SULZER

CASE STUDY 12/2019

Challenging turnkey installation of five raw water pumps by Sulzer

For one city in Texas, accessing a new source of water required considerable expertise in pumping technology. The pumping station was to be located 320 feet (98 meters) above the 9 ft (2.7 meter) tunnel that carries the water from the intake system in the lake. The water had to travel almost a mile (1.6 km) uphill to the water treatment plant, so a considerable amount of civil engineering was required.

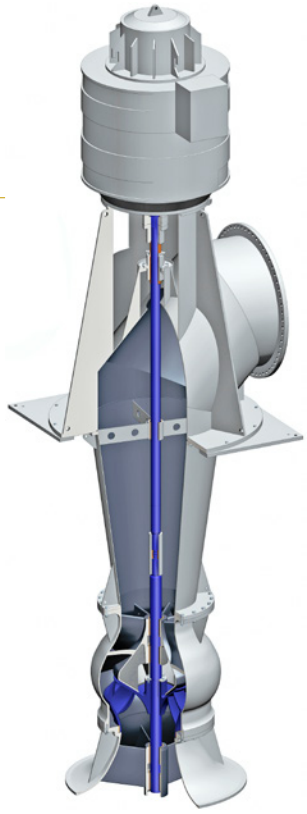
"The pumps have now been running perfectly for a considerable time and the customer is very happy with their performance."

Chuck Smith, Regional Sales Manager, Sulzer Pumps Solutions Inc.

The challenge

Once the decision to build a new water treatment plant was taken, the next question was how to best move the water from the new source over 390 feet (120 meters) vertically from the lake to the treatment plant. This turned out to be a considerable challenge both when it came to design and to installation. Also, the position of the pumping station is very enclosed, making access difficult, both for the contractors and the lifting equipment.

Sulzer invited the municipality's engineers to visit a similar installation where large vertical turbine pumps were in operation. The company's pump engineering knowledge and ability to deliver large-scale projects convinced the customer, and Sulzer won the contract, including installation and commissioning.



SJT vertical turbine pump

The solution

Sulzer chose the SJT large vertical pump as the most suitable pump for this project. The pumps were engineered to order for this application and designed as 3-stage units, equipped with 320 feet (98 meters) of steel column with a 1'500 hp (1'120 kW) electric motor located on top of the above-ground discharge head.

Sulzer delivered a total of five pumps for the project.

Realizing the installation could face some major challenges, Sulzer involved the field service team during the order engineering process to minimize these challenges during the installation.

Customer benefit

Sulzer field service engineers planned and completed the pump installation work on site. Due to the restricted work-space, this required considerable logistics planning to ensure that all the pump sections were delivered in the correct sequence for assembly. One of the customer's project managers was very impressed, considering the technical requirements and the physical constraints involved in delivering the pumping system.

Project data

SJT28GMC 3-stage vertical turbine pumps
Application: raw water from lake
Service conditions: 10'700 gpm @ 390 ft TDH, 82.9% pump efficiency
Pump materials:

Bowls	ductile iron ASTM A536
Impeller	stainless steel CF8M ASTM A743
Shaft	stainless steel 17-4 ASTM A564
Enclosing tube	carbon steel ASTM A53
Fabrications	carbon steel ASTM A105, 106, 516
Seal	Chesterton Model 442

For this project, the customer insisted on an enclosed line shaft pump design. This means that an enclosing tube is added to surround the full length of the line shaft, allowing clean water, or oil-based (NSF-approved) lubricant, to be supplied from the top of the pump before startup. In deeper setups, this ensures continued reliability of the line shaft bearings.

Each ten-foot (3 meter) pump column section contains the pump line shaft, its support bearings and the enclosing tube, which is gradually lowered into the ground. As the top flange reaches ground level, it is held in place while the next section is connected. This process is repeated until all 32 sections have been assembled and the drive motor and discharge head are in place at ground level.

The final step is to straighten the enclosing tube and bring it into perfect alignment, minimizing shaft oscillation during operation.

For any inquiries please contact

charles.smith@sulzer.com

sulzer.com