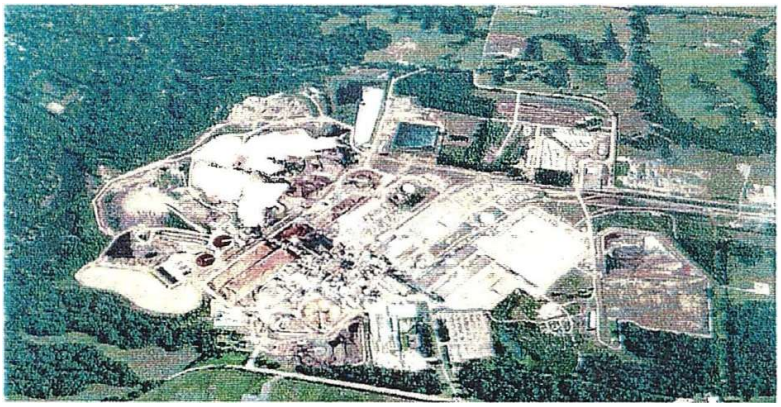
JUST YESTERDAYS GOVERNOR'S ENVIRONMENTAL LEADERSHIP AWARD APPLICATION POLLUTION PREVENTION CATEGORY

Biological Reduction of Wastewater Treatment Lagoon Solids
This report sanitized at the clients request

PROJECT DESCRIPTION

This Corporation operates a 50-acre Secondary Wastewater Treatment Lagoon at the Up The Street Operations pulp and paper mill near Your house, USA. This aerated stabilization basin biologically treats about 38 million gallons of mill wastewater a day. Biological waste accumulates in the bottom of the lagoon in the form of sludge. This sludge can reduce the water column thickness and reduce treatment efficiency. Traditionally, the pulp and paper industry has mechanically dredged and treated this sludge with solidification agents to maintain design capacities. This method is labor intensive, costly and produces a residual solid waste that must be handled appropriately. It also places additional solids into suspension that may discharge into receiving waters.



This Corporation teamed with a firm from Yeehaw, Texas. Yeehaw Services, to test an alternate sludge reduction method. This method involves the addition of a liquid material, a bio-stimulant that stimulates the metabolism of the resident biomass to increase aerobic, anaerobic and facultative processes. The benefits of this stimulation may include reduced

BOD, reduced suspended solids, odor reduction, and reduction of the sludge blanket. Our wastewater treatment performance has historically reduced discharge monitoring parameter concentrations to about half of our permit limits, therefore our primary benefit from the project is sludge reduction and much improved cash flow. The sludge is eliminated "in-situ", where it is located.

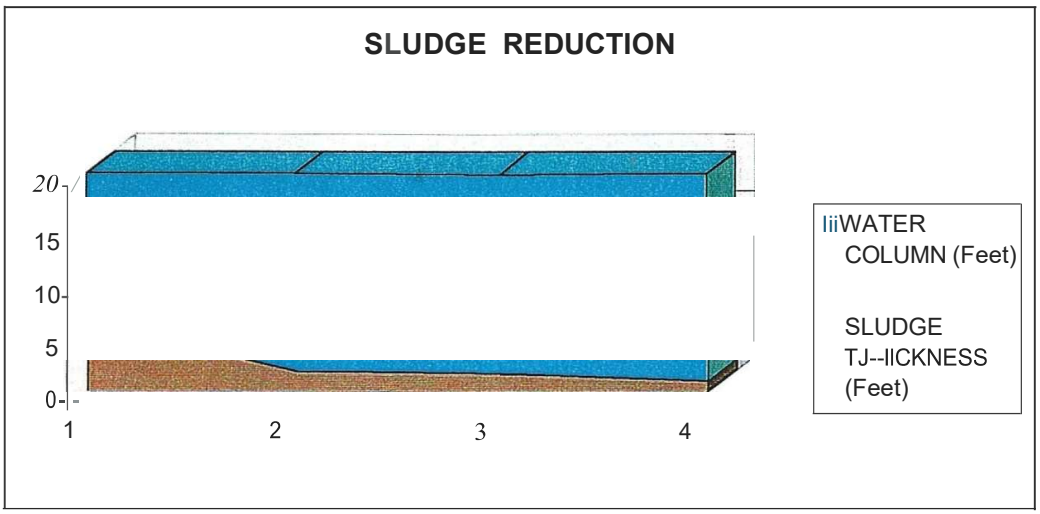
This bio-stimulant is an alkaloid extracted from selected plants. It allows resident microbes to penetrate the cellular tissue of organic waste much more quickly. Typical results decrease sludge volumes 30 to 70 percent. This bio-stimulant is recognized as an "Innovative Technology" by the States Natural Resource Conservation Commission Innovative Technology Board. The product is non-toxic, non-flammable, biodegradable, non-irritating to the skin, and non-corrosive. The material can be applied manually or by a simple metering device.

Our project consisted of a 90-day trial between early September and early December 1998. Before adding the bio-stimulant, the Corporation and Yeehaw Inc. measured sludge thickness and water depth near the end of the wastewater treatment lagoon where the sludge blanket accumulates the fastest. We also compiled historical treatment parameter concentrations for later comparison to trial data. An initial "shock dose" of bio-stimulant sprayed throughout the lagoon on the first day of the trial stimulated biological activity. A dosing pump continuously injected the material from containers into the lagoon near the inlet during the 90-day trial period. Monthly sludge thickness measurements were obtained at strategic locations throughout the project. The mill collected a sample of the remaining sludge at the conclusion of the trial for analysis of percent organic to evaluate the potential reduction of the organic portion of our sludge blanket.

ENVIRONMENTAL IMPROVEMENT

The primary environmental improvement goal for this bio-stimulation project was to reduce the thickness of the sludge blanket in the wastewater treatment lagoon. Reducing the sludge blanket thickness increases the water column thickness, where biological activity reduces wastewater parameter concentrations, thus improving the quality of the

receiving stream. Significant reductions of sludge blanket thickness were measured at each location after the first JO days as shown on the graph below. The project realized its goal of reducing the sludge blanket thickness by 70 percent after the first 30 days of the project. Sludge reduction continued during the remainder of the 90-day trial, and would have continued to decrease if the project had continued beyond the trial period. Laboratory measurement of the organic content of the remaining sludge indicates that nearly all of the remaining solids are inorganic meaning that virtually the entire organic portion of the sludge had been consumed. The sludge blanket was zero to four feet thick after completion of the project, which means that the lagoon could operate with 80% or more of its design depth. This result meets our sludge removal goal without producing secondary treatment material.



EXCEEDING REGULATORY REQUIRMENTS

The Corporations wastewater treatment system has operated for over seven years without exceeding a discharge monitoring report (DMR) limit established in our NPDES permit. DMR parameter concentrations are typically 40-60 percent lower than the permit limits. However, they continue to drive down our discharge concentrations as an ongoing effortto be better stewards of our environment. Based on the 1998 bio-stimulation report, the wastewater treatment lagoon TSS removal efficiency increased from 27% to 65% - **almost two and a half times more efficient!** A significant improvement in BOD removal

efficiency was also documented. The biological stimulation project will help us in meeting our good stewardship goals in a cost effective and safe manner by improving TSS removal efficiency.

REDUCTION OF ENVIRONMENTAL RISK

The Corporation views the biological stimulation for sludge reduction project as a cost effective alternative to mechanical dredging that significantly reduces waste treatment and disposal liabilities in a safe and environmentally sound manner. Elimination of the solidified lagoon sludge as a potential solid waste that may need to be landfilled will reduce our environmental liability significantly. The additional benefit of improved wastewater treatment efficiency will also reduce our environmental risk by improving our discharge quality and improving the quality of the receiving stream, the Mark Twain River.

WASTE MANAGEMENT STRATEGY

Georgia-Pacific shares a vision with environmental leaders in Louisiana that an effective waste management strategy focuses on source **reduction** as the primary method of improving our environment. Other options in decreasing order of preferred use are recycling, treatment, and disposal. The biological stimulation project precisely meets this strategy in that it eliminates an entire treated solid waste from our disposal management profile. Wastewater treatment lagoon sludge will no longer require mechanical dredging, will not require solidification, and it will not require secondary handling.

INNOVATION

The TNRCC Innovative Technology Board designated this biological enhancement method as an Innovative Technology due to its natural origins and it's effectiveness. While mechanical dredging is the tried-and-true method for pulp and paper mill biological treatment lagoon sludge removal, The Corporation has found the biological method to be a cost effective, environmentally sound innovative alternative.