Puris Proteins

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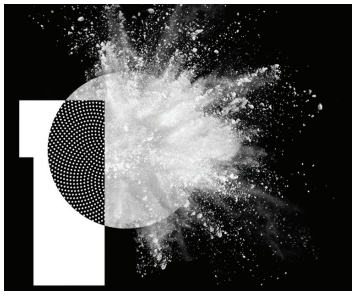
Organization Background

Puris Proteins was founded in 1985, and for nearly 40 years, it has served its mission to develop a more sustainable and plant-based approach to food production. In 2018, the company rebranded as PURIS and formed a joint venture with Cargill, Incorporated to expand its pea protein production capabilities. This partnership enabled the purchase and retrofitting of a large facility in Dawson, Minnesota, and this facility is now the largest operating processing plant for yellow field pea protein in North America.



"I am grateful to MnTAP and PURIS for the opportunity to work together and be exposed to advanced and lean operations within the food industry, contributing to the ongoing efforts to enhance the efficiency of processes and complex equipment. Through this experience, I gained valuable insight into sustainability practices." ~ RL

Project Background

PURIS has worked extensively in perfecting the core processes of production, maximizing reuse of water, and improving efficiency. The team at the Dawson plant had identified areas they felt were the most promising and wanted to dive deeper in.

Incentives To Change

As a leader in sustainable food production, PURIS continually strives to reduce its environmental footprint. Now that PURIS' facility has been set up and in operation for several years, it can focus more on exploring opportunities to tweak and fine-tune the equipment for even more efficient, cost-effective operations.

> *"Roman took ownership of projects and collaborated with our on-site operations and management teams to complete them, while requiring little guidance from me. Roman and the MnTAP program identified new energy savings opportunities, gave us different perspectives on known opportunities and quantified payback so we can re-align our improvement priorities."*
>
> *~ Brandon Eddy, Utilities Engineer, Puris Proteins*

SOLUTIONS

Upgrade Spray Nozzles

Low flow nozzles can be used for clean-in-place (CIP) washdown stations and would save 280,000 gallons of water and $4,500 annually.

Insulate Spray Dryer

The spray dryer was originally designed to be insulated, but the insulation was never installed. Applying insulation could reduce natural gas usage by 38,000 therms and save $15,800 annually.

Optimize Baghouse

The pulse jet cleaning system is the main user of compressed air. The baghouse is the largest piece of equipment in the plant and has more than 100 filters cleaned by compressed air. Each pulse takes fractions of a second, but when repeated thousands of times a day, can lead to significant energy demand.

To reduce energy use, it is recommended to reduce pulse duration by a maximum of 0.4 seconds and increase the pulse delay by a maximum of 10 seconds. It is also recommended to optimize the pulse sequence and control automation. Implementing each action will decrease the

Solutions

savings from carrying out the other actions. Therefore, full implementation would reduce air usage by up to 90% or 400,000 kWh and $14,000 per year. However, this is a theoretical estimation, and in reality, the total energy and savings will be somewhat lower than that amount.

Install Capacitor Bank

Demand charges make up a significant part of the electricity bill at the plant. Using a capacitor bank would reduce these costs and save up to $82,000 annually.

Update Boiler Infrastructure

Boilers are running around the clock to provide steam that is necessary for multiple applications in the plant. Proposed upgrades and synchronization of the equipment controls could save up to 380,000 therms and $155,000 annually.

Institute Regular Steam Trap Audit

As the plant's steam traps reach their end of life, a routine inspection procedure should be implemented for timely identification and repair of faulty traps. This could potentially save up to 1,770,000 gallons of water; 138,000 therms of natural gas; 5,300 kWh; and $65,000 annually.

Recommendation	Annual Reduction	Annual Savings	Status
Upgrade Spray Nozzles	280,000 gal water	$4,500	Recommended
Insulate Spray Dryer	38,000 therms	$15,800	Recommended
Optimize Baghouse (duration) by a Maximum of 0.4 Seconds	180,000 kWh	$6,300	Implemented
Optimize Baghouse (delay) by a Maximum of 10 Seconds	67,000 kWh	$2,300	Recommended
Optimize Baghouse (sequence)	11,000 kWh	$400	Recommended
Optimize Baghouse (control automation)	11,000 kWh	$400	Recommended
Install Capacitor Bank	N/A	$82,000	Recommended
Update Boiler Infrastructure	380,000 therms	$155,000	Recommended
Institute Regular Steam Trap Audit	1,770,000 gal 138,000 therms 5,300 kWh	$65,000	Recommended

MnTAP Advisor: Gabrielle Martin, Associate Engineer