Introduction

"There are more things to alarm us than to harm us, and we suffer more often in apprehension than reality."

—Lucius Annaeus Seneca

Why We Wrote the Second Edition

In 2006, we published the original edition of *The Alarm Management Handbook*. It was then republished by ISA (with minor changes) as *Alarm Management: Seven Effective Methods for Optimum Performance*. The response to these books has been amazing. Thousands of copies have been sold. In some cases, single companies bought dozens of copies for their multiple sites and engineering organizations. We've had positive feedback from hundreds of readers.

The purpose of the original book was to capture in one volume the current body of best practices knowledge for improving and optimizing the performance of a modern alarm management system. The book focused on practical advice, strategies, and techniques. In 2006, there was no such alarm management reference book with such a practical focus.

The past four years have seen much growth and improvement in the alarm management landscape.

- Alarm Management has consistently remained as a high profile topic at technical symposia.
- Control systems manufacturers are beginning to understand the problems inherent in their system designs, and are making improvements.
- System implementers have begun to realize that rule-of-thumb methods of alarm configuration will cause big problems for the system owner, and are adopting improved methods.

- Third-party companies have continued to lead in technical innovations and advanced alarming solutions.
- Hundreds more successful implementations of alarm management principles have taken place, providing additional terabytes of data which continue to confirm the validity of the principles in this book.
- The electric power generation industry has begun widespread and concerted efforts in alarm management, accompanied by an alarm management recommended practice document published by the Electric Power Research Institute (EPRI), a document co-authored by the authors of this book.
- The American Petroleum Institute (API) is working on a recommended alarm management practice for pipelines (RP-1167), intended to be published in late 2010 or early 2011.
- ISA has (finally!) completed and published a standard on alarm management, an effort underway since 2003. This second edition contains information on this important development.

Given these factors, it makes sense to update the content within this book, and to provide additional guidance on some topics based upon the latest data and experiences.

This second edition, like the original work, will remain an intentionally different kind of book than you usually find in engineering circles. It is based on hundreds of person-years of extensive experience working with industrial control and alarm systems in almost every industry. All manner of practices make up the background information used in producing this book–the good and the bad, the best and the worst. The basis includes a working knowledge of the guidelines, standards, articles, reference works, and other materials on the subject, along with knowledge and experience obtained from hundreds of alarm management improvement projects.

Breakthrough results have been achieved by following the principles contained in this book. The principles herein can also enable new systems to be initially configured correctly, and not require expensive re-engineering after problems later become apparent.

In this book, you will find actual examples of good practices and poor practices. The various problems of alarm systems are covered with precise guidance on how they come about and how to effectively correct them. We know operating companies are limited by time, money, and

resources. We do not advocate academic, theoretical, or impractical approaches to the problems. Instead, in this book you will find fact-based, field proven, straightforward, and practical solutions.

Changes and Additions in the Second Edition

This second edition includes an additional 50 pages of information and many new figures. Questions and comments from readers of the original edition helped shape the new content. Much of the additional text provides more thorough discussion of specific topics, and almost every section in the book has been revised. There are some completely new sections and chapters as well.

The major changes and additions include:

- Where are we now–four years after the first edition
- Details and impact of the new standard *ANSI/ISA-18.2-2009 Management of Alarm Systems for the Process Industries*
- Changes in the regulatory environment
- Additional discussion on the human factors issues associated with alarm analysis
- Additional information about alarm management and batch and discrete manufacturing processes
- Additional information on alarm bad actor resolution
- Additional information on diagnostic alarms
- Alarm classification
- Improvements in alarm rationalization techniques
- A thorough examination of staged approaches to alarm rationalization
- Additional information on advanced real time alarming techniques
- An update on the future of alarm management
- An enhanced appendix on alarm philosophy documents
- An updated appendix on both High Performance HMI concepts (proper operator graphics) and control loop optimization methods

Is This Book for You?

This book specifically targets alarm management related to modern Distributed Control Systems (DCSs). This designation includes SCADA systems (Supervisory Control and Data Acquisition). These flexible and capable systems are used throughout various industries, including oil and gas, refining, chemical, petrochemical, pulp and paper, pharmaceu-

ticals, power generation, minerals processing, discrete manufacturing, and others. Both DCS and SCADA types of control systems have identical concerns and solutions to alarm management issues. In this book, use of the term "DCS" includes SCADA systems.

The most common scenario this book addresses is a processing facility—continuous, batch, or discrete—with one or more operators using a modern control system. This is typically the case in the chemical, petrochemical, refining, power generation, pipeline, mining and metals, pharmaceutical, and similar industries. The product being made, extracted, or transported is immaterial—be it gasoline, megawatts, polymers, aspirin, or aluminum. The alarm problem is the same. If you have such a facility, you will find this book valuable.

This book also serves those involved in designing and modifying such facilities. Proper alarm management practices are most effectively and inexpensively accomplished in the original specification, design, and configuration of a control system. Many companies now require the application of these principles in the design phase; this book will tell you how to do it right the first time.

CHAPTER 1

Alarm Management Best Practices: Highly Condensed

"My definition of an expert in any field is a person who knows enough about what's really going on to be scared."

—P. J. Plauger

1.1 The Alarm Problem

A poorly functioning alarm system is often noted as a contributing factor to the seriousness of upsets, incidents, and major accidents. Significant alarm system improvement is needed in most industries utilizing computer-based SCADA or distributed control systems; it is a massively common and serious problem. Most companies have become aware of the need to thoroughly investigate and understand their alarm system performance. Alarm management is a fast-growing, high profile topic in the process industries. It is the subject of constant articles in the trade journals and at various technical society meetings and symposia.

Having decided to investigate this area, how do you proceed? Your time and resources are always limited. The subject is complex. Alarm system improvement involves an interlinked combination of technology and work processes.