



4th International Conference on Oil, Gas & Petrochemistry

September 23-24, 2019 Kuala Lumpur, Malaysia

Effect of Recycled Sour Water to Refinery Asset's Integrity

Azzura Ismail

Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia

Sour water is contaminated water that produces from crude distillation unit. Sour water composed of many unknown elements that may initiate corrosion problem. The purpose of this research is to identify corrosion rate of carbon steel in this sour water and effect of using this overhead sour water as wash water to other units such as crude unit desalter system. The composition of sour water was investigated to identify aggressive elements in the sour water that may initiate corrosion problem at overhead crude system if untreated sour water used as wash water for crude unit desalter system. ICP test been conducted to identify any elements that may initiate corrosion such as Cd, Cu, Pb, Zn and Cr in sour water composition. Apart, pH, salinity and dissolve oxygen in sour water shown that sour water not achieve the Petronas's technical standard for wash water. Carbon steel were used as working electrode in this research to represent material used in Petronas. Electrochemical test using potentiostat and immersion test had been conducted to identify the corrosion rate of carbon steel. Three different solutions were prepared namely, sour water, sodium chloride (NaCl) and dilution of sour water used to make comparison between the rates of corrosion. The results of electrochemical and immersion was been compared and the trend of the graphs was analysed. Weight loss for immersion test and Tafel extrapolation graph from potentiostat indicate the corrosion rate higher in sour water compared to other solutions. The corrosion product on specimen been observed under optical microscope and Scanned Electron Microscope. The elements of iron, oxide, carbon and sulphur found in sour water while element of iron, oxide, carbon, silicon, manganese and sodium found in seawater from EDX and XRD test. The hardness of carbon steel and after the experiment been measured and decrease after corrosion attack. However, sour water with purged oxygen revealed reduction rate on carbon steel up to 20%. As a conclusion, sour water is not suitable to be used directly as wash water in overhead crude system. However, it can be recycle if the solution is treated with inhibitor and purged out the oxygen.

Biography

Dr. Azzura Ismail was graduated from the University of Leeds, United Kingdom in corrosion area and currently senior lecturer at the Faculty of Mechanical and Manufacturing Engineering of Universiti Tun Hussein Onn Malaysia. With her 16 years and more experience in teaching, she has taught several courses for postgraduate and undergraduate students. Her research interest is in corrosion, materials selection and failure analysis with regards to corrosion failures. She has research collaboration with industries and was attached to Malaysia's prestigious oil & gas company, Petronas. She also an active member to several memberships and currently a treasurer of National Association of Corrosion Engineers (NACE) International, Founding Malaysia Section.