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underground construction

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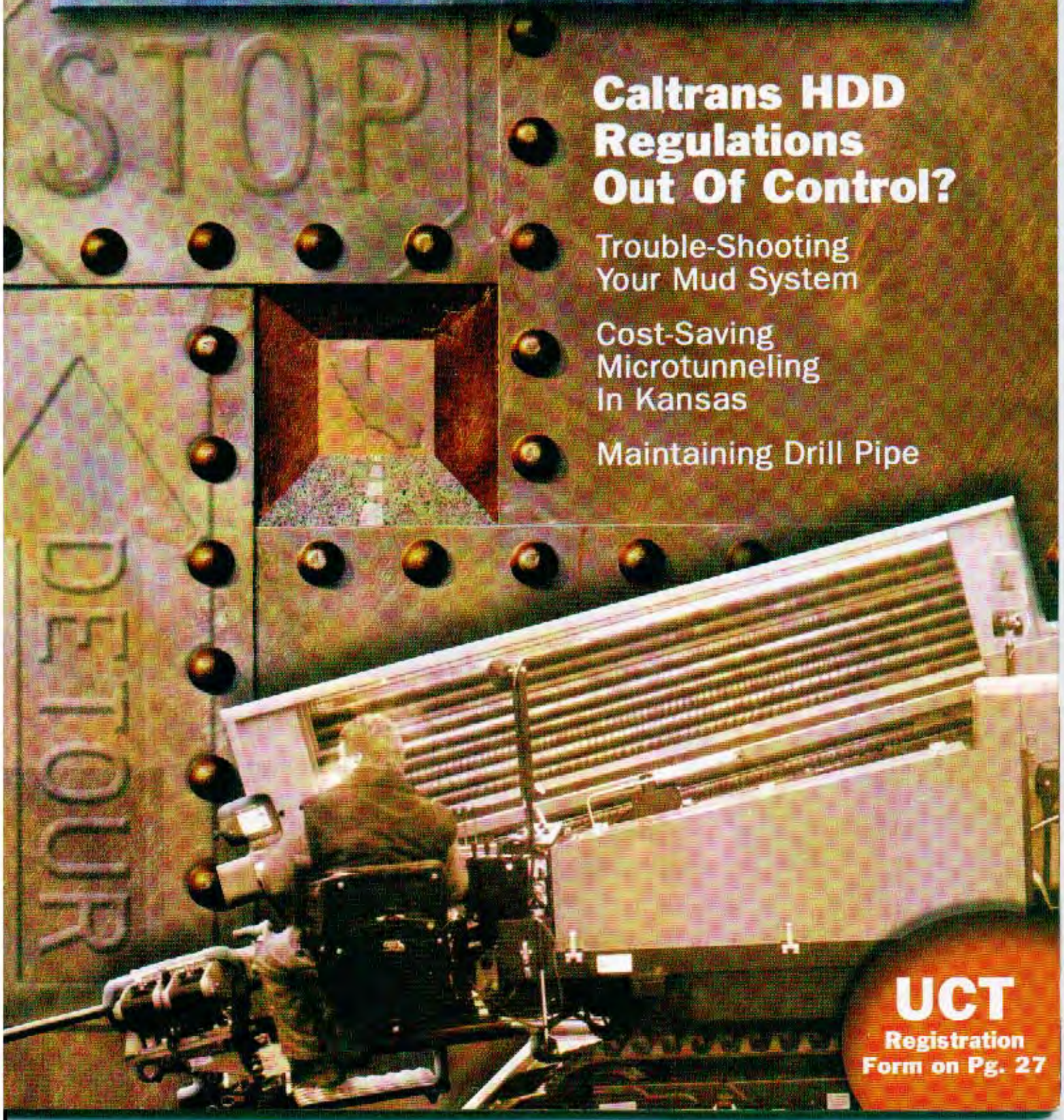
Caltrans HDD Regulations Out Of Control?

Trouble-Shooting Your Mud System

Cost-Saving Microtunneling In Kansas

Maintaining Drill Pipe



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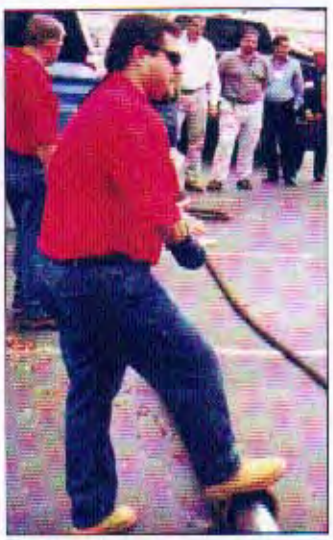

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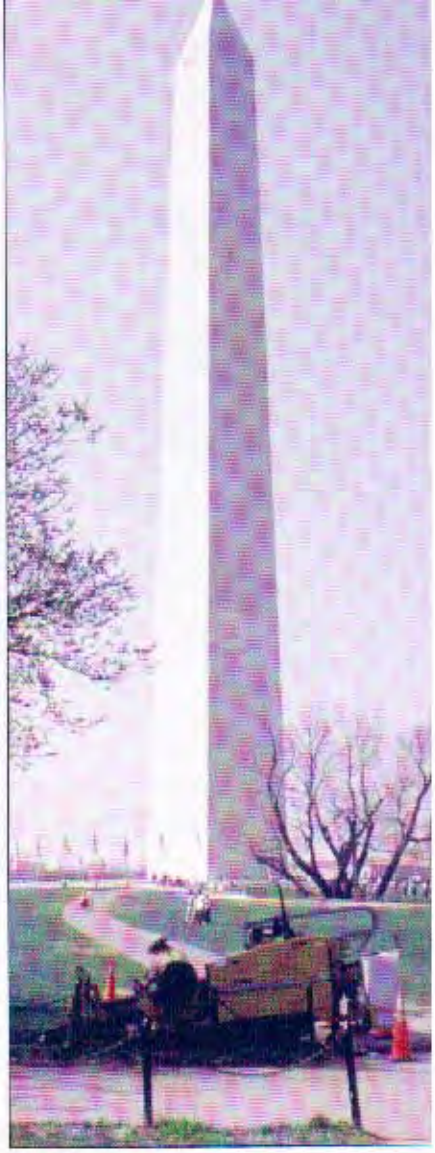

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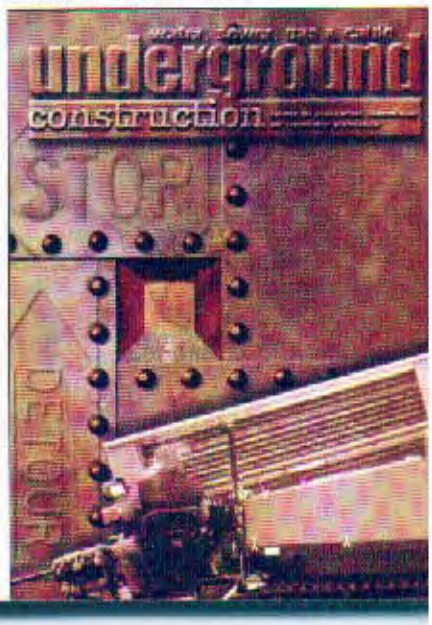
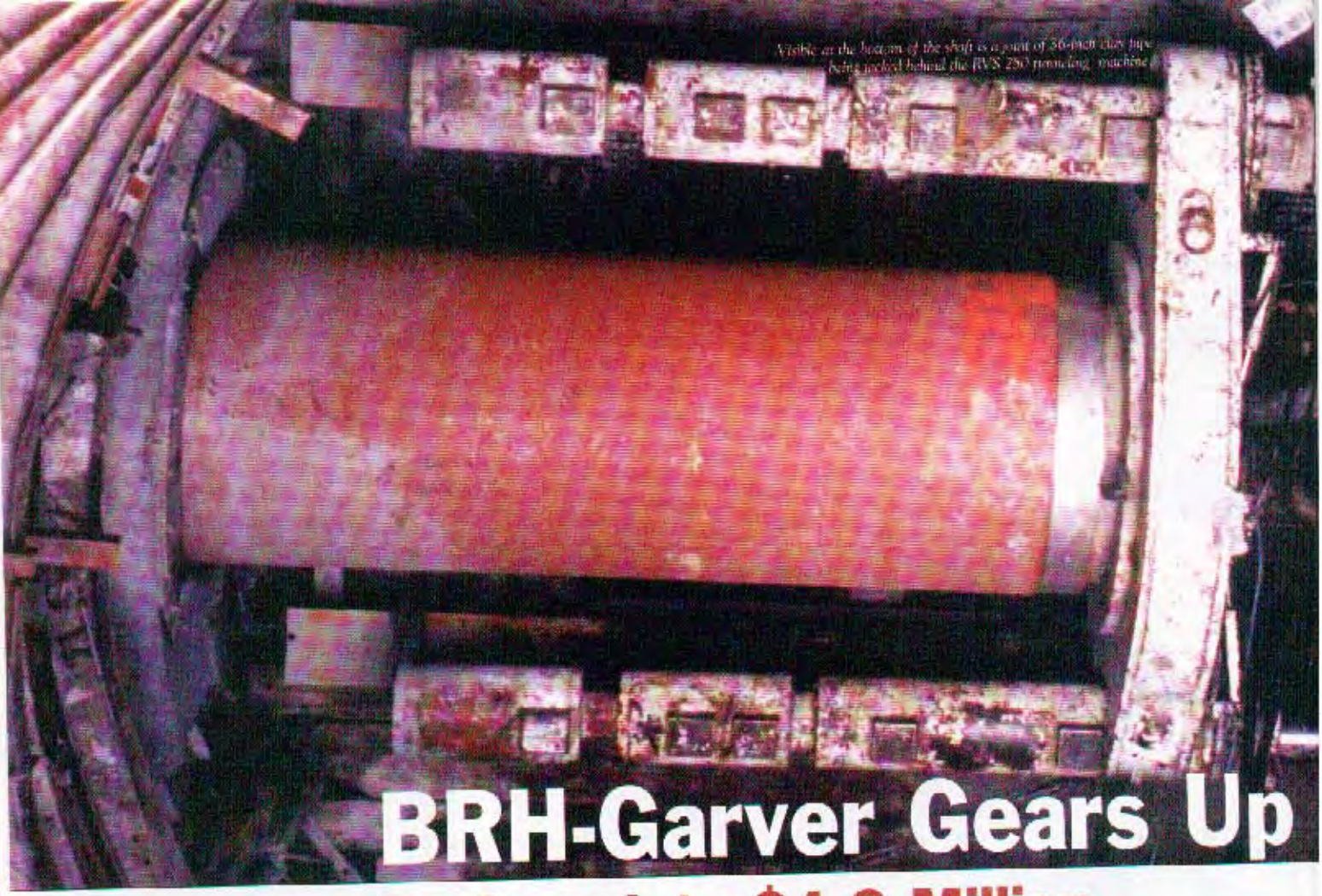
ON THE COVER:

The California Department Of Transportation turned the HDD industry upside down in 1999 with its announced intentions to regulate and require certification of HDD operators. Now, it appears Caltrans bypassed due process of law in creating its regulations and has put HDD certification on indefinite hold.





Visible at the bottom of the shaft is a joint of 36-inch clay pipe being pushed behind the BVS 250 tunneling machine.

BRH-Garver Gears Up

To Complete $4.2 Million Microtunneling Project In Kansas

In Wichita, KS, microtunneling was selected for installing a $4.2 million sanitary sewer project for the city's public works and engineering division. BRH-Garver of Houston, charged with this phase of the project, is installing 7,600 feet of 36-inch CanClay Denlock Vitrified Clay jacking pipe for the job.

by Muretta Tubb • Managing Editor

Cost saving construction has been paramount for utilities. In some areas, however, as more city planners and engineers become familiar with trenchless methods, other considerations are becoming equally important.

In Wichita, KS, microtunneling was selected for installing a $4.2 million sanitary sewer project for the city's public works and engineering division. BRH-Garver of Houston, charged with this phase of the project, is installing 7,600 feet of 36-inch CanClay Denlock Vitrified Clay jacking pipe for the job.

The project is the second-phase of a multi-phase program to improve the city's sanitary sewer system.

Prior to starting the project, an existing sanitary sewer system that runs along the southeast side of the city was experiencing overflows during rain events.

As noted by City Area Engineer Greg Baalman, local sewer problems are due to both the age of the existing system, which was installed more than 50 years ago, and the fact that the city relies on a single sanitary sewer plant to accommodate its 400,000 area residents.

Anxious to ensure against overflow problems and to handle future developments in the northeast quadrant of the city, a decision was made to add an overflow sanitary sewer system. The site selected for the sanitary sewer installation was adjacent to an existing system and on flood control and park owned property on the city's southeast side.

When city planners needed to carry out deep construction to alleviate their sanitary sewer problems, they realized it would not be cost effective to rely on open cut throughout the project. For this reason, they elected to utilize microtunneling to install the gravity sewer in high use areas that would otherwise require extensive restoration work.

BRH-Garver's project manager, Shannon Hicks, indicated that site selection posed some special challenges. A large portion of the microtunneling route travels under jogging and biking trails, playground equipment, picnic tables, covered parking lots and traditional park amenities. To the north of the park is a residential area and to the south is the Kansas Turnpike.

Job Personnel closely associated with the project are (l to r): City of Wichita, KS Inspector Henry Wood; BRH-Garver's Project Manager, Shannon Hicks; General Superintendent Todd Hendricks; Job Supervisors Eugene Smith and Tad Lemaster

Construction method selection

BRH-Garver's General Superintendent Todd Hendricks said cost is still a deciding factor in determining the type of construction method to be used.

Hendricks pointed out that while the 36-inch diameter pipe selected for this project was not too large in diameter for horizontal directional drilling (HDD), the job was not conducive to this technology. Because of the required sewer grade on the more than 7,000 feet of pipe and the 45-foot specified depth, HDD would have been too complicated.

The same is true for open cut. If the installation is in an area that would dictate extensive restoration and is deep - usually beyond 25 feet - it is generally considered to be cost prohibitive.

"When faced with these types of limitations," he said, "microtunneling becomes a viable alternative. With force water main installations, line and grade is not that important. However, when you're installing a gravity-type sanitary sewer you have to be very accurate. It becomes very important for gravity lines to be precisely located, which is one of the best selling points for microtunneling."

Hendricks is quick to point out, however, that cost is still the deciding factor. "When the City of Wichita needed to carry out deep construction to install the sewer system in a high use area, microtunneling was selected. At the same time, open cut was selected for use on the southern most section of the job. Here the ground elevation is lower and there is little or no traffic.

"This is even more telling when you consider that two crossings of Gypsum Creek on the project will be completed using two different construction techniques. While our crews will be microtunneling under the creek on the upstream side, crews with Utility Contractors Inc., Wichita, KS, will be installing a 350-foot crossing on the same creek through open cut."

Site preparation

The majority of the activity in this phase involves construction to make the site accessible for the microtunneling operations. Over the course of the project, crews with T&S Construction of Houston will construct 16 shafts to launch and retrieve the tunneling machine.

The retrieval shafts are 13 feet in diameter, while the launching shafts measure 18.5 feet in diameter.

Construction of the launching shafts basically starts by excavating to depths of about eight feet. As the excavation progresses, crews will place and bolt ring beam and liner plate segments together to form a 24-inch deep ring around the inside of the shaft. Next, grout is poured behind the ring to stabilize and set the shape.

When the desired depth is reached, concrete is pumped down to form a seal slab. Other work associated with the construction includes cutting a 50-inch diameter entrance eye into the side of the liner plate to launch the machine.

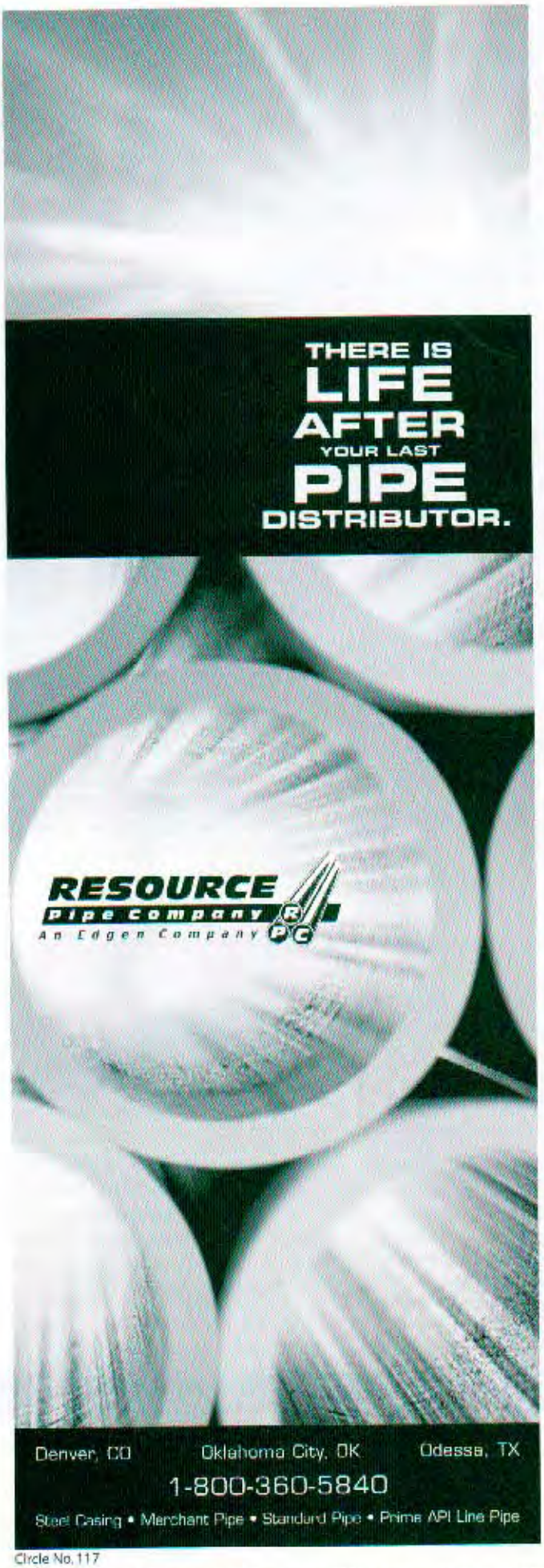
The smaller liner plate retrieval shafts are constructed in a similar way.

Equipment spread

In describing the equipment mobilized to the site to conduct the microtunneling, Hendricks said the equipment included a Soltau RVS 250 slurry type microtunneling machine equipped with a 41-inch cutting head. The machine can handle up to 50-inch diameter bores, with slurry ground control and a slurry muck removal system. It is equipped with a hydraulically driven cutting head. The 400-ton jacking frame can easily handle the 10-foot joints of 36-inch diameter clay pipe selected for the project.

Microtunneling

After receiving all the necessary equipment and materials, BRH-Garver's crews, led by Eugene Smith, a supervisor and machine operator, began the microtunneling operation. At the initial jacking location, about 1,000 feet from the upstream end of the job, the larger liner plate/ring beam shaft allowed Job Superintendent and Machine Operator Tad Lemaster to



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BRH-Garver

make a 500-foot drive toward the upstream location, then retrieve the machine and return it to the jacking shaft and complete a 500-foot drive in the opposite direction.

The jacking loads have been very desirable, ranging from 40 to 100 tons during the first two drives.

"Although the ground is making a lot of water, it isn't a problem because we have pumps in every shaft that run 24 hours a day. The water, basically clean, is circulated through the slurry system before being pumped to a retention pond on site," Hicks said.

Hicks added that although only about 32 percent, or 1,800 feet, of the microtunneling had been completed, everyone is pleased with the progress. This is not to say there have not been problems. During the first run, BRH-Garver had to spend $14,000 on variable speed drives for its slurry pumps. On the second tunneling run, another drive failed. An additional $9,000 was spent to revamp variable speed drives on the slurry motors.

He pointed out that it is somewhat typical to use the first few runs to work out the bugs and get everything working well.

"For this project, the machine was transported over 1,000 miles and you don't really know what may have occurred during transit," he said. "On the first couple of runs, you get your feet and hopefully things start going well - which has been the case so far. The job is going in on line and grade."

Despite the problems with the motors and drives, the machine has cut a 44-inch diameter hole and jacked an average of 55 to 60 feet of pipe per day. Prior to beginning the next run, consideration is being given to changing the cutter head. During the last run, crews reported encountering much harder and denser ground conditions. The cutter head change will be made when the machine is taken out of the ground for its routine maintenance after each run. BHR-Garver is looking at using a combination type cutter that uses rollers and clay cutters.

As to the 450-foot Gypsum Creek crossing, plans call for leaving this run until a later date. This will allow ample time for crews to address any maintenance problems that might crop up and to make the necessary adjustment so that the machine is fitted with an optimum cutter head prior to the drive.

Other challenges will be getting crews used to working through the harsh winter months ahead. The crew will have to ensure that the water setting in the equipment on top of the ground doesn't freeze. Hicks said they would be discussing this to make sure that the crew is cognizant of any problems from freezing.

Ultimately, this may not be a problem. The company is in the process of putting together a second shift. BRH-Garver's Eugene Smith will be the machine operator and the second crew should be operational within a few weeks.

According to Hendricks, the project is scheduled for completion in March 2002. During the project, Garver will be conducting air tests on the line to check for possible leaks.

Background

Since completing its first job more than 26 years ago, BRH-Garver has completed more than 200,000 linear feet of microtunneling construction throughout the U.S.

In May 2000, rePipe acquired BRH-Garver Construction, along with PM Construction and Pipeline Products with the goal of providing experts in all phases of trenchless technology and no-dig solutions.

At this time, BRH-Garver has $100 million worth of work going on in California, Texas, Kansas and Florida, all locations where the company currently maintains office locations. ■