

OVERCOMING THE OBSTACLES



**Christine Smith,
Vermeer Corporation,
USA, explains how
horizontal directional
drilling was used to
complete an upgrade
project in a built-up area.**

After years of preparation, work on the Northern Natural Gas (NNG) Cedar Station Upgrade in Dakota County, Minnesota (US), was completed in the autumn of 2019. Approximately eight miles (12.9 km) of 20 in. (50.8 cm) steel pipeline was installed around the Twin Cities suburb of Eagan. The new pipeline loops NNG's Rosemount Junction to the Minneapolis No. 1 branch line, and is part of a 14 700 mile (23 657.4 km) pipeline connecting from Texas through Minnesota to upper Michigan.

The bulk of the work on the Cedar Station Upgrade project was undertaken using horizontal directional drills (HDD) – 22 bores in total. Helping with HDD installations for the project's general contractor, Minnesota Limited, was Arizona-based HDD experts Southeast Directional Drilling (SEDD). The company's crew performed 17 bores on the project ranging in distances from 400 - 1700 ft (121.9 - 518.2 m).

SEDD's Minnesota-based drill crews began working on the project in the spring of 2019 and wrapped up their part in late summer the same year. Heading up the two crews on the

job was Kyle Pellinen, General Superintendent for SEDD, whose team used a Vermeer D100x120 and D330x500 Navigator® horizontal directional drill to complete the work.

“We determined it would be more efficient to use a couple of different drills on this job,” explained Pellinen. “The ground conditions were pretty sandy, so while it was a challenge to maintain the hole integrity in spots, we didn’t have to contend with much rock. On shorter bores ranging between 400 - 600 ft



Figure 1. Minnesota’s sandy soils meant crews would have to take extra precautions to maintain the integrity of the bore hole, mitigate sinkholes, and minimise any inadvertent returns.



Figure 2. 22 bores in total were completed on the Cedar Station Upgrade project using horizontal directional drills.

(121.9 - 182.9 m) with an average bore depth approximately 30 ft (9.1 m), we used the Vermeer D100x120 HDD. For longer bores ranging from 1000 - 1700 ft (304.8 - 518.2 m), we had to bore approximately 50 ft (15.2 m) deep to avoid wetlands and other environmentally sensitive areas. We stepped it up and used the Vermeer D300x500 HDD for those.”

The location where SEDD’s crews were working is a thriving residential area with several other utilities buried nearby. Crews surveyed the project and daylighted all existing utilities before work began – which was challenging in wetland areas and working near a major road. “There were a lot of obstacles to work around on this project,” said Pellinen. “We didn’t have a clear line of sight because of all the buildings near the jobsite, and we were working alongside several busy roadways, including Interstate 35. We made several passes under the busy interstate without disrupting traffic.”

Sandy conditions

Having worked around the US on many large pipeline projects, SEDD’s crews are experts at making the necessary adjustments for all soil conditions they may face. On this particular project, Minnesota’s sandy soils meant crews would have to take extra precautions to maintain the integrity of the bore hole; make sure they were deep under roads to mitigate sinkholes; and do their best to minimise any inadvertent returns.

Dan Smith, SEDD Director of Project Management, said his team always reviews a bore’s geotechnical report, the bore design and any formations they might encounter before a job begins. “Taking these precautions helps ensure that a bore will be successful and won’t cause any issues in the future,” he explained.

SEDD’s crews mixed their drilling fluid thick for this project, using only bentonite and water. After each pilot bore was complete, crews used a 30 in. (76.2 cm) reamer to open the hole wider before pulling back the 20 in. (50.8 cm) pipe. Crews did have to deal with some inadvertent returns, but Smith and Pellinen both said they expected it ahead of time and their team had precautions in place to deal with them.

“The ground was soft, and since we were going down and coming right back up on a lot of those shots, we knew we would have some frac-outs,” Pellinen said. “We did our best to plan for them, so none would occur in environmentally sensitive areas, and we had silt fences installed and vac trucks on-site to deal with them quickly.”

Finishing up and moving on

Smith said SEDD’s crews spent an average of six days on each of the shorter bores using the Vermeer D100x120 HDD, and between eight and 12 days on the longer bores where they used their Vermeer D330x500 HDD. “Our team did a great job on this project – everything went according to plan,” he said. “I believe Minnesota Limited and NNG’s teams were happy with the work we did.”

After that, SEDD’s crews moved on to the next challenging large diameter project. With a fleet of 10 maxi drills, SEDD has people working all over the US at any given moment. Eddie Ramos, Director of Operations for SEDD, said keeping it all organised and co-ordinated is like a game of chess. “Gas

pipeline projects tend to have a lot of moving timelines – one project gets pushed, another is delayed, and we just have to make sure we are always in a good spot to be able to have machines and people in place when work is ready to begin,” he explained.

To be responsive to their customers’ changing schedules, every rig that SEDD sends to a project travels with everything it will need to get to work right away – drill pipe, bits, reamers, and all of the accessory equipment crews will use on a job. “We do our best to make sure every rig is fully stocked, so that we don’t get in a spot where work can’t begin because another crew is borrowing something from another drill,” said Ramos. “This might mean that sometimes our crew shows up with more pipe or tooling than they need, but we believe it’s better to be over-prepared than standing around waiting for something to be hauled in.”

Investing in quality equipment and working with a responsive dealer network is another way Ramos said his team ensures they meet their customers’ needs. “We have crews working in urban and rural areas all over the country, so when we invest in a machine, we must look at a manufacturer’s dealer network coverage,” said Ramos. “It’s a big reason why we like working with Vermeer. Our local team at Vermeer Southwest does an excellent job of giving us support in Arizona, and will help connect us with the local dealership wherever our crews are working.”

Self-sufficient crews

SEDD’s approach to operating carries over to the way the company structures its crews. The crew foremen are responsible for adding employees, training and promoting them when the time is right. “Most of our management team started as labourers for the company before being promoted into the



Figure 3. On shorter bores ranging between 400 - 600 ft (121.9 - 182.9 m), the crew used the Vermeer D100x120 HDD. For longer bores ranging from 1000 - 1700 ft (304.8 - 518.2 m), the Vermeer D300x500 HDD was used.

roles they are in today,” said Pellinen. “We are big believers in training our people, giving them the resources they need and promoting from within. It’s why we have such an amazing track record of retaining employees and reputation for being experts in our field. Everyone is connected to the work they are doing and do their best to perform it at a very high level.”

Hiring the right people and creating a working environment that makes them want to stay for a long time helps drive SEDD’s reputation in the industry, which is essential for securing projects such as the NNG Cedar Station Upgrade. 

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