

The Bio-Corrosive Nature of Injection Water Sources Used in the Nigerian Oil and Gas Industry.

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Abstract

The bio-corrosive nature of injection water used in the Nigerian oil and gas industry from different sources such as seawater, produced water, brackish water, fresh and underground water were investigated with special emphasis on some of their components which enhance corrosion such as microbial activity, dissolved oxygen and presence of dissolved substances such as chlorides, sulfates and ammonia. Our investigation reveals that seawater, produced water and brackish water had higher salinity, conductivity, concentrations of dissolved oxygen, TDS, sulfate, organic nutrients, sulphate reducing bacteria (SRB), acid producing bacteria (APB) and higher corrosion rates ($0.24-0.56 \text{ mm yr}^{-1}$) than fresh and underground water whose corrosion rates ranged between $0.06-0.08 \text{ mm yr}^{-1}$. Our study also established high correlation between corrosion rates and the concentrations of Fe^{2+} , SRB, APB, TDS, DO and conductivity in all injection water samples examined in the study. The role of microorganisms in enhancing corrosion was also clearly established in some samples.

Keywords: bacterium, micro-organisms, seawater, subsaharan Africa, sulphate reducing bacteria

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