

# Case Study

## KLa Slot Injector<sup>TM</sup> Aeration System Assists Cheese and Whey Production Plant Solve Its Nitrogen Discharge Challenge

### The Challenge

A gourmet cheese, whey protein, and lactose production facility located in the Midwest had been utilizing a land application system for effluent discharge for over 40 years. Using a combination of ridge and furrow and spray irrigation, the plant had many years of success applying their wastewater to the land. However, as the gourmet cheese products gained in popularity along with the growth in demand for food grade whey protein and lactose the plant grew to a scale where the land application system could no longer achieve compliance with the strict ground water standards for nitrates. This challenge could most effectively be met by building a biological wastewater treatment plant. After evaluating a variety of biological treatment options such as SBR, MBR, MBBR, and conventional activated sludge, the economics dictated that an activated sludge plant would be the best approach.

The next step was to determine the type of aeration system to utilize as this unit operation is the highest energy user in a typical aerobic wastewater treatment plant. Fine bubble diffused aeration systems are often a popular choice for this application, however, there were concerns that the diffusers would be prone to reduced performance due to calcium precipitation, biological fouling, and the high mixed liquor concentration. Diffuser fouling can cause process upsets as well as increased energy usage, and maintenance costs. After a detailed evaluation the KLa Systems *Slot Injector*<sup>TM</sup> Aeration System was selected. The choice was made due to the slot injector system's high energy efficiency, flexible design features, and proven long term, trouble-free operation. Over the past 12 years KLa Systems' jet aeration technology has been utilized successfully in over 35 (thirty-five) milk, cheese, whey, lactose, and yogurt production plants.



Model KSI-BJA-60 Slot Injector<sup>™</sup> Aeration System

## The Solution

The new aeration plant consists of a single 1.1 million gallon aeration tank, which is 92-ft. in diameter with a 22.5 ft. liquid depth. The Model KSI-BJA-60 Slot Injector<sup>™</sup> Aerator is designed for an oxygen transfer requirement of approximately 24,000 lb/d as well as complete mixing of the tank contents for enhanced COD and nitrogen removal. A high-speed floating aerator is installed in the tank for supplemental oxygen transfer and mixed liquor cooling during the warm weather months of operation. The aeration headers and in-tank piping are highly corrosion resistant and consist of a vinyl ester resin FRP piping system, polypropylene injectors, and a stainless steel support system. The Slot Injector<sup>™</sup> Aerator receives motive liquid flow from a 100 Hp dry pit, centrifugal pump. Low pressure air is supplied via three 75 Hp positive displacement blowers. The pumps and blowers are on variable frequency drives, enabling them to be turned up or down for improved process control and energy savings during lower organic loading periods. The plant was commissioned in the summer of 2013 and is successfully meeting all of the design requirements.