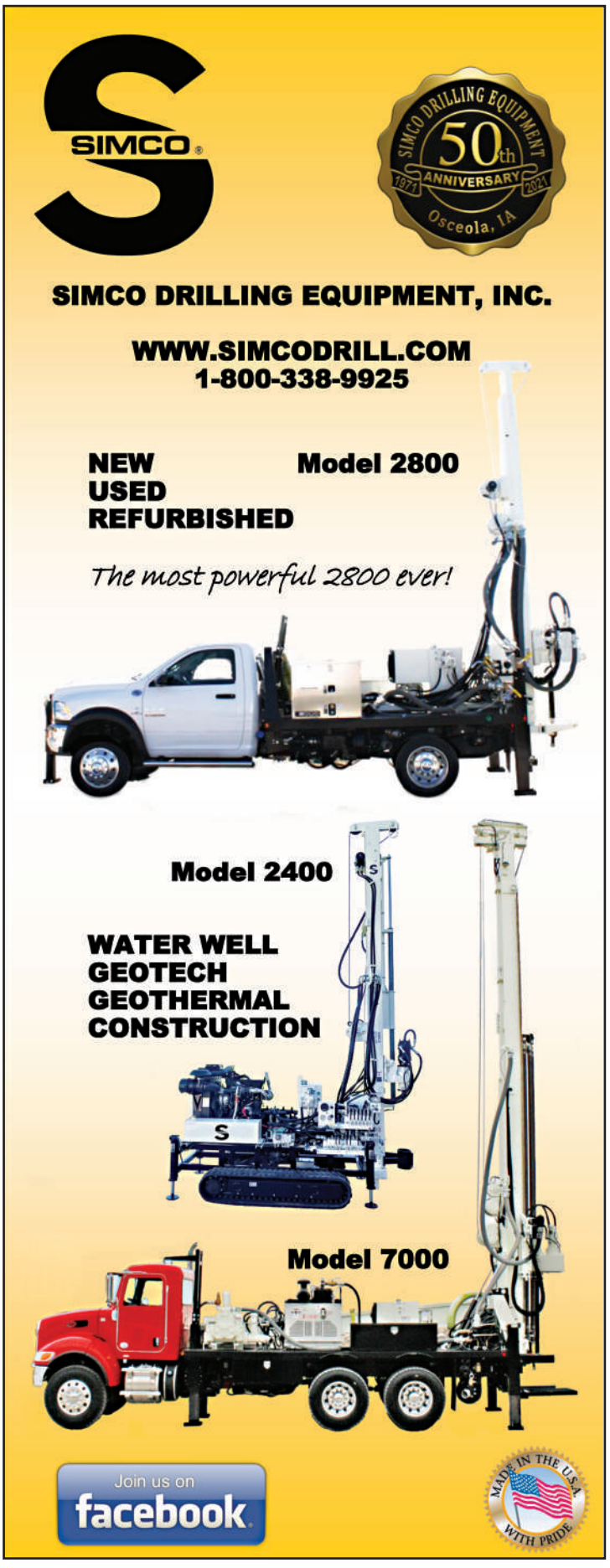


Photo courtesy of Bit Brokers International.

Most of these drill bit configurations have been around for decades. Manufacturers continuously monitor the performance of their drill bits in the field, leading to continual innovations and improvements.

Today's drill bits are far more efficient than those of even a couple of decades ago, speeding up the drilling process no matter what formation gets in the way; and faster drilling means lower costs for everyone.



What Makes a Good Water Well?

Three main ingredients go into making a good water well: drilling, pumping, and developing. The first two ingredients are indispensable since an opening has to be made in the water-bearing formation and a means must be supplied to lift water to the surface.

The third ingredient, development of the well, is often overlooked. In many instances, wells are drilled, pumps are installed, and the obtained flow is accepted, though it may not be the desired flow. A conclusion is made this is all the water available from the formation. However, the flow may be increased with proper development.

Mechanical methods for developing water wells include: bailing, pumping, backwashing or backlashing with the pump, surging with a surge block or compressed air, using explosives, jetting, or fracturing. Each of these mechanical efforts attempts to open perforations with force by applying pressure from the well bore out into the formation. During development, pressure is applied in the same direction as it was during drilling operations, which can plug some water pathways in the process.

Once a well is drilled, all the mud cake must be removed if the well is to be developed to its maximum capacity. The combination of properly used chemical treatments and mechanical agitation methods are quickly gathering acceptance as highly effective ways for removing mud and opening perforations and water-bearing formations.

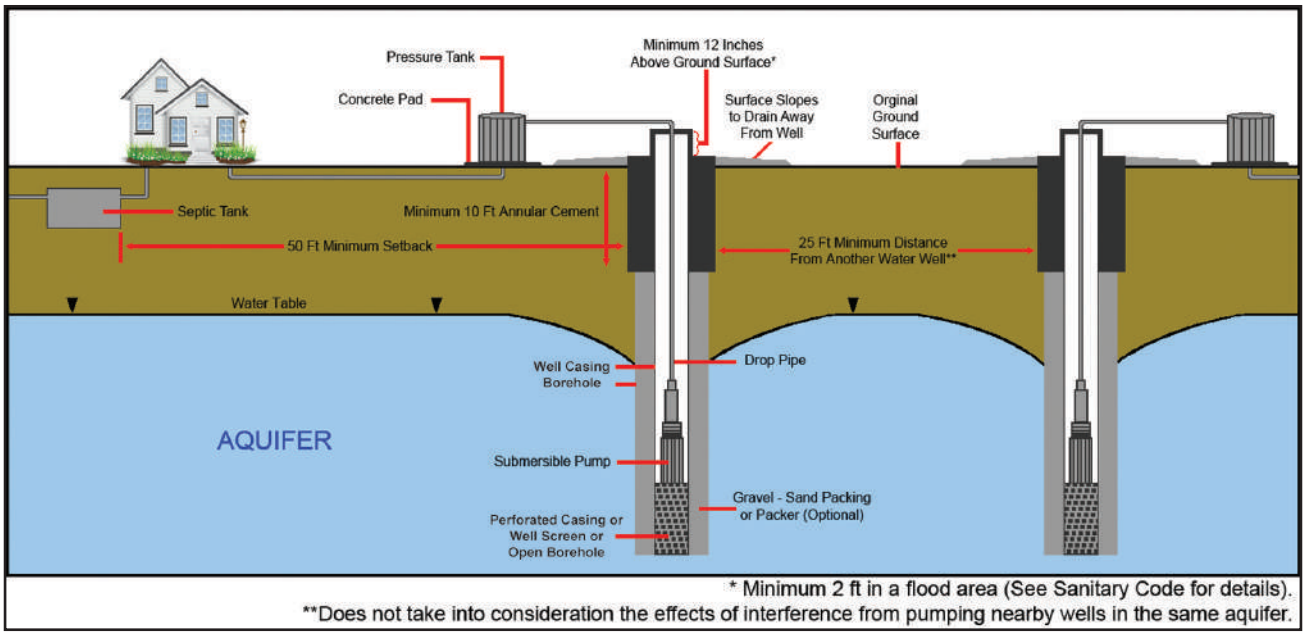


Diagram courtesy of the Louisiana Department of Health.

For a chemical treatment to work, the chemistry must match the problem. Some chemicals must be effective in dissolving, disintegrating, and dispersing commercial drilling muds, clays, and shales so they can be easily bailed or pumped to waste. Others should be capable of dissolving limestone and water-deposited scales, corrosion products, and organic growths.

If it's going be used in a water well, any chemical should meet certain requirements: it should be relatively nontoxic and should not contaminate water; it should be safe to use on mechanical equipment in the well; and it should also be safe and easy to handle. From a contractor standpoint, chemical treatments should be services performed without additional equipment. Certain chemicals have been developed specifically for use in water wells, making it possible for a contractor or well service company to include chemical treatment along with other services, adding extra profit to a job while also making a better well for the customer.

Flow loss in many wells is simply due to a lowering water table; in which case, nothing can be done except drill another well or use less water. However, for the majority of water wells, flow loss is due to biological and/or mineral deposits plugging the natural flow of water. At this point, the problem is not how or why the water flow is obstructed, but how best to remove the obstruction so maximum flow can be achieved.

As you go about the work of drilling wells, do not overlook the crucial step of well development. Effective chemicals for removing practically any type of water-pathway obstruction are available. In addition to mechanical agitation methods, a properly designed chemical treatment can make it possible to complete a job better in less time. The one-two punch of chemical and mechanical methods for treating a well provide a combined effect hard to match in today's industry.

New Water Plant Filters for Sulphur

Infrastructure has been a buzz word lately, and Louisiana is no stranger to the problems associated with aging infrastructure. “Over 50% of Louisiana water systems have infrastructure that is over 50 years old,” said Governor John Bel Edwards. “They are expensive to repair and modernize, but they are absolutely essential to the health of the community.” The U.S. Environmental Protection Agency estimated Louisiana’s 20-year funding needs for drinking water infrastructure is over $7 billion.

The City of Sulphur, Louisiana knows firsthand how aging infrastructure, particularly water systems, can impact the local population. Earlier this year, a winter storm caused unusually low temperatures in the teens, so residents dripped faucets to prevent water in pipes from freezing. This, combined with water leaks discovered after the thaw began, caused a dip in water pressure and levels.

Help arrived in the form of $1.6 billion federal funds for Louisiana, with $300 million going to local water and sewer systems. Sulphur Mayor Mike Danahay said, “The funding is absolutely a necessary thing . . . the water’s going to be funded in the current fiscal year. The next fiscal year, the water plant improvements. Certainly, we want to focus on wastewater as well.”

Since 2019, Mayor Danahay and city workers have been providing temporary fixes, but they are planning long-term solutions now. Sulphur’s allocation of $7.4 million will jump-start the process. One of the first things the city plans is to completely replace the water system filter vessels. They have already used funds from the city’s budget to make improvements to the water system, so the new funds will more than likely be used in the next fiscal year once the city’s water filter project and water well installations are complete. Sulphur recently completed a two-million-gallon ground storage water tank and anticipates making improvements to its water well system with the additional funding.

Last fall, two of the city’s eight water filter vessels were replaced.

The council authorized the city to accept bids on water filters for the Verdine Water Plant to decrease the amount of iron in the water causing discoloration, something Sulphur residents see running from their faucets from time to time. Previously, the city tried a temporary fix by replacing the media in the current vessels, but since then, the water vessels holding those media filters have become too deteriorated. Last spring, Sulphur accepted a bid of from ETEC Services for new eight-foot Manganese Greensand pressure filters.

The second part of the project includes a pretreatment system to remove a lot of the iron content prior to the water entering the filters. Until this is completed, the city plans to continue to flush out water when it contains sediments or decolorization. Flushing the line will ensure clear drinking water for residents. Sulphur city officials have maintained the water, although discolored, is regularly tested by the Louisiana Department of Health and has been found safe to drink.

Don’t Forget to Maintain Your Battery!

The battery, and specifically the connections to it, seems to be one of the most neglected items on a drilling rig. The hydraulics and engine may get serviced routinely, but very rarely do people take time to clean and maintain the connections at the battery.

Lose or corroded connections can lead to starting issues in the field. Routine maintenance of battery connections, and even the connections to the Master Disconnect can eliminate many problems down the road. A poor connection can lower the amperage from the battery getting to the starter, leading to cranking the starter too long without it starting, which in turn can burn up the starter or, at the very least, shorten its life.

A good rule of thumb would be to simply remove and clean the connections and reinstall them with some dielectric grease whenever you service the hydraulics.

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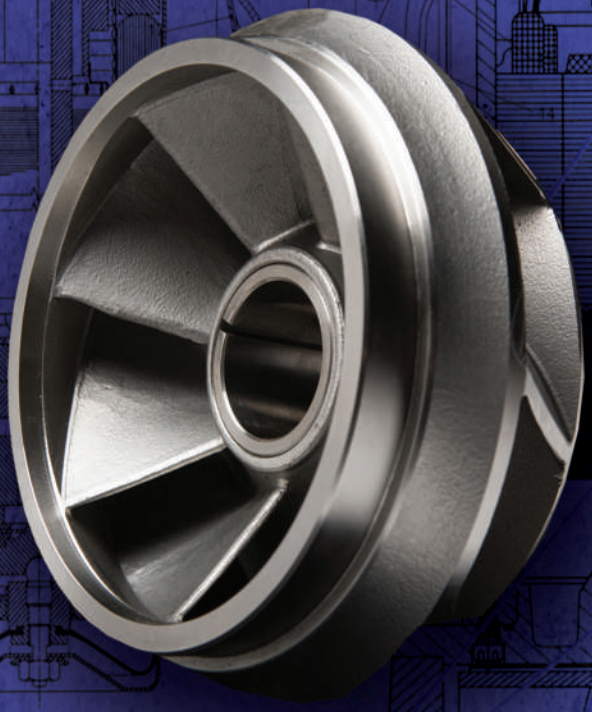

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