THERMAL PROCESS SYSTEMS

ThermAer™ Applications Report

Pacifica, CA

THERMAER

California's First Installation of 2nd Generation ATAD

Pacifica, CA - A retrofit with ThermAer provides scenic coastal community with Class A biosolids and odor-free operation.

Calera Creek Water Recycling Plant, located in Pacifica, California, recently retrofitted to the Thermal Process Systems' ThermAer™. This is California's first installation of the second generation ATAD system.

Wetlands condition plant effluent prior to discharge into the Pacific. These wetlands have provided a habitat for an endangered species of frogs, now flourishing.

The state of California is sensitive to environmental impact and has some of the highest energy costs in the country. These criteria require communities to be responsible with their selection of wastewater treatment equipment. In addition, regulations regarding effluent discharge and land application hold wastewater treatment plants to the highest standards. Liquid effluent is ultimately returned to the Pacific Ocean while land application favors Class A biosolids. In addition, residents living along the scenic Pacific coastline demand an odor-free plant operation.

In September, 2000, a first generation ATAD was installed. Although an effective digester, this system provided oxygen levels below those required by the organisms. As a result, mercaptans and other odor-causing compounds were produced; a situation unacceptable to the residents of Pacifica.

The city contacted Thermal Process Systems to upgrade their digester to the ThermAer Process; a second generation ATAD. ThermAer uses constant observation of the Oxidation Reduction Potential (ORP) and matches the oxygen supply with the real time oxygen demand. Higher oxygen levels are required after a feed event to provide superior mass reduction and minimize the formation of mercaptans and other sulfur compounds. Jet aeration provides mixing and control of the oxygen feed to the reactor.

> *"There is not a single process in this plant that the ATAD has not affected in a positive way. The results are positive...odors in the process areas are greatly reduced and the quality of the [biosolids] is greatly improved."*
>
> *Dave Gromm*
> *Director of Waterwater Collection and Plant Operations*
> *Calera Creek Water Recycling Plant*

Upstream of the ThermAer, Pacifica employs a sequencing batch reactor (SBR). This SBR allows for shock loading and gives the system a high tolerance for peak flows. Solids from the SBR are thickened to approximately 4.25% prior to the ThermAer.

Microbial activity of the thermophilic bacteria maintains an internal temperature of around 155°F within Digesters 1 & 2. No supplemental heating is required. Time, temperature and isolation assure proper pathogen kill and VS destruction to meet EPA 503 regulations for Class A biosolids.

Retrofit to ThermAer required little changes to the existing infrastructure on site.

The biosolids are transferred from the ThermAer reactors to a storage nitrification/denitrification reactor (SNDR™). Nitrification is inhibited at the higher ThermAer temperatures, therefore a heat exchanger reduces the temperature to approximately 95°F prior to the SNDR. By lowering the temperature and controlling the pH in the range of 6.2 to 6.8, an optimal environment is created for nitrification and denitrification. The SNDR also acts as a pre-scrubber for the odor control system, removing ~60% of the ammonia released in the ATAD. Furthermore, since the addition of the SNDR, the plant effluent has gone from ammonia exceedances and violations to concentrations lower than 1 mg/L, well below compliance limits. A biofilter uses organic soil-compost material which allows naturally occurring microorganisms to break down and eliminate malodorous compounds in an environmentally friendly process.

The City of Pacifica is committed to investing in alternative energy source projects that will add to the sustainability of the Calera Creek Water Recycling Plant. A project utilizing photovoltaic solar panels has already been constructed and has been in operation since January 2006. The project has been a success and currently provides a 17% reduction in power costs per year or around $150,000. To reduce the facility footprint, the solar panels were installed above the existing biofilter.

Thermal Process Systems worked very closely with the Calera Creek staff and operators to facilitate a smooth and phased transition from the existing ATAD operation to the 2nd generation ThermAer ATAD process. This modification was conducted over a three-year period in order to minimize the impact of upgrading to the ThermAer.

The ThermAer system installed at Calera Creek offers:

- Class A Biosolids
- Total Solids Reduction = 48-55%
- Volatile Solids Reduction = 60-67%
- Final cake – 25-29% solids
- Elimination of neighborhood complaints due to odors from the facility.
- SNDR yields ammonia concentrations well below 1 mg/L

Photovoltaic solar panels reduce energy costs.

ThermAer Transfer System

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