

Elements of a Risk-Based Inspection Program

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Contents

	Page
1	Scope..... 1
1.1	Industry Scope..... 1
1.2	Purpose..... 1
1.3	Flexibility in Application..... 2
1.4	Mechanical Integrity Focused..... 2
1.5	Target Audience..... 2
1.6	RBI Assessment Benefits and Limitations..... 2
2	Normative References..... 3
3	Terms, Definitions, Acronyms, and Abbreviations..... 4
3.1	Terms and Definitions..... 4
3.2	Acronyms and Abbreviations..... 11
4	Risk Assessment Concepts..... 11
4.1	What is Risk?..... 11
4.2	Risk Management and Risk Reduction..... 12
4.3	Relative Risk vs Absolute Risk..... 12
5	Introduction to Risk-Based Inspection..... 13
5.1	The Evolution of Inspection Intervals and Due Dates..... 13
5.2	Consequence of Failure (COF) and Probability of Failure (POF) for RBI..... 13
5.3	Precision vs Accuracy..... 15
5.4	Types of RBI Assessment..... 18
5.5	Expected Outcome of the RBI Process..... 21
5.6	Using RBI for Risk Management..... 21
5.7	Using RBI as a Continuous Improvement Tool..... 24
5.8	Relationship Between RBI and Other Risk-Based and Safety Initiatives..... 25
5.9	Relationship with Jurisdictional Requirements..... 27
6	Planning the RBI Program..... 27
6.1	Organizing the Work Process..... 27
6.2	Establishing Objectives and Goals of an RBI Assessment..... 30
6.3	Initial Screening..... 32
6.4	Establish Operating Boundaries..... 35
6.5	Selecting a Method of RBI Assessment..... 36
6.6	Factors Influencing the Resources and Time Required..... 37
6.7	Keys for Success: RBI Program Planning..... 37
7	Roles, Responsibilities, Training, and Qualifications..... 38
7.1	Team Approach..... 38
7.2	Team Members, Roles, and Responsibilities..... 38
7.3	Training and Qualifications for RBI Application..... 40
7.4	Keys for Success: Roles, Responsibilities, Training, and Qualifications for RBI Team Members..... 41
8	Data and Information Collection for RBI Assessment..... 41
8.1	General..... 41
8.2	RBI Data Needs..... 42
8.3	Data Quality..... 43
8.4	Codes and Standards—National and International..... 43
8.5	Sources of Site-Specific Data and Information..... 44

Contents

	Page
8.6	Keys for Success: Data and Information Collection..... 45
9	Damage Mechanism Review 46
9.1	General 46
9.2	Identifying Corrosion Rates and Damage Mechanisms..... 47
9.3	DMR Outcome Documentation 48
9.4	DMR Relationship with IOWs 48
9.5	Keys for Success—Damage Mechanisms and Failure Modes 48
10	Assessing Probability of Failure (POF)..... 49
10.1	Introduction to Probability of Failure (POF) 49
10.2	Units of Measure in the POF Analysis 49
10.3	Types of Probability of Failure (POF)..... 50
10.4	Determination of POF 51
10.5	Keys for Success—Assessing POF..... 52
11	Assessing Consequence of Failure (COF) 53
11.1	Introduction to COF Analysis 53
11.2	Types of Consequence of Failure (COF) Analysis 54
11.3	Units of Measure in Consequence of Failure (COF) Analysis 55
11.4	Volume of Fluid Released 58
11.5	Consequence of Failure Effect Categories 58
11.6	Determination of COF 62
12	Risk Determination, Assessment, and Management 65
12.1	Purpose 65
12.2	Determination of Risk 65
12.3	Understanding Acceptable Levels of Risk 66
12.4	Sensitivity Analysis 67
12.5	Assumptions 67
12.6	Risk Presentation..... 67
12.7	Risk Thresholds 69
12.8	Keys for Success—Risk Determination, Assessment and Management..... 69
13	Risk Management with Inspection Activities 70
13.1	Risk Management..... 70
13.2	Managing Risk by Reducing Uncertainty Through Inspection 70
13.3	Identifying Risk Management Opportunities from RBI Results 72
13.4	Establishing an Inspection Strategy Based on Risk Assessment 73
13.5	Managing Inspection Costs with RBI 73
13.6	Assessing Inspection Results 74
13.7	Achieving Lowest Life Cycle Costs with RBI 74
13.8	Modifying RBI Plans After a Failure Investigation 74
13.9	Keys for Success—Risk Management with Inspection Activities..... 74
14	Other Risk Management Methods 75
14.1	General 75
14.2	Equipment Replacement and Repair 75
14.3	Evaluating Flaws for Fitness-for-Service 75
14.4	Equipment Modification, Re-design, and Re-rating 75
14.5	Emergency Isolation 76

Contents

	Page
14.6	Emergency Depressurizing/De-inventory 76
14.7	Modify Process 76
14.8	Reduce Inventory..... 77
14.9	Water Spray/Deluge..... 77
14.10	Water Curtain..... 77
14.11	Blast-resistant Construction 77
14.12	Additional Risk Management Methods 77
14.13	Keys for Success—Other Risk Management Methods..... 78
15	Updating the RBI Assessment..... 78
15.1	The Difference Between Evergreening and Reassessment 78
15.2	Why Conduct an RBI Reassessment? 80
15.3	When to Conduct an RBI Reassessment 81
15.4	Keys for Success—Updating the RBI Assessment..... 82
16	RBI Documentation and Recordkeeping 82
16.1	Documenting the RBI Management System..... 82
16.2	Documenting the RBI Assessment 83
16.3	Documenting the Outcome of the RBI Assessment..... 84
16.4	Keys for Success—RBI Documentation and Recordkeeping 84
	Bibliography..... 85

Figures

1	Risk Plot..... 15
2	Accuracy vs Precision..... 16
3	Continuum of RBI Methods..... 19
4	Management of Risk Using RBI..... 23
5	Risk-Based Inspection Analysis Process..... 29
6	Determination of COF 63
7	Example Risk Matrix Using COF and COF Categories to Display Risk Rankings..... 68
8	Risk Plot when Using Quantitative or Numeric Risk Values 69

Tables

1	Example of RBI Inputs 17
2	Examples for Three Levels of Qualitative POF Ranking..... 50
3	Examples for Six Levels of Qualitative POF Ranking 50
4	Examples for Three Levels of Qualitative COF Ranking 54
5	Examples for Six Levels of Qualitative COF Ranking..... 54
6	Examples for Six Levels of Cost Consequence of Failure Ranking..... 57
7	Example for Three Levels of Safety, Health, and Environmental Consequence Categories..... 58
8	Examples for Six Levels of Safety, Health, and Environmental Consequence of Failure Categories..... 58

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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.

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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.