Failures of insulating joints and spark gaps on the Hellenic Gas Pipeline System – a case study

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Abstract

The practical experience derived from the field performance of insulating joints or flanges of the natural gas pipeline system of Greece is briefly presented. The defective isolation incidents on buried insulating joints were effectively mitigated by a proper surge protection scheme that has been applied. However, after a time period of a seemingly reliable operation, extending over a decade, two buried underground monolithic insulating joints lost their isolation properties despite being protected by properly installed spark gaps. On another insulating joint the spark gap malfunctioned whereas the insulating joint largely maintained its isolating properties. The causes of these failures are investigated and possible explanations are provided. The aging of spark gaps and the aging related reduction of the dielectric strength of the joints is also discussed in the paper.