

## **Control Soil Side Corrosion of Above Ground Tanks By Injection Vapor Phase Corrosion Inhibitors (VPCI)**

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The above ground storage tanks (AST's) in the refinery is experiencing bottom plate underside (soil) corrosion at an extraordinarily high rate of 1mm/year. This has resulted in the failure of 7 tanks within a period of 11 years since commissioning (2006-2017).

The corrosion morphology is of severe localized corrosion with large deep pits. The design of the underside corrosion protection for the AST's is by providing an impressed current cathodic protection (ICCP) system (MMO grid anode system). Recent and past cathodic protection (CP) survey of the tanks clearly reveal a very low (electropositive) polarized potential across the tanks indicating the CP system has not functioned correctly since commissioning. The corrosion rates observed has been amplified by the ingress of water (through the gaps between annular plate and foundation), primarily from leaking fire water sprinklers, which bring in bacteria and corrosive anions like chloride and sulfate. With the CP system being ineffective and no other means of corrosion control, the tank floor was exposed to a severe form of bacterial and under deposit corrosion leading to perforation and loss of inventory within 8 years from commissioning.

Vapor phase inhibitors (VPCI) were used to temporarily extend the life of the tank bottom plates for 21 tanks out of 46 tanks. The injection of VPCI underneath the tank bottom plate was done online. After few months a significant reduction in corrosion rate is identifiable across the majority of ER probes in total of 108 probes are installed across 21 tanks. The average percentage reduction in the corrosion rate based in ER probes readings is about 70%.

**Key Words:** Storage Tanks, Impressed Current CP System, Soil Side Corrosion, Vapor phase inhibitors