ABSTRACT

Upgrade of Demineralisation Plant at the Methanol 3 Facility

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The incoming water to the Methanol Facility contains dissolved salts and suspended solids, which can negatively affect the operation of the boilers and the process system. As such, removal of these impurities is undertaken in an on-site water treatment utility, referred to as the "Demineralisation Plant", prior to use of the water in the methanol production operations.

The Demineralisation Plant at the Methanol 3 facility is plagued with the inability to consistently produce the quantity and quality of water required to sustain the methanol production at its maximum rates. This results in higher operational costs and the need to import treated/polished water from the nearby Methanol 4 facility.

A thorough investigation of the present, historical and design performance and operation of the Demineralisation Plant showed the demineraliser section as under-performing. The filtration and polishing sections were found to be quite effective in their operations.

Deficiencies in the equipment were highlighted as the contributor to the inconsistent performance of the demineraliser. The main problems identified were:

- leaking valves
- an unstable air block
- a malfunctioning eductor system
- failures of distributors/collectors
- the absence of a decarbonation system

A detailed engineering analysis of the problems established the following corrective actions:

- conducting routine preventative maintenance
- installing additional equipment
- relocating sample points
- upgrading and reinforcing existing pieces of equipment.

An economic analysis based on the present demineraliser operating cost and the expected reduced operating cost with the modifications/upgrade, showed the payback period for the upgrade to be approximately 6 years. Taking the remaining useful life of the plant to be 9 years, this upgrade is feasible and thus should be implemented.

Upgrading of the demineraliser will produce the desired results of improved demineralisation plant performance, reduced operational cost (reduced regenerant and water usage, and extended resin service life) and reduced Plant Operator intervention.

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