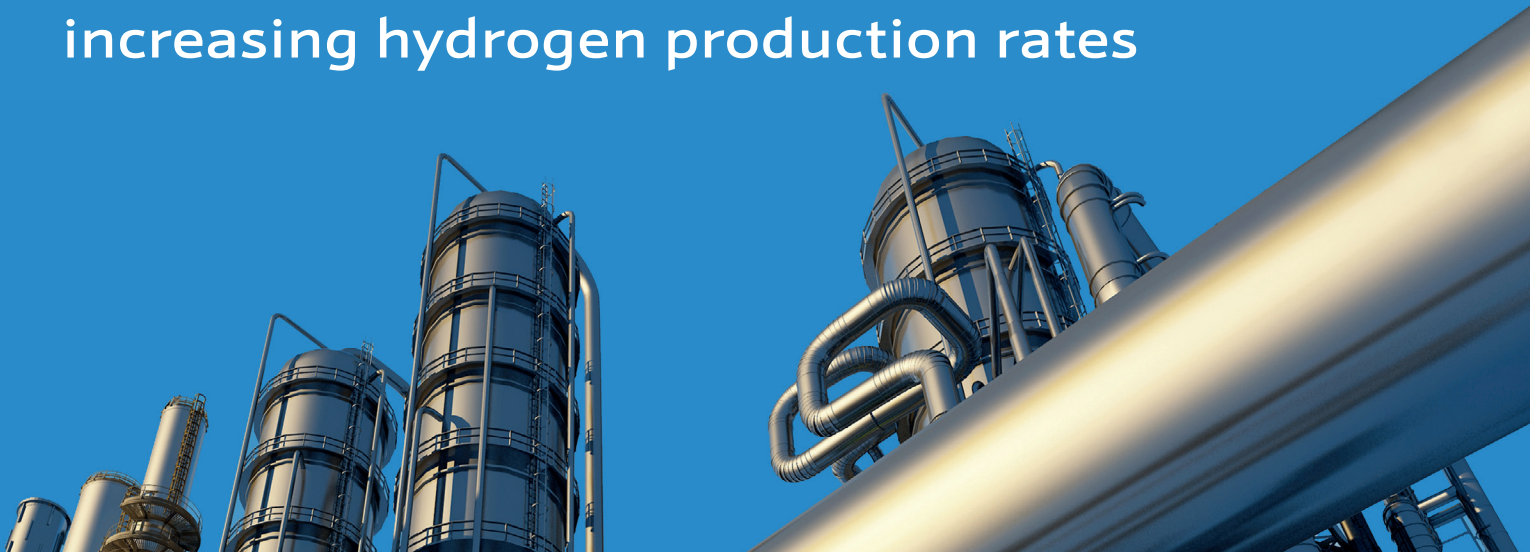


# Case Study

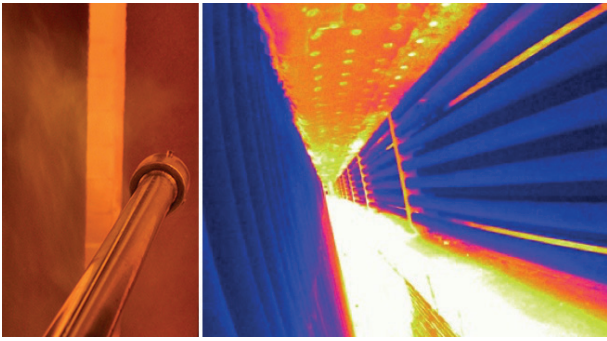
## Releasing the potential of the refinery through increasing hydrogen production rates



### Demonstrating the real value of a Reformer Survey from Johnson Matthey

Johnson Matthey has a long history of offering world class products and services to customers, including KATALCO™ PERFORMANCE Reformer Surveys. A Reformer Survey offers the plant operator a comprehensive assessment of the performance of the steam reformer unit. This service includes measuring the tube wall temperature spread, inspecting the internal & external aspects of the furnace and detailed modelling of both the reforming and combustion processes.

A recent Reformer Survey of the hydrogen plant at Petroineos Grangemouth Refinery in Scotland provides an excellent example of the benefits of this service. The hydrogen production was restricted due to the instrumentation indicating that several key measured temperatures around the steam reformer were approaching the design limits.

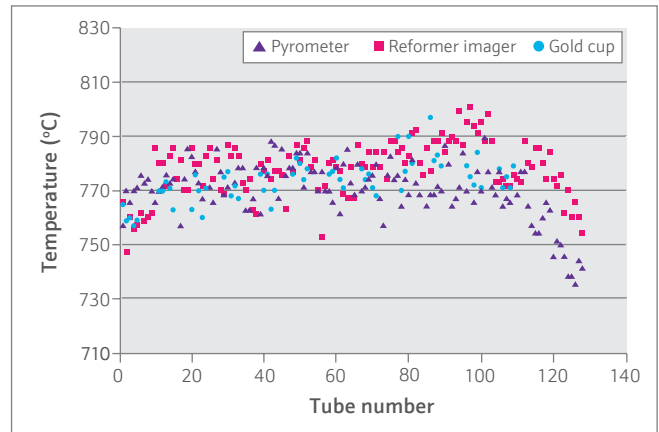


The plant operators were regularly measuring the tube wall temperatures inside the furnace using an older model of optical pyrometer. Comparison of these results versus the gold cup contact thermocouple showed the actual skin temperatures to be lower than the site pyrometer indicated by over 50°C, allowing the outlet temperature to be raised to increase conversion. The gold cup contact thermocouple is the most accurate device for measuring tube wall temperatures, as the direct tube contact eliminates the need for background corrections.

Additionally, the exceptional wide viewing angle capability of the Reformer Imager was utilised to inspect the convection bank coils. The temperatures extracted from the recorded videos indicated the installed temperature indicator was reading high, thereby removing another artificial limit of the plant.

The results of this Reformer Survey significantly contributed to achieving an increase in production rates of over 30%. The resulting increase in hydrogen released a costly constraint on the hydrocracker, with this key unit dependent on the hydrogen plant operating at capacity to maximise refinery profitability.

The combination of Johnson Matthey's state-of-the-art equipment and extensive experience in steam reforming provided significant benefits to Petroineos, creating additional value through safely increasing production rates.



Customer focus and collaboration, leading Johnson Matthey into our third century as a company.

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Billingham, UK  
 Tel: +44 (0) 1642 553601  
 Tel: + 1 732-223-4644  
 www.matthey.com