Manufacturer of **SOIL, WATER, and ROCK SAMPLING** Machines and Tooling for the Technical Driller

SUMMER 2020

PROBING TIMES

Information for the **ENVIRONMENTAL, GEOTECHNICAL, GEOTHERMAL, EXPLORATION, and WATER WELL** Industries

3126GT Geotech Rig

NEW

SIMPLIFY WORK *on Your* GEOTECH JOBS

Save time and effort swiftly sliding the innovative centerline head side shift into position for rotary, automatic drop hammer, even CPT or direct push. No need to move the machine or drill mast on the compact, off-road rig.

Geoprobe®

www.geoprobe.com

Six functions along the centerline simplify geotechnical applications like completing SPT sampling through hollow stem augers.

Hands-free rotary and head feed controls reduce strain on driller when completing applications like mud rotary.

GEOTECH MACHINES & TOOLING by Geoprobe®

WATCH 3126GT MUD ROTARY:
See how efficient mud work is with independent pump.

geoprobe.com/3126GT

NEW

NEW 3126GT GEOTECHNICAL RIG:
Simplify Your Geotech

No one wants to be stuck in the stone age, which is what it can feel like trying to squeeze profits out of a clunky conventional drill rig. The old dinosaur lumbers into position completing only one application while guzzling fuel and spitting fluids before breaking down – putting you behind schedule and over budget. Meanwhile you dream of a modern-day machine that swiftly slides from rotary to automatic drop hammer, even to CPT or direct push, without having to reposition mast or machine.

This innovative centerline head side shift is a reality on the compact, off-road NEW 3126GT.

Advance augers with the 2 or 4-speed rotary head. Then use the machine hydraulics to slide the head over to position the hands-free automatic drop hammer for driving SPT samples between core runs. Or use the controls to slide the head the other way to conduct CPT logging using the integrated CPT head-feed rate controls complete with cone overload protection. Or use the GH63 direct push hammer to see the subsurface with Direct Image® tooling. No manipulating the drill mast position. No mobilizing multiple machines.

So forget the days of herding multiple rigs to a job site. Forge a brighter future using the centerline head side shift to simplify the process of traditional geotech techniques — augering, mud rotary, SPT, Shelby tubes, hard rock cores, CPT – and even direct push. A taller telescoping drill mast specifically designed for geotech work with heavier winch options, 105" head travel, and 36k push and 48k pull at the head-feed cylinder means greater pull back – ideal for drive and wash – and head travel.

All this within a smaller footprint than the relic you've been using, which still includes room for a separate hydraulic circuit for the mud pump (stabilizing mud flow) and space for accessories.

But don't fret about having to break the bank to afford becoming an industry leader. The price point comes in lower than you might expect, and all the features minimize your operating costs. The end result – launching your drilling production and profit light years ahead.

Seasoned Drillers Praise Next Generation Machine

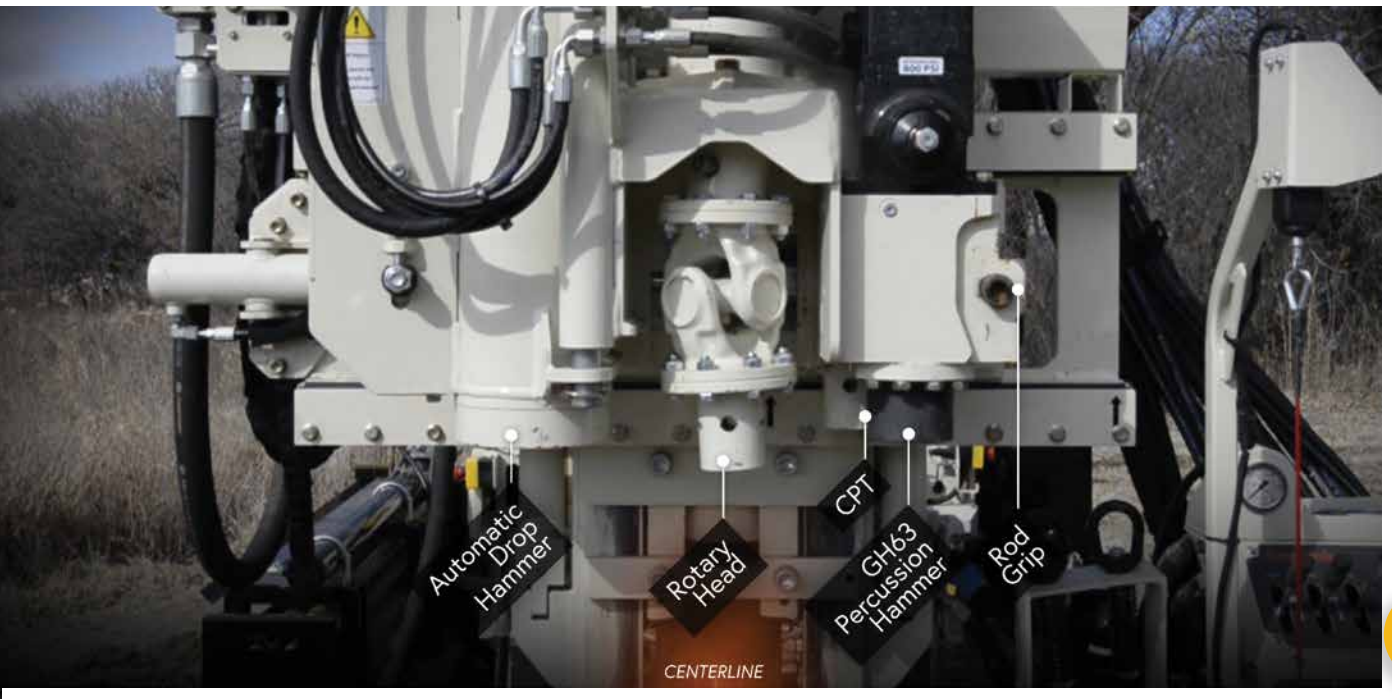
Reducing time transitioning between functions with the centerline head side shift is just one of the advantages afforded by the NEW 3126GT. Seasoned drillers who have watched and run the machine recognize the careful attention to a host of features addressing the field needs of the driller.

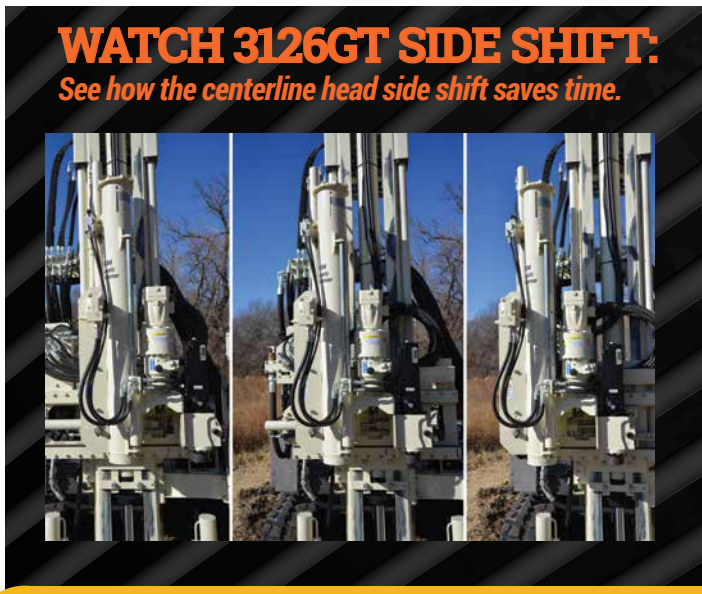
- *Wider and larger track base provides additional ground clearance to tackle difficult terrain*
- *Hands-free rotation & feed facilitates rock coring and other rotary applications*
- *Hands-free automatic drop hammer reduces strain when driving SPT samples*
- *Telescoping winch mast with additional height for center rods suited for geotech work*
- *Heavy pull winch eases pulling augers and spoons*
- *Head shifting speeds up drilling and minimizes time driller spends in danger zone*
- *Separate hydraulic circuit for mud pump provides stable mud flow while extra mast dump leaves space for mud pan*
- *Ample, well-spaced storage includes two stacked tool boxes, helper-side storage compartments, and control panel storage bin/trays*

CALL GEOPROBE®:
to schedule a demo in your area.

785-825-1842

3126GT Innovative Centerline Head Side Shift



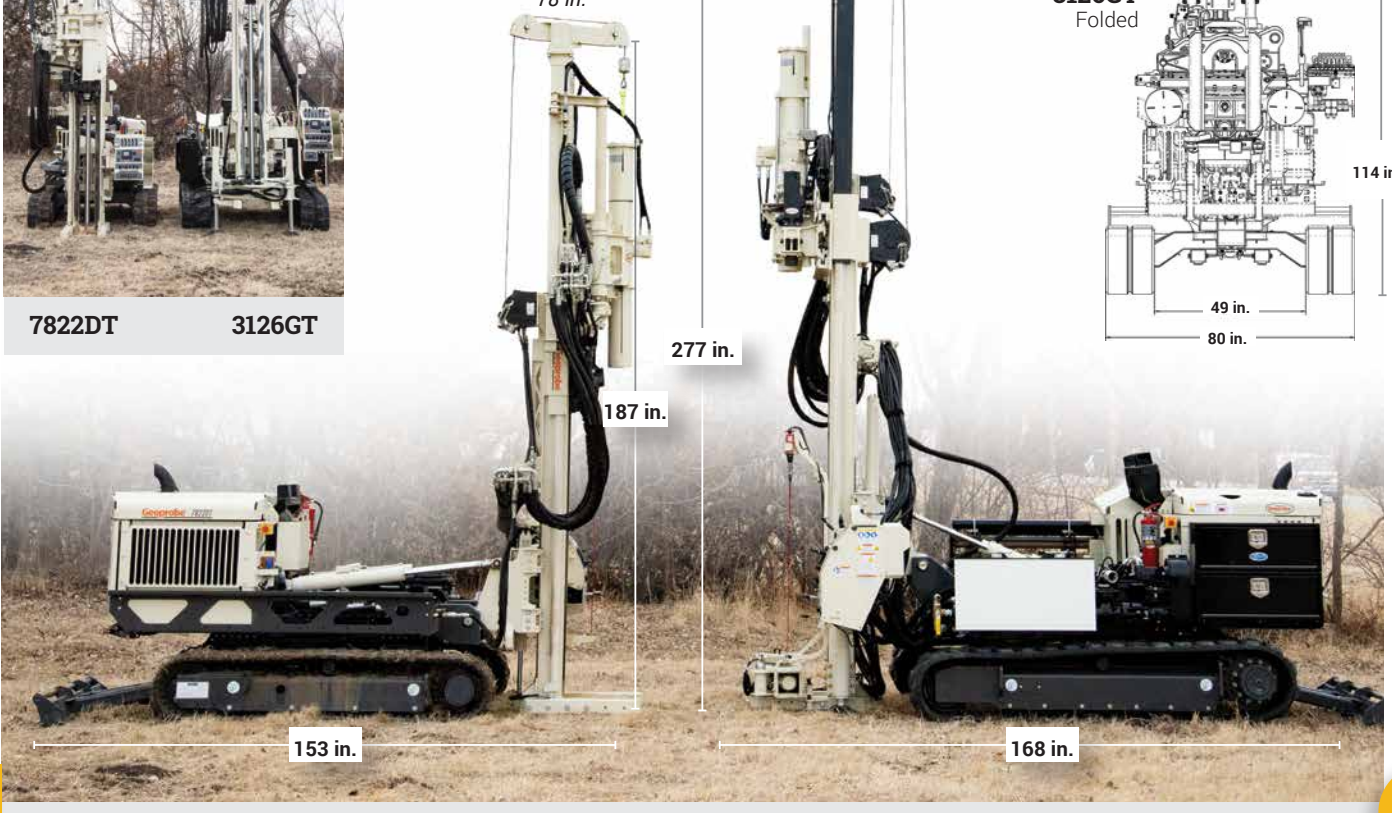


Already a Fan of the 7822DT?

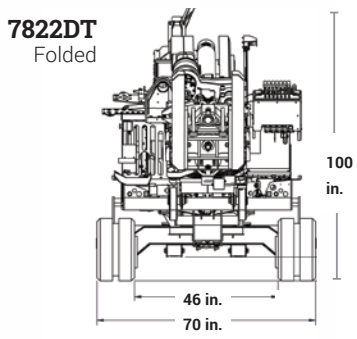
If you're accustomed to the advantages of the industry-benchmark 7822DT combination machine, then you're familiar with the wide-range of work it can accomplish. The NEW 3126GT turns the efficiency dial up another notch.

- *Larger undercarriage for better off-road capability*
- *Hands-free automatic drop hammer*
- *Space to work above the mudpan*
- *Outriggers to stabilize unit when doing rotary work*
- *More winch capacity*
- *Stable mud pump flow thanks to independent mud pump circuit*
- *Centerline head side shift with a GH60 class hammer*

7822DT 3126GT



7822DT Unfolded 3126GT



See the 3126GT in Action

You have several ways to witness the 3126GT – and our other geotech offerings like the 3100GT and CPT solutions – safely in person. Call Geoprobe® at 785-825-1842, or contact your sales representative to determine the best option:

- *Schedule a personalized factory visit.*
- *Request a personalized demo in your area.*
- *Choose a virtual viewing option.*

Confidence to Close High-profile Forensic Jobs

As a locally-owned, homegrown geotechnical engineering service provider, MLA Geotechnical in Austin, Texas, was accustomed to using their conventional rigs to complete more than 250,000 soil borings in Central Texas. With the influx of people moving to Texas, they worked to meet the challenges of increasing workload by hiring and training new staff and upgrading their fleet of drilling equipment. When they found themselves in need of a truck-mounted drill rig – fast – to complete thousands of borings per year in hard clays and limestones, the Geoprobe® 3100GT quickly became their top choice.

"The advantages of the Geoprobe® 3100GT over the other rig we were considering purchasing were availability, the support of Geoprobe®, and the quality of the 3100GT itself," Tim Weston, president, said. "The quality of construction of the 3100GT is like no other drill rig we have used and we have been drilling for 55-plus years."

Conducting tools-in-the-ground testing with the 3100GT both in Kansas and Texas proved they could maintain their production levels.

"I was worried it wouldn't push Shelby tube with the soils we have here, but it proved me wrong," Duane Clark, driller, said. "I was worried about rock and harder subsurfaces, but it far exceeded what I thought it would do. The 3100GT does so much in a small package. I'm pleased with how well it drills and how easily it does what I need it to do."

This means they've been able to rely on it for a near constant-level of production.

"The 3100GT has exceeded production of our other rigs due to its versatility in sampling types and ability to handle drilling in hard clay and limestone. We can easily switch from continuous sampling with Shelby tubes, to blow counts, to auger drilling with efficiency," Weston said. "The Geoprobe® 3100GT fits perfectly in the sweet spot of geotechnical drilling in central Texas. It is neither too large or too small to meet our needs, but instead perfectly fills the void. It has met the high demand of drilling thousands of borings and remains extremely reliable."

In addition to production, they also gained confidence to go after high-profile forensic geotechnical jobs.

"The rig is solid," Shauna Strehler, operations manager, said. "From a drilling manager's standpoint I don't have to worry about where I send it. It's turn-key. It does every kind of testing we provide. And with the craftmanship, I don't have to worry about leaks or failures. I don't worry about where I send it or what I can do. For me, that's money."

So now Strehler doesn't shy away from the job with grumpy owners and their lawyers, clients and their lawyers, and her boss all standing in the driveway watching the work.

"It made me nervous to take our old equipment. It was often a volatile rig and you didn't know what you would get," she said. "With the 3100GT, I know I can show up, turn the rig on, do what I said it would do, and it won't create more problems. That is a huge stress relief."

Clark credits the rig with more good days on high profile jobs.

3100GT features increase production for MLA Geotechnical.

"A good day at a high-profile job equals more jobs through word-of-mouth," Clark said. "I know our other rig didn't do that for us."

For Strehler, the dependability isn't just because it's new. She's had to shut down jobs for weeks with other new rigs because of leaks and breakdowns. She credits Team Geoprobe® and the pride each employee exhibits in their day-to-day contributions to the final product. For her a quality rig isn't the only thing she's gained.

"We've actually gained production level. It drills just as many holes as the conventional rig we were used to, but it does better in many ways," Strehler said. "We can get in and out quicker, do a better job, and leave less mess, which means the more money we can make. And we're only putting one rig on a job versus pulling another rig, which means more profit."

When reflecting on the work MLA has done, Strehler reminisces of a large subdivision job in San Antonio completed in 2018 where many of the houses were failing, requiring borings in the front and back yard.

"I wish I'd had the 3100GT for those 100 holes in San Antonio," Strehler said.

NEW

Split tube soil sampling system manufactured under U.S. Patent 9,551,188

3-Inch Interlocking Split Spoons

After just a few uses of the 2-inch interlocking split spoon, Discovery Drilling in Alaska was convinced they needed the new design in a 3-inch version to satisfy their sample-hungry clients. In their market, 80 percent or more of the geotechnical jobs – where split spoon sampling and blow counts are required – are conducted by advancing a 3-inch split spoon with a 340-lb. drop hammer. With this customer feedback in hand, Geoprobe® tooling engineers set out to meet their need and then let Discovery put them to the test.

"We've conducted several projects so far with the new 3-inch spoons. …We've sampled geology where the spoons would have to endure 100 blows with the 340-lb. hammer to barely achieve six inches of penetration, and they come out of the ground still maintaining their integrity," DJ Wardwell, operations manager, said. "And most importantly, they are hardy enough where even after that kind of punishment, they still assemble and disassemble vastly easier than the legacy samplers we were used to."

The shoes shown were just pulled from a job site after being driven to refusal on bedrock (30 to 50 blows with the 340-lb. auto drop hammer) in two, 35-foot borings. Blow counts were in the 20-40 range per 6 inches throughout the borehole, sampling every 2.5 to 10 feet, and then every 5 feet thereafter to refusal around 35 feet in total depth. The shoes look to be in fantastic shape even after multiple bedrock refusal drives.

NEW Spring Assisted Swivel Lift Caps:
Improved for Geotech

Ample rains the past few years have the United States Army Corps of Engineers out of Omaha, Nebraska, busy from the Mississippi River west, conducting geotechnical tests on levees and damns. From spinning 4.25-inch augers to completing SPT or Shelby tube tests, the drill crew divides up, spreading across the United States with their four conventional rigs.

"Pulling 35-foot tool strings works your forearms pretty good," Steve Carroll, operations manager, said.

When Carroll saw the spring assisted swivel lift caps from Geoprobe® he thought it was a "no brainer" to put them on all the rigs.

"It's easier to turn, making it easier on the hands and the body — the spring does the work," he said. "When you're staying busy you do what you can to save the arms and wrists."

According to Carroll, younger members of his drill crew clearly found using the spring assisted swivel lift caps easier when drilling holes to a couple hundred feet as compared to the traditional-style NWJ pull caps. For them it was simply a matter of working smarter, not harder.

"They barely have to turn it. If you don't have to work harder, why? It just spins right off," Carroll said. "You don't have to worry about carpal tunnel. It's easier on the joints as you get older or as it gets colder outside."

Now even easier on the forearms and wrists, the NEW Spring Assisted Swivel Lift Caps are lighter weight and feature improved vent holes. Customer feedback related to length and weight as well as requests for vent holes provided inspiration for Geoprobe® tooling engineers to make them even more of a geotech asset.

"Conversations with geotech customers were the catalyst for increasing the vent hole size on the NWJ lift cap," Kyle Riedel, tools group-manager, said.

WATCH SWIVEL LIFT CAPS:
See how they minimize twisting to break tool strings.

geoprobe.com/lift-cap

AWJ (231440)

- *Decreased length by 3 inches*
- *Decreased weight by 2 pounds*
- *Added vents (2 X 1/2")*

NWJ (230334)

- *Decreased length by 4 inches*
- *Decreased weight by 5 pounds*
- *Increased vent area by 125%*

Also available in: 2.25 Box, 2.25 Pin, 3.75 Box, 4.5 RHML Box, and 3.25 Box.

Durability and ease of Geoprobe® interlocking split spoons have made them a staple on Bulldog Drilling rigs and a favorite among their clients.

WATCH INTERLOCKING SPLIT SPOON:
See how the fingerlike design decreases effort and increases durability.

geoprobe.com/split-spoon

Sturdy Interlocking Split Spoon Means More Footage

Located in the St. Louis metro area, Bulldog Drilling often found themselves bending traditional split spoons and rounding off shoes in the urban fill. When they retrieved samples they struggled to open the spoons, resorting to gripping with bench vises and beating with wrenches. So for a company with an ever-increasing geotechnical workload making a name for itself by drilling in difficult geologies, seeing the Geoprobe® interlocking split spoon at the 2018 open house seemed like a perfect solution to their struggle.

"We bought two interlocking split spoons and used them 8-9 months, pounding rocky rubble for several thousand feet. We never had to put a wrench on them, could always turn them by hand," Rob Scharringhausen, partner, said.

Once they experience how the extra effort typically required to open standard split spoons is eliminated by the innovative fingerlike design, his clients love the simplicity and speed afforded by the interlocking split spoons. But it's not just the ease of that he has come to value. It's also the durability.

"The shoes don't round off like on traditional spoons and they don't get bent in rubble fill like traditional spoons," Scharringhausen said. "The very first two we had lasted a year-and-a-half of everyday use. The durability and workmanship is as good or better than anything else I've seen."

Now they have eight of the Geoprobe® interlocking split spoons for their three conventional drill rigs.

"It's definitely faster taking them apart and putting them together, which means we can drill more footage in a day," Scharringhausen said. "The helper can be prepping tool strings instead of at the back of the rig opening up split spoons."

Dedicated CPT Machine Opens Profit Options

Geoprobe® 20CPT skid steer has opened the windfarm market to Olsson, gathering data on soil stability along crane paths.

The 65-year-old engineering firm, Olsson, has been in the drilling side of the industry for the past 15 years, utilizing five conventional drill rigs. However, they were frustrated their big rigs lacked the necessary weight to complete Cone Penetration Testing (CPT) to the full potential. What they desired was an efficient, dedicated machine to run their CPT. In choosing the Geoprobe® 20CPT skid steer, their dedicated machine also provided profit versatility.

"If we're not pushing cone, the skid steer can be cleaning up or helping other rigs so it can be profitable no matter what it's doing," Kevin Whitla, project manager, said.

New Markets

One of the first big CPT jobs completed with the 20CPT skid steer was for a solar farm on the Texas coast. Olsson also worked an Iowa windfarm, where they were moving cranes around, that didn't call for any physical soil samples. They gathered data on the crane paths to ensure the soil was stable for the heavy equipment. In a market that requires a lot of cone data, Olsson is now a player.

"We're widening the field of what we can do now that people know we have a dedicated machine," Whitla said. "We have a better shot at jobs like the solar and windfarms."

Amplified Production and Results

In addition to opening markets, the 20CPT skid steer has removed the time-consuming task of setting up their conventional drill rig to do cone and then tearing it down to do drilling while adding the ability to push to greater depths.

"Many jobs require a certain percentage of cone and a certain percentage of drilling. Now we can send both rigs out to do their job, not tying up equipment," Whitla said. "And we can push cone to a further depth than with our traditional rigs, so we're getting better results."

Increased Efficiency

The 20CPT press has also enabled them to efficiently solve challenges. When Olsson completed a roadway job in Lincoln where an oddball layer of sand showed up inconsistently across the borings, CPT was the economical solution.

"We came back through with the CPT to punch a bunch of holes in between to get the complete profile – without excess soil samples and extra effort. This was more efficient and cheaper for us," Whitla said. "The CPT provided a continuous soil reading to pinpoint the depth of the sand versus the drilling, which disturbed the soil making it hard to pinpoint the exact start of change in soil layers."

Additional Access

The small size of the 20CPT skid steer has also given them the option to do more limited access jobs, getting them into tight spots while still getting quality data.

"We do a lot of work for the Natural Resource District on water conservation projects. So when they build a damn for a retention pond, we do a lot of cone work on the limited access levees," Whitla said.

A recent job was on a golf course. Thanks to the cone and tracks they completed the job with less soil disturbance and fewer ruts when trying to get to the site.

Reliable Partners

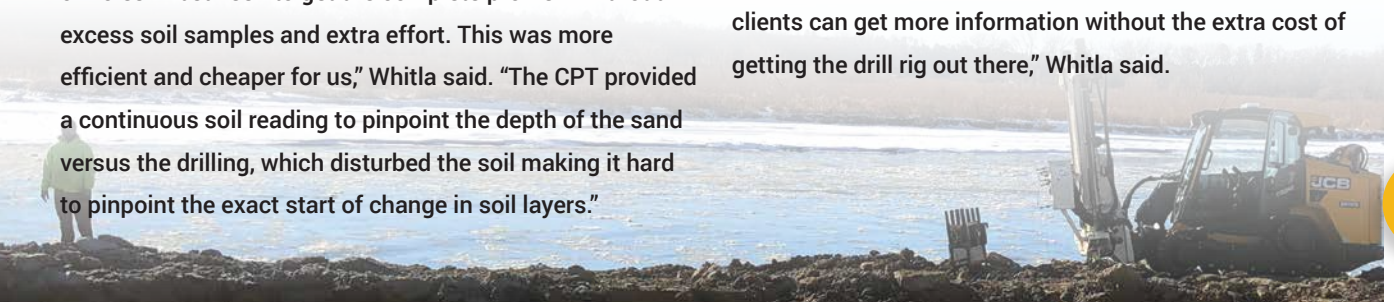
Automatic feed rates and well laid out controls make the rig efficient and easy to run. And while Whitla describes the quality as "great," for the few times he's had an oddball software or cone issue – or even when they've experienced some hydraulic issues with the anchors – he's known help is just a phone call away.

"I can contact Troy Schmidt and he'll walk me through troubleshooting while I'm in the field," Whitla said. "Geoprobe® has put in a lot of time and effort to try and solve problems and accommodate our needs."

Saving Time and Increasing Profitability

With the 20CPT skid steer, Olsson now completes a lot of footage in a short time, leading to increased profitability – which pleases them and their clients.

"It takes a lot less time to set up and push cone to 50 feet versus a drill rig drilling to 50 feet. Engineers and clients can get more information without the extra cost of getting the drill rig out there," Whitla said.



Geoprobe® CPT Advantage: CPT-ready Rigs and Cone Calibration

At Geoprobe® we consider our machines to be "CPT-ready" if they incorporate the following components:

DOWNFORCE: effectively push CPT with force to execute the work.

AUTOMATIC HEAD FEED RATE CONTROL: provides a consistent 2cm/sec CPT push rate, meeting ASTM standards.

Troy Schmidt, CPT Specialist

DOWNFORCE LIMIT CONTROL: the 3126GT, 3100GT, 3230DT, and 2060CPT include a control in the menu of the system display to derate the downforce and observe the pressure being placed on the cone, providing another operator checkpoint.

Cory Harvey, CPT Specialist

With more than 20 years experience, Geoprobe® has the technical team to offer CPT troubleshooting, spare parts, service, and repairs — including cone calibration.

Doug Koehler, CPT Specialist

CONE CALIBRATION: it's common for cone electronics and gauges to drift out of tolerance over time and frequent use. Calibrating annually — per the ASTM standard — provides the opportunity to confirm your CPT is measuring correctly and accurately.

Cabin Solves Challenge of Weather Extremes

Many years ago, MATECO invested in Cone Penetration Testing (CPT) for use by anchoring one of their direct push rigs. As geotechnical engineering firms continue to increasingly call out CPT, they began looking for ways to up their game in the CPT market. This time, rather than relying on anchoring, the Michigan-based company looked to rely on static weight in order to market the use of CPT regionwide. Given their service area in the north-central United States, the climate-controlled cabin of the Geoprobe® 2060CPT Crawler provided an advantage they thought their customers would appreciate.

"We're really excited to have a field investigation performed in a controlled or open environment," Dale Elliott, president, said. "In the Midwest, there are a number of months that are not best for investigative work. We've got the best working space available for clients to come and enjoy it while we're performing their investigation."

WATCH 2060CPT CRAWLER:
See the advantage of the self-contained unit.

geoprobe.com/2060CPT

While in the climate-controlled cabin, clients can observe the large visual display projecting real-time data as testing is performed. The cabin also provides the ideal working environment to expand their Direct Image® expertise. They upgraded their tooling to include the Membrane Interface Hydraulic Profiling Tool (MiHPT) to reach their goal of keeping the 2060CPT Crawler busy with one-half CPT work and one-half environmental work.

To get started on the right track, the MATECO team attended nearly a week of training at headquarters in Salina. This training provided them a baseline for operation of the rig, press, and tooling along with the opportunity to discuss logistics and capabilities.

Almost immediately upon delivery of the rig, they took it out on a job site comprised of high blow-count materials. They completed a few borings to get a feel of the performance and what kind of results they could expect on such as site.

"Geoprobe® worked side-by-side with us and continues to develop some things to help make the crawler even more of a complete package," Elliott said.

For now the team is busy getting organized. With an abundance of storage within the specialized rig, they're working through the logistics of which spare parts to carry and where to put them.

"This is our seventh Geoprobe® and each one is different. Each has its own special use, and this is going to be one of those special-use machines that we're going to have for a long, long time," Elliott said. "Geoprobe® is one of those manufacturers who listens to the needs of the industry. Others do, but Geoprobe® has had an ear to many contractors and I feel like we've been one of those. Their team works to improve operating standards of good contractors."

MATECO tests their new 2060CPT Crawler and MiHPT system shortly after delivery.

NEW

NEW Dual Flight Anchor: Save Set-up Time

Earth anchoring options on our 3126GT, 3100GT, and 7822DT now include a single, dual flight anchor leading with a 10-inch standard anchor and following with a 12-inch flight on the extension above. The dual flight anchor approach provides up to twice the reaction when installed to the same depth (relatively cohesive soils). When installed 5-feet deeper it will gain another 60 percent reaction or more.

WATCH SINGLE ANCHOR:
See the speed of using the dual flight single anchor.

geoprobe.com/bridge

NEW

Convenient, Consistent Poly-filters

Founded more than 40-years-ago as a geotechnical drilling company, Amdrill in Brooksville, Florida, has noticed opportunities for Cone Penetration Testing (CPT) have picked up in the past year. They have also noticed that in certain types of denser, consolidated soils the pressure readings with the brass ring filters weren't quite as defined as they would have liked. Then they tried the NEW Geoprobe® poly filters.

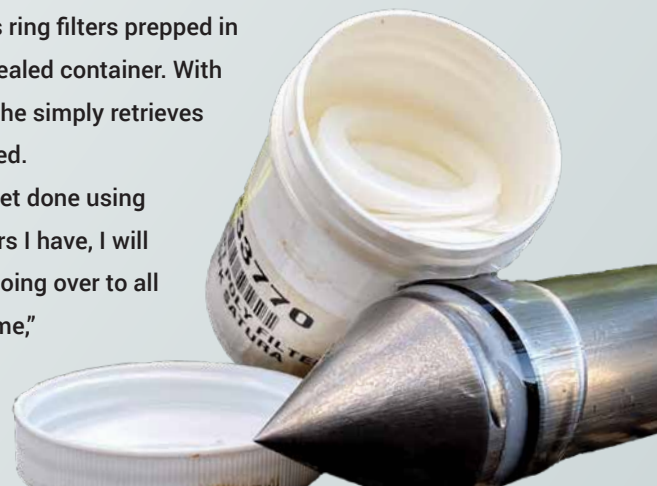
"I had been getting a bit of a 'lazy' line in denser materials. These provide a better reading," Todd Ives, operator, said. "If I know I want to do a dissipation test, I will definitely use the poly filter because I think I get a bit better pore pressure reading."

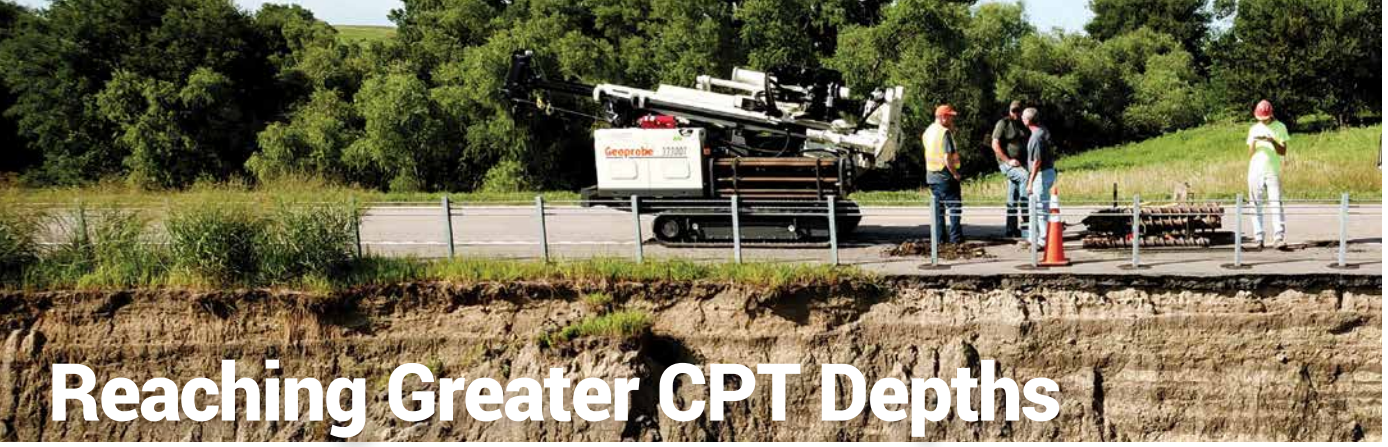
Coming in pre-soaked packs of 10, the new poly filters also provide the convenience of 'one-and-done' versus the extra effort of determining whether the brass filter has exceeded its viability.

"With brass you have to gauge when it's worn out, which is sometimes a fine line between ok and done," Ives said. "This takes the guess work out."

The increasingly busy schedule sometimes requires more than a dozen pushes, which historically would have necessitated Ives having multiple brass ring filters prepped in the vacuum-sealed container. With the poly filter, he simply retrieves them as needed.

"Once I get done using the brass filters I have, I will definitely be going over to all poly, all the time," Ives said.





Reaching Greater CPT Depths

Responsible for completing all soil mechanic and bridge foundation drilling, design, and testing, members of the Nebraska Department of Transportation team in Lincoln are adept at all applications – hollow stem, Shelby tube, mud rotary, coring, continuous sampling with direct push, and Cone Penetration Testing (CPT). So when it came time to replace one of their conventional rigs, they wanted something as versatile as they are. Upon delivery of their Geoprobe® 3230DT, they quickly learned its operation and headed into the field.

"We can go into places throughout Nebraska to replace bridges and drill for slope failures and complete direct push until we hit rock and then core samples to 100 feet. It works really well," Nikolas Glennie, engineer, said. "Without that capability, in the past we hadn't been able to seal off the hole, which creates a big mess with hollow stem auger. Now we make less mess, it's lots easier, and we're quicker to get projects done."

In addition to the mess, the Nebraska DOT had also been dissatisfied with depths their old rig could push CPT.

"We can take the head of the 3230DT closer to the ground, so there's not a lot of rod in the air compared to a traditional rig," Glennie said. "We're able to do more CPT pushing through sand layers and denser materials, gathering more data than before. With a traditional rig, we'd start bending rods in stiffer materials rather than going deeper."

The ability to anchor the 3230DT, achieving greater CPT depths, has led to the development of a new procedure integrating the CPT data into the bridge piling design.

"Before we would do four to six mud rotary SPT borings. Now we can, if the site allows, do one or two mud rotary and four to six CPT in half the amount of time," Glennie said.

The Nebraska DOT has also found themselves developing a preference for direct push, valuing the solid profile of the soil materials that, when compared side-by-side to Shelby tubes, appear to be nearly identical.

"The plastic liners seem to provide a more realistic sample than the Shelby tubes because they aren't compressed," Glennie said. "They provide a nice, clean, continuous geological profile rather than guessing where layers meet in the ground."

The team also values the safety features built into the 3230DT, including the presence bar and the ability to move the control panel.

"The operator is not only able to monitor what is happening all around the project site, but is also able to stand away from the rotary drive," Glennie said.

The ability to safely, quickly, and easily switch from percussion direct push to core drilling or to hollow stem auger over CPT has saved the office significant time. Now there is no downtime when switching over different drilling methods and they're completing a lot more CPT work.

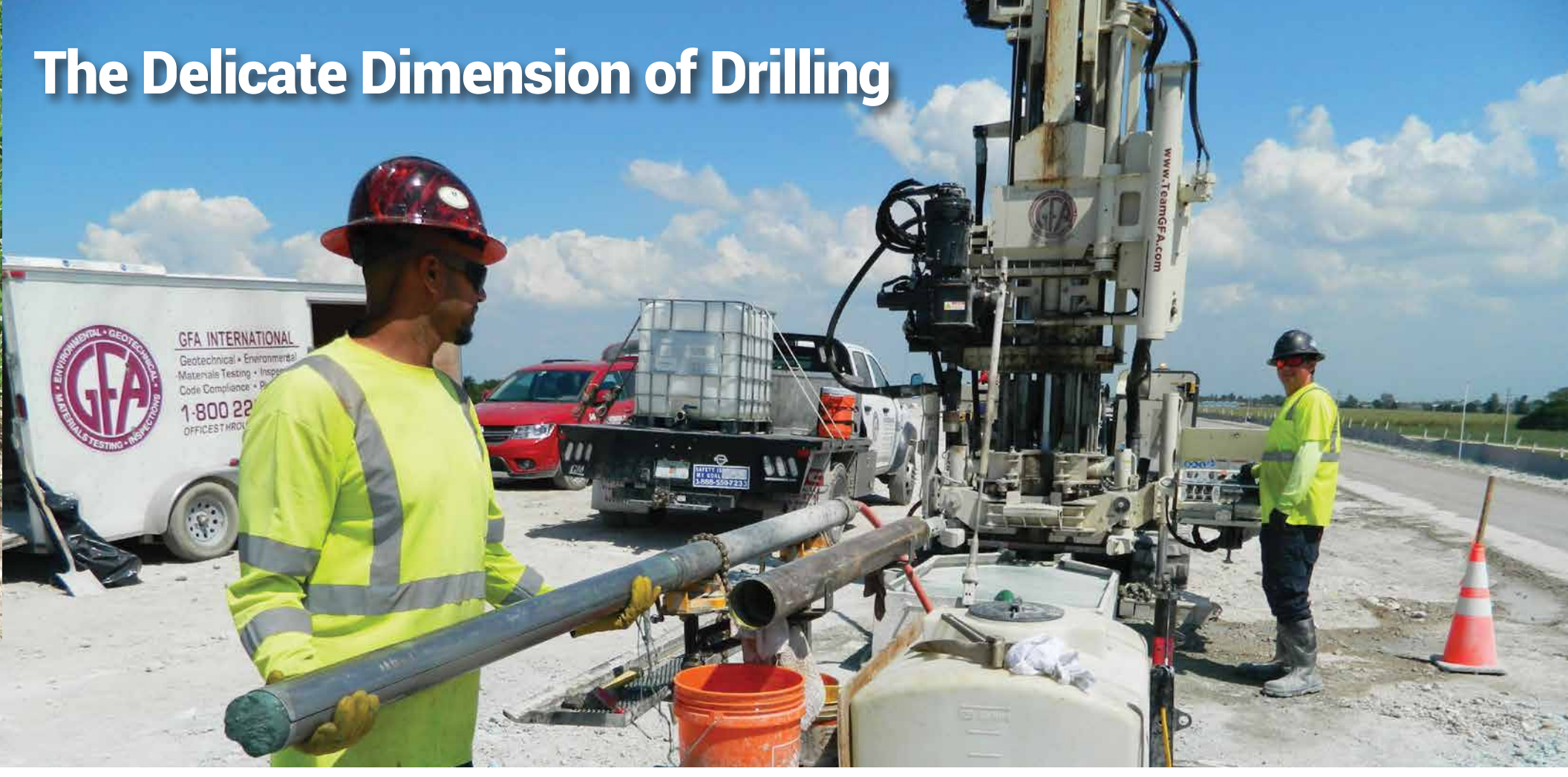
"We've had a lot of flooding the past year with 27 bridges needing work or replacement. We've gone out to most of them with the 3230DT," Glennie said. "We're able to get to other projects faster. We can get ahead of schedule versus being on or behind schedule."

Flooding has kept the Nebraska Department of Transportation busy completing bridge foundation and slope failure tests, increasingly relying on CPT to inform designs (top left). With the versatility of the 3230DT they create less mess, exert less energy, and complete projects faster (above).

WATCH 3230DT-CPT:
See how efficient it is to switch from rotary to CPT.

geoprobe.com/3230DT-CPT

The Delicate Dimension of Drilling



Geoprobe® 3230DT increased productivity for GFA International, allowing them to complete exploration work along Herbert Hoover Dike almost twice as fast versus sending two different rigs, leading to additional work.

Members of the damns and levees specialty division of GFA International are no strangers to the pressure for perfection. GFA's contract with the U.S. Army Corps of Engineers for work on the Herbert Hoover Dike, the largest Army Corps project in the nation, requires a 90 percent recovery rate. To be successful requires them to be efficient – and delicate.

"It's a funny thing to say, but the drilling we're doing is very delicate," Tom Ortner, manager, said. "A whole day's worth of work can be destroyed by applying too much down force."

To remediate piping – water flowing out from under the dike, grabbing sand, causing the dike to erode or sinkholes to develop – in the seepage control project, the Army Corps has installed a cutoff wall along the southeast part of the dike that surrounds Lake Okeechobee. Cement and bentonite are mixed with the soil, making it cohesive, to form the 3-foot-thick wall. GFA's role is to come through and core the new wall – perfectly straight through – up to 80 feet to test the cores and boreholes.

When they began working on the project they would mobilize one rig, conducting exploratory SPT to define a certain layer of the material. Then they would mobilize a second rig, conducting the coring of the very fragile 150-psi material. Their proficiency being gentle was paramount as they investigated ways to increase efficiency running the PQ3 wireline system. GFA found the perfect combination of precision and power with the Geoprobe® 3230DT.

"Often times in a top-head driven rig with multiple systems on top, it wobbles or has slack. In the type of work we're doing we can't have rigs that move around, we have to have them be true and straight and rigid," Ortner said. "We have found the 3230DT to be very tight. No wobble."

GFA also got the added benefit of increasing their productivity through the 3230DT's direct push capabilities.

"Now we're able to use the DT325 system and complete exploration almost twice as fast versus sending two different rigs to do the work," Ortner said.

For Ortner, going from 80-100 feet of SPT per day to 180 feet of direct push has meant money in the bank.

"Our ability to direct push allows us to maximize footage. When we invoice, live, and breathe on rate-per-foot, the revenue increases on a daily basis make this a profitable service line," Ortner said.

As a company GFA has always been open to change, moving away from older-style drill rigs to embrace technology and focus on what it can do for them. Perhaps unexpectedly, the 3230DT has expedited the training of new drillers, quickly turning them into more productive members of the team.

Prior to the 3230DT, the driller would establish a standard amount of time spent drilling required to reach the desired material. However, this wasn't always a true test since the formation composition fluctuates.

"The sensitivity of the feed rate and weight on bit controls on the 3230DT allow you to see on the control panel what a 30-year-experienced driller knows," Ortner said. "Now we can teach a guy the optimal weight on bit using the controls – so they know not to exceed a certain value – and a new driller can have confidence in completing the coring without damaging the material."

For them, embracing technology also leads to safer operation. The double breakout on the 3230DT eliminates manually breaking connections often necessary on small rig platforms, minimizing opportunities to get hurt. The quick-connect hooks ease transition and encourage use of the correct tool versus avoiding harder to change hooks on other rigs.

Ultimately, adding the 3230DT to their fleet has added more work, which recently led them to add a new 3230DT.

"Our success rate since we started using the 3230DT has improved and opened doors on other projects. Contractors that we work for now want us to go wherever they go," Ortner said. "We're starting a new job in Illinois as a direct result of the work we've done on the Florida projects."

In fact, the last four or five rigs GFA has purchased have been Geoprobe® as a result of Team Geoprobe®'s efforts to better the industry.

"When we bought our first 7822DT, we came and visited headquarters and were impressed with how Geoprobe® was wanting to change the industry, to make it better for the drillers," Ortner said. "I like that they're looking out for our interests, to help us become more efficient."

Gaining Ground on the Green Ooze

One cold day in late December rush-hour motorists noticed green ooze gushing onto the pavement through a crack in the retaining wall of I-696, north of Detroit. That evening and into the next day, the U.S. Environmental Protection Agency (EPA) began an initial cleanup of more than 11,000 gallons of polluted rain and groundwater from inside and beside the vacant factory — a cleanup process that started back in 2016 *(see timeline below)*.

A hand-dug hole, 10-feet square and 5-feet deep, hidden in the basement of the former metal-plating factory had collected waste chemicals, ultimately contaminating the ground.

To mitigate the situation, EPA installed a sump in the building basement and along the highway barrier to pump out the contaminated liquid. EPA also created a 90-foot long by 14-foot wide trench filled with porous material between utilities where a strategically placed sump intercepts the contaminated groundwater coursing toward the highway.

By early January, the EPA hired contractors to extract soil borings, complete Hydraulic Profiling Tool (HPT) logs, and install monitoring wells. Mannik Smith Group was on the site in Madison Heights with their Geoprobe® 3230DT and Stock Drilling used their Direct Image® HPT tooling.

"The EPA wanted us to delineate where the ooze was leaking from the building on the site," said Rob Schippert, driller with Mannik Smith Group. "We completed environmental borings to narrow in where the source was located and installed monitoring wells around the building to watch for leaks in other directions."

During the week-and-a-half on site, the 3230DT came in handy to use 4.5-inch casing with direct push instead of augers for the well installations.

"The EPA representatives on site were convinced direct push was the right way to do this job," Schippert said. "We weren't turning up soils that would have to be drummed and then disposed of. It was a whole lot cleaner process."

Early each day he'd set up the rig and there would already be a news crew on site.

"The contamination story was very well covered by the news media, until the coronavirus kicked off," Schippert said. "They're still doing clean up, but now it's not being covered."

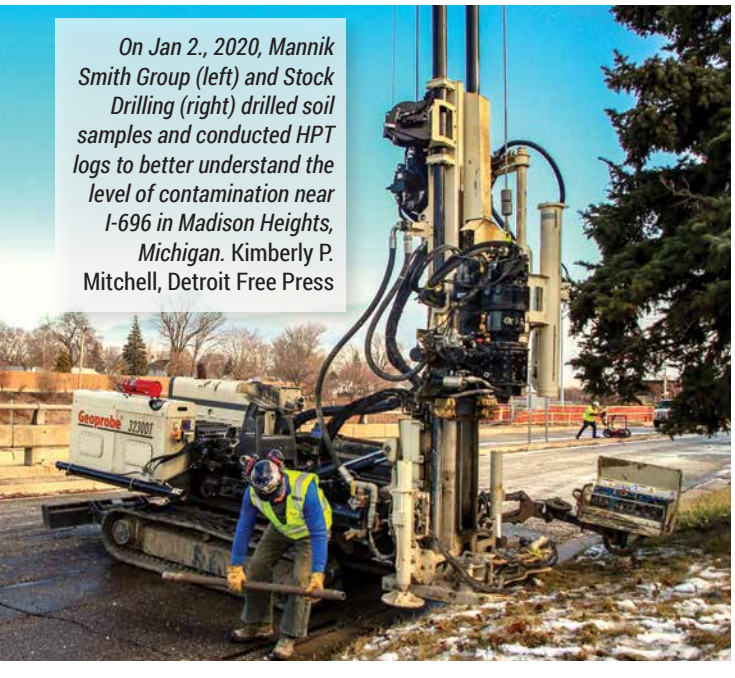
By mid-January the EPA had collected 21 soil boring samples and eight surface soil samples. Four permanent monitoring wells and 25 temporary monitoring wells were installed. Six water samples were collected from the storm sewer and catch basins near the facility and the outlet to Bear Creek. Michigan Department of Environment, Great Lakes, and Energy (EGLE) had collected additional samples from storm sewers and from Bear Creek.

- *Soil samples collected from the highway embankment, where the green ooze appeared, showed hexavalent chromium, multiple heavy metals, and other contaminants at levels below the threshold for direct human contact.*
- *Groundwater samples taken between the building and the highway service drive showed elevated levels of chromium, trichloroethylene (TCE) and cyanide – all chemicals previously used by the former metal-plating factory.*
- *Water samples collected from the storm sewer near the site showed levels of hexavalent chromium at 140 micrograms per liter (ug/L) above the 100 ug/L standard for drinking. The storm sewer eventually enters Lake St. Clair miles away.*
- *Water samples retrieved from the hand-dug hole contained levels of PFOS — one of the PFAS compounds — at a level more than 10 times above Michigan's groundwater standard.*

As of late March, 64 soil samples and 60 groundwater samples had been collected by EPA contractors. By early May, more than 150,000 gallons of contaminated water had been recovered from sump pumps and the interceptor trench diverting groundwater from the building.

According to the EPA website, "Although measurement of the [contaminants] are all high on the site when compared to standards, off-site and site edge measurements indicate that, at this time, contamination is largely contained by the emergency measures EPA has put in place. At this time, due to the security of the site and the measures in place there is little risk of human exposure to these chemicals. We will continue to monitor the site as we work with the state of Michigan and local partners to develop a longer-term plan to continue to protect human health and the environment for the Madison Heights community."

Sources: Michigan Department of Environment, Great Lakes, and Energy (EGLE) website - https://www.michigan.gov/egle/0,9429,7-135-3312_4118-515339--,00.html, U.S. Environmental Protection Agency website: https://www.epa.gov/mi/electro-plating-services-i696-release-site.



On Jan 2., 2020, Mannik Smith Group (left) and Stock Drilling (right) drilled soil samples and conducted HPT logs to better understand the level of contamination near I-696 in Madison Heights, Michigan. Kimberly P. Mitchell, Detroit Free Press

Contaminants Discovered

- ***Chromium:*** *Exposure has been linked to lung, nasal, and sinus cancers, kidney and liver damage, nasal and skin irritation and ulceration, and eye irritation and damage. Hexavalent chromium detections have been in shallow groundwater which is not used as a drinking water source in the area. Therefore, there is no health risk attributed from potential ingestion of the shallow groundwater contamination.*
- ***Cyanide:*** *Exposure has been linked to brain and heart damage. Cyanides have been detected in the highway embankment – not accessible by the public – at levels that do not present a direct contact threat.*
- ***TCE:*** *Exposure may result in liver and kidney damage and/or cancer and there is some evidence that exposure to TCE can impact the development of the heart in the fetus of an exposed mother. TCE has been found in shallow groundwater above EPA and EGLE screening levels. Additional investigation is ongoing to determine if a complete exposure pathway to the public exists.*
- ***PFAS:*** *polyfluoroalkyl substances are manmade chemicals used in a variety of industrial and consumer products, such as carpeting, clothing, upholstery, food paper wrappings and fire-fighting foams. Exposure has been linked to reproductive and developmental, liver and kidney, and immunological effects, increased cholesterol levels, low infant birth weights, cancer (for PFOA), and thyroid hormone disruption (for PFOS). PFOS was found in the hand-dug hole within the old building.*

EPA disclaimer: Sampling results are considered preliminary until data validation is complete. Data validation is ongoing.

Investigation Timeline

2016 — After a history of repeated violations of environmental laws, the metal-plating factory was issued a Cease and Desist order from the EGLE in December due to extreme mismanagement of hazardous waste that posed an immediate and substantial threat to the community.

2017 — EPA conducted a cleanup of the site, removing the hazardous chemicals and pumping contaminated liquid from an earthen pit in the basement of the facility. This clean-up addressed the immediate hazards on the site but was not intended to address all environmental impacts.

2019 — A preliminary analysis of the site was completed by EGLE as part of the process to determine eligibility for EPA Superfund testing and cleanup. This identified significant contamination at the site but concluded there was no risk to drinking water and low risk for migration of contaminants off site. Thus, the site was not accepted for EPA Superfund actions and would be addressed by other cleanup authorities, including state environmental laws.

Geotechnical drilling for a future HDD pipeline boring using 3.25-inch augers and NQ coring in West Virginia (top left). Mineral exploration sampling using 5-foot split spoons with DT45 for casing down to 110 feet in Illinois (top right). Geotechnical structure borings for a new coal mine belt line using 3.25-inch augers and NQ coring in Eastern Kentucky (bottom left). DT35 sampling with 4.25-inch augers setting 2-inch monitoring wells in Cincinnati (bottom right).

Changing with the Times

Founded in 2006 focused on environmental drilling and engineering, Enviroprobe Integrated Solutions in West Virgina has steadily increased its geotechnical work since 2013. Now 70 percent of their work is geotechnical. They keep their eight rigs – three Geoprobe®, one Geoprobe® sonic, and three conventional rigs – hard at work in tough conditions. For Jim Fore, operator, his preferred rig is the Geoprobe® 7822DT.

"The Geoprobe® 7822DT does as much geotechnical work as our conventional rigs do," Fore said. "It's a stout rig with growing technology. It's tough. There are no issues hammering or pulling steel. And the coring speed is just as fast as other rigs on the market."

As their field of work has changed over time, Fore leverages the 7822DT's ability to core rock. He's run HQ casing to advance more than 160 feet into mine refuse and boulder fill while SPT sampling before continuing to NQ rock core to 225 feet. He's reached 247 feet below ground surface rock coring in Pennsylvania.

"We have the most overworked rigs, but we've had our second 7822DT for more than two years with no breakdowns," Fore said. "With routine maintenance it tolerates a lot. Sometimes I wish it would breakdown so I could get a break, but it just keeps going."

While he may not be getting a break any time soon, Fore does admit the 7822DT makes his job easier.

"You can set up the tool rack close to you, keeping you and your helper fresh compared to having to go around the rig to get tooling," Fore said. "I can use the blade to clear a spot to make the job site more comfortable. There's plenty of space for tooling and an area to break down spoons and write up reports."

Making the job – and training – easier increases in importance as demand for drillers rises. As "old-timers" get out of the industry, Fore finds training the next generation faster on the 7822DT. He's trained five drillers on the 7822DT and credits the simplicity of the machine with them being quickly prepared to take over as driller.

"With a mechanical rig you don't learn the breaking point until you've reached it. With Geoprobe® it's easier to gauge when you're pushing the limit," Fore said. "For example, when rock coring I can tell by the RPMs on the control panel when to lay off or give more pressure. With a mechanical rig I have to rely on the sound of the motor."

Fore also finds the electric over hydraulic generally safer, another advantage when building up the next generation of drillers.

"Geoprobe® engineers understand clients' need to find new drillers and are building equipment that helps ease the training of new drillers. I appreciate the willingness of the engineering staff to listen and understand what drillers need in a rig," Fore said.

Dealing with Industry Demands

Environmental investigations and remediation projects have been the mainstay for East Cost Drilling Inc. (ECDI) for many years, but recently they've noticed an uptick in geotechnical investigations. To meet the varying requests, they rely heavily on the Geoprobe® 7822DT.

"The 7822DT combination rig is very efficient, performing direct push sampling and injection work with quick adaptation to utilize hollow stem augers for permanent well installations. Couple that with a small footprint and it is a very powerful tool in the fleet," Jim Duffy, president, said. ""The Geoprobe® keeps pace with our larger truck rigs on well installations less than 50 feet in depth but also provides the direct push services that conventional truck rigs do not, which equals more versatility."

For ECDI, adapting to changes in the industry includes training new drillers. The 7822DT provides them an easier stepping-stone for new helpers to work up to driller.

"The learning curve on the Geoprobe® 7822DT is definitely faster than on other types of equipment. It's not as intimidating or imposing and is more forgiving if the operator makes a slight error," Duffy said. "The digital readouts at the control panel are invaluable."

With the added peace-of-mind provided by all the safety components, ECDI can quickly show a skilled helper how it's done, put them at the controls, and have the driller stand back and coach.

"The 7822DT has made our operations very efficient in dealing with demands of the industry and client requests," Duffy said.

ECDI relies on 7822DT.

Need New Drillers?

Companies have noticed training new drillers and making them productive as they're coming up the curve is easier on Geoprobe® equipment thanks to:

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A Combination of Extremes

Diamond coring to complete geotechnical survey, advancing CPWL tools to 100 feet in weathered basalt formation, often driving SPT samples between core runs.
Inset photo: 175-foot HQ rock core in tight, rough conditions.

A group of geoscientists, simultaneously unemployed, decided to strike out on their own and formed GeoTek Alaska. Becoming proficient at being self-reliant in the artic tundra, they looked to the other end of the Earth, launching GeoTek Hawaii. Their high-quality environmental work earned them increasing volumes of requests. So as they developed expertise, their repertoire expanded to geotechnical and geophysical services.

Part of being self-reliant means being prepared for a range of requests, from tight urban lots to wide-open spaces. The need of GeoTek Hawaii to provide a combination of services, in a combination of environments, led them to have a combination of rigs – though the fleet tips toward Geoprobe® combination rigs like the 7822DT.

"Its size to power ratio is good for completing direct push environmental work in the urban core where space is a premium," Quinton Wilson, operations manager, said. "It's easy to mobilize between islands and handles a heavy amount of geotechnical work."

Packing a powerful punch for its size and boasting a breakout foot clamp, the 7822DT weaves its way into clusters of structures to complete urban investigations. In tight, rough conditions, the rig completed 175-foot HQ rock core.

"We can advance SWT 6-5/8-inch casing that bigger machines can't handle in their breakout clamps," Wilson said. "And the 4-speed head has nice torque-speed settings. It does well spinning H core as well as utilizing solid flight augers."

Their ability to maneuver under trees, into tight alleys, and alongside drifting houses has allowed them to conduct more work and allowed their clients to become more creative with preliminary site investigations completed before demolition.

"They can see the feasibility of a project in a less intrusive manner before paying for building permits," Wilson said.

At the other extreme, their 7822DT proved invaluable in their site investigation work for a proposed missile defense radar in Hawaii. One of the proposed sites had come under protest due to its cultural significance. Natives still used the ancient Hawaiian sacred site as part of their indigenous religion. Consequently the preliminary site investigation had to be conducted without any surface preparation – no grading or building access roads.

"Our production maintained footage on par with any other project even with the tough terrain," Wilson said. "We were proficient and competitive thanks to the V3's stable platform. We set it up with a lot of options and the V3 produced without any downtime due to machine breakdowns."

Geoprobe® dependability is a major component in Wilson's purchasing decisions.

"If it breaks, it's my job to figure it out. So who can I rely on?" Wilson said. "Darren Stanley's service group is rock solid. They fight to find the problem and get it resolved. Nobody can touch Geoprobe®."

Playing Ball with the Big Dogs

Geotechnical investigation to assess an aging bridge (above). Completing SPT confirmation and rock coring from surface street through passageway of Underground Atlanta for future development geotech investigation (bottom left). 7822DT picked up by a crane and dropped into a coffer 30-feet below water level to complete rock coring (bottom center). Dangling auger rods 25 feet next to a train trestle to complete geotech SPT and rock coring (bottom right).

Establishing a strong foothold in the direct push business, Geo Lab Drilling got their start in 1996 as a sampling and on-site lab screening company, using a van-mounted probe and mobile chemistry lab. Growth of the company allowed them to progress from solely a direct push investigation firm into a more long-term monitoring and remediation focus. The addition of a 66DT with auger head opened up more horizons, but required some re-education of consultants to teach them that Geoprobe® doesn't mean just direct-push.

"Yes, we're going to install hollow stem augered wells, and yes, we're going to do it with a Geoprobe®," Brian Strickland, owner, said. "Environmental services require more than just direct push."

Over the years they've continued to look for ways to stretch their capabilities.

"We also purchased conventional drill rigs to broaden our scope of services beyond direct push, only to realize that 7822DT rigs are often preferred for conventional rotary drilling tasks due to their efficiency and mobility," Strickland said.

Rock Coring

In the piedmont of the South, they're penetrating shallow rock with a downhole air hammer using a large air compressor and a 7822DT. The height of the drillmast accommodates 5-foot rods and an air swivel to feed the air hammer. With the addition of the 4-speed head, they're now performing mud rotary and NQ wireline rock coring. Active development in Georgia keeps them busy completing geotechnical investigations which often involve shallow SPT borings to rock with an automatic drop hammer, and then quick conversion to NQ wireline coring for 10 to 15 feet of rock core confirmation.

"The 7822DT is very efficient and often outperforms conventional rigs head-to-head. Its agility allows us to complete 80 to 100 feet of rock coring in a day," Strickland said. "In a playground dominated by conventional drill rigs, we can come in and show them that Geoprobe® rigs core rock well. The efficiency gained allows us to do more linear footage and play ball with the big dogs, and we don't have to concede on rates or production."

Limited Access

The 7822DT's tracks and small size also allows them to stretch into new spaces – off-road, inside buildings, and under canopies. Work on an Electrical Resistance Heading (ERH) remediation project required drilling and installing supplemental electrodes in and around previously installed electrodes and careful navigation around a mass network of electrical lines.

"No other rig could get into the nooks and crannies and creep over wires without damaging them," Strickland said. "Where others have tried and failed, we succeed."

They can successfully complete projects that require installing monitoring wells under gas station canopies or foraging through marshland while crossing small creeks to access remote sampling locations.

"Most conventional rigs can't perform low-clearance work under canopies and inside buildings with the nimbleness of a 7822DT," Strickland said. "We have the ability to respond across the board. Name the project and we have a distinct advantage if we can find the unique tool to do it. We know we have the rigs and the operators, which gives us more access and impresses customers."

Quality Tooling

When they use Geoprobe® tooling they're confident they have the right tool.

"We mobilized to an out-of-state site where another drilling firm – who wasn't using Geoprobe® rods – was consistently breaking off at 60 feet. The client was concerned we would encounter the same problem," Strickland said. "Using genuine Geoprobe® rods, we repeatedly advanced to 90 feet over the entire project with no broken rods. Geoprobe® tooling quality is unparalleled."

Success

"High utilization of our 7822DT rigs is due in part because they are requested by our clients both verbally and written into RFP's," indicating to Strickland a strong return on his investment. He now can charge for more profitable applications like rock coring and the dependability of the 7822DT provides additional profit assurance.

"I've experienced more frequent mechanical failure of conventional rigs in our fleet. Geoprobe® is reliable to do a project and do it well," Strickland said. "They're reliable to go day in and day out. Bearings and general wear items seem to last much longer. They have a lower maintenance side and increased longevity."

Geo Lab tries to stay on top of preventative maintenance schedules to avoid costly breakdowns, but when issues arise, they know they can rely on Geoprobe® service technicians for answers.

"A huge part of our success is our ability to get support when needed. You can clearly see a partnership, receiving support with a smile and lots of late hours, shipping at the 11th hour when necessary," Strickland said. "Top knowledge and willingness to help is what differentiates Geoprobe® ."

Sonic Satisfies Lithology Needs

For South Atlantic Environmental Drilling and Construction Company (SAEDACCO) in South Carolina, responding to customer needs as an environmental services company means completing all phases – drilling through remediation. Staying true to this business model since 1993, they established a consistent customer base, some of whom they've worked with for more than 20 years, and experienced steady business growth. Exploring for several years how sonic drilling might fit their model, they were concerned it might be too expensive for their customers with the high costs and high maintenance. In the end, customer needs and evolving technology convinced them to invest.

"Customers were wanting better unconsolidated sample data. They needed more information from sonic to better map out projects and provide a better understanding of the lithology of the subsurface," Pete Byer, president, said. "Sonic is another tool in the tool bag to help pinpoint where the next dollars are going to be spent on remediation. It actually helps save money on remediation."

SAEDACCO uses 8140LS and 8150LS to pre-drill borings using 4X6 system 122 feet to 170 feet below ground, conducting continuous logging in 10 percent (top). AST Environmental uses their 7822DT to inject 60,000 lbs of BOS 100® through 2.25-inch rods (bottom).

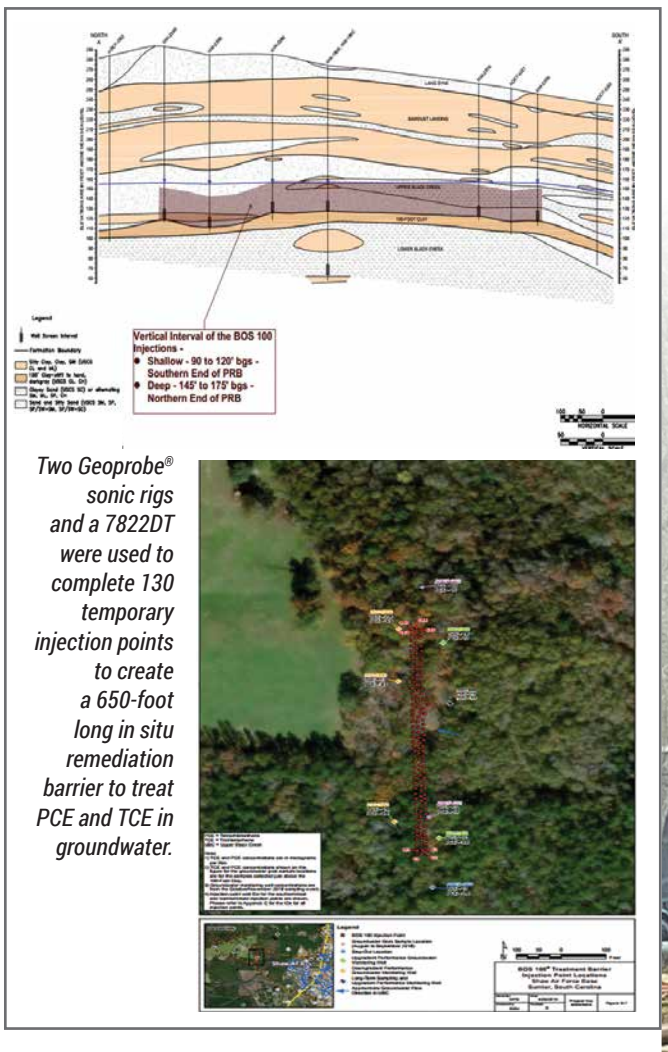
The hands-free tooling, along with the customer service and support they'd always received from Geoprobe®, were the initial selling points for purchasing an 8140LS and later an 8150LS.

"We like to avoid guys getting their hands near the drill rods whenever possible. The Geoprobe® rod loader was a game changer in that area," Byer shared.

Adding sonic diversified their expertise and strengthened their market position.

"Our equipment covers a broad spectrum, as such, it's challenging to have operators who are competent on every piece of equipment," Byer said. "Having all types of drills — from direct push machines, auger, rotary, air and sonic drills — along with our extensive construction/remediation capabilities gives SAEDACCO a unique advantage in the marketplace."

This advantage had them on a four-month job outside a southern air force base last spring. Perchloroethylene (PCE) and trichloroethylene (TCE) contaminants were found to have migrated off-base approximately one-mile, most probably sourced from a former base dry cleaning facility that burned down in the late '60s.



Two Geoprobe® sonic rigs and a 7822DT were used to complete 130 temporary injection points to create a 650-foot long in situ remediation barrier to treat PCE and TCE in groundwater.

They teamed with AST Environmental for drilling and injection between 122 feet and 170 feet below ground surface, installing 60,000 lbs of BOS 100® into 130 temporary injection points.

"We didn't believe direct push would reach the necessary depth, and the client lacked key lithologic data," Byer said. "For 10 percent of borings, we conducted continuous logging so we could pinpoint what we had down there so AST could better target the areas to inject remedial product and get the best contact in the right areas."

The "trap and treat" in situ remediation technology binds up chlorinated solvents and helps quickly degrade them to harmless amounts. They also performed discrete interval groundwater sampling using an inflatable packer/screen tool to help in the installation of monitoring wells used to measure remediation effectiveness. The goal of the project is to treat the groundwater as it migrates and monitor reduction in contamination from less than 30 ppb to less than five ppb while also reducing potential adverse effects on additional private properties.

Struggling to supply water, fighting freezing temperatures, managing property owner needs, and clearing and constructing access roads were just a few of the challenges encountered as they worked to create the 650-foot long permeable reactive barrier.

"We were buying bentonite pellets by the truckload (approximately 5,000 pails), hauling it in," Byer said. "We ended up creating a short-term shortage in the market which raised prices and caused some challenges."

What wasn't a challenge was the equipment. Using the SAEDACCO sonic rigs' 4X6 system and AST 7822DT injection through 2.25-inch rods proved the most economic way to reach depth and complete the injection process – satisfying their customer's needs.

"We knew at 200-feet or less they would be the most efficient drills and give our customer the best lithologic data," Byer said.

Sonic Only Tool to Succeed

Geoprobe® 8150LS sonic successfully dry drills to 200 feet in tough formations in Oklahoma.

The Oklahoma panhandle dishes up difficult drilling with its layers of rough limestone and caliche. Often drillers resort to using water, whether with rotary or sonic, to achieve desired depths. But when setting monitoring wells, water clouds the results.

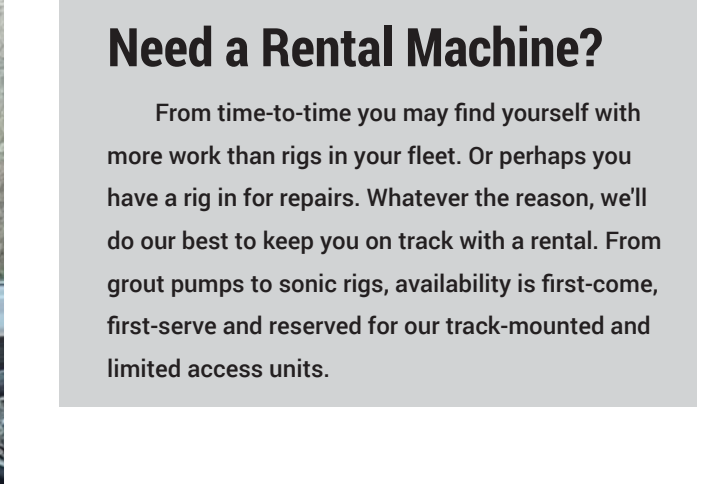
"Most people believe the only way to do it is with mass amounts of water, but you don't know when you hit groundwater," Robert Keyes, president of Associated Environmental Industries, said. "When doing water rotary, you dilute the sample and don't know where the water is coming from."

Companies who had tried drilling at a site in Guymon, Oklahoma, lost pipe strings in the rough formation. Being successful dry drilling with his Geoprobe® 8150LS in Oklahoma and Texas, Keyes had faith in his rig and his driller, Billy Graham, to get the job done. He convinced the state to let them give it a try, offering "free" services.

"I told them 'if we fail, you don't owe us anything'," Keyes said. "We don't like the word 'can't'. We either make the box bigger or tear its walls down. We keep getting better at what we do."

Using the 8150LS, rod loader, and 4.5-inch HD sonic rods, Graham successfully completed the four, 200-foot borings and accurately set the monitoring wells.

"We got the full, accurate lithology to put the screens where needed to isolate the contamination," Keyes said.



The rod loader saved wear and tear on the driller during the long eight days.

He credits the tooling and machine along with Graham, known for accepting challenges and succeeding.

"When coring at that depth, you may get a 10-foot run, you may only get a 2-foot run. That's a tremendous amount of tripping out," Keyes said. "With other brand sonic rigs we own, guys are worn out after a 200-foot core without the rod loader."

Keyes attributes his business success to following the technology. So when Geoprobe® began developing its sonic line of machines and tools in early 2000, he watched eagerly – knowing he'd have the service support he'd lacked after purchasing another brand's sonic.

"I evaluated price versus production on the 8150LS and it fell right where we needed it to be. I haven't regretted it since," Keyes said. "If you've been in the drilling business long enough – a day – you realize how important service is. The service support and remote diagnostics are priceless. If you're broke down anywhere in the country, a Geoprobe® service technician can tell you exactly what you need to do."

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Customers remark how they increasingly see requests for sonic capabilities, making sonic rig ownership necessary to maintain or gain market share. When you choose a Geoprobe® 8150LS sonic rotary rig you gain additional avantages:

OPERATION: quick learning curve and efficient operation made possible from your fingertips. Maintain mast and machine position leveraging the rod handler, winch, and head centerline side shift to guide the GV5 head, automatic drop hammer, or coring head to align with the borehole.

SAMPLING: in a variety of geologies and formations where traditional drilling methods struggle or fail, the powerful GV5 sonic head makes it possible to retrieve high-quality samples and is backed by a 2-year warranty. A powerful rig coupled with genuine Geoprobe® sonic tooling allows sonic users to operate 4X6 dual tube and weighted wireline tool systems efficiently.

SAFETY: no rotating augers, safer operating position with adjustable control panel, and optional rod handler and indexing rack minimizes heavy lifting of large tooling.

SERVICE: training and field support from a dedicated team of sonic experts who are just a phone call away and able to provide remote diagnostics of electrical components, shipping service parts stocked and ready to meet your needs.

COSTS: cuttings and waste are kept to a minimum. With used and rent-to-purchase options, we can help meet your price point.

TRAINING: our sonic team has years of experience training new operators, offering your crew comprehensive sonic training.

If you're considering entering the sonic market, call Geoprobe® for a no-pressure introduction. Our dedicated sonic team can help you evaluate how sonic can serve your current customers and help you gain footing with new clients.

CALL GEOPROBE®:
to explore your sonic potential.

785-825-1842

Need a Rental Machine?

From time-to-time you may find yourself with more work than rigs in your fleet. Or perhaps you have a rig in for repairs. Whatever the reason, we'll do our best to keep you on track with a rental. From grout pumps to sonic rigs, availability is first-come, first-serve and reserved for our track-mounted and limited access units.

Capitalize on Combination Capabilities

With a 420M limited-access machine, Fulcrum Resources Environmental in Monrovia, California, worked to keep up with demand doing environmental due diligence assessment and remediation. Since the limited-access machine couldn't go very deep, they often found themselves dependent on other drilling contractors to complete a fair amount of their work. Frustrated, they began looking for ways to make the 20-year-old company more competitive by doing all drilling operations in-house.

By adding the 6712DT, Fulcrum Resources Environmental brought all their environmental assessment drilling operations in house.

"I've been a geologist in the field for many years and watched Geoprobe® rigs run with minimal problems," Don Kellar, CEO, said. "That's what got me interested in purchasing my own. In the past we'd hit refusal and have to sub out the job to others."

By adding the Tier 4 Geoprobe® 6712DT, they are now able to do most baseline assessment jobs throughout the entire state of California – whether inside or outside. The mobile machine enables them to do both auger and direct push so they can reach 50 feet in many different conditions. Having worked with other firms who had combination machines, Kellar had seen the capabilities when hitting hard-pan clay.

"If we know the site condition, we can bring the 6712DT and not sub out as much, which means more profit," Kellar said. "I don't have to go back to the site. I don't have to reschedule. It reduces my limitations, and I'm booked out consistently."

On a recent project in alluvial soil, they began with direct push but hit refusal at 3-to-5 feet. They switched to auger and completed sampling at the 5, 10, and 15-foot depths. For Fulcrum, adding the "powerful, straight-forward, and easy-to-use" 6712DT has achieved the goal of keeping all drilling in-house, while the Tier 4 engine helps out the environment.

"We're ahead of the curve, setting the standard for reducing carb emissions," Kellar said. "I mean we are an environmental company. We're setting the bar."

Using the DT22 system to sample before setting a 25-foot well at Lake Tahoe.

Sticking to What Works

Specializing in direct push work, Penecore Drilling, in California, started during the 2008 recession, turning a profit within the first year.

"We believe in sticking to what we can do well, which is direct push work," Xavier Green, project manager, said. "Direct push work is more common now since it's the quickest, easiest, cheapest way to get what geologists need."

Being proficient includes using the Geoprobe® DT22 Detent Drive Head — speedier compared to a set screw.

"It's a quicker option with the extra safety of not losing liners. That's better for all parties," Green said.

And he's quick to point out the advantage of using genuine Geoprobe® liners.

"When we use other liners we spend time with soil catchers popping out or liners sliding out in the boring," Green said. "It's worth it to pay a little extra and reduce these problems."

Being manufactured in the United States is another benefit according to Green.

"Nothing ever goes smoothly in drilling, but I can pick up the phone and the Geoprobe® tooling department helps it go smoother," Green said.

Smoother also results from durable tooling kept in stock.

"We're still using tooling from early 2000 that hasn't broken. We don't need a bunch of excess tooling around, because it lasts," Green said. "If we do need something, Geoprobe® can get it out to us immediately."

From injection tooling, DT45 to DT60, and Macro-Core® 7 to Macro-Core® 5, Green has extensive experience with genuine Geoprobe® tooling and quickly names other benefits:

- *When I buy a new one, it comes out of the package working.*
- *Geoprobe® provides an array of things so we can advise customers on the best approach.*
- *Tooling is always better than most in the industry.*
- *Tooling department streamlines tooling to make jobs easier.*

For Green, sticking to what they do best and remaining resilient through recessions – and now COVID-19 – has been made just a little easier because "Geoprobe® always comes out with a lot of different things that help us."

Farewell Friend, Not Just Colleague

Since Jan. 10, Greg Johnson, international sales representative, has been focusing his time on ministry within the community, missions with the Haven of Hope school and medical facility in Nigeria, and family — including 10 grandchildren. Their favorite retreat is the 40 acres, including pond, that has been in his family since his Great Grandfather moved from Sweden in 1885. Greg's sense of humor is evident in the signs around his property, including one near the sauna stating "from this point clothing is optional…"

Several months prior to finishing 17 years in Europe spreading Bibles to communist countries and discipling to refugees, Greg Johnson's visiting father voiced his concerns.

"What are you going to do in Salina, Kansas, to support five kids," his father asked. "You are a dinosaur in your field. You learned electronics back when there were vacuum tubes." Greg replied, "Dad, don't you think God can provide?"

Upon return to the states, he and wife Rebecca purchased an old home in which Greg was refinishing the dining room floor. One day while driving in search of polyurethane, he stopped to visit an old friend. During their conversation, which included mention of looking for work, his friend suggested "you should see the guys at Geoprobe®, they'd be a good fit for you."

After purchasing the polyurethane Greg proceeded home, but upon seeing the Geoprobe® facilities, pulled in completely unannounced and introduced himself to Tom Christy and Mel Kejr.

"Mel dropped everything he was doing to take me on a tour of the facilities. After visiting with Tom and Mel for awhile they said, 'don't look for a job, you've got one'," Greg said.

He began in 1993 as shipping manager. During the next eight years, as individuals left, he gradually took on international sales, which at the time were focused in Japan and Korea. Adding European sales was a natural fit for Greg. Eventually he would no longer be torn between multiple roles, but could focus on international sales full time. During his tenure he built a network of in-country international representatives, preferred by customers due to the close proximity, cultural awareness, and shared language.

Greg Johnson, left, and wife Rebecca, right, were presented with a parting gift during a company-wide chili cook-off conducted in recognition of his retirement.

After 26 years, he leaves a legacy of treating customers with honesty and respect and raising the profile of international customers within the company. The relationships he's built with clients have resulted in their signing farewell letters with "your friend," not just "your colleague."

"We appreciate everyone at Geoprobe®, from the customer service team who answers the phones with a smile on their faces and makes sure we get to the right department, to the sales/parts team who always makes sure we get to the right tooling even if we don't know the correct name for it. And, the service/technical team couldn't be more knowledgeable and willing to offer help and suggestions to all of us when we are desperate with a breakdown or just doing regular repairs. It feels good to have you on our side!

– Juan Luna, President, Earth Solutions Inc., St. Charles, Illinois

Trade Old Rigs for New Rigs

Doug Koehler, Sales

Trading in your old Geoprobe® – and even non-Geoprobe® – machines toward the purchase of new equipment can have many advantages.

- *Reduce amount to be financed.*
- *Most states only require sales tax be paid on the difference between price of trade-in and new piece of equipment.*
- *Possible savings in capital gains tax.*
- *Continue to use your trade-in until the new unit arrives.*

To determine a trade-in value, send 4-6 current photos (mast up), current hours, and serial number to: koehlerd@geoprobe.com.

CALL GEOPROBE®:

to save operating costs by trading in your old rig on a new, efficient one.

785-825-1842

Snow or Shine, It's Always a Good Training Time

Whether it's your first time with the NEW Geoprobe® 3126GT (left), comprehensive training for your new sonic driller (center), or Direct Image® tooling you've added to expand your environmental investigations (right), we'll help you get off on the right foot and succeed — no matter the weather.

Investigation included MIP logs to delineate contamination plumes in the forest surrounding the landfill site.

Containing Communist-Era Contamination

In the eastern part of the Czech Republic sits an old sand quarry, which during the communist era served as a landfill for various paint, varnish, and pharmaceutical factory wastes. Inappropriate waste management caused significant pollution of the surrounding environment by a wide range of contaminants. With no containment, rainfall water leaked from the landfill into the groundwater, risking contamination spreading to a nearby stream.

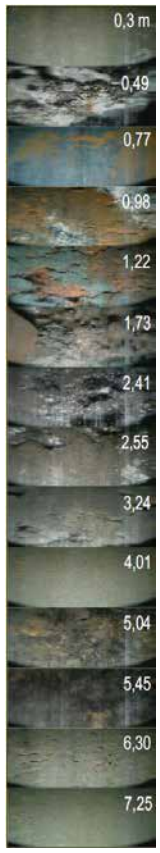
Despite the sloping terrain, swampy forest, and harsh winter weather, Dekonta – an international environmental services and technology supplier established in 1992 in the Czech Republic – successfully used a Geoprobe® 7822DT and Direct Image® tools in their investigation of the site to generate data sets valuable for further decision making and remediation design.

"We always try to use the best available technologies and wanted quality tools from a proven manufacturer," Vladislav Knytl, operator, said. "Geological conditions in the Czech Republic are often a big challenge for our projects. We had good references on Geoprobe® from our R&D activities. Geoprobe® rigs are easy to transport and thanks to compact dimensions we can use them in areas with limited access."

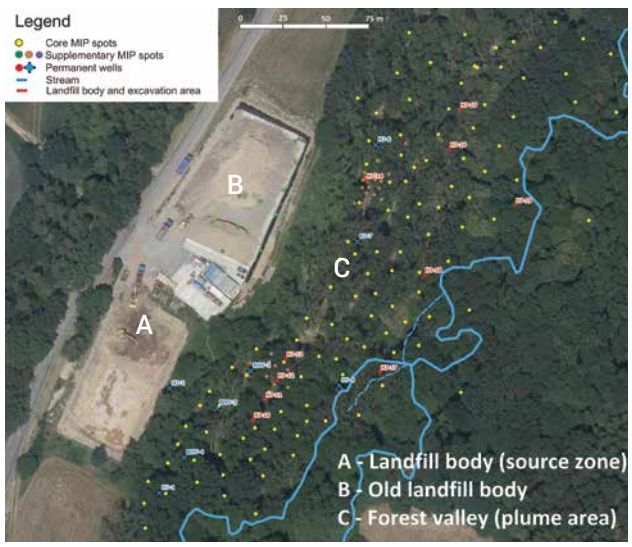
To delineate the contaminant plumes, they completed nearly 150 Membrane Interface Probe (MIP) logs from 16-to-40-feet deep in the excavated landfill and in the nearby forest. MIP was chosen for its ability to log the relative concentration of volatile organic compounds (VOC) with depth in the soil to precisely delineate the pollution spreading under the forest area.

Dekonta also employed an Optical Imaging Profiler (OIP) using UV and visible light sources to characterize the landfill body. The OIP provided details of the soil layers containing various wastes. They also completed soil and groundwater sampling and installed 70 new monitoring/injection wells within the forest to confirm their direct-sensing results.

"MIP proved itself as a really powerful tool generating valuable data, but it is crucial to interpret them correctly and know the limits of the technology," Knytl said. "OIP is very good for areas heavily contaminated by petroleum hydrocarbons. Designing an excavation is then much easier and more precise."



Above: OIP was used within the landfill body to characterize the layers of contamination. Left: An example of landfill profiling using OIP under visible light. Contaminated horizons are clearly visible (paint residues etc.)



The investigation revealed contaminant plumes of halogenated compounds and BTEX (benzene, toluene) distributing – through the carboniferous grewacke covered by quaternary sands and sandy clays – horizontally and vertically from the landfill bodies themselves, and from an old drainage system running between both landfill bodies. With supplemental investigation and tracer tests, they were able to determine the plume emerging from the base of old landfill (B) is sourced from landfill (A).

"Thanks to MIP and OIP we have found source zones, which were difficult to detect before," Knytl said. "One of the advantages is more precise delineation of contamination distribution, therefore it is easier to design better conceptual model for the site."

Detecting the source zones and migration paths of the contamination was critical to target combined treatment technologies based on in situ chemical oxidation (ISCO) and aerobic biodegration. Remediation has begun following excavation, restoration, and direct push injections of strong ISCO agents under the former landfill. Dekonta will continue to investigate the progress of the remediation using Direct Image® tools.

Exploring Paper Island's Environmental History

Currently Paper Island is a construction site, but at the end of the 17th century Christiansholm — the official name of the island — was a private shipyard. Established as reclaimed land based on waste from the city, the site contains a treasure trove of knowledge about consumption and housekeeping from that period.

Lars Prinds, NIRAS project manager.

Using a Geoprobe® 7822DT, intact soil samples could be taken in designated depths to help approximately 20 archaeologists from Museum of Copenhagen uncover the city's environmental history.

"We have made eight drillings with the rig's probe and obtained 38 soil samples in depths of up to eight meters below the surface. It is very efficient method when you don't have the time to excavate the whole island. Museum of Copenhagen wanted information about the layers of waste in different depths and to locate the original intact layer under the reclaimed area, so we needed to obtain soil samples from the whole area," explains NIRAS project manager Lars Prinds.

In Lars' experience the Geoprobe® 7822DT with DT22 is perfect for taking intact core samples. The team worked in a huge archaeological excavation on a wet, soft surface. Access roads were very muddy, steep, and hard to navigate. Often, they had to place the rig in uneven locations, requiring using the rig´s many settings to oscillate and adjust the mast in order to obtain soil samples in the correct depth.

Samples will be scanned, and results will reveal a lot about the city's environmental history such as pollution, traces from the historic Copenhagen fires, and much more. Furthermore, samples are to be examined for eDNA (environmental DNA). Previous practice so far has been to examine aDNA (ancient DNA).

"eDNA examinations can, in theory, give us a very wide perspective on flora and fauna that have been in contact with the soil samples. In addition, you can find traces from fungi, bacteria, viruses etc. And maybe even traces from the plague outbreak in 1711 in Copenhagen," tells curator Gerd Bindesbøl Ravnholt from Museum of Copehnhagen.

She is very happy about the initiative: "We achieved a clear picture of what is hiding in the ground despite a lack of time. The results are worth their weight in gold for Copenhagen's history."

For Lars working with archaeologists is a rare pleasure. "It is in our DNA to look for environmental harmful substances and look at the earth's geology. Here, our client is looking for something quite different which is fascinating," Lars said. "Driving home from a day with a happy client and a great cooperation between team and the 7822DT is extremely satisfying."

The archaeologists are also digging for other artifacts. So far, they have found remains from the private shipyard together with remains from later developments such as the school of artillery and a mast crane from 1754.

NIRAS' 7822DT collects soil samples on Paper Island.

PFAS Testing of Groundwater Samplers

Q&A with Wes McCall, Geoprobe® geologist

Wes, before we get into the tech stuff, tell us where you have been hiding out during the COVID shutdown, we haven't seen you around the office.

Yes, the last couple of months have been pretty unusual. Most of the time I have been working from home providing tech support for clients and working on a couple ASTM standards and new technical bulletins. However, I did spend a few days at the Direct Image® Training Center working on some projects.

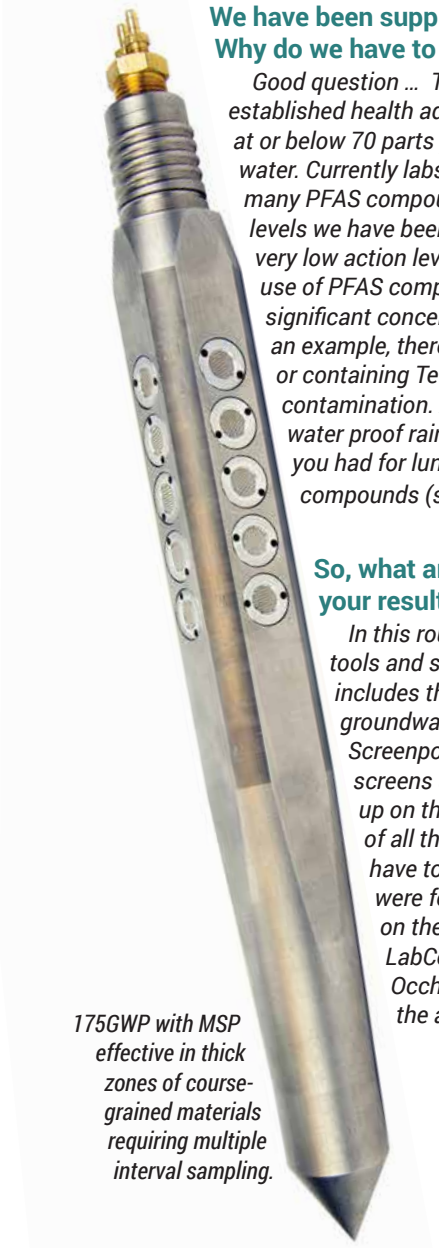
Wes McCall, Geologist PG

It sounds like you have been keeping busy, even while isolated, and we hear you have been working with the PFAS compounds. What's up?

The PFAS compounds have really "emerged" as a significant contaminant of concern all across the nation. These polyfluorinated alkyl substances have been used in many industrial and commercial products and applications. Unfortunately, this means they have contaminated the soil and groundwater at many locations. Because of the very strong bonds between the fluorine and carbon atoms in these compounds, they are nearly indestructible (persistent) and their high solubility allows them to readily migrate in groundwater.

We have been supplying groundwater sampling products for decades. Why do we have to do PFAS testing on these systems now?

Good question … The U.S. EPA and many state regulatory agencies have established health advisory levels, or action levels, for PFAS compounds that are at or below 70 parts per trillion. Yes, 70 parts per trillion or 70ng/l for drinking water. Currently labs are using analytical methods (LC/MS/MS) that can detect many PFAS compounds at the 2ppt to 5ppt levels, this is about 1000 X below levels we have been concerned with before for environmental sampling. These very low action levels and detection levels combined with the widespread use of PFAS compounds in many commercial products means there are significant concerns with potential cross contamination of samples. To give an example, there were concerns that anything with a Teflon® component or containing Teflon® tape or sealants may cause detectable PFAS cross contamination. Also, anything coated to be water or oil resistant (e.g. your water proof rain coat, the carpet in your house, the wrapper on the burger you had for lunch, the pizza box) probably contains detectable PFAS compounds (see Denly et al. 2019 and Rodowa et al. 2020).



175GWP with MSP effective in thick zones of course-grained materials requiring multiple interval sampling.

So, what are the systems you have been testing and what do your results indicate?

In this round of testing we have focused on groundwater sampling tools and systems used during many groundwater investigations. This includes the Hydraulic Profiling Tool (HPT) system, the new 175GWP groundwater profiling system, the Screenpoint16 (SP16) and Screenpoint22 (SP22) groundwater samplers, and the prepacked screens used in many direct push installed monitoring wells. We set up on the bench and conducted rinsate tests with PFAS free water of all the system components that would be used in the field. I have to say I was a bit surprised that all of the systems tested were found to be nondetect for each of the 36 PFAS compounds on the Wisconsin PFAS analyte list (https://dnr.wi.gov/topic/LabCert/documents/EA-19-0001-C.pdf). We worked with Jim Occhialini at Alpha Labs in Westborough, Massachusetts, for the analytical work.

That sounds like pretty good news. How can users of Geoprobe® products obtain this data?

We have developed PFAS Technical Bulletins for each of the groundwater sampling/investigation tool systems we have tested. The bulletins provide a detailed review of the equipment tested and procedures used. In addition, the lab report from Alpha Labs is included with each bulletin. These bulletins can be downloaded from our website at these links:

- ***Hydraulic Profiling Tool (HPT): geoprobe.com/hpt-pfas***
- ***175GWP (groundwater profiler): geoprobe.com/gwp-pfas***
- ***SP16 & SP22 groundwater samplers: geoprobe.com/sp16sp22-pfas***
- ***Prepack well screens: geoprobe.com/prepack-pfas***

resources

One last question; if you were going to the field to perform direct push groundwater sampling for PFAS compounds, what basic steps would you take and what groundwater sampling system would you use?

First, be sure you are familiar with the site specific PFAS work and sampling requirements. Which state you are working in and which agency the work is being done for will influence your site-specific requirements. There are lots of different guidance documents for the appropriate personal protective equipment, sampling materials, and even personal care products that can be used on PFAS sites.

Of course, it is always wise to review existing reports and any available boring logs for the site. If there is little background information available for the site, then at a minimum you would want to run an array of HPT logs across the proposed investigation area, especially adjacent to proposed groundwater sampling locations, if they have been identified. The HPT logs will quickly identify zones of permeability in the formation where you can successfully sample groundwater and low permeability zones where the formation will not yield sufficient water for groundwater sampling (you don't get water from a tight silt-clay layer). Then if you are going to sample groundwater from just one or two depths at each location I would consider using either the SP16 or SP22 sampling systems. The newly modified SP22 system using 3/4-inch PVC riser with the integral mechanical syringe pump (MSP) would provide high integrity samples for PFAS sampling (geoprobe.com/MSP). If you need to profile groundwater at multiple depths for PFAS (or other contaminants) at each location you may want to check out the 175GWP with MSP (geoprobe.com/175-groundwater-profiler). This is especially effective where you have thick zones of coarse-grained materials and need to do multiple interval sampling

Be sure to practice good decontamination procedures between each sample location. This is critical for the low concentration PFAS work. Periodically collect a rinsate sample from the groundwater tools/components that have sample contact after decontamination is conducted. Send this to the lab for analysis with the samples. Also collect a sample of the PFAS free water supplied by the lab and used to perform the rinsate tests. You can send this to the lab with the samples and have it held to see what the rinsate test results look like. If the rinsate tests and/or multiple samples come back positive at similar levels for the same compounds, you will want to analyze that PFAS free blank water.

Running the 175GWP onsite during a field study with Susom Dutta, Geoprobe® 2019 summer intern. Susom was working on his Ph.D. and this field project became a significant part of his dissertation. He successfully defended his dissertation this spring at the University of Massechussetts-Lowell. We used the 175GWP to collect groundwater samples at multiple depths and then Susom conducted field screening for hexavalent chromium with a new miniature anode stripping voltametry (ASV) device onsite.

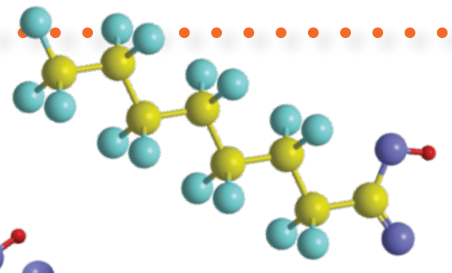
Geoprobe® PVC Liners Tested Nondetect for 52 PFAS Compounds

Geoprobe® submitted samples of our clear PVC soil liners, including the lay flat liners used for sonic soil sampling, to Jennifer Field, Ph.D., at Oregon State University and her research team. Field's team analyzed the Geoprobe® soil liners for 52 PFAS compounds, including PFOS and PFOA. The PVC liners tested nondetect for all 52 compounds. The research concluded that field sampling materials are an unlikely source of contamination for Perfluoroalkyl and Polyfluoroalkyl substances in field samples.

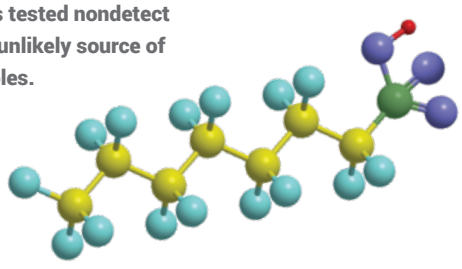
LEARN MORE:

see Rodowa et al. 2020 for more information.

geoprobe.com/pfas-nondetect



PFOA= perfluorooctanoic acid, yellow - carbon, teal - flourine, purple - oxygen, red - hydrogen, green - sulfur



PFOS = perfluorooctane sulfonate

DM450 Takes on the Rocky Mountains

A recently delivered DM450 drilling geothermal wells at a university at the base of the Rocky Mountains. Experienced drillers were impressed with the speed, power, and controls of the new rig. Another word that they used to describe the DM450 was "stout."

photo by Erin Myrtle

Distinctly Different DM450

With a 140-foot open hole and casing ready to set, Bush Services of Graceville, Florida, noticed the hole starting to cave in. They quickly lowered the mast and raised the jacks, fortunately the operator abandoned the rig as it started sliding backward — into a sinkhole. The 35-foot wide sinkhole swallowed their rig, leaving the bumper 10-feet below ground.

That was early January. During the next month Greg Bush, owner, considered his options.

"I previously had a DM400 and liked it, but was looking for something bigger and newer," Bush said. "I liked the design changes [on the DM450] to make it easier to operate and service."

He quickly rattles off new features on the DM450 with many of the improvements directly related to the totally redesigned drill mast:

- ***Upgraded head feed system with adjustable rollers, rotary head side shift, and increased pullback.***
- ***Layout and routing of hydraulic hoses in a secured manner.***
- ***Dual winches provide a combination of power and speed.***
- ***Hydraulic system runs cool***
- ***Truck chassis power for both drilling and faster rig transport speed***
- ***Quieter, faster, and easier to operate.***

"Rod spinner and helper controls make it faster and easier on the driller," Bush said. "It gives the helper more to do, taking pressure off the driller."

Engineering on the DM450 makes it "quieter, faster, and easier" for Bush Services to complete residential and agricultural wells with less downtime.

With business ranging from residential to agricultural well drilling, from 4-inch to 12-inch wells, Bush needed something universal.

"It does small wells and does big wells just as easy," Bush said. "They took a good rig and put a lot of design thought into it and made it better."

For the couple of minor issues he's run into, Bush appreciates the quick service response and engineer support. Overall he's experienced less downtime.

"I'm proud of it," Bush said. "Other drillers see it and envy it."

Island Geo Drillers Take Geothermal Business to the Next Level with Fast, Powerful DM250

DM250 efficiently completes 15 bores to 305 feet through tough, plastic clay 80 percent of the hole to install geothermal field at a large residence.

Launching Island Geo Drillers in New York five years ago, Joe Dalba and partner Ryan Maletta were ready to take their closed-loop geothermal installation business to the next level. Their projects were progressing from residences with up to 50-ton fields to schools requiring 300-ton fields with 90 bores to 350 feet. Yet, they desired to go after more municipal projects. What they needed to take the next step was a new drill rig.

"We wanted to increase efficiency," Dalba said. "We wanted to go deeper and needed more power and pull back, switching from 10-foot to 20-foot stroke to clear holes of cuttings."

They looked at several different rigs, wanting to keep everything non-CDL.

"To get a more capable rig and take our business to the next step, DRILLMAX® DM250 was the only one non-CDL," Dalba said. "Others with these capabilities required a CDL or were not yet in production, just prototypes."

Dalba did his research and talked to other DRILLMAX® owners on the island to confirm his choice.

"I watched videos and thought 'it can't be that fast'. It almost startles you," Dalba said. "With our old rig, I'd look at the pressure gauge because I had time to, but this just happens in the blink of your eyes."

On a recent job, COVID-19 restrictions limited them to having just the two owners on site. Dalba and Maletta completed the 15 bores to 305 feet through tough, plastic clay 80 percent of the hole. Dalba ran the rig while Maletta worked the mud cleaner getting loops ready for installation.

"The DM250 took a beating but got right through it. We doubled our production speed with the stroke and pump," Dalba said. "The way she forces plastic clay out of the hole was pretty unbelievable. The 20-foot stroke and speed of the tophead means it goes faster for a longer distance, good for plunging clay out of the hole."

The pressure consistency produced by the piston pump, physical comfort created by the wide driller's platform, and production capability provided by the rod loader add to the advantages afforded by the DM250.

"It has everything really – it's faster and lots easier," Dalba said. "Speed of tophead rotation combined with 20-foot stroke on tight package, ramps up production, and it being non-CDL also saves on insurance."

Proper Care for Aging 7822DT Rigs

In production for more than 12 years, the Geoprobe® 7822DT is a workhorse in many company fleets. If you've had your rig for a few years, it may be showing some signs of age. Three key components on the front of the 7822DT deserve periodic inspection.

Probe and Hammer Slides

These are the slides upon which your head runs up and down. Unfold your machine, running it all the way down to the bottom of the stroke. If you see a gap between the rail and slide or if you're missing the "pucks" as people refer to them, it's time to replace the slides. Don't forget to also inspect the trunnion slides located behind the front foot rail. Remember: you should always replace an entire set.

Hammer Rotation Assembly

Assess the pressed bearing on the hammer spindle by removing the anvil and retainer. Looking up inside the spindle, is it still hex shaped? Are there any cracks? Does it have any play when grabbed with your hand? If the answer is 'yes', then it's time to replace your hammer spindle, bearings, and races inside. A worn gearbox affects the percussion cell performance, potentially causing failure.

Auger Hose, Swivel Fittings, and Auger Speed Solenoid

Exposed to potential damage from weather, casings, or swinging winch hooks, inspect your auger hoses and when worn, replace them. If your swivel fittings are leaking, install a simple seal kit or replace them. If the 2-speed solenoid is bent or leaking, or if the electrical is cut or frayed, you need to fix this. Addressing these issues can save you from not only losing auger rotation speed but also from blowing a fuse, causing you to lose other machine functions.

Need Parts?

Most replacement and critical parts are kept on the shelves at all times. And if you call before 3 p.m. CT, we can ship most the same day.

If you find any of these are in need of attention, call Geoprobe® service and we can help you with the process, sending the parts to complete repairs on your own or scheduling you for service.

Multiple Service Options Available

Geoprobe® service strives to provide the best equipment service support in the drilling industry. Understanding the difficult job you face servicing drill rigs when they are busy performing field work, the service centers – in Kansas and Florida – offer several different options to meet your needs.

SERVICE: change fluids/filters, lubricate slides, grease pivot points, check track tension, charge hammer.

REPAIRS: anything beyond service. Slide changes, hoses changes, cylinder rebuilds, gauge replacement, hammer replacements, tracks replaced, pump rebuilds, gearbox rebuilds, etc.

SERVICE AND REPAIR: fluids and filters and a repair of any kind to the machine.

SERVICE, REPAIR, AND PAINT: complete fluids service, agreed upon repairs, and as much painting as can be done without tearing the unit all the way down.

GEOPROBE® FACTORY REFURBISH*: (pictured at left) complete teardown, sandblast, paint, and building back up of a machine using all new slides, hoses and fittings, hydraulic pump, electrical components, new remote, rebuild hammer, hose carriers, rubber tracks, and more so the unit comes back looking and running like new. Essentially, it is like hitting the reset button on your machine's life.

*Only completed at Geoprobe® headquarters in Salina, Kansas.

Darren Stanley, Service Manager

785-825-1842

CALL GEOPROBE®:
with questions or if you need service assistance.

Service Team Grows

Providing opportunities for the next generation of service technicians to work alongside your current trusted service guru is just one way we ensure our superior service support. These part-time employees are putting to use in our shops the knowledge from their mechanical engineering or diesel mechanic college classes, gaining hands-on experience in system/unit diagnositics and troubleshooting, general service and repair, and unit rebuilds. This gives them exposure to electric, hydraulic, and mechanical systems.

"The quality of the part-time help we employ rivals anyone in the industry," Darren Stanley, service manager, said.

Andrew Wood

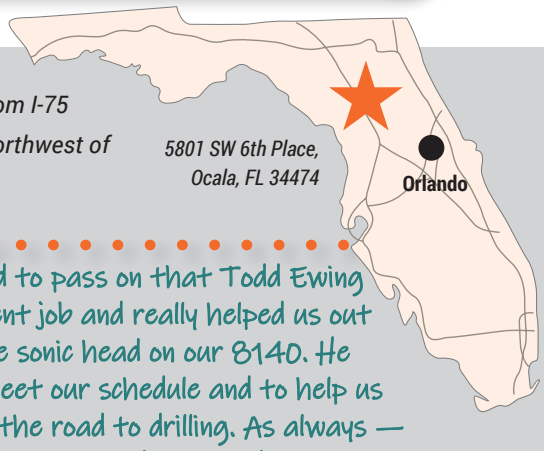
Attending K-State Polytechnic (Salina) studying mechanical engineering, Andrew enjoys turning wrenches with the people he works with. He describes his job as "busting knuckles, bathing in oil, and rebuilding and repairing machines," which applies what he's learning in class to real work situations. Born and raised in Florida, he enjoys fishing and working on cars and trucks when not busy in the shop or classroom.

Garett Folger

Also attending K-State Polytechnic studying mechanical engineering, Garett appreciates the ability to learn new things. He describes his job as "diagnosing and fixing broken components along with helping tear down and reassemble refurbished units." Work allows him to gain a better understanding of hydraulics. Garett enjoys spending time with his two daughters as well as designing and printing items on his 3D printer.

- *One-mile from I-75*
- *One hour northwest of Orlando*

5801 SW 6th Place, Ocala, FL 34474



"Just wanted to pass on that Todd Ewing did an excellent job and really helped us out changing the sonic head on our 8140. He worked to meet our schedule and to help us get back on the road to drilling. As always — Geoprobe® steps up and gets it done!

– Steve Taylor, President, Geologic Exploration, Statesville, North Carolina

Southeast Service Shop

Our team is growing! Service technicians with double-digit years of hands-on experience at Geoprobe® or DRILLMAX®, continued connection to Geoprobe® headquarters, and new team members bringing fresh perspectives mean you can depend on the Southeast Service Shop in Ocala, Florida, for general maintenance to major repairs.

From L to R: Steve Johnson, Hays Browning, Thad Barber, Todd Ewing, Donnie Wood, Ali Rady

CALL SE SERVICE SHOP:
to schedule your appointment today.

352-854-1780

Sage EnviroTech performing in situ remediation with their 7822DT.

Technique Creates Competitive Edge

With scheduling busy drillers becoming increasingly difficult in the Northeast, affecting their clients, SAGE Environmental recognized the need to control its environmental, remedial injection, and geotechnical drilling services. SAGE also recognized they could provide added-value by enabling their in-house science, remedial, and geotechnical staff to further develop and educate their drillers to be more aware of their clients particular needs.

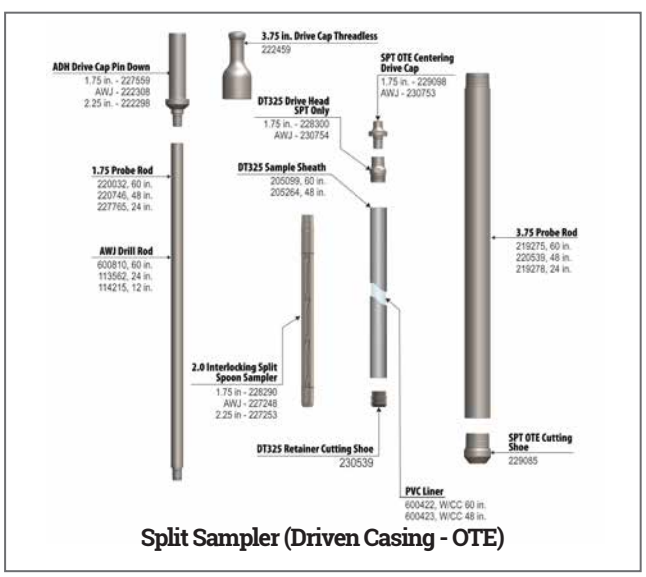
Having overseen drilling for decades SAGE staff was familiar with Geoprobe®, making it a natural choice. A second generation driller, underutilized at another firm, got wind SAGE was considering starting a drilling business and the rest is history. In 2017 EnviroTech Drilling Services was created.

"We started the business with a brand new, state-of-the-art 7822DT track rig with all the bells and whistles to enable us to offer geotechnical, environmental, and remedial services our clients were clamoring for," John Clark, general manager, said.

In the three years since launching the businesss, EnviroTech has developed two Master Drillers and two apprentices. They've also added a "like-new" refurbished Geoprobe® 6600 with automatic drop hammer and a new 540MT for drilling and injecting in low-clearance areas.

"We've been somewhat surprised by the volume of geotechnical work demanded by our engineering and construction clients," Clark said. "We needed to gain speed and efficiency in geotechnical drilling to have advantage over others so we could do more in a given day."

Clark called Vic Rotonda, Geoprobe® regional sales representative, who described out-the-end (OTE) sampling as a means to gain these geotechnical drilling efficiencies. The EnviroTech drilling team saddled up and drove to New Jersey to complete an intensive training with Vic and the OTE and dual tube sampling tooling and techniques.



Split Sampler (Driven Casing - OTE)

"Under certain soil conditions it (OTE and dual tube) can be twice as fast as drive and wash," Clark said. "Twice as much data. Twice as many borings. Twice as much vertical feet in a day, putting us on par with traditional auger rigs and then some."

Using OTE sampling proved especially beneficial for a client who was aware of EnviroTech's new tooling. The client had been using conventional auger rigs to sample a gravel bank on a large tract of land to analyze the type of material in the soils. With the OTE sampling, they were able to do twice as much work as other contractors. The client quickly recognized these benefits and had EnviroTech analyze the entire gravel bank rather than just the portion originally contracted.

"Using OTE allowed us to complete nearly a year's worth of work in a week," Clark said. "It opened up a fantastic business advantage over others not using the method. Part of our challenge is to educate the geotechnical engineering community about the speed, efficiency, and flexibility provided by the modern Geoprobe® rigs."

OTE isn't the only Geoprobe® tooling helping EnviroTech function efficiently.

"The spring assisted swivel lift cap accelerates how quickly we can switch out rods. They're intuitive, my guys love them," said 30-plus year and second generation Master Driller Steve Perry. "And we love the new design of the split spoons. They quickly open and close where traditional spoons get harder to put back together as they age. They're less finicky than traditional spoons. The new design is more tolerant of residual left on the spoon."

Along with the machinery and tooling, the "top-notch" support received from Geoprobe® contributes to the company's success.

"I can pick up the phone, and whether it's Vic or a tech assistant from headquarters, anyone can call and get very descriptive, quick answers. If we're out at a site and need assistance, we can call and get immediate answers and get parts overnight shipped for next day," Perry said. "Our partnership with Geoprobe® and its support staff have enabled us to consistently WOW our clients…and what could be better than that!"

Versatile Tooling Platform Upon Which to Build New Company

After first being around a Geoprobe® on a skid steer back in 1996, throughout his career Michael Jordan has used a 54LT, 6610, 7800, 8040DT, and 3230DT. So this past summer when he formed his own company in Vermont he chose a 7822DT and genuine Geoprobe® tooling to build Platform Environmental Drilling and Remediation.

He predominantly focuses on environmental/remediation work but finds many jobs also need geotechnical sampling.

"They need environmental data but also need geotechnical information for foundation construction," Jordan said. "Traditional geotechnical rigs are dated, larger, and consume more fuel than a 78. The 78s are great, versatile machines and with the 4-speed auger head can cross over between environmental and geotechnical sampling."

He recently completed a job sampling through 12-to-18-inch reinforced concrete runways using 4-speed rotary head with diamond coring then switching to Macro-Core® 5 sampling.

"It was really efficient. No need for pre-coring. You can just do it all right there," Jordan said.

OTE sampling with the 7822DT.

For Jordan, the versatility of completing different drilling applications with one rig is amplified by the versatility of Geoprobe® tooling. For example, Jordan completes rock coring to collect Shelby tube, split spoon, and environmental samples through 3.75-inch out-the-end (OTE) sampling system.

"The versatility of Geoprobe® tooling to complete OTE versus geotech drive and wash means I can complete the job with minimal water, which is helpful especially in winter," Jordan said. "Drive and wash is problematic when it's below 15 degrees – water tends to not be your friend."

Recently Jordan asked an engineer, who he knew to be particular, for approval to use OTE rather than drive and wash.

"He was shocked by how fast we got downhole and how we retrieved a continuous sample from the deeper portion, getting readings in between where we would typically be doing split spoon samples," Jordan said.

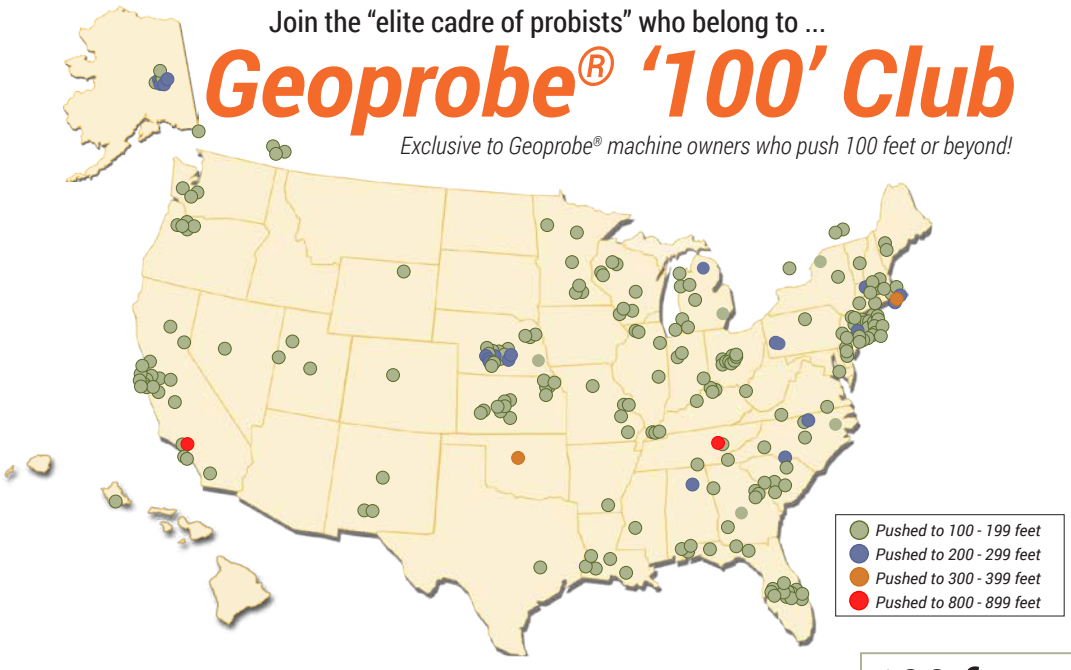
For Jordan, "easy-to-use and well-thought-out" Geoprobe® tooling has become a necessity for this new phase in his career.

"Other tooling doesn't stand up to the abuse that Geoprobe® tooling does. The triple lead pipe thread is needed to last," Jordan said. "Geoprobe® tooling has become 'the game'."

Join the "elite cadre of probists" who belong to ...

Geoprobe® '100' Club

Exclusive to Geoprobe® machine owners who push 100 feet or beyond!



145 feet

Penecore Drilling – California

Field Team: Heriberto Ramirez & Juan Munoz
Field Site: Madera, California
Depth/Date: 145 feet / Aug. 30, 2019
Geoprobe® Owner: Penecore Drilling, Monrovia, California
Field Data: Model 7822DT V3

100.2 feet

GHD Services Inc.& Dakota Technologies

Field Team: Rob Helton & Garrett Keen (pictured), Christine Matthews & Darin Shisher (not pictured)
Field Site: New Mexico
Depth/Date: 100.2 feet / April 24, 2019
Geoprobe® Owner: JR Drilling
Field Data: UVOST-EC sampling, 7822DT through caliche nodules

120 feet

Geo Lab Drilling – Georgia

Field Team: Alex Smith & Phillip Ricker
Field Site: Atlanta, Georgia
Depth/Date: 120 feet / May 15, 2019
Geoprobe® Owner: Geo Lab Drilling, Atlanta, Georgia
Field Data: Model 7822DT, HSA SPT boring

100 feet

Municipal Testing Labs - New York

Field Team: Chris Parras & Anthony Kappel
Field Site: Kings Park, New York
Depth/Date: 100 feet / May 2019
Geoprobe® Owner: Municipal Testing Labs, Hauppague, New York
Field Data: 7822DT V3 test boring

181 feet

Technical Drilling Services Inc. - Massachusetts

Field Team: Jay Jumonville
Field Site: Devens, Massachusetts
Depth/Date: 181 feet / Aug. 20, 2019
Geoprobe® Owner: TDS Inc, Sterling, Massachusetts
Field Data: 6712DT and SP22 groundwater sampling

157 feet

Technical Drilling Services Inc. - Massachusetts

Field Team: Alfred Allen
Field Site: Devens, Massachusetts
Depth/Date: 157 feet / Aug. 8, 2019
Geoprobe® Owner: TDS Inc, Sterling, Massachusetts
Field Data: 6712DT and SP22 groundwater sampling

100 feet

Dakota Technologies Co LLC - Ohio

Field Team: Alyssa Byron (Geologist, Stantec), Elliott Mazur (HRSC Specialist) & Andrew Kirsch (Operations Manager/HRSC Specialist)
Field Site: Northwest Indiana
Depth/Date: 100 feet / Oct. 9, 2019
Geoprobe® Owner: Dakota Technologies Co LLC, Galena, Ohio
Field Data: 6620DT, MiHPT

185.5 feet

Sage Enviro Tech – Rhode Island

Field Team: Steve Perry, Tyler Perry, Timothy Auger
Field Site: South Boston, Massachusetts
Depth/Date: 185.5 feet /July 12, 2019
Field Data: 7822DT, 3.75-inch casing drive and wash boring

172 feet

GeoTek Hawaii Inc. - Hawaii

Field Team: Kendall P. Bane, A. Quinton Wilson
Field Site: Mailiili, Honolulu, Hawaii
Depth/Date: 172 feet / Dec. 20, 2019
Geoprobe® Owner: GeoTek Hawaii Inc.
Field Data: 7822DT, open hole rotary with HQ coring

142.85 feet

Cascade Technical Services - New York

Field Team: Davis Ocana (L) & Aaron Zapf (R)
Field Site: SRG Global, Portageville, Missouri
Depth/Date: 142.85 feet / Jully 11, 2019
Geoprobe® Owner: Cascade Technical Services
Field Data: HPT

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Share your story or submit 100 Club information:
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