

Kuwaiti WWTP Takes Integrated Biological Approach to Reduce Construction Costs and Improve Effluent Quality

The BioFlowsheet+™ Solution in Action

Application

The BioFlowsheet+™ Solution from Siemens Water Technologies analyzes an existing system to evaluate how the system can be improved to meet a variety of new and updated effluent parameters. SWT would recommend a total process solution by which an additional capacity may be achieved, improve effluent parameters to a high level of performance, maximize the use of existing tankage, provide guarantees on the process, power consumption and solids reduction capabilities.

The Challenge

iMushrif Trading and Contracting Company of Kuwait City is installing a high-performance nutrient removal system to handle 180 mld average to 270 mld peak flow at the Kubd Wastewater Treatment Plant (WWTP) located outside of Kuwait City, Kuwait. The solution is based on a biological process optimization program from Siemens Water Technologies that will help the WWTP meet required effluent levels to produce reuse-quality water for irrigation and landscaping purposes. The Kubd plant will be commissioned in August 2010.

After reviewing merits of the plant design and operating results from a similar installation in South Carolina, USA, Mushrif and the end-user, Kuwait's Ministry of Public Works, were convinced that Siemens' BioFlowsheet+™ Solution would best meet the plant's needs.

Siemens' proposed BioFlowsheet+™ Solution is an alternative to the originally specified conventional MLE (Modified Ludzack Ettinger) process that consisted of an anaerobic selector, anoxic zone and fine-bubble aeration for nitrification, scraper clarification, and sand filtration/disc filtration.

Compared to its conventional counterpart, Siemens' solution will provide superior process design and performance, a smaller footprint, less energy consumption, and compact tertiary filtration.

Design Solution

BioFlowsheet+™ Solutions integrate several key WWTP operations including biological, solids separation, solids treatment and controls to meet the needs of most wastewater treatment applications. At the start of each project, this complete process design approach looks at critical elements of the entire system and analyzes interaction between unit operations. The biological process optimization program evaluates effluent requirements, land availability and specific cost factors such as energy use, labor, and disposal.

Benefits include a plant-wide performance warranty, unified submittals and field service support, coordinated start-ups, long-term corporate and plant-wide commitment, and significant operations and maintenance savings. For the Kubd plant, implementing a BioFlowsheet+™ Solution approach also reduced construction costs. It will facilitate system installation and improve discharged effluent quality, too. And, as part of the design, Siemens will also provide an overall process warranty for the biological process to guarantee the plant meets required effluent quality levels.

Another key advantage of following a BioFlowsheet+™ Solution is that the different processes used in the design enhance one another. The Kubd WWTP's design will include four VertiCel® systems (in two parallel operating trains), six 46m high-performance clarifiers and eight Forty-X™ disc filters (with 24 discs apiece).

Case Study
The BioFlowSheet+™ Concept in Action

Water Technologies

SIEMENS

The Siemens Solution

Siemens Added Value

- VertiCel® system. Reduction in footprint and lowering of the operational cost. (30% reduction in power cost).
- High Performance Clarifiers. Reduction in footprint and use of 8 smaller units vs. original 12 units.
- Forty-X™ disc filters. Reduction in footprint, power and construction savings. Improved effluent quality.
- Floating Surface Aerators for Aerobic Digestion.
- Odor Control System. Reduction in operational cost vs. conventional system. Reduced chemical usage.

Project Facts

- Project: 180,000 m3/day Green Field System
- Customer: Mushrif Trading and Contracting Company
- End User: Ministry of Public Works, Kuwait
- BNR design suitable for reuse quality water
- New and innovative technology for the region
- 80% of the process equipment is Siemens including the sludge handling system



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