Reducing Product Loss During Shutdown

Melrose Dairy Proteins

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MDP Overview

• First started cheese in 1968 as Kraft
• Joint venture of Land O’Lakes & Dairy Farmers of America since 2001
• 126 employees
MDP Overview

- **Whey Protein Concentrate (WPC)**
  - Kraft Foods
  - Land O’Lakes
  - Bongards’ Creamery

- **Concentrated Whey & Milk Permeate**
  - Proliant Dairy

- **Cheese Production (CM and AM)**
  - Land O’Lakes
  - Kraft Foods
  - DairiConcepts
Motivations for Change

• Significant amount of AM product is lost during shutdown due to cleaning and sanitizing thin film evaporators
• Reduce overall waste/increase product yield
• Cost savings from process improvements
Reasons for MnTAP Assistance

- Projects tried in the past were unsuccessful—need more time
- Fresh outlook needed
- Cost effective resource that doesn’t add headcount
Approach

• Total lost product was quantified and sources identified

Total Annual Product Equivalent Loss: 72,622 lbs

- Thin Film Evaporator Rinses: 55%
- Piping from Thin Film Evaporator: 34%
- Final Product Piping: 11%
Determining Inefficient Processes

• Process observation
• Product loss analysis
• Quality analysis of lost product
• Discussions with management and operators
• Solution trials
Solids Lost in Pipe Cleaning

• Background
  - Final product piped from evaporator to barrel filler
  - Evaporator shutdown every other day for cleaning
  - Flow stopped with product in pipes & pipes have to be cleaned

• Problem
  - Product is lost

• Possible Solutions
  - Use different pipe material to enable easy clean out
  - Install a pigging system
Solids Lost in Shutdown Rinse

• Background
  - Thin-film evaporator is flushed out before Clean In Place (CIP)
  - Rinsings go to animal feed or drain

• Problem
  - Product is lost

• Possible Solutions
  - Change flow rate, timing, and/or temperature of flush to reduce dilution of product
  - Collect rinsings, heat treat, & add back into process
Successful Implementation

• Pigging system being implemented
  – Estimated 32,000 lbs product recovered annually adding up to over $42,000
  – Approximately $3,000 in equipment (~1 month payback)
  – Improve operator’s working conditions
Promising Recommendations

• Collect thin-film evaporator rinsings and add back into process
  - Estimated 40,000 lbs product equivalence recovered annually adding up to over $52,000
  - Increase process yield
  - Reduce raw material quantities
  - Improve sanitation and working conditions
  - Decrease potable water usage
  - Reduce effluent loading
Personal Benefits

- Real world experience
- Networking opportunities
- Process exposure