Electromagnetic Interference Between Overhead Transmission Lines and Lines and Oil/Gas Pipelines

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Abstract

A gas pipeline which shares common corridor with AC Overhead Transmission Line (OHTL) becomes energized by the magnetic and electric fields surrounding the power system in the air and soil. In consequences of this sharing, an electromagnetic interference occurred between the OHTL and pipelines during normal load and fault conditions. This electromagnetic interference is captured by the pipeline, resulting in induced AC potential which varies in magnitude throughout the length of the pipeline. The pipeline potential for the normal load and fault conditions sometimes are exceeding the acceptable limits determined in accordance to ANSI/IEEE Standard 80 and other international standards. The induced potential on pipelines can be dangerous and potentially life threatening for operation personnel to touch the pipeline or appurtenances and can damage the pipeline's coating. In addition pipeline corrosion also can result from AC discharge. This project investigates the electromagnetic interference of the OHTL on the nearby buried gas pipeline. The electromagnetic interference was simulated using a state of the art software CDEGS. This software used to produce a set of design curves, which illustrate the effects of various parameters (separation distance, soil resistivity, and current magnitude) upon electromagnetic interference between transmission lines and nearby gas pipelines during both the steady-state and fault conditions. This project also describes the resulting reduction in the pipeline potential made by applying mitigation methods.