

# 2016 SIPS Project Summaries

## Participating organisations

- AB Mauri Technology and Development Pty Ltd., North Ryde, NSW
- BOC Ltd., North Ryde, NSW
- Dow, Sadara, Saudi Arabia (3 students)
- Dow Chemical Australia Ltd., Geelong, VIC
- Dow Chemical Australia Ltd., Altona, VIC
- Orora Limited, Matraville, NSW
- Osaka Gas, Osaka City, Japan
- Parkes Shire Council, Parkes, NSW
- Visy, Smithfield, NSW

## Projects

### Validation and Verification of Clean-in-Place Methods for Industrial Yeast Production

**Company: AB Mauri**

AB Mauri uses Clean-in-Place systems to remove carry-over contamination between batches. This project investigated if rapid microbiology monitoring tools could be used to validate and verify effective cleaning. The thesis presented AB Mauri with an increased understanding of the pitfalls in hygiene monitoring and justification for greater focus on hygienic design and maintenance.

### Scrubber System Performance Analysis and Process and Optimisation

**Company: Dow Chemical Australia, Geelong**

Dow Coating Materials produces a range of polymer emulsion products from acrylic monomers. A caustic scrubber at Geelong was installed in order to maintain safe levels of acrylic monomers in the atmosphere.

The project was to analyse the suitability of the scrubber for daily duty, both technically and operationally, and propose/implement solutions to improve required performance of scrubber.

### Improvements in the sugar pneumatic conveying system and bulk storage in the Propylene Oxide Derivates plant

**Company: Dow Chemical Australia, Altona**

Downtime can cost chemical plants hundreds of thousands each year in loss of production. Regardless of the industry, plant downtime means loss of revenue and higher operating costs.

The aims of this project are to identify the root cause(s) of unplanned downtime in the sugar system at the Dow Altona Polyol Plant, implement corrective actions and identify areas of improvement. The scope of this work also includes the development of a predictive preventive maintenance strategy for the sugar system.

Key corrective actions implemented in April 2016 have resulted in a 96% decrease in unplanned downtime of the sugar system and on average monthly reductions of \$50,000 in loss of revenue.

### **Sadara CHEM I Waste Water Compliance**

#### **Company: Dow**

The project was based at The Sadara (JV between Dow Chemical and Saudi Aramco) Brine and Chlorine Production Plant (CHEM I facility) in Saudi Arabia. A comprehensive measurement plan was developed for The entire facility to validate The design model used to predict waste water compliance. Through this project, mitigation activity not requiring capital investment was also proposed to be implemented for minor non-compliance events. The aims of this project were to reduce The risk of Plant shut down and prevent revenue loss due to delays in schedule.

### **The Dow Human Element at Work**

#### **Company: Dow**

The Dow Chemical Company expatriated over 700 employees (predominantly engineers) to work on the Sadara megaproject in Saudi Arabia. This industrial research project investigated the critical motivational factors influencing the expatriates success and assessed the effectiveness of the expatriate management practices implemented by Dow. In-depth interviews with senior management and employee surveys were conducted to analyse the expatriate population's viewpoints. The work produced has provided detailed insights for Dow with implementable recommendations for future expatriate projects and improvements for the current Sadara project.

### **Characterising Chlorine Decay in the Parkes-Peak Hill Scheme**

#### **Company: Parkes Shire Council**

Parkes Shire Council treat and supply drinking water to more than 10,000 consumers in regional NSW. Maintaining a residual concentration of chlorine in treated water is essential to protect public health. This study involved investigating major causes of chlorine decay, developing a chlorine decay model and recommending strategies to improve residual retention across the scheme.

### **Aeration Bypass for Anaerobically Treated Wastewater**

#### **Company: Visy, Smithfield**

This project investigated the feasibility of bypassing the aeration process or substituting a chemical process to assist in maintaining low biological oxygen demand and suspended solids in pulp and paper mill wastewater. The aim was to find process alternatives with less financial cost and environmental impact on air, water, and land, while maintaining high quality effluent. The feasibility of recycling final effluent into the mill to reduce fresh water consumption was also evaluated.