

Sustainable odor treatment in Abu Dhabi pumping station

Abu Dhabi's new wastewater pumping station, to be the world's largest upon its completion in 2017, will rely on EcoFilter technology to control odors. Steve Murphy of BioAir explains how the system will reduce hydrogen sulphide odors and emissions.

In 2008, Abu Dhabi Sewerage Services Company (ADSSC) embarked on one of the largest sewage collection projects in the world, known as the Strategic Tunnel Enhancement Programme (STEP). The STEP project will allow ADSSC to collect all of the wastewater generated by the city of Abu Dhabi in the United Arab Emirates and transfer it through a large underground tunnel, 5 meters (m) in diameter and approximately 41 kilometers (km) long.

At the end of the tunnel, the sewage discharges into the main pumping station, STEP PS01, which transfers the sewage from a wet well located approximately 100 m below ground level up to the nearby sewage treatment plants. The pumping station PS01 is the largest of its kind in the world, according to ADSSC, and will have a design life of at least 80 years.

But operating the largest pumping station in the world also means generating significant amounts of odor. Due to the flow of sewage in the tunnel, the drag force between the sewage and the air headspace will create a flow of sewer gases to the end of the tunnel. This odorous air needs to be captured since it will have hydrogen sulphide (H₂S) levels of up to 500 parts per million by volume (ppmv), a concentration that is fatal to humans if left untreated. In order to avoid any odor complaints in the vicinity of the pumping station, the design of the odor control system for STEP therefore includes a robust collection system to capture the odorous air and treat it in a centralized biological odor control system. Further benefits of the odor collection and treatment system include minimizing corrosion of the pumping station's equipment and, most importantly, reducing the sewage gases inside the pumping station to provide for a safe and healthy working environment for the site's operating staff.

The STEP project is unique not only because its size is unprecedented but also because it uses the most advanced, current odor treatment technology to ensure that any potential odor issues at the site are resolved in a sustainable, environmentally friendly manner. Several odor control technologies were considered for use at PS01 before a clear specification for the technology of choice was developed. BioAir Solutions' EcoFilter® biotrickling filter technology was then selected for this unique and very stringent odor control application.

According to BioAir Solutions' President Louis le Roux, the company's EcoFilter technology was developed in the United States through an

extensive process of research and development. Le Roux says, "At the heart of every EcoFilter system is our proprietary EcoBase® media, a structured, synthetic media with carefully designed, engineered flow channels, which maximizes mass transfer and optimizes the removal of odors." Le Roux further notes that "EcoFilter systems use no hazardous chemicals, nor consumables such as carbon, while delivering reliable, consistent, long-term performance with very low operating costs, and thus solve the anticipated odor problems in a sustainable and environmentally friendly manner."

At STEP PS01, the BioAir design consists of eight EcoFilter biotrickling filter reactor vessels, which treat a combined total airflow of 105,000 cubic meters per hour (m³/h) and which will reduce the H₂S and air emissions at the point of final stack discharge to levels low enough to prevent unpleasant odors from being detectable at the site's boundaries. Each EcoFilter reactor vessel is approximately 4 m in diameter and 8.8 m tall.

BioAir is also providing the odor treatment system at the nearby Al Wathba Wastewater Treatment Plant in Abu Dhabi, which is the facility that will treat the sewage coming from STEP PS01. This system at Al Wathba, also consisting of eight large EcoFilter units, has already been commissioned and is operating at greater than 99-percent removal efficiency.

The EcoFilter systems are currently being installed and are scheduled for commissioning in 2017.

In addition to the STEP PS01 and Al Wathba systems in the emirate of Abu Dhabi, BioAir has more than 40 other installations in the Middle East region, in locations including Qatar, Jordan, and the Kingdom of Saudi Arabia, as well as in the emirates of Dubai, Ajman, Ras Al Khaimah, and Sharjah in the United Arab Emirates.

According to le Roux, BioAir's strong growth in the region is due in part to the company's ability to provide detailed, scientific studies of the odor issues across a customer's entire collection system and treatment plant, and then to design custom odor treatment solutions for that specific application, a process BioAir calls Total Odor Control.

Author's Note

Steve Murphy is the manager of business administration at BioAir Solutions, headquartered in Voorhees, New Jersey, United States. The company has offices in Sharjah and Dubai, UAE.



Eight EcoFilter biotrickling filters reactor vessels will treat odors at the STEP project's main pumping station. Photo by BioAir Solutions