

PERSONNEL TRAINING

INTRODUCTION

Over the past two decades, personnel training requirements have become the key requirements in regulations related to workplace health and safety and environmental quality. Their importance derives from several distinct although interrelated factors that influence not only the American but also the global workplace: (a) the need for employees to develop the skills and behavioral patterns required to achieve and maintain safe work conditions, (b) the right of employees to participate in decision-making that affects their well being, and (c) the recognition by the public at large that whole communities are increasingly at risk of their continually expanding and increasingly complex industrial base.

Given the diversity of health and safety regulations and the growing awareness of health and safety risks as well as of alternative methods for controlling those risks, personnel training has become a complex undertaking for even small business and, in large corporations, typically demands a significant investment of time and money. In both large and small corporations, effective personnel training is directly relevant not only to broad health and safety objectives, but also to the converging economic and marketing interests that underlie any modern business.

Whatever the objectives of any specific type of corporate training in health and safety, all such personnel training is today best viewed in the context of *corporate risk management*, which is inclusive of all corporate effort to control losses in productivity, capital resources, human resources, and market performance. However, *an effective corporate risk management program is today the necessary first step not only toward achieving business objectives, but also to achieving proactive management control of hazards that could result in community-wide emergencies.* In short, good business management practices are today based upon good hazard management practices.

PROACTIVE MANAGEMENT OF HAZARDS: CORPORATE PERSPECTIVE

The proactive management of hazards in the corporate setting is the essential first objective in any program of emergency response planning. Specifically, proactive management of workplace hazards directly impacts emergency response in two ways:

1. lessens the likelihood that an in-plant incident will require full-fledged emergency response by both on-site first responders and community response services to protect and/or rescue personnel, and
2. lessens the likelihood that an in-plant incident will escalate into a community-wide emergency that endangers not only in-plant personnel but also the public at large.

It is for these reasons that *any in-plant health and safety program must be considered an essential part of both corporate and community emergency response planning.*

Deficiencies in personnel training related to human health and safety, including the health and safety not only of employees but also of the general public, clearly contribute both directly and indirectly to significant business losses, including such losses as:

- Direct health care costs for affected employees and the public
- Regulatory fines and other legal costs associated with civil and criminal proceedings related to environmental and workplace incidents
- Insurance premiums that reflect the degree of health and safety risk containment and management
- Facility audit costs associated with enforcement efforts of regulatory agencies
- Remediation costs associated with the clean-up of contaminated sites and environmental resources
- Loss of accreditation by national and international business and marketing associations, with consequent adverse impact on competitive standing within a global market
- Loss of market share due to adverse publicity generated by health and safety incidents or conditions
- Increased administrative costs due to incident reporting and follow-up, as well as recruitment and training of appropriate personnel

In light of these considerations, it is clear that an in-plant health and safety training program must first be integrated with an overall business ethos that gives the highest priority to effective health, safety, and environmental management practices—an ethos that, today, is rapidly becoming the

essential managerial hallmark of any globally competitive enterprise and, consequently, a touchstone in modern graduate education programs in business management.

The fact that, more than 100 years after the advent of the industrial revolution, “the marketplace” has finally discovered the importance of human health and safety should not diminish the key relevance of legally enforceable and technically complex regulations. Notwithstanding the persistent debate regarding the pros and cons of governmental intrusion into boardroom deliberation, the elevation of “good health and safety” practices to “good business” practices has occurred, in fact, only after regulatory agencies caught the serious attention of business.

The number of these regulations and the range of workplace standards they establish clearly define a range of potential health and safety hazards to both employees and the public that few if any would dare refute before any objective audience.

With regard to diverse workplace health and safety standards, OSHA has clearly circumscribed certain issues that must be addressed by personnel training:

1. Responsibility and Accountability in the Design and Day-to-Day Management of the Corporate Health and Safety Program

Personnel training that does not clearly identify functional responsibilities and specific means for establishing and maintaining accountability for all policies, practices, and procedures regarding the safety of the workplace environment (as well as of environmental resources that link the workplace to the community) cannot be condoned in any circumstance and must be viewed as *prima facie* evidence that the corporation is primarily concerned with “paper compliance” with health and safety standards as opposed to the actual health and safety of its employees and the public at large.

2. Behavioral Measurements of the Efficacy and Adequacy of Health and Safety Policies and Procedures

The objective of any training must be objective-oriented communication, which is always a two-way flow of information between the trainer and the persons being trained. The one-way flow of information from an instructor or, as is more commonly the case, from video tapes, from canned, computerized programs, or from pamphlets to a silent student is neither communication nor training. The only meaningful health and safety training is that which actually affects workplace behavior, and this can occur only

when the training actively involves employees in discussion of information related to their specific work-related activities and responsibilities.

3. Active Employee Participation in All Decision-Making Regarding Health and Safety

Effective personnel training must be based on the premise that health and safety are a joint objective and responsibility of both management and labor. Where health and safety practices and procedures (or the lack thereof) are perceived as emanating solely at the discretion of corporate management, it is unlikely that any personnel training program can have any measurable influence on workplace-related health or safety.

4. The Importance of Personnel Training as a Prerequisite to Undertaking Job Assignment

Personnel training in health and safety practices and requirements is today an essential component of the initial in-plant processing of new employees. While it is neither possible nor desirable to attempt to complete all health and safety training prior to undertaking actual job assignments, the company must ensure that initial training is sufficient to ensure (a) that workers are not at special health or safety risk simply because of their status as newly assigned personnel, and (b) that the public at large as well as community emergency response personnel are not at risk simply because workplace personnel are incompetent in managing in-plant operational hazards. This requires that the corporate health and safety training program be appropriately “tiered” or “staggered” to meet the needs of personnel at various stages of their employment, including the categories of newly hired, newly assigned, and temporary personnel, as well as personnel in need of refresher or advanced training, or additional training due to the implementation of new production processes or procedures.

Corporate Training and Regulatory Compliance

Health and safety training objectives too often become confused with regulatory compliance objectives—a confusion that typically reflects a misguided corporate preoccupation with doing as little as possible to comply with specific regulations, which in turn, is an attitude that reflects an hierarchical isolation of upper level management from the realities of the modern workplace.

In the United States, for example, many executives would be surprised to learn that the Williams Steiger Occupational Safety and Health Act of 1970, which is the congressional authority for OSHA, requires “that every employer covered under the Act furnish to his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees (29 CFR 1903.1).” Thus, even in the absence of specific regulatory workplace standards (e.g., lockout/tagout, confined spaces, hazard communication), OSHA has the statutory authority to act to protect the health and safety of workers.

In some jurisdictions, broad authority to ensure the health and safety of the citizen-worker is accomplished not only by legislative but also by constitutional means, as in India, where the Supreme Court in 1983 interpreted the constitutionally guaranteed right to life as requiring a healthy and safe environment, and in South Africa, where the newly elected democratic government included in its constitution the right of every citizen to an environment that is not detrimental to health and well-being. To these examples of the increasingly broad national and international mandate on behalf of human health and safety (which also presumes environmental quality) must be added the directives of the European Union, which are legally binding on its member states and which, since 1973, have specifically focused on the rights of citizens to a healthful and safe environment.

Where corporate executives understand that human health and safety and environmental quality are essential corporate objectives in an interactive and interdependent global economy, it is well established that health and safety training of personnel must ensure regulatory compliance, but must not be solely defined or constrained by (or otherwise limited to) specific regulatory requirements. In short, regulatory requirements are best viewed as *de minimus* requirements that apply in all circumstances. However, to ensure both employee and public health and safety, it is typically necessary to go well beyond published regulatory standards. To effectively integrate what may be required by written law and what is required by actual workplace (and environmental) circumstance to protect human health and safety is, accordingly, the fundamental objective of any health and safety training program.

Training Policy Document

Historically, companies have devised separate training programs to meet the legal requirements of individual regulations regarding workplace health and safety, including specific requirements for personnel training. Given the number of such regulations as well as the need for health and

safety training beyond *de minimus* regulatory requirements, corporations are well advised to develop a comprehensive policy document as a basic management tool for the design, implementation, and quality control of all corporate health and safety training. Key elements of such a policy document include:

- Programs and responsibilities
- Training methods
- Scheduling constraints
- Presenters
- Training records
- General policies
- Specific programmatic requirements
- Training documentation

Programs and Responsibilities

The objectives of this section are (a) to identify precisely the individual training programs that fall within the purview of this policy document, and (b) to assign specific responsibilities for the design, content, conduct, and quality control of each program.

Programs to be included are (a) those required by specific regulations (e.g., respiratory protection, confined spaces, hot work, bloodborne pathogens), and (b) those deemed by corporate officials and employees as appropriate to workplace and environmental circumstances or otherwise desirable but not specifically addressed by existing workplace regulations (e.g., personal hygiene and carry-home contamination, waterborne diseases).

Assigned responsibilities should include specific requirements regarding the development, review and substantive revision, and quality control of each program. Provision should also be made for the timely addition of new programs, including new topics and additional levels of training within the various programs.

Training Methods

For each training program, specific training methods should be identified on the basis of which method or combination of methods is most likely to achieve behavioral and informational objectives. Regardless of personal preferences, a comprehensive range of methods should be evaluated for efficacy, including (but not limited to):

- Classroom style lectures
- Demonstrations
- Roundtable workshops or problem solving sessions

- Seminars
- Audio-visual programs
- Topical discussions
- On-the-job practicums
- Table-top or field exercises
- Site visits to other facilities

While on-the-job training is a valuable approach, it must be emphasized that this approach must be carefully evaluated with regard to (a) relevant regulatory requirements, (b) the risk to which the person being trained will be exposed, and (c) the risk to which the surrounding community will be exposed because of the incompetence of employees who are yet in the process of being trained.

Scheduling Constraints

Training schedules that are determined solely by routine work schedules are typically irrelevant to training objectives. The time required for a particular training session is precisely the time required to achieve specifically stated and monitored behavioral and informational objectives and should not be determined by any other factor. For example, while it may be convenient to train employees at the end of an 8-hour shift, it is hardly surprising that such training is most frequently a waste of time and effort. The schedule for training in each program should be established to ensure the most meaningful involvement of employees with the training exercise—an objective that can be met only by considering the type of information to be discussed, the nature of the exercise, and the mental and physical condition of the workers to be trained.

Presenters

While many companies have tended to use consultants as trainers, the range of health and safety training is today sufficiently broad that both in-house personnel and external consultants should be considered for the presentation of training programs. The actual selection, of course, depends upon the type of information to be discussed and the relevance of the presenter's credential to that type of information. In some instances, priority must be given to academic or professional credentials, and in some, to practical experience. The types and balance of the presenter's academic, professional, and experiential credentials should be specified for each training program, as well as those personal skills and attributes that are considered essential for the achievement of specific training objectives.

All presenters of personnel training programs should provide the company with a detailed resume of relevant experience as well as a syllabus for the training program and a copy of any training materials used during the presentation. It is recommended that the corporation always reserve the right to make an audio-visual recording of any health and safety training program presented by either in-house personnel or consultants, as well as the right to use any recording for purposes of documentation, quality control, and/or subsequent training purposes.

Training Records

In addition to the documents provided by each presenter (i.e., resume, syllabus, and course materials), the safety officer should maintain (at least) the following documents for each training session:

- Training attendance form—Including the name of the program, the name of the presenter, the date of presentation, and the printed name and signature of training participants
- Employee's training evaluation form—To be submitted by each program participant upon completion of the training and to include a detailed assessment of the content of the training, the quality of the presentation, and the usefulness of the training
- Monitor's training evaluation form—To be completed by a designated company employee who attends the training session for the express purpose of evaluating the content and presentation of the training; usually a person with administrative or upper managerial authority

The increasing use of training evaluation forms, whether completed by training participants or by specially designated monitors, requires appropriate documentation regarding actions subsequently taken in response to those evaluations, including any revision of training session contents and the replacement of presenters. At least an annual review of all training evaluations should be conducted with appropriate documentation of findings and consequent actions.

Additional documents may also be required, such as the results of written examinations or exercises that many companies use to measure and document the efficacy of in-house training. In some instances, companies also include posttraining evaluation forms that document the assessment of workplace behavior of individuals who have completed various stages of training. Documentation of *personnel actions* undertaken by the human resource department due to inappropriate employee behavior or activity specifically addressed in previous health and safety training is also often included as part of the documentation associated with that training.

General Policies

This section is devoted to those policies that must guide and inform the overall training effort, such as:

- Assessment of efficacy of training
- Programmatic review and revision
- Availability of resource information on health and safety issues
- Relationship between workplace health and safety and general lifestyle
- State-of-the-art standards and procedures

In developing these policies, the company must understand that it is increasingly subject to external legal scrutiny, especially with regard to the correspondence between written policies and the manner in which they are actually executed (or ignored) in the workplace. The basic rule to follow is that adage: “Say what you mean; mean what you say!”

Specific Programmatic Requirements

In this section, all requirements for each health and safety program (Table 9.1) are collated, with particular emphasis given to the following:

- Regulatory reference (if any) for program
- Behavioral and informational objectives
- Personnel to be trained (by job categories and work status, as in “new employees,” “office personnel,” “temporary laboratory personnel”)
- Frequency of presentation
- Method of evaluation of effectiveness
- Responsibility for design, implementation, review, and revision

Corporate Training: Special Issues

Regardless of the size of a company, the management of personnel training related to health and safety demands an important investment of time and effort which, though arguably a necessary insurance against regulatory, criminal, and civil law proceedings, is subject to numerous factors that can easily overcome the best of intent.

Some of these stubbornly difficult facts are directly related to the simple fact that the act of training is inextricably connected to the act of learning. While the failure to train is very often the failure to learn, in matters related to workplace health and safety it is the corporation’s responsibility to train that receives primary attention—with the consequence that an employee who refuses to learn or to change workplace behavior in accordance

TABLE 9.1 Recommended Training Topics and Emphasis (Adapted from NIOSH, USCG, and EPA, 1985: Occupational Safety and Health Guidance Manual for Hazardous Waste Activities)

Training Topic	Emphasis of Training
Biology, Chemistry, and Physics of Hazardous Materials	Chemical and physical properties; chemical reactions; chemical compatibilities
Toxicology	Dosage; routes of exposure; toxic effects; immediately dangerous to life or health (IDLH) values; permissible exposure limits (PELs); recommended exposure limits (RELs); threshold limit values (TLVs)
Industrial Hygiene	Selection and monitoring of personal protective clothing and equipment; calculation of doses and exposure levels; evaluation of hazards; selection of worker health and safety protective measures
Rights and Responsibilities of Workers under OSHA	Applicable provisions of Title 29 of the Code of Federal Regulations
Monitoring Equipment	Functions; capabilities; selection; use; limitations; maintenance
Hazard Evaluation	Techniques of sampling assessment; evaluation of field and lab results; risk assessment
Site Safety Plan	Safe practices; safety briefings and meetings; standard operating procedures; site safety map
Standard Operating Procedures (SOPs)	Hands-on practice; development and compliance
Engineering Controls	The use of barriers, isolation, and distance to minimize hazards
Personal Protective Clothing and Equipment (PPC & PPE)	Assignment; sizing; fit-testing; maintenance; use; limitations; hands-on training; selection of PPC and PPE; ergonomics
Medical Program	Medical monitoring; first aid; stress recognition; advanced first aid; cardiopulmonary resuscitation (CPR); emergency drills; design, planning and implementation
Decontamination	Hands-on training using simulated field conditions; design and maintenance
Legal and Regulatory Aspects	Applicable safety and health regulations (OSHA, EPA, etc.)
Emergencies	Emergency help and self-rescue; emergency drills; response to emergencies; follow-up investigation and documentation

with good health and safety practices and who thereby suffers an injury is likely to benefit economically at the expense of the company.

It is therefore clearly incumbent upon a company not only to devise competent training programs, but also to implement stringent *personnel actions* whenever employees who have completed that training nonetheless fail to translate training lessons into workplace behavior. Yet, even then the company is typically constrained by a wide range of legal and societal standards that may often serve to protect a worker from the consequences of his own intransigence or incompetence—intransigence or incompetence, it must be emphasized, that place at risk not only that employee but also his fellow workers and, possibly, the public at large.

Certainly one can empathize with a business manager who, unlike a teacher in a college or university, is typically to be blamed for the failure of someone else to learn. However, that same manager should understand that empathy is not necessarily the guarantor of sympathy. The fact remains that, in the modern world, a business does have the responsibility to make every reasonable effort to inform and instruct its employees as to the proper means for working safely—and, by proper monitoring of personnel, to ensure that they translate training into appropriate workplace behavior. Regardless of the attendant difficulties and frustrations, health and safety training and all that it implies is a basic cost of doing business. In light of the clearly dismal history of worker health and safety throughout most of the industrial revolution, one might reasonably add, “Finally!”

In undertaking its admittedly burdensome and difficult task of translating training into safe work-related behavior, any business must come to grips with two key issues that, regardless of a company’s size or geographic location or industrial code, typically demand particular attention: managerial skills, and the process of the communication.

Professional Managerial Skills

The overall responsibility for personnel training in health and safety matters is most often given to a safety or training officer or other persons who, regardless of the extent of their technical, scientific, or other skills, are not professionally trained managers. What managerial skills they do possess have typically been obtained through limited on-the-job experience, with little if any guide or instruction by professional managers. Perceived as essentially technicians, they occupy relatively low-level and low-status positions in a corporate hierarchy that, minimizing their authority even while expanding their responsibility, effectively defines their contribution as a white-collar service function that, at best, is seen as subservient to both mainline corporate managerial and production tasks.

While more sophisticated corporations have in recent years begun to elevate the status of personnel training by assigning this function to higher level departments, such as a human resource or loss control department, or even, in very few case, to executive level officers, the vast majority of companies persist in marginalizing personnel training. The consequence is that the typical safety or training officer is essentially ignorant of basic managerial skills, especially those related to the management of information, quality control, and objective-oriented systems analysis.

Consider the fact, for example, that even a small manufacturing company having on the order of 40 employees may be legally required to comply with a dozen or more relatively complex health and safety regulations that serve not only to protect the workplace employee but also to protect the public surrounding that workplace. In addition to these regulations, the same company may have a variety of additional health and safety training requirements imposed by the concerns of corporate executives, insurance carriers, corporate owners, and unions. In this rather common situation, which specific employees must be trained in what, to what degree or level of competence, how often, and with what measure of success or failure are fundamental questions—and yet, few safety officers who have mainline training responsibility can immediately provide the answers or even know how to organize a relevant database or computerize a database to generate the answers.

The prevailing ignorance of safety officers with respect to basic managerial skills, and the consequent ineffectiveness of much of the health and training programs conducted within corporations cannot be blamed on the safety officer but, rather, should be attributed to that corporate executive who considers the management of finances, productivity, raw materials, and product distribution to be inestimably more important than the management of human health and safety—that corporate executive who, despite a long reign in the history of corporations, is well poised to become an endangered species throughout the world.

The Realities of Communication

That there can be no effective training without effective communication is a bromide so logically soporific it is usually ignored in practice, especially in the United States where the Americanized English language is considered the *lingua franca* that not only overcomes all linguistic and cultural barriers but also obviates any and all distinctions imposed by diverse personal experience and values. The perception is, of course, quite wrong—as evidenced in the United States by the rapidly expanding influx of non-English speaking persons into the work force as well as by the tardy and painful recognition that many of our English-speaking fellow citizens (including some with college degrees) are in fact functionally illiterate.

The political rhetoric that bemoans this real situation as well as regulations requiring the use of English in warning signs and labels are, however, absolutely irrelevant to the fact that, for now and for the foreseeable future, corporate health and safety training must effectively confront the linguistic pluralism of the American work force, whether that pluralism derives from differences in primary language, from difference in language skills, or, for that matter, from differences in linguistic expression and cognition imposed by personal experience. To do otherwise is essentially equivalent to defining worker health and safety as a reward for social conformity rather than as a right regardless of human diversity.

The enormous difficulty inherent in the act of communication within an actual linguistic, cultural, and experiential pluralism cannot be made any the less, of course, simply by extolling the importance of the common objective of human health and safety—nor is the American experiment in linguistic diversity yet so far progressed as to give universally relevant clues as to the most effective strategies for dealing with that difficulty. However, we do know that one does not overcome it simply by speaking English more loudly and more slowly! We also know that the American business community, which is increasingly dependent for its very livelihood upon communication across cultural and linguistic barriers, has had to begin to divest itself of its traditional linguistic and cultural isolationism and to experiment with practical means of fostering cross-cultural and linguistic fluency.

Finally, we know that computer technology has only begun to be tapped for its contribution to human communication, whether in the university, at home, or in the business. With a realistic understanding of the limitations of any language, with an experimental ethos directed toward achieving business objectives despite those limitations, and with a sophisticated electronic technology simply waiting to be used, we already perceive that perhaps our long trusted approach to education and training is already grossly outdated and in need of drastic revision.

INCIDENT RESPONSE PERSONNEL

Except in special circumstances, it cannot be expected that in-plant first responders will be trained to the same level of expertise and competence as professional community and governmental response services. However, because of the critical role that first responders play, it is necessary that industry become more knowledgeable of the guidance and training materials available through professional response services and take specific steps to integrate that guidance and training experience into the corporate training of, at least, in-plant initial responders and, preferably, all in-plant managers and other personnel who have mainline responsibility for materials and op-

erations that present risk to facility personnel, environmental resources, and the surrounding community.

Of particular importance is the experience of professionals with regard to:

- Designing a comprehensive emergency response training program,
- Identifying those types of training that have been proven to be highly effective for ensuring the development of emergency response skills, and
- Utilizing professional emergency response services, resources, and information to meet specific training objectives.

Design of Comprehensive Training Program

The comprehensiveness of an adequate training program in emergency planning and response must not be defined solely in terms of corporate experience with so-called “personnel training” which, after all, being inclusive of all aspects of business operations, is far more focused on normal procedures and SOPs than life-threatening incidents. The comprehensiveness of training that focuses on emergency planning and response must be based on what the professionals in emergency response deem important.

For example, Fig. 9.1 is a partial listing of diverse resources provided by the U.S. National Response Team, including handbooks, reports, bulletins, courses, videos, model exercise plans, and other documents specifically designed by professionals as effective tools for training related to emergency response.

In some instances, guidance for emergency response training is provided across a broad spectrum of types of emergencies (as in Fig. 9.1); in others, detailed guidance is provided with respect to particular types of emergencies. An example of the latter type of resource that can prove invaluable to industries using, storing, or producing petrochemicals is the National Preparedness for Response Exercise Program (PREP), developed by the U.S. Coast Guard, EPA, the Research and Special Programs Administration in the U.S. Department of Transportation, and the Minerals Management Service. This program (Fig. 9.2) provides specific guidelines for conducting response training exercises in compliance with the Oil Pollution Act of 1990.

Of course, the comprehensiveness of emergency response training is not to be simply determined by the substantive content of training related to response procedures and techniques, but also by the substantive content related to the overall design and quality control of the training effort itself. A valuable resource to industry at large is a handbook prepared by the U.S. Department of Energy (Fig. 9.3), which emphasizes alternative approaches

National Response Team

<http://www.nrt.org/nrt/home>

RESOURCES

The following resources can help you to design, conduct, and evaluate exercises that test your emergency response procedures. If you are aware of additional materials that could be included in future issues, please send a complete description, including contact information, to the NRT Preparedness Committee, Mail Code 5101, U.S. Environmental Protection Agency, Washington, DC 20460.

Developing a Hazardous Materials Exercise Program: A Handbook for State and Local Officials (NRT-2). The NRT developed NRT-2 to provide guidance for the initial development of (or refinement of an existing) exercise program. It also identifies federal-level resources available to state and local officials to assist in the implementation of comprehensive exercise programs to assess their hazardous materials plans and annexes. Contact EPA's EPCRA Hotline at (800) 535-0202 / FAX: (703) 412-3333 to obtain a free copy.

***The Exxon Valdez Oil Spill: A Report to the President* (NRT).** This report addresses the preparedness for, response to, and early lessons learned from the Exxon Valdez oil spill in Prince William Sound, Alaska. Exercise planners should review the document when developing exercises that test response procedures for major incidents. Contact EPA's EPCRA Hotline at (800) 535-0202/ FAX: (703) 412-3333 to obtain a free copy of this report.

***Guide to Exercises in Chemical Emergency Preparedness Programs* (EPA) -** This series of three bulletins provides an overview of the major types of exercises and describes some resources currently available for conducting exercises. You can obtain free copies of Introduction to Exercises in Chemical Emergency Preparedness Programs, A Guide to Planning and Conducting Table-Top Exercises, and A Guide to Planning and Conducting Field Simulation Exercises by contacting EPA's EPCRA Hotline at (800) 535-0202 / FAX: (703) 412-3333.

***Exercise Design Course* (FEMA) -** This course develops skills that will enable participants to train staff and to conduct an exercise that will test a community's plan and its operational response capability. Contact the Emergency Management Institute at (301) 447-1286.

***EPA Region 2 Exercise Video and Manual* (EPA) -** A video and manual demonstrating field exercises held in the state of New Jersey features comments from Federal On-Scene Coordinators (FOSCs). Contact John Uishoefer, EPA Region 2 at (908) 321-6620 for more information.

***GSA Exercise Diskettes* (GSA) -** Government employees can review GSA's model exercise plan that includes handbooks for both exercise players and controllers, an exercise evaluation plan, a master scenario events list, and sample standard operating procedures for an emergency operations center. Contact Gordon Tassi, GSA Emergency Management Department at (202) 501-0900 for more information.

***Hazardous Materials Exercise Evaluation Methodology* (HM-EEM) and *Manual* (FEMA) -** This document was designed to assist state and local governments in the comprehensive evaluation of hazardous materials exercises. It contains a series of modules prepared to evaluate major exercise objectives, so that emergency plans can be amended to reflect the lessons learned. Contact FEMA's Publications Management Office, 500 C Street, SW, Washington, DC 20472 to obtain a copy.

FIGURE 9.1 Example of training resources available through U.S. National Response Team (National Response Team, internet home page).

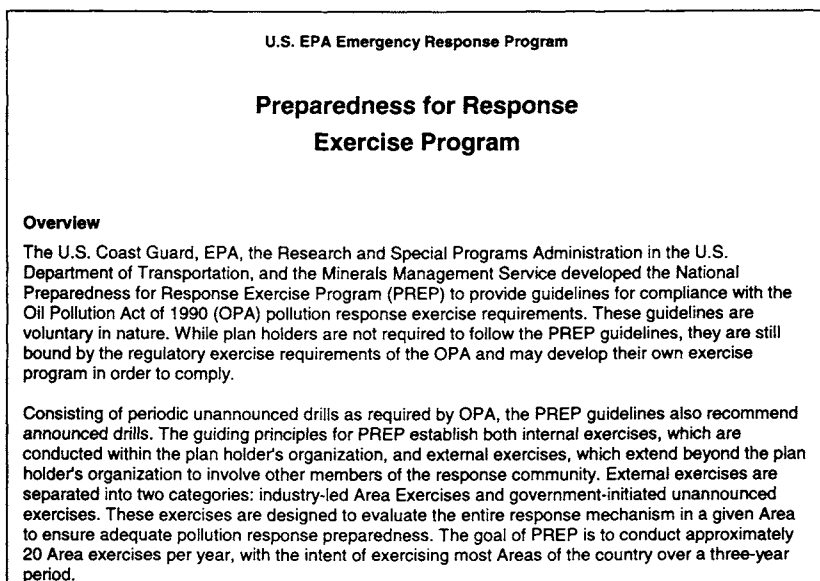


FIGURE 9.2 Overview of national preparedness for response exercise program for conducting response training exercises in compliance with the oil pollution act of 1990 (U.S. EPA, Electronic Reference Library). *continues*

to training and techniques for evaluating both their selection and success—precisely those elements of training that are so crucial to developing an effective in-plant emergency response capability.

Proven Training Methods

The general literature is replete with learned discussions and assessments of a plethora of alternative training methods, and there can be no doubt that new methods will continue to be developed, especially with regard to the use of rapidly evolving computer and communication technologies. Given the seemingly limitless plenitude of training methods, it is understandable that trainers tend to have their favorite few—nor is it surprising that, in industry at large, such favorites are generally those (e.g., brief lectures and video presentations) that minimize the absence of attending personnel from their main productive work.

While professional emergency response personnel also utilize lectures and video presentations in the process of their training, the emphasis of

U.S. EPA Emergency Response Program

Oil Spill Prevention, Preparedness & Response

Oil Spill Training

Oil spill training is an important element in EPA's oil spill prevention and preparedness efforts. Studies indicate that a significant number of oil spills at fixed facilities are caused by operator error, such as failing to close valves or overfilling tanks during transfer operations. Because operator error is more likely to be a factor in causing spills, training and briefings are critical for the safe and proper functioning of a facility.

Training provides a number of benefits in the area of oil spill preparedness. Proper training of facility personnel can reduce the occurrence of operator-related spills and reduce the severity of impacts when a spill does occur. Training encourages up-to-date planning for the control of, and response to, an oil spill, and also helps to sharpen operating and response skills, introduces the latest ideas and techniques, and promotes interaction with the emergency response organization and familiarity with the facility's SPCC Plan. EPA offers training courses for conducting proper response measures in cases of inland oil spills as well as a drill/exercise program for oil-storage facilities.

EPA Training Requirements

EPA requires owners and operators of facilities subject to the Oil Pollution Prevention regulations to conduct training on facility-specific oil spill prevention and response measures. Under the Oil Pollution Prevention regulation, EPA requires owner/operators to instruct their personnel on the operation and maintenance of equipment to prevent discharges of oil. In addition, regulated facilities should have a designated person who is accountable for oil spill prevention and who reports to line management. The current regulations also compel facility owners or operators to conduct spill prevention briefings for their operating personnel as often as needed to ensure an adequate understanding of the SPCC Plan for that facility.

In 1994, EPA added requirements for oil spill response training for facilities that are required to prepare a facility response plan. Specifically, facility owner or operators are required to develop and implement a facility response training program if their facility is determined to pose substantial harm to the environment. According to the rule, training must be specific in nature and scope to the responsibilities of facility personnel identified in the facility response plan. In addition, facilities are required to develop and implement an oil spill drill/exercise program. The drill/exercise program is comprised of tabletop and deployment exercises that are both announced and unannounced, as well as participation in larger area drills and exercises. To satisfy the drill/exercise program, facilities may participate in the federal government's Preparedness for Response Exercise Program.

In 1991, EPA proposed revisions to the SPCC regulations to clarify the mandatory nature of the oil spill prevention training requirements and proposed several additional requirements. Specifically, EPA proposed the following spill prevention training requirements:

- All employees who are involved in oil-handling activities would be required to receive 8 hours of facility-specific training within one year of the final regulations.
- In subsequent years, employees would be required to undergo 4 hours of refresher training.
- Employees hired after the training program has been initiated would be required to receive 8 hours of facility-specific training within one week of starting work and 4 hours each subsequent year.

EPA currently is reviewing and evaluating comments received from the public on these proposed revisions.

FIGURE 9.2—*continued*

U.S. EPA Emergency Response Program**Preparedness for Response
Exercise Program****Exercise Components*****Internal Exercises***

Internal exercises are those that are conducted wholly within the plan holder's organizations. The internal exercises are designed to examine the various components of the response plan to ensure the plan is adequate to meet the need of the organization for spill response.

The internal exercises include:

- Qualified individual notification exercises;
- Emergency procedures exercises for vessels and barges;
- Emergency procedures exercises for facilities (optional);
- Spill management team tabletop exercises;
- and Equipment deployment exercises.

External Exercises

External exercises are exercises that extend beyond the internal focus of the plan holder's organization, and involve other members of the response community. The external exercises are designed to examine the response plan and the plan holder's ability to coordinate with the response community in order to conduct an effective response to a pollution incident. The external exercises include area exercises and government-initiated unannounced exercises.

Credit for Spill Response

All internal exercises are self-evaluated and self-certified, meaning that the plan holder is responsible for confirming and documenting that the completed exercise was conducted in accordance with PREP guidelines and an examination of the effectiveness of the plan during the exercise was performed.

Responses to actual spills may also be taken as credit for unannounced internal exercises. The plan holder must determine which exercises were completed in the spill response and document the findings. This determination should be based on whether the response effort would meet the objectives of the exercise as listed in the PREP guidelines. To receive credit from the NSCC for area exercises conducted as part of an actual spill response, the plan holder must meet the following criteria: (1) the response involved the entire response community; (2) the objectives of the area exercise were met as outlined in the PREP guidelines; (3) the response was evaluated; and (4) the spill response was properly documented and certified.

Proper documentation for self-certification should include, as a minimum, the following information:

- The type of exercise;
- Date and time of the exercise;
- A description of the exercise;
- The objectives met in the exercise;
- The components of the response plan exercised;
- and Lessons learned.

This documentation must be in writing and signed by an individual empowered by the plan holder organization.

FIGURE 9.2—continued

3.5.4 Training Program Description	6.6.1 In-Training Evaluations
3.5.5 Facility Involvement	6.6.2 Training Delivery Evaluations
3.6 Documentation	6.6.3 Post-Training Evaluations
4. TRAINING DEVELOPMENT	6.6.4 Change Actions
4.1 Purpose	6.6.5 Evaluating Facility and Industry Operating Experience
4.2 Techniques for Development	6.6.6 Comprehensive Training Program Evaluation
4.3 Elements of Development	6.7 Documentation
4.4 Products of Development	6.7.1 Approval and Tracking of Changes/Improvements
4.5 Application	6.7.2 Updating Analysis Data
4.6 Documentation	APPENDIX A, FACTORS AFFECTING TECHNIQUE SELECTION
5. TRAINING IMPLEMENTATION	General Guidance - Grading Based on Hazard
5.1 PURPOSE	Nuclear Hazard Category 1 (High-Hazard) and 2 (Moderate-Hazard) Facilities
5.2 Techniques for Implementation	Nuclear Hazard Category 3 (Low-Hazard) Facilities
5.2.1 On-the-Job Training	General Guidance - Technique Selection Considerations
5.2.2 Classroom Training	Key Factors
5.2.3 Individualized Instruction	APPENDIX B, SAMPLE TEMPLATE FOR DETERMINING SYSTEM KNOWLEDGE AND SKILLS
5.2.4 Laboratory Training	APPENDIX C, ON-THE-JOB TRAINING GUIDANCE
5.2.5 Simulator Training	OJT INSTRUCTOR
5.3 Elements of Implementation	GENERAL GUIDANCE
5.4 Products of Implementation	Preparation
5.5 Application	Conduct
5.6 Documentation	CONDUCT OF OPERATIONS GUIDELINES
6. TRAINING EVALUATION	OJT INSTRUCTIONS TO THE TRAINEE
6.1 Purpose	EVALUATOR INSTRUCTIONS
6.2 Methods of Evaluation	PERFORMANCE EVALUATION
6.3 Elements of Evaluation	INSTRUCTIONS TO THE TRAINEE
6.4 Products of Training Evaluation	
6.5 Application	
6.6 Conducting Training Evaluations	

FIGURE 9.3—continued

the professional is on exercises and drills (Table 9.2)—on the actual practice of specific skills; on the personal *doing* rather than on a safely removed *viewing*; on *being* where the real action is rather than on *seeing* someone else perform; on playing an actual role rather than on simply sitting in an audience.

While there are standard distinctions made among the various types of drills and exercises by professional response services, it should be noted that different organizations (including industrial companies) often experiment with and mix elements of different techniques. For example, while a table-top exercise is usually considered to be more of a conference than an actual drill, many organizations have developed table-top exercises into simulations that others would describe as walk-through or functional drills. The categorical name is not important—the objective is! And the objective is to practice what has been learned . . . and, then, to practice again and again.

Various types of training are, of course, mandated by specific regulations (Table 9.3). However, even when not mandated, training may in fact be necessary to achieve the objective of effective emergency response. In such instances, it is necessary to define individual training topics precisely and then to determine the most appropriate training technique (or combination of techniques) for each topic. In undertaking these tasks, corporate training personnel should be guided by the examples of professional organizations and agencies that have had to meet the same need (Tables 9.4 and 9.5).

Professional Emergency Response Training Services, Resources, and Information

One of the most important advantages of using the training services, resources, and information of professional response services is that such services, which must devote significant effort to evaluating the effectiveness of their own efforts, typically make these evaluations available so that others can learn from their experience. For example, the U.S. National Response Team (NRT) Preparedness Committee has developed an *information exchange*, which is intended to share NRT experience (via the internet) with both training exercises and actual incidents with the broad emergency response community (Fig. 9.4). Another example of an excellent training resource for general industry as well as governmental agencies is the Learning Resource Center (LRC) maintained by the U.S. Fire Administration (Fig. 9.5).

TABLE 9.2 Basic Forms of Training (Adapted from FEMA, 1996: Emergency Management Guide for Business. FEMA Electronic Library)

Orientation & Education Session	Regularly scheduled discussion session to provide information, answer questions, and identify needs and concerns.
Table-top Exercise	Members of the emergency management group meet in a conference room setting to discuss their responsibilities and how they would react to emergency scenarios. This is a cost-effective and efficient way to identify areas of overlap and confusion before conducting more demanding training activities.
Walk-through Drill	The emergency management group and response teams actually perform their emergency response functions. This activity generally involves more people and is more thorough than a table-top exercise.
Functional Drill	This drill tests specific functions, such as medical response, emergency notification, warning and communications procedures and equipment, though not necessarily at the same time. Personnel are asked to evaluate the systems and identify problem areas.
Evacuation Drill	Personnel walk the evacuation route to a designated area where procedures for accounting for all personnel are tested. Participants are asked to make notes as they go along of what might become a hazard during an emergency (e.g., stairways cluttered with debris; smoke in the hallways). Plans are modified accordingly.
Full-scale Exercise	A real-life emergency situation is simulated as closely as possible. This exercise involves company emergency response personnel, employees, and management and community response organizations.

TABLE 9.3 Selected Standards That Affect Technical Rescue Training (Adapted from U.S. Fire Administration, 1995: Technical Rescue Program Development Manual [FA-159])

Rescue Discipline	OSHA Standard	NFPA Standard	Comment
Confined Space	29 CFR 1910.146	None	Training requirements mandate annual entry training at a representative permit space and basic first aid training, but do not specify levels of training or minimum training proficiencies. A separate OSHA standard on hazmat operations training (29 CFR 1910.120) affects training for operations in confined space with IDLH (toxic or oxygen deficient) environments.
Collapse	None	NFPA 1470	
Water/Diving	None	None	Professional Association of Diving Instructors (PADI) and other dive organizations have standards for dive training. The American Red Cross also has water rescue training standards.
Trench	29 CFR 1926.650-.652	None	Mandates training on hazards of trench activities, including proper use of shoring, but does not establish operational training levels.
Rope	None	None	NFPA 1983 is the standard for rope to be used for rescue but does not discuss training.

These and other similar services that are easily available through governmental agencies are invaluable resources and should be regularly consulted by emergency response trainers and managers throughout industry. Other governmental training services are available that meet more narrowly defined needs and/or focus primarily on the training needs of governmental agencies.

For example, the U.S. National Institute for Occupational Safety and health (Pittsburgh Research Laboratory) is currently developing a computer

TABLE 9.4 Examples of Appropriate Training Topics for Various Types of Rescue (Adapted from U.S. Fire Administration, 1995: Technical Rescue Program Development Manual [FA-159])

<ul style="list-style-type: none"> • Types of rope • Types of equipment • Types of hardware and technical gear • Communications • Knots, hitches, and anchors 	<p style="text-align: center;">Rope Rescue</p> <ul style="list-style-type: none"> • Lashing and picketing techniques • Simple and complex mechanical advantage systems • Belay techniques • Litter rigging and evacuation techniques 	<ul style="list-style-type: none"> • Low angle rescue • High angle rescue • Urban rescue operations • Traverse techniques • Incident command • Self rescue techniques • EMS considerations • Helicopter operations
Equipment: Helmet; Boots; Leather gloves; Harness; Clothing		
<ul style="list-style-type: none"> • Types of confined spaces • OSHA rules • Hazard recognition • Securing the scene • Resources 	<p style="text-align: center;">Confined Space Rescue</p> <ul style="list-style-type: none"> • Atmospheric monitoring • Incident Command • Rescuer entry techniques • Retrieval systems • Rope and hardware and technical equipment 	<ul style="list-style-type: none"> • Lockout/Tagout procedures • Breathing apparatus equipment • EMS and patient care considerations • Safety and survival
Equipment: Helmet; Gloves; Boots; Clothing; Harness; Knee pads/elbow pads; Eye protection; SCBA		
<ul style="list-style-type: none"> • Trench hazards • Securing the scene • Safety 	<p style="text-align: center;">Trench Rescue</p> <ul style="list-style-type: none"> • Incident command • Equipment and Resources • Department SOPs • Shoring techniques 	<ul style="list-style-type: none"> • Rigging • EMS care • Entry and patient removal techniques
Equipment: Helmet; Gloves; Boots; Clothing; Harness Knee pads/elbow pads; Eye protection; SCBA; Folding shovel		

continues

program that simulates a major mine emergency. Known as the Mine Emergency Response Interactive Training Simulations (MERITS), this program will serve as an important training device for command center personnel, including personnel from mining companies, labor organizations, and governmental agencies. Once operational (Fall, 1998), MERITS will be a highly interactive program that will provide simulated emergency-related data and information to users via personal computers and the internet and require command input regarding both underground and surface operations.

TABLE 9.4—*continued*

<ul style="list-style-type: none"> • Size up and command considerations • Construction types • Types of collapses • Initial actions • Dangers to rescuers • Basic search techniques • Advanced search techniques 	<p align="center">Structural Collapse</p> <ul style="list-style-type: none"> • Shoring and stabilizing techniques • Equipment and technologies for collapse rescue • EMS and patient considerations • Safety and psychological impact 	<ul style="list-style-type: none"> • Critical incident stress debriefing • Breaching concrete and steel and other barriers • Tunneling and excavation techniques • Hazards to rescuers • Heavy construction equipment operations
<p>Equipment: Helmet; Gloves; Boots; Clothing; Harness; Knee pads/elbow pads; Eye protection; SCBA; Folding shovel</p>		
<ul style="list-style-type: none"> • Water hazards • Ice characteristics and dangers • Swift water hazards and hydraulic characteristics • Reach techniques • Throw techniques • Row techniques • Go techniques • Helicopter uses • Cold water drowning and Hypothermia 	<p align="center">Water Rescue</p> <ul style="list-style-type: none"> • Self rescue and survival techniques • Rescue vs. recovery • Diver support • Search patterns and techniques • Safety • Incident command • Boat operations • Flash flood and rising water 	<ul style="list-style-type: none"> • Contaminated bodies of water • Ice rescue equipment and techniques • Swift water rescue equipment and techniques • Surf rescue equipment and techniques • Basic water safety • Swimming test
<p>Equipment: Personal flotation device/life vest; Whistle; Knife or shears; Flashlight; Rope throwbag; Helmet; Gloves; Goggles/eye protection; Wet or dry suit; Suitable footwear; SCUBA gear (dive team only)</p>		

Another such program is the Comprehensive Exercise Program (CEP), developed by the Federal Emergency Management Agency (FEMA), which is intended to be inclusive of comprehensive, all-hazard, risk-based, multiscenario training exercises that test and evaluate the effectiveness of plans, policies, procedures, systems, and facilities used to respond to diverse emergency situations. The CEP, which is primarily intended to contribute to the development of compatible Federal, state, and local Emergency Operation Plans (EOPs), is based on the concept of an emergency response partnership among federal, state, and local government authorities, as well as volunteer and private sector organizations. One of the major objectives of this partnership is to provide a means for sharing response-related information throughout the emergency management community.

TABLE 9.5 Major Categories of Training for Dispatchers (Adapted from U.S. Fire Administration, 1995: Fire Department Communications Manual: A Basic Guide to System Concepts and Equipment)

Elements of Dispatcher Training
Communication Skills: Includes the ability to listen intently, speak clearly and accurately, not jump to conclusions, and obtain the correct information.
Departmental Procedures: Includes basic types of fire incidents, emergency medical incidents, responses to other emergencies, administrative notifications, and interagency communications.
Equipment Use: Covers the gamut from telephones to sophisticated computer systems; today's dispatcher must be skilled in the use of the latest communications equipment available to department.
Interpersonal Communications and Understanding: Addresses the need to be aware of the community; differences in verbal mannerisms can prevent accurate information from being communicated.

The U.S. Fire Administration (U.S. FA) provides a wide range of training materials and information on fire response, including:

- Training courses released through U.S. FA's National Fire Academy and available from the National Technical Information Service (NTIS; <http://www.ntis.gov/>). Industrial trainers may be able to review course materials at state fire training schools and metropolitan fire departments.
- Other training materials and packages developed by the U.S. FA and available through NTIS
- Documents and reports that are easily integrated into a corporate training program on emergency response and which are available in hard copy and download format from U.S. FA (<http://www.usfa.fema.gov/pubs>)

Finally, it must be emphasized that many training resources are available not only through national, regional, and local emergency response

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Prepared by the
National Response Team
Preparedness Committee

Lessons Learned From Exercises and Incidents

A WORD FROM THE NRT

This edition of the NRT/RTT Information Exchange, *Lessons Learned from Exercises and Incidents*, was developed by the NRT Preparedness Committee as a vehicle for sharing the lessons learned from recent exercises and from actual incidents. The insight gained from one exercise can help other planners and responders further develop their own emergency response plans, and ultimately improve preparedness and response capabilities.

Agency representatives serving on the NRT Preparedness Committee collected and submitted the lessons learned described in this issue - each agency is identified in the text. In order to publish this document annually and to keep the information timely, we have developed a SURVEY FORM to collect lessons learned from recent exercises and incidents. Please take a few moments after you have been involved in an exercise to fill out this form and provide us with the lessons you have learned so that others may benefit from your experience. Use the summary of exercise objectives and explanatory notes listed on the back of the form to help us categorize the information. The exercise objectives, adapted from those found in *Developing a Hazardous Materials Exercise Program: A Handbook for State and Local Officials (NRT 2)*, correspond to the sections of this document. You will notice that there are more objectives on the form than appear in this issue.

While this effort is certainly voluntary, your input is needed for effective information exchange between and among all levels of government. The NRT Preparedness Committee encourages you to copy this document and distribute it to those likely to plan and conduct exercises in your jurisdiction. Should you have any questions or if you would like to provide feedback on this project, please contact NRT by fax at: (202) 260-0154..

<http://www.nrt.org/nrt/home>

FIGURE 9.4 Information exchange program for sharing national response team experience with training exercises (U.S. National Response Team, Electronic Reference Library).

Learning Resource Center

United States Fire Administration

The Learning Resource Center (LRC) provides current information and resources on fire and emergency management subjects. With its collection of more than 50,000 books, reports, periodicals, and audiovisual materials, the LRC facilitates and supports student and faculty research and supplements classroom lectures and course materials.

The LRC routinely answers simple requests; e.g., an organization's telephone number and address. In response to more complex inquiries on specific subjects, the LRC will do literature searches, compile bibliographies, and, depending on length and copyright restrictions, provide documentation in the form of reports and articles. Users of this website may access the LRC's Online Card Catalog to perform their own literature searches.

Only FEMA personnel and National Emergency Training Center (NETC) students may borrow materials from the LRC. However, via interlibrary loan through local libraries, the general public can access the LRC's collection of books and research reports. Audiovisuals, magazines, and general reference materials are noncirculating.

Call (800) 638-1821 outside of Maryland or (301) 447-1030 for information on how to borrow materials from the LRC. Our email address is netclrc@fema.gov. Please include your mailing address and phone number in all email messages. Or, write to us at:

National Emergency Training Center

Learning Resource Center
16825 South Seton Avenue
Emmitsburg, MD 21727

Updated September 8, 1997

FIGURE 9.5 Learning resource center resources available for training purposes (U.S. Fire Administration, Electronic Reference Library).

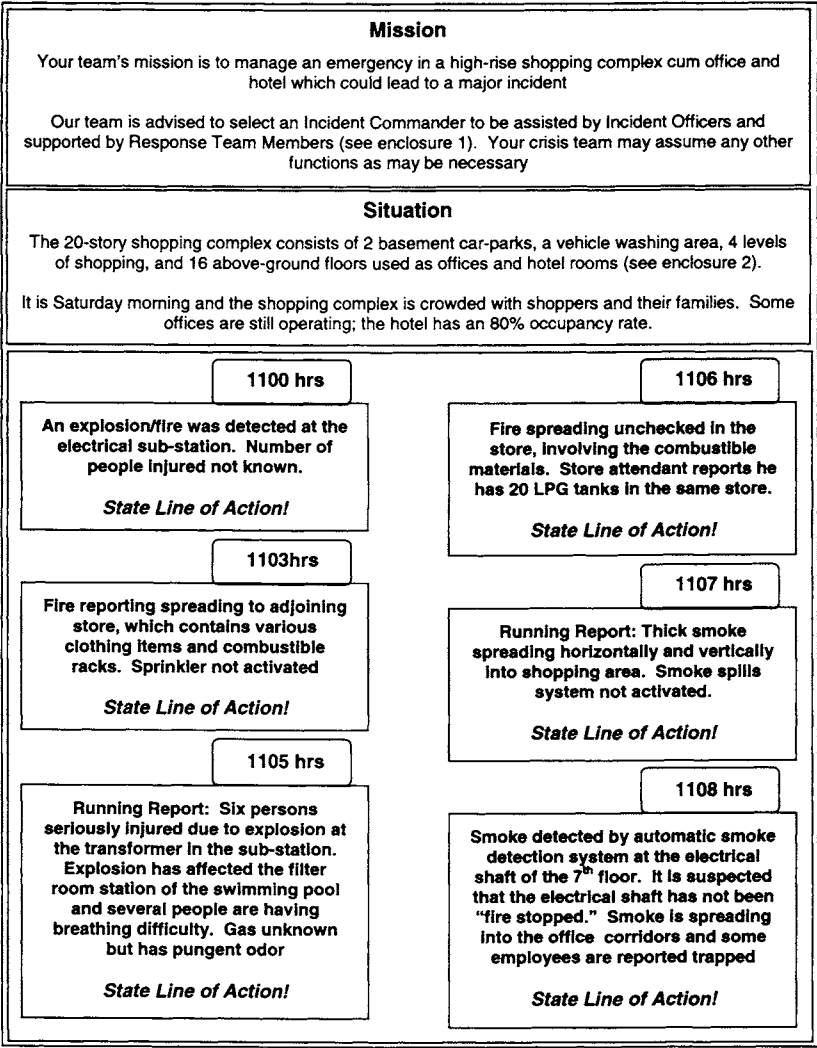


FIGURE 9.6 Portion of table-top exercise materials showing timed units of information sequentially provided to crisis team members (adapted from scenario designed and provided by Dato' Soh Chai Hock, Director General of Fire and Rescue Services, Malaysia).

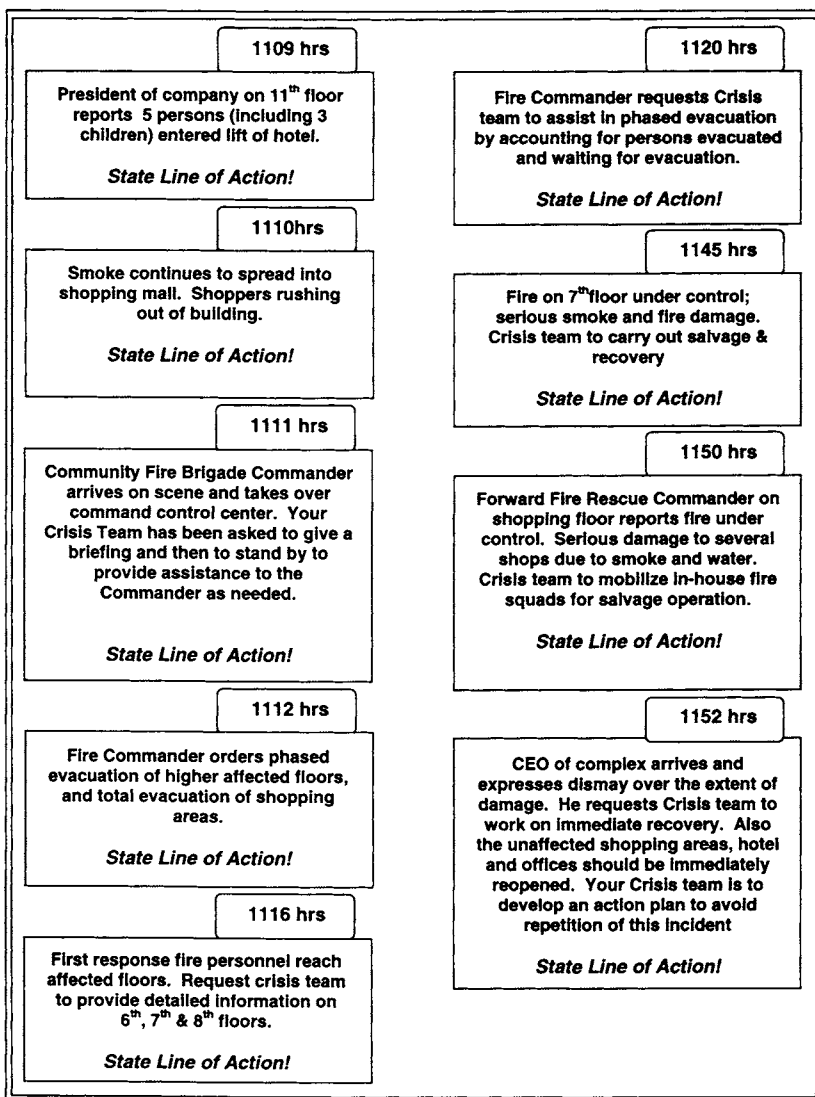


FIGURE 9.6—continued

organizations, but also through the international network of practicing professionals dedicated to comprehensive and effective emergency response. For example, Fig. 9.6 includes a summary of a table-top exercise developed by the Director General of the Malaysian Fire and Rescue Services (Dato' Soh Chai Hock) for use in a 3-day training program presented to industrial managers throughout Malaysia, but also made freely available by him to anyone who could use it in their own emergency response training program.

The broad sharing of such information and resource training materials, as exemplified by individuals, governmental agencies, and professional associations throughout the world, underscores the fact that *no corporate trainer having responsibility for training in-plant emergency response personnel lacks direct, readily available (and, in most cases, free) access to extensive professional guidance and training materials.*