CASE STUDY

MaximOS™ - Lakehaven, WA

Lakehaven Utility District Reduces Costs with MaximOS™

Overview

The Lakota Wastewater Treatment Plant is the larger of two plants in the Lakehaven utility district in Washington State. The 10 MGD facility serves a mostly residential community between the cities of Seattle and Tacoma, and it discharges effluent into Puget Sound. After upgrading to a UV system for its primary disinfection needs, the plant retained its chlorine system to treat recycled water and to serve as a backup contingency. However, the rising costs of chlorine and the legal obligations of using the hazardous chemical spurred Lakehaven officials to consider new options.

Parkson's MaximOS™ On-Site Water Disinfection technology was chosen by Lakehaven to replace the back-up chlorine system at the Lakota plant. Lakehaven managers opted for the mixed oxidant version of MaximOS™, and used a capital lease program to match their operational and maintenance budget and conserve funds in their capital improvement budget.

Challenge

The Lakota WWTP is designed for CBOD removal and does not have nutrient loading TMDL's on its effluent discharge. As a result, the plant is not designed with Anoxic selectors that are commonly used to eliminate filamentous organisms. Without those selectors, filamentous bacteria growth was prevalent in their process tanks.

Filamentous bacteria growth is not an uncommon problem for activated sludge systems, where it can interfere with proper settling. Some varieties of the bacteria thrive in oxygen-deprived environments, while others depend on certain nutrient imbalances, or high grease and fat loads. Finding the right treatment method relies on identifying the specific type of bacteria and whether it is causing slime, foam, bulking or some other problem with settling. Chlorine is the most common tool to combat filamentous, and it works by damaging bacteria on the floc surface. Too high a dose, however, damages the floc-forming bacteria that are needed in the system.

Process Optimization with Mixed Oxidants

Parkson's MaximOS™ allows for fine adjustments of dosage to ensure the proper amount of mixed oxidants to combat filamentous bacteria growth, a common problem which was clogging filters and pipes in the plant's recycled water system. By upgrading to MaximOS™ with mixed oxidants, Lakehaven has been able to reduce the amount of chemical usage by 30-50% to control the filamentous foaming.

Additionally, the plant has replaced a 12.5% hypo-chloride odor air-scrubbing system with the mixed oxidant solution, which has proven to virtually eliminate odor problems.

Finally, the technology continues to fulfill its role as a backup disinfection system. Even with the unit seeing some regular use, personnel are confident it could be scaled up to meet whatever needs the plant has.

MaximOS™ life cycle costs - During warranty period (1-4 yrs) and after warranty period (5-20 yrs)

SYSTEM COSTS INCLUDING POWER, PARTS, LABOR AND SAFETY-RELATED ITEMS	CHLORINE GAS	MAXIMOS™ ONSITE GENERATION SYSTEM
Power costs of Miox system	N/A	$3,158
Salt	N/A	$11,232
Labor costs of ordering, receiving and processing of salt	N/A	$4,300
Capital lease costs	N/A	Unit has been paid off
Service agreement costs from Miox	N/A	$8,000
Costs of replacement cells	N/A	Included in O&M annual costs per year (cell costs $30,000 every 10 years)
Cost of Miox system O&M considerations per year	N/A	Should be lower due to reduced run time requirements ($9,643)
Total system yearly costs ($61,000 in chemicals and $40,000 in O&M)	$101,528	$36,333
Savings per year during lease agreement (yrs 1-4)		$32,438
Projected savings of unit during years 5-20 of equipment life		$1,043,120/65k per year
Projected savings of unit during 20 year equipment life		$ 1,397,872
Total savings of unit during 20 year equipment life		$ 1,212,872

Highlights

- Power costs were reduced by 76% due to effectiveness of fresh Miox chemical compared to 12.5% hypo or chlorine gas. Estimated with upcoming projected 8% price increase, 9.4 cents per kW.
- Salt averaged at 21.6 cents per pound or three year average of proposed contract pricing.
- Years 1-4 original only compared salt/lease costs versus historical chemical costs.
- Total savings is reduced by installation costs of $185,000. For parts and staff labor.
- For reference: Snoqualmie WWTP paid over $400,000, for contractor labor and installation costs.

Economic and Safety Results

The technology has performed well, achieving the same results as the earlier chlorine system but doing so with about one-third of the equivalent in chlorine gas. The improved efficiency translated into a savings of about $12,000 a year.

Additionally, plant personnel were pleased to replace a hazardous chemical with salt, which is much safer to handle and store on-site. The transition to MaximOS™ generated numerous benefits for Lakehaven.

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