

CHEMICAL PROCESS
SAFETY MANAGEMENT:

A
CHALLENGE
TO
COMMITMENT



CCP
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CHEMICAL PROCESS SAFETY

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A SUCCESSFUL chemical process safety management program needs top management's participation—in judging risks, setting goals, allocating resources, delegating authority, and holding all levels of the organization accountable for timely and effective implementation. This participation assures priority assignment and continued performance by middle management in chemical process safety. Without it, risk management decisions will continue to be made, but without your direction, and in a fashion which may jeopardize the health and safety of your employees and the public and the viability of your business. Lack of such participation has contributed to catastrophic losses in the chemical industry. For instance, does your organization have in place clear guidance for sizing inventories of highly hazardous materials? Inventory sizing is but one of the many components of risk management.

The Center for Chemical Process Safety (CCPS) believes that to be effective, chemical process safety management programs require the participation of top management; technology alone is not enough. Management systems are needed to assure that technological solutions are implemented and maintained. Process safety management systems are the mechanisms through which risk management directives are implemented.



Process Safety addresses the control and prevention of fires, explosions, and accidental uncontrolled releases of hazardous substances. It does not address the equally important chronic health issues or traditional personnel safety matters.



I. ACCOUNTABILITY: OBJECTIVES AND GOALS

This element encompasses continuity of operations, continuity of systems (resources and funding), continuity of organizations, company expectations (vision or master plan), quality process, control of exceptions, alternative methods (performance versus specifications), management accessibility, and communications.

II. PROCESS KNOWLEDGE AND DOCUMENTATION

The main features here are: process definition and design criteria, process and equipment design, company memory (management information), documentation of risk management decisions, protective systems, normal and upset conditions, and chemical and occupational health hazards.

III. CAPITAL PROJECT REVIEW AND DESIGN PROCEDURES

For existing plants, expansions and acquisitions, these concerns must be addressed: appropriation request procedures, risk assessment for investment purposes, hazards review (including worst credible cases), siting (relative to risk management), plot plan, process design and review procedures, and project management procedures.

IV. PROCESS RISK MANAGEMENT (INTERNAL AND TOLLING OPERATIONS)

The key components are: hazard identification (periodic process reviews of all operations inside the fence), risk assessment of existing operations, reduction of risk, residual risk management (in-plant emergency response and mitigation), process management during emergencies, and encouraging client and supplier companies to adopt similar risk management practices.



The Chemical Process Safety Management Program

CPS HAS IDENTIFIED 12 TECHNICAL elements that must be part of any chemical process safety management program. These 12 elements have been chosen with the advice of senior safety specialists. They all play equal and interactive roles in process safety management. They provide overlapping layers of assurance and a system of checks and balances that are needed to achieve safe operations during the entire life of a chemical plant.

These elements apply to all internal operations and must be considered when making decisions regarding external toll manufacturing and transportation of feed stocks, products, and waste. Particular attention must be paid during organizational transitions, such as down-sizings or mergers, acquisitions or divestitures.

CCPS has prepared this Overview Document to encourage your participation in your company's program. This document will be followed by a more detailed description of technical guidelines, which your middle management can use to shape process safety management to fit your organization's culture.



V. MANAGEMENT OF CHANGE

These items include change of technology, change of facility, organizational changes that may impact on process safety, variance procedures, temporary changes, and permanent changes.

VI. PROCESS AND EQUIPMENT INTEGRITY

Among the things to be considered are: reliability engineering; materials of construction; fabrication and inspection procedures; installation procedures; preventive maintenance; process, hardware and systems inspections and testing (pre-startup safety review); maintenance procedures; alarm and instrument management; and demolition procedures.

VII. INCIDENT INVESTIGATION

In assessing this element, the following must be taken into account: major incidents, near-miss reporting, follow-up and resolution, communications, incident recording, and third-party participation as needed.

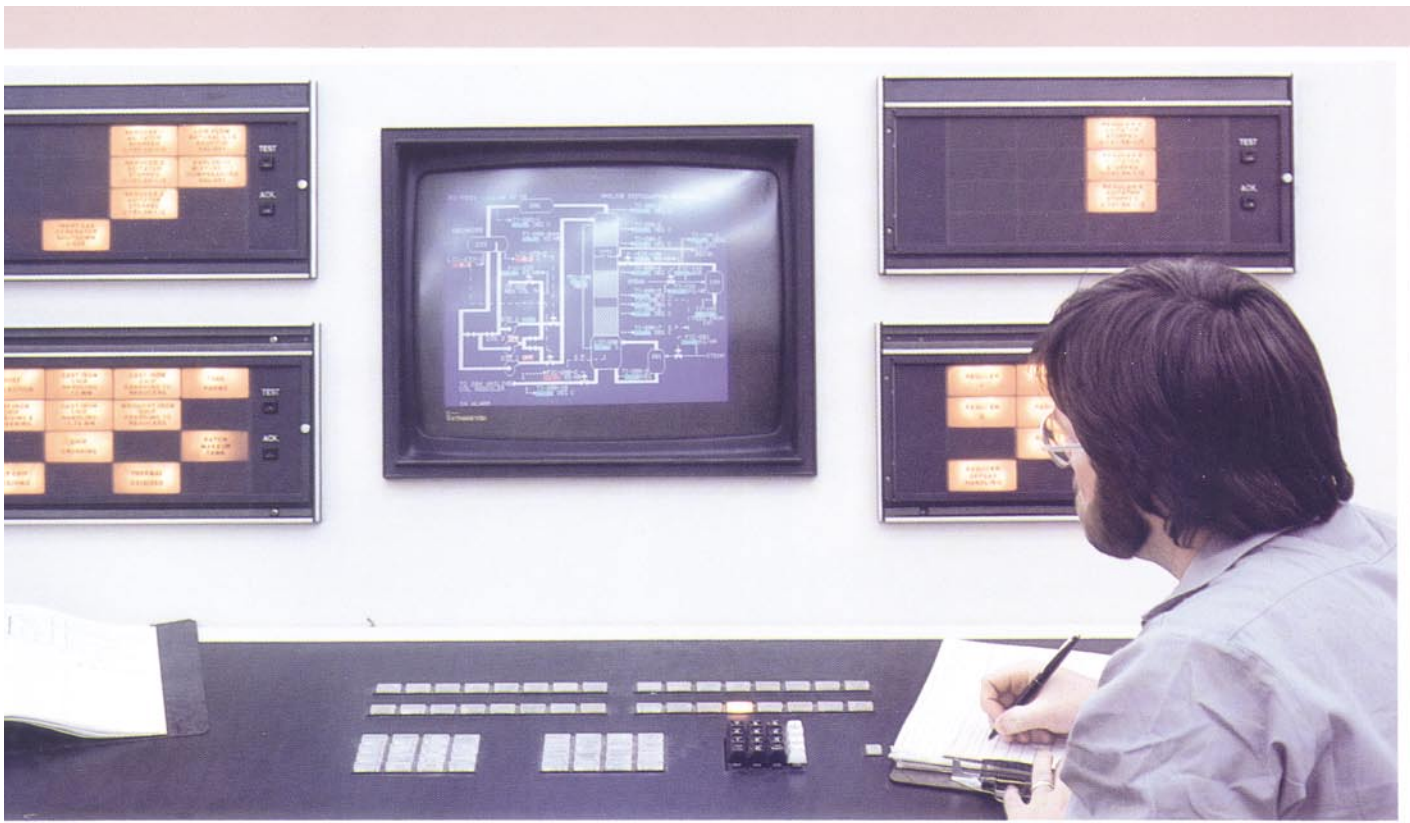
VIII. TRAINING AND PERFORMANCE

The key components are: definition of skills and knowledge, training programs (new employees, contractor, technical employees), design of operating and maintenance procedures, initial qualification assessment, ongoing performance review and refresher training, instructor program, and records management.

Management Opportunities and Concerns

IN TODAY'S BUSINESS CLIMATE, A COMPANY CANNOT continue practices and operations that present unacceptable levels of risk to the public, customers, or in-plant personnel. Putting a quality chemical process safety management program in place reduces risks, protects people, offers economic rewards, and helps to preserve our natural environment.

The success of a process safety management program depends on the involvement of every level of the organization, from the CEO to the newly hired operator, or maintenance technician. Chief executives must see that a system exists to define each person's responsibility and to hold each person properly accountable. Within this system the CEO has certain responsibilities, including allocation of adequate resources, selection of risk criteria, establishment of performance mea-



IX. HUMAN FACTORS

Included here are: human error assessment, operator/process and operator/equipment interfaces, and administrative controls versus hardware.

X. STANDARDS, CODES AND LAWS

Core concepts are: internal standards, guidelines and practices (past history, flexible performance standards, amendments and upgrades), and external standards, guidelines and practices.

XI. AUDITS AND CORRECTIVE ACTIONS

Items considered are: process safety audits, management systems audits and compliance reviews (criteria for internal/external reviews and auditors for external/internal reviews), and resolutions and close-out procedures.

XII. ENHANCEMENT OF PROCESS SAFETY KNOWLEDGE

The level of performance in this area can be based upon an analysis of involvement in internal and external research, including CCPS programs and professional and trade association programs—both domestic and international; improved predictive systems, such as toxicological data and trend information on maintenance failures; and a process safety reference library.

asures and controls, and assurance that audits are conducted regularly and that follow-up is carried out.

Two-way communication is an essential part of a well-run chemical process safety program. Top management should exert leadership and interact with people at all levels of the company, synergizing expectations, goals and action. Getting employees to share experiences about past incidents is just one way that top management can ensure improved safety and reliability.

Communication has to be extended to the community. Speeches before service organizations by management representatives and plant tours for the public are both effective demonstrations of your commitment to safety. Consulting local authorities on the development of emergency response plans is good policy and is legally mandated in certain cases.

A successful chemical process safety management program is based on proper application of adequate resources to the technical elements identified. It is the chief executive's commitment to these elements and personal participation that gives life to this management program. There is no substitute for that commitment.



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