

# Dry-feed gasifier operation optimization and reliability improvement project



Building on more than 70 years of gasification experience, Air Products has become a premier provider of turnkey solutions to convert hydrocarbon feedstock into synthesis gas for high-value products.

## Client

A global leader in the coal-based diversified energy field and a licensee of Air Products' dry feed gasification technology. The plant is producing hydrogen for a downstream chemical plant.

## Challenge

Due to coal pricing increases, the client was switching to an economic, high sulfur content coal and experiencing problems with slag tap blockage and syngas cooler (SGC) inlet plugging. When the gasifier ran on the colder side, the slag tap was prone to blocking and when the gasifier ran too hot, the SGC inlet tended to plug quickly. This resulted in lower plant reliability and the inability to run the plant at full capacity. Constant monitoring was required by skilled operating staff to keep the plant operating.

## Solution

Air Products gasification experts used coal assessment tools to analyze the coal feed stock and made recommendations to improve the blend ratio of various coal and flux. They suggested broadening the operation window by using a larger quench flow. This produced a higher gas load visible in the syngas cooler and downstream. Air Products was able to screen all the units and de-bottleneck the process.

## Result

By implementing the process changes, the gasifier operation window can be wider, significantly reducing the blockage potential of the slag tap and SGC inlet. Operators now have confidence that they can run the gasifier on more cost-effective feedstocks at higher loads and achieve improved plant reliability.

## Application

The Air Products gasification team offers plant assessment services to clients who want to improve dry feed gasifier performance. They evaluate feed sources using coal assessment tools to optimize blend ratios and can run process simulations to analyze and recommend process parameters. Clients benefit by receiving improved gasifier efficiency and reliability.

## Meet our Technical Staff



Dr. Liu Shuigang, Lead Mechanical Engineer, has over 14 yrs. of experience in dry-feed gasification processes and gasification equipment, supporting commissioning, start-up, and trouble-shooting activities for Air Products gasification projects.

Shuigang received his PhD from the Chinese Academy of Sciences and has worked at Sinopec, Shell, and China Shenhua before joining Air Products.

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