Guide to Environment Safety & Health Management

DEVELOPING, IMPLEMENTING, & MAINTAINING A CONTINUOUS IMPROVEMENT PROGRAM

Frances Alston
Emily J. Millikin

CRC Press
Taylor & Francis Group

Guide to Environment Safety & Health Management

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CRC Press
Taylor & Francis Group
Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an **informa** business

CRC Press
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

Version Date: 20150511

International Standard Book Number-13: 978-1-4822-5941-4 (eBook - PDF)

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Preface

The field of environment safety and health (ES&H) pertains to the management and control of hazards to personnel, the environment, and the community. Developing, implementing, and managing an effective ES&H program is complex due to the vast amount of regulatory and contractual requirements that may be imposed on businesses. Regulatory applicability depends on the type of business, product produced, and potential impacts to employees, the public, and the environment. Additionally, the perception exists with some business owners and executives that the rules and regulations imposed or enforced do not directly add to the financial bottom line. A solid ES&H program can ensure regulatory compliance and contribute to the success of the company both monetarily and by shaping public perception of the company. An ES&H program that is strategic and follows project management concepts can add to the bottom line in many ways; however, the exact financial gain oftentimes cannot be quantified in the near term and in hard dollars.

When establishing and managing an ES&H organization, there are key programs and topical areas that must be addressed in order for the organization, and ultimately the company, to be successful:

- Organizational structure and succession planning
- Fundamental understanding of ES&H functional areas
- Training
- The approach and measurement of continuous organizational improvement
- Project management of ES&H
- Application of technology
- Culture and trust in the workplace

This book covers the primary areas of ES&H and key elements that should be considered in developing, managing, and implementing the program. It is intended to serve as a practical guide for ES&H managers and professionals to use in executing a successful program.

About the Authors

Frances Alston, PhD, has built a solid career foundation over the past 25 years by leading the development and management of environment safety, health, and quality (ESH&Q) programs in diverse cultural environments. Throughout her career, she has delivered superior performances within complex, multistakeholder situations and has effectively dealt with challenging safety, operational, programmatic, regulatory, and environmental issues.

Dr. Alston has been effective in facilitating integration of ESH&Q programs and policies as a core business function while leading a staff of business, scientific, and technical professionals. She is skilled in providing technical expertise in regulatory and compliance arenas as well as determining necessary and sufficient program requirements to ensure employee and public safety, including environmental stewardship and sustainability. She also has extensive knowledge and experience in assessing programs and cultures to determine areas for improvement and development of strategy for improvement.

Dr. Alston earned a BS in industrial hygiene and safety, an MS in hazardous and water materials management/environmental engineering, an MSE in systems engineering/engineering management, and a PhD in industrial and systems engineering. She is a fellow of the American Society for Engineering Management (ASEM) and holds certifications as a Certified Hazardous Materials Manager (CHMM) and a Professional Engineering Manager (PEM). Dr. Alston's research interests include investigating and implementing ways to design work cultures that facilitate trust.

Emily J. Millikin has more than 29 years of leadership experience in regulatory, environmental compliance, radiation protection, and safety and health programs at multiple Department of Energy (DOE) and Department of Defense (DOD) sites. She has served as safety, health, and quality director and subject matter expert for ESH&Q programs. She has extensive leadership experience in safety, health, and quality programs and has managed all aspects of program, cost, and field implementation of safety and health, industrial hygiene, radiological control, environmental, quality assurance, contractor assurance system, emergency preparedness, safeguards and security, occupational health, and Price–Anderson Amendment Act programs. Millikin has achieved over 11 million safe work hours while consistently demonstrating a low total recordable case rate. She has established

successful employee-led behavioral-based safety observation programs and successfully achieved Voluntary Protection Program (VPP) Star status.

Millikin earned a BS in environmental health from Purdue University with double majors in industrial hygiene and health physics. She is a Certified Safety Professional (CSP), Safety Trained Supervisor (STS), and certified in the National Registry for Radiation Protection Technologists.

Acronyms

ACA	Affordable Care Act
ACGIH	American Conference of Government Industrial Hygienists
ACM	Asbestos-contaminated material
ADA	Americans with Disabilities Act
AEC	Atomic Energy Commission
ALARA	As low as reasonably achievable
ANSI	American National Standards Institute
CAA	Clean Air Act
CD	Compact disc
CDC	Centers for Disease Control and Prevention
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHP	Certified Health Physicist
CIH	Certified Industrial Hygienist
CSP	Certified Safety Professional
CTIM	Culture trust integration model
CWA	Clean Water Act
D&D	Decontamination and decommissioning
DOE	U.S. Department of Energy
EFA	Environmental functional area
EMS	Environmental management system
EP	Environmental protection
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERDA	Energy Research and Development Administration
ES&H	Environment safety and health
FWS	Fish and Wildlife Services
HI&C	Hazards identification and control
HIPAA	Health Insurance Portability and Accountability Act
ID	Task identification
IH	Industrial hygienist
ISO	International Organization for Standardization
IT	Information technology
JHA	Job hazard analysis
KPI	Key performance indicator

LASER	Light amplification stimulated emission of radiation
LOI	Line of inquiry
LSO	Laser safety officer
MIC	Methyl isocyanate
MSDS	Material safety data sheet
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NIOSH	National Institute of Occupational Safety and Health
NMFS	National Marine Fisheries Services
NRC	U.S. Nuclear Regulatory Commission
NRRPT	National Registry of Radiation Protection Technologists
OCQ	Organizational culture questionnaire
OEL	Occupational exposure limit
OSH	Occupational safety and health
OSHA	Occupational Safety and Health Administration
PEL	Permissible exposure limit
PI	Performance indicator
PM	Project management
PMIIM	Performance metric and indicator improvement model
PPE	Personal protective equipment
QA	Quality assurance
R2A2	Roles, responsibilities, accountability, and authority
R&D	Research and development
RCF	Refractory ceramic fiber
RCO	Radiological control officer
RCRA	Resource Conservation Recovery Act
RI	Responsible individual
SARA	Superfund Amendments and Reauthorization Act
SAT	Systematic approach to training
SDS	Safety data sheet
SME	Subject matter expert
SOMD	Site occupational medical director
STEM	Science, technology, engineering, and math
TRC	Total recordable case
TSCA	Toxic Substances Control Act
TWA	Time-weighted average
USACE	U.S. Army Corps of Engineers
WSH	Worker safety and health

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Environment Safety and Health (ES&H)

1.1 Introduction

The environment safety and health profession is a broad and diverse field primarily governed by regulations that can result in monetary penalties if not followed. The rubrics or disciplines included in ES&H are designed primarily to protect the health of workers and the environment from adverse effects resulting from the workplace. A well-designed and implemented program can serve as a means to also protect the company from frivolous claims and accusations that may result from disgruntled employees. In addition, an effective ES&H organization is designed to support the identification and control of workplace hazards. The success of an ES&H program is predicated upon the ability to attract and sustain the staff with the appropriate skills and knowledge. Therefore, it is important to have a succession strategy that is complementary to the goal of the organization and resource needs.

Typical areas of ES&H will include radiation safety, industrial hygiene, conventional or industrial safety, occupational health, and environmental science and protection. Other areas that can be included in an ES&H organizational structure, which depends upon the goal of the organization, are fire protection, nuclear safety, emergency management, security, and quality assurance. A detailed discussion of each of these areas can be found in the chapter written specifically for that discipline to provide detailed information on program design and implementation.

1.2 ES&H Hazards Identification and Control

Fundamental to an ES&H organization is the hazards identification and control (HI&C) process. The basic premise of an HI&C process is that a logical and consistent approach exists whereby industrial safety, industrial hygiene, radiological, and environmental hazards are identified and mitigated. The generic hazards and control process consists of basically three elements:

- Definition of the scope of work
- Identification of hazards
- Mitigation of hazards

Figure 1.1 depicts a generic hazards and control process.

1.2.1 Definition of the Scope of Work

The definition of the scope of work is the first element of the hazards and control process and forms the foundation by which hazards are identified and mitigated. Work may be defined through either a requirement or a need. For example, the Occupational Safety and Health Administration (OSHA) requires a worker to perform a thorough periodic inspection of alloy steel chain slings in use on a regular basis, or if a piece of equipment has broken down and is in need of repair. In both examples, the scope of the work must be identified and defined.

Once the work is bound, then steps must be defined to determine how to complete the work. The method for defining the steps needed to complete a task may be formal or informal; however, without the discrete work steps being defined, it is not possible to determine who will be required to accomplish the work, how the work will be performed, or materials needed to perform the job.

The last step in defining the scope of work is to identify the resources that will be needed to complete the work steps. Depending upon the complexity of the work scope, several types of personnel may be required, such as an electrician, operator, carpenter, or plumber, or the work may be performed just by one person who has the skills and knowledge to ensure the work is done completely and safely.

1.2.2 Identification of Hazards

The identification of hazards should be performed for each discrete work step that was defined and should address all hazards:

- Industrial safety (i.e., falling surfaces, fire hazard)
- Chemical (i.e., organic, inorganic)
- Biological (i.e., bacterial, virus, human and animal pathogens)
- Radiological (radiation exposure and contamination)
- Environmental (i.e., toxins and pollutants, waste, and natural disasters)

When performing the hazards identification process, the regulations should be consulted because there may be specific requirements associated with a particular hazard, such as the process safety requirements or waste

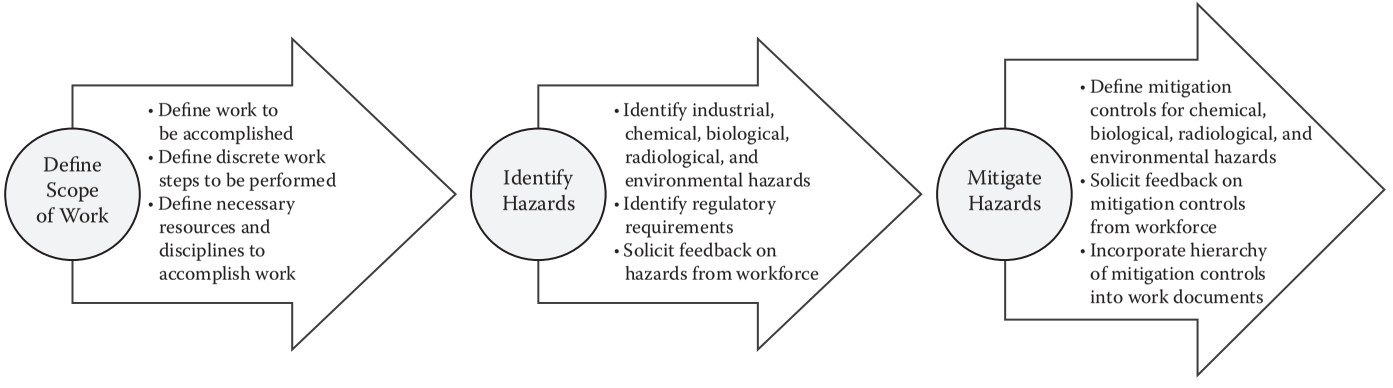

FIGURE 1.1
Hazards and control process.