
THE UNIVERSITY
of ADELAIDE
SouthernOil
Southern Oil Refining
HYDROTHERMAL LIQUEFACTION OF
MUNICIPAL WASTEWATER SLUDGE
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Commercialisation of Renewable Crude Oil Production

$4m
Funded by ARENA

$12.29m
Total project cost

Project overview

Lead Organisation
Southern Oil Refining Pty Ltd

Location
Gladstone, Queensland

ARENA Program
Advancing Renewables

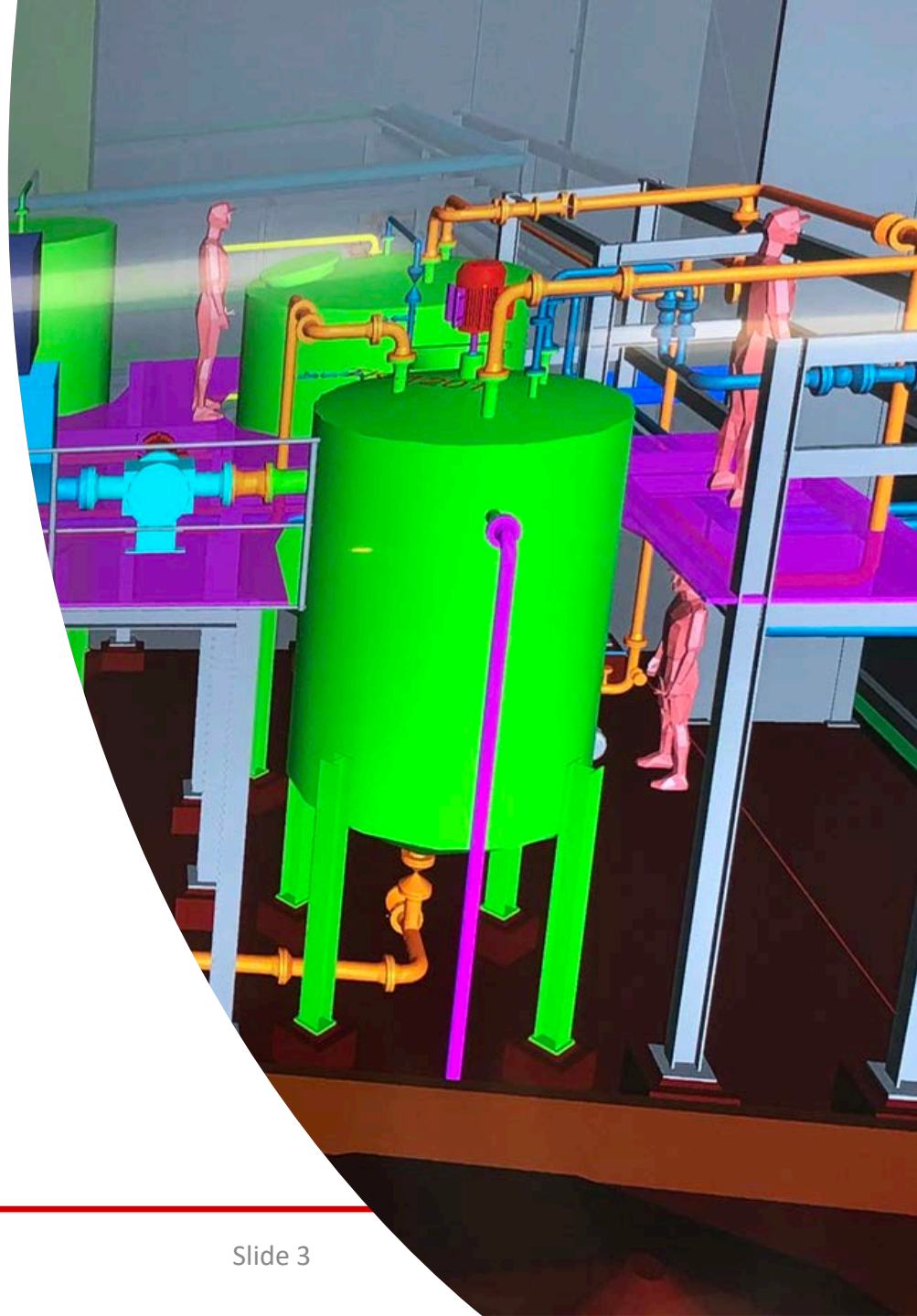
Start Date
April 2019

Status
Current

Project Partners
Melbourne Water Corporation, Queensland Urban Utilities

Project Objectives

- To develop continuous processes for HTL of municipal wastewater sludge that optimise separation, yield and quality of renewable crude
- Economic reality (presently) an acceptable RoI (<5 year payback) would require a tipping fee of $160/dry tonne
- Need to valorise all product streams



Project Objectives

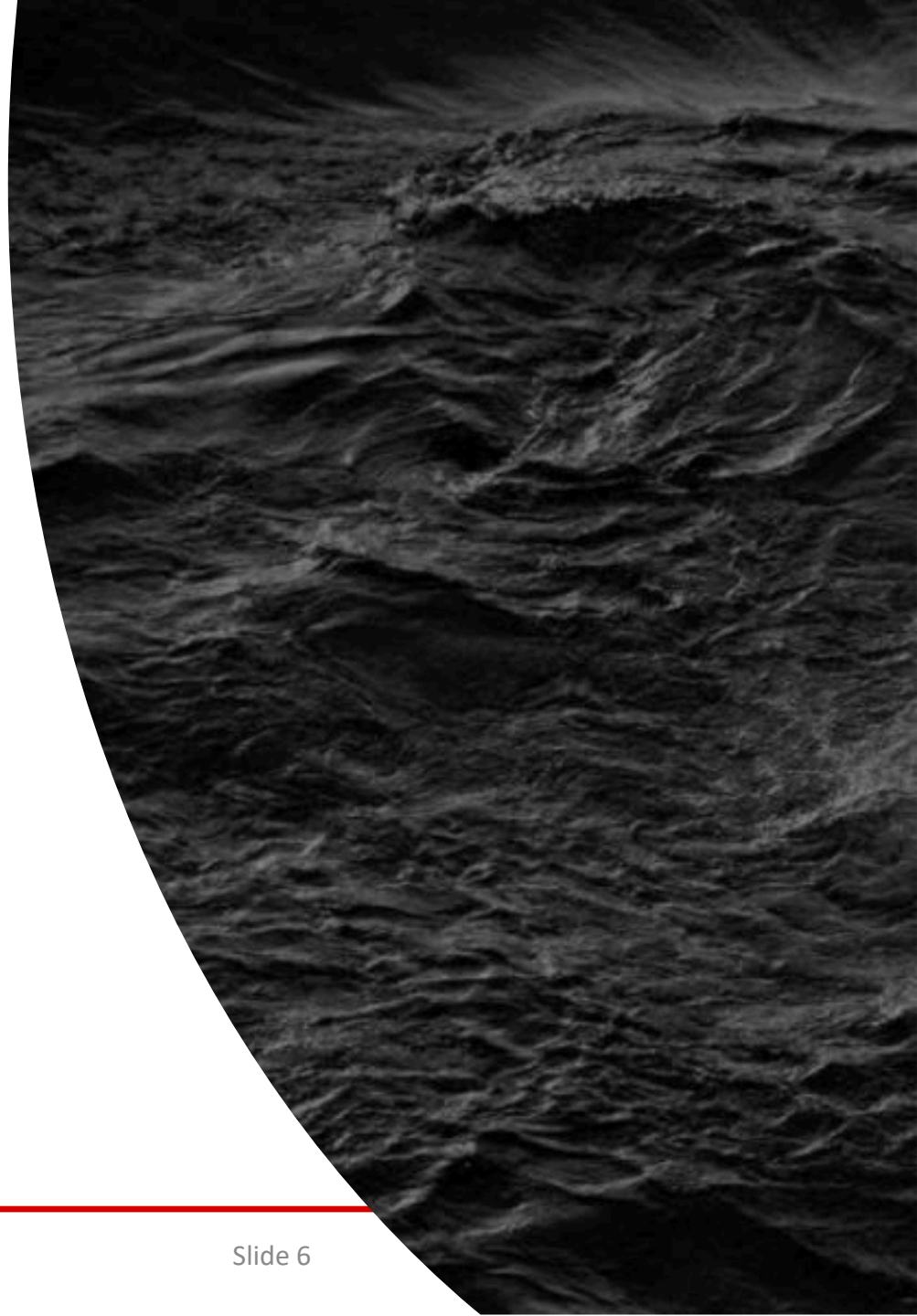
- To quantify the affect of polymer on the renewable crude oil composition and aqueous fraction under continuous HTL operation
- What is the optimum re-circulation conditions of the aqueous phase for subsequent feed preparation that achieves optimum renewable crude yield in terms of quality and quantity?
- What is the optimum blow-down rate for removing the recycled aqueous fraction and the subsequent characteristics of the resultant fraction for anerobic digestion (AD) treatment?
- Details biological and chemical characterisation on the resultant renewable crude oil and aqueous fraction composition of each re-circulation cycle?

Project Objectives

- HTL renewable crude is not close enough to fuel oil properties.
- Nitrogen and sulphur content, instability due to high acidity, high viscosity and high char yields, are limiting its application.
- Development of suitable catalysts are needed that can produce renewable crude of sufficient quality and to limit formation of aqueous and solid phase organics.

Project Objectives

- Valorisation of the aqueous phase to produce biogas via AD treatment, and solid phase:
- Is coagulation treatment using aluminium sulphate ($Al_2(SO_4)_3$) able to remove the accumulated toxic and rate limiting compounds (e.g. phenols and cyclic hydrocarbons) prior to anaerobic digestion?
- What is the optimum concentration of $Al_2(SO_4)_3$ required?
- What is the biogas yield produced from AD treatment of the aqueous fraction?
- What is the raw and final composition of the aqueous phase treated by AD treatment?
- Can the resultant AD digestate be recycled to the HTL feed? This to minimizes the level of waste handling required as part of commercialisation of this process
- Downstream solids composition



Project Objectives

- To develop a piping system integrity monitoring technique that can overcome the fundamental challenges of existing techniques by achieving non-destructive evaluation (NDE) of early damage and non-contact inspection for high temperature and high-pressure metallic pipes.

Status

- Q1-Q3 2019 FEED Completed
- Q4 2019 Detailed design commenced
- Q1 2020 Construction
- Q2 2020 Commissioning