

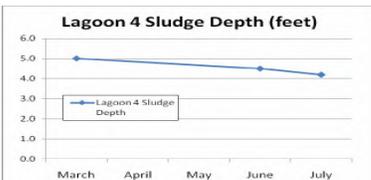
Performance Focus—PF-SR-8-2013

Sludge Reduction Performance Focus: Lagoon Sludge



In-Pipe Technology[®] Company, Inc., is an effective, environmentally-friendly, and fiscally responsible method to reduce accumulated lagoon solids. By reducing accumulated sludge volumes by 40% to 85%, In-Pipe Technology has helped their clients significant savings every year by extending the intervals between dredging events. Additional benefits are seen in improved BNR, a significant reduction of odors and collection system degradation.

This Iowa city has dredged the sludge lagoons at the WWTP every three years. 2011 was slated to be a 'dredging year' for their two wastewater lagoons. In March of 2011 In-Pipe was selected to reduce the accumulated solids enough to forestall the scheduled dredging and save the city a substantial amount of money. In September 2011 following six months of In-Pipe Technology service the treatment plant's operator and city engineer determined that dredging the lagoons would not be required. The result was a net savings to the City of \$170,000. It is significant to note that both lagoons were receiving solids from the wastewater plant throughout the treatment



regimen. In 2006, with the planned dredging of their four wastewater lagoons, this Iowa city was facing a staggering cost. The contract operator, who operated the wastewater facility at the time of treatment, reported approximately 180,000 gallons of digested sludge at 2%-3% solids pumped into the lagoons daily. The starting sludge depth in the lagoon was 7.8ft, which converts to 870,000lbs. The sludge added to the lagoon from the plant operating data was 810,000lbs. After the treatment program, 980,000lbs were converted in the lagoon to decrease the sludge depth by 1.6ft. Converting 980,000lbs of sludge in the lagoon decreased the total sludge by 58%. The results of biological dredging were accomplished with microbes and mixing. Based on those conditions, IPT completed their treatment program in less than 8 weeks achieving greater than a 50% reduction in pounds of lagoon total solids.

The estimated starting total solids in lagoon 4 were 870,000lbs. At project inception, no definable water or rag layer could be determined. Strong odors and heavy bottom solids were present. Limited biological activity was observed.

In-Pipe has additional lagoon success stories in Alaska, Florida, Mississippi, Pennsylvania and Utah for more information please contact us.

Summary at a Glance

Project Location: Iowa #1

Plant Type: Activated Sludge with VLR

Project Installed: March, 2011

Plant Size: 4.0 MGD

Performance Summary:

- 10% Decrease in Total Sludge Produced
- 22% Decrease in Lagoon Digested Sludge

Project Location: Iowa #2

Plant Type: Activated Sludge

Project Installed: March, 2007

Plant Size: 15.0 MGD

Performance Summary:

- An Almost 2 Foot Change in Lagoon Sludge Blanket in 3 Months
- 980,000 lbs Solids Converted in Lagoon

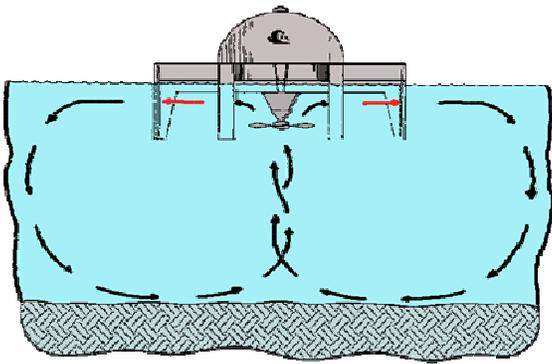
In-Pipe Technology Low Energy Mixer

Lagoons have been used as a part of wastewater treatment processes for decades. The efficacy of treatment depends upon the microbiology of the wastewater and the aerobic and/or the anaerobic conditions in the lagoon. The wastewater treatment is rapid and more effective under aerobic conditions



Low energy mixer

than anaerobic conditions. However, lagoon aeration is a very energy intensive process and represents one of the barriers for rapid treatment of wastewater in a lagoon.



Low energy mixer circulation pattern

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Service Offering

In-Pipe provides engineered wastewater treatment services to municipalities and industries worldwide. In-Pipe engineers a solution for each customer based on a full system review and includes turnkey installation, service and maintenance.



Unmatched Expertise

- Process Engineering
- Wastewater Treatment Plant Design Optimization
- Microbiology Laboratory
- Project Management
- Control Systems (SCADA) Programming and Remote Monitoring
- Microbial Production

Proven Improvements

- Reduce Influent Loading
 - TSS 30%
 - BOD 50%
 - Ammonia 50%
- Total Nitrogen 30%
- Reduce Sludge Disposal 50%
- Reduce Energy Consumption 30% to 60% (KwH)
- Control H₂S Odor & Corrosion
- Control Fats, Oils, & Grease (FOG)
- Increase Plant Capacity



Because Efficiency Counts

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