

PULP AND PAPER MILL, NEW YORK STATE

Case study showing approximately 50% sludge reduction; DO increase in hot weather, Elimination of noxious odors; Savings in chemical usage and Lowering of Effluent TSS

This Pulp & Paper Mill is a high yield sulfite mill generating 200 tons/day paper production, discharging 1.5 MGD of high BOD pulp waste (35,000 lbs/day BOD) to a 50 MG ASB, plus 2.5 MGD of lower paper waste (10,000 lbs/day BOD) to a 20 MG ASB. Discharge from the 50 MG basin flows into the 20 MG basin with final discharge from the 20 MG ASB after a quiescent zone designed to settle solids.

The 50 MG ASB has coarse and fine bubble diffused aeration and the 20 MG ASB has fine bubble diffused aeration. There was 6-8' of sludge below diffusers in the 50 MG ASB and in the quiescent zone of the 20 MG ASB when treatment began. Continuous withdrawal of sludge from the end of the 20 MG basin is routed to a 20 MG sludge holding basin (functioning as a sludge digester) with overflow back to the 50 MG ASB. Sludge is also wasted to a filter press from the 20 MG ASB quiescent zone.

Pre-Treatment Conditions

1. Low DO in both ASB's and high H₂S readings at mill boundary, leading to numerous odor complaints.
2. New York State Department of Environmental Conservation beginning to fine mill \$1,000 to \$3,000/day for odor violations and discharge permit violations.
3. Poor settling of solids in quiescent/settling portion of the 20 MG ASB, leading to high effluent TSS. High percentage of biomass consisted of filamentous bacteria.
4. High solids levels in both ASB's.
5. Liner in 20 MG ASB beginning to form large bubbles, further disturbing sludge blanket, increasing odors and effluent TSS and reducing treatment efficiency and capacity.
6. The mill discharge stream created a visible plume in the river.
7. Lower levels of the settled sludge were black and anaerobic.

BYO-GON PX-109® Treatment Program

Treatment began with applying a shock dosage of **BYO-GON PX-109®** into the surface waters of the 20 MG ASB, at the overflow from the 50 MG ASB. A daily maintenance dosage of the product was added into the influent of the 20 MG ASB on Day 2. Once positive impacts were seen in the 20 MG ASB, the 50 MG ASB was treated by directly injecting **BYO-GON PX-109®** into the sludge blanket of the 50 MG ASB followed by an elevated dosage of product to impact odor and sludge generation.

Changes Noted Since Program Began on 5/18

1. The bubble in the 20 MG ASB continues to impact stability of system and capacity of the ASB.
2. Since early July, odor complaints have been sporadic and very infrequent, leading one NYSDEC official to remark that the odor problem is much better than it was.

3. Effluent TSS is reduced from 278 ppm to 85 ppm (84% reduction) on a consistent basis. The quiescent zone of the final ASB has developed a stable clear layer of final filtrate extending to nearly 75% of its depth.
4. The receiving stream now has a clear flow with no solids visible.
5. The plant no longer uses polymer to attempt to settle solids.
6. A filamentous bloom that began prior to treatment is now gone, without using chemicals for control. Overall bacterial activity has increased as seen under the microscope.
7. Supplemental sludge removal in the settling area has stopped because the existing sludge withdrawal system has the capacity to effectively remove any settled sludge solids. It appears that sludge production has significantly been reduced since treatment began.
8. Sludge depths in both ASB's has reduced from 6-8 feet to approximately 3-4 feet in depth.
9. Core samples of sludge:
 - prior to treatment, sludge had a uniform black septic color in bottom layers.
 - several weeks after applying shock dosage, sludge showed isolated areas of black sludge surrounded by a lighter brown, younger appearing sludge. Sludge now is a uniform lighter brown, younger color throughout.
10. Plant is now in full permit compliance and odor complaints are very infrequent, even during the hottest summer months that have historically been the most problematic period.
11. Dissolved oxygen levels have increased in both ASB's, even without additional aeration. Increases seen during this summers hottest months have never been observed in the past.

Data Analysis (May 1998 - September 1998)

	30 min settling	Final TSS mg/l	Final TSS #/day	Final BOD mg/l	Final BOD #/day	H2S at fenceline
Pre-BYO-GON	980	27%	20,169	271	7739	1.8 ppm
After BYO-GON	180	85%	2,713	135	4393	0.01 ppm
% Difference	-82%	-84%	-87%	-50%	-43%	-099% +