

Tallawarra gas pipeline project

A joint venture consisting of Nacap Australia/Tru Energy recently installed a 272 mm steel gas main under the F3 Freeway, Ducks Creek and the Illawarra Railway Line. The pipeline is to supply gas from a spur off the Eastern Gas pipeline to a new 400 Mw gas fired power station currently under construction for Tru Energy.

The joint venture engaged UEA Pty Ltd to undertake HDD works including the boring and installation of 763 m of 272 mm steel pipe in rock rated up to 120 Mpa. UEA used its recently purchased Vermeer D300 x 500 (136 t) as well as a DFE 700gal/min recycling system, and 700 gal/min Weatherford mud pump.

Site specific problems included varying rock strengths and fractured rock; depth to allow for clearance of bridge piers on the F3 Freeway, the bore was required to be at least 28 m deep; dealing with the requirements of State Rail for the Illawarra rail line crossing; and, tight tolerances imposed on the bend radius.



Pilot Bore

To assist in working to the tolerances a surveyor was engaged to peg out the route and verify the profile. Once this was completed the information was entered into the bore planner software and a profile was created.

Due to the tight time constraints and prior work commitments for its maxi drill, UEA decided to utilise its 25 tonne Vermeer D50 x 100 HDD machine to commence the pilot bore. Using an in-house Digitrak SST steering tool the initial 500 m was pilot bored in nine days. Upon verification of the alignment it was found to be incorrect due to a magnetised sonde

housing which significantly affected the magnetometers within the steering tool. This pilot bore was then abandoned.

UEA then mobilised the Vermeer D300 x 500 and a new pilot bore commenced. This time a Paratrak 2 steering system was utilised to track the bore. The Paratrak system allowed very accurate monitoring of the bend radius throughout the pilot bore to ensure that the tolerances were not compromised. The geotechnical information stated that there was a likelihood of encountering clay approximately 80 m from the exit point. UEA stopped the pilot bore at this distance, pulled the rods out and set up to forward ream.

Throughout the pilot bore the ground conditions varied in consistency, a percentage appeared to be broken. With the varying ground conditions, Baroid's experience was utilised to develop a successful mud plan to cope with the broken ground and deal with the large mud losses that were happening.

Forward Ream

A hole-opener with 16" medium formation cutters were used initially to forward ream the 700 m of rock. Progress throughout the reaming process was slow using the selected cutters and some experimentation was required with the





cutter selection to reach an acceptable progression rate. To avoid large 'frac' outs in the clay section, the D50 x 100 was moved to the exit side and pilot bored down and intersected the initial 8" pilot bore created by the D300. An 8" sewer plug was placed in the hole so as to aid with the forward reaming process currently being undertaken by the D300. Once the rock section has been completed by the D300 it was re-mobilised to the exit side where it proceeded to forward ream the clay section. Once completed it was then remobilised to the entry side in preparation to pull the dummy pipe.

Dummy Pipe Pull

As part of the process for borehole approval, UEA was required to pull a section of dummy pipe approximately 36 m long. Once the pipe had been pulled in it was inspected for damage and tested. The client was happy with the sample condition and the bore hole was approved for final installation of the product pipe.

Pullback of Product Pipe

The 763 m of gas pipeline had been placed on rollers in preparation for pullback to reduce friction during the process. The pulling head was attached to the drill rods the day before pullback. Pullback commenced at 6.30am and the pipe was pulled in over a 13 hour period. Throughout the pullback process the pipe coating was tested to ensure its integrity.



Once the pipe pullback was complete the pipeline was tested again. After a few anxious moments the pipeline passed the test parameters and the project was complete.

Outcome

This project provided UEA with some significant challenges in particular steering tool and hole-opener selection. The project was completed within a few days of the required date of contract. UEA

has said that the Nacap/Tru Energy joint venture was an excellent client to work with from the top down, in particular the management's proactive approach to any site issues.

UEA is happy to have this project as part of its résumé due to the length and the tight tolerances required for a steel pipeline. The project has provided the company with some excellent experience when called upon by future clients to undertake similar projects.