

uvc lights enhance

Air Quality

By Robert Scheir

Indoor air quality problems are solved by an odor control system and UVC lights

Located at the center of the Hyperion Wastewater Treatment Plant in Los Angeles, the Pregerson Building was experiencing indoor air quality (IAQ) problems. Built in 2002 to house nearly 400 city employees, the facility rapidly became the source of complaints about poor IAQ and odors. An engineered solution that incorporates both an odor control unit and supplemental ultraviolet-C (UVC) lights in the air handlers has solved the problem and earned the project semifinalist status in the city's prestigious Quality and Productivity Awards program.

"Our investigation of the complaints found two major problems with the building," said Daniel Strauss, P.E., mechanical engineering manager for the Environmental Engineering Division (EED), Bureau of Engineering, Los Angeles Department of Public Works. "First, the fresh air intake louvers positioned on the face of the building next to the primary settling tanks pulled foul air into the building and distributed it via the air conditioning system. Hydrogen sulfide (H₂S) concentrations of nearly 100 ppb were measured in the office areas."

H₂S is an odorous, gaseous contaminant that commonly occurs in sewage treatment facilities.

"Second, the building was under negative pressure, and contaminated air infiltrated into the building through the main entrance doors at ground level," Strauss added.

The solution

To address these problems, EED design engineers decided on an odor-control unit that took all the outdoor ventilation air and purified it by scrubbing out the obnoxious elements. Custom manufactured by Energy Labs, Inc., San Diego, the equipment contains three banks of activated carbon filters for H₂S removal and two stages of air filtration for capture of particulate contaminants. The odor control unit is also outfitted with a variable frequency drive (VFD)-powered fan to overcome airflow restrictions and introduce outside air in sufficient quantities to maintain positive pressure in the building.

To provide added insurance against airborne contaminants in the building, the EED specified high-output UVC lights at the cooling coils in the





A view of the coils with the UVC lights on.



A general view of the mechanical equipment room showing two of the air handlers.



HPscrubber—view of the odor control unit (scrubber) described in the article.

existing air handling units that serve the building.

“We had seen presentations about UVC’s ability to kill airborne bacteria, as well as surface and airborne fungal contaminants, which are also a cause of widespread discomfort and health problems,” Strauss said. “We believed the addition of UVC lights would allow us to do a complete job and ensure the highest level of indoor air quality.”

UVC energy is the most germicidal wavelength in the UV spectrum. Installed in an air-handling system, UVC lights emit enough of this energy to penetrate even the tiniest microbe and destroy its DNA and RNA, killing or deactivating it. In this manner, UVC effectively stops both surface organisms that grow inside heating, ventilating and air conditioning (HVAC) systems and airborne microbes that circulate through these systems to the occupied space—including the mold and bacterial contaminants that tend to proliferate in standing water in cooling coil and drain pan areas. Many users of UVC technology also report that it generates a “fresh air” smell in buildings by keeping air handling systems clean and free of mold and organic buildup.

“Since implementing these improvements in mid-2006, we have eliminated odor problems and the accompanying complaints,” Strauss

said. “Presently, the building is under positive pressure, and the ventilation air has less than 2 ppb of H₂S, making the system at least 98% efficient in H₂S removal. The UVC lights add an extra dimension of protection, and we believe the benefits exceed the cost.”

The UVC lights require no maintenance other than periodic changeout approximately once a year to ensure that they deliver the required energy to kill contaminants in the system.

“We believe UVC technology has broad application for all types of buildings and have recommended that it be incorporated into the Bureau of Engineering master specifications for all our HVAC equipment,” Strauss said.

Award nomination

The Pregerson Building Air Quality Upgrade project recently became a semifinalist in the 2006 “QP Awards” competition mounted by the city’s quality and productivity commission. The awards program “recognizes and honors city employee teams for their initiative, creativity, teamwork, cost containment efforts and entrepreneurial spirit in providing a high level of customer service.”

It is based on a rigorous eight-month application and review process, culminating in the selection and recognition of winning teams. In addition to recognition by the mayor, city council, commission and

the community, concepts learned are transferred and implemented elsewhere throughout the city by the commission.

The air quality upgrade project was designed by the Bureau of Engineering and the EED and constructed by the city’s Department of General Services. The UVC lights were manufactured by Steril-Aire, Inc., Burbank, Calif., supplied by U.S. Air Conditioning Distributors, City of Industry, Calif., and installed by Custom Air Systems Corp., Simi Valley, Calif. Energy Labs, Inc. manufactured the odor control/air scrubbing unit.

The Hyperion Wastewater Treatment Plant is the last stop for the liquid wastes flowing out of Los Angeles. The city’s network of 6,500 miles of buried pipeline processes 360 million gal per day of sewage. Hyperion underwent a major expansion in the 1990s and is now the third largest sewage facility in the country. **WWD**

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