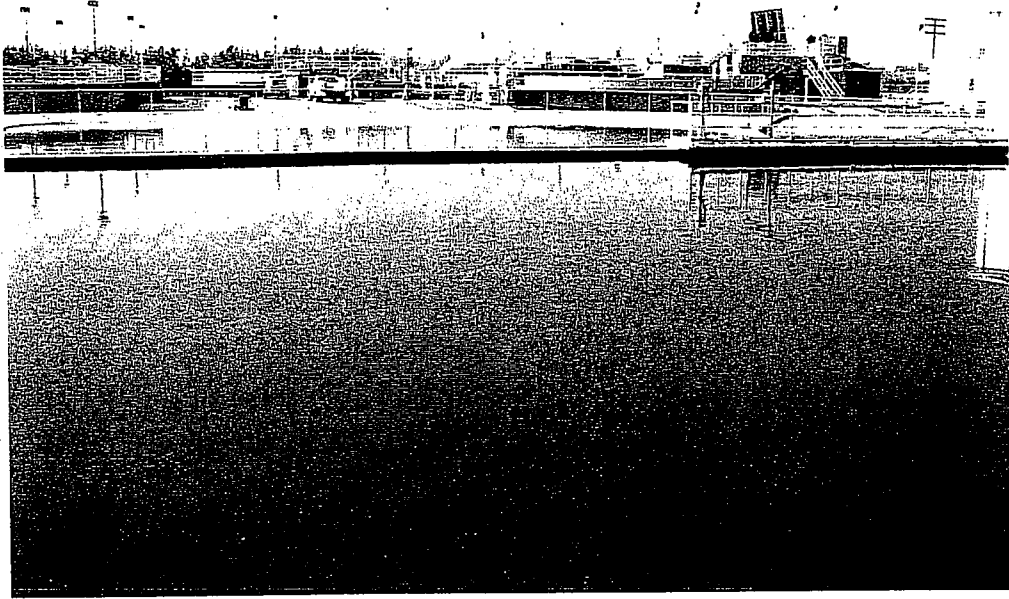


Aerobic Digester Optimization – How To Do More For Less



Program Description

The motivating forces for improving biosolids treatment and disposal are regulatory compliance, cost reduction or insufficient capacity. To help environmental managers meet these needs, Ennix spent years perfecting its **Digester Optimization Program for Energy Management and Biosolids Reduction**. Targeted at WWTP's with aerobic digesters, this energy conservation and sludge management service is **guaranteed** to lower energy, dewatering and disposal costs while significantly reducing volatile solids and pathogens to aid in meeting Part 503 regulations. It is **funded entirely from customer operating expense savings** without any capital outlay or up front fees. **Seven years** of documented field history in a broad spectrum of sludge processing and handling configurations prove the program's ability to significantly reduce biosolids production, aeration requirements and polymer usage while providing odor control, manpower optimization and increased biosolids processing capacity without additional capital investment.

Features and Benefits

There are powerful **benefits** to a WWTP when they incorporate the ENNIX digester optimization program, including: 1) lower energy cost; 2) reduced disposal cost; 3) lower dewatering chemical cost; 4) increased plant solids handling capacity; 5) reduced maintenance; 6) alkalinity and pH control; 7) assured compliance; 8) greater reliability; and 9) the absence of noxious odors and citizen complaints.

The program is easy to implement and operate due to the following **features**: 1) turnkey service program; 2) funded from the existing budget; 3) no capital expenditures; 4) controls out-year expenses 5) no upfront fees and 6) no risk due to performance guaranteed.

The Service

Ennix service technicians are on site to implement the program and train operators in operating protocol and program monitoring. Regular service calls are scheduled to continue operator training, monitor results, enhance performance and make any necessary adjustments caused by plant operational changes, system loading or weather events. Periodic written reports are provided that evaluate performance results.

Performance Warranty

The program is **performance warranted** so that service fee payments are made only after performance parameters related to odor, compliance or operational criteria are met and the client has realized specified minimum savings from reduced sludge processing, handling and disposal costs.

Biotechnology Description

The Ennix Digester Optimization Program introduces a custom blend of growth enhancing proteins, minerals, organic acids and target enzymes as well as substrate-specific aerobic and facultative anaerobes into a digester cell. A balanced microbiology is established and maintained that allows the digester to be operated under facultative/anoxic conditions similar to those that occur in a natural pond. Mechanical aeration, other than that used for occasional mixing, is no longer required. A study of digester reaction mechanisms reveals that each bacterial species is restricted to the metabolism of select compounds. The degradation products of one metabolic reaction become the food supply required of the next. These cascade reaction mechanisms

Anaerobic
digestion

determine the overall rate of digestion. The Ennix approach is to identify the slowest reactions, or "weakest links", and through nutritional supplements, bio-stimulants and bacterial augmentation and substitution, increase bacterial populations and species diversity. Proprietary catalytic activators are also used to open metabolic pathways for this newly balanced micro-life thereby providing faster and more complete solids digestion while maintaining positive levels of dissolved oxygen in the digester cell.

By optimizing and diversifying the biomass or "digestive labor force" in the digester, volatile solids are reduced to a greater degree than what can be achieved in a conventionally operated aerobic digester. The lower organic fraction or content in the solids improves settling and dewatering. Bacteria are also excellent floc formers and produce natural biopolymers. With the enhanced microbiology, the digester will experience superior settleability, increased supernatant production and reduced demand for polymer or coagulants. Sludge bulking and foaming are also eliminated.

Since the digester is no longer aerated and is experiencing superior settleability, supernatant is available for decant which increases Sludge Retention Time (SRT) and leads to even greater Volatile Solids (VS) and Total Solids (TS) reduction.

The ability to control odors and reduce pathogens through the Ennix process is largely due to two aspects. The first factor is the program's documented ability to establish and maintain positive levels of dissolved oxygen (DO) throughout a digester. Positive DO prevents septic conditions and the proliferation of odor causing sulfate reducing bacteria (SRB) and pathogens which prosper in oxygen deprived conditions. The second factor is the ability of the highly active "first generation" bacteria in the Ennix formulas to "competitively exclude" SRB and pathogens. This is partially due to the enhanced metabolic degradation potential of the newly established biomass to out-compete the pathogens and sulfide-generators for food and nutrients. Without adequate food supply, the SRB and pathogens fail to multiply and are replaced in the biomass by the bio-augmented organisms. The capability of the balanced and synergistic microbes to reproduce more rapidly than obligate anaerobes also aids the "competitive exclusion" process. Finally, the microbes used in the Ennix formulas produce compounds with antibiotic action (e.g. bacitracin produced by bacillus subtilis) which directly reduce the population of competing odor producing and pathogenic organisms.

Ennix Digester Optimization Program FAQ's

Q. Without aeration won't we experience odors?

A. Any odor, if present, will be of a low threshold, fresh earthy nature, which indicates good digestion. Plants that had odors off the digester now experience odor control.

Q. What is the Ennix "Performance Guarantee"? *If there are unsatisfactory odors or the promised electrical and biosolids savings are not achieved, you don't pay.*

Q. What happens if we have a critical situation?

A. Just turn your aeration on and you are back on line as you were. However, don't expect failure. The Ennix process has been working in WWTP's digesters since 1997.

Q. What capital expense will this process incur?

A. None, other than the need for a small supernatant transfer pump if you don't have multi level decant ports or some other flexible method of decanting.

Q. How will this affect my de-watering process (belt press, drying beds, thickener, centrifuge, etc.)?

A. You will achieve the same or better results as you do with your present dewatering method. Most customers experience better dewatering with less polymer use.

Q. How much time will this require of our plant operators?

A. Actually, very little. The product is usually added twice a week and, as the digestion rate in the digester increases, your operators will spend less time moving sludge and less time dewatering. Otherwise your normal routines will be unchanged.

Q. Will this process impact compliance with Part 503 Regulations?

A. Every Ennix customer using this process reports higher %VS reductions and, if measured, significantly lower pathogens counts..

Q. How will we know that it is working?

A. The 1st thing you will notice is that it controls odors and that, without aeration, there is positive D.O. in the digester.

The 2nd thing is that when you start doing the VS reduction calculation, you will notice a steady increase in percent reductions until the maximum point is reached. The process will improve your ability to meet Part 503 Regulations.

The 3rd thing is you will notice that the pH will be stabilized around neutral and your alkalinity will raise and stabilize.

Q. Will we ever turn the air back on?

A. Yes, but only once every 4 to 6 months for 15 minutes to stir up any old grit and solids that may have accumulated in the corners or on the bottom so that they can be removed and dewatered for disposal.