

Natural Gas Storage Field Expansion: HOSS Construction Provides Static Pipe Bursting Power

While big trenchless pipeline installation projects often receive the majority of the attention in the natural gas industry, sometimes smaller trenchless projects play an important role in maintaining the flow and storage of natural gas and deserve their due. A recent project for [Kinder Morgan] Natural Gas Pipeline Company of America's natural gas storage facility in Herscher, Ill. is a good example.

The Herscher natural gas storage facility was once part of the Trenton Oil Fields, which began operating in the 1880s, but was abandoned in the early 1900s. Since being abandoned, the Herscher site has been used to store natural gas beginning in the 1950s, with Cambrian-age sandstone providing an ideal formation for the underground storage of natural gas.

The American Gas Association (AGA) reports that there are approximately 420 operating natural gas storage fields in the US. For an average winter heating season, approximately five months, about 15 to 20 percent of natural gas consumed originates in an underground storage facility. These underground storage facilities are commonly depleted gas reservoirs, aquifers, mined or salt solution caverns, or depleted oil reservoirs, like the field in Herscher, Illinois.

According to the Federal Energy Regulatory Commission (Docket No. CP08-032-000), Natural Gas Pipeline Company of America filed for approval of an expansion of the Herscher field in January of 2008. The ultimate goal of the project was to increase the field's capacity by 10 billion cubic feet, and increase the peak day withdrawal capacity. The expansion



The Herscher storage field expansion project included the replacement and upgrading of a 2,300-foot, 6-inch fiberglass water line to an 8-inch SDR 11 HDPE line through pipe bursting. That particular line distributes water to and from water pump wells and water disposal wells. Pictured staged 8-inch HDPE.

would include, new water withdrawal wells, new and extended water disposal wells, new water pipelines, one new compressor station addition, and extension of five existing natural gas injection/withdrawal wells. In addition, the project included upgrading and repairing portions of the existing storage system.

Project approval was granted in the summer of 2008 and HOSS Construction Co., Searcy, Ark., was contracted to complete the work. According to HOSS Construction general manager and vice president, Dave Seitz, his company is a utility and mechanical contractor serving the pipeline, communications and municipal industries, specializing in directional drilling. The Herscher storage field project gave Seitz the opportunity to expand the company's capabilities into static pipe bursting for the replacement of a 6-inch fiberglass water line.

PROJECT PROFILE:

Contractor: HOSS Construction Co.

Location: Herscher, Ill.

Equipment Used: Grundoburst 800G static pipe bursting system

Specifications: Replacement and upgrading of a 2,300-foot, 6-inch fiberglass water line to an 8-inch SDR 11 HDPE line

Seitz said, "Due to the time of year, the well-maintained right-of-way, business activity and the concern for ensuring that the business for adjacent landowners and property appearance was maintained, the decision came down to directional drilling, or pipe bursting the segment. Pipe bursting, in this situation, required only the excavation of one tie-in connection hole utilizing only one path of ingress and egress. Considering all costs, boring, and clean-up, versus one tie-in hole, pipe bursting was selected." For the project, Seitz enlisted the assistance of trenchless equipment manufacturer TT Technologies, Aurora, Ill. and the 800G GRUNDOBURST static pipe bursting system.



During the static bursting process specially designed bladed rollers are pulled through an existing pipe. As the bladed rollers are pulled through, they split the host pipe and expander attached forces the fragmented pipe into the surrounding soil while simultaneously pulling in the new pipe. Pictured tri-blade cutter, expander and new HDPE.

Contractor & Project Background

While a relatively new company on the books, HOSS Construction has years of utility and pipeline contracting experience. Seitz, a civil engineer, began his career with NGPL at the Herscher Storage field almost 30 years ago. After 20 years with NGPL, Seitz spent several years as a partner in a pipeline and utility construction firm and a consultant in the pipeline industry before finally striking out on his own and starting HOSS construction in 2005. While the project at the Herscher storage facility may have felt like familiar territory, it was also an opportunity for Seitz to explore a trenchless pipe rehabilitation and replacement method that was new to HOSS Construction, static pipe bursting.

The project took place along the south side of Illinois State Highway 115 on the east side of the town, and involved the replacement and upgrading of a 6-inch

fiberglass water line to an 8-inch SDR 11 HDPE line. That particular line distributes water to and from water pump wells and water disposal wells.

Water pumped from the ground during withdrawal season has a slightly elevated salt content that the water absorbs naturally underground. According to TT Technologies Pipe Bursting Specialist Bryan Bachmann, this may have contributed to the demise of previous pipes, like cast and ductile iron waterlines. This fiberglass line, however, was simply being replaced for capacity reasons because of the overall expansion.

The line was installed between an existing 10-inch steel water line and a 6-inch PVC municipal supply water main. The area was located in the state highway right-of-way on the back slope of a drainage ditch. The area was well maintained by adjacent business owners and four existing driveways were used for business ingress and egress. The total length of the segment was approximately 2,300 feet.

Static Pipe Bursting

According to Bachmann, static pipe bursting has established itself as a dependable trenchless pipe replacement method throughout the U.S. He said, "Static pipe bursting has really come to the forefront of trenchless pipe rehab and replacement. A lot has to do with the fact that the method has really gained acceptance from the utility construction industry and the fact the method itself has grown in terms of its versatility."

The static bursting process is simple, yet effective. Specially designed bladed rollers are pulled through an existing line by a hydraulically powered bursting unit. As the bladed rollers are pulled through, they split the host pipe. An expander attached to the rollers forces the fragmented pipe into the surrounding soil while simultaneously pulling in the new pipe.

Patented Quicklock bursting rods are linked not screwed together like traditional drill stems or other static systems. This system speeds the installation process as well as the breakdown procedure. The rods can be quickly removed one at a time at the exit pit as bursting is in operation. While HDPE is commonly used, new techniques and technologies are allowing contractors a choice when it comes to product pipe. According to Bachmann, other pipe materials are being installed now through static bursting include ductile iron, PVC, specially designed clay and steel.



The crews divided the run into two segments, position the bursting unit in the middle. While bursting the first run, crews allowed the Quicklock bursting rods to pass through the machine and rod the second bursting run, a time saving technique.

He said, "Several techniques have been developed by TT Technologies and partner contractors to allow the use of a variety of product pipe options with the static pipe bursting process. Beside its inherent trenchless aspect, this is one of the main reasons that the popularity of the method has

really taken off. Often HDPE is the right choice for a project. However, for certain municipalities or parts of the country it's ductile iron, PVC, or clay. It really provides a level of choice and versatility previously not available with the bursting process. The reception by contractors, engineers, and municipalities has been tremendous, and has led to the continuing growth of the method, as well as continuing innovation from the field."

On the Job

The pipe bursting project was to be completed in just two pulls. The first segment was 1,275 feet and the second was 1,025 feet. A GRUNDOBURST 800G static bursting system with a tri-blade cutter was chosen for the project. HOSS crews excavated a single machine pit in the middle of the two bursting runs. The pit measured 4 feet wide by 5 feet deep by 16 feet long. Once the pit was dug, crews lowered the bursting unit into the hole and prepared the support and bracing.

Seitz said proper bracing is important to the success of the bursting operation. He said, "The biggest

challenge was supporting the machine given the round conditions. The soil was a 24-inch top layer of good Illinois black dirt, and below the black dirt was a clay-loam with pea gravel. The soil had high moisture content and the water level was just at the bottom of the 5.5-foot excavation. Additional support structures and equipment were required to hold the machine during the pullback. The GRUNDOBURST unit had enough power to do the job and the design of the unit enable us to maneuver and add additional support and bracing during the pull-back process."

Crews rodded the first 1,275-foot section of pipe. At the launch pit, crews then connected the tri-blade bursting head and then bolted the expander with the new fused 8-inch HDPE to the bursting rods. The first 750-foot segment of pipe was pulled in with only one stop for a fusion joint adding 600 feet in the staging area. While the bursting of the first run was in progress, crews allowed the locked bursting rods to pass through the machine and rod the second bursting run. Bachmann said, "This is a huge time saving method, unique to Quicklock style bursting rod systems. You're essentially accomplishing two tasks at once. It's really contributes to productivity and efficiency."

Once the first run was complete crews took the GRUNDOBURST, rotated it 180 degrees in the machine pit in order to pull from the other direction. Crews then completed set-up for the second burst attaching the tri-blade bursting head, expander and new 8-inch HDPE. The second 1,025-foot segment was also successfully pulled into place and all the connections were made without incident.

Bachmann said, "The project went really well and that can be directly attributed to the quality people at HOSS Construction. They're great to work with and excellent in the field." In addition to the static bursting portion, HOSS Construction also completed the additional portions of the Herscher field expansion project. Seitz said that he intends to add static pipe bursting to his list trenchless services and looks forward to utilizing the method again in the future.

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