



## Mud Recycling Plays Key Role in Utility Re-Locating Project

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Jim Moscal — Mar 23, 2011

On Dec. 17, 2010, USA HDD Texas LLC, a division of Utility Services Authority, LLC (USA) of Belleville, Mich., began receiving the first of 15 semi tractor-trailers loaded with drill rod, reamers and support equipment into Beaumont, Texas, in preparation for one of Texas Department of Transportation's (TxDOT) more unique projects.



The TxDOT is in the planning stages of rebuilding the Purple Heart Memorial Bridge, which extends across the Neches River, connecting Orange County and Jefferson County. However, before construction can begin, existing conduits containing utilities located on the bridge and directly under the proposed new foundations need to be rerouted to an area that will not be impacted by the approaching construction. The solution: to horizontally directional drill a 30-in. diameter steel casing 4,000 lf nearly 140 ft below the river bottom to serve as a carrier pipe for multiple conduits, which will house the relocated utilities. This is an area where Utility Services Authority LLC has a wealth of experience, especially in the eastern United States.

USA is one of the few players in the maxi-rig HDD construction arena and every project of this magnitude requires intense scrutiny and flawless planning. Any mistake, from a miscalculation on the amount of drill fluids to use to an improper bend radius in the product pipe, could result in the loss of expensive equipment or product pipe nearly 165 ft below the surface of the earth.

For these reasons, USA's project estimators and project managers consulted with Metro Consulting Associates PLLC, (MCA) a Michigan-based project consulting and engineering firm, during the bid process and prior to mobilizing to the site. MCA's engineers reviewed the project specifications and performed calculations to determine whether the project, as planned, was feasible and within allowable "best practice" tolerances. Once it was determined that the proposed bore was acceptable given the available information, USA began drilling.

In January 2011, USA assembled its team and began setup of the maxi-rig drill spread on the west side of the Neches River. The drill side was equipped with a 2008 upgraded American Augers DD-625 drill, Tango 1000S Kem-Tron recycler, as well as the associated power units, water tanks and support equipment. Nearly a mile away, USA personnel set up a 2008 MC 1000 Tulsa recycler and Lewco mud pump in preparation for the pilot hole exit. During the setup phase, the 30-in., .625-wall steel carrier pipe was welded and strung along the I-10 exit ramp by ST Pipeline Inc. welders and a temporary wire grid was placed along the surveyed bore path, including two passes that were placed across the bottom of the river by professional divers.

The wire grid, used in conjunction with a tensor probe and part of the TruTracker surface-monitored guidance system was the chosen method to steer the drill string because of its proven accuracy when boring at great depths, maneuvering around existing utilities or where other possible environmental factors are likely to create interference during the bore tracking process.

USA's decision to bring in a team of professionals from the horizontal drilling industry, ranging from a drilling fluid technician from DCS Fluid Solutions to a steering hand from Horizontal Technology Inc., was a worthwhile investment. Due to the length of the crossing and depth of the bore, USA passed through numerous soil strata, each requiring changes in mud flow and operating pressures and the crew experienced interference from the concrete and steel reinforcement from the existing bridge.

Additionally, USA had to ensure it avoided conflict with the existing underground utilities while staying within the tight alignment tolerances set forth by TxDOT. Nonetheless, after seven days of drilling, the pilot bore reached its exit hole as planned signaling successful completion of the first phase of the bore.

The next phase of the bore was to enlarge the hole created during the pilot bore with a reamer. USA brought a



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second smaller maxi-rig drill to the exit side of the bore path to increase productivity during the reaming process. The second machine helps offload some of the duty on the larger rig and increases the effectiveness of the bore fluids. Once reamed sufficiently, 17 4-in. conduits will be placed inside the steel casing and the entire line will be pulled into the enlarged bore hole.

While not a new idea in the industry, the consolidation of multiple utilities into a single carrier pipe is not as common as it should be given the economic and environmental benefits. TxDOT area engineer Duane Browning explains that the consolidation of all the utilities into one casing is one way TxDOT is using new technologies, such as directional drilling and creative thinking to reduce costs on construction projects. Typically, each utility would be responsible for relocating its own facilities, creating scheduling issues and coordination problems that can delay a large project like the Purple Heart Memorial Bridge rebuilding and often results in cost overruns.

For the local TxDOT district, large diameter directional drilling is a new process. However, Browning believes that engineers need to consider such technologies and innovative construction methodologies when design issues and challenges arise.



As for USA, it has adopted the use of mud recyclers or reclaimers on all its large drill projects to create a cleaner, more efficient drilling operation and to demonstrate its commitment to the environment.

"It used to be common to use a stream of vector trucks to haul away the spoils from the drilling process. This meant more fresh water was needed to mix new mud and drivers would be lined up waiting to haul out the next load of spoils.

Now, we can remove the majority of solids from our mud mix and reuse the clean water throughout the drill process. At the end, we have a cleaner site and we don't have to haul a fraction of the spoils offsite. It's an added expense up front, but it creates a more efficient operation and it's better for the environment" says USA president Brian Bunton.

While the relocation of utilities is only a small part of the bridge expansion project, it is integral to the overall success of the project. Once the casing is installed, the remaining open-cut work can be completed, connecting the existing lines to the new crossing and bringing TxDOT one step closer to the estimated \$75 million bridge construction phase, which is anticipated to be let in early 2012.

*Jim Moscal is compliance manager with Utility Services Authority, headquartered in Belleville, Mich.*

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