Pressure Equipment Integrity Incident Investigation

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1 Scope

1.1 General

The purpose of this document is to provide owner-operators with practices for developing, implementing, sustaining, and enhancing an investigation program for pressure equipment integrity (PEI) incidents. This recommended practice (RP) describes characteristics of how an effective investigation could be structured so organizations can learn from PEI failures, near-misses, or discoveries. This RP is not intended to define or supplement criteria for compliance with regulatory requirements for which companies already have defined investigation processes in place. Rather, API 585 provides a specific focus on investigating PEI failures as well as near misses or discoveries that are precursors to potential failures that could have significant impact on safety, health, and environment. As such, this RP can add value to process safety incidents/issue investigations by helping to focus specific investigative techniques that would enhance learning and enhance value from PEI incidents.

Significant pressure equipment mechanical integrity incidents are rarely the result of one isolated problem; there are almost always less severe precursors to an equipment failure. These precursors are frequently called near misses or discoveries when they are experienced. Additionally, this document highlights the value in recognizing these precursor occurrences and promotes investigating them to determine the immediate, contributing, and root causes. If these precursor occurrences are uncovered, investigated, and the contributing and root causes are resolved, then major catastrophic failures of pressure equipment could be minimized or prevented.

1.2 Industry Scope

The investigation principles and concepts that are presented in this RP are specifically targeted for application to pressure equipment in the oil, gas, refining and petrochemical industry but could be applied to other equipment and industries at the discretion of the owner-operator.

1.3 Flexibility in Application

Because of the broad diversity in an organization’s size, culture, national, and/or local regulatory requirements, API 585 offers users the flexibility to apply the investigation methodology within the context of existing incident investigation practices and to accommodate unique local circumstances. API 585 is intended to promote the use of systematic investigations as a way to learn from unexpected leaks and equipment degradation or near misses associated with PEI.

As such, API 585 is intended to supplement owner-operator incident investigation procedures when the incident involves pressure equipment failures, near-misses, and discoveries such as those that involved one of the equipment damage mechanisms outlined in API 571. As indicated below in 1.4, API 585 offers information focused on PEI incidents that can enhance the typical features of process safety incident investigations. Referencing API 585 in owner-operator and site investigation procedures may help to bring the PEI focus to bear on such incidents.

Investigation methodologies consist of investigators collecting evidence and conducting an analysis of the evidence to determine the causes. Many types of investigation analysis methods exist and are used throughout the industry. This document is not intended to single out one specific analysis method for conducting investigations. This document highlights PEI issues for investigation and provides guidelines and work processes for PEI incident investigations.

1.4 Pressure Equipment Integrity (PEI) Focused

Investigation is a vital element for learning from unexpected discoveries or incidents (e.g. finding significantly more corrosion damage or other forms of deterioration than expected) and can be used in a continuous improvement process. Investigating and determining the causes of unexpected leaks, equipment degradation, or near misses