

PROBING TIMES

a publication of **Geoprobe Systems®**

INNOVATIVE RIGS AND EQUIPMENT FOR THE
Environmental, Geotechnical, Geothermal and Exploration Industries

Fall 2013



GEOPROBE® SONIC SUCCESS

GEOPROBE® SONIC A COMPLETE PACKAGE

My, how time flies! It's been 13 years now since Geoprobe Systems® started its sonic technology development program. There were many years of product testing prior to the first new machine delivery in 2009. Now, five quick years later and after sending new sonic machines and tools to customers around the world, our collective experience in a broad range of subsurface conditions has grown tremendously. Our sonic products continue to improve and our excitement for the future of Geoprobe® customers utilizing Geoprobe® sonic equipment grows.

I was recently asked, "Why is the demand for Geoprobe® sonic machines and tools growing so fast?" Good question. After a brief pause, the word 'Success' came to mind. Yes, *Geoprobe® sonic customers are successful.* Our customers are successfully completing projects on a daily basis, and ultimately, if a customer is successful, growth happens. Customer success is important, but then I thought of specific aspects of Geoprobe® sonic products that help customers succeed. Here's my list

SONIC MACHINES. There is no sonic without Power. The Geoprobe® sonic offering has surprising power in a compact package that customers are utilizing in very difficult-to-access locations. Operators also benefit from the easy-to-use control system and the rod handling option. Drillers just like running Geoprobe® rigs!

SONIC TOOLING. Tooling is a big part of the success equation. We engineer, manufacture, and stock a complete line of Geoprobe® sonic tooling which ranges in sizes of 4-,

Iain Haycock, Manager for McMillan Drilling Services in Canterbury, New Zealand, used their 8140LC rotary sonic and DT45 to retrieve samples of mostly cobble-sized Greywacke ("hard, to say the least!") on the west coast of the south island of New Zealand. The filled liners contained vesicular Basalt rock. The field team was impressed with the recovery and lack of drilling-induced fractures.

6-, 8- and 10-in. diameter. Our tooling allows customers to obtain subsurface samples faster and set wells at the desired depths. We also offer new dual tube sonic sampling systems that make even the most experienced sonic operators smile.

SONIC TRAINING. Trained operators are important in order for customers to maximize their investment in sonic machines and tooling systems. Geoprobe® offers comprehensive sonic training, typically to new operators that have never had sonic experience, in the operation, maintenance, and use of Geoprobe® sonic products.

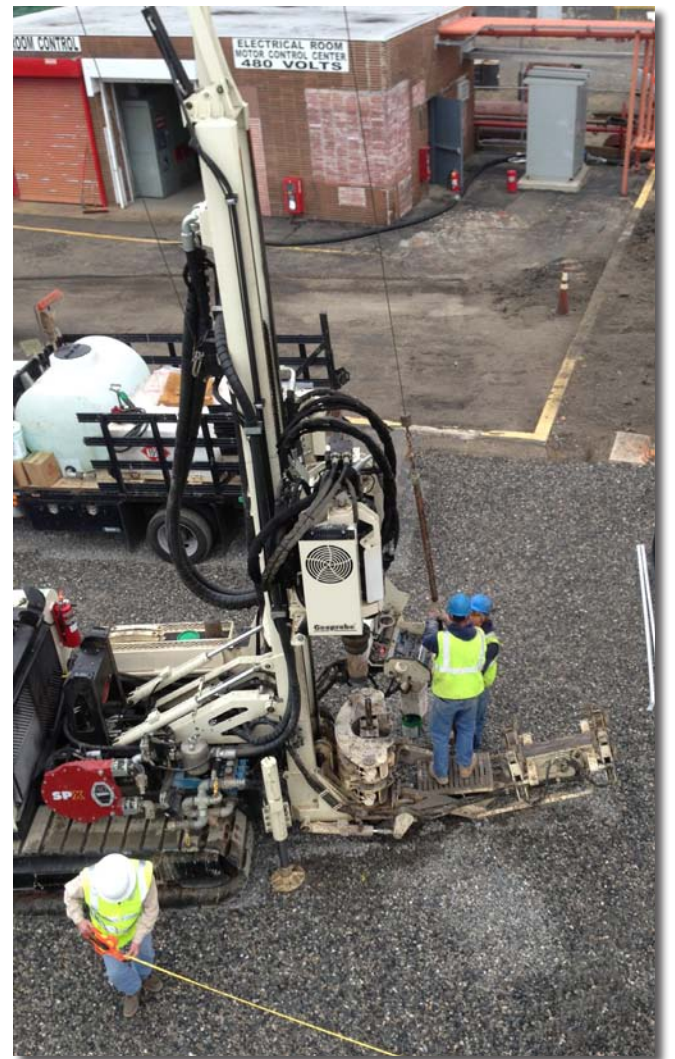
SONIC SERVICE SUPPORT. Geoprobe® maintains the best service center in the drilling industry. When our customers call with a need, we respond.

CONTINUOUS SONIC PRODUCT DEVELOPMENT. Geoprobe Systems® is committed to the future of our sonic customers. We continue to invest resources in the development of new sonic machines and tooling options that will broaden and improve the field capabilities of our customers. We're off to a good start ... but there are many new sonic offerings coming soon.

Sonic Thoughts shared by Tom Omli Geoprobe® Sales Director



Iain Haycock, Manager for McMillan Drilling Services in Canterbury, New Zealand, used their 8140LC rotary sonic and DT45 to retrieve samples of mostly cobble-sized Greywacke ("hard, to say the least!") on the west coast of the south island of New Zealand. The filled liners contained vesicular Basalt rock. The field team was impressed with the recovery and lack of drilling-induced fractures.



Drillers Dale Becroft and Mark Schock, with Glacier Drilling in Durham, CT, install a remediation system in Brooklyn, NY using the Glacier Drilling 8140 Rotary Sonic.



The compact size of the Model 8140LC Rotary Sonic allows Aquifer Drilling and Testing in Newington, CT, to efficiently transport their sonic rig and tools on a truck.



Chris Tatum with National in Richmond, CA, is on location at an undisclosed UST site near the Nevada/California border.

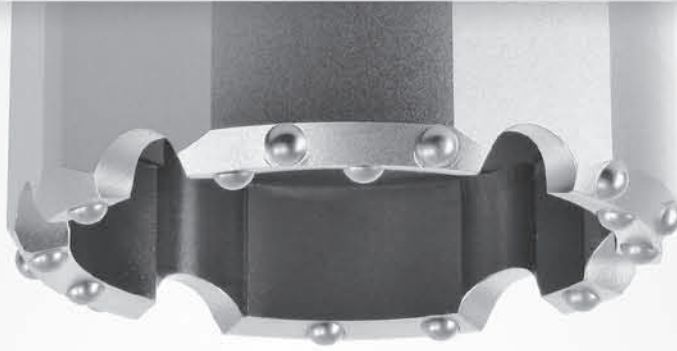
GEOPROBE® SONIC BITS



At Geoprobe Systems®, we recognize the concept of different strokes for different folks ... especially when it comes to sonic bits. We design and manufacture many sizes and styles of sonic bits. This includes casing bits, coring bits, dual tube bits (exclusive to Geoprobe Systems®), and special purpose bits. Our team of engineers and drillers are constantly working to improve and refine bits for sonic applications. This includes increasing bit life, improving sample recovery rates, and increasing penetration rates. We regularly maintain an extensive inventory of sonic bits in order to respond to customers in the field with same day shipping.

SONIC CASING BITS

Sonic casing bits are normally used in 'core and case' applications where a casing string is used in combination with a sampling tool string. One of the most common applications is in 4x6 sonic tooling systems which utilizes 6.0-in. casing. There are also larger options available, such as 6x8 and 8x10 where 8- and 10-in. casings are used respectively. Casing bits provide the necessary cutting features in order to advance the casing string into the subsurface. They have porting features to facilitate the use of water or air for flushing the face of the bit. Geoprobe Systems® carries sonic casing bits for 6.0-, 7.625-, and 9.625-in. Geoprobe® sonic casing.

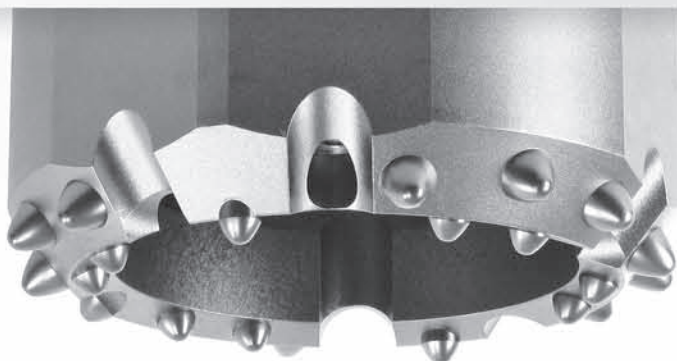


SONIC CORING BITS

Sonic coring bits are used in sampling applications with specific features to help penetrate and sample most all formations. The most common use for sonic coring bits would be in 'core and case' applications as described above. Geoprobe® sonic coring bits feature different carbide button configurations, water channels for flushing cuttings, and provisions for the use of core catchers to help retain sampled material in the sampler. The coring bits are the workhorse behind sonic soil sampling operations. Much like other drilling technologies, penetration rates and sample recovery can hinge on proper coring bit selection. Geoprobe Systems® stocks sonic coring bits for 4.5-, 6.0-, and 7.625-in. sample barrels.

SONIC DUAL TUBE BITS

Sonic dual tube (SDT) bits are specific to sonic dual tube sampling systems, such as SDT45, which utilizes 4.5-in. casing, and SDT60, which utilizes 6.0-in. casing. Dual tube systems are common alternatives to 'core and case' systems, such as 4x6. Geoprobe Systems® offers smooth-face dual tube bits that can maximize sample recovery in sensitive soils, and carbide button dual tube bits for use in more consolidated formations. The most commonly used dual tube bits have parabolic carbide buttons and face discharge ports for flushing cuttings away from the bit face for faster penetration in consolidated formations and rock.



SPECIALTY SONIC BITS

Geoprobe Systems® also carries 'lost point' or expendable-type bits for sonic applications as well as full face sonic bits. These bits are used for the installation of wells, loops, or other downhole products. Full-face bits are used where a simple bore hole is needed. If you have a unique application requiring a unique bit, please give us a call.



Geoprobe® Tooling Engineers: (l to r) Joel Christy, Kyle Riedel, Mike Carlin, Jed Davis and David Golden.



"The Geoprobe® sonic product line offers you the widest array of bits and sampling systems available; from conventional telescoping soil coring to dual tubing and face flush bits for rock coring. Our sonic tooling is going into the ground almost every day at Geoprobe Systems®. Our tooling engineers are constantly improving and refining our sonic tool offerings. Our tooling is made to the highest quality standards and backed by unsurpassed customer service."

*... Mike Carlin
Geoprobe® Tools Group Leader*

GEOPROBE®
SONIC
Specialized Machines and Tools
for Soil, Water & Rock Sampling

SDT45 Sonic Tool System Now Available For 10-foot Sampling Intervals

Yet another “you saw it here first” from Geoprobe Systems®! The speed and efficiency of Geoprobe® Sonic Dual Tube 45 (SDT45) tooling is now available in a 10-ft. version. SDT45 has been popular because it uses 2.25-in. center rods to trip the sampler in and out of the 4.5-in. casing. The 2.25-in. center rods can be winched in and out in 10- or 15-ft. sections which significantly speeds up the trip in and trip out time in the field. When you couple the fast trip times with 10-ft. sampling intervals, it makes very quick work out of most soil sampling projects.



Soil cores taken with the 10-ft. SDT45 system. Cores were collected from 200 to 300 feet during Geoprobe® R&D testing.

The 10-ft. SDT45 system actually uses an 11-ft.-long sample sheath which leaves extra room so the sampler is not overfilled. No sample liners are used with the 10-ft. system, and the cores are transferred into sample bags. (In the past, overfilling a sampler can make sample extraction very difficult and time consuming.) Due to the length and weight of the SDT45 sampler, it is coupled directly to the sonic head (via spindle) so that the soil sample

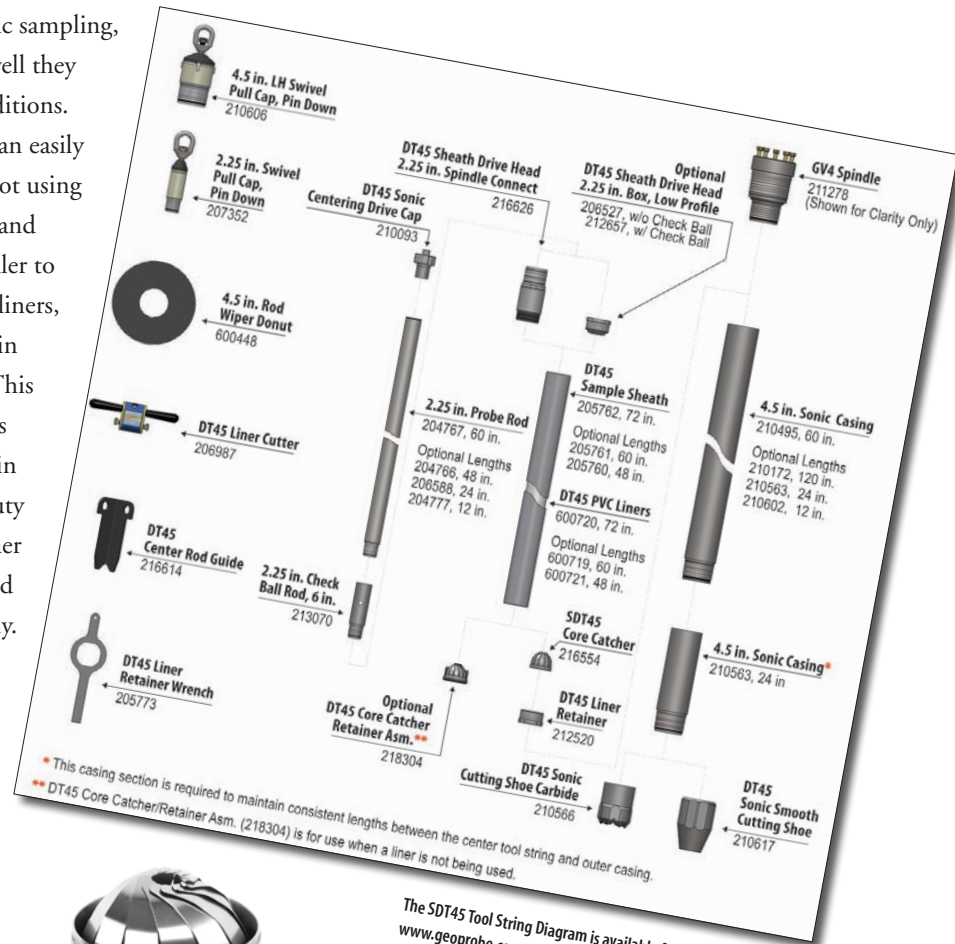
can be vibrated out into a core bag. This is made possible by the dedicated SDT45 spindle connect drive head for the sample sheath that allows the sheath to be directly coupled to the sonic spindle without the use of adapters or subs.

More Options For 5-ft. SDT45 ... Liner or No Liner

The SDT45 system has proven to be a good sampling system for sonic drilling applications. One of the features of the 5-ft. SDT45 is that the soil sample can be collected in a clear, rigid PVC liner. This method minimizes sample disturbance when removed from the sample sheath. PVC liners have long been the standard in many soil sampling methodologies, so it is no wonder that the use of PVC liners in the SDT45 system is a favored option.

Even as a favored method for sonic sampling, PVC liners do have limits on how well they hold up under extreme drilling conditions. For this reason, 5-ft. SDT45 users can easily alternate between using liners and not using liners. An optional SDT45 retainer and core catcher assembly allows the driller to take soil samples without using soil liners, but still utilize a core catcher to retain loose soils inside the sample sheath. This retainer/core catcher assembly allows the retainer to be held in place within the sheath with a custom, heavy duty snap ring. This allows the core catcher to be removed and replaced if needed without replacing the entire assembly.

More information is available from Geoprobe® Customer Service.



The SDT45 Tool String Diagram is available for free download at www.geoprobe.com, along with other tooling TSDs for addition products in the Geoprobe® tooling lineup.



217894 ... SDT45 Retainer/Core Catcher Assembly with Short Thread for use with 11-ft. SDT45 Sheaths



218304 ... SDT45 Retainer/Core Catcher Assembly with Long Thread for use with 5- and 6-ft. Sheaths

MiHpt Demo for Florida DEP

Wes McCall, Geoprobe® Environmental Geologist, and Dan Pipp, Geoprobe® Chemist, recently demonstrated Direct Image® logging tools to the Florida Department of Environmental Protection, Site Investigation Section. The demonstration was held at a former dry cleaner location in Pensacola, FL.

Florida DEP personnel were impressed with the performance of the logging tools and saw how these tools could improve the understanding of contaminant distribution and soil type determination. The regional geology lacks the mineral composition necessary to produce robust electrical conductivity readings in the finer grained soils. On this site, most of the EC readings were below 10mS/m offering very little contrast between different soil types even when HPT (Hydraulic Profiling Tool) injection pressure significantly increased. This phenomenon is common along the eastern seaboard of the US which makes the HPT injection pressure very important to determine soil types, show permeability, and show if contaminants are mobile or not.

The Florida DEP will use their HPT logging system on their sites as well as work with local MIP (Membrane Interface Probe) contractors for their site contaminant mapping.

FL DEP MiHpt Demo Log. The log, collected at a sand and gravel aquifer, shows (left to right) electrical conductivity, HPT injection pressure with piezometric profile, XSD and PID detectors, and estimated hydraulic conductivity (K). Overlaid with the detectors are lab analytical results of chlorinated VOCs from confirmation groundwater samples taken with the HPT-GW sampler.



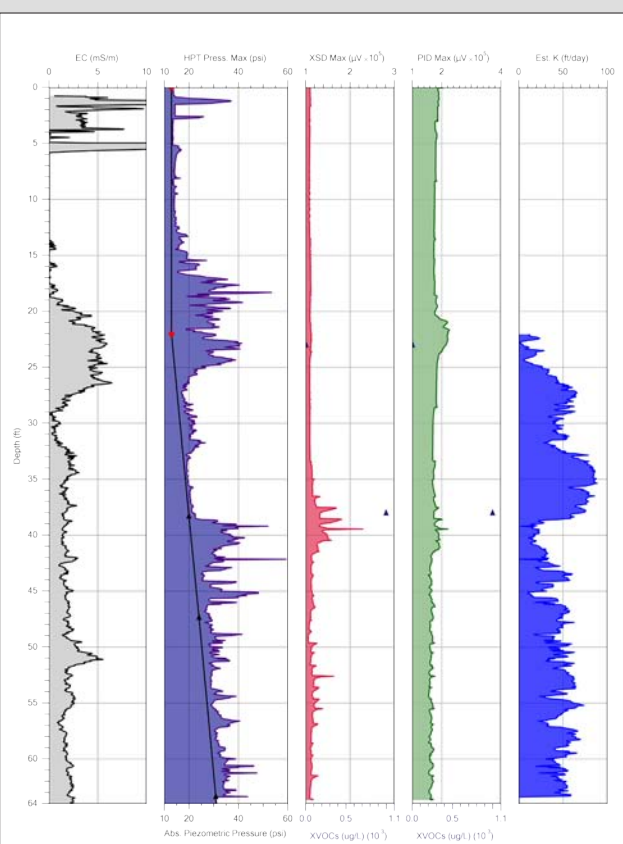
FL DEP personnel use their 6600 to advance the HPT-GW sampler onsite in Pensacola, FL.



FL DEP personnel (left to right) Steven Robinson, PG; Bob Cilek, PG; Dennis Jensen; and Jeff Newton, PG, ask questions of Dan Pipp (with hard hat), Geoprobe® Chemist.



Wes McCall, (left) Geoprobe® Environmental Geologist, prepares an HPT-GW sampler for demonstration while attendees observe the progress of an MiHpt log. Among those attending were: (left to right) Bob Cilek, PG with FL DEP, Amber Igoe with Tetrach, and Jeff Newton, Dave Meyers and Jason Kam, all Geologists with FL DEP.





A 7822DT, owned by Strata Drilling Group, provides geotechnical information for a new Goldcorp mining site in Canada.

Rock Sampling at New Mining Site

7822DT powers through scrap rock as large as a full-sized truck to retrieve confirmatory samples for new mine.

Strata Drilling Group used a Geoprobe® 7822DT at a new mine site in Canada for Goldcorp Inc., the second largest gold producer in the world.

According to Johan Fenelius, Manager of Geotechnical and Exploration Services for Strata Drilling Group in Richmond Hill, ON, Canada, Strata Drilling used the 7822DT on a variety of projects at the Goldcorp mining site with good success. “All of the projects came with unique challenges,” he said.

The first project was on a site where Goldcorp was constructing an open pit mine and building a berm surrounding the entire mine. Geotechnical information was collected using SPTs (standard penetration tests) in the overburden by casing the hole with hollow stem augers and using split spoon samplers until they hit bedrock. “We continued into the bedrock by rock coring 1.5 to 3 meters using a BQ core barrel to confirm the consistency of bedrock,” Johan explained. “This went quite well providing our client with the information we promised to achieve.”

On a variety of other projects Strata Drilling used their 7822DT with a 3.5-in. down-hole hammer (DHH) using a Symmetrix system (an all around multi-purpose concentric drilling system). The goal was to get through thick layers of scrap rock ranging in size from 6 in. to the size of a full-sized truck. “Our 7822DT managed to break through the scrap rock and we cased the hole at the same time,” he continued. “Our field team retrieved a confirmatory sample of the native material at the bottom, and then completed the borehole by installing a monitoring well to monitor any leaching that may have occurred over time. We managed to do this in record time while other previous attempts failed using much different and larger machines.”

**Johan Fenelius • Geotech & Exploration Services
Strata Drilling Group • Richmond Hill, ON Canada**

“We managed to complete our project in record time while other previous attempts had failed using much different and larger machines. Our team did it again!”



Scott Reid, Driller with Strata Drilling, checks his notes. This 7822DT is equipped with a rotational safety cage that remains closed during drilling operations.



Eric Langdon, Driller/Operator for Strata Drilling, completes another coring hole with the 7822DT.



Strata Drilling personnel Phil Halladay, Driller, operates the 7822DT with Rob Parsons on an environmental site in Ottawa.



Eric Nuchims, Chemist with Ecology and Environment in Seattle, WA, spent two weeks on Bainbridge Island, WA, using a 6600 (foreground) at an environmental investigation. It was his first time operating a rig alongside a master operator, Alan Jensen. An 8140 rotary sonic is shown working atop the hill. Downtown Seattle, WA, is in the background.



It's the first day of spring and the first day in the field for Rob Schippert and a new 7822DT just delivered to Mannik-Smith Group in Canton, MI.



Tri-State Drilling Technologies, in Levittown, NY, uses a 7822DT for residential environmental work.

Geoprobe®

... on your side!

These companies know the VALUE of reliable machines and tooling, the IMPORTANCE of sound engineering, and the SECURITY of knowledgeable and timely support and service. Geoprobe® is ready to help you accomplish your goals. Give us a call at 1-800-GEOPROBE.

(send your high resolution Geoprobe® in-the-field photos to laceyg@geoprobe.com for future publications)



Cody Clayton, with Vortex Drilling in San Antonio, TX, uses an air hammer with their 7822DT on a project in Texas.



Glenn Reiss, Owner/Geologist with Vapor Tech Services in Hayward, CA, guides a 7822DT through a building entrance. Seventeen remediation wells were installed inside the building.



Parade Crasher!

It appears the Geoprobe® transport truck has kidnapped the Salina Central High School football team and is trying to make a get-a-way! Not this time. Blackie actually got all spiffed up special so he could join the school's homecoming parade before the big game.



With barely 0.5 in. to spare on each side, the new 6712DT owned by Environmental Priority Investigations in Cream Ridge, NJ, heads "where no rig has gone before!"



Rob Bittel (right), President of Tri-State Drilling in Chattanooga, TN, accepts delivery of their new 7822DT in September from Lee Shaw, Geoprobe® Customer Service.

A 6625CPT machine, owned by Golder Associates in Christchurch, New Zealand, has pushed over 1,000 m with CPT tooling. Sean Templeton, Geologist, said the rig is named 'Dorothy' since she came from Kansas. The transport truck: 'Tornado'.



Stone Environmental, Montpelier, VT, uses an air rotary hammer with a 7822DT to install 160 multipurpose injection/monitoring wells at a former drum burial site in New England. The wells were used to delineate the source area of contamination in preparation for an in-situ chemical oxidation remedy.



6620DT Has 5,000 Work Hours

Steve Norrie, Owner of Ecoprobe in Forrestfield, Australia, reports that his 6620DT has completed nearly 5,000 hours of field work! They just completed a second re-condition of 'her' and he reports she looks as good as new and continues to run as new. "She has been a great workhorse for us and has been very reliable." This Ecoprobe field team consists of (left to right) Ian MacPherson, Clinton Winder, Joey Zito, and Mitch Skender.



Pat Clark, Physical Scientist with the US Environmental Protection Agency in Cincinnati, OH, sent in a recap of work he's been involved with. (above) "I worked with the 540MT (mounted on a John Deere tractor) with the USGS out of Lincoln, NE. It was 107 degrees F and we worked 12 hr days. It was great to get back at the controls again and be back in the saddle. Of course once word got out that a member of the "Geoprobe® Hall of Fame" was in town the press swarmed all over the place. You'd think Brad Pitt was there!! (upper right) Sediment sampling for cleanup of rivers draining into the great lakes. (right) Russel Neill and Tim from the Ada, OK EPA office used the 6620DT in Oregon to find the depth of tailings dumped from a mine."



Looking for a Geoprobe® Service Provider in Your Area?

Call us at 1-800-436-7762!

We receive requests from Project Coordinators almost daily from all parts of the country looking for Geoprobe® Service Providers.



When Sean Bromley (third from right), Owner of Direct Push Services in Salt Lake City, UT, isn't at the controls of his 7730DT, his mind gravitates elsewhere. "When you hear the word 'Brazil', what comes to mind? For me it's soccer! Since I was 5-years-old soccer has been a major part of my life, as a player, trainer, coach and even on a couple occasions (which everyone should have to do at least once) a referee! It had been a dream of mine to go there someday and play. So when a friend, Mateus Costa, who was born and raised in Fortaleza, Brazil, told me about his Soccer Foundation I knew I wanted to be a part of it. Mateus is the Trainer for the Utah Surf, an extension of the San Diego Surf, both soccer clubs for the development of youth soccer players. In just over one month's time donations were collected from parents, players, businesses

and neighbors to help with the Foundation. Nearly 500 lb. (that's five 4.5-in. probe rods!) worth of soccer gear was purchased to give to the kids in the neighborhoods where Mateus grew up. On June 14, we journeyed there to 'give back' to kids in Brazil. I saw young children playing barefoot in the streets with only power poles and brick walls or chunks of concrete or broken brick as their goals. The joy they had in their expressions after they saw the soccer gear reminded me of when I was a child getting new shoes (some how they made me play better and run faster!). This was the first of many trips for me. Our next trip is scheduled for June 2014 during the FIFA World Cup soccer games! Pictures of this year's trip and future donations for the Foundation can be made at www.facebook.com/mcsoccerfoundation."

Expand Your Business with the 7822DT

(Q) What does a Geoprobe® rig and fresh produce have in common?

(A) Sometimes they occupy the same space!

Who would have thought ... potatoes, pomegranates and probe rods ... sharing space at the corner grocery store! It's probably an unusual jobsite for a 7822DT, but it's a great example of another use for this popular rig. Its small footprint, easy maneuverability and versatility also made it ideal for angle sampling at a dry cleaning business. The 78 Series machines (by the way, there's a brand new brochure for them) will help you adapt to changing work roles whether you're focused on environmental sampling, geotechnical investigations, or rock sampling for exploration.

The 78 Series machines are loaded with features and capabilities that enhance subsurface sampling, from direct push to hollow stem augering, from air and mud rotary to concrete and rock coring. You'll find the 78 Series rigs to be more powerful to complete rotational drilling projects, designed to work with larger diameter tooling, and equipped with more options allowing you to offer more services to your clients. Find out why customers find excuses to own more than one!



Parratt-Wolff, in E. Syracuse, NY, was tasked with assisting to delineate a suspected plume of cleaning solvents from an historical dry cleaning operation previously located on the site. The investigation included 15 soil borings to 25 ft. bgs; five of which would be located indoors. Since the current business at the property was an active grocery store, Parratt-Wolff used their 7822DT along with an exhaust extraction system to core through the linoleum-covered concrete floor and advance the DT22 tooling to the target depths. Without having the ability to close the store, night work was performed and the strictest safety operations followed as the store was open 24 hours-per-day. Based on the data collected from the investigation, permanent monitoring wells were installed around the area of impacted soil, and chlorinated solvents have been confirmed to be present in the groundwater.



Coring through a variety of underground materials at a disaster site. The power of the compact GA4100 Augerhead performs well for drilling jobs varying from torquing-in hollow stem augers to high-speed rock coring applications.



Free copies of the 78 Series brochure are available by calling us at 1-800-436-7762. If you already own one of these rigs and would like multiple copies of the brochure to help promote your services, call us and ask for Lori; she'll get them sent to you.



(left and right) Maher Services in North Reading, MA, use their 7822DT to collect continuous soil samples and install a 2-in. monitoring well in the basement of a functioning dry cleaning business. Access to the basement was limited. Low clearance was also an issue because of the ceiling height and hanging pipes. Working with Nobis Engineering, the contractor for the project, David Maher, Vice President of Maher Services developed a plan to drill an angle hole inside the threshold of the basement door with 3.5-in. dual tube tooling. The mast was set at 35 degrees off of vertical and the boring was drilled 30 lineal feet. To install a uniform filter pack around the well screen, the field team used Silibeads, a round, glass bead filter material that flowed down around the well screen as the casing was removed. Steve Dubois (yellow jacket) was the machine operator for Maher Services, and Jeff Brunelle was the geologist onsite for Nobis Engineering.



THE SITE, THE KIDS, AND THE PUMP

"I believe our GP350 injection machine is one of the hidden gems in the Geoprobe® product line. It's very portable, and provides an easily adjustable high-pressure flow rate for site-specific conditions. I'm a big fan of this machine!"
... John Martinuzzi, Geoprobe Systems®



John Martinuzzi
Geoprobe® Customer Service - Southeast Region

The Site: The site was along a road in an active shopping and retail district in a suburb of Raleigh, NC. A daycare facility was located on a side street with a typical grocery store plaza and residential homes nearby.

The Issue: A former drycleaning facility had discharged a significant amount of TCE into the groundwater. The plume had migrated off site under a two-lane roadway and onto the daycare property. Plume gases were detected in the buildings in the area along with groundwater impacts.

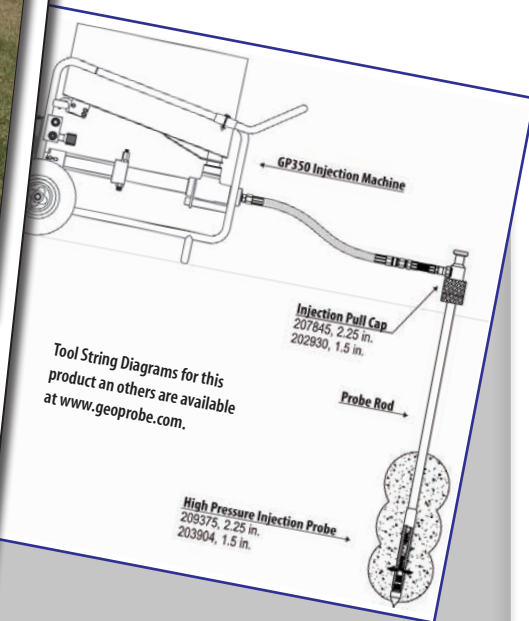
The Challenges: To place an injected barrier wall of reactive compounds to remediate and stop down gradient migration to the daycare, shopping areas, homes, and beyond.

The Soils: Consisted of construction fills along the right-of-way and with underlying soils being very clayey with very small particle size and placement. The soil posed a problem of mass placement of the reactive compound and the soil's ability to accept it.

The Equipment: The Consultant and the Geoprobe® service provider chose a 7822DT rig and the GP350 injection pump. The downhole tool string consisted of 1.5-in. probe rod, an injection pull cap, and a Geoprobe® 1.5-in. pressure activated injection probe. The GP350 pump was chosen for its ability to deliver various compounds under pressures in excess of 1000 psi. The site was gridded and the injection process began. The soil column

GP350 Injection Machine Specifications	
Weight (without grout)	145 lb. / 66 kg
Height	29.8 in. / 757 mm
Width	20.6 in. / 523 mm
Length	38.7 in. / 983 mm
Hopper Capacity	12.75 gal. / 48.3 L
Hopper Capacity (3 in. freeboard)	9.5 gal. / 36 L
Pump Displacement	13 cu. in. / 213 mL
Pump Pressure Rating*	1,300 psi / 89 bar
Pump Flow Rate*	0-5 gpm / 0-18.9 Lp

*Dependant on Hydraulic Power Source.



would only allow a very low flow rate of 1 to 4 gpm. The GP350 was able to meet the flow requirement on the site and still achieve the pressure required for placement.

The Summary: The GP350 was able to deliver compounds with flows under 1 gpm as required at the site and up to 4 gpm as subsurface conditions allowed. The new hydraulic switching system used in the GP350 provides a more reliable and robust control system than the electrical components previously used. Even under high temperatures, high pressure, and high-cycle applications necessary to pump material into the ground, sometimes grout and sometimes remediation materials, the hydraulic switching system continues to deliver. The combination of the small footprint and the easy maneuverability of the GP350 by one crew member made it the right pump for this project.

6712DT Takes Flight in Alaska

Multiple drill sites spread over 200 square miles of rugged, impassable terrain in Alaska. Multiple borings required at each site in a relatively small area. Find a self-propelled, sling-ready rig to use with a helicopter long-line system that can move itself to multiple boring locations within each drill site. It was a project perfect for the new Geoprobe® 6712DT. And the result: the savings of a massive amount of valuable helicopter time and a substantial cost savings to the client.

The 6712DT, when used in remote areas, easily disassembles into three separate parts ... drill mast, tracks, and power unit ... and can be re-assembled in about 15 minutes. Only four bolts are needed to connect the engine to the tracks, as well as connecting a series of quick connect hydraulic fittings. Adding the mast required two bolts to be tightened and another series of quick connects.

Steve Rowland, President and Owner of RECON LLC, based in Palmer, AK, purchased the 6712DT specifically for this remote drilling project in Alaska. Utilizing a Eurocopter AS350B3 helicopter, the rig's three separate sections were picked and placed individually. According to Steve, the entire process was very user friendly; not only for the drill crew, but the helicopter pilot as well. Once the individual pieces were placed, the drill crew could begin to advance the first sample in as little as 15 minutes.

Samples were collected with a combination of MC5 and MC7 tooling. The new MC7 tooling was used in areas containing larger gravels or when frozen core samples were required for lab testing and characterization of ice content and structure. The MC7's larger inner diameter provided substantially better results than a smaller sampling system. "The MC7 is by no means a replacement for the MC5 system," Steve said. "However, having both options on the rig, the driller could choose the right tool for the job. The MC7 worked great and we were able to collect large, gravelly material, as well as achieve 90-100 percent recovery on most runs. It's a great sampling system."

While RECON was finalizing their project, Discovery Drilling, based in Anchorage, was working on a separate project in the same location. Their scope of work also required the installation of groundwater monitoring wells to pre-bedrock depths, something they thought the 6712DT would be well suited for. "We have our own Geoprobe® rigs and are well aware of their capabilities," DJ Wardwell, Assistant Operations Manager for Discovery Drilling said, "so we asked to borrow the 6712DT since it was already at the site!"

"I was the lucky one from Discovery who got to try out the rig after it was mobilized to our project site," DJ added. He used a mix of direct push drilling and hollow stem auger drilling with the GA2500 two-speed augerhead to complete their project. A series of 15-ft. groundwater monitoring wells were installed using the MC7 system to collect three 5-ft. samples to 15 feet. He used a wood-plug in the bit of the 4.25 in. hollow stem augers, quickly re-drilled the hole, and installed the well. "It was a fast and efficient process," DJ said, "and our client was very pleased with the samples we provided."

According to DJ, multiple groundwater monitoring wells were installed in a fraction of the time it would have taken a larger drill rig. "I really like the machine, he said. "It's powerful, has so many options, and is very user friendly. You can easily access all of the electrical and hydraulic components, and the new MC7 system is also a real winner. It works just like the MC5, except with a larger sampler. It's perfect for larger, gravelly materials. No matter how hard I drove that sampler, the liner always came out smooth, and we came to expect great recovery on every run."

Since purchasing the 6712DT, Discovery Drilling has already used it for various projects around Anchorage and further north in Fairbanks. "It's a great addition to our growing fleet," said DJ. "We're really excited about all the possible applications that the 6712DT brings to the table."



drill mast ...



tracks ...

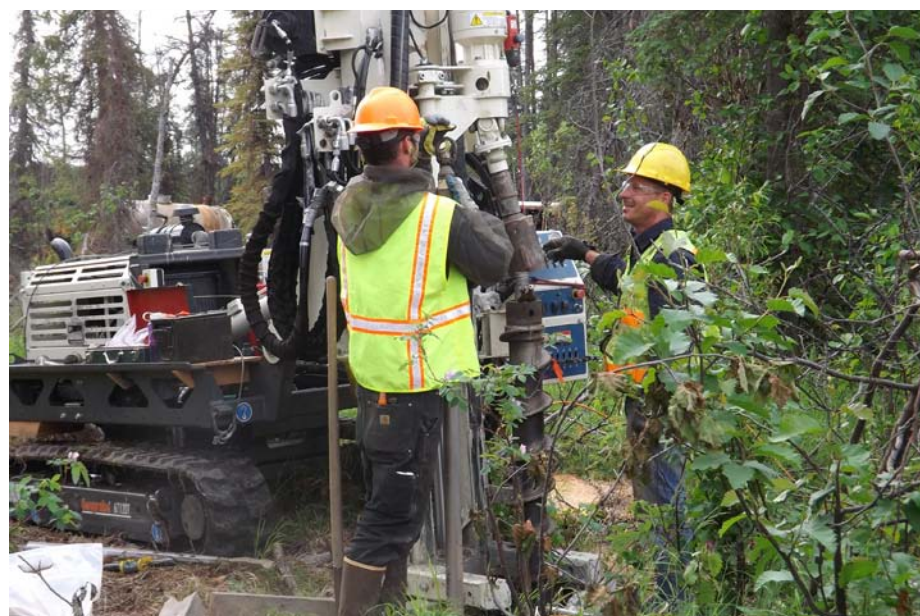


power unit

(above left) First the drill mast section of the 6712DT is mobilized to the site via helicopter. (above center) Then the tracks are lowered to the site. (above right) And finally, using a helicopter long-line system, the power unit of the 6712DT joins the other two sections on the ground. (below right) The power unit attaches to the tracks by tightening four bolts and connecting a series of quick connect hydraulic fittings. The drill mast connects to the power unit with two bolts and another series of quick connects. Assembly takes approximately 15 minutes, then the rig is ready to roll.



Ben Gerwig, Engineering Technician with RECON LLC and a student at LeTourneau University in Texas, walks a 6712DT off the tarmac after unloading it from the cargo aircraft in Alaska.



DJ Wardwell, Assistant Operations Manager/Driller, and Scott Bombard, Driller's Helper, both with Discovery Drilling, advance 4.25 in. hollow stem augers to install 2.0 in. groundwater monitoring wells with the 6712DT.



There were no clouds in the sky during the flight to the drill site. The 'clouds' were actually smoke from various forest fires burning at the time in the Alaskan interior.



Two RECON field team members apply mosquito repellent after they have the 6712DT assembled and ready for work. (Mosquitos are known as Alaska's national bird.) RECON specializes in remote route reconnaissance, infrastructure development, and project management in arctic and subarctic regions. After the RECON project was completed, Discovery Drilling purchased the 6712DT for environmental sampling work around Anchorage and further north in Fairbanks.



Environmental Probing Investigations collected continuous soil cores from 56 borings at a site in northern New Jersey. The subsurface was pre-heated to nearly 400 degrees F prior to sampling to alleviate onsite contamination. The maze of gray electrical junction boxes and electrical cables and air hoses were used to distribute electricity to power the 'heater cans' in the subsurface.

Field Team Faces Mother Nature's Fury

A four-man field team from Environmental Probing Investigations in Cream Ridge, NJ, went toe-to-toe with Mother Nature this summer during a super hot/humid week in northern New Jersey. Warren Atkinson, Bob Flemming, John Brass, AJ Benjamin, Josh Septor, Jeremy Wilkins, and Mike Santore, drillers for EPI, spent seven days in July with heat-resistant gloves and face shields on a project where the ground had been electrically heated to 35-ft. bgs to treat contaminants in the subsurface. Prior to EPI's arrival onsite, electrical junction boxes, connected by electrical cables and air hoses, were installed. The junction boxes distributed electricity to heat up 'heater cans' in the subsurface to approximately 400 degrees F. to remediate onsite contamination. With extremely high humidity and temperatures in the upper 90's, the field team completed 56 borings on ground approaching 200 degrees F. EPI used their 7720DT and 6620DT to collect the soil cores in Teflon® liners from between 20- and 40-ft. bgs. After each sample was pulled, the liners were cooled with ice in a fabricated trough so they could be cut open for viewing and analysis.

Tony Pressimone • Operations Manager
Environmental Probing Investigations • Cream Ridge, NJ

"During a summer sizzler of a heat wave this past July, our guys endured difficult site conditions as well as Mother Nature's fury. During our sampling event, the ground had cooled to a 'comfortable' 200 degrees F while the air temps were in the high 90s. The EPI crew persevered and completed all of the soil sampling ahead of schedule and without incident. Great job, guys!"



Adding to the already hot/humid ambient temps, 200 degree F steam is seen pouring out of a borehole after sampling tools were pulled.



Warren Atkinson (left) and Bob Flemming, EPI drillers, catch a few winks in the comfort of an air-conditioned truck after standing on the heated surface all day.



One of EPI's 7720DT rigs stands alone as steam vents from a borehole after sampling while the drillers take a break to get some relief from the heat.

Bob Fleming, EPI driller, with heat-resistant gloves, prepares to collect another soil core. The yellowish-tan material he's walking on is a fine-grained sand that was carried out of the bore holes by the steam.





Pamela Oree, Engineer with Schnabel Engineering, holds a split spoon soil sample collected from 30 ft. below ground surface.

**Dearal Rodgers • Owner
Elite Techniques • Camden, SC**

"We want to be 'the best' in our region. Owning the best equipment ... Geoprobe® ... is where it starts. But we also want to learn all of the techniques that make the Geoprobe® rig so special, and then be able to apply those techniques to help our clients."

Elite Techniques, Inc. driller, Al Large and helper, Ryan Tucker retrieve sample cores from points adjacent to the bank of the Penn Branch Creek.



Dearal Rodgers, owner of Elite Techniques, Inc., retrieves an SPT sample via the augers on the Penn Branch project.

Elite Techniques and 6620DT Tackle Restoration Project

Elite Techniques, Inc. in Camden, SC, teamed with Rich Wargo, PE and Pamela Oree, PE with Schnabel Engineering on the Penn Branch Rehabilitation and Restoration project in Richland County for the City of Columbia, SC. Penn Branch is a creek that partially runs through the eastern part of the city and discharges into nearby Lake Katherine. Mortared rock gravity walls, or CMU block gravity walls, border the majority of Penn Branch through the city on both sides of the creek. Sections of these walls are deteriorating and beginning to fail. Specific areas of concern consist of sloped embankments, some of which appear to be significantly eroded and/or are unstable.

Schnabel Engineering was hired to formulate repair/replacement solutions for the failing wall sections, stabilization solutions for wall facings, and recommendations for long-term maintenance of the Penn Branch stream. Rich Wargo, Schnabel Engineering's Columbia Branch Manager stated, "Most of the areas were difficult to access due to existing overhead utilities, sloped surface conditions, unstable

slopes/walls, and residential properties where homeowners were concerned about ground cover disturbance. Elite Techniques' 6620DT with SPT capabilities was the perfect equipment for this project."

Elite Techniques completed a total of seven holes to depths of 30-ft. bgs. "We used the power of our 6620DT and augerhead along with the DH66 drop hammer to collect blow counts at numerous intervals for each location," said Dearal Rodgers, owner of Elite Techniques.

The 6620DT, from Geoprobe Systems®, continues to perform well for Dearal. He's pleased with the versatility and power of his company's first rig. "This rig has done it all for us. The last couple of years our 6620DT has augered environmental wells to over 60 ft., collected dual tube sand mine soil samples to depths of 60 ft., collected water quality samples with the SP16 groundwater sampler to depths of 100 ft., pulled well pumps from over 200 ft. deep for repair, and installed methane ventilation systems. I'm excited to add remote SPT soil sampling to the list."

This portion of the Penn Branch Creek shows the deterioration of the gravity walls along the channel. The Penn Branch is located east of Columbia and runs through numerous residential and commercial properties.





Dependable ... Robust ... Efficient ... Versatile

All are qualities that make the Geoprobe® 2.25-in. tool system **THE** working rod for a wide range of direct push applications!

Dependable. Versatile. Efficient. These are qualities you look for when selecting the best driller for the job, but also when selecting the best tooling system for your field team to use. The Geoprobe® line of 2.25-in. outside diameter (OD) probe rods and accessories provides everything needed to complete your specific application of direct push technology.

Dependable.

Robust threads and thick sidewalls make 2.25-in. probe rods tough enough to handle machines up to the Model 7822DT equipped with our powerful GH60 Series Percussion Hammer. But as any operator will tell you, reaching the targeted depth is only half the battle. The job doesn't pay until the tools are back out of the hole, and that's where our over 25 years of experience in proprietary thread design truly shines. Our 2.25-in. rod joints hold up to the 80,000 pounds of retraction force provided by the 8040DT while maintaining the ability to be unthreaded with hand tools.

Versatile.

Geoprobe® 2.25-in. tools provide the primary driven casing for more direct push applications than any other tooling system available today. Whether the job requires soil sampling, groundwater sampling or monitoring, Direct Image® logging, or materials injection, we have parts on the shelf to complete the tasks with the 2.25-in. tool system.

Efficient.

In the drilling industry, efficiency is measured in dollars and cents. Contractors and clients both benefit from getting the job done right while minimizing time and material inputs. The versatility of the Geoprobe® 2.25-in. rod system contributes to higher operating efficiency because less time is spent switching out rod strings and less tools are needed on the truck to perform the job than with other rod systems. Less time and less tools means more return on investment for contractors and clients alike.

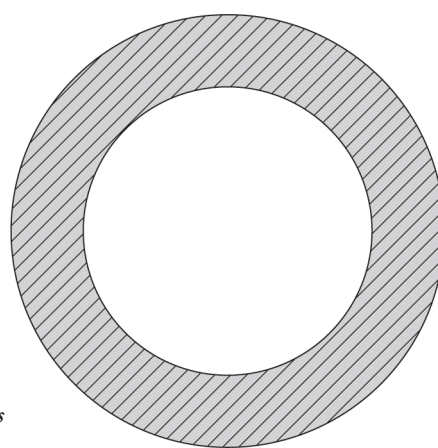
Many of the direct push technology applications that may be completed with 2.25-inch tooling fall under four main categories: Soil Sampling, Groundwater Sampling and Monitoring, Direct Image® Logging, and Materials Injection. Over the course of this and the next three issues of the Probing Times, we will highlight the uses and benefits of the 2.25-in. tooling systems in each of these categories. This issue we begin with Soil Sampling and the MC5 (Macro-Core®), MC7, and DT22 (Dual Tube) Soil Sampling Systems.

Soil Sampling with the Geoprobe® 2.25-in. rod system may be accomplished by using single tube and dual tube methods. The MC5 and MC7 soil samplers utilize the single tube method where the entire tool string is advanced from ground surface to sampling depth and then removed to retrieve each soil core. This contrasts to the dual tube method, using the DT22 sampler, in which the outer 2.25-in. rods remain in place and only the inner rod string is removed to retrieve each soil core.

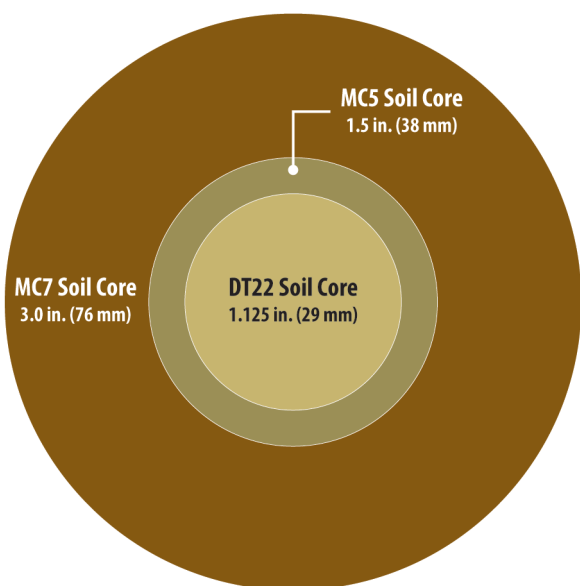
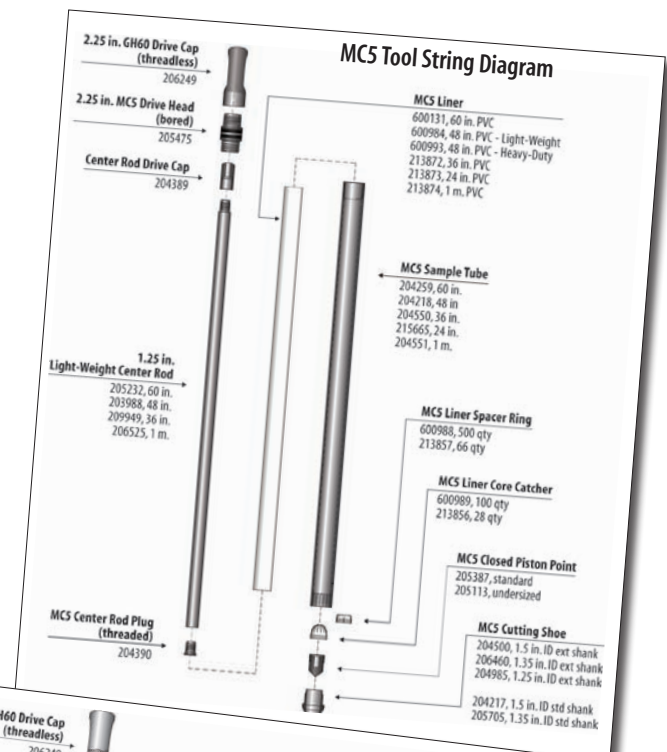
Refer to the tool string diagrams (TSDs) below for more information about the Geoprobe® MC5, MC7, and DT22 soil sampling systems. These and other Geoprobe® product TSDs are available at: www.geoprobe.com.



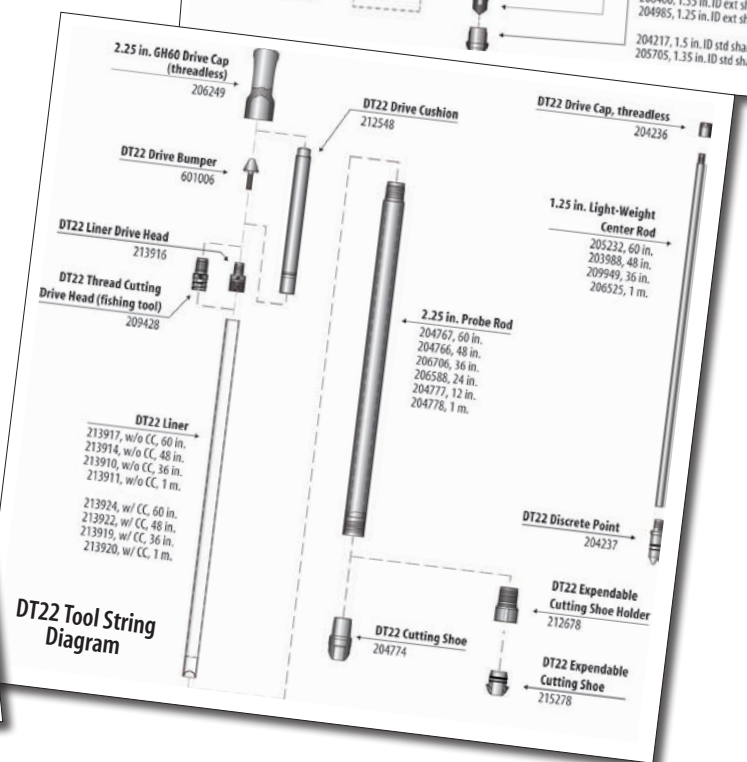
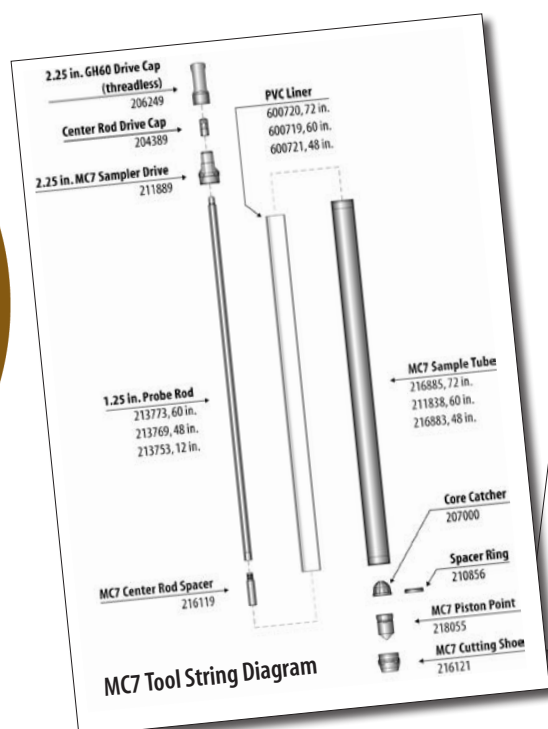
Geoprobe® 2.25-in. probe rods provide the primary driven casing for three soil sampling systems, including the DT22 dual tube system shown here.



Geoprobe® 2.25-in. Probe Rod Cross-Section (actual scale)
2.25 in. (57 mm) OD / 1.5 in. (38 mm) ID



Geoprobe® 2.25-in. Tool System Soil Core Diameters (actual scale)





Heritage of Harvest

Dust clouds hover above the combines as they cut a path across a field. Late night lights shimmer in the fields into the early morning hours. City folks yield to farm vehicles as they haul grain to elevators. This is Kansas harvest! Harvest impacts a farm family like no other event, bringing the generations together to share in the work and pass along the stories and the heritage....

As wheat harvest was drawing to a close for 2013, the Geoprobe® Family was invited to share in the celebration of the harvest and join the Kejr family in the field to operate, experience, and enjoy a day in the wheat field. Mel Kejr, President of Geoprobe Systems® also had a special treat planned.

In addition to the hot dogs, snow cones, ice cream, and watermelon, Mel had prepped four vintage combines to use for the last few trips around his last wheat field that needed cutting. He touted it as a 'hands-on event', saying he couldn't run four combines at once. Experienced drivers were able to climb into the driver's seat and make a lap or two. Kids got to ride with their parents and get a little dirty too.

"Combines have fascinated me ever since I was a little kid," Mel said. "Maybe it's all the moving parts that have to work together. Maybe it's because the combine is sort of the top of the farm equipment food chain. Maybe it's because the combine represents the focal/critical time in the farm cycle when personnel, machine, and weather must all come together and work in symmetry."

Mel described the four vintage combines, ranging from the late 50's to late 60's:

Case 660. One of the smallest combines Case made. Would be in near perfect shape except the weather took some of the new off! I bought it to give friends exposure to the broader combine market!

Massey Ferguson Super 92. This is the largest and later version of the widely known Massey Harris combines of the 1940's. They created a name for themselves during WWII when North America needed a way to get crops harvested while so many young men were absent from the farms.

Round-back John Deere 95. This was manufactured in either 1958 or '59. I purchased it earlier this spring. It's always been kept in a shed so it's very well preserved. It looks and runs very well for its age. At the time, this was John Deere's biggest combine, and they were a common sight in the central plains.

Square-back John Deere 105. First introduced in 1961 to address the farmer's demand for a bigger combine, this was the first model of combine I ever drove. During my first year in custom harvesting, I used a diesel/hydro 105 square back. I've been looking for one of those. This one needs significant repairs, but it looks good in the pictures!

"Maybe another reason I like combines and harvest is how it connects the families present to its past," Mel added. "And maybe it's the stories of years gone by with their assortment of serious, funny, and challenging situations."

No matter, harvest is definitely a time to acknowledge God's grace and celebrate the heritage.

Mel Kejr • President, Geoprobe Systems® and Kansas Farmer

"I like combines because they are central to the harvest experience, and harvest time is a great time to reflect on the grace and mercy of our Creator, Sustainer, and Savior, Jesus Christ. Some years are good. Some years are full of struggles. But no matter, God is sovereign, God is faithful, God is still Good."



The beauty of the Kansas landscape is sometimes hidden from the well-traveled highways, such as three of the family's combines cutting wheat as seen from above the nearby grain elevator.



The finishing touches of duct tape and silicone caulking, to keep wheat from running out the cracks, and fuel, grease, and tires were used in preparation for the harvest event. Lined up and ready to roll were (foreground to back) a Case 660, a Massey Ferguson Super 92, a square-back John Deere 105, and a round-back John Deere 95. Pulling in behind is a John Deere 9770 to wrap things up ... just in case it's needed!



You water where the plow has been used.
You cover the seeds with earth.
You make it soft with rain....

the Valleys
are covered with
grain
Psalm 65:9-13



The Geoprobe® Service Rock Stars: (l to r) Roman Burrows, Bryan Lorenson, Todd Ewing, Brian Rogers, and Darren Stanley.

Winter Service Tips for Year Round Maintenance

“For the most part, service is service,” says Darren Stanley, Geoprobe® Service Manager. “With regular service all year round, your machine should continue to run well no matter the climate.” That said, Darren recognizes that many Geoprobe® rig owners choose to wait until the weather cools down to turn their attention to servicing equipment.

“We have a few customers who work in extreme temperatures who are pros at winterizing their equipment, but for the average unit,” Darren added, “keeping up with regular service intervals is good enough to keep you going.”

Roman Burrows, one of the Geoprobe® Service Rock Stars, suggests four ‘winter’ service tips that can be done all year round.



Clean the Outside of your Machine. Power washing the body of your rig helps it look better on the work site and also helps identify issues that may require attention. Keeping the unit free from harsh chemicals and road salt also helps prohibit rust. Clean, but do not power wash, the control panel, remote systems, or inside the hammer.

Clean the Inside of your Machine. Keep up on hydraulic fluid change intervals. We suggest changing them every 500 hours or at least once a year. Change the filters every time you change the fluid. We also recommend opening up the cleanout and wiping down the inside of the tank.



Use Good Fuel. Use fuel that is appropriate for your working environment. If necessary, fuel additives may be used. Most machines have an in-line and canister fuel filter. Keep all fuel filters changed regularly. If you store fuel at your facility, be sure to change the filter on your bulk tank as often as you change the filters on your machines.



Replace worn hoses. Replace worn hoses as soon as they look cracked or weathered. Don't wait until they start to leak! A part number is stamped on all original hoses from the Geoprobe® factory. We can have replacement hydraulic lines shipped to your door before you even remove the old hose!

Those are just a few suggestions to prep for winter. You can find more wintertime operating instructions in your Geoprobe® rig Owner's Manual, or just call us. We also have information regarding filters, change intervals, or instructions for other service issues.

Keeping your rig in excellent operating condition is one of our goals. It keeps your investment paying dividends and is also key to operator safety. Call us at 1-800-436-7762 if you have questions.



MAINTENANCE MINUTES

The Geoprobe® Service Team continues to develop a series of short videos to help you tackle machine service topics in a simple and easy-to-understand way.

Although the list is steadily growing, you can go to www.geoprobe.com/mm to view the following videos:

- 7822DT Tethered Remote Overview
- 7822DT Wireless Remote Overview
- 7822DT Wireless Remote Re-association
- Hose Carrier Maintenance
- Fuel Line Bleeding
- Voltmeter Basics



MAINTENANCE MINUTES

#3 7822DT Wireless Remote Re-Association

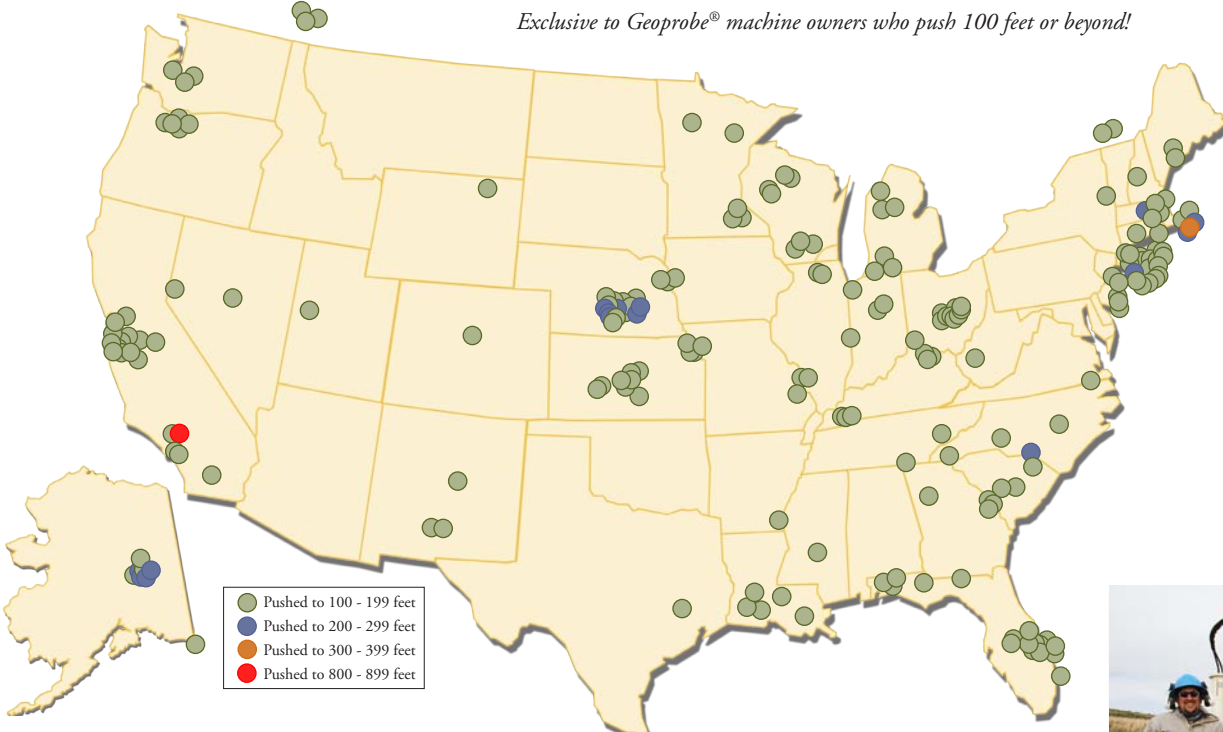


Geoprobe® Maintenance Minutes
www.geoprobe.com/mm

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● Pushed to 100 - 199 feet
● Pushed to 200 - 299 feet
● Pushed to 300 - 399 feet
● Pushed to 800 - 899 feet



103 feet

KLM Environmental – So. Carolina

--- FIELD NOTES ---

Field Team: (l to r) Jason Boots & Chris Austin w Environmental Drilling Tech.; Reginald Butler with Fuss & O'Neill; and Mark Keller & Micah Bennett w/ Environmental Drilling Tech.
Field Site: Bennettsville, SC
Depth/Date: 103 feet / Jun 13, 2013
Geoprobe® Owner: KLM Environmental in Goose Creek, SC
Field Data: Model 6600 on PC111 carrier using SP16 groundwater sampler.



105 feet

BeneTerra – Wyoming

--- FIELD NOTES ---

Field Team: (l to r) Brian Edwards and Frank Boggess
Field Site: near Sheridan, WY
Depth/Date: 105 feet / May 23, 2013
Geoprobe® Owner: BeneTerra in Sheridan, WY
Field Data: Model 7822DT. Investigating depth to groundwater with new machine delivered in March. Impressed with the power and performance as this was the first time advancing tooling to this depth. Using 4.5-in. solid stem auger.



140 feet

Walker-Hill Environmental – Louisiana

--- FIELD NOTES ---

Field Team: (l to r) Seneca Varnado, Marty Westmoreland and Cody Reid
Field Site: Bayou Corne, LA
Depth/Date: 140 feet / Dec 19, 2012
Geoprobe® Owner: Walker-Hill Environmental in Foxworth, MS
Field Data: Model 7822DT using HPT (Hydraulic Profiling Tool) tooling.

126 feet

CT Dept of Energy & Environmental Protection – Connecticut

--- FIELD NOTES ---

Field Team: Charles Morrison
Field Site: Haddam, CT
Depth/Date: 126 feet / Jun 21, 2013
Geoprobe® Owner: CT Dept of Energy & Environmental Protection in Hartford, CT
Field Data: Model 5400. The Site Assessment and Support Unit were asked to test the limits of the equipment for a possible Superfund investigation in an area with thick overburden, 100 to 200 feet. Test site was at a DOT facility with similar subsurface conditions. Used four feet of 1.25-in. rods.



132 feet

150 feet

Soil Essentials – Wisconsin

--- FIELD NOTES ---

Field Team: David Paulson
Field Site: Prairie du Sac, WI
Depth/Date: 132 feet / Jun 5, 2013 and 150 feet / Jun 13, 2013
Geoprobe® Owner: Soil Essentials in New Glarus, WI
Field Data: Model 7822DT using SP16 groundwater sampler. After 18 years of probing, finally went over 100 feet! Have been in the upper 90s many times, but always hit bedrock before 100 feet.



138 feet

Geologic Exploration – No. Carolina

--- FIELD NOTES ---

Field Team: (l to r) Brandon Hess & Johnny Burr (not pictured, Paul McVey)
Field Site: Charlotte, NC
Depth/Date: 138 feet / Jul 18, 2013
Geoprobe® Owner: Geologic Exploration in Statesville, NC
Field Data: Model 8040DT. Advanced 8.25 in. augers to 15 ft., then used 8-in. air hammer to continue to 65 ft. and set 6-in. PVC casing. Used 6-in. air hammer to drill out casing to 138 ft.



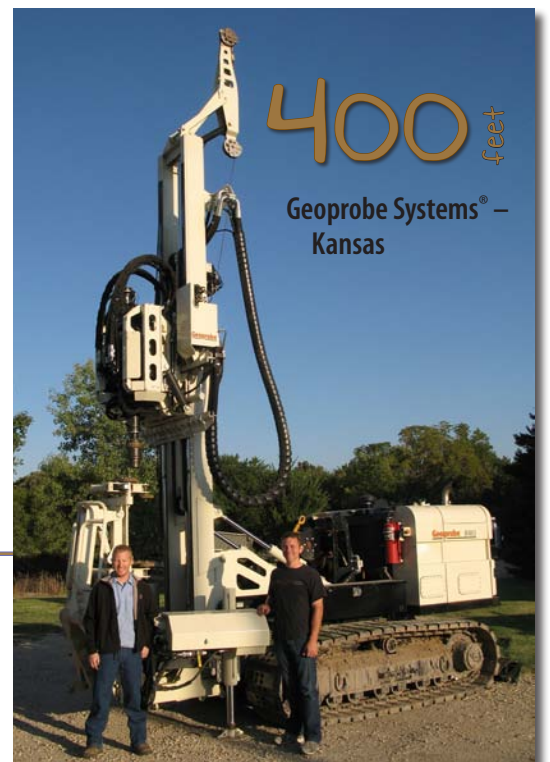
131 feet

Walker-Hill Environmental – Louisiana



--- FIELD NOTES ---

Field Team: (l to r) Roger Matthews & Gary Hill with Walker-Hill, Dan Pipp with Geoprobe Systems®, Frank Harrington with Walker-Hill, and Aaron King with Geoprobe Systems®
Field Site: Bayou Corne, LA
Depth/Date: 131 feet / Jul 17, 2013
Geoprobe® Owner: Walker-Hill Environmental in Foxworth, MS
Field Data: Model 7822DT using MiHPT, then grouted through the rods.



400 feet

Geoprobe Systems® – Kansas

--- FIELD NOTES ---

Field Team: (l to r) Jed Davis and Kyle Riedel
Field Site: Salina, KS
Depth/Date: 400 feet / Jun 20, 2013
Geoprobe Owner: Geoprobe Systems®
Field Data: 8140LS. Continuous soil cores on 10-ft. intervals using SDT45 (sonic dual tube 4.5 in. tooling).

geoprobe® 400 club

The Probing Times is the official newsletter of Geoprobe Systems®. Suggestions for future newsletter articles or submission of 100 Club information are encouraged. Call Gayle Lacey at 1-800-436-7762 or email probingtimes@geoprobe.com. An online version of the newsletter is available at www.probingtimes.com

Geoprobe Systems®
1835 Wall Street • Salina KS 67401
1-800-436-7762 • 785-825-1842
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