

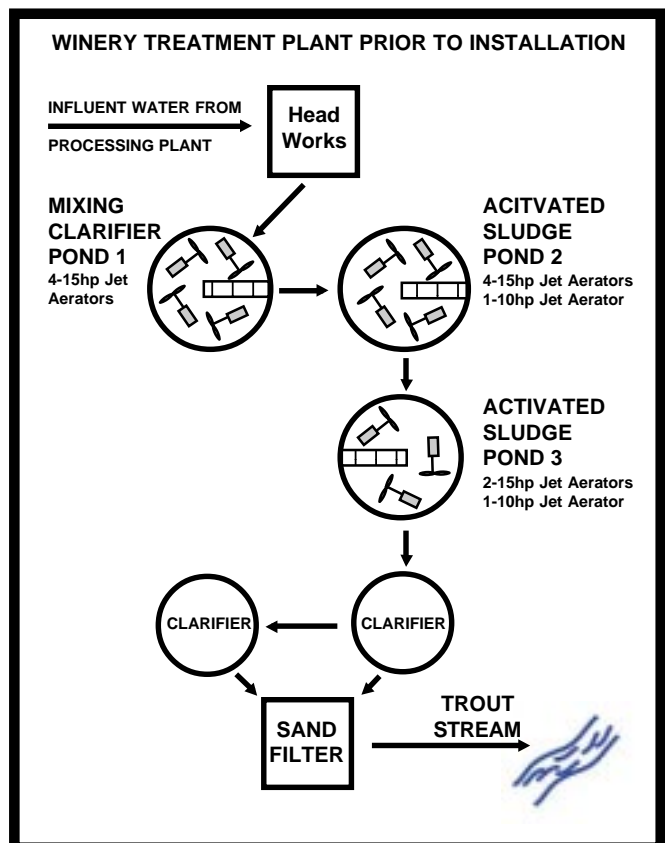
Winery Application, High Strength Waste, 30% to 40% Reduction of Electricity, Quick Recovery of Mature Bio-Film with Q-Pac, Continues Flocking in Equalization basin
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The patented Bio-Boost™ (TVT-Bio 32) System from TVT US Corp with Q-Pack from Lantec has operated successfully at a Winery in Upstate New York since November and is achieving positive results in their wastewater treatment system. The winery is located in a rural Upstate New York Community and utilizes its own on-site wastewater treatment system to treat its processing wastewaters with discharge to the high quality trout streams common to the Finger Lakes area. The operator has frequently experienced difficulties balancing the microbiology of the treatment system and welcomed the opportunity to install and operate on a pilot basis the TVT-Bio 32 System.



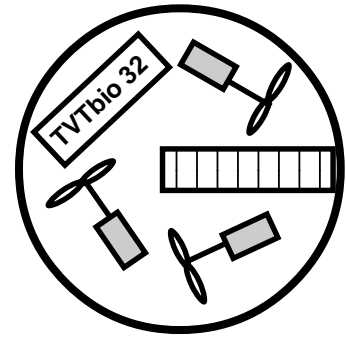
The Winery Wastewater Treatment Plant consists of a series of concrete lined circular ponds. A Head works followed by the equalization/mixing pond, followed by two long- retention, activated sludge ponds, followed by two clarifiers, and finally a sand filter. The daily inflow is 32,000 GPD with peak loads at crushing time up to 90,000 GPD. Pond 1, the equalization/mixing pond has a diameter of 72', pond 2, the first activated sludge pond has also a diameter of 72', and pond 3, also activated sludge, has a diameter of 90'. The activated sludge empties into both clarifiers and from there is passed through the sand filter to be finally discharged into a trout stream.

The winery operations management, in conjunction with TVT personnel, met with the State Regulatory Agency Engineer, who recommended that the TVT-Bio 32 System be installed in the equalization/mixing basin (pond 1). The TVT system operated with measurable electrical cost savings and improvement in treatment performance to stabilize the microbiology for over a period of ten months.



Equalization/Mixing basin Retrofit with BIO-Boost

Within the equalization basin (pond 1) are four 15hp aspirating aerators configured to promote mixing and oxygenation in the basin. During the pilot program one 15hp aspirating aerator has been removed and replaced with the TVT-Bio 32 System using a total of 11hp of energy (including blower system and aspirating aerator with a variable frequency drive). The TVT Bio 32 System is packed with 500 cubic feet of the Lantec Q-Pac media, which is essential to provide the base for the bio-film development and regeneration of mature microbial diversity.



The Waste Water Plant Operator observed that in spite of inflow changes (32,000 GPD - 90,000 GPD), production fluctuations, hydraulic surges, spills, temperature inversions etc., the TVT System was able to successfully treat the diversity of inflow and recover from changes in BOD within a couple of days instead of four to ten days. The microbes within the TVT-BIO 32 continued to mature and perform properly, becoming more diverse resulting in Ideal Flock. The microbiological diversity has expanded to include even higher life forms such as nematodes,

previously not observed. The TVT-Bio 32 system performed well in dealing with the diversity of inflow providing stable, more consistent winery waste effluent, which the operator had not been able to achieve beforehand without the TVT-Bio 32 System, thereby enabling him to perform additional cost savings operations.

Increased Microbial Bio Diversity

The TVT System continually receives flow through as a result of the aspirating aerator forcing winery waste through Q-Pac media. The velocity within the enclosure causes intermittent slough off of mature bio-film from the media, allowing renewal of the bio-film on a regular basis creating continuous flocking in the mixing/equalization basin. The oxygenated, sloughed off (bio-film) microbes pass through the equalization basin to succeeding activated sludge treatment ponds to provide higher life forms and stable microbiology for the entire activated sludge treatment plant.

Quick Microbiological Recovery

A production shut down of ten days occurs in December between the holidays. At production start up in January (winter conditions) new application specific bacterial cultures are inserted into the mixing basin, to build up to mature microbial diversity required for treatment in the activated sludge basins. Previously the microbiology required ten days to mature to become fully effective again. Viewing through the microscope the operator located live microbiology and mature nematodes in spite of the 10-day shut down. With the TVT-Bio 32 System in the equalization basin, that delay did not occur, the time of effective treatment was re-established within three days.



Continues regeneration of highly diverse microbes (bio-film) and sloughing off of mature bio-film (microbes) from within the TVT System is reseeding mature microbiology into the equalization basin. The unexpected result in the equalization basin became noticeable as increased treatment, and the generation of microbiology resulted in highly visible flocking and residual oxygenation.

59hp-69hp Combined Total HP Reduction during Summer Operations with Waste Water Temperatures at 90F

4hp Reduction, Pond 1

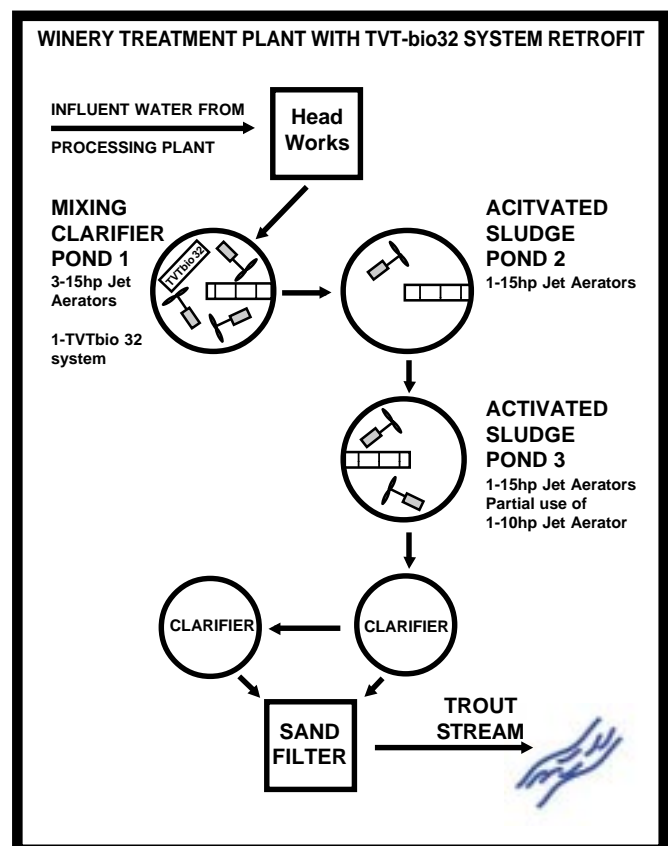
Pond 1, the mixing/equalization basin has (4) four 15 hp jet aerators, totaling 60hp. The insertion of the TVT System replacing one 15hp jet aerator saved in Pond 1, 4hp.

40hp Reduction, Pond 2

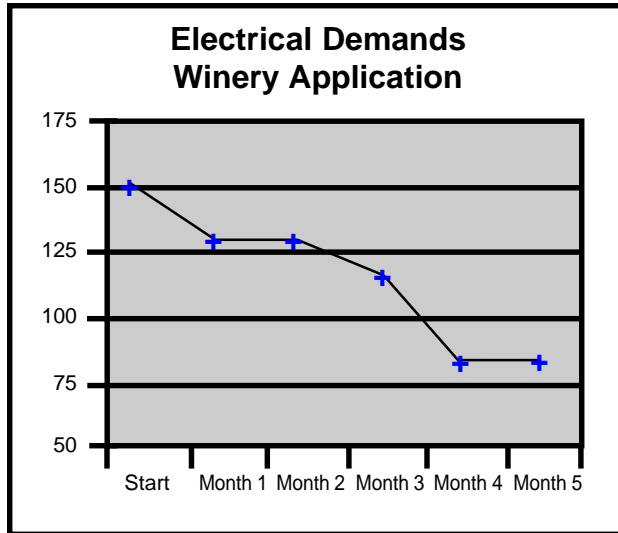
Pond 2, has three 15hp jet aerators and one 10hp aerator, totaling 55hp. As a result from the already pretreated, oxygenated, flocculated wastewater from the mixing/equalization basin, the operator was able to shut down (3) jet aerators during summer operations with wastewater temperatures at 90 F saving in Pond 2, 40hp.

15hp – 25hp Reduction, Pond 3

Pond 3, the second activated sludge basin has (2) two 15hp jet aerators and (1) one 10hp jet aerator totaling 40hp. The pretreated activated sludge from the mixing basin (pond 1) and the preceding activated sludge (Pond 2) enabled the operator to shut down 1 (one), mostly 2 (two) of the jet aerators in Pond 3, saving 15hp-25hp.



Electrical Power Reduction in Activated Sludge Treatment Plant

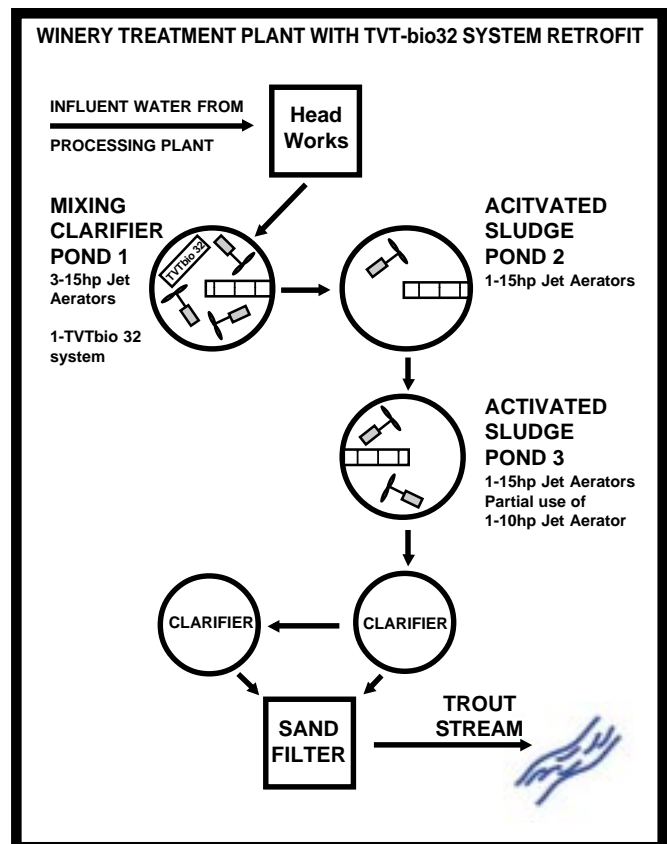


The winery waste water (activated sludge) from the mixing/equalization basin has the high population of mature microbes, residual oxygen, and floc generated by the TVT System. This enables the operator to shut down four (4) and mostly five (5) jet aerators in the activated sludge treatment plant, thusly achieving considerable electrical cost savings as indicated in the graph.

30 to 40 % Electrical Cost Savings

Paul Russell P.E., from JR Engineering reviewed the electrical consumption data of the wastewater treatment plant from the previous year totaling 150hp. The TVT-BIO-system is able to decrease power consumption between 30%- 40 % in this particular waste water treatment plant within one year.

Previously total treatment plant consumption was 150hp. When the TVT-Bio System was installed in November the resulting power consumption was reduced and fluctuated down to 130hp within two months. During the following eight months, throughout the summer, power consumption fluctuated down below 90hp to sometimes as low as 86hp.



Summary of TVT-Bio 32 Systems Benefits at Winery Application

- ❑ Hydraulic surges and increased BOD loads are buffered by the TVT system. The existing application specific bacteria continue effective treatment.
 - ❑ Quick recovery to normal levels of BOD, which previously have taken four to ten days, take two/three days now.
 - ❑ Increased biological diversity and maintenance of higher levels of residual bacterial cultures also have been observed, as well as residual dissolved Oxygen.
 - ❑ Limited flocking has previously occurred and with the use of Q-Pac within the TVT-Bio System has increased to a more developed and constantly flocculated structure in the mixing/equalization basin.
- Electrical cost savings; 30% - 40%
 - Flocking
 - No foaming
 - Odor elimination and sludge reduction
 - Highly increased treatment of activated sludge

