TERRA-JET drills 2 river crossings in rocky subsoil

Key data jobsite:

Contractor:	Eau-gaz & Pompes SA, Chénens
Place:	canton of Fribourg (Switzerland)
Bore length:	120 m + 86 m (400 ft + 285 ft)
Backreaming:	ø 360 mm (14”)
Pipe:	HDPE OD 280 mm (11“)
Medium:	gas
Underground:	gravel, molasse and sandstone
Peculiarity:	river crossing and rocky subsoil

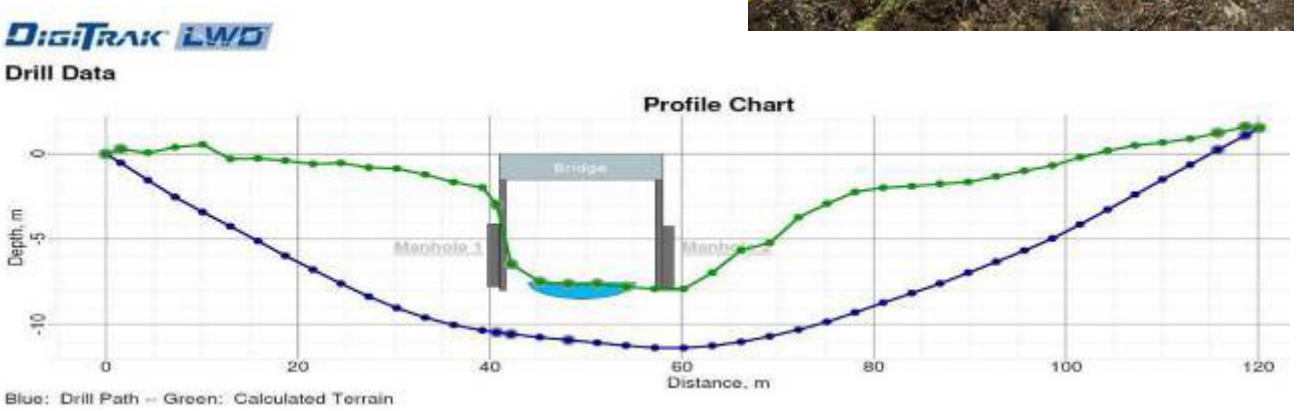
In French-speaking Switzerland, nearby Romont, two HDD-river crossings for the extension of the gas distribution system had to be realized. This region is well-known for its HDD-unfriendly subsoil with layers of molasse and sandstone, which tend to be hard like solid rock. The TERRA-JET customer Eau-gaz & Pompes SA had therefore decided to use the **TERRA-JET TJ 8522 S** for this jobsite. With a pulling force of 22 metric tonnes (48’400 lbs) and a torque of 8‘500 Nm (6300 ft.lbs) this machine is supposed to successfully drill and backream in such hard soil conditions for this range of pipe installation.

TERRA-JET TJ 8522 S

Alltogether two river crossings were executed for the same main line at two different areas.
The larger one was 120 m (400 ft) in length with a total vertical difference in altitude of 13 m (43 ft). For the preparation of the Bentonite with its additives an external mixing unit with tank was used in addition to the on-board mixing unit of the TERRA-JET TJ 8522 S. This ensured a continuous drilling process (picture right).

The underground was extremly hard on the entire bore length, which caused the drill team to retract twice completely in order to replace the worn and broken teeth of the deployed 3-finger directional head. With little more time as initially scheduled the pilot bore had been successfully finished at last and dead on target. Nevertheless the 3-finger directional head arrived again with no more teeth left (picture left). As a result TERRA developed a new directional borehead for tough undergrounds which was directly used for the second bore. The **multipin directional head** came to life (picture bottom left) and has passed the first test with flying colors through 86 m (285 ft) of challenging underground (mix of gravel, molasse and sandstone). Although a certain wearout can be seen (which is reasonable for such a continuous load), all pins (teeth) were still in place (picture bottom right).

Digitrak F5 has been used for locating the pilot bore. Due to the erratic topography the **ZIP-Level PRO-2000** (picture right) has been used additionally in order to keep track of the surface profile along with the data points of the F5. The drill record was recorded handwritten as well as electronically by the F5-receiver with the log-while-drill application. Subsequently the recorded data points were uploaded to a computer and a digital graphical log was generated by the Digitrak LWD-software (picture below).



With respect to the rocky subsoil three intermediate reamings were made. After back-reaming to 215 mm, 300 mm and 360 mm (8.5”, 12”, and 14”) the pipe was pulled in with a backreamer 360 mm (14”) within three hours without difficulty.

Outline of the installation of the TERRA-JET TJ 8522 S and the additional external mixing unit during the second bore (picture above).
During the river crossing (picture bottom right) the TERRA-JET TJ 8522 S partially drilled through sandstone, which became a bit of a test of patience and restricted steering a lot. However, the pilot bore, backreaming and pipe pulling in (picture right) had been finished, thanks not least to the new multipin directional head.

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