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Standard Practice

Pipeline External Corrosion Direct Assessment Methodology

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Foreword

External corrosion direct assessment (ECDA) is a structured process that is intended to improve safety by assessing and reducing the impact of external corrosion on pipeline integrity. By identifying and addressing corrosion activity, repairing corrosion defects, and remediating the cause, ECDA proactively seeks to prevent external corrosion defects from growing to a size that is large enough to impact structural integrity.

ECDA as described in this standard practice is specifically intended to address buried onshore pipelines constructed from ferrous materials. Other methods of addressing external corrosion on onshore ferrous pipelines, such as pressure testing and in-line inspection (ILI), are not covered in this standard but are covered in other industry standards. Users of this standard must be familiar with all applicable pipeline safety regulations for the jurisdiction in which the pipeline operates. This includes all regulations requiring specific pipeline integrity assessment practices and programs. This standard is intended for use by pipeline operators and others who must manage pipeline integrity.

ECDA is a continuous improvement process. Through successive ECDA applications, a pipeline operator should be able to identify and address locations at which corrosion activity has occurred, is occurring, or may occur. One of the advantages of ECDA is that it can locate areas where defects could form in the future rather than only areas where defects have already formed.

Pipeline operators have historically managed external corrosion using some of the ECDA tools and techniques. Often, data from aboveground inspection tools have been used to locate areas that may be experiencing external corrosion. The ECDA process takes this practice several steps forward and integrates information on a pipeline's physical characteristics and operating history (pre-assessment) with data from multiple field examinations (indirect inspections) and pipe surface evaluations (direct examinations) to provide a more comprehensive integrity evaluation with respect to external corrosion (post assessment).

This standard was originally prepared in 2002 by Task Group (TG) 041—Pipeline Direct Assessment Methodology, and it was reaffirmed in 2008 by Specific Technology Group (STG) 35—Pipelines, Tanks, and Well Casings. This standard is issued by NACE under the auspices of STG 35.

In NACE standards, the terms *shall, must*, *should,* and *may* are used in accordance with the definitions of these terms in the *NACE Publications Style Manual.* The terms *shall* and *must* are used to state a requirement, and are considered mandatory. The term *should* is used to state something good and is recommended, but is not considered mandatory. The term *may* is used to state something considered optional.

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Section 1: General

1.1 Introduction

1.1.1 This standard covers the NACE external corrosion direct assessment (ECDA) process for buried onshore ferrous piping systems. This standard is intended to serve as a guide for applying the NACE ECDA process on typical pipeline systems.

1.1.2 This standard was written to provide flexibility for an operator to tailor the process to specific pipeline situations.

1.1.3 ECDA is a continuous improvement process. Through successive applications, ECDA should identify and address locations at which corrosion activity has occurred, is occurring, or may occur.

1.1.3.1 ECDA provides the advantage and benefit of locating areas where defects can form in the future rather than only areas where defects have already formed.

1.1.3.2 Comparing the results of successive ECDA applications is one method of evaluating ECDA effectiveness and demonstrating that confidence in the integrity of the pipeline is continuously improving.

1.1.4 ECDA was developed as a process for improving pipeline safety. Its primary purpose is preventing future external corrosion damage.

1.1.4.1 This standard assumes external corrosion is a threat to be evaluated. It can be used to establish a baseline from which future corrosion can be assessed for pipelines on which external corrosion is not currently a significant threat.

1.1.5 ECDA as described in this standard is specifically intended to address buried onshore pipelines constructed from ferrous materials.

1.1.6 ECDA applications can include but are not limited to assessments of external corrosion on pipeline segments that:

1.1.6.1 Cannot be inspected using other inspection methods (such as ILI or pressure testing).

1.1.6.2 Have been inspected using other inspection methods as a method of managing future corrosion.

1.1.6.3 Have been inspected with another inspection method as a method of establishing a reassessment interval.

1.1.6.4 Have not been inspected using other inspection methods when managing future corrosion is of primary interest.

1.1.7 ECDA may detect other pipeline integrity threats, such as mechanical damage, stress corrosion cracking (SCC), microbiologically influenced corrosion (MIC), etc. When such threats are detected, additional assessments and/or inspections must be performed. The pipeline operator should utilize appropriate methods such as ASME[(1)] B31.4,[1] ASME B31.8,[2,3] and API[(2)] 1160[4] to address risks other than external corrosion.

1.1.8 ECDA has limitations and all pipelines cannot be successfully assessed with ECDA. Precautions should be taken when applying these techniques just as with other assessment methods.

1.1.8.1 This standard can be applied to poorly coated or bare pipelines in accordance with the methods and procedures included herein and given in Appendix A (nonmandatory). Poorly coated pipelines are usually treated as essentially bare if the cathodic current requirements to achieve protection are substantially the same as those for bare pipe.

1.1.9 For accurate and correct application of this standard, the standard shall be used in its entirety. Using or referring to only specific paragraphs or sections can lead to misinterpretation and misapplication of the recommendations and practices contained herein.

1.1.10 This standard does not designate practices for every specific situation because of the complexity of conditions to which buried piping systems are exposed.

1.1.11 The provisions of this standard should be applied under the direction of competent persons who, by reason of knowledge of the physical sciences and the principles of engineering and mathematics, acquired by education and related practical experience, are qualified to engage in the practice of corrosion control and risk assessment on buried ferrous piping systems. Such persons may be registered professional engineers or persons recognized as corrosion

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