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Monash Industry Team Initiative (MITI) 2015-2016

Evaluation and Optimisation of Thermal Processes

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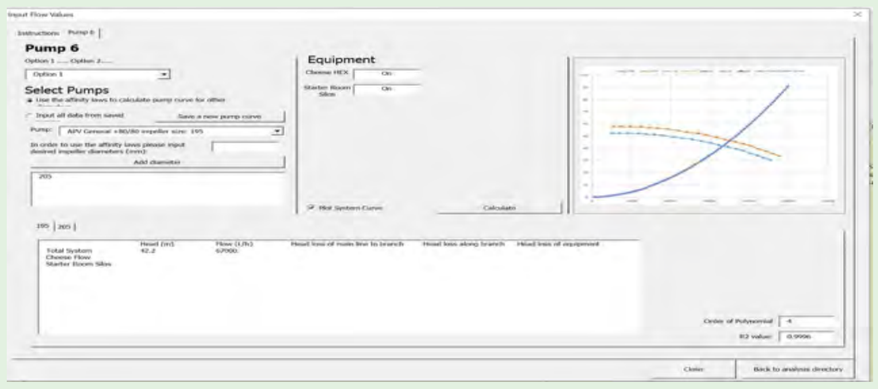
Project Goals:

- prepare a report detailing the energy balance model for the refrigeration system.
- devise a demand planning tool to maximise effectiveness of the refrigeration system.
- prepare a report on the performance of the cheese cooling tunnel with recommendations for optimisation.
- provide recommendations for the optimisation of the chemical reuse system and opportunities for further reuse.

Refrigeration System:

- Developed a 3D model of the plant's refrigeration system, to assist in planning the addition of refrigeration lines in the future
- Developed an excel model to analyse the effectiveness of the refrigeration system, through a hydraulic analysis.This model is adaptable to any changes that occur in the plants refrigeration system
- We were able to determine specific process equipment that were causing significant head loss

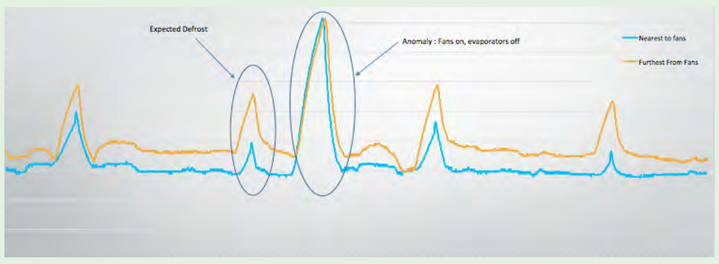


Excel userform, for determining an appropriate pump for the system as well as the head loss across equipment.

Auto-Cad model of refigeration system

Cheese Cooling Tunnel Optimisation:

- We determined the temperature profile of the cheese blocks over the time spent in the Cheese Cooling Tunnel. We realised that cheese was not being cooled down enough from it's time in the cooling tunnel
- We discovered that the Cheese Cooling Tunnel it self was well above the required 3 degrees Celsius, due to a temperature probe that wasn't reading correcting. Due to an incorrect temperature reading the system was turning off, as it thought it was hitting the appropriate temperatures.



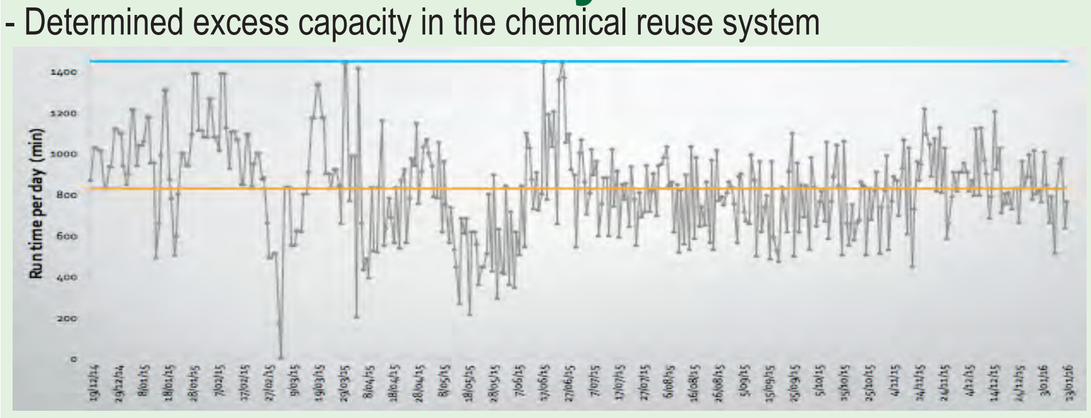
Cooling Tunnel Temperature profile before changes

Cooling Tunnel Temperature profile after changes

After Changes to the Cooling tunnel PLC (programmable logic controller) there was a significant decrease in the colling tunnel temperature.

Chemical Reuse System:

- Determined excess capacity in the chemical reuse system



- Chemical re-use plant's run time over the year on a daily basis. With the blue horizontal line being the maximum run time, and orange being the average run time, which is well bellow capacity.

- Reviewed the existing usage of chemical across the plant and determined potential areas for chemical reuse

- Determined that both the clean and reuse tanks had potential extra capacity.