

Performance and Results:

Since installation of the Restorers, the production of sludge from the complete treatment system has decreased by approximately 20%. This reduction is attributed solely to the reduction in sludge produced in the wastewater lagoons and translates to a savings of over \$55,000/year in reduced sludge disposal costs.

The estimated total savings in energy under current operations as compared to previous operations are approximately 3,500 kWh/day (a reduction of 60%) which equates to an annual savings of approximately \$71,000.

The lagoon system, treating ~1- MGD, has been successful at nitrification and removal of organic matter. The effluent from the Restorer Lagoon has an average ammonia level of 0.8 mg/l and TSS of 4.3 mg/l. The performance of the entire system, of which Restorers are a component, is given in the table to the right.



	Influent	Effluent	Target Effluent	Reduction
TSS	80	4.3	26.5	95%
Ammonia	15	0.8	1.2	94%
Nitrate	1.3	9.8	10.0	35%***
COD	490	22	-	95%
Total Phosphorus	10.9	0.5	0.5	96%
BOD derived* summer	418	16	7.5	96%
BOD derived* winter	275	21	23.0	92%
BOD actual**	267	12		95%

All mean data excludes outliers greater than 2 standard deviations from mean.

*Based on estimated BOD:COD ratio at influent and effluent.

Only COD data was monitored weekly N = 60 (influent), 92 (effluent) over 12 months

**BOD actual represents mean data analyzed as BOD, N = 13 over 4 months

***Percent denitrification of total nitrogen load to the system (including ammonia)



Tyson Foods Inc. has successfully retrofitted an existing lagoon with a highly efficient biological treatment system while continuing to use traditional treatment technologies in other parts of their system. The Berlin system emphasizes the compatibility of Restorer technology with conventional technologies including dissolved air flotation, anoxic denitrification reactors, and chemical phosphorus removal. For similar upgrades and retrofits in the future, we would also recommend, where appropriate, the installation of a cost-effective constructed wetland following the Restorer Lagoon instead of a clarifier. This would allow for improved reduction in BOD and suspended solids, which primarily leave the lagoon in the form of algal biomass. Denitrification of nitrate-nitrogen will also be enhanced and sludge disposal, with its associated costs, further reduced.



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