Elements of a Risk-Based Inspection Program

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Introduction

The use of Risk-Based Inspection (RBI) methodologies for inspection planning is not compulsory. The use of RBI is entirely optional, subject to the requirements and limitations of the other inspection codes (such as API 510, API 570, and API 653). This recommended practice (RP) contains the requirements and expectations required to establish and maintain an API 580 compliant RBI program.

RBI is a systematic process that begins with identification of facilities or equipment, continues with a determination of risk (via probability of failure and consequence of failure analysis). The process culminates in the creation of a risk-based management plan based on the credible damage mechanism(s) and the risk of failure. Owner-operators may utilize this output to prioritize the execution of the inspection programs effectively and efficiently. For the purposes of this document, RBI is synonymous with descriptions of other RBI programs used in the industry: risk-prioritized inspection, risk-informed inspection, and inspection planning using risk-based methods.

Elements of a Risk-Based Inspection Program

1 Scope

1.1 Industry Scope

This RP is specifically targeted to the application of RBI in the hydrocarbon and chemical process industries. The principles and concepts herein can be applied in other industries with appropriate documentation.

1.2 Purpose

The purpose of this RP is to provide users with the recommended elements for developing, implementing, and maintaining an RBI program. This RP provides guidelines for establishing an RBI program which when implemented properly, will allow the owner-operator to integrate risk assessment and inspection planning into an existing inspection program. The approach emphasizes safe and reliable operation through risk-prioritized inspection. A spectrum of complementary risk analysis approaches (qualitative through fully quantitative) can be considered as part of the inspection planning process.

This RP contains individual sections that describe the steps in applying concepts and principles of an RBI program which include:

a) risk-based inspection analysis methods;

b) planning the RBI program;

c) roles, responsibilities, training, and qualifications;

d) data and information collection for a risk assessment;

e) damage mechanisms review;

f) assessing probability of failure (POF);

g) assessing consequence of failure (COF);

h) risk determination, assessment, and management;

i) other risk management activities;

j) evergreening and reassessment of the risk assessment; and

k) RBI documentation and recordkeeping.

1.3 Flexibility in Application

Because of the broad diversity in organizational size, culture, and regulatory requirements, this RP offers users the flexibility to create and implement an RBI Program within the context of existing corporate risk management practices—including the selection and application of a specific RBI methodology.

Various RBI methodologies exist and are currently being applied throughout industry. This RP is not intended to recommend nor endorse any specific methodology for implementing the assessment steps within an RBI program. However, this document is designed to provide a framework that specifies the minimum requirements and expectations needed for a quality risk assessment without imposing undue constraints on users.