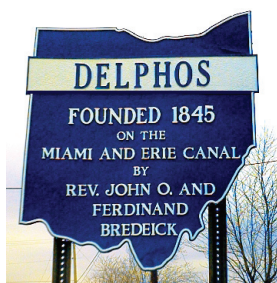


MBR Coupled with 2nd Generation ATAD Provides Exceptional Quality Effluent and Biosolids

Delphos, OH – ThermAer™ easily maintains thermophilic temperatures even under the low MBR volatile solids loading conditions producing Class A biosolids.

Delphos, Ohio, is located at the intersection of Lincoln Highway, the country's first coast-to-coast highway, and the historic Miami-Erie Canal. Prior to 2006, Delphos



utilized aerobic digestion to treat their biosolids. The resulting Class B biosolids were liquid land applied. Annual hauling and application costs were between \$200,000 and \$300,000. The greenfield WWTP improvement project

enabled Delphos to treat its high organic influent and upgrade from a Class B liquid biosolids to a Class A dewatered biosolid material. Delphos retained the services of Floyd Browne Group and CT Consultants, regional engineering firms, to aid in the selection of process equipment and the design of this award winning facility. A comprehensive investigation of various technologies and process equipment, including lime stabilization, drying and standard aerobic digestion led Delphos to select the Thermal Process Systems' ThermAer to provide them Class A biosolids and substantial volume reductions.

Upstream of the ThermAer, Delphos utilizes a membrane bioreactor (MBR) for wet-stream biological treatment. The MBR is an activated sludge process that allows for secondary treatment, clarification, and filtration typically installed in conventional activated sludge facilities. Solids (WAS) from the MBR are taken across a gravity belt

thickener to remove excess water and increase the solids to approximately 4 - 6% TS. These thickened solids are pumped to one of the two ThermAer reactors at the facility. Microbial activity of the thermophilic bacteria maintains an internal temperature of around 145°F; no supplemental heating is required. An isolation time, based on the operating temperature, ensures the required pathogen kill and VS destruction to meet USEPA 503 regulations for Class A biosolids.



Out-of-basin pumps complete with VFDs allow for variations of mixing intensity.

Jet aeration and positive displacement blowers provide mixing and oxygen to the reactor. Monitoring of the oxidation reduction potential (ORP) controls the mixing intensity and air supply to match real time conditions as dictated by the oxygen demand. Following feed events, oxygen supply is increased to counteract the deficit created in order to reduce the mass and minimize the formation of mercaptans and other reduced sulfur compounds.

ThermAer™ Applications Report

Delphos, OH



Blowers provide the oxygen required by the system as indicated by the ORP.

Nitrification and denitrification are inhibited at the higher ThermAer temperatures. Therefore, a heat exchanger reduces the temperature to around 95°F during the transfer from the ThermAer reactors to the storage nitrification/denitrification reactor (SNDR™). An optimal environment is created to facilitate these microbial reactions. The aeration is controlled by adjusting the pH setpoints (typically in the range of 6.5 to 6.8) to remove ammonia from the filtrate and produce a final biosolid material that is very stable and easily dewatered at a reasonable cost. Furthermore, up to an additional 10% total solids reduction can be realized with the SNDR operation. Lower temperatures and pH combined with the reduced concentration of ammonia results in lower chemical consumption and therefore reduced costs associated with the dewatering process. Combination gravity belt thickener/belt press units dewater the biosolids to a final concentration of approximately 25% TS. Local farmers haul and apply the biosolids to crop fields. Additionally, a small amount of the biosolids is retained at the WWTP for use by residents of the community.

The city council was adamant the new WWTP be odor free. As such, a BioflitAer™ odor control unit was selected to treat the off-gas from the ThermAers and SNDR solids digestion process.



“The City of Delphos wastewater treatment facility staff is thoroughly pleased with the TPS ThermAer™ ATAD system. The city has realized many benefits such as approximately 50% reduction in total solids across the system, no associated odors, total ease of operation, reduced costs and a beautiful, exceptional quality biosolids end product. In addition, the process support provided by TPS since the 2006 start-up has been first rate.”

*Kim Riddell, Wastewater Superintendent
Delphos Wastewater Treatment Plant*

The ThermAer system installed at Delphos offers the following:

- Class A Biosolids
- 2008 Average Total Solids Reduction = 49%
- 2008 Average Volatile Solids Reduction = 67%
- Final cake – 25% solids
- **Reduction of hauling/land application fees resulting in savings of up to \$200,000 a year**

Class A Biosolids, on average, consist of:

- Ammonia as N – 5,900 mg/kg
- Phosphorus – 40,600 mg/kg
- Total N – 39,800 mg/kg



Thermal Process Systems

627 E. 110th Ave.
Crown Point, IN 46307 USA

Phone: (219) 663-1034
Fax: (219) 663-7248

E-Mail: engineering@thermalprocess.com
www.thermalprocess.com