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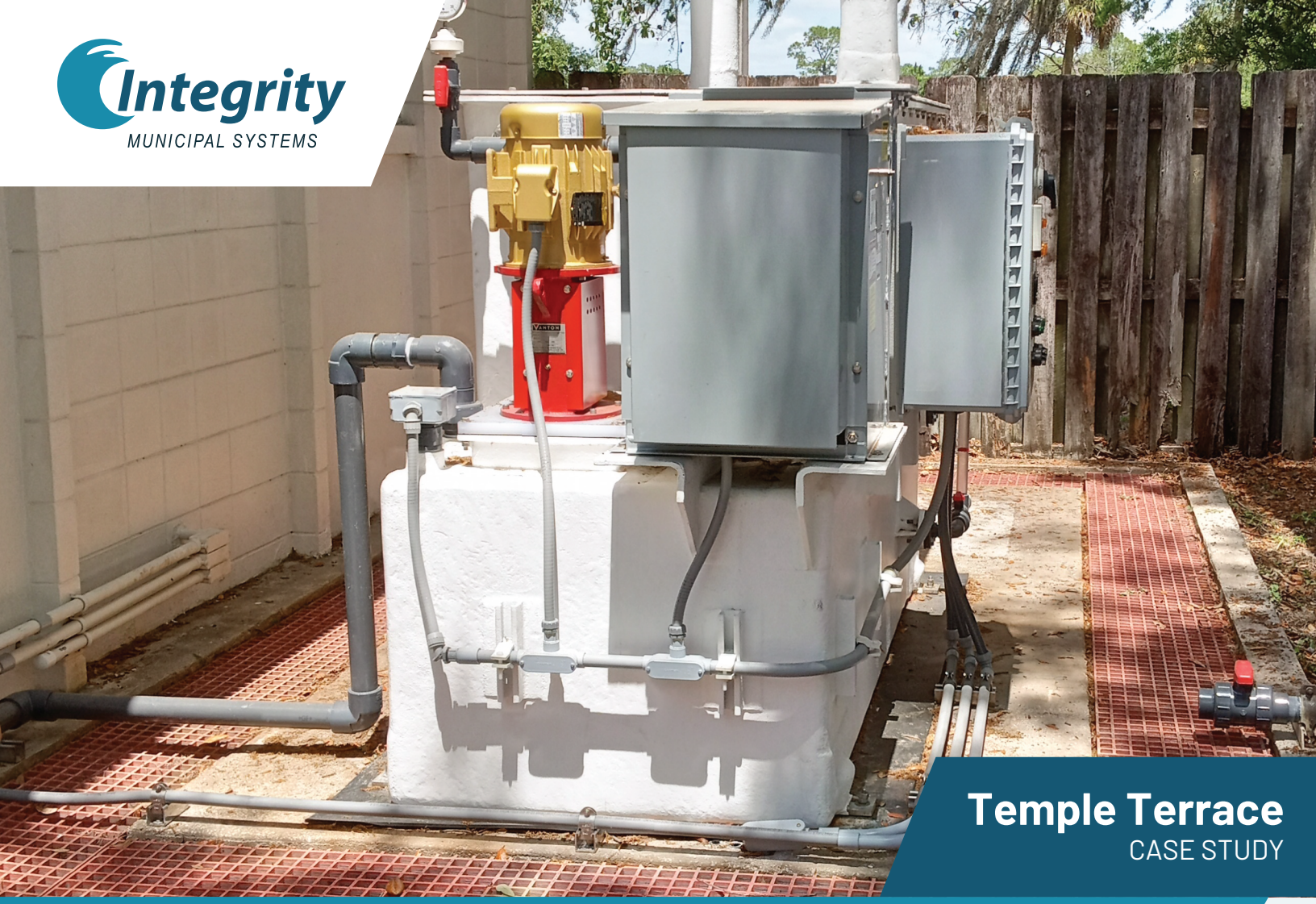

Temple Terrace
CASE STUDY

City of Temple Terrace Upgrades to IMS Chlorine Scrubber

The City of Temple Terrace, Florida (the City), incorporated in 1925, is located in Hillsborough County, within the Tampa Bay area. This vibrant city provides water and wastewater services to approximately 26,000 residents. The history of Temple Terrace's water treatment and distribution system dates back to the early 1920s when the city's first waterworks facility was established. Over the years, the system has undergone expansions and improvements to meet the growing needs of the community.

The Sunningdale Water Treatment Plant, built in 1956, plays a crucial role in Temple Terrace's water infrastructure. It is located at 520 Belle Terre Ave, Temple Terrace, FL 33617 and serves as a key facility for the treatment and purification of drinking water, ensuring a safe and reliable water supply to the residents and businesses of Temple Terrace. The plant services various areas within the city, including Sunningdale, Riverhills, Terrace Hill, and other nearby neighborhoods.

In February of 2020, Integrity Municipal Systems LLC (IMS) began working with the City to design and specify a chlorine scrubber to replace the existing scrubber at the City's Sunningdale Water Treatment Plant.

The chlorine room at the Sunningdale Water Treatment Plant measures approximately 12' x 12' x 12' and houses six (6) 150 lb. chlorine cylinders. The City, as part of their Sunningdale Water Treatment Plant - Emergency Chlorine Scrubber Replacement Construction Project, intended to replace the entire system, including the scrubber, chemical dosing, blowers, and electrical components. Their main objective was to install a fully functional system capable of effectively neutralizing any potential chlorine leaks.

Chlorine is commonly added to raw water for disinfection purposes and to make it safe to drink. However, chlorine gas is extremely toxic and presents an immediate danger to life and health (IDLH) at concentrations as low as 10 ppm.

In order to minimize the risks and consequences of an accidental leak of chlorine gas, The Uniform Fire Code, Article 80, requires that all sites storing chlorine gas must have a scrubbing system capable of neutralizing a full release from a leaking storage cylinder. An emergency chlorine scrubber is such a system. An essential part of an effective Risk Management Plan (RMP), the scrubber allows safe evacuation of chlorine-laden air from a chlorine storage room and neutralization of the chlorine gas prior to discharge to the atmosphere.

The IMS EVS-150-2 Emergency Chlorine Scrubber is a once-through wet media emergency scrubbing system designed to treat the release of chlorine gas in accordance with the requirements and guidelines of the Uniform Fire Code. The EVS-150-2 system is pre-assembled, piped, wired, and factory tested to facilitate installation and start-up at the jobsite. The packaged emergency chlorine scrubber system consists of an FRP absorber vessel with integral caustic sump, recirculation pump, FRP air exhaust fan, and electrical control panel. All of the components of the scrubber system (fan, pump, control panel) are mounted on the low-profile vessel deck in one place for easy operator access and maintenance.

The IMS emergency chlorine scrubber is a three-stage chemical absorption system consisting of a horizontal crossflow spray system followed by two horizontal crossflow packed bed sections. The absorber is placed on top of a caustic storage tank, which is an integral part of the system. An induced draft fan pulls vapors through the scrubber, where intimate contact with a recirculating caustic solution results in the complete absorption and removal of chlorine vapors. A high-efficiency mist eliminator is located in the gas stream, prior to exhaust, to remove any residual caustic solution.

The EVS-150-2 is designed to treat a chlorine release from up to two (2) 150 pound cylinders (up to 300 lbs total), at a release rate of 28 lbs/min. The air flow rate of 250 cfm assures a negative pressure in the chlorine room.

The system is normally in a stand-by mode. When a chlorine leak is detected, a signal is sent to start the EVS-150-2 exhaust fan, and the chlorine-laden air is immediately evacuated through the chlorine scrubber. The caustic pump is activated first to permit proper wetting of packing in the scrubber stages before starting the exhaust fan, with a 0 to 5 second adjustable time delay. The time delay is typically set for 3 to 5 seconds, a feature that allows the scrubber to be ready prior to passing any chlorine laden gases through it. The treated air passes through the exhaust fan and is discharged to the atmosphere. For safety reasons, the system continues to operate until manually turned off.

The City had an old wet scrubber that needed replacement as it had exceeded its useful life. To explore alternatives, the City assessed dry media chlorine scrubbers as a potential solution to replace the wet caustic scrubbers.

Dry media chlorine scrubbers have gained popularity due to their convenience and low maintenance. However, they raise concerns such as limited heat dissipation, decreased adsorption capacity at high temperatures, potential for bypass and channeling, and lack of testing for full-scale releases.

Wet chlorine scrubbers on the other hand offer proven performance and are specifically designed to handle emergency situations, requiring minimal maintenance and caustic solution replacement every five years. The wet scrubber design has been tested for a full-scale chlorine leak and demonstrated complete neutralization of the released chlorine.

After careful consideration, the City decided to retain wet caustic scrubbing technology instead of switching to a dry media chlorine scrubber due to these concerns. IMS was selected to provide the new wet caustic scrubber based on their competitive offering and ability to meet the specifications set by the consulting engineer for a packaged emergency chlorine scrubber with caustic solution.

Following successful installation of the new system, IMS performed start-up and commissioning of the emergency chlorine scrubber system and provided operator training in April 2022. The EVS-150-2 has provided the City of Temple Terrace with a reliable, efficient, cost effective and proven emergency chlorine scrubbing technology.

"I want to give you a big compliment and thank you. Great customer service."

- James Nevola, Chief Water Plant Operator,
City of Temple Terrace

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