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AC corrosion : detection, investigations and mechanisms

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Abstract:

During the recent years, there has been a renewed interest for AC induced corrosion. Buried pipelines parallel to high voltage electrical transmission lines and flowlines for oil and gas immersed in the sea are two important applications. CEBELCOR has produced a considerable work to develop a method for the detection of AC induced corrosion in the field. This led to a system and an instrumentation (the CORREAC system) that measures the « true potential » (without ohmic drop error), the current density and the pase angle at every instant of an AC period. These data give an interesting insight on the presence or absence of AC induced effects at different times and places along the pipelines and on their influence on the corrosion rate. This paper describes the method and the instrumentation, the result of several extensive laboratory studies, the experience gained in the field and some mechanisms that are currently considered valid for AC induced corrosion. One of the conclusions of these studies is that AC polarisation can prevent the formation of protective films. The CORREAC system allows also to determine the pH at the metal interface and the situation with regard ot hydrogen evolution.

Keywords : AC corrosion, cathodic protection, overprotection, hydrogen, buried pipelines, flowlines

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