

# CASE STUDY:

**Mayfield Dairy Farms - Dean Foods Company**  
HOMWOOD, AL



**KUSTERS-WATER**  
a division of ZIMA corporation

## THE PLANT

The City of Homewood, Alabama, is home to Mayfield Dairy, a hometown favorite. Mayfield Dairy is owned and operated by Dean Foods Company, one of the nation's largest processors of fluid milk products, marketed under 50 local and regional brands and private labels, and employing over 16,000 employees at 70 manufacturing facilities throughout the U.S. The Homewood dairy plant manufactures Barber fluid milk products and Mayfield ice cream for multiple corporate brands and private labels.



The on-site wastewater facility is owned and operated by Vanguard. The plant is designed to treat 300,000 gallons per day containing high organic loads commonly associated with milk-based wastewater. The treatment process includes equalization and liquid solid separation using dissolved air flotation, followed by aerobic and anaerobic treatment processes prior to discharging into the local sewer. The entire treatment system is located indoors, thus creating a highly odorous and corrosive environment.

## THE PROBLEM

The existing facility was equipped with a conventional extraction carbon-based odor scrubber. The scrubber requires routine maintenance, via media replacement, 3 times a year to maintain effective odor treatment at an average cost of \$15,000 per maintenance interval, or \$45,000 annually. Due to the proximity of the dairy to local neighborhoods, odor control is of the utmost importance. The odors are composed of a "cocktail" of organic acids, VOCs, R-SH, and H<sub>2</sub>S, which can be complex to treat with a carbon-based scrubber. The plant personnel realized the existing system was unable to consistently and effectively reduce odors to an acceptable level.

## THE SOLUTION

In the fall of 2015, Mayfield contacted Kusters Water to assess the existing system and offer suggested improvements. After multiple visits and discussions with the Dairy and wastewater operations staff, it was determined that an ionized-based odor control system would be an effective way to treat the odors inside the building (in-situ) prior to the external scrubber.

### PRODUCTS MANUFACTURED

Milk Products  
Ice Cream Products

### ODOR TYPE

Cocktail of odors consisting of VOCs, R-SH, H<sub>2</sub>S, organic ketones, acids, and ethers resulting from the breakdown of fatty and lactic acids in milk and ice cream.

### WWTP FLOW RATES

Peak = 300,000 gpd  
Average = 225,000 gpd

### TERMINODOUR™ SYSTEM INSTALLED

February 2016

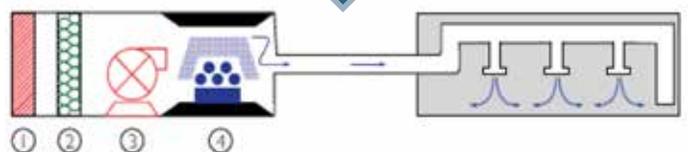
### TERMINODOUR™ DETAILS

AHU = One (1)  
230V / 60 Hz  
Fan = One (1), 7.5 Hp  
CFM = 6,356 or (3 m<sup>3</sup>/sec)  
No. of Ionizers = 4, with 5 plasma tubes each  
No. of Internal Diffuser Drops = Qty 29, each 200mm (8") diameter

## HOW TERMINODOUR™ WORKS

Each Terminodour™ system includes an Air Handling Unit (AHU) located outside the building. The AHU is manufactured from galvanized or stainless steel with foam core for acoustic insulation and protection from the elements. Air is drawn in through the external louvers (1), passes through filters (2), and a blower (3) moves the air into the plasma reactor chamber (4) where the air flows over corona discharge tubes and oxygen molecules are ionized.

(AHU) Air Flow Diagram



## ■ ABOUT IONIZATION

Ionization technology is based on the production of highly ionized air containing hundreds of thousands of ions (O+ and O-) delivered through ductwork into the building. The ionized air reacts by actively attacking the contaminants in the air and oxidizes odors at the source, resulting in a healthier working environment for operators and a reduction in corrosive gases.

## ■ THE RESULTS

As air exits the AHU it is fed through a series of galvanized steel ducts located on the exterior of the building. The duct contains multiple wall penetrations that lead to an interior diffuser drop used to distribute the ionized air within the building. The diffuser drops were deliberately located at the mid- to lower level of the building since the scrubber extraction point is located at the top of the building. The combination of duct location and volumetric flow minimizes short circuiting and allows for longer contact times that enhances oxidation of the odors.

Due to high humidity, common in the southern United States, the AHU was preceded by an air conditioning (A/C) unit. Very high humidity can inhibit the oxidation process of the ions, so partially reducing it is beneficial to the performance of the Terminodour™ system. The A/C unit reduces humidity and improves the interior temperature of the building, thus enhancing the working environment for operations and maintenance personnel.

Once operational there was a noticeable improvement in interior air quality, an estimated ~90% reduction in odors. The reduced odor load to the scrubber led to fewer carbon media changes, typically 3 times a year, now once yearly resulting in an annual cost savings of approximately \$30,000 for the Dairy. More importantly, odor complaints from neighbors have stopped and the building working environment is much improved. As an added benefit of the ionization process, specifically the reduction of H<sub>2</sub>S, plant personnel have noticed a reduction in corrosion of electrical components.

## ■ CONCLUSION

While other systems extract and treat odors, the Terminodour™ system is unique in that it oxidizes the odor at the source. Terminodour™ uses no water, chemical, or media, which minimizes capital and operational costs. Terminodour™ is ideally suited for applications involving enclosed buildings, covered tanks, and wet wells. There are more than 150 operational Terminodour™ plants worldwide.

Air Handling Unit (AHU)



External Feed Ducting



Internal Diffuser Drops

