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DIAGNOSIS OF THE AC CURRENT DENSITIES EFFECT ON THE CATHODIC PROTECTION PERFORMANCE OF THE STEEL X70 FOR A BURIED PIPELINE DUE TO ELECTROMAGNETIC INTERFERENCE CAUSED BY HVPTL

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Abstract: This paper diagnosis the effect of the AC current densities induced by the electromagnetic interference between high voltage power line and buried power line on the cathodic protection performance of the X70 steel in simulated soil. First, the induced AC voltage onto the pipeline was calculated for different power line configuration, separation distances between transmission line and pipeline and parallelism lengths. The induced AC current density was calculated function to the induced AC voltage, soil resistivity, and holiday diameter. Then, the electrochemical characters of the X70 steel at various AC current densities are measured using the potentiodynamic method. The electrochemical parameters obtained by the electrochemical tests are used as boundary conditions in the cathodic protection simulation model. The results indicate that, under influence of AC current densities, the X70 steel is more susceptible to corrosion, and the cathodic protection is unable to maintain the protection potential.

Keywords : cathodic protection, electromagnetic interference, AC Corrosion