Reducing Waste and Energy Consumption

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Company Overview

- MGK- Specialty manufacturer of insect control solutions

MGK®
Insect Control Solutions

- Strengths:
  - Pyrethrum refinery
  - Custom formulations and flexibility
  - Responsible solutions

Tank Cleaning

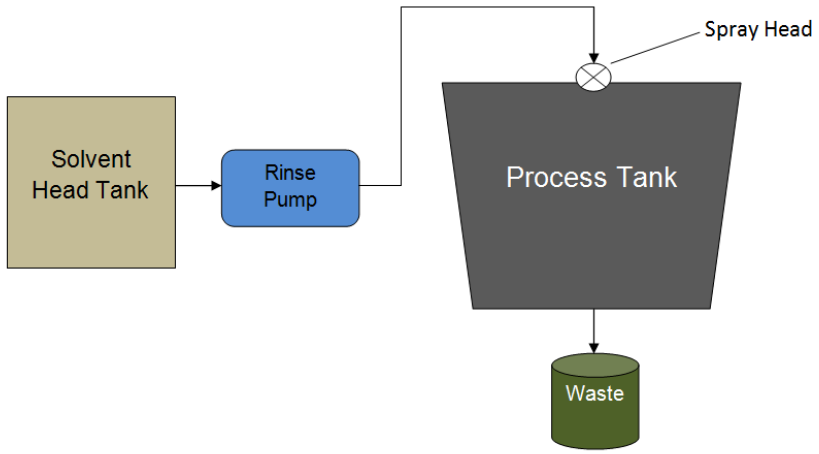
- With over 300 formulations, product changeover requires tank cleaning
- Cleaning ensures no contamination in next product
- Chlorinated rinse solvent used in tank cleaning procedure

Project Purpose

- Verify tank cleaning process and reduce solvent usage
- Lean out the process to help expand production
- Investigate energy efficiency improvements
  - Process manufacturing is very energy dependent

Cleaning Process

- Numerous process tanks with wide range of volumes
- Triple solvent rinse between incompatible products
- Automated rinse pump and valves system



Incentives to Change

- Process is time consuming
- Solvent purchase and disposal cost
- Future production growth = Optimize process
- Regulatory pressures
- Corporate sustainability goals

Cleaning Process Verification

- Quantitative: Target of <1,000 Parts Per Million (PPM) of the highest active ingredient of the previous product in the final rinse
- Qualitative: Final rinse must be visually clear
- Building a database to verify tank cleanliness
- Verify robust, repeatable cleaning procedure

Rinse Recommendation

- Observation:
  - <1,000 PPM target often met after second rinse
- Suggested change:
  - Products with <20% active ingredient level receive two rinses instead of three
    - 5% reduction in solvent usage for tank cleaning
    - $4,100/year in savings

Rinse Recommendation

- Observation:
  - The final rinse typically is the heaviest
- Suggested change:
  - Shorten final rinse cycle time
    - Estimated 10% reduction in solvent usage
    - $10,000/year in savings

Further Rinse Options

- Recycle solvent from third rinse
  - Potential of using 1/3 less solvent in each tank cleaning
  - $19,400/year in savings
- Install a check valve to reduce variance in rinse weights
  - Would help to standardize rinse process and improve monitoring of solvent usage

Energy Efficiency with EMS

- Energy Management Solutions (EMS)- Consulting firm contracted through City of Chaska Electric
- Worked with EMS to investigate energy savings opportunities around the facility

Air and Nitrogen Leaks

- Used ultrasonic instrument to locate leaks
- Suggested change: repair leaks and schedule routine system maintenance
  - $10,000/year in savings
  - 122,400 kWh

Variable Frequency Drives

- VFD on 50 hp cooling water pump
  - $12,200/year in savings, 135,000 kWh
- VFD on 5 hp exhaust fan
  - $2,000/year in savings, 23,000 kWh
- VFD on 7.5 hp HVAC supply fan
  - $1,800/year in savings, 20,000 kWh

Equipment Information Centralization

- Motor audit and list of make-up air units, HVAC units, and exhaust fans
  - All equipment info in one location
  - Reference for future replacement/upgrades

Recommendations Summary

Recommendation	Waste / energy reduced (per year)	Implementation cost	Net savings (per year)	Payback period	Status
Double rinse when applicable	5% reduction in solvent	$250	$4,100	<1 month	In progress
Shorten final rinse	10% reduction in solvent	$500	$10,000	<1 month	In progress
Recycle final rinse	33% reduction in solvent	$0	$19,400	Immediate	In progress
Install check valve	N/A	$1,600	N/A	N/A	In progress
Repair air and N_2 leaks	122,400 kWh	$2,500	$10,100	4 months	In progress
Install VFDs	177,400 kWh	$7,600	$16,000	7 months	Under Review

>$50,000/year opportunity in savings

Personal Benefit

- Experience leading a team
- Data analysis
- Exposure to lean manufacturing
- Communicating with vendors and consultants
- Project startup and continuation
- Working with experienced professionals

Questions?

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