

# MONASH INDUSTRY TEAM INITIATIVE (MITI) 2017/2018

## Reviewing Wastewater Treatment and Cheese Plant CIP

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### INTRODUCTION:

#### BACKGROUND

Warrnambool Cheese and Butter (WCB) was established in 1888, making them Australia's oldest dairy processor today. In June 2017, WCB's Cheese Plant completed an upgrade to increase their production capacity by approximately 30%, which also resulted in downstream effects to the cleaning processes and the amount of waste produced. This upgrade was on the back of Saputo Inc. acquiring 100% of WCB ownership in 2017.

#### WASTEWATER PLANT

In order to cope with the increased wastewater due to the upgrade, an additional wastewater plant was rented. The key objectives for the team were to:

- Observe and understand the plant operation
- Produce irrigation and further potable quality water
- Make recommendations for a future permanent plant to be installed

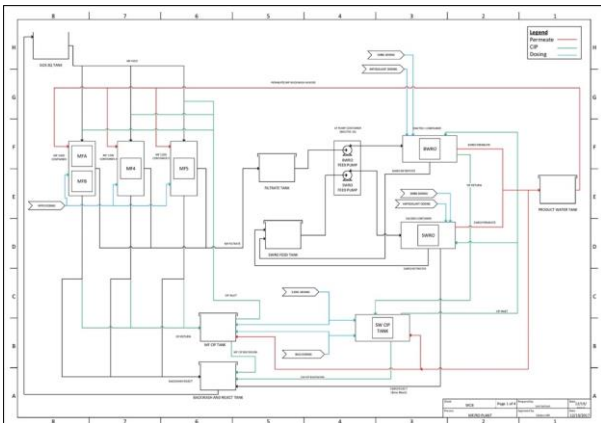
#### CHEESE CIP

The upgrades had significant impacts on the Cheese Plant Clean-in-Place (CIP) process. The team were tasked to:

- Review the CIP process
- Find the source of operational issues and propose solutions
- Monitor chemical usage
- Identify sources of potential process inefficiencies and optimise CIP process

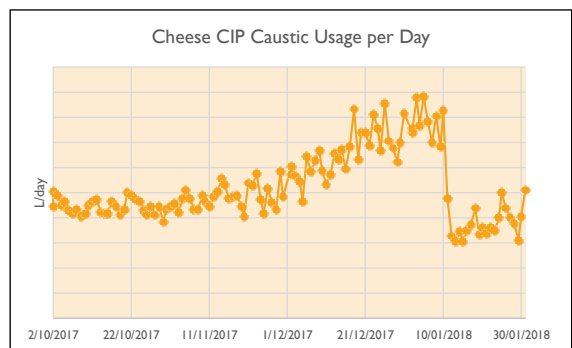
### OUTCOMES:

#### PROCESS FLOW DIAGRAM OF WASTEWATER PLANT



#### CAUSTIC USAGE

Observation of the cleaning process revealed that there was a hot water leak into the caustic tank, resulting in wasted water, caustic dilution and increased raw chemical usage. Upon replacing the leaking valves, raw caustic usage visibly decreased, leading to cost savings of ~\$1538/day. This also increased the amount of hot water available for other processes, mainly increasing Cheese Plant efficiency and reducing the amount of water required to be tanked in.



#### CIP CONDUCTIVITY SET-POINTS

It was observed that conductivity set-points used to initiate step changes during the CIP process were not operating effectively, and the team discovered several issues resulting in the set-points being rendered ineffective. Upon implementing changes to correct these set-points, significant time was saved during cleaning and a larger proportion of high strength caustic was able to be recovered for re-use.

#### COLD WATER TANK

Quarterly testing of the cold water storage tank revealed a high pH, indicating traces of caustic. Further investigation found this to be a result of caustic back-flushing into the tank during the cleaning process. This was confirmed by recording the temperature and noting peaks during step changes, with the increase in temperature being attributed to caustic back-flushing into the tank.

### RECOMMENDATIONS:

#### WASTEWATER

- Hot water for CIP
- Feed to be pretreated
- Further treatment of the polisher plant effluent

#### CHEESE CIP

- Further adjustments to conductivity set-points will allow for increased CIP efficiency
- Implement timing change whilst switching to rinse steps to avoid caustic back-flush