

Still Expanding, L.A.'s Plant Upgrades

Enhancements made to Hyperion wastewater treatment plant will benefit Santa Monica Bay for decades to come.

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Not far from the Los Angeles International Airport sits the mammoth, 55-year-old Hyperion Wastewater Treatment Plant, one of the nation's largest. Originally built for secondary treatment in 1949, the facility now serves some 4 million area customers and handles 340 million gallons per day (mgd), with the capacity to treat up to 450 mgd of wastewater.

In the early 1960s, Hyperion reduced secondary treatment to 120 mgd due to limited secondary capacity. In the late 1980s, the plant increased secondary treatment to 200 mgd by adding chemicals during primary treatment and by modifying its internal reactors' air system to increase oxygen transfer. After making further modifications in the late 1990s, Hyperion once again achieved full secondary treatment.

Along the way, it reached another significant milestone. In 1987, the plant completely ceased discharging sludge into the ocean, acting before the federal mandate that would soon require all such plants to follow suit. The upgrades then ended plant spills, reduced the amount of wastewater solids entering Santa Monica Bay by 95 percent, and improved the quality of life for marine animals, birds, and indigenous mammals.

Prior to the 1972 Clean Water Act, many municipalities dumped solid waste directly into public waterways. When federal clean water standards were instituted, these municipalities—including Los Angeles—were given a certain timeframe in which to legally comply. Los Angeles had until 1987 to cease ocean discharge of sludge, and until 1998 to provide secondary treatment to all wastewater. The city successfully met both target dates.

Around the same time, Hyperion personnel began assessing the more than 60 individual scrubbing odor control units used throughout the plant. Types of units ranged from conventional packed tower systems to ac-

tivated carbon adsorbers, with each unit differing in size and design.

With a growing population, an increasing amount of sewerage produced, and aging plant parts and components from various manufacturers, the city realized in 1980 that it needed to make some changes. Chief among them, Hyperion had to be converted into a full secondary treatment facility, with expanded sludge-handling capacity. The plant's odor control equipment also needed to be upgraded in several critical areas. Perhaps more importantly, the plant also needed to make all these changes while meeting the EPA's National Pollutant Discharge Elimination System (NPDES) permit requirements.

CLEANER WATER

In converting the facility and expanding its solids handling capability,

the city had to gradually replace, beginning in 1988, the plant's original 300x20-foot primary sedimentation basin cast collector chains and flights with non-metallic units. In the end, Hyperion tried several brands of nonmetallic collectors, but none could effectively and reliably process the increase in sludge.

USFilter Envirex Products had pre-



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WASTEWATER TREATMENT

PROVIDING CLEANER AIR

Another facet of the plant upgrades involved standardizing and centralizing the odor control equipment installed throughout Hyperion. This would not only reduce the number of individual odor control stations, but also streamline operation and facilitate maintenance. According to Varouj Abkian, manager of the city's environmental engineering division (EED), having one type of odor control system also cuts down on the number of purchasing contracts, spare parts inventory, and field operators needed.

"Obviously, it's a lot easier to learn how to care for one type of system than 60," says Abkian.

After conducting an extensive odor control-testing and technology research program, the city selected the three-stage, packed scrubber LO/PRO odor control system from USFilter RJ Environmental Products. "In addition to removing more than 99.5 percent hydrogen sulfide, the system also reduced chemical consumption and produced significant chemical cost savings," recalls USFilter's Eric Davis.

In practice, the product's three adsorption stages consist of a gas conditioning/pretreatment removal stage, followed by two vertical counter-current gas absorption steps. The systems use sodium hydroxide (NaOH)

and sodium hypochlorite (NaOCl) to remove hydrogen sulfide (H₂S) from the H₂S-producing plant process areas, and exhaust the deodorized air into the atmosphere. Scrubber recirculation sumps and packed-bed absorption stages are all housed in a single fiberglass reinforced plastic support structure.

In the coming years, the city will install six full-scale, 20,000-cubic feet per minute (cfm) LO/PRO systems at Hyperion's Centralized Primary Scrubber Facility and its Intermediate Pumping Station Odor Control Facility. The City of Los Angeles and consulting engineer Montgomery Watson Harza of Pasadena, Calif., initially projected that the LO/PRO system would save Hyperion \$240,000 annually in chemical costs, based on a system designed for 20,000-cfm and 100 parts per million inlet concentrations of H₂S.

"We installed two modules, which are already in operation, to temporarily vent the Intermediate Pumping Station pumping primary effluent," says Bill Hartnett, chief process engineer for the EED. "We're still evaluating chemical and energy costs. We'll have much more data after the centralized odor control system for the full primary sedimentation system is installed over the next 2 years," he adds.

Hyperion personnel and area residents agree the plant expansion and system upgrades so far are a success. Since completing the upgrades in 1998, the plant has consistently met all NPDES requirements. Specifically, rehabilitating the existing facility and adding secondary treatment equipment has led to 95 percent removal of sludge from the influent. This, in turn, has improved the Santa Monica Bay's overall water quality, allowing marine life to rebound and people to enjoy the sand and surf without fear of getting sick. **PW**

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viously worked with city personnel at the plant, supplying 11 chain and flight sludge collectors for the plant's three primary treatment facilities in 1987. The city asked the Waukesha, Wis.-based company to help determine the most reliable solution for processing wastewater at Hyperion.

For its assessment of the secondary treatment facility, USFilter worked with consulting engineer Black & Veatch, Kansas City, Mo., and Hyperion personnel to evaluate the loads experienced by the collector chains and predict the wear resistance and overall strength of new alternatives. After careful analysis, USFilter suggested nine Envirex HS730 high-strength collector chains for Hyperion's primary sludge collectors.

The collector chain uses fiberglass components and can operate in heavily loaded tanks, and in tanks longer than 200 feet. It is the only high-strength, nonmetallic design with a working load of 4500 pounds and a minimum ultimate tensile strength of 20,000 pounds.

According to Harold Gies, mechanical supervisor at Hyperion, converting to the new, nonmetallic system has saved considerable maintenance staff hours. And the collectors' and flights' light weight has significantly reduced the number of personnel and the time required to maintain the primary collector systems.



The Hyperion plant is one of the largest in the United States, serving about 4 million people in the Los Angeles area.