

Pipelines Corrosion Due to the Electromagnetic Pollution caused by the High Voltage Power

M'hamed OUADAH, Omar TOUHAMI, Rachid IBTIOUEN, Ahcen BOUZIDA, Saida Bouyegh, Djilali Allou, Ahmed HADDAD

Abstract : This paper studies the effect of the electromagnetic pollution caused by the high voltage power lines on the corrosion of the buried pipeline. In this objective, the finite element method (FEM) was used to calculate the magnetic field distribution and the induced current densities in the buried pipeline caused by both horizontal and vertical configuration of the HVPL during steady state conditions. In order to diagnose the effect of the electromagnetic pollution on the corrosion of the pipeline, the electrochemical impedance spectroscopy (EIS) measurements were used to characterize the corrosion polarization properties of X70 steel in simulated soil at various AC current densities. The results show that, the electromagnetic pollution caused by the high voltage power lines affect the electrochemical characteristics of the X70 steel pipeline and accelerate the corrosion of the pipeline.

Keywords : Electromagnetic pollution, high voltage power line, induced current density, X70 steel pipeline, corrosion, Finite Element Method, electrochemical impedance spectroscopy.