PROJECT PROFILE

An Affordable Wastewater Treatment Solution for Commercial Properties

SOYO MUNICIPAL HOSPITAL, ANGOLA

Problem The Soyo Municipal Hospital in Soyo, Angola, needed expansion and renovation, including a sustainable, easy-to-maintain sewage treatment and disposal system. The hospital is surrounded by houses; fine, sandy soil; and a high water table. Consequently, a standard septic tank and leach field were not appropriate. The proposed design for a Moving Bed Biofilm Reactor (MBBR) was impractical, given the remote location, difficulty in acquiring the required chemicals, and lack of skilled personnel to operate and perform routine repairs. Furthermore, the hospital needed a wastewater technology that did not require the addition of chemicals and could operate well despite unscheduled and frequent interruptions to the electricity supply.

Solution Project managers decided that the best option for the Soyo Municipal Hospital was an Orenco AdvanTex® AX-Max™ wastewater treatment system, permanently installed at the hospital facility. In addition to meeting all the design requirements, Orenco was able to satisfy the many obligations required for exporting equipment to Angola and deliver the AdvanTex AX-Max treatment system to the Port of Soyo in 80 days after receipt of the equipment purchase order.

A Hospital in Need of Intensive Care

Soyo Municipal Hospital, a 70-bed facility in Soyo, Angola, is one of the main hospitals in the province. The Angolan government wished to increase the hospital's capacity and designated its expansion as a priority. Angola LNG, a consortium of oil and gas companies that included Chevron, took on the project, working in partnership with local stakeholders and the Angolan government.

The newly renovated and expanded Soyo Municipal Hospital in Soyo, Angola, now includes a sustainable, easy-to-maintain AdvanTex® wastewater treatment system, manufactured by Orenco®.

Commercial Market

Project Overview

SOYO, ANGOLA

Design Parameters
- 10,570 gpd (40,000 L/day) design flow

Startup Date
- February 2012

Cost for Complete AX-Max Treatment System to Port of Soyo $320,000 (USD)

Collection
- Gravity sewer to lift station

Primary Treatment
- Two 39-ft (11.9-m) T-Max™ Tanks – 13,200 gal (50,000 L) each

Secondary Treatment
- Two 35-ft (10.7-m) AX-Max™ Treatment Systems

Tertiary Treatment
- Two UV Pure Hallett™ 30 disinfection units

Dispersal
- Infiltration Basins (x4)

Operation
- Angola LNG

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Wastewater from the hospital gravity-flows to a lift station (wet well) seen at bottom right. From there it's pumped to the two T-Max tanks for primary treatment followed by the two AX-Max filter units, where it is recirculated an average of four times before being pumped through the UV unit housed in the small controls building shown at left. Following UV disinfection, the final effluent is conveyed to the four infiltration wells surrounding the controls building, for subsurface dispersal.

One of the 35' long (10.7 m) AX-Max units is filled entirely with engineered textile filter media. A manifold with spray nozzles disperses the effluent evenly over the textile, to optimize treatment.

One end of the second AX-Max unit holds all the pumping and electrical equipment for the treatment system in a compact space that is easy to access for installation, operation, and maintenance.

The hospital, centrally located in the town of Soyo and surrounded by residential homes, has fine, sandy soil with a high water table during the rainy season, making the site unsuitable for a standard septic tank and drainfield. The hospital originally received a proposal for a Moving Bed Biofilm Reactor (MBBR) with inlet bar screen, flow equalization chamber, diffused aeration system, scum and sludge transfer systems, sludge digester chamber, and chlorine disinfection chamber.

Although MBBRs are an effective wastewater treatment system, they require a reliable source of electricity, a ready supply of chemicals, and regular operator attention. These requirements can pose difficulties in a remote location. Angola LNG construction superintendent Gary Bridier, who has worked in Africa for more than 20 years, knew that there had to be a more appropriate and sustainable solution for the hospital's wastewater treatment facility.

Bridier began a search for other wastewater treatment technologies and contacted Orenco Systems®, a leader in the decentralized wastewater industry. Orenco, which offers decades of experience in supplying wastewater equipment to Africa and other parts of the world, recommended a treatment system for the Soyo Municipal Hospital consisting of ...

- Two 39-ft (11.9-m) long T-Max™ tanks
- Two 35-ft (10.7-m) long AdvanTex® AX-Max™ textile treatment units
- One service building for system controls and UV disinfection units

Once Bridier saw the system in action and weighed his options, the choice was clear. The order was placed in July of 2011 and, even with custom specifications and manufacturing, the system arrived at the construction site in November. Installation began immediately.

The AdvanTex AX-Max treatment system receives effluent from the Soyo Municipal Hospital, which includes wastewater from toilets, sinks, showers, laundry, laboratories, kitchen and other related hospital facilities. The design flow rate for the system is 10,570 gpd (40,000 L/day). Effluent from the hospital is pumped into the 13,200-gallon (50,000-L) T-Max primary tanks and flows by gravity to the AX-Max

secondary treatment units. These four units were installed five feet (1.5 m) below grade, to reduce the visual impact of the system, while still offering optimal access for any necessary maintenance work.

Effluent from the AX-Max Treatment System is pumped through two, UV Pure Hallett™ 30 ultraviolet disinfection units. Because of the high-quality of AdvanTex effluent, the Hallett 30's maximum flow-through rate of 30 gpm (113.5 L) was possible. From the UV units, the disinfected effluent (tertiary treated wastewater) flows into a distribution box, where the water flows by gravity into four infiltration basins. Each infiltration basin is sized to accommodate 5,283 gal. (20,000 L). Since the AX-Max requires less than 2 kWh per 1000 gallons (3,785 L) treated, the intermittent power required from the treatment system does not unduly burden the generator installed at the hospital.

An onsite service building was constructed next to the AX-Max treatment system to provide a secure facility for installing the system controls and UV disinfection units. An Orenco TCOM™ control panel for the treatment system has remote telemetry capabilities and

Seven-foot-wide (two-meter) lids with hydraulic shocks allow operators to quickly inspect and maintain the AX-Max filter units. Lids are then re-secured for safety.

Orenco engineer Ted Kulongoski flew to Angola to oversee the commissioning. As part of Orenco's rigorous system-commissioning process, water is added to the AX-Max system so that all components, including pumps and floats, can be tested. In addition, the entire system is checked to ensure that, after shipping and installation, each unit continues to be watertight. (AX-Max units are all pre-tested for watertightness at the factory, after assembly.)

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includes a touch screen on the outside of the control panel programmed in both English and Angolan Portuguese. The touch screen provides an uncomplicated user interface for viewing system data logs, as well as real-time monitoring or adjusting of the system's operating settings, including its liquid level sensors, pumps, and UV disinfection units. Soyo's TCOM panel can be connected to a landline, cellular service, Internet network, or satellite service, allowing technicians at Orenco's headquarters in Oregon, U.S.A. to assist in real-time system monitoring, operation and maintenance, and troubleshooting.

Installation of the "plug-and-play" AX-Max treatment system was coordinated by Teixeira Duarte Engineering and Construction SA and accomplished in just a few days with the help of local labor. Orenco engineer Ted Kulongoski supervised the system commissioning. Angola LNG has since placed an order for a second AdvanTex Treatment System to serve a local school.

Installation/start-up team from Angola LNG, Teixeira Duarte & Monofásica. Installation of the AX-Max™ treatment system was accomplished in just a few days with the help of local labor.

The Orenco® TCOM™ control panel includes a touch screen programmed in both English and Angolan Portuguese. Two UV Pure Hallett™ 30 disinfection units are also housed in the secure controls building at the site.

Data used by Orenco to derive the representations and conclusions contained within this Project Profile were current as of September, 2012.

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For more information about effluent sewers, Orenco Sewers™ and AdvanTex® Treatment Systems, contact Orenco Systems®, Inc.

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