Pipeline Leak Detection—Program Management

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Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

Contents

Contents

Contents

Figures

Tables

Introduction

Background

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

This RP is designed to provide 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 an operator's individual companies.

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

Objectives

This RP is written to provide guidance to 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 operators to "go beyond" and, in so doing, to promote the advancement or stronger utilization of LDPs in hazardous liquid pipelines.

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

Each operator is expected to tailor their LDP to their 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 operators with guidance on development, implementation, and management of a sustainable LDP to minimize the size and consequences of leak events.

— Providing 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 an operator shall take to protect a sensitive area.

— 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 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.

This RP does not include the following:

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

— SCADA system design (as this is already covered in other API documents, for example API RP 1113 [1] , API RP 1165, or API RP 1167);

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

[1] This is a historical document and is no longer supported by API.

— field response (as this is covered in an operator’s emergency response plan);

— presentation of information to controllers (covered in RP 1165);

— equipment selection criteria (as these are specific to an 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. This RP is an industry consensus document revised by hazardous liquid pipeline operators, leak detection manufacturers, consultants, and others. API RP 1175 focuses on using a risk-based approach to each 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 RP 1175 represents industry best practices in managing an LDP.

All leak detection systems (LDSs) used by a pipeline operator should be managed in a coordinated manner. The 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 LDSs, and therefore contains relatively little technical detail. As with API RP 1130, API RP 1175 is intended for single-phase pipelines only; however, the approach may be applicable to pipelines that are not single phase.

Leak detection reduces the consequences of a LOC but does not reduce the likelihood of a leak. An appreciation and evaluation of leak event likelihoods, threats, and vulnerabilities drives the design of the LDP.

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 Recommended Practice 1130, *Computational Pipeline Monitoring for Liquids*

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

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

API Recommended Practice 1167, *Pipeline SCADA Alarm Management*

API Recommended Practice 1173, *Pipeline Safety Management Systems*

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.

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.

3.1.3
dynamic leak volume
Amount of hazardous liquid that is leaked after the onset of a leak prior to the shutdown of the pipeline or other appropriate operational response is initiated.