

IMS I-BOx® 7000 Eliminates Persistent Odor Problems at the Punto A Preliminary System Facility in Lima, Peru

The Punto A Preliminary System Facility was built in the District of Surco, a residential area of Lima, Peru, as part of a project for the improvement of the sewerage system in the south of Lima (MESIAS Project). Equipment at the 50 MGD facility removes the debris and grit contained in the wastewater prior to conveyance to three wastewater treatment plants: San Juan, Huascar, and San Bartolo.

The Punto A Preliminary System Facility began operations in 2001 under the scope of the Lima Water and Sewerage Service Company (SEDAPAL). The treatment process at the

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Operation Chief of the South
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facility consists of mechanical screens, grit removers, and classifiers that were covered and ducted to an organic media biofilter for removal of the foul hydrogen sulfide (H₂S) gas released in the treatment process. From the beginning, the organic media biofilter did not reach the expected removal of H₂S. Operational problems persisted, including the need for frequent replacement of the organic media, which was damaged by the sulfuric acid produced during oxidation of the hydrogen sulfide. Additionally, large amounts of water were required for biofilter irrigation. When a number of luxury residential buildings, business offices, and restaurants were built next to the Punto A Preliminary System Facility in 2010, SEDAPAL began receiving numerous complaints. The nearby community and businesses were demanding the closure of the facility due to the odor issues caused by the ineffectiveness of the organic media biofilter.

To address community concerns, in 2014, SEDAPAL initiated a public bid for the replacement of the old organic media biofilter. After the technical and economic evaluation of different gas treatment options, SEDAPAL awarded the bid to a local distributor of Integrity Municipal Systems, LLC (IMS) with a scope including the supply, installation, and commissioning of an IMS I-BOx® 7000 inorganic media biofilter as well as

training of the facility’s operating personnel. The IMS system was selected for its reliable, efficient, cost effective, and sustainable technology. The inert long-lasting media used for the system is resistant to acidic conditions and performance is guaranteed for the concentration of H₂S in the purified outlet air to comply with the <0.1 ppm limit established in the national Peruvian standards.

The IMS biological odor control system used at Punto A Preliminary System Facility, I-BOx® 7000, was pre-assembled, piped, wired, and factory-tested to facilitate installation and start-up at the jobsite. The packaged biological odor control system consists of an FRP air exhaust fan, FRP odor control vessel, water and nutrient feed panel, nutrient tank and electrical control panel. All of these components of the I-BOx® system are mounted on the low-profile vessel deck in one place for easy operator access and maintenance.

The packaged biological odor control system is a once-through system equipped with a fan that operates continuously and pulls the odor-laden air from the mechanical screens and grit removers into the biological odor control system for treatment prior to release to the atmosphere. The biological odor control system comprises of two treatment stages. Stage 1, the biological process stage, is designed to remove primarily H₂S by providing an environment promoting the natural growth of



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acidophilic, sulfur-oxidizing bacteria. The first stage media is an inert, porous, mineral-expanded clay material designed to resist compaction and degradation from the acidic sulfates of the biological oxidation of the hydrogen sulfide.

Stage 1 operates with an independently controlled irrigation system to provide the biological media with adequate moisture to sustain bacterial growth and to remove toxic byproducts. The irrigation process is controlled by a programmed timing sequence that actuates a solenoid valve located on the water supply piping. Nutrients are also trickled down over the media to enhance and sustain the biological activity. The nutrients are housed in an integral nutrient tank and are dosed into the system by a nutrient pump mounted in the water and nutrient feed panel.

Integral to the system is a pelletized coal activated carbon second stage, Stage 2, used to remove any remaining hydrogen sulfide and other odorous organic compounds and to polish any sharp H₂S spikes that break through Stage 1. After treatment in Stage 2, the cleaned air is discharged to the atmosphere through the stack at the top of the unit.

Marco Pinchi, operation chief of the South WWTP Sector of SEDAPAL, said, "The installation of the I-BOx[®] 7000 was simple with the system footprint almost half of the previous biofilter. The operation of this biofilter is simpler and friendlier to our staff, and the materials of construction are resistant to our environment. We appreciate the support of the local representative, and we can say that this biofilter solved our odor control problem at this facility."

System Design Parameters

Odor Control System Design Information	
Design Air Flow rate	2,000 cfm
Biological OCS Model	I-BOx [®] 7000
Avg. Inlet H ₂ S Concentration, ppm	50 ppm
Peak Inlet H ₂ S Concentration, ppm	100 ppm
Minimum H ₂ S Removal Efficiency	99.0%*
Biological Odor Control System Dimensions	
Length	9'-6"
Width	7'-0"
Height (SSH)	6'-8"
Shipping Weight (Vessel)	11,500 lbs.
Operating Weight	12,700 lbs.
Nutrient Tank and Metering Pump	
Nutrient Tank Capacity	30 gal
Nutrient Metering Pump Flow Rate	0.8 gpd
Water Feed	
Solenoid Frequency	Every 30 minutes
Solenoid Valve Open Duration	1 minute
Flow Rate	8 gpm

*The minimum H₂S removal efficiency is 99.0% or an outlet concentration of 0.1 ppm, whichever is greater.