MBBR Process Increases Landfill Treatment Capacity by 209% Without Requiring Additional Footprint

**Background**
Keystone Sanitary Landfill, Inc. is a privately owned, 720 acre municipal solid waste landfill located in Dunmore, Pennsylvania that processes 5,000 tons of sanitary wastewater each day. The landfill operates under the revised Commonwealth of PA regulations which conform to Sub Title D requirements and is in full compliance with 25 PA Code, Chapter 273. Keystone maintains an Environmental Management System which is second to none and takes pride in its uncompromising commitment to maintain an environmentally friendly operation.

**Challenge**
Keystone needed an economical retrofit that would increase the capacity of the wastewater treatment process to 108,000 GPD while reducing BOD$_5$ and NH$_3$ for effluent discharge. The ActiveCell$^\text{TM}$ biological treatment process from Headworks BIO$^\text{TM}$ Inc. was selected for the application to retrofit and upgrade four existing biological reactors that were previously used as a static fixed film media process equipped with a down draft mixer.
ActiveCell Solution
Moving Bed Biofilm Reactor (MBBR) technology employs robust, reliable next-generation biological technology. The process biodegrades wastewater using thousands of suspended media that operate in a continuously mixed environment. Each piece of media provides an active surface area sustaining heterotrophic and autotrophic bacteria within protected cells. This dynamic population of bacteria achieves high rate biodegradation productivity within the system, while also offering process resiliency and automated operation. MBBR technology enables industrial facilities, marine vessels, communities, and commercial businesses to reliably meet or exceed stringent environmental regulations.

Design
When the static media was removed from the existing biological reactors, it was packed with biosolids and was anaerobic and septic. The down draft mixers were replaced with coarse bubble air diffusers and regenerative blowers. Last, the basins were loaded with ActiveCell450 biofilm carriers.

The complete mix aerobic ActiveCell process operates without buildup of excess biomass since the carriers are in constant motion where dead biomass is continuously sloughed from the active surface area. This eliminated an anaerobic digester process and as a result, provided the landfill with increased treatment capacity, enhanced performance, and optimized reliability of the wastewater treatment facility.

Results
The MBBR treatment process eliminated the problematic anaerobic digester process while increasing flow capacity from 35,000 GPD to 100,800 GP, a 209% increase, all within the same overall footprint.

To learn more about treating landfill leachate in a compact footprint, contact:
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