Overview
The sponsor has developed a new method of coal to liquid technology. This new technology produces a gas stream which contains H$_2$S, NH$_3$, and particulate matter which needs to be removed to capture the desirable components as well as recover the carrier gas. The goal for the team was to design a gas scrubber system to remove the particulates and undesirable components.

Objectives
- Remove at least 90% of H$_2$S and NH$_3$.
- 100% particulate removal.
- Greater than 90% capture for carrier gas.

Approach
- Customer needs were gathered through video conferences with the sponsor.
- When needs were assessed, a patent search was performed to develop a preliminary proposal.
- Initial proposal was tweaked by the company until a design was decided upon.
- The solvents (scrubbing liquids) used by the initial design were modelled using Aspen Hysys.
- New solvents were chosen due to reactivity, based on residence time.
- A final simulation was performed in Hysys to reinforce calculations.

Outcomes
- The sponsor will be able to remove:
  - 100% particulates
  - 99.9% NH$_3$, and H$_2$S
- Sponsor can recover 98% of carrier gas.
- This was designed as an engineering scale system so there will need to be further testing to determine the full scale model of the system.