

Integrity Municipal Systems Solves Odor Problems at Santa Margarita Water District's Chiquita Water Reclamation Plant in Orange County, California

Santa Margarita Water District (SMWD) is the second largest water district in Orange County, California, providing water and wastewater services to more than 155,000 residents and commercial enterprises. When a new housing development was planned adjacent to SMWD's 9.0 MGD Chiquita Water Reclamation Plant, the District initiated plans for enhanced odor control solutions. District staff identified the primary process area (grit removal and primary clarifiers) as a significant contributor to odor emissions.

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Tricia Butler, Chief Engineer
SMWD

Following a thorough review of existing odor control technologies in use at the facility and extensive pilot testing at various locations throughout the plant of the best available odor control technologies, SMWD selected a two-phase (biological/carbon) odor control system with two parallel trains to serve the primary process area. District staff requested proposals from manufacturers that met pre-requisite criteria. The District selected Integrity Municipal Systems, LLC (IMS) based on system performance, pricing, service and ability to meet the project schedule. The IMS system is a two-train system. Each odor control train consists of the IMS I-BOx® 8025 biological odor control system, followed by an IMS BCS-1000 carbon/potassium permanganate blend adsorber odor control system. Each train is independent and capable of treating an airflow rate of 5,000 cfm, creating redundancy capability in the event that one train is down.

The new IMS biological odor control systems replaced an existing 24,000 cfm chemical scrubber system. Biological systems like the IMS I-BOx® 8025 are desirable as primary

odor control treatment systems (“Stage 1”) because of their low operating and maintenance costs, eliminating the need for chemical handling. Using activated carbon and potassium permanganate media blend systems such as the BCS-1000 as secondary odor control treatment systems (“Stage 2”) ensures overall hydrogen sulfide (H₂S) removal efficiencies greater than 99.5% - polishing off any sharp H₂S spikes that may break through Stage 1 – and treatment of other low-concentration, reduced-sulfides in the airstream.

The I-BOx® 8025 biological odor control system is pre-assembled, piped, wired, and factory-tested to facilitate installation and start-up at the jobsite. The packaged system consists of an FRP air exhaust fan, FRP fan noise enclosure, FRP odor control vessel, water and nutrient feed panel, nutrient tank and electrical control panel. All the components of the I-BOx® 8025 system are mounted on the low-profile vessel deck in one place for easy operator access and maintenance. The fan operates continuously and pulls foul air from the process area into the biological odor control system for treatment prior to conveyance via interconnecting FRP ductwork to the BCS-1000 activated carbon/potassium permanganate blend media adsorber.



I-BOx® 8025, SMWD's 9.0 MGD Chiquita Water Reclamation Plant

The I-BOx® 8025 system is composed of a process stage (Stage 1) that removes primarily H₂S by providing an environ-

ment that promotes the natural growth of acidophilic, sulfur-oxidizing bacteria. The Stage 1 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 H₂S. An intermittent water irrigation system supplies moisture for the media. Nutrients are also trickled over the media to enhance and sustain biological activity. The nutrients are commercially available fertilizers stored in an integral nutrient tank and dosed into the system by a nutrient pump mounted in the water and nutrient feed panel. Water and acidic sulfate byproducts washed from the media leave the system through the drain piping at the bottom of the vessel and are returned to the treatment process.

After Stage 1 treatment in the I-BOx® 8025 system, the foul air is conveyed to the BCS-1000 for a polishing stage (Stage 2) that removes any remaining H₂S, as well as other odorous organic compounds, before release to the atmosphere. The interconnecting ductwork between Stages 1 and 2 includes bypass ductwork and dampers that allow discharge of the treated air directly to the atmosphere after Stage 1. This arrangement provides operational flexibility, allowing the activated carbon/potassium permanganate media adsorber system to be isolated during maintenance or media replacement. The Stage 2 BCS-1000 consists of a 10-foot, single-bed FRP adsorber vessel loaded with a combination of high H₂S capacity, pellet-

ized activated carbon and a layer of potassium permanganate media blend to capture and remove any reduced sulfides in the airstream.

A critical objective of this unique project was use of a sustainable and proven odor control technology to minimize the possibility that odors from the primary treatment process would impact residents near the plant. The IMS system provided maximum value, measured by performance; reliability; and capital, installation, maintenance and operating costs. Timing was also a crucial factor, requiring the system to be designed, fabricated, installed and started up 12 weeks after the issuance of the purchase order.

“Process expertise, exceptional responsiveness, hard-working field personnel, robust nuts-and-bolts equipment design, all enabled the IMS team to design, successfully install and commission its highly effective odor control system at our Chiquita Water Reclamation Plant primary process,” commented Tricia Butler, SMWD chief engineer.

The I-BOx® 8025 biological odor control system and the BCS-1000 carbon adsorber provided SMWD with a reliable, efficient, cost-effective and sustainable odor control technology for the primary process area at the Chiquita Water Reclamation Plant.