



Cannibal[®] Solids Reduction Process

Water Technologies

SIEMENS



Cannibal® Solids Reduction Process

The Cannibal® Process Means Major Savings:

Equipment

- Unit operations can be reduced or eliminated from new plants
- Eliminate the need for solids handling upgrade at existing facilities

Operation

- Significant reduction in quantity of solids for disposal
- Reduces sludge hauling costs
- Only trash, grit and inerts are removed on a regular basis
- Power costs for biosolids handling are greatly reduced
- Reduces polymer costs for sludge dewatering
- Routine operation of dewatering equipment is reduced or eliminated

Cannibal® Solids Reduction Process Applications:

- Plants with high solids disposal costs
- New plants or plants looking at solids handling upgrades
- Facilities with aerobic digesters and high power costs

Why Choose the Cannibal® Process?

The Cannibal® process is a revolutionary technology that significantly reduces the biological solids produced by wastewater treatment plants and decreases the costs associated with sludge wasting, stabilization and disposal. Many types of activated sludge treatment facilities can incorporate the process and achieve immediate savings in solids handling, sludge hauling, energy, chemical usage and labor.

- New plants will enjoy significant savings on capital costs and construction costs by eliminating or minimizing solids handling and dewatering facilities, and long-term savings on operational costs by eliminating routine biological solids wasting.

- Existing treatment facilities can frequently be retrofitted using existing digesters or other tankage for the Cannibal® interchange tanks.

How the Cannibal® Process Works

The Cannibal® process is designed to tackle two main components of solids present in the mixed liquor of any conventional activated sludge plant: biological solids and non-readily degradable trash, grit and inerts. The nonbiodegradable material is removed through a series of physical separation steps and the biological solids production is reduced by reconfiguring the biology of the treatment process.

1.

Side-Stream Interchange Bioreactor

Solids that would normally be wasted from a conventional plant would instead be sent to the side-stream interchange bioreactor where the unique conditioning environment of the Cannibal® process is created. Minimal aeration is applied in the interchange tanks and the oxidation reduction potential (ORP) is carefully monitored so that air is only supplied for



Side-Stream Interchange Bioreactor

short periods of time when the ORP becomes too low. In the low ORP environment, aerobic bacteria are conditioned for destruction and biodegradation, making their by-products available for facultative bacteria that can survive in this environment.

A portion of this side-stream tank is interchanged back into the main treatment process where biodegradation is completed and the facultative bacteria are out-

competed by the aerobic bacteria. As the solids are interchanged and cycled between the aerobic and non-aerobic environments of the aeration basin and interchange tanks, solids are destroyed and the effective biological solids yield is significantly reduced. The result is that solids need be purged only periodically from the system at the convenience of the treatment facility.

2. Solids Separation Module

In the Cannibal® process flowsheet, the return activated sludge is sent through a patented solids separation module which contains ultra-fine mesh screens and hydrocyclones for the removal of trash, grit and inert material that would otherwise build up with the elimination of routine wasting. This material, not removed in a typical headworks, commonly makes up 20% to 25% of the mixed liquor solids. The screenings are compressed to 30% to 40% solids and removed from the plant on a routine basis, typically to a landfill.

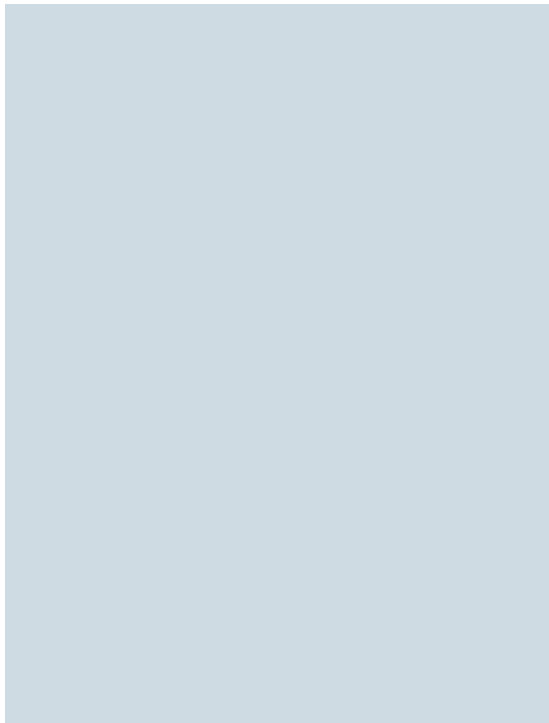
3. SmartCannibal™ Control Systems

The SmartCannibal™ Control Systems provide the operator with easy-to-use tools for the most precise plant control, regardless of varying load conditions. SmartCannibal™ control offers the following features and benefits:

- Absolute minimum power costs are achieved.
- Applies aeration and mixing at the optimum rate and time for solids destruction with ORP and pH probes that monitor the environment in the interchange bioreactor.
- Mass flow rate through the process and MLSS concentrations are monitored by suspended solids and flow sensors.
- Interchange of solids is managed to optimize overall plant performance.

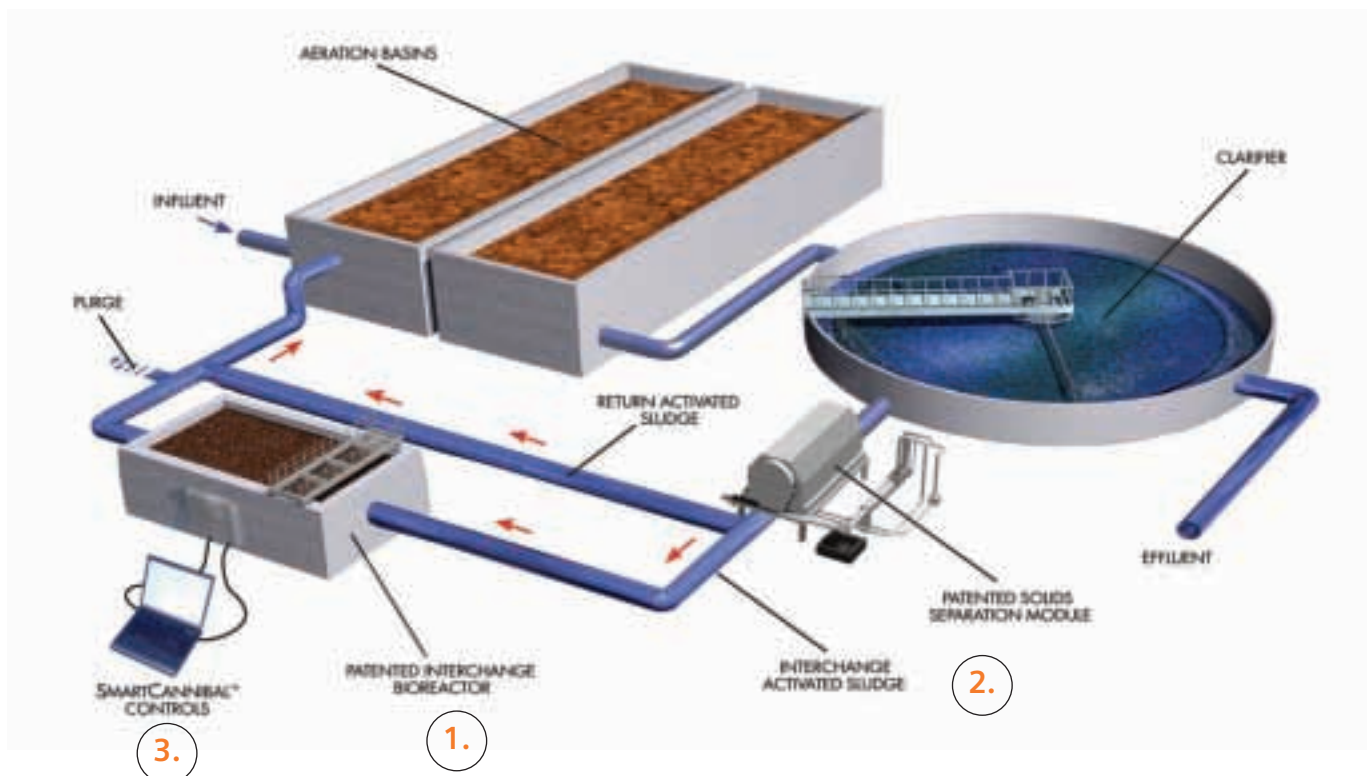


Solids Separation Module



SmartCannibal™ Control Systems

Flow Diagram for the Cannibal® Process



Annual Cannibal® Process Savings-1.5 MGD Facility

	Without Cannibal® Process	With Cannibal® Process
Power for aerobic digester (\$.09/kW-hour)	\$56,660	\$8,950
WAS disposal (\$37/wet ton at 18% TS)	\$86,670	\$9,390
Screenings/inert disposal (\$37/wet ton at 30% TS)	\$0	\$12,390
Polymer for dewatering (\$25/dry ton)	\$10,540	\$1,140
Power for solids separation module (7 Hp total)	\$0	\$2,875
Power for mixers in side-stream tanks (30 Hp total)	\$0	\$1,470
Net operational savings	\$117,655 per year	



Annual biological solids purged from a facility treating 0.25 MGD.

Proven and Unparalleled Results

Since the Cannibal® process was first introduced in 2003, plants ranging in size from 0.75 MGD to 16 MGD have been sold across the United States. Several plants are now in operation and many more facilities will soon be underway. The process is designed for plants that use a variety of treatment technologies as the main biological process, including oxidation ditches, sequencing batch reactors, and conventional diffused air systems.

To learn more about customizing a Cannibal® process for a new or existing facility, contact us for a preliminary design, performance data and a life cycle cost-savings analysis.

Why are so many people choosing the Cannibal® process?

"Our client was able to pay for the Cannibal process out of annual savings."

—Consulting Engineer

"Installing the Cannibal process eliminated 80+ man hours per week for sludge dewatering, which freed up plant staff for other critical activities."

—Plant Operator

"Cannibal is one of the most exciting and needed technologies to enter our industry."

—University Professor

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