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## Project Objective & Scope

- The brewery is dedicated to achieving sustainability goals, and there is sufficient opportunity for improvement in their utility consumption.
- Develop necessary process changes to reduce utility consumption without compromising the standard of the product and introduce a more sustainable mindset among employees.

## Problem Statement

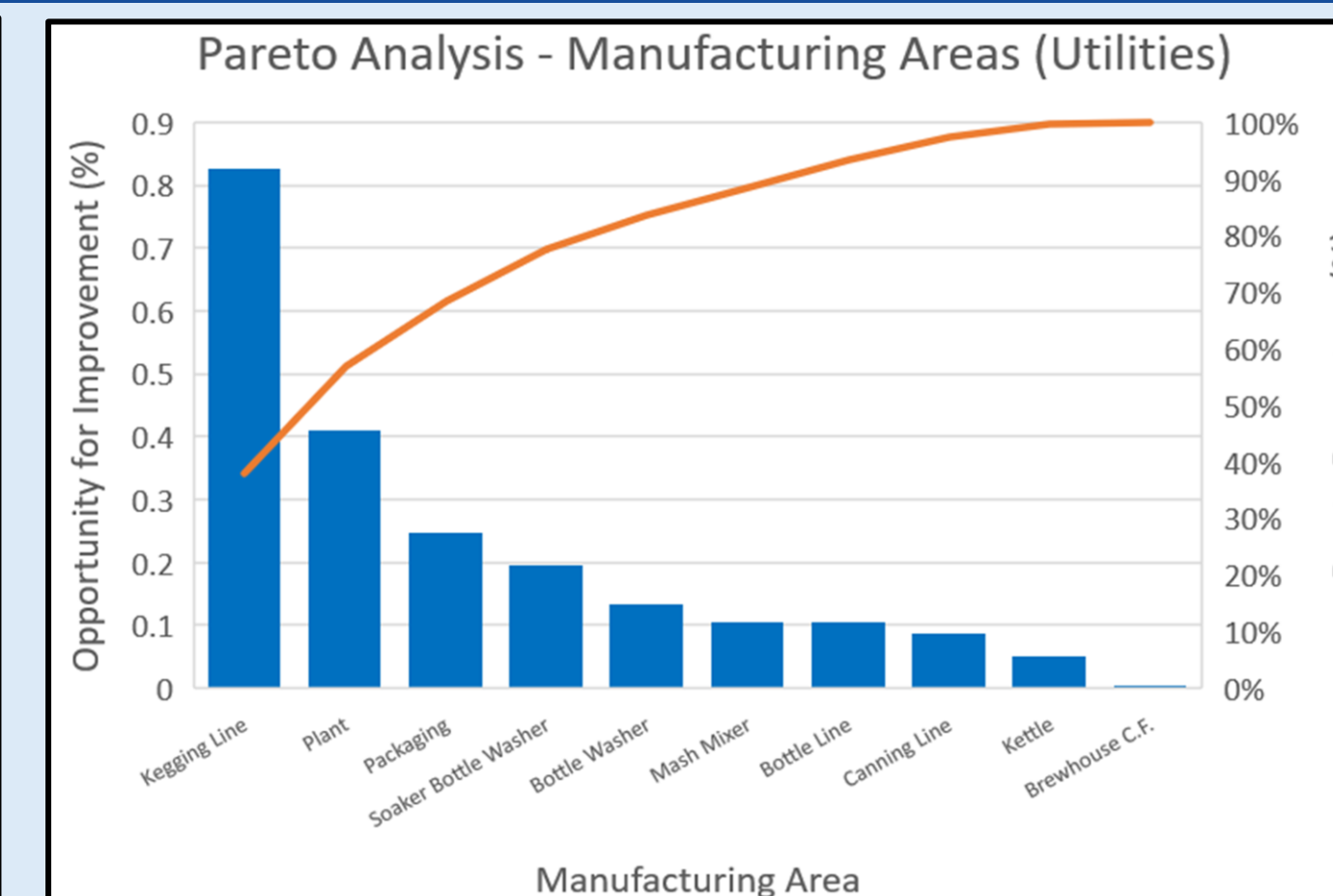
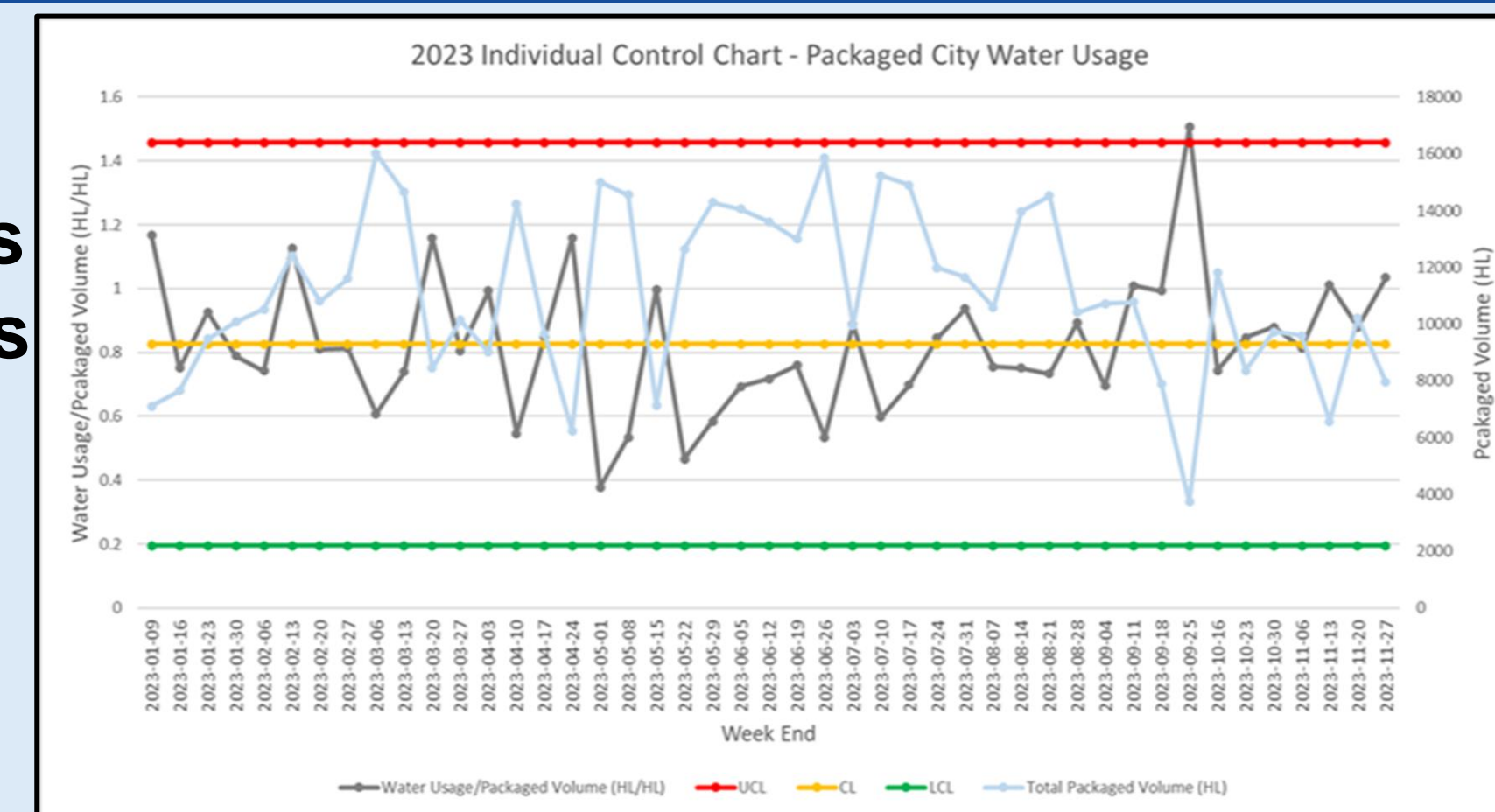
- Unknown excess utility consumption patterns and inefficiencies found on non-production days.
- Film boiling issue identified in brewhouse tanks, creating a vapor film blanket over the solid surface and leading to increased steam usage.
- Standard Operating Procedures (SOPs) lack detail and are outdated, requiring updates to meet current standards.
- Operators lack value-added tasks during machine downtime.

## Methods & Tools

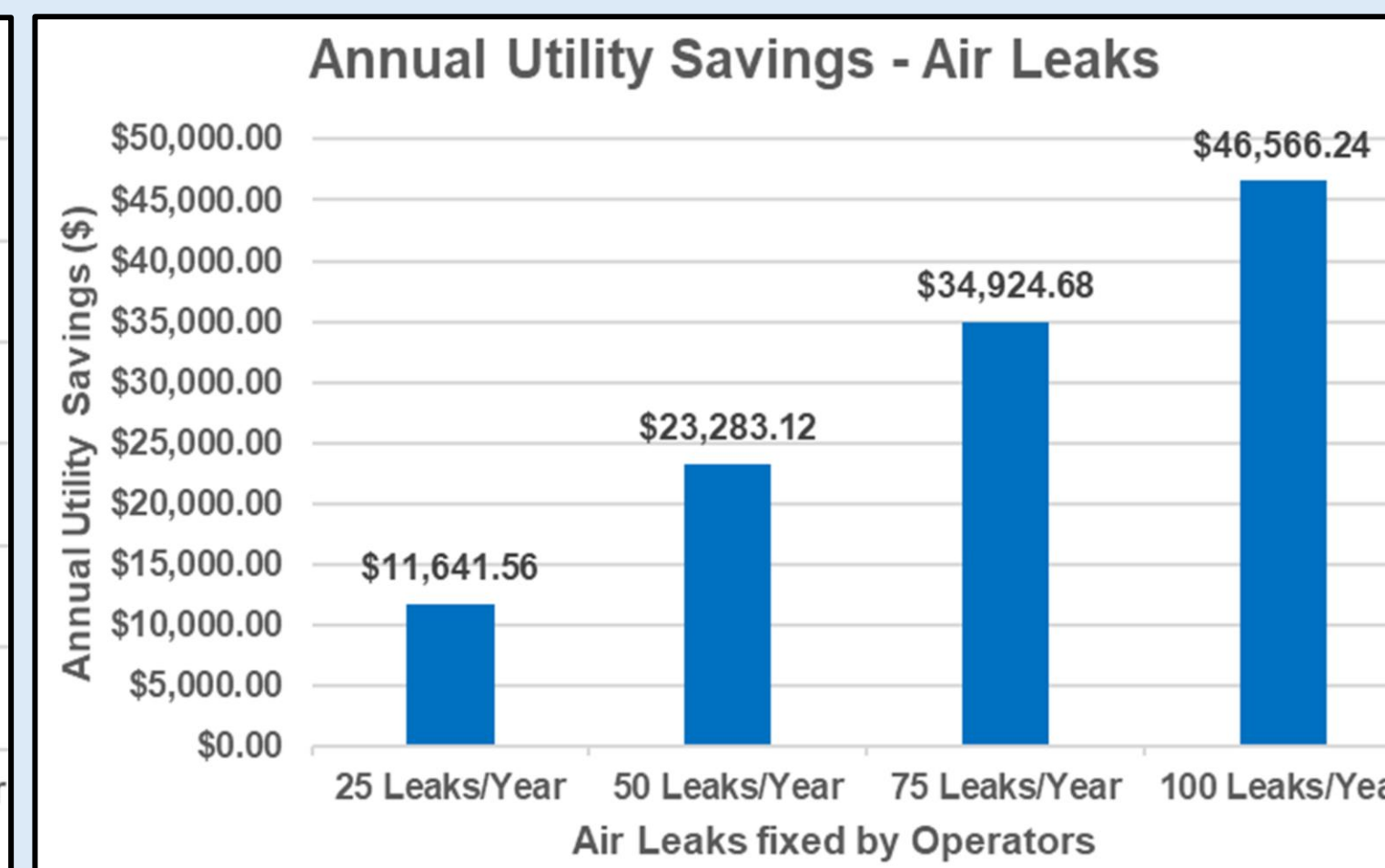
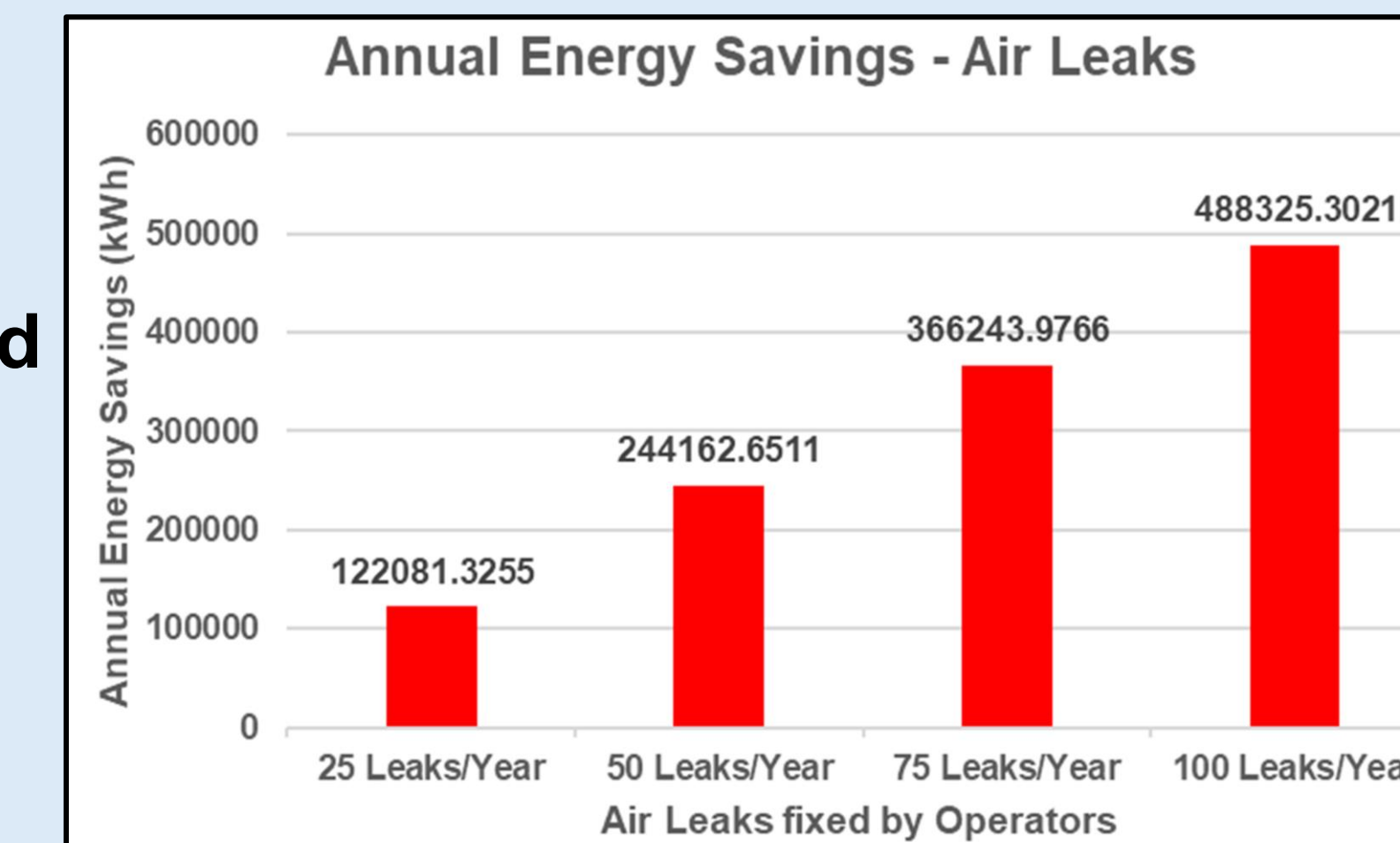
- Data Collection and Analysis
- Fishbone diagram
- Pareto Analysis
- Control Charts
- Gemba Walks
- Operator Interviews
- Review of Process Maps
- Weekly Supervisor Consultation
- Creating and Updating SOPs
- Cost Analysis
- Expected Savings Calculations

## Data Analysis

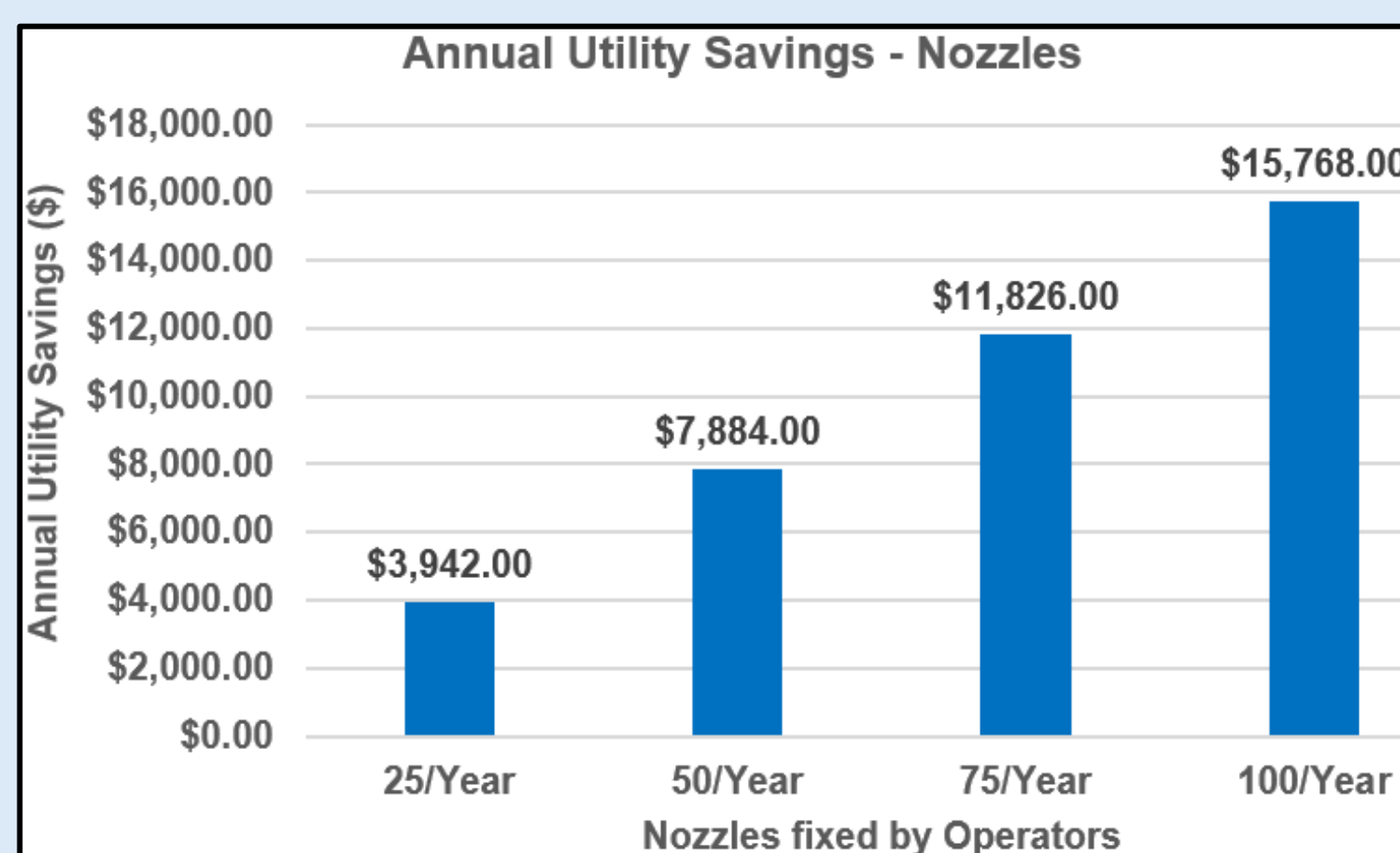
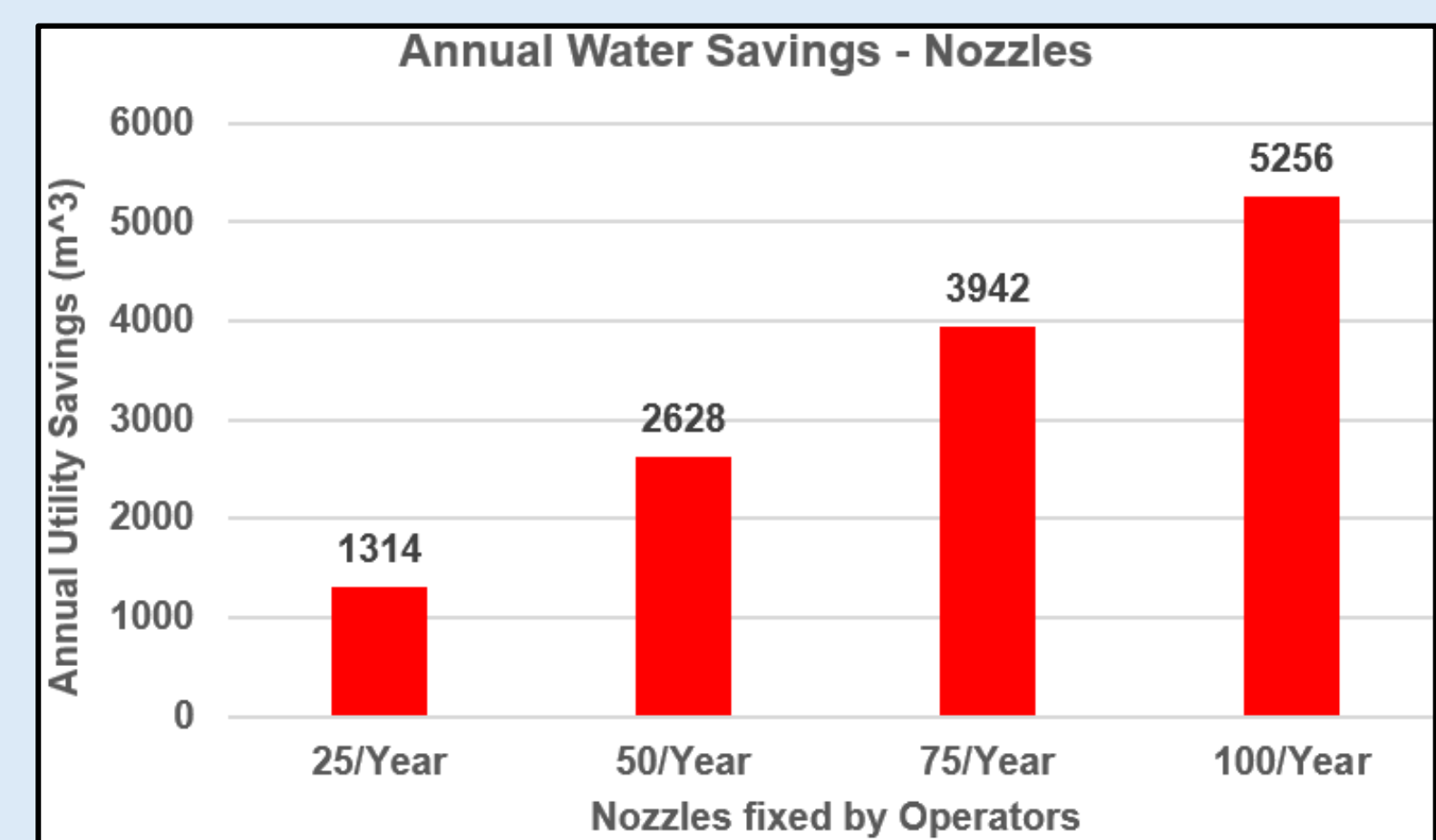
### I-MR Control Charts and Pareto Analysis



### Air Leak Energy and Cost Savings:



### Nozzle Water and Cost Savings:



## Nozzle SOP

- Identify a nozzle that is not functioning properly
- Put on the cut resistant gloves
- Put on the chemical resistant gloves
- Turn off the conveyor belt
- Turn off the VFD disconnect
- Shut off and remove the nozzle
- Diagnose the problem
- Go to the inventory room
- Retrieve a filter
- Retrieve a sprayer head
- Retrieve a new nozzle
- Replace parts
- Turn the nozzle back on
- Turn VFD disconnect back on
- Turn the conveyor belt back on
- Confirm that the nozzle is working

## Operator Checklist Actions

- Follow the Shut-down procedures
- Check for air leaks
- Fix air leak if necessary
- Check for CO2 leak
- Check for water leak
  - Look for signs of water accumulation on the ground.
  - Inspect nozzles/pipes to ensure they aren't leaking.
- Check lubrication of nozzles
- Ensure there is enough lubricant soap
- Change nozzle if necessary
- Fill work order if necessary
- Use thermal camera to verify equipment temperature
- Clean equipment surfaces and components
- Inspect equipment condition
- Ensure safety protocols are being followed

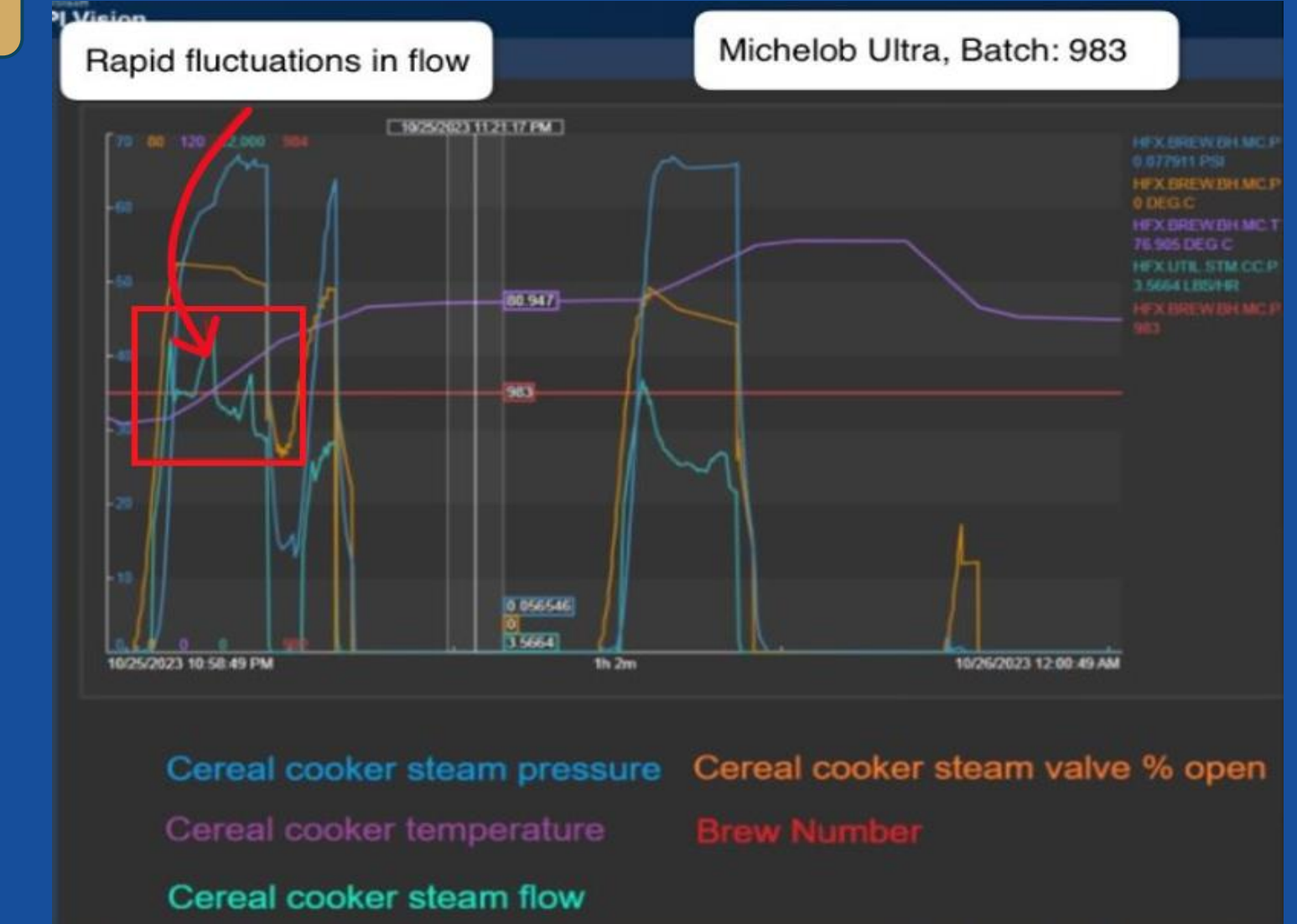
## Film Boiling Observations

### Logic Checks Conducted:

- Agitator speed, Vessel CIP audits, Steam traps, AB InBev Taste panel

### Recommended Checks:

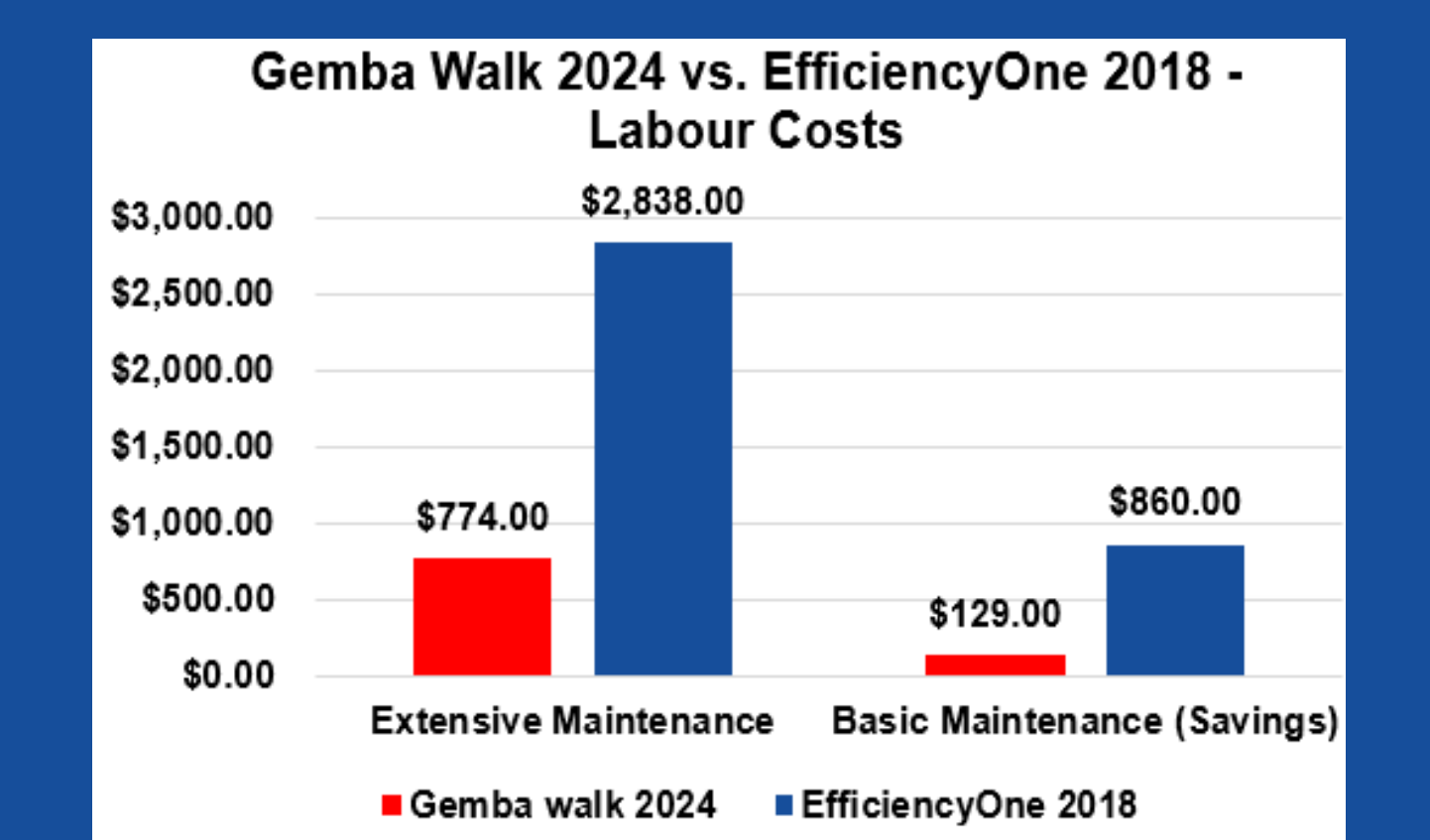
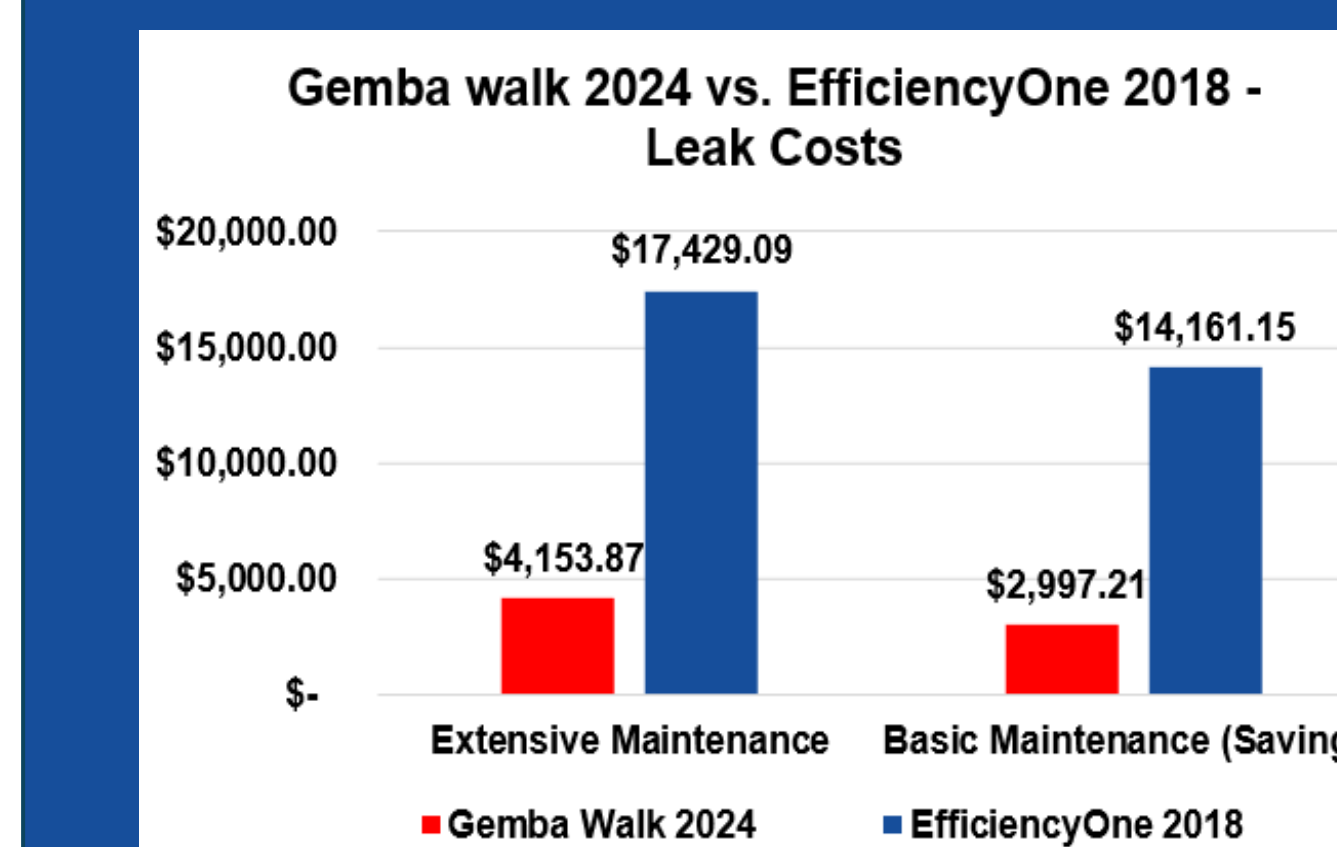
- Pressure testing, Generator plant output, Alarm Testing



## Compressed Air Leak Repair SOP

### Objectives of the new SOP:

- Minimizing leaks promptly
- Faster response times
- Saving costs on air leaks
- Hourly labor transitioning savings from operators to maintenance staff



## Recommendation

- Air leaks and incentives poster
- Run operator workshop on autonomous teams
- Update weekend manager checklist
- Further investigate down day analysis
- Work Order Tool Improvements
- Audit CIPs
- Fix bottle washer air lines
- Further investigate steam usage in the brewhouse
- Standardize brewhouse operations
- Improve tracking system for work orders

**\$7150** Gemba walk identified \$7150 in leak costs.

**43%** 43% of air leaks can be fixed by operators.

**50 Hours** If operators fix 100 leaks/year, we will save 50 hours of maintenance time.