

Standard Practice

Pipeline Integrity Method Selection

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Foreword

This standard practice provides guidance on determining the appropriate integrity assessment method for diagnosing the corrosion threats recognized as part of a pipeline integrity process. This NACE integrity assessment methodology is limited to addressing external corrosion (EC), internal corrosion (IC), and stress corrosion cracking (SCC). It has the potential to indicate prior mechanical damage threats, such as third party or vandalism, and it cannot locate threats that are the result of equipment damage, manufacturing technologies, construction practices, incorrect operations, or weather and external force. The integrity assessment techniques to be covered include in-line inspection (ILI), direct assessment (DA), pressure testing, and other new technology techniques.

The pipeline integrity process is a continuous improvement process. A particular assessment integrity method may not be the same one used for the first and subsequent assessment. The lessons learned after each assessment assist in determining the appropriate method for subsequent assessments. Through successive applications of the integrity assessment methods, a pipeline operator should be able to identify and address locations at which corrosion activity has occurred, is occurring, or may occur. The process is intended to assist in locating areas where defects could form in the future rather than only identifying those areas where defects have already formed.

This standard is intended for use by individuals and teams planning, implementing, and managing corrosion integrity assessment projects and programs, including managers, supervisors, and engineers.

The integrity assessment process in this standard is specifically intended to address buried onshore pipelines constructed from ferrous materials. Users of this standard must be familiar with all applicable pipeline safety regulations and industry standards for the jurisdiction in which the pipeline operates. This includes all regulations requiring specific pipeline integrity assessment practices and programs.

This NACE Standard was developed by Task Group (TG) 401, "Integrity Assessment Tool Selection," which is administered by Specific Technology Group (STG) 35, "Pipelines, Tanks, and Well Casings." This standard is issued by NACE International 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 Corrosion integrity assessment is a process for improving pipeline safety. Its primary purpose is to prevent future corrosion damage.

1.1.2 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 may lead to misinterpretation and misapplication of the recommendations and practices contained herein.

1.1.3 This standard provides the evaluation methodology, but does not designate practices for every specific or unique situation because of the complexity of conditions to which buried piping systems are exposed.

1.1.4 This standard presents a methodology for the selection of integrity assessment methods for external corrosion, internal corrosion, and SCC on onshore ferrous pipelines carrying natural gas and hazardous liquids.

1.1.5 This standard provides flexibility for the pipeline operator to tailor the corrosion integrity assessment method to specific pipeline situations.

1.1.6 This methodology is a continuous improvement process. Through periodic successive assessments, the process should identify and address locations at which corrosion activity has occurred, is occurring, or may occur, and show the effectiveness of various mitigation programs.

1.1.6.1 This methodology provides the advantage and benefit of locating areas in which corrosion wall loss may form in the future rather than only areas in which corrosion defects have already formed.

1.1.6.2 Comparing the results of the successive periodic assessments is one method of evaluating the integrity assessment process, determining the effectiveness, and demonstrating that confidence in the integrity of the pipeline with respect to the corrosion threats continuously improving.

1.1.7 The individual integrity assessment processes may detect pipeline integrity threats other than EC, IC, and SCC, such as mechanical damage, microbiologically influenced corrosion (MIC), etc. When such threats are detected, additional assessments and inspections should be performed. The pipeline operator should utilize appropriate assessment methods such as those listed in ANSI⁽¹⁾/ASME⁽²⁾ B31.4,¹ ANSI/ASME B31.8,² ANSI/ASME B31.8S,³ and API⁽³⁾ 1160⁴ to address each of these other risks.

1.1.8 Each integrity assessment method complements the others. They do not have identical performance, but each has advantages over the others. All pipelines may be successfully assessed with just one particular method. Precautions should be taken when applying these methodologies, just as with other assessment methods, in order to choose what is most appropriate.

1.1.9 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 specialists or cathodic protection (CP) specialists by organizations such as NACE or engineers or technicians with suitable levels of experience, if their professional activities include external corrosion control of buried ferrous piping systems.

⁽¹⁾ American National Standards Institute (ANSI), 25 West 43rd St., 4th Floor, New York, NY 10036.

⁽²⁾ ASME International (ASME), Three Park Ave., New York, NY 10016-5990.

⁽³⁾ American Petroleum Institute (API), 1220 L St. NW, Washington, DC 20005.