World water works

CASE STUDY

PLAINVILLE FARMS

QUICK FACTS

- INDUSTRY: Food & beverage
- START UP DATE: 2007
- TECHNOLOGY: IDEAL DAF & MBBR

BACKGROUND

Plainville Farms produce turkeys using all-natural ingredients, no antibiotics, no animal by-products as feed, and renewable energy is used. Plainville Farms has been producing healthy and responsible food products since 1835. Traditionally, the wastewater generated from the facility has been directed to a marsh field. The marsh field naturally treated the water to remove the impurities. However, as the facility grew, proactive environmental impact studies demonstrated that this procedure had its limits. In 2004, Plainville invested in an Internal Rotary Screen and Hydrocal CAF system. The intention of this system was to unload the Fats, Oils, and Greases (FOG), Total Suspended Solids (TSS), and Biochemical Oxygen Demand (BOD).

Although there was a significant investment made, this system really did not provide a significant reduction in the load. Plainville Farms' philosophy is to care about their customers, team members, the animals they raise, and their community. Thus, the President, Mark Bitz felt that it was very important to develop a more comprehensive plan to address this problem both on a short-term basis as well as on a long-term basis.

ABSTRACT

A turkey-kill and processing facility in New York State has demonstrated local environmental stewardship by designing a direct discharge wastewater system using advanced treatment technology. Beyond robustness, ease of operation, and high performance, the design is flexible offering expansion and backup systems. These features assure long-term direct discharge success.

DEVELOPING CLEAR GOALS

Plainville Farms hired Plumley Engineers, a local environmental consulting firm, to evaluate Plainville's options and recommend a course of action with the following parameters:

1) Achieve Direct Discharge Water Quality
2) Provide Adequate System Scalability for the Future
3) Incorporate a Back-Up Plan into the Design
4) Select a System that is Intuitive and User Friendly

With these four criteria, it was felt that Plainville would assure the highest quality discharge water for a long-time into the future. Craig Brunning, from Plumley Engineers, was assigned the project. Plainville's property was assessed in order to develop a long-term storage lagoon. This would become the Back-Up Plan, as there were reasons this would not serve well as the main option.

Plainville and Plumley worked to develop a complete characterization of the wastewater. This included analysis of the following parameters: Flow, PH, BOD, sBOD, COD, TSS, TKN, TP, NH3, NO3-N, NO2-N, TON, O&G, CN, TDS, and Temperature

This study was conducted over June, July, and November to provide a comprehensive picture of the wastewater and its variability during changes in production.

Through discussions with the state DEP, the following direct discharge limits were determined as follows:

BOD	5 ppm
TSS	10 ppm
FOG	15 ppm
NH3	1.5 ppm
pH	6-9
Settable Solids	0.1 ppm
Chlorine	0.1 ppm

These stringent requirements dictated the need for nitrification. Nitrification is the process of biologically converting NH3 to NOx.However, Plainville and Plumley decided not to develop a traditional design and have companies bid on that exact design. Instead, they wanted to allow the technology providers to develop the designs that they felt were ideal. They hoped that this would allow the implementation of the best, most innovative design at the best value.

SELECTING THE TECHNOLOGY

At the Poultry Show, Mark Bitz visited many of the wastewater treatment companies exhibiting. Based upon their experience, his impression of their technology, and the company philosophy, he selected several companies to evaluate further through comprehensive proposals.

World Water Works submitted a design proposal that addressed all of the needs: High Performance, Compact yet Greatly Scalable, Easy to Operate, and Complete with Backup Capabilities. Beyond these features, World Water Works demonstrated the ability to listen and adjust the design to assure complete satisfaction of all the goals set forth. For instance, a design was developed to utilize the existing concrete in-ground EQ tank by adding height to it, providing additional EQ capacity. Mark Bitz confirmed World Water Works' experience by checking several references, whom all lauded WWW's technology. One notable reference was for a system at a Poultry plant in Arkansas that would soon be treating over 1 MGD of wastewater to meet potable water drinking standards and achieve ~50% reuse. Coupling all of these features and this experience with one of the most economical solutions, World Water Works was selected as the vendor.

DETAILED DESIGN

World Water Works' design utilized the existing rotary screen to remove coarse particulate to protect downstream equipment and specified the increase in the EQ tank capacity to allow for proper equalization and pH control. The next unit operation would be to use the WWW/RESOURCE DAF to remove FOG from the wastewater. The RESOURCE DAF is a highly efficient dissolved air flotation system. It is constructed of Polypropylene to allow flexibility in treatment and maximum FOG removal. The system incorporates several proprietary design features: Progressive Water Extraction, Cross Flow, Plate Packs, Nikuni Dissolved Air, and Cone Bottom Sludge Removal. These features each maximize Archimedes Principal and Stoke's Law of liquid/solids separation. The result is a highly efficient separation system that has demonstrated higher performance at lower costs through head-to-head competition, technology upgrades, and competitor system replacements.

RESULTS

The system has been delivered and the installation is near completion with an anticipated startup Q1 of 2007.

SUMMARY

The system has been a terrific success and allowed the Turkey processing facility to achieve all the goals set forth.

	INFLUENT	EFFLUENT					
	COD	BOD	COD	cBOD	TP	TSS	NH3
MIN	204	0	4.8	0	3	5.5	0.21
AVERAGE	1198	6	28	3	4	8	8
MAX	2848	13	48	4.8	5	12	1.1
LIMITS	-	-	-	5	-	10	1.5