

# 2014 SIPS Project Summaries

## Participating organisations

- AB Mauri Technology and Development Pty. Ltd. North Ryde, NSW (2 Students)
- BHP Billiton Olympic Dam Corporation Pty. Ltd., Adelaide, SA (2 Students)
- BOC Ltd. North Ryde, NSW
- Dow Chemical, London, UK
- Dow Chemical, Houston, Texas, USA
- Dow Chemical, Sadara, Saudi Arabia
- Dow Chemical Australia Ltd. Altona, VIC
- Dow Chemical Australia Ltd. Geelong, VIC
- Epuron Pty Ltd, North Sydney, NSW
- Santos Ltd, Adelaide, SA
- Sydney Water, Parramatta, NSW

## Projects

### **Development of optimum operating strategies for the acid digestion process at Cronulla Waste Water Treatment Plant**

#### **Sydney Water**

A balancing tank ahead of the anaerobic digester at Cronulla Wastewater Treatment Plant (WWTP) was suspected of performing as an acid phase digester. This was confirmed by the high degree of solubilisation of organic matter and volatile fatty acids (VFA) produced. An experimental and theoretical investigation into the upstream performance of the anaerobic digester under varied operating conditions helped determine the optimum operational parameters. This enabled improvements in volatile acid formation (acidogenesis) with significant potential techno-economic benefits.

#### **Cooper Basin Waste Management Plan**

#### **Santos**

The update of the Cooper Basin Waste Management Plan required engagement with stakeholders, conducting surveys and interviews. The project required identification and analysis of a full range of legislative documents and company standards. This included visits to remote locations throughout Central Australia to develop an understanding about the waste management practices undertaken in the field. The Plan will improve Santos' environmental performance and operational efficiency.

#### **An Examination of Quality Reviews for the Dow Aramco Reverse Osmosis Project**

#### **The Dow Chemical Company**

This project, based at Dow Chemicals offices in Houston USA, focused on Fluor and Dow Reverse Osmosis project quality reviews during the transition from FEED to Detail Design. It involved enhancing the Fluor review in order to meet the Dow requirements, reducing both cost and schedule. The aims of this project were achieved through a combination of desk reviews,

interviews and surveys with experienced Dow and Fluor personnel.

### **Construction Productivity Study: Welding at Sadara CHEM II Isocyanates**

#### **The Dow Chemical Company**

Through in-field studies, the labour productivity and welding productivity were tracked and measured at the Dow Aramco CHEM II Isocyanates construction project on location at Sadara Saudi Arabia. Through comparative analysis with literature, welding productivity benchmarks were established for the Middle East region and guidelines were developed for welding productivity improvement on future megaprojects.

### **Re-designing the Boggy Creek Carbon Dioxide (CO2) production plant to handle a different feed gas. Investigate cost-benefits of various options**

#### **BOC**

Through simulation studies, verified against both design parameters and historical operational data, it was determined how the CO2 plant would perform if it is required to operate on a different feed gas. To maintain production rates, various changes in the plant would be required and the economics of each option were analysed. BOC was provided with a complete UniSim model of the plant for future reference and/or plant modifications.

### **Planning the Regulatory Permitting Process for the Dow-Sadara Co-Polymer Polyols (CPP) Facility in Saudi Arabia**

#### **The Dow Chemical Company**

This project, based in Houston USA, focused on the regulatory process for Dow-Sadara Co-polymers Polyol (CPP) project in Saudi Arabia. Its aim was to create a strategic permitting schedule and work process. 'Lessons Learned' were obtained from the procurement of capital equipment for the three polyethylene trains Dow Engineering Company (DEC) were contracted. Lessons learnt will be used for future Dow or Sadara projects in Saudi Arabia.

### **Commissioning and validation of Fluidised Bed Drying for Yeast**

#### **AB Mauri**

The understanding of yeast fluidized-bed drying has been improved by the application of pilot-scale testing and scaling theory from the literature, allowing the performance of yeast drying to be extrapolated to different processing conditions of air and product. New pilot-scale fluidized-bed dryers had been built and commissioned, with MIPPS support during the project.

### **Emulsion and Dispersal Regeneration**

#### **AB Mauri**

This experimental study based at North Ryde examined the formation and stability of nano-dispersions and emulsions. New methods of emulsion and dispersion generation were developed and tested.