

NAME:

Gold Bar Wastewater Treatment Plant

LOCATION:

Edmonton, AB, Canada

PLANT SIZE:235-mgd primary capacity;
111-mgd secondary/tertiary capacity**INFRASTRUCTURE:**

Seven aerated grit tanks; 12 primary clarifiers; six anaerobic digesters (plus two more in the works); 11 secondary bioreactors and clarifiers; a UV disinfection facility; a WAS thickening facility; four wastewater sludge fermenters; and a 4-mgd membrane filtration facility.



Natural treatment, biogas conversion and water reuse are among Gold Bar WWTP's ongoing areas of focus.



The WWTP is situated along the North Saskatchewan River and discharges treated water into it.

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PLANTPROFILE

By Caitlin Cunningham

Plant Progression

Foresight and meticulous planning carry an innovative WWTP into the 21st century

Situated on a 48-acre plot of land in the North Saskatchewan River Valley, the Gold Bar Wastewater Treatment Plant (WWTP) serves roughly 750,000 people in greater Edmonton, AB, Canada. Annually, the 111-million-gal-per-day (mgd) advanced treatment facility treats a liquid volume equivalent to that held by 37,000 Olympic-size swimming pools. It is owned and operated by EPCOR Utilities, a city-owned entity run by an independent board of directors.

When its doors first opened in 1956, the WWTP was designed to address the wastewater needs of 250,000 residents. It comprised one grit tank; two primary clarifiers; four digesters; three secondary aeration tanks; four sludge storage lagoons; a blower and boiler building; and an administration building with an adjoining laboratory.

Over the years, Edmonton has upgraded, improved processes and expanded capacity to keep up with growing demand and regulatory requirements. By 1991, the plant included five aerated grit tanks; eight primary clarifiers; six anaerobic digesters; eight secondary clarifiers and aeration tanks; two blower buildings; a remodeled administration building; and a new, expanded laboratory. Construction of two new bioreactors, an ultraviolet disinfection facility, a waste activated sludge (WAS) thickening facility and a primary sludge fermenter soon followed, with the plant upgrading from secondary to tertiary treatment. As part of that effort, Gold Bar completed its Biological Nutrient Removal upgrade program in 2002 with the conversion of all aeration tanks to bioreactors.

Today, the city of Edmonton and Gold Bar staff take great pride in their Class IV tertiary treatment facility and strive to maintain its reputation as an international leader in wastewater technology.

Natural Treatment

Gold Bar's primary treatment process removes about half of the incoming wastewater's pollutant load. The WWTP addresses the other—often more stubborn—half in secondary treatment, where microorganisms are conditioned to grow, multiply and perform specific tasks. They feed on and break down the dissolved organic matter, along with nutrients (phosphorus and ammonia-nitrogen), eliminating the need for chemical aid.

Biogas Conversion

As wastewater sludge is digested, biogas is generated. Gold Bar has found use for this byproduct: The WWTP converts it into energy used for facility heating, thus reducing its reliance on coal-generated electricity. It is one of the first plants in Canada to do so on a large scale, with European counterparts serving as the models.

"We are working on new methods to make full use of all of the energy available in the biogas," said Vince Corkery, director of Gold Bar WWTP. He

noted that the facility is in the early stages of working to produce clean, 100% methane. Achieving this objective could help fuel cogenerators for producing heat and electricity as well as reduce sulfur-related maintenance costs.

Water Reuse

Gold Bar uses membrane filtration technology to treat a portion of its secondary effluent for reuse. The plant currently maintains agreements to provide Petro-Canada and the Edmonton Parks Department with reclaimed water. Over time, the WWTP plans to expand its membrane treatment from its current 4-mgd capacity to about 53 mgd, supplying more recycled water, protecting the North Saskatchewan River and helping the city of Edmonton achieve its long-term goal of zero discharge.

Furthermore, Edmonton is conducting ongoing research on maintaining high-quality recycled water in storage and distribution systems. "The study will directly benefit utilities by providing information that will allow them to cost-effectively modify processes to minimize complaints of microbial regrowth—bacterial and algae—odor and color," Corkery said. "The study will also examine how utilities can reduce operational challenges, reduce public health risks and build public trust."

A Bright Future

Among various benefits, Gold Bar WWTP upgrades have helped improve the health and biodiversity of the North Saskatchewan River. According to city research published in 2003, Edmonton has steadily reduced its impact on the vital water body—from an Alberta Surface Water Quality Index value of 26 in 1996 to a 4 in 2001.

"The visionary approach and support by senior management promoted the culture of good planning and continual improvement," Corkery said. "Edmonton was always open to new technologies and actively participated in developing and implementing these technologies at the plant."

EPCOR and Gold Bar plan to continue addressing the four focus areas of their recently revamped business plan:

1. Discharge high-quality effluent to the North Saskatchewan River—Edmonton's main drinking water supply;
2. Reclaim water for nonpotable uses;
3. Support nutrient and energy resource recovery from biosolids; and
4. Produce energy from biogas. **WWD**

Caitlin Cunningham is associate editor for *Water & Wastes Digest*. Cunningham can be reached at 847.391.1025 or by e-mail at ccunningham@sgcmail.com.

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