Pipeline Leak Detection—Program Management

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ERRATA

Page 55, Section 14 should read:

14 Management of Change (MOC)

Pipeline operators shall apply their formal MOC process as required in 49 *CFR* Part 195.446(f). The MOC process should include the requirements of API 1167, Section 14 and API 1160, Section 13. The requirements of the two API documents may be tailored to accommodate the unique aspects of LDSs.

Changes to any aspects of LDSs (technical, physical, procedural, and organizational) should follow the pipeline operator's formal MOC process.

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Shall: As used in a standard, “shall” denotes a minimum requirement in order to conform to the specification.

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Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

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0 Introduction

Background

The general public, Congress, the National Transportation Safety Board (NTSB), and the Pipeline and Hazardous Materials Safety Administration (PHMSA) have a high level of interest in the subject of pipeline leak detection. PHMSA has been exploring issues involving leak detection program (LDP) effectiveness for a number of years, including through proposed rulemaking. Recent Congressional mandates and National Transportation Safety Board (NTSB) recommendations are attempts to address gaps in LDPs. The Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 required the Secretary of Transportation to analyze technical, operational, and economic feasibility aspects on LDPs used by pipeline operators of hazardous liquid pipeline facilities and transportation-related flow lines. The Act also required a report to Congress and the issuance of rulemaking, if practical to do so. Along with this Recommended Practice (RP), PHMSA is working to address a leak detection related recommendation for natural gas transmission and distribution pipelines, as prompted by the NTSB. PHMSA has taken a number of initiatives to help address the congressional mandate and NTSB recommendation including sponsoring a public workshop on improving the effectiveness of LDPs in 2012, coordinating research and development forums and related solicitations in 2012 and 2014, and commissioning an independent study on leak detection in 2012.

PHMSA has communicated with industry on potential measures to further address leak detection effectiveness through related standards and asked the American Petroleum Institute (API) and the Association of Oil Pipelines (AOPL) for comment on whether expanding the existing API 1130, *Computational Pipeline Monitoring for Liquids,* or creating a new guidance document are viable options for addressing concerns of congressional mandates. In a joint response to PHMSA, API and AOPL chose the latter as the best approach to improve safety and made a commitment to develop this new RP for Pipeline LDP Management.

This pipeline LDP management Recommended Practice (RP) provides guidance to pipeline operators of hazardous liquid pipeline systems regarding a risk-based pipeline LDP management process.

This RP is specifically designed to provide pipeline operators with a description of industry practices in risk-based pipeline LDP management and to provide the framework to develop sound program management practices within a pipeline operator's individual companies. It is important that pipeline operators understand system vulnerabilities, risks, and program management best practices when reviewing a pipeline LDP management process either for a new program or for possible system improvements.

It is recognized that this RP creates new requirements and practices that may take time to fully implement.

Objectives

This RP is written to provide guidance to pipeline operators for developing and maintaining management of pipeline LDPs. The elements of this RP are written to conform to current pipeline regulations and to encourage pipeline operators to "go beyond" and, in so doing, to promote the advancement or stronger utilization of LDPs in hazardous liquid pipelines.

This RP is intended to be used in conjunction with other industry-specified documents.

This RP builds on and augments existing requirements and is not intended to duplicate requirements of any other consensus standards or regulations.

While API 1175 is based on industry best practices, each pipeline operator is expected to tailor their LDP to their particular requirements.

The goal of an operator is to operate their pipelines safely and reliably so that there are no adverse effects on the public, employees, the environment, or the pipeline assets. This pipeline LDP management RP aids in this primary goal by the following.

— Providing hazardous liquid pipeline operators with guidance on development, implementation, and management of a sustainable LDP to minimize the size and consequences of leak events.

— Providing pipeline operators with enhanced guidance on selection of leak detection systems (LDSs) using a risk-based approach and on establishing performance measures for the capabilities of LDSs unique to each pipeline to meet or exceed the requirements of 49 *CFR* Part 195, such as in 195.452(i)(3), pertaining to leak detection related preventive and mitigative measures a pipeline operator shall take to protect a sensitive area (SA).

— Addressing identified gaps and incorporating guidance into a comprehensive program document.

The LDP decisions rely on a thorough assessment and analysis of risk and threats as they apply to leak detection and should integrate with the pipeline operator's acceptable risk level. An LDP may reduce the consequence of a leak and contribute to the development from a "thinking to knowing" leak detection culture.

The sections of this RP do not include the following:

— detailed technical design of LDSs (as this is pipeline operator, LDSs, and infrastructure dependent);

— SCADA system design (as this is already covered in other API documents, for example API 1113, API 1164, API 1165, or API 1167);

— specific performance metrics (an individual pipeline operator's risk-based approach and engineering evaluation covers this);

— field response (as this is covered in a pipeline operator's emergency response plan);

— presentation of information to Pipeline Controllers (covered in API 1165);

— equipment selection criteria (as these are specific to a pipeline operator, LDS, and vendor selection);

— a universal metric for pipeline leak detection performance (it is not a practical objective); or

— a definition of the relationship between emergency flow restriction devices (EFRDs) and leak detection (EFRDs and leak detection are two different mitigation systems).

Pipeline Leak Detection—Program Management

1 Scope

API Recommended Practice (RP) 1175 establishes a framework for Leak Detection Program (LDP) management for hazardous liquid pipelines that are jurisdictional to the U.S. Department of Transportation (specifically, 49 *CFR* Part 195). This RP is an industry consensus document written by a representative group of hazardous liquid pipeline operators. API 1175 focuses on using a risk-based approach to each pipeline operator's LDP. Reviewing the main body of this document and following the guidance set forth assists in creating an inherently risk mitigating LDP management system. API 1175 represents industry best practices in managing an LDP. All forms of leak detection used by a pipeline operator should be managed in a coordinated manner. The overall goal of the LDP is to detect leaks quickly and with certainty, thus facilitating quicker shutdown and therefore minimizing negative consequences. This RP focuses on management of LDPs, not the design of leak detection systems (LDSs), and therefore contains relatively little technical detail. As with API 1130, API 1175 applies to single-phase pipelines only; however, the approach may be applicable to pipelines that are not single phase.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies (including any addenda/errata).

API Publication 1149, *Pipeline Variable Uncertainties and Their Effects on Leak Detection Sensitivity*

API Recommended Practice 1130, *Computational Pipeline Monitoring for Liquids*, September 2007

API Recommended Practice 1162, *Public Awareness Programs for Pipeline Operators*, December 2010

API Recommended Practice 1160 *Managing System Integrity for Hazardous Liquid Pipelines*, September 2013

API Recommended Practice 1167, *Pipeline SCADA Alarm Management*, December 2010

US DOT [1] 49 *CFR* Part 195 (general) 2015

3 Terms, Definitions, Acronyms, and Abbreviations

3.1 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
continuous leak detection
Leak detection system that is operating in real time or near real time.

NOTE It is usually SCADA-connected or uses continuous telemetry.

3.1.2
consequence level
Ranking of the possible consequences of a leak based on a calculated value or a relative value of the consequences.

[1] US Department of Transportation, 1200 New Jersey Ave SE, Washington DC 20590, www.dot.gov.