

Water Conservation & Wastewater Optimization Kerry Ingredients

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UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Company Background: Kerry

- **The Taste & Nutrition Company**

- World HQ: Naas, Ireland
- North American HQ: Beloit, Wisconsin

- **Rochester Site**

- Applied health and nutrition
- Spray dried fermented ingredients
 - Shelf-life extenders in bread
 - Natural meat cultures
- Liquid buffered vinegars & peptides



Figure: Kerry R3 spray dryer start-up

Project Overview

•Water Flow

- Desire to expand plant
- Sewer size limitations
- Sustainability goals

•Biochemical Oxygen Demand (BOD)

- Remove BOD from waste stream
- Maintain permit compliance

•Wastewater Optimization

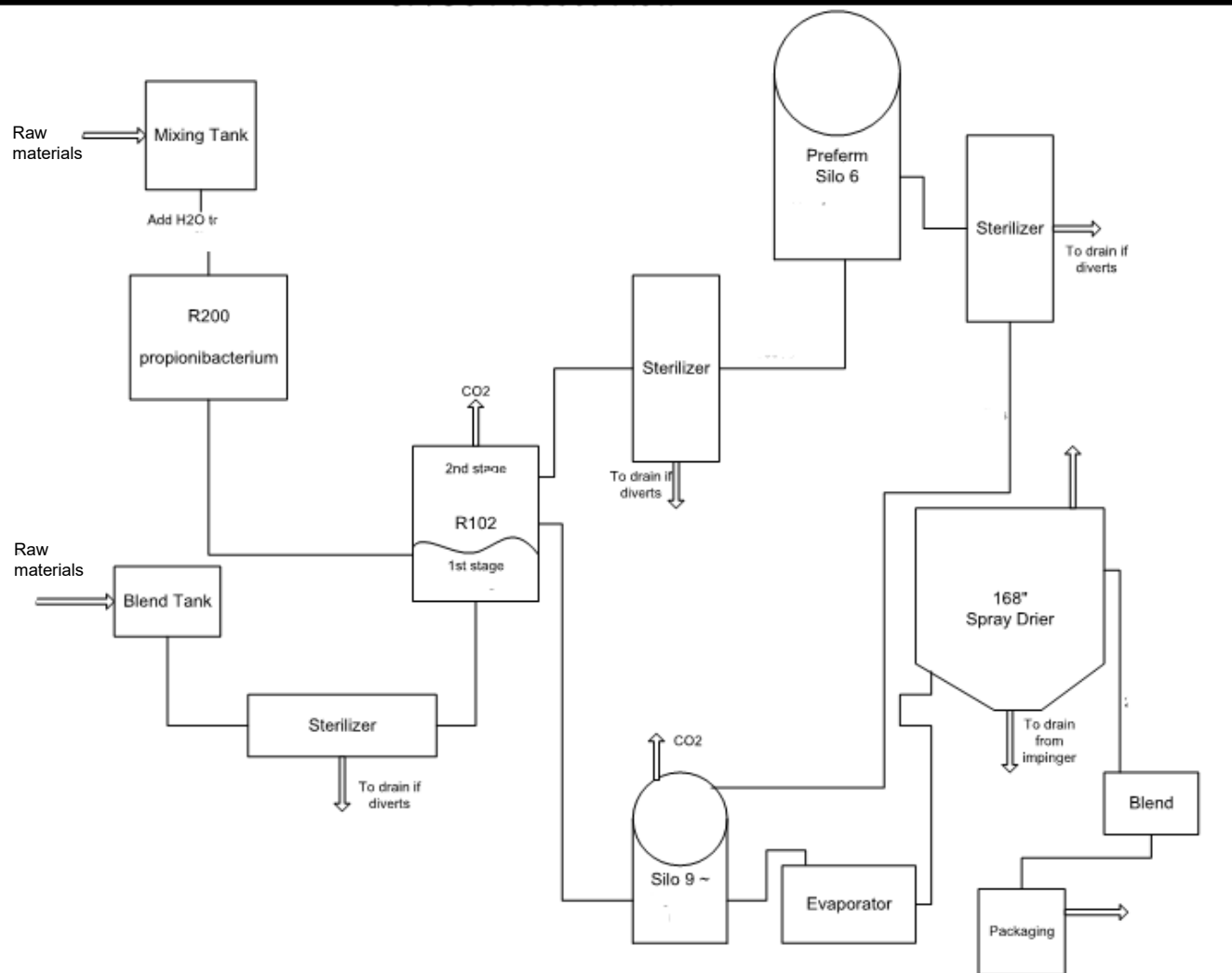
- Effluent pretreatment system
- Adjustment of flow and pH



Figure: (Above) Kerry logo. (Below) Looking at product within an evaporator.



Process Overview



Approach

- **Conduct wastewater assessment**
 - BOD characterization
- **Optimize process controls**
 - Logic programming
- **Develop ideas for improvement**
- **Perform water balance**



Figure: (Top) Lower portion of scrubber for R3 spray dryer.
(R) Water samples were obtained from major assets.



Recommendation: Wastewater Optimization

- Increases residence time
- Regulates pH and mixing
- Programs automated control
- Benefits
 - Chemical usage
 - Permit compliance
- Increases efficiency by 94%

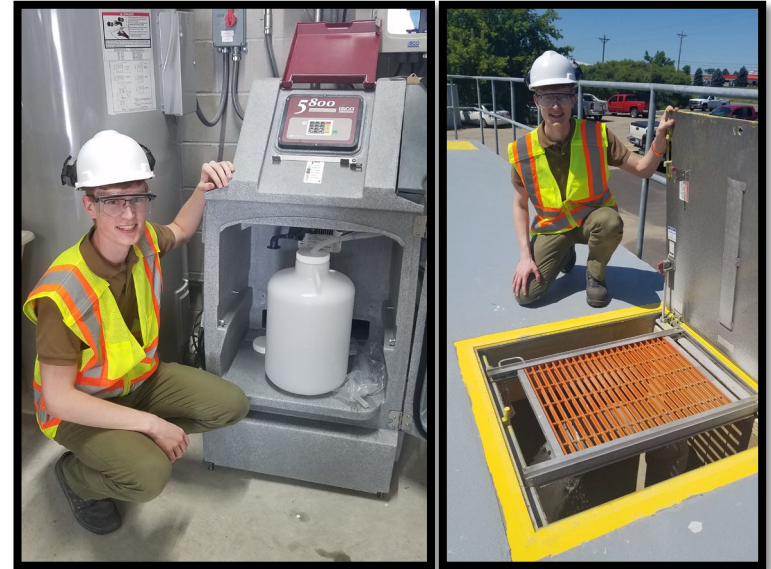
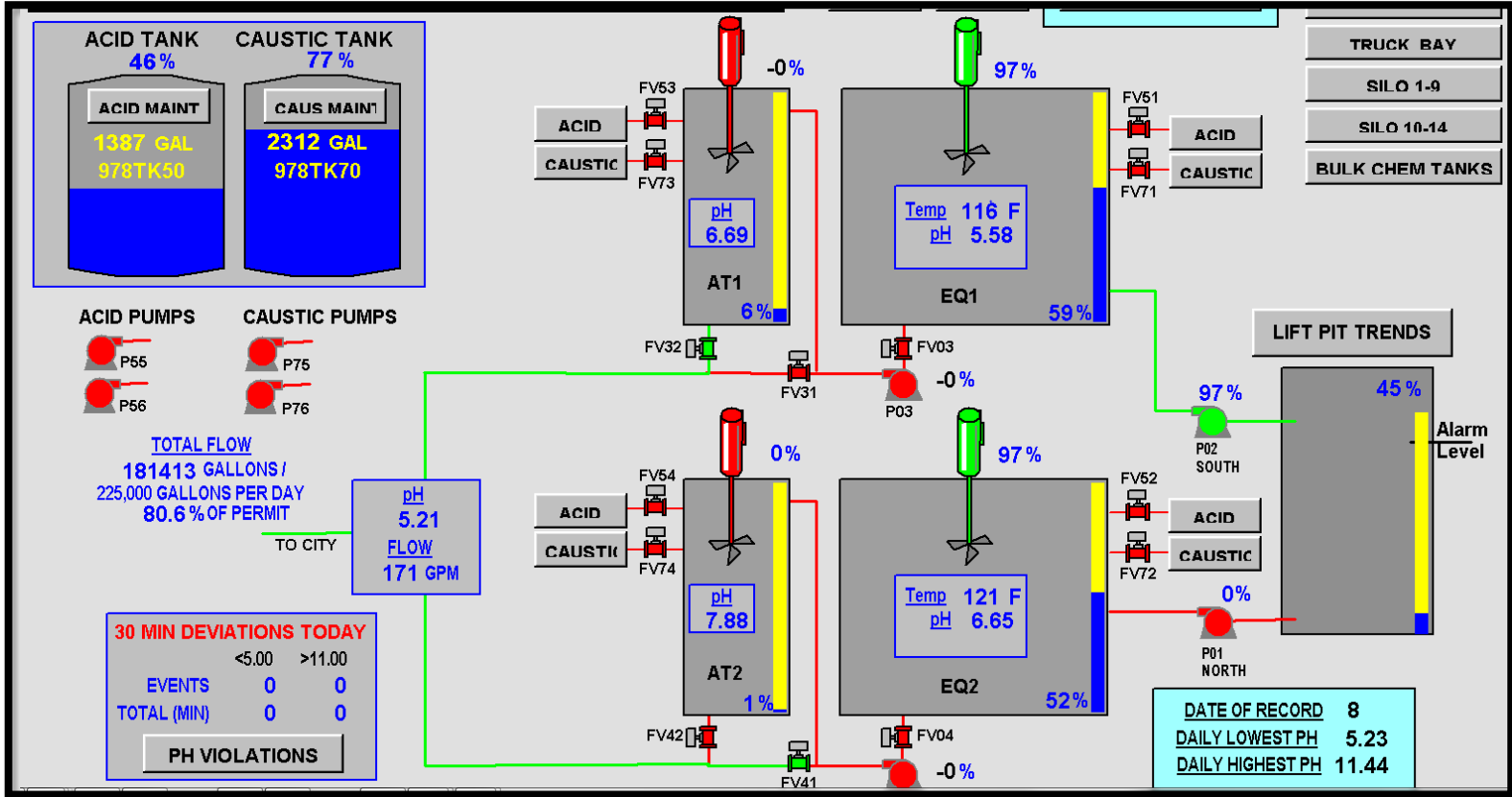


Figure: (L) Water sampler connected to waste system. (R) Access hatch to an adjustment tank



Solutions



Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Effluent process control	4 million gal water of unsafe pH	\$0	\$20,000	Instant	Implemented
Condensate water reuse	30 million gal water	\$900,000	\$300,000	3 years	Planned
Re-route scrubber water	1.2 million lb. BOD	\$0	Further analysis needed	Instant	Partially implemented
Improved product scheduling	200,000 lb. BOD	\$0	Further analysis needed	Instant	Recommended
Powder packaging control	Further analysis needed	Further analysis needed	Further analysis needed	N/A	Investigation recommended.
On-site biological treatment	Further analysis needed	Further analysis needed	Further analysis needed	N/A	Further analysis needed.
Total Savings	4 million gal water 30 million gal water 1.4 million lb. BOD	\$900,000	\$320,000	3 years	



Personal Benefits

- Engineering role
- Industry experience
- Utilization of computer science background
- Problem-solving skills
- Interest in process control and wastewater



Figure: Noah in front of Rochester facility sign