



**NOT MEASUREMENT  
SENSITIVE**

**DOE G 151.1-1A  
7-11-07**

# **EMERGENCY MANAGEMENT FUNDAMENTALS and the OPERATIONAL EMERGENCY BASE PROGRAM**

## **Emergency Management Guide**

*[This Guide describes suggested nonmandatory approaches for meeting requirements. Guides are not requirements documents and are not to be construed as requirements in any audit or appraisal for compliance with the parent Policy, Order, Notice, or Manual.]*

---



**U.S. Department of Energy  
Washington, D.C.**

---

**AVAILABLE ONLINE AT:**  
[www.directives.doe.gov](http://www.directives.doe.gov)

**INITIATED BY:**  
National Nuclear Security Administration  
Office of Emergency Management

## Table of Contents

<b>1. DOE COMPREHENSIVE EMERGENCY MANAGEMENT SYSTEM .....</b>	<b>1-1</b>
1.1 Introduction.....	1-1
1.2 Requirements and Guidance .....	1-3
1.3 Conceptual Foundation of DOE Emergency Management.....	1-4
1.4 Emergency Management Programs .....	1-4
1.5 Technical Planning Basis for a Hazardous Material Program .....	1-6
1.5.1 Hazards Survey .....	1-7
1.5.2 Hazards Assessment - EPHA Analyses .....	1-7
1.6 Operational Emergencies .....	1-8
1.7 Early Recognition of Operational Emergencies.....	1-9
1.8 Plan, Prepare, and Train for Effective Response to Hazardous Material Release Operational Emergencies .....	1-10
1.9 DOE/NNSA Emergency Management and Integrated Safety Management .....	1-13
1.10 DOE/NNSA Comprehensive Emergency Management System and the National Response Plan and the National Incident Management System .....	1-14
1.10.1 National Response Plan.....	1-14
1.10.2 National Incident Management System .....	1-16
<b>2. EMERGENCY MANAGEMENT GUIDANCE .....</b>	<b>2-1</b>
2.1 Application of Guidance .....	2-1
2.2 Organization of the EMG .....	2-1
<b>3. OPERATIONAL EMERGENCY BASE PROGRAM AND BASE PROGRAM     FACILITIES .....</b>	<b>3-1</b>
3.1 Introduction.....	3-1
3.2 Technical Planning Basis.....	3-1
3.3 Programmatic Elements .....	3-2
3.4 Response Elements .....	3-4
APPENDIX A. Standard Format and Content of Emergency Plans for Base Program Facilities .....	A-1
<b>4. LEASED FACILITIES.....</b>	<b>4-1</b>
4.1 Introduction.....	4-1
4.2 Application of Emergency Management Guidance .....	4-2
4.2.1 Technical Planning Basis .....	4-2
4.2.2 Programmatic Elements .....	4-2
4.2.3 Response Elements .....	4-3
<b>5. CLOSURE ACTIVITIES.....</b>	<b>5-1</b>
5.1 Introduction.....	5-1
5.2 Technical Planning Bases .....	5-1
5.3 Programmatic Elements .....	5-3
5.4 Response Elements .....	5-4
<b>6. BIBLIOGRAPHY .....</b>	<b>6-1</b>
6.1 DOE Directives and Publications .....	6-1
6.2 Federal Regulations .....	6-3
6.3 Other Publications.....	6-5

## Figures

Figure A-1. Recommended Emergency Plan Format for an Operational Emergency Base Program Facility .....	A-2
---	-----

# 1. DOE COMPREHENSIVE EMERGENCY MANAGEMENT SYSTEM

## 1.1 Introduction

The United States Department of Energy (DOE) and the National Nuclear Security Administration (NNSA) manage a wide variety of sites and activities throughout the country. These include:

- National Laboratories;
- Nuclear weapons complex;
- Legacies of the Manhattan project and attendant cleanup sites;
- Transportation of hazardous materials:
  - Office of Secure Transportation
  - Hazardous waste shipments
- Power Marketing Administrations (PMAs); and
- Strategic Petroleum Reserve (SPR).

The National Laboratories conduct basic and applied research, ranging from high energy particle physics to the human genome, alternative sources of energy, and applications of technology to homeland security. Activities at other sites include development, stockpiling, and dismantling of nuclear weapons, production of nuclear power sources for space vehicles, environmental cleanup at legacy sites, transportation of waste materials generated by Departmental operations, and storage and isolation of radioactive waste. The Department also manages the national SPR, which stores reserves of petroleum product in case of a national emergency that impacts normal supplies, and is the home of the PMAs, which function both as distributors of electric power and brokers of regional energy supplies. Finally, the DOE/NNSA is involved in energy restoration activities following major disruptions of supply or distribution.

As the diversity of these activities indicates DOE/NNSA sites and facilities store, use, produce and dispose of many different hazardous substances, including radioactive materials, toxic chemicals and biological agents and toxins. In managing these hazards, DOE holds the safety of workers and the public to be paramount. By maintaining high standards of facility design, conduct of operations, safety oversight, and personnel training, DOE activities consistently achieve accident and injury rates that compare very favorably with those of similar operations in the private sector. In addition to the systems of workplace hazard controls that prevent incidents and ensure worker safety, the DOE

emergency management system superimposes additional protections over all operations involving dispersible hazardous materials in quantities that could harm people outside the immediate workplace.

The overall mission of DOE emergency management is to be ready to respond promptly, efficiently and effectively to *any emergency* involving or affecting DOE facilities/sites or activities by applying the necessary resources to mitigate the consequences and protect workers, the public, the environment, and national security. The DOE “*comprehensive*” emergency management system provides a *framework* within which to address **all** hazards, from natural phenomena to terrorist attacks, and **all** of the components of an effective emergency management program. The standard components of a DOE emergency management program are *planning, preparedness, readiness assurance, response, and recovery*.

- “**Planning**” involves determining, in advance, what will be done in response to specific emergencies.
- “**Preparedness**” is putting in place procedures, equipment, and personnel capabilities that will be needed to respond.
- “**Readiness Assurance**” is the ongoing process of verifying and demonstrating readiness to respond.
- “**Response**” is the actual mobilization of people, equipment and resources to take action during an emergency.
- “**Recovery**” includes planning for and actions taken following termination of the emergency to return the facility/operations to normal.

The current DOE emergency management requirements are the result of the evolution that began after the Three Mile Island reactor accident in 1979. At that time, the Department was still operating several reactors and producing materials for nuclear weapons. Accordingly, throughout the early- and mid-1980’s, DOE emergency management requirements focused heavily on nuclear and radiological hazards. After the 1984 tragedy in Bhopal, India and other accidents turned the world’s attention to chemical release hazards, the Department expanded its emergency management requirements in 1991 to include toxic chemicals. After the Occupational Safety and Health Administration (OSHA) enhanced its worker protection regulations and included hazardous waste operations, DOE expanded its emergency management requirements to stipulate a level of basic emergency planning for **all** facilities/sites or activities, with more specific and detailed requirements for activities using radioactive materials and toxic chemicals. Current emergency management requirements also address biological toxins and infectious agents, since research is ongoing at some DOE/NNSA laboratories using these materials to develop detectors and support other homeland security-related programs.

The DOE “comprehensive,” all-hazards approach to emergency management became firmly established with the issuance of DOE O 151.1 in 1995. The Order established DOE policy that provides a general structure and framework for response to any emergency at a DOE facility/site or activity and specific requirements to address protection of the workers, the public, and the environment from the release of hazardous materials.

This guide cancels and supersedes DOE G 151.1-1, Volume 1, *Introduction to the Emergency Management Guide*, dated 8-21-97.

## 1.2 Requirements and Guidance

DOE O 151.1C, *COMPREHENSIVE EMERGENCY MANAGEMENT SYSTEM* (the Order) establishes policy, assigns roles and responsibilities, and provides the framework for the development, coordination, control, and direction of the DOE Emergency Management System. The Order establishes requirements for emergency planning, preparedness, readiness assurance, response, and recovery activities and describes the approach for effectively integrating these activities under a **comprehensive, all-emergency concept**. DOE facilities/sites or activities, Cognizant Field Elements, and DOE Headquarters offices are required to develop emergency management programs as components of an integrated and comprehensive emergency management system. Together, these elements ensure that DOE emergency management is prepared to respond promptly, efficiently, and effectively to any emergency involving DOE facilities/sites or activities to protect workers, the public, the environment, and national security.

The majority of specific requirements related to the release of hazardous materials promulgated in DOE O 151.1C are *intentionally non-prescriptive* due to the wide variety of operations and activities conducted by DOE/NNSA and its contractors, and the broad range of associated hazards. The Order requires that facility/site or activity emergency management programs be developed *commensurate with the hazards* at that particular facility/site or activity. To assist facilities/sites and activities in implementing the Order requirements, DOE/NNSA has developed this comprehensive guidance document, the **Emergency Management Guide (EMG)**. This EMG is applicable to all DOE/NNSA facilities/sites and activities and *generally* applicable at DOE/NNSA organizational levels, including Cognizant Field Elements and Headquarters offices.

If official interpretation of the requirements in DOE O 151.1C or guidance in the DOE G 151.1-series is needed, the NNSA Associate Administrator for Emergency Operations serves as DOE’s primary point of contact for all emergency management activities. Questions or requests should be submitted directly to the Office of Emergency Operations. Questions and accompanying interpretations will be posted as Frequently Asked Questions (FAQs) on the Internet at:  
[http://www.ora.gov/emi/DOEOrder151\\_1C\\_Files/view\\_DOEOrder151.html](http://www.ora.gov/emi/DOEOrder151_1C_Files/view_DOEOrder151.html).

### 1.3 Conceptual Foundation of DOE Emergency Management

The DOE approach to emergency management is built upon three guiding principles or conceptual “*foundation stones*” of emergency management. These key concepts are:

- **Effective response is the “last line of defense” against adverse consequences.** Regardless of how sound the fundamental safety programs and controls may be, events will sometimes happen that have adverse health effects on people and/or the environment. This principle expresses the DOE position that if controls should fail, the facility/site or activity must be prepared to take actions to limit or prevent adverse health and safety impacts to workers and the public. The application of this principle requires some level of emergency response planning even for those events whose severity exceeds the design basis for safety controls (i.e., “*beyond-design-basis*” events).
- **Planning, preparedness, response, and recovery must be specific to and “commensurate with the hazards.”** The Department is responsible for a large number of different hazards that could threaten the health and safety of workers or the public if released to the environment. These hazards are very different in the nature of their impacts on people, their behavior in the environment and the distance at which adverse impacts would be experienced. While the basic emergency management framework is the same for all DOE facilities/sites or activities, the specific planning and response measures for each hazard are to be tailored to the hazard, such that they are specific (i.e., technically appropriate) to the hazard and commensurate with (in size, scope, or scale) the magnitude of the hazard and its potential impacts.
- **“Early recognition” is vital to timely, effective, and commensurate response.** In many cases, warning potentially affected workers and the public and directing them to take actions to prevent or limit their exposure is the only way of mitigating the adverse health impacts. Hence, the early recognition of an event is essential if warnings are to be delivered in time to be executed effectively. By developing a full understanding of possible scenarios and the indications that would point to an actual or impending event, emergency management will increase the likelihood of successful warning and intervention to prevent or limit health impacts. This analysis of scenarios and development of recognition indicators provides the basis for *tailoring* the response to the actual or potential hazard (i.e., *commensurate* response).

### 1.4 Emergency Management Programs

The DOE comprehensive emergency management system is based on a three-tiered management structure consisting of facilities/sites or activities, Cognizant Field Element, and Headquarters, with each tier having specific roles and responsibilities during an emergency. Each organizational tier provides management, direction, and support of emergency response activities. The facility/site or activity manages the **tactical response** to the emergency by directing the mitigative actions necessary to resolve the problem, protect the workers, the public, and the environment, and return the facility/site to a safe

condition. The Cognizant Field Elements oversee the facility/site response and provide local assistance, guidance, and **operational direction** to the facility/site management; the Cognizant Field Element also coordinates the tactical response to the event with Tribal, State, and local governments. DOE Headquarters provides **strategic direction** to the response, provides assistance and guidance to the Cognizant Field Elements, and evaluates the broad impacts of the emergency on the DOE complex. DOE Headquarters provides **strategic direction** to the response, provides assistance and guidance to the Cognizant Field Elements, and evaluates the broad impacts of the emergency on the DOE complex. DOE Headquarters also coordinates with other Federal agencies on a national level, provides information to representatives of the executive and legislative branches of the Federal government, and responds to inquiries from the national media.

DOE O 151.1C requires that emergency management programs are established and maintained at each organizational level to implement requirements pertaining to the comprehensive emergency management system. Because DOE and its contractors are involved in a variety of operations and activities incorporating a broad range of hazards that must be considered in effective emergency management, the Order requires that the emergency management program for a specific facility/site or activity be *commensurate with the hazards* present at that facility/site or activity (i.e., a *tailored* approach.)

Each DOE facility/site or activity is required by DOE O 151.1C to have an **Operational Emergency Base Program**, which provides the framework for response to serious events or conditions that involve the health and safety of workers and the public, the environment, and safeguards and security. Although DOE O 151.1C establishes several DOE-unique requirements and a minimum set of generic requirements for the **Base Program**, the framework for response results mainly from the implementation of the requirements of DOE regulations, other DOE orders, and applicable non-DOE Federal, Tribal, State, and local laws/regulations/ordinances. The specific requirements that constitute the Operational Emergency **Base Program** are the emergency planning and preparedness aspects of these Orders and laws/regulations/ordinances. Examples of emergency response features addressed in other DOE Orders and laws/regulations/ordinances include: medical support, worker evacuation plans, fire drills, worker notification systems, hazardous material communication, contingency planning for oil spills, environmental spill drills and exercises, and DOE security and safeguards requirements. The *objective* of the **Base Program** is to achieve an effective integration of emergency planning and preparedness requirements into an emergency management program that provides capabilities for *all-emergency* response, through communication, coordination, and an efficient and effective use of resources.

The **Hazards Survey**, which is required by DOE O 151.1C for each facility/site or activity, is used to identify the generic emergency events or conditions that define the scope of the emergency management program. The Hazards Survey is a qualitative examination of the events or conditions specific to the facility/site or activity that may require an emergency response. The description of the potential impacts of such events or conditions (e.g., natural phenomena, wild land fires, hazardous materials releases, malevolent events, etc.) contained in the Hazards Survey determines the planning and

preparedness requirements that apply. These requirements constitute the **Base Program**. The Hazards Survey is the formal mechanism used to determine the scope and extent of the facility/site or activity **Base Program**. If hazardous materials are not present at the facility/site or activity, or are present in quantities less than quantities that are “easily and safely manipulated by one person” (i.e., threshold screening quantities), then the **Base Program** appropriately defines the facility/site or activity emergency management program that meets the requirements of DOE O 151.1C. General guidance for the Base Program requirements and Base Program Facilities is presented in DOE G 151.1-1A, Chapter 3, *Operational Emergency Base Program and Base Program Facilities*.

A facility/site- or activity-specific **Emergency Planning Hazards Assessment (EPHA)** is required by DOE O 151.1C to be conducted for each DOE facility/site or activity where identified hazardous materials are present in quantities exceeding the quantity that can be “easily and safely manipulated by one person” and whose potential release would cause the impacts and require response activities characteristic of an Operational Emergency. An EPHA is a quantitative analysis that includes the identification and characterization of hazardous materials specific to a facility/site or activity, analyses of potential accidents or events, and evaluation of potential consequences. The results of the EPHA determine whether an **Operational Emergency Hazardous Material Program** is required. If the analysis results indicate that no potential accident events and conditions would be classified as an Alert or higher (as defined in DOE O 151.1C), then the **Base Program** (including 29 CFR 1910.120 requirements) constitutes the appropriate emergency management program for the facility/site or activity. If the analysis results associated with a facility/site indicate the potential for an Alert, Site Area Emergency (SAE), or General Emergency (GE) (as defined in DOE O 151.1C), a **Hazardous Material Program** is required; the analysis results will also provide the *technical planning basis* for the hazardous materials emergency management program. The **Base Program**, described above, provides the “**base**” or “**foundation**” for the **Hazardous Material Program**. The emergency management program that results from the “*seamless*” integration and coordination of these sets of requirements (“base” plus hazardous materials) becomes the emergency management program for the facility/site or activity.

Not every conceivable situation can be analyzed and, hence, not every response can be preplanned. However, the development of an adequate Hazards Survey and EPHA, in combination with effective and integrated emergency planning and preparedness, provides the framework for response to any emergency event or condition.

## 1.5 Technical Planning Basis for a Hazardous Material Program

A DOE comprehensive emergency management program is developed for a facility/site or activity based on a comprehensive understanding of the specific hazards that are identified through the Hazards Survey and EPHA process. The results of the examination and analysis of hazards in these processes become the *technical planning basis* for the Hazardous Material Program.

### 1.5.1 Hazards Survey

A *hazardous material screening process* is an essential component of the Hazards Survey process. Screening excludes from further consideration any substances that are not dispersible, non-toxic, or present only in small quantities (i.e., less than specified threshold screening quantities). The screening process yields a list of substances that are candidates for quantitative analysis. If it is not clear that a substance should be eliminated from consideration based on the screening criteria, it is retained for quantitative analysis in an EPHA. Materials are then characterized to the extent necessary to analyze their potential health impacts quantitatively.

If hazardous materials are not present at the facility/site or activity, or if hazardous materials are present in quantities less than the specified threshold screening quantities, then the **Base Program** defines the emergency management program that meets the requirements of DOE O 151.1C. General guidance for the Base Program requirements and Base Program Facilities is presented in this EMG, DOE G 151.1-1A, Chapter 3.

### 1.5.2 Hazards Assessment - EPHA Analyses

The EPHA analysis of identified hazardous materials associated with a facility/site or activity consists of a systematic examination of hazardous materials that identifies potential release scenarios for each substance in each location where it exists in the facility/site or activity. A range of different failure modes and initiating events are considered, including accidents; natural phenomena (e.g., earthquakes, tornadoes); external events (e.g., aircraft crashes, offsite transportation accidents involving hazardous materials, pipeline explosions); and, terrorism, sabotage, or other malevolent acts. A spectrum of potential events ranging from low-consequence, high-probability events to high-consequence, low-probability events are postulated and realistically analyzed. The DOE approach requires some planning even for events whose severity exceeds the design basis for safety controls; the facility/site or activity must be prepared to take actions to limit or prevent adverse health and safety impacts to workers and the public.

The EPHA analysis determines the amount of the substance that would be released, the rate of release, the pathway by which it would reach the environment, and observable indicators associated with the release event. By comparing the features of the different release scenarios, a number of specific cases are selected to represent the range or spectrum of possibilities. Using source and atmospheric transport models appropriate to the substance and the release conditions, the hazardous material concentration (for toxic chemicals) or dose (for radioactive materials) at several receptor locations is calculated. Receptor locations are chosen to represent a nearby worker, workers at other facilities on the same site, and the public. The health impact at each of these receptors is judged by comparing the dose or concentration to the applicable Protective Action Criteria (PACs) that are specified in the DOE Order and guidance for each hazardous material.

## 1.6 Operational Emergencies

DOE O 151.1C requires that an **Operational Emergency (OE)** be declared when major unplanned or non-routine abnormal events or conditions occur that:

- Involve or affect DOE or NNSA facilities/sites or activities by causing or having the potential to cause serious health and safety or environmental impacts;
- Require resources from outside the immediate/affected area or local event scene to supplement the initial response; and,
- Require time-urgent notifications to initiate response activities at locations beyond the local event scene.

This is the process of **categorizing** an event or condition as an OE. Such events or conditions can cause, or have the potential to cause:

- Serious health and safety impacts to workers or the public;
- Serious detrimental effects on the environment;
- Direct harm to people or the environment as a result of degradation of security or safeguards conditions;
- Direct harm to people or the environment as a result of a DOE offsite transportation shipment;
- Direct harm to people or the environment as a result of a major degradation safety systems, protocols, and/or practices involving hazardous biological agents or toxins; or
- Loss of control over hazardous materials (i.e., toxic chemicals or radioactive materials).

OE events or conditions involving the **loss of control over hazardous materials**, that is an actual or potential airborne release to the environment (i.e., outside a structure or enclosure on a DOE facility or site), are referred to as *Events Requiring Classification* in DOE O 151.1C. OEs that **do not involve the loss of control over hazardous materials** are referred to as *Events That Do Not Require Classification*.

In general, to be considered an OE, an event or condition involving the *uncontrolled release of a hazardous material* should:

- Immediately threaten or endanger personnel who are in close proximity of the event;

- Have the potential for dispersal beyond the immediate vicinity of the release in quantities that threaten the health and safety of onsite personnel or the public in collocated facilities, activities, and/or offsite; and
- Have a potential rate of dispersal sufficient to require a time-urgent response to implement protective actions for workers and the public.

The emergency response to such an event can benefit from a *classification* scheme that is based on the severity of potential consequences at specific distances from the source of the release. The Order requires that these events be classified as **Alert**, **SAE**, or **GE**, in order of increasing severity. This classification scheme facilitates early decision-making, particularly with respect to response activities, offsite notifications, and protective actions, by making initial decisions during planning rather than during actual response. The release of hazardous biological agents or toxins, although requiring a response similar in many respects to the response to radioactive or toxic chemical releases, is not classified.

Note that the criteria specified in the Order for defining various OEs (DOE O 151.1C, Chapter V) are *not entirely sufficient* for determining whether an abnormal event or condition has all of the characteristics of an OE. Each event should be evaluated in the context of the criteria specified in the Order and the general definition of an OE as given in the Order and above.

## 1.7 Early Recognition of Operational Emergencies

The early recognition of an event is essential if warnings are to be delivered in time to be executed effectively. DOE O 151.1C requires that OEs be recognized, categorized, and, as necessary, classified (i.e., emergency classification is determined) promptly. These OEs need to be reported and specific notifications made to local, State, Tribal, DOE/NNSA (as appropriate), and other regional Federal response agencies. To accomplish this, the emergency management staff attempts to identify the earliest possible indications of each identified OE in order to ensure that warnings can be issued in time to be effective. In addition to indications of *actual* events (equipment failures, alarms, human sensory impact, etc.), signs of *impending* events (indications that barriers or controls are failing) are identified. Events/conditions that may be *precursors* to failures (natural phenomena, loss of utilities, security incidents, etc.) may also be used to initiate actual warnings or raise the state of readiness for making critical decisions.

Using the identified recognition factors, the emergency management staff works closely with facility Operations staff to develop clear, unambiguous *decision criteria* [i.e., non-classified OE “criteria” and Emergency Action Levels (EALs) for classified OEs] for categorizing/classifying OEs. The operators and managers should be completely familiar and comfortable with the criteria and the decision-making process in order to make time-critical warning decisions with the greatest possible speed and certainty. According to DOE O 151.1C, an event needs to be categorized as an OE as promptly as possible, but no later than 15 minutes after event recognition/identification/discovery. Classification (determining the emergency class) is an integral part of the categorization process. Thus,

for OEs involving hazardous materials, categorization/classification needs to be completed as promptly as possible, but no later than 15 minutes after event recognition/identification/discovery.

Every facility/site or activity should assign the responsibility and authority for making time-critical, categorization/classification decisions to an individual who is:

- On duty or immediately accessible (i.e., on-call), 24-hours per day/7-days per week;
- Knowledgeable of the facility/site or activity hazards and potential emergencies; and,
- Trained in the use of the facility/site or activity OE recognition procedures.

Preventing death or severe injury in the nearest population groups can sometimes be shown to depend completely on early recognition, warning, and protective actions. Often the simplest and most effective risk reduction measure is to make sure that the operating staff is trained to recognize the significance of certain indications that are already available and observable to them.

Scenarios involving the release of airborne toxic hazards, developed through the EPHA process, should be carefully examined because the only means for minimizing health impacts may be to warn workers or the public early enough in the event to allow effective protective actions to be implemented (e.g., evacuation and sheltering). Specific planning and preparedness measures are considered necessary for any location where the calculated consequence impacts exceed the applicable PAC. Rapid, effective response to initiate planned measures to protect people begins with recognizing the release. In characterizing the material and identifying release scenarios, the indications that might signal an actual or impending release are identified in the EPHA process.

From the standpoint of effective response, the most valuable recognition factors are those that indicate a *degrading* safety condition or a *potential* release at some future time (such as increasing pressure in a storage tank), and not just indications that a release is already in progress. Recognition factors are an important product of the EPHA, because the facility staff needs to be aware of indicators for which they must be alert in order to start the protective action process. These recognition factors are also important to the overall facility safety program. The indicators can be used for mitigation, taking actions to reduce the severity or consequences of an emergency. This can include warning of the potential failure of safety systems so that actions can be taken before the event progresses in severity to trigger an emergency, as well as identifying opportunities for reducing the hazards present in the facility.

## **1.8 Plan, Prepare, and Train for Effective Response to Hazardous Material Release Operational Emergencies**

Using the knowledge and insights gained through the Hazards Survey and EPHA processes, a DOE facility/site or activity emergency management organization should develop detailed plans and procedures and train the staff to carry out response actions, in

particular, to reduce the severity of hazardous material release events and to minimize health impacts. The emergency management program for a facility/site or activity with hazardous materials will typically include the following measures for the most effective response to releases:

- Mobilization of response assets. The resources and personnel needed for different types of emergencies are determined during the planning phase. Their activation or mobilization is built into the procedures and checklists that guide the very early response actions for different events or types of emergencies. A number of different specialized response elements (e.g., spill teams, medical response units, offsite support organizations) can be called into action with a *single decision*, reducing the time required to field the most capable and appropriate “package” of assets.
- Rapid warning and notification of affected population. Minutes lost deciding whom to warn of an event and how to warn them can be a matter of life and death. Determining in advance just when (in response to what indications) a warning will be issued and exactly how it will be done (what method and message) gives the potentially affected people the most time to protect themselves.
- Planned (predetermined) protective actions. The most effective action to mitigate the impact of the emergency will not be the same for all events. The properties of the hazard, type of scenario, and availability and effectiveness of protective equipment or shelter are all considered during the planning phase. The most effective course of action for each population group or area is selected, spelled out in the immediate response procedures and checklists, and practiced during drills and exercises.
- Pre-positioned equipment and supplies. If they are to be effective, equipment and supplies for mitigating an event must be stored where they will be needed and maintained in serviceable condition. Personal protective equipment, communications devices, and materials that can be used to enhance shelter effectiveness are a few examples of supplies that might be determined necessary for the protection of specific groups.
- Provisions for personnel decontamination and medical intervention. Timely and effective decontamination and/or specialized medical treatment can reduce the health detriment from many events. The planning and preparations (decontamination methods, antidotes, etc.) for these measures are guided by the results of the EPHA. Preparations and arrangements for offsite medical support are coordinated by the emergency management organization.

The emergency management program for a facility/site or activity should include the following measures to provide assurances of an effective response to hazardous material releases:

- Structured training/drills program. A comprehensive, coordinated, and documented program of training and drills is an integral part of the emergency management

program to ensure that preparedness activities for developing and maintaining program-specific emergency response capabilities are accomplished.

- Formal exercise program. A formal and focused exercise program should validate all elements of the emergency management program over a multi-year period through a formal exercise program. Facility- and site-level emergency management program elements are validated by initiating response to simulated, realistic emergency events/conditions in a manner that replicates an integrated emergency response to an actual event as nearly as possible. Lessons-learned are developed, resulting in corrective actions and improvements.
- Continuous program improvement. A *readiness assurance program* provides a framework and associated mechanisms to assure that emergency plans, implementing procedures, and resources are adequate and sufficiently maintained, exercised, and evaluated, and that appropriate, timely improvements are made in response to needs identified through coordinated and comprehensive emergency planning, resource allocation, training and drills, exercises, and evaluations.

The measures identified above are reflected in the 15 program elements of a DOE emergency management program. These elements include functions and activities that can be grouped into three categories: Technical Planning Basis, Programmatic Elements, and Response elements. The DOE program elements follow:

- **TECHNICAL PLANNING BASIS**  
Hazards Survey/Hazards Assessment
- **PROGRAMMATIC** (“*ongoing*” activities)
  1. Program Administration
  2. Training and Drills
  3. Exercises
  4. Readiness Assurance
- **RESPONSE** (“*standby*” activities)
  1. Emergency Response Organization (ERO)
  2. Offsite Response Interfaces
  3. Emergency Facilities and Equipment
  4. Categorization and Classification
  5. Communication and Notification
  6. Consequence Assessment
  7. Protective Actions and Reentry
  8. Emergency Medical Support

9. Emergency Public Information
10. Termination and Recovery

These elements are components of a Hazardous Material Program. However, many aspects of *general* planning, preparedness, and response functions and activities (e.g., program administration, exercises, emergency public information) associated with classified OEs will be applicable to many other types of OEs not requiring classification.

## 1.9 DOE/NNSA Emergency Management and Integrated Safety Management

As the last line of defense in protecting workers, the public, and the environment, the comprehensive emergency management program at each DOE/NNSA facility/site or activity is a key element of work planning and execution in accordance with Integrated Safety Management (ISM). Emergency management (like quality assurance, maintenance, personnel training, conduct of operations, fire protection, and waste management) should be a specific function addressed by the safety management program necessary to ensure the safe operation of a facility/site or activity. The DOE emergency management system ensures consistency across the complex through a common understanding of emergencies and the expected DOE response at all organizational levels, including the local worker and facility/site or activity level, which are the primary focus of ISM.

Since 1991, DOE emergency management Orders have incorporated the concept of “tailoring” requirements to specific hazards through the “commensurate with hazards” approach. The approach begins with a complete understanding of the emergencies that could impact DOE facilities/sites or activities followed by analyses of the resultant hazards to workers, the public, the environment, and national security. Based on the hazards analyses, the requirements in the Order are *tailored* to develop an emergency management program (e.g., plans, tools, training, response, resources) that addresses the unique hazards and operating environment of each facility/site or activity. The Hazards Survey and EPHA, which are integral parts of the “commensurate with hazards” or “tailoring” approach, provide the recognition tools (e.g., EALs) and defines the appropriate response (e.g., protective actions) to potential releases of hazardous materials. Such hazard controls are essential components in the last line of defense in protecting workers, the public, and the environment.

Continuous improvement is a fundamental concept embedded in ISM and the DOE emergency management system. In DOE emergency management, continuous improvement is provided through the readiness assurance program required of all DOE/NNSA facility/site and activity emergency management programs. Readiness assurance provides the framework and associated mechanisms to assure that planning and resources are adequate and sufficiently maintained, exercised, and evaluated, and that appropriate, timely *improvements* are made in response to needs identified. A structured and focused program of evaluations (program and exercise evaluations) and a reliable lessons-learned process ensure that an effective program of continuous improvement maintains DOE/NNSA emergency management programs.

Thus, the fundamental concepts that characterize DOE emergency management and the requirements contained in DOE O 151.1C set forth DOE/NNSA expectations for emergency management and provide effective mechanisms for integrating emergency management objectives effectively and seamlessly with ISM fundamental concepts and core safety management functions.

## **1.10 DOE/NNSA Comprehensive Emergency Management System and the National Response Plan and the National Incident Management System**

### **1.10.1 National Response Plan**

The National Response Plan (NRP) provides a single, comprehensive approach to domestic incident management. It is an all-hazards plan built on the template of the National Incident Management System (NIMS). The NRP, using NIMS, provides the structure and mechanisms for national-level policy and operational direction for incident management. The NRP can be partially or fully implemented in response to an incident requiring a coordinated Federal response.

The NRP is based on the premise that incidents are typically handled at the lowest jurisdictional level, with first responders using existing authorities. Consequently, when an Operational Emergency occurs at a DOE/NNSA facility/site, the initial response is conducted by the facility/site using plans and procedures developed commensurate with the hazards at the facility/site and according to the requirements of the DOE Comprehensive Emergency Management System. These plans could include use of response capabilities from the surrounding jurisdictions. Most Operational Emergencies should be resolved using these plans and capabilities.

There may be situations where the DOE National Radiological Response Assets are needed to augment the local response. Requests for Radiological Assessment Program (RAP) teams are generally directed through the appropriate DOE Regional Coordinating Office to the DOE Headquarters (HQ) Emergency Operations Center (EOC). All other requests for Federal radiological monitoring and assessment go directly to the DOE HQ EOC. When other agencies receive requests for Federal radiological monitoring and assessment assistance, they notify the DOE HQ EOC.

The Nuclear/Radiological Annex of the NRP, which replaced the Federal Radiological Emergency Response Plan (FRERP), provides planning guidance and outlines operational concepts for the Federal response to any nuclear/radiological incident requiring Federal coordination. DOE would serve as the coordinating agency for the Federal response to radiological incidents involving DOE/NNSA facilities or material otherwise under its jurisdiction (e.g. transportation of material shipped by or for DOE/NNSA). The National Oil and Hazardous Substance Pollution Contingency Plan (NCP), found in 40 CFR 300, provides similar planning guidance and operational concepts for Federal response to other hazardous material incidents requiring Federal coordination.

DOE O 151.1C contains requirements for the Cognizant Field Element to pre-designate personnel to oversee the facility/site response and assign tasks to those Federal assets that are deployed to support the facility/site, under the authority of the full NRP, the Nuclear/Radiological Annex of the NRP, or the NCP. As part of the DOE O 151.1C planning process, DOE/NNSA facilities/sites and Cognizant Field Elements should identify the scenarios where response capabilities may be exceeded and broader assistance from the Federal government would be needed. The scenarios requiring these response capabilities are likely to be limited to the high-consequence end of the spectrum of potential events. It is possible that, commensurate with the hazards at the DOE/NNSA facilities/sites, Federal response capabilities or assistance may not be needed.

Implementation of the NRP reveals concepts that are not directly addressed within the DOE Comprehensive Emergency Management Program. As part of the change to an all-hazards approach at the Federal level, the NRP broadened concepts related to incident management and began the process of establishing a common terminology related to emergency management. Where the DOE emergency management program names the standard components as *planning, preparedness, readiness assurance, response, and recovery*, the NRP includes two other concepts, prevention and mitigation. These are defined in the NRP as follows:

- ***“Prevention”*** includes actions taken to avoid an incident or to intervene to stop an incident from occurring. It involves applying intelligence and other information to a range of activities taken to protect lives and property.
- ***“Mitigation”*** includes activities designed to reduce or eliminate risks to persons or property or to lessen the actual or potential effects or consequences of an incident. Mitigation measures may be implemented prior to, during, or after an incident.

Prevention involves the use of information and data to avoid an incident or to intervene to stop an incident from occurring. The primary focus of this activity in incident management involves the use of intelligence data or other types of surveillance activities to anticipate and stop/avoid the incident. The current DOE emergency management framework accommodates this activity, but does not explicitly address the concept. Prevention activities are more closely related to activities undertaken in the security, safety, or health programs, before the event rises to the seriousness of an emergency.

On the other hand, DOE activities, representing the standard components of a DOE emergency management program, explicitly incorporate the NRP concept of *mitigation*. Examples include:

- The planning analysis associated with a hazards assessment can identify opportunities to reduce the consequences of a potential hazardous material release event using hazard mitigation activities such as inventory reduction or inventory dispersal.
- Readiness assurance activities include incorporating lessons-learned from evaluations and actual emergencies to improve the response and, perhaps, identifying vulnerabilities in hazardous materials safety procedures and systems.

- Response activities include the execution of incident mitigation activities designed to limit the loss of life, personal injury, property damage, and other unfavorable outcomes.
- Recovery includes the evaluation of the incident to identify lessons learned; and develop initiatives to mitigate the effects of future incidents.

These and other NRP concepts and terminology will be more fully integrated into the DOE emergency management system in future versions of the Order and this guidance.

### **1.10.2 National Incident Management System**

For years, DOE requirements and guidance have discussed the need to have an incident command system at the facility/site level that could seamlessly integrate response assets from the surrounding jurisdictions. The NIMS is designed to achieve the same integration at all levels of government. The Department of Homeland Security (DHS) promulgated NIMS in March 2004, under the authority of Homeland Security Presidential Directive (HSPD)-5. NIMS is the nationwide template enabling Federal, State, local, and tribal governments and private-sector and nongovernmental organizations to work together effectively and efficiently to prevent, prepare for, respond to, and recover from emergencies.

All Federal Departments/Agencies were required to develop a NIMS Implementation Plan. The DOE NIMS implementation plan was published in February 2005, requiring all Departmental elements to complete implementation of NIMS by September 30, 2005, or when their surrounding jurisdictions implemented NIMS. The basic requirement, without the implementation date, is included in DOE O 151.1C, Chapter IV, paragraph 3b(1).

The DHS made preparedness grant funding for State, Territorial, Tribal and Local Governments contingent upon NIMS compliance after Federal Fiscal Year (FY) 2006. Most local jurisdictions, as well as all DOE/NNSA facilities/sites, should have achieved NIMS compliance by this time.

## 2. EMERGENCY MANAGEMENT GUIDANCE

### 2.1 Application of Guidance

The Emergency Management Guide (EMG) provides acceptable approaches to emergency planning, preparedness, readiness assurance, and response activities at DOE/NNSA facilities/sites or activities, including DOE transportation activities, Cognizant Field Elements, and Headquarters offices. The EMG provides preferred, non-mandatory, supplemental information about acceptable methods for implementing requirements of the DOE Comprehensive Emergency Management System. The EMG “does not impose requirements, but may quote requirements as long as the sources are adequately cited.” (Cf. DOE M 251.1-1B) Thus, the DOE/NNSA guide is *not* a requirements document and may not be construed as requirements in any audit or assessment of compliance with the associated Order. However, although *NOT* mandatory, the guide provides needed clarification regarding the intent of DOE O 151.1C requirements.

Guidance contained in the EMG is generic in nature because detailed guidance on every conceivable type of emergency for every type of facility/site or activity cannot be provided. Other equivalent approaches for meeting the Order requirements may be acceptable to accommodate the wide range and diversity of DOE operations and activities, facility types and missions, hazards, and site characteristics. Features such as local and state political structures, geography, and local demography may also contribute to unique facility-specific solutions for developing and maintaining an acceptable emergency management program that complies with the Order requirements.

Using either the guidance contained in the EMG or another acceptable approach to implement the Order requirements, the resulting emergency management program should be integrated and coordinated with regulations and plans developed by other Federal agencies, states, local authorities, and other DOE offices. These regulations and plans may establish requirements similar to those required within the Operational Emergency Base Program or the Operational Emergency Hazardous Material Program, and should be integrated, where applicable, to ensure a standard approach and continuity of effort. Newly issued or revised DOE Orders, regulations, or plans should be incorporated, in accordance with corresponding implementation requirements, as soon as reasonably achievable (e.g., during the performance of hazards survey and EPHA reviews/updates).

### 2.2 Organization of the EMG

The EMG is organized in functional areas represented by the DOE/NNSA emergency management **Program Elements** and associated topics identified in the Order. Each chapter of each document in the DOE G 151.1-series covers a separate area with direct application to an emergency management program.

**DOE G 151.1-A:    *EMERGENCY MANAGEMENT FUNDAMENTALS and the  
OPERATIONAL EMERGENCY BASE PROGRAM***

1. **DOE Comprehensive Emergency Management System**. Briefly describes the basic concepts that determine the organization, structure, underlying philosophy, and content of the DOE comprehensive emergency management system.
2. **Emergency Management Guidance**. Explains the role of emergency management guidance and briefly describes the organization and content of the EMG.
3. **Operational Emergency Base Program and Base Program Facilities**. Provides selected guidance for the Base Program for all DOE/NNSA facilities. Provides a single source of guidance for Base Program Facilities.
  - A. **Standard Format and Content of Emergency Plans for Base Program Facilities**.  
Describes the recommended standard format that may be used when developing emergency plans for Base Program Facilities.
4. **Leased Facilities**. Provides selected factors that should be considered to integrate leased facilities at DOE/NNSA sites into site-wide emergency management programs.
5. **Closure Activities**. Addresses important issues that should be considered when planning changes to an emergency management program based on the projected closure of a facility/site.
6. **Bibliography**.

**DOE G 151.1-2:    *TECHNICAL PLANNING BASIS***

1. **Hazards Survey**. A Hazards Survey includes an examination of the features and characteristics of the facility/site or activity that identifies the generic emergency events and conditions and the potential impacts of such emergencies to be addressed by the DOE Comprehensive Emergency Management System. The Hazards Survey identifies key components of the Operational Emergency Base Program that provide a foundation of basic emergency management requirements and an integrated framework for response to serious events involving health and safety, the environment, safeguards, and security. For facilities/sites or activities involved in producing, processing, handling, storing, or transporting hazardous materials that have the potential to pose a serious threat to workers, the public, or the environment, the Hazards Survey provides a hazardous material screening process for determining whether further analysis of hazardous materials in an EPHA is required.
  - A. **Hazardous Material Screening Process**  
Detailed description of a hazardous material screening process.

**B. Example Application of the Hazards Survey Guidance to a Hypothetical DOE Facility**

Application of Hazards Survey process to an example facility.

2. **Hazards Assessment.** An EPHA is performed for each facility/site or activity involving at least one candidate hazardous material, as identified through the hazardous material screening process and indicated in the Hazards Survey. EPHAs involve the application of rigorous hazards analysis techniques that provide sufficient detail to assess a broad spectrum of postulated events or conditions involving the potential release of (or loss of control over) onsite hazardous materials and to analyze the resulting consequences. Each EPHA reflects both the magnitude and the diversity of the hazards and the complexity of the processes and systems associated with the hazards, and provides the technical planning basis for determining the necessary plans/procedures, personnel, resources, equipment, and analyses.
- C. Facility and Site Boundary Guidelines**  
Provides guidance for determining emergency management facility and site boundaries for use in classification and other response functions.
- D. Onsite Transportation Analysis**  
Addresses Department of Transportation (DOT) requirements and the use of the DOT Emergency Response Guide (ERG) for response to onsite transportation accidents. EPHA requirements are also discussed.
- E. Malevolent Events**  
Guidance is provided for addressing the malevolent events and their role in constructing the spectrum of events and conditions that form the planning basis for DOE/NNSA emergency management programs.
- F. Consequence Thresholds**  
The definitions and use of PACs for radioactive and toxic chemical releases.
- G. Example Hazards Assessment**  
EPHA methodology applied to an example facility.
- H. Combustion Products and Toxicity in Hazards Assessments**  
Addresses the issue of the treatment of smoke as a hazardous material release in EPHAs.
3. **Emergency Planning Zones.** Describes the methodology for determining an Emergency Planning Zone (EPZ) for the Operational Emergency Hazardous Material Program.
4. **Maintaining Hazards Surveys and Hazards Assessments.** Hazards Surveys and EPHAs should be maintained so that they accurately reflect changes in the facility design, operations, safety features, inventories of hazardous materials, and features of the surrounding area.

5. **Using Hazards Surveys and Hazards Assessments.** Addresses the use of Hazards Survey and EPHA results to develop emergency management program elements.

**DOE G 151.1-3: PROGRAMMATIC ELEMENTS**

1. **Program Administration.** This element promotes effective organizational management and administrative control of the facility emergency management program by establishing and maintaining authorities and necessary resources commensurate with the responsibility to plan, develop, implement, and maintain a viable, integrated, and coordinated comprehensive emergency management program. The establishment and maintenance of the emergency management program and management responsibilities are described. The role and responsibilities of the designated emergency management administrator are discussed; the documentation and administrative procedures associated with the position are also described.
  - A. **Standard Format and Content for Emergency Plans for Hazardous Material Programs**

Describes the recommended standard format that can be used when developing emergency plans and discusses the details of emergency management program elements that should be included in emergency plans.
2. **Training and Drills.** Provides guidance for a comprehensive, coordinated, and documented program of training and drills that is an integral part of the emergency management program. The program ensures that preparedness activities for developing and maintaining program-specific emergency response capabilities are accomplished. The general training that should be provided to all workers about OEs is discussed. In addition, the specialized training on hazards and response for workers and all regional Federal, Tribal, State, and local emergency response organizations expected to provide onsite assistance is addressed. General concepts related to training programs are reviewed, including the management and administration of the program, program objectives and guidelines, and contents of the program plan. The development and implementation of the training program and the delivery of training and drills and their associated logistics are described. Topics related to training evaluation, self-assessments, and documentation are also included.
3. **Exercises.** Describes the role of an exercise program in validating the integrated emergency response of facility- and site-level emergency management program elements by initiating response to simulated, realistic emergency events/ conditions. An effective, structured approach includes documentation of specific objectives, scope, timelines, injects, controller instructions, and evaluation criteria for realistic scenarios. Each exercise is conducted, controlled, evaluated, and critiqued effectively and reliably. The functional aspects of exercise development are addressed, but not the roles and responsibilities of specific organizations or individuals. Lessons learned are developed, which result in corrective actions and improvements.

**B. Controller and Evaluator Manual**

Provides a discussion of the roles of controllers and evaluators in DOE/NNSA exercises.

4. **Readiness Assurance**. Describes a readiness assurance program for each facility/site or activity, which includes evaluations, improvements, and documentation. The program provides a framework and associated mechanisms to assure that emergency plans, implementing procedures, and resources are adequate and sufficiently maintained, exercised, and evaluated and that appropriate, timely improvements are made in response to needs identified. The Emergency Readiness Assurance Plan (ERAP) development is reviewed briefly.

**C. Emergency Readiness Assurance Plans (ERAPs)**

Contains acceptable format and content for ERAPs.

**D. Evaluation Criteria**

A recommended standard set of performance-based evaluation criteria to be used for program and exercise evaluations.

**E. A Systematic Approach for Performing Self-Assessments of Emergency Management Programs**

An example approach for developing a systematic self-assessment program is presented.

**DOE G 151.1-4: *RESPONSE ELEMENTS***

1. **Emergency Response Organization (ERO)**. The ERO, which represents the structured organization with overall responsibility for initial and ongoing emergency response and mitigation, is discussed. The ERO establishes effective control at the event/incident scene and integrates local agencies and organizations providing onsite response services. An adequate number of experienced and trained primary and alternate response personnel should be available on demand for timely and effective performance of ERO functions. The organizational structure of the ERO is defined with clearly specified authorities and responsibilities. The configuration and staffing of the ERO is discussed in terms of initial response and staff augmentation during an emergency.
2. **Offsite Response Interfaces**. The establishment and maintenance of effective interfaces ensure that emergency response activities are integrated and coordinated with the Federal, Tribal, State, and local agencies and organizations are discussed. The interrelationships with Federal, state, tribal, and local organizations should be prearranged and documented in formal plans, agreements, understandings, and/or other pre-arrangements for mutual assistance. The content of the documentation for these formal agreements is discussed.
3. **Emergency Facilities and Equipment**. Facilities and equipment adequate to support emergency response should be available, operable, and maintained. The role of the

EPHA in defining facility and equipment requirements for emergency response to hazardous material releases is described. EOCs, command centers, Joint Information Centers (JICs), and other types of facilities are addressed. Emergency equipment is reviewed in terms of general functions, including: command, control, and communications; consequence assessment; personal protective equipment (PPE); protective actions; medical care; and emergency public information.

4. **Emergency Categorization and Classification.** The basic definition of a DOE/NNSA OE is discussed in term of its practical applications. The process by which serious events or conditions are recognized and *categorized* as OEs, involving or affecting DOE/NNSA facilities/sites or activities, is described. The development of criteria for quickly categorizing events or conditions is discussed. Also described are the basic principles of *classification* of hazardous material OEs, the relative severity of events that fall into each emergency class [e.g., Alert, SAE, or GE], and the transition from normal/off-normal operations to event categorization and classification. The use of PACs to establish hazardous materials emergency classification for radioactive and toxic chemical releases is addressed. Guidance is provided for developing criteria, known as EALs, used to detect and recognize hazardous materials events and assign them to specific emergency classes. Predetermined conservative onsite protective actions and offsite protective action recommendations are associated with the classification of these OEs.
  - A. **Integration of Event Categorization and Classification with Normal Operations**

Discusses techniques for integrating categorization/classification functions with normal operations.
  - B. **Methods and Examples for Implementation of Event Categorization and Classification**

Presents suggestions for the placement of OE categorization criteria within existing facility/site or activity occurrence reporting and classification procedures. Discusses the application of the barrier approach to EAL development and provides examples of EAL organization and format by presenting EALs developed for the hypothetical facility EPHA.
5. **Notifications and Communications.** Prompt, accurate, and effective initial emergency notification is the subject of this guidance. Follow-up notifications are discussed for changing conditions, for classification upgrade, or for emergency termination. Recommendations for reliably maintaining continuous, effective, and accurate communications among response components and/or organizations throughout an OE are provided. Several aspects of emergency communications are addressed: notification requirements, report contents, communications equipment, and effective responder communications. Emergency reporting includes initial notifications to onsite personnel and offsite authorities and emergency status updates. The accurate, timely, and useful exchange of information during an emergency response is emphasized.

**C. Emergency Report Form**

Example form for providing the types of information that should be included in emergency reports used in notifying offsite authorities, including local and state agencies and all three tiers of the emergency response system: facility/site or activity, Cognizant Field Elements, and DOE or NNSA HQ.

**D. Emergency Situation Report**

Contains an example situation report that can be used to keep HQ updated on the progress of an emergency.

6. **Consequence Assessment.** Focuses on the process of performing timely initial assessments necessary to support critical first decisions and the continuous process of refining those initial assessments as more information and resources become available. The process is discussed in terms of sequential functional areas: identification of input data/information; calculation of consequences; and the interpretation and communication of results. Consequence assessments are integrated with event classification and protective action decision-making, they incorporate facility and field indications and measurements; and, they are coordinated with offsite agencies. The importance of coordination of information is stressed. Recommendations are provided for a systematic quality assurance approach to ensure that consequence assessment tools conform to established functional, operational, and technical requirements.

**E. Ingestion Pathway Calculations for Radioactive Releases**

Provides a brief overview of food and water interdiction calculations and criteria.

**F. Field Monitoring**

Briefly describes the process for obtaining *in situ* information about the impact of an actual or suspected release of radiological or chemical hazardous material by taking direct measurements in the environment or by sampling environmental media for subsequent laboratory analysis. The integration of monitoring data and results of calculations is addressed.

7. **Protective Actions and Reentry.** Discusses protective actions that can be implemented individually or in combination, to reduce exposures from a wide range of hazardous material types; these actions can include evacuation, sheltering, decontamination of people, medical care, ad hoc respiratory protection, control of access, shielding, radio protective prophylaxis, control of foodstuffs and water, relocation, decontamination of land and equipment, and changes in livestock and agricultural practices. Provisions for specific, predetermined actions to be taken in response to emergency conditions to protect onsite personnel and the public are described. The process of protective action decision-making is discussed in terms of PACs and the determination of affected area. The specific applicability of selected protective actions (e.g., sheltering and evacuation) is presented. Accountability methods are described. Reentry activities are addressed in terms of the protection of response personnel. Planning, decision-making, and operational aspects of reentry

- are described. The special case of reentry for “rescue and recovery” is discussed. Decontamination and the management of personnel exposure are addressed.
8. **Emergency Medical Support.** Describes medical support provided for workers contaminated by hazardous materials. Addresses arrangements with offsite medical facilities to transport, accept, and treat contaminated, injured personnel are documented. Also discussed are the requirements from DOE O 440.1A, which provide for the medical treatment and planning for mass casualty situations and medical response for contaminated workers. Addressed are the medical organization, facilities and equipment, communications, access and services, and preparedness activities.
  9. **Emergency Public Information.** Describes an emergency public information program to provide timely, candid, and accurate information to workers, the news media, and the public during an emergency, to establish facts, provide health and safety information, and avoid speculation. Coordination with Tribal, State, and local governments is essential. Addresses: the identification of the various emergency response components of the Emergency Public Information (EPI) program and their roles in the emergency; designation of emergency facilities to be used during an emergency; establishment of appropriate broadcast and print media interfaces; establishment of a system to develop and release emergency information; development of programs for EPI training, drills, and exercises including offsite organizations; development of an emergency public education program; and organization of a JIC with representatives of offsite agencies.
  10. **Termination and Recovery.** An OE is terminated only after a predetermined set of criteria is met and termination has been coordinated with offsite agencies. Explains difference in concept of termination for OEs *not requiring classification* versus OEs *requiring classification*. Discusses recovery from a terminated OE involving communication and coordination with local, State, Tribal, and other Federal agencies; planning, management, and organization of the associated recovery activities; and ensuring the health and safety of workers and the public. The response functions related to recovery that need to be included in plans and procedures are discussed, including the creation of a recovery organization and the conduct of recovery operations. The resumption of normal operations is also addressed.

#### **DOE G 151.1-5:      *BIOSAFETY FACILITIES***

Describes selected aspects of DOE/NNSA emergency management programs that reflect the impact of the unique characteristics of biological hazardous materials. Discussions depend on knowledge of the preceding documents in the DOE G 151.1-series. Introduces both emergency management personnel and biosafety facility staff to a DOE/NNSA approach for developing an emergency management program.

##### **A. Operational Emergency Scenarios for Biosafety Facilities**

This appendix provides a number of example biological OE scenarios to illustrate

an approach for developing an *integrated description* of scenarios for analyzing biological agent releases. This approach represents a recommended thought process that may assist analysts in the development of facility-specific release scenarios in EPHAs, and in the application of EPHA results to develop categorization criteria and associated initial protective actions.

**B. Bibliography**

Lists documents used to develop the EMG and provided as references.

Additional, specialized documents in the DOE G 151.1 series may be published in the future.

### 3. OPERATIONAL EMERGENCY BASE PROGRAM AND BASE PROGRAM FACILITIES

#### 3.1 Introduction

The objective of an **Operational Emergency Base Program** is to achieve an effective integration of emergency planning and preparedness requirements into an emergency management program that provides capabilities for *all-emergency* response, through communication, coordination, and an efficient and effective use of resources.

Each DOE facility/site or activity is required by DOE O 151.1C to have a **Base Program** that provides the framework for response to serious events or conditions that involve the health and safety of workers and the public, the environment, and safeguards and security. DOE O 151.1C establishes DOE-unique requirements and a minimum set of generic requirements for the **Base Program**. The framework for response results from the implementation of the emergency planning and preparedness requirements of DOE regulations, other DOE Orders, and applicable non-DOE Federal, Tribal, State, and local laws/regulations/ordinances. The Base Program should ensure that all the requirements identified from DOE regulations/directives and external regulations/requirements addressing emergency issues are seamlessly integrated without duplication.

The objective of this chapter is to provide guidance for the implementation of Base program requirements in an emergency management program. This guidance is applicable for both **Base Program Facilities** and the Base Program that represents the foundation for a **Hazardous Material Program** facility. This chapter is organized in sections according to DOE/NNSA Emergency Management System *Program Elements*. Within each section, Order requirements may be specified and related guidance provided, as necessary. In some instances, the guidance for the element in a Base Program Facility or the Base Program for a Hazardous Material Program facility will be the same as provided for the Hazardous Material Program requirements and a reference to the appropriate chapter in subsequent documents in the DOE G 151.1-series will be given.

The **Base Program** should provide for integrated planning to meet the response requirements identified in the Hazards Survey, and, at a minimum, address the DOE O 151.1C requirements discussed in the following sections.

#### 3.2 Technical Planning Basis

Hazards Survey. The Hazards Survey is required by DOE O 151.1C for each facility/site or activity and is used to identify the generic emergency events or conditions that define the scope of the emergency management program at a facility/site or activity. The Hazards Survey is a qualitative examination of the events or conditions specific to the facility/site or activity that may require an emergency response. The description of the potential impacts of such events or conditions contained in the Hazards Survey determines the planning and preparedness requirements that apply, and these

requirements constitute the **Base Program**. Thus, the Hazards Survey is the formal mechanism to determine the scope and extent of the Base Program. The Base Program, as described above, also provides the “base” or “foundation” for a Hazardous Material Program.

If the Hazards Survey screening process identifies hazardous materials in a facility/site or activity that exceed the threshold screening quantities, then these materials require further analysis in an EPHA. If hazardous materials are not present in sufficient quantities to produce classified OEs (i.e., Alert, SAE, or GE) at the facility/site, then the Base Program appropriately defines the emergency management program for a **Base Program Facility** that meets the requirements of DOE O 151.1C.

A detailed approach applicable to **Base Programs** and **Base Program Facilities** for developing the Hazards Survey can be found in DOE G 151.1-2, Chapter 1, *Hazards Survey*.

### 3.3 Programmatic Elements

**Program Administration.** Chapter XI of the Order specifies Program Administration requirements that are applicable to both **Base Program Facilities** and **Base Programs** for facilities that require a **Hazardous Material Program**. Each manager/administrator of a DOE/NNSA facility/site or activity needs to designate an individual to administer emergency management in accordance with the terms of the Order. This individual has the responsibility for developing and maintaining the emergency plan, developing the Emergency Readiness Assurance Plan (or contributions to one) and annual updates, developing and conducting training and drills (or ensuring their performance in another program such as General Employee Training), coordinating the exercise program and evaluation/assessment activities, developing related documentation, and coordinating emergency resources.

For **Base Program Facilities**, the requirements provided in Chapter XI of the Order should be *tailored* to characterize the less complex duties and responsibilities of the emergency management administrator, in comparison with duties and responsibilities associated with Hazardous Material Program administration. For a **Base Program Facility**, it is expected that performance of these duties may be assigned as collateral duty.

Existing plans, such as catastrophic earthquake plans or mass casualty plans detailing compliance with Federal, State, and local standards, may be incorporated directly into the Base Program or invoked by reference. A sample format and associated content for the Base Program Facility Emergency Plan is contained in DOE G 151.1-1A, Appendix A. Further guidance on the implementation of Chapter XI of the Order can be found in DOE G 151.1-3, Chapter 1, *Program Administration*.

**Training and Drills.** All workers who may be required to take protective actions (e.g., shelter-in-place, assembly, evacuation) are to participate in initial training and periodic drills. Training should be provided at the time of employment, when expected

response actions change, or when the emergency plan changes. Initial and annual refresher training should be provided to certified operators and supervisors, workers who are likely to witness emergency conditions, those required to notify proper authorities, and workers required to attain “first responder awareness level,” as described in 29 CFR 1910.120. In addition, emergency-related information and training on site-specific conditions and hazards should be made available to offsite personnel who may be requested to respond to an emergency at the DOE site/facility or activity.

DOE G 151.1-3, Chapter 2, *Training and Drills* provides guidance on the training/drill program and training methodologies associated with topics to be covered by Base Program training activities. This chapter will also assist a Base Program Facility that has a more extensive Emergency Response Organization (ERO), fulfilling requirements from external or other Federal agencies.

**Exercises.** At a minimum, the Order requires that each site/facility conduct building evacuation exercises consistent with Federal regulations [e.g., (41 CFR 102-74-360)], local ordinances, or National Fire Protection Association (NFPA) Standards. Exercises are to be conducted as often as needed to ensure that employees are able to evacuate their work areas safely. The organizations responsible for communications with DOE/NNSA Headquarters, Cognizant Field Elements, and offsite agencies are to test communications systems at least annually, or as often as needed to ensure that communications systems are operational.

The minimum DOE O 151.1C requirements for site and facility exercises associated with Base Programs are limited to activities such as building evacuations and communications systems testing. Exercises in this context can be much more limited in scope than exercises related to hazardous materials. The exception to this might be natural phenomena emergencies (e.g., earthquake response). For these emergencies or for a more extensive Base Program Facility, DOE G 151-1-3, Chapter 3, *Exercises* may be applicable for developing and conducting exercises. In general, a systematic approach is recommended for all exercises associated with the Base Program Facility, using the principles and general approach applicable to hazardous materials exercises.

**Readiness Assurance.** Requirements for Readiness Assurance are found in Chapter X of the Order. The general requirements for a readiness assurance program contain the following three components: Evaluations, Lessons Learned, and Documentation. The guidance contained in DOE G 151.1-3, Chapter 4, *Readiness Assurance* should be tailored to a Base Program Facility or a Hazardous Material Program.

Of particular importance for Base Program Facilities are self-assessment activities. The major focus of most external evaluations of necessity will be concentrated on programs that have the potential for substantive hazardous materials releases or releases of large quantities of materials that may cause severe environmental damage. Hence, most Base Program Facilities will depend on internal evaluations and/or comprehensive self-assessments to maintain the *readiness* of their programs through continuous improvement.

### 3.4 Response Elements

**Emergency Response Organization (ERO).** The minimum Base Program requirement for an ERO is the assignment of an individual to manage and control all aspects of the facility/site response. For a **Base Program Facility** (e.g., office building), the individual could be the building or facility manager or similar position and it is expected that performance of these duties may be assigned as a collateral duty. In most cases, a **Base Program Facility** will not maintain its own response assets, but will depend upon initial response elements from the surrounding local governments [e.g., fire, emergency medical, and hazardous materials (HAZMAT)]. However, DOE/NNSA retains the responsibility to ensure the health and safety of its personnel and to protect its facilities/sites and activities. The individual assigned responsibility for managing and controlling all aspects of the facility/site or activity response works with the responding Incident Commander and, as necessary, establishes a Unified Command under the provisions of the NIMS Incident Command System (ICS) (or other ICS system used by the local government).

For some **Base Program Facilities**, compliance with other regulations may require that several individuals possess more comprehensive emergency management skills, such as coordinating emergency response with an ICS. DOE G 151.1-4, Chapter 1, *Emergency Response Organization (ERO)*, may be useful for establishing an ERO that fulfills more extensive **Base Program Facility** requirements from external or Federal agencies.

**Offsite Response Interfaces.** DOE O 151.1C requires coordination with Tribal, State, and local agencies and organizations responsible for offsite emergency response (e.g., "911" emergencies), and for protection of the health and safety of the public. The level of offsite coordination that is required to support a Base Program is not unique to a DOE facility/site. The requirements for offsite interfaces with fire, HAZMAT, medical, and law enforcement services are essentially the same as would apply to a non-DOE facility. As a result, even though DOE G 151.1-4, Chapter 2, *Offsite Response Interfaces* is focused on the more extensive needs of the Hazardous Material Program, the general guidance provided is also applicable to a Base Program Facility.

**Emergency Facilities and Equipment.** The Base Program requires the provision of facilities and equipment adequate to support emergency response, including the capability to notify employees of an emergency to facilitate the safe evacuation of employees from the work place, immediate work area, or both. Requirements in these areas mandate that facilities/sites have the ability to properly notify, take protective actions, and maintain accountability of affected employees in the event of an emergency. The results of the Hazards Survey are used to tailor Base Program requirements. Although the guidance provided in DOE G 151.1-4, Chapter 3, *Emergency Facilities and Equipment*, is aimed at the needs of the Hazardous Material Program, the information may be useful in addressing the a Base Program Facility.

**Emergency Categorization.** Each DOE/NNSA site/facility or activity is required to produce a Hazards Survey to identify the generic emergency events and conditions to be addressed by the DOE Comprehensive Emergency Management System. This survey is

used to define those events and conditions that should be categorized as OEs. Base Program Facilities are required to identify these OEs and develop criteria for categorizing them quickly.

An event must be categorized as an OE as promptly as possible, but no later than 15 minutes after event recognition/identification/discovery. This process of categorizing OEs and developing associated criteria is addressed in DOE G 151.1-4, Chapter 4, *Emergency Categorization and Classification*. The two associated appendices provide additional guidance for the Base Program Facility in developing the criteria and integrating categorization with normal operating procedures.

**Notifications and Communications.** At a minimum, the Order requires that a Base Program be capable of prompt initial notification of workers, emergency response personnel, and response organizations, including DOE elements and state, tribal, and local organizations in the event of an emergency. In addition, the Order also requires the continuing effective communication among response organizations throughout an emergency. For the Base Program Facility, most of these capabilities would be similar to a non-DOE facility/site; the most obvious exceptions are the requirements for notifications to DOE and, possibly, offsite authorities in the case of an OE. For a more extensive Base Program, established notification and communications systems may be comparable to a Hazardous Material Program. General guidance that may be useful for Base Program Facilities can be found in DOE G 151.1-4, Chapter 5, *Notifications and Communications*.

**Consequence Assessment.** There are no minimum requirements specified for the Base Program in Consequence Assessment. Consequence assessment capabilities for the Base Program Facilities will be derived from other DOE Orders, Federal laws/regulations, or local ordinances. The guidance presented in DOE G 151.1-4, Chapter 6, *Consequence Assessment* could be useful in developing such a capability.

**Protective Actions and Reentry.** The minimum protective action requirements for Base Programs specified in the Order include plans for evacuation or sheltering of employees, along with provisions to account for employees after emergency evacuation has been completed. If a Base Program Facility has hazardous materials, though not in significant quantities, the protection of workers involved in response and clean-up is covered by 29 CFR 1910.120. Reentry planning includes contingency planning to ensure the safety of reentry personnel, such as planning for the rescue of reentry teams. All individuals involved in reentry are to receive a hazards/safety briefing prior to emergency response activities, consistent with Federal, state, and local laws and regulations. Further guidance related to evacuation, sheltering, and accountability can be found in DOE G 151.1-4, Chapter 7, *Protective Actions and Reentry*.

**Emergency Medical Support.** DOE O 440.1A establishes requirements for facility and site medical programs within Section 18 of the Contractor Requirements Document (CRD). Contractor requirements are in transition to the provisions of 10 CFR 851.210, *Occupational Medicine*. Most medical situations will fall within the scope of the program established to meet these requirements. The *Accreditation Manual* of the Joint

Commission on Accreditation of Healthcare Organizations, Federal Ambulance Specifications, 29 CFR 1910.151, and NFPA 99-2005 will likely be used, in addition to DOE O 440.1A (10 CFR 851.210), to define facility/site medical programs.

DOE O 440.1A (10 CFR 851.210) directs the physician responsible for providing medical services to develop the medical portion of the “site emergency and disaster plan.” DOE O 151.1C defined the interface between the medical plan and the emergency plan as situations with mass casualties. Mass casualty situations were chosen as the interface point because they are characterized by the marshaling of resources from a variety of sources. In order to ensure the health and safety of the injured, these actions must be well planned, practiced, and controlled. The Base Program provides the framework to coordinate planning, preparedness, and response actions.

Sharing patient information between onsite and offsite health care providers during emergencies must be coordinated in advance and be consistent with the requirements of 42 USC 300, *Health Insurance Portability and Accountability Act (HIPAA)* of 1996.

DOE G 151.1-4, Chapter 8, *Emergency Medical Support* discusses the characteristics of mass casualty incidents and identifies areas that should be addressed by medical and emergency planners working in concert.

**Emergency Public Information.** Emergency Public Information (EPI) requirements are found in Chapter IX of DOE O 151.1C. This chapter applies to Base Programs and Base Program Facilities, since all emergencies will require a level of EPI response. The extent of the EPI program and organization for Base Program Facilities depends on the types of OEs identified and the potential consequences.

For all Base Programs, the EPI program needs to have provisions in place to establish a media center, which is a designated location where Cognizant Field Element and contractor personnel can conduct the necessary briefings and press conferences regarding an OE at the facility/site. For a Hazardous Material Program, the media center becomes the JIC, as required. Other requirements specified in Chapter IX of the Order, such as an EPI communications system and review of national security information prior to release of materials, are common to all EPI programs.

The detailed structure of EPI described in DOE G 151.1-4, Chapter 9, *Emergency Public Information*, is most appropriate for Hazardous Material Programs or Base Program Facilities that potentially affect more than the facility/site itself (e.g., a substantial oil spill), but it is useful as general guidance for other Base Program Facilities.

**Termination and Recovery.** Termination of an OE must be coordinated with State, Tribal, and local agencies and organizations responsible for offsite emergency response and notification. The guidance contained in DOE G 151.1-4, Chapter 10, *Termination and Recovery* addresses the termination of OEs that do not require classification, which are associated with both Base Program Facilities and Hazardous Material Programs. The guidance covers the establishment of criteria necessary for prompt categorization.

The Order requires that, at a minimum, recovery shall include notifications associated with termination of an emergency and establishment of criteria for resumption of normal operations. Recovery must include establishment of criteria for resumption of normal operations. A required recovery activity is the investigation of the root cause(s) of the emergency and development of corrective action(s) to prevent recurrence in accordance with Departmental requirements (e.g., DOE O 225.1A, DOE O 231.1A Chg. 1, and DOE 5480.19 Chg. 2).

## **APPENDIX A. Standard Format and Content of Emergency Plans for Base Program Facilities**

### **A.1 Introduction**

Emergency management programs for each DOE/NNSA facility/site are documented in an emergency plan. The plan describes provisions for response to OEs and activities for maintaining the emergency management program. The recommended emergency plan format and content for Base Program Facilities is provided in this chapter. A Departmental facility/site with no additional requirements of a Hazardous Material Program must develop and implement an emergency plan for a Base Program.

Section A.2 contains a recommended format and content for a Base Program emergency plan. The Base Program plan explicitly addresses the minimum requirements specified in DOE O 151.1C. Base Programs with substantial response requirements (i.e., those having organizational structures and functions similar to a hazardous material program) may use the more detailed plan structure presented in DOE G 151.1-3, Chapter 1, Appendix A. The appendices are recommended, but not required. As long as the necessary information is contained in the plan, an equivalent format, such as one based on State emergency plans, may be used to ensure local compatibility.

### **A.2 Emergency Plan**

This section provides a candidate format and associated content for the Base Program Facility Emergency Plan. **Figure A-1** contains a recommended format for the emergency plan. Specific content for each section in the plan follows.

#### **EXECUTIVE SUMMARY**

*Summarize the Emergency Plan by briefly stating its purpose and a description of what is included in each chapter.*

#### **TABLE OF CONTENTS**

*See Figure A-1.*

EXECUTIVE SUMMARY

TABLE OF CONTENTS

1. INTRODUCTION
2. EMERGENCY RESPONSE ORGANIZATION (INTERNAL)
3. OFFSITE RESPONSE INTERFACES
4. EMERGENCY FACILITIES AND EQUIPMENT
5. EMERGENCY CATEGORIZATION
6. NOTIFICATIONS AND COMMUNICATIONS
7. CONSEQUENCE ASSESSMENT
8. PROTECTIVE ACTIONS AND REENTRY
9. EMERGENCY MEDICAL SUPPORT
10. PUBLIC INFORMATION
11. TERMINATION AND RECOVERY
12. PROGRAM ADMINISTRATION
13. TRAINING AND DRILLS
14. EXERCISES
15. READINESS ASSURANCE

Appendixes

List of Figures

List of Tables

List of Acronyms

List of Definitions

Agreements

Maps

Listing of Emergency Management Personnel

References

**Figure A-1. Recommended Emergency Plan Format for an  
Operational Emergency Base Program Facility**

**1. INTRODUCTION**

State the overall function and mission of the facility and/or site. Broadly describe the facility and/or site; for a site, this includes the buildings and facilities within the site.

The Hazards Survey establishes the scope of the Operational Emergency Base Program required at a facility and/or site by identifying potential hazards and associated emergencies, possible impacts, and the applicable emergency planning and preparedness requirements. Include or summarize the results of the Hazards Survey. Describe known hazards originating outside the Departmental facility and/or site that could affect the health and safety of onsite personnel or other Departmental interests.

**2. EMERGENCY RESPONSE ORGANIZATION (ERO) – Internal**

List the individual (e.g., building manager, facility manager, or similar position) who has been assigned to manage and control all aspects of the facility/site response. Indicate how the individual will fit into the responding Incident Command System (ICS).

**3. OFFSITE RESPONSE INTERFACES**

Outline all coordination with Tribal, State, and local agencies and organizations responsible for emergency response and/or protection of the health and safety of the public. If there is no offsite coordination, provide a brief justification statement.

**4. EMERGENCY FACILITIES AND EQUIPMENT**

Identify the facility/site capabilities and specific equipment in place that is used to support an emergency response, including systems and equipment used to notify and evacuate employees.

**5. EMERGENCY CATEGORIZATION**

This section should provide criteria for determining quickly if an event is an Operational Emergency (OE) and how categorization is accomplished within 15 minutes.

**6. NOTIFICATIONS AND COMMUNICATIONS**

Discuss the required and proceduralized notification process for onsite and offsite notifications for all OEs. Specify time limits in which notifications are required and the authority for the time limit. Identify personnel (positions) responsible for both initiating and receiving notifications. Discuss the method of notification (e.g., beepers, telephone). Discuss notification procedure for termination of an incident. Include copies of all notification forms; particularly those used in response to DOE O 231.1A Chg 1 and its successors.

Describe the communications systems and equipment that would be employed by emergency personnel at the site or any specific facility for any notifications, sirens, or warnings to the public, including a description of primary and alternate systems. Discuss communications interface with onsite and offsite organizations. Identify what portions of the system are dedicated to emergency management. Describe the equipment, back-up equipment, quality assurance, and testing procedures.

**7. CONSEQUENCE ASSESSMENT**

Since there are no minimum requirements specified for this area, this section would contain only references to types of consequence assessment functional areas required by other Departmental Orders or Federal regulations.

**8. PROTECTIVE ACTIONS AND REENTRY**

Describe the procedures to determine personnel accountability and evacuation. Discuss the method and procedures for accountability of onsite personnel and visitors, locations of shelters, and other conditions. Describe access control procedures for evacuated areas. Describe the system to ensure safe shutdown of operations following the declaration of an emergency. Describe the plan and criteria for reentry at each facility and, where applicable, for the entire site; identify all reentry plans.

**9. EMERGENCY MEDICAL SUPPORT**

Identify onsite medical support, if applicable, as well as offsite medical response agencies and facilities responsible for providing support in normal and mass casualty situations.

**10. EMERGENCY PUBLIC INFORMATION**

List the organization and personnel responsible for providing information to the media during an emergency event.

**11. TERMINATION AND RECOVERY**

Detail notifications associated with termination of an OE and the criteria for resumption of normal operations.

**12. PROGRAM ADMINISTRATION**

State the name, position, mailing address, and telephone number of the emergency management program administrator at the facility and/or site level. (This information should also be in the appendix that lists Emergency Management Personnel).

**13. TRAINING AND DRILLS**

List all drills and training programs (including fire drills and other building evacuation drills) that are provided to all employees. Indicate refresher training for employees who are certified operators or supervisors and those workers who are likely to witness a hazardous material release.

**14. EXERCISES**

Describe the exercise program. Describe how exercises will be controlled and evaluated and how lessons learned from exercises, improvements, and/or corrective actions are incorporated into emergency planning. List all offsite agencies involved in the exercise program (i.e., Headquarters, other Federal agencies, and local agencies). List annual testing of all emergency notification equipment.

**15. READINESS ASSURANCE**

Ensure that the procedure for annual self-assessments is listed in this section. The formal improvement program consisting of lessons learned from evaluations and

drills/ exercises should be described. Describe the process for identifying and implementing relevant lessons learned from external sources.

*Appendixes*

*List of Figures*

*List of Tables*

*List of Acronyms*

*List of Definitions*

*Agreements (MOU, MOA, etc)*

*Maps (site, offsite, buildings, floor plans, etc)*

*List of Emergency Management Personnel (phone number, position, etc)*

*References*

## 4. LEASED FACILITIES

### 4.1 Introduction

Leasing facilities within DOE/NNSA sites for *non-DOE/NNSA* work presents some unique difficulties for those responsible for implementing site-wide emergency management programs. In accordance with the “Guidance on Protection of Workers Utilizing DOE Leased Facilities,” issued through the Department’s Safety Council on August 6, 1999, each Cognizant Field Element, in consultation with the Lead Program Secretarial Officer (LPSO), should:

- Develop evaluation criteria which result in leasing conditions that provide protection to workers at leased facilities from radioactive, chemical, and biological hazardous materials; and,
- Determine the appropriate level of protection by grading facilities being leased by hazard to worker safety and health. Prior to leasing a facility for private use, each Cognizant Field Element Manager is required to make a determination that the facility is suitable for re-use and that worker safety and health will be protected.

To ensure protection of worker health and safety in the event of an emergency involving or affecting the leased facility, arrangements with lessees should effectively integrate the activities of the leased facilities into the DOE/NNSA site-wide emergency management program. These arrangements should ensure consistent interfaces with offsite emergency response organizations and establish and sustain an effective working partnership for emergency planning, preparedness, readiness assurance, and response activities. Arrangements with lessees should include:

- Integration of each of the lessee’s emergency management program elements into the site-wide program;
- Annual reporting of the tenant’s hazardous materials inventories to the site emergency management organization; and
- Means for reporting significant changes to the facility or to hazardous materials inventories to the site emergency management organization prior to implementing the changes.

Incorporating leased facilities into site-wide emergency management programs should be addressed consistently across the DOE/NNSA complex. To promote this consistency, emergency management factors that should be considered by DOE/NNSA elements with responsibility for leasing facilities at DOE/NNSA sites for non-DOE or non-NNSA work are presented in Section 4.2.

## 4.2 Application of Emergency Management Guidance

Leased facilities at DOE/NNSA sites should be included in site-wide emergency management programs using criteria from DOE O 151.1C, whether the leased facility utilizes significant quantities of hazardous materials or not. Specifically, the following factors should be considered for selected elements of the emergency management program.

### 4.2.1 Technical Planning Basis

#### Hazards Surveys and EPHAs

- *DOE/NNSA* should ensure that:
  - Security vulnerability assessments are changed as appropriate to reflect leased facility conditions.
  - Emergency responders and medical treatment providers have appropriate information to plan and respond to an emergency event involving or affecting the leased facility.
- *DOE/NNSA* should provide to the lessee:
  - An assessment of potential hazards to the leased facility from DOE/NNSA facilities and activities, and from DOE/NNSA onsite transportation activities, with periodic updates.
  - Information on hazards and medical concerns that DOE/NNSA, other emergency responders, and/or medical treatment providers may encounter.
- The *lessee* should provide to DOE/NNSA:
  - Information on hazards and activities that could impact DOE/NNSA facilities and activities, with periodic updates.

### 4.2.2 Programmatic Elements

#### Training, Drills, and Exercises

- *DOE/NNSA* should provide to the lessee:
  - Initial and refresher training on the site emergency plan for personnel at the leased facility.
  - Opportunity for personnel at the leased facility to participate as appropriate in site drills and exercises for postulated emergency events affecting the leased facility.

- Opportunity for personnel at the leased facility to participate as appropriate in the planning and critique processes for emergency response exercises involving events that affect the leased facility.
- **DOE/NNSA** should ensure:
  - Site responders and decision-makers receive training on all hazards associated with the leased facility and all facets of emergency response associated with events involving or affecting the leased facility, and that these factors are practiced during drills and tested during exercises.
  - Leased facilities and personnel are incorporated in site emergency response drills and exercises as appropriate.
- The *lessee* should ensure:
  - Personnel at the leased facility attend initial and refresher training on the site emergency plan.
  - Personnel at the leased facility participate as appropriate in site drills and exercises for postulated emergency events involving or affecting the leased facility.

#### **4.2.3 Response Elements**

##### **Emergency Response Organization**

- **DOE/NNSA** should ensure:
  - Designated Incident Commanders (ICs) have access to and understand hazards related to or impacting leased facilities.
  - Lessee emergency response resources are effectively integrated through plans, procedures, drills, and exercises with site and other emergency response resources.
  - The emergency management plan and implementing procedures contain provisions for personnel from the leased facility to be integrated into the site ERO as appropriate during emergency events involving or affecting the leased facility.
- The *lessee* should ensure:
  - The scope of emergency services provided through the site-wide emergency management program and associated incident command is fully understood and effectively integrated in the emergency response plan and implementing procedures, practiced during drills, and tested through exercises for the leased facility.

- The emergency management plan and implementing procedures contain provisions for a representative to interact with site emergency management personnel during emergency events involving or affecting the leased facility.

### **Offsite Response Interfaces**

- *DOE/NNSA* should ensure:
  - Local agencies, law enforcement officials, and offsite mutual aid and support organizations are aware of the relationship and the respective emergency management roles and responsibilities between the site and the leased facility for response and notifications to hazardous material and security events. This includes information on hazards and medical concerns that offsite emergency responders and/or medical treatment providers may encounter.
- The *lessee* should ensure:
  - Information concerning unique facility-specific hazards is made available to offsite emergency responders and emergency medical personnel.

### **Communication/Notifications**

- *DOE/NNSA* should ensure:
  - Site-wide plans and procedures contain provisions and assignment of responsibilities to contact representatives of the lessee in event of a site emergency affecting the leased facility, and that these provisions are practiced during drills and tested during exercises.
  - Site-wide plans and procedures, and those of potentially affected DOE/NNSA facilities, contain provisions for receipt of notification of an emergency at the leased facility.
  - Coordination with the lessee on communication equipment and protocols and messages for timely and effective notifications of emergency events.
- The *lessee* should ensure:
  - Plans and procedures contain provisions to notify and protect personnel in accordance with OSHA requirements for hazards at the leased facility.

### **Consequence Assessment**

- *DOE/NNSA* should ensure:
  - Site-wide consequence assessment models include the leased facility locations for emergency management decision makers.

- Site-wide consequence assessment models include appropriate hazards information specific to the leased facility.
- Site-wide field monitoring (radiological, chemical, and biological) plans, personnel, equipment, and resources appropriately consider leased facility hazards and site hazard impacts on the leased facility.
- The *lessee* should ensure:
  - Facility-specific consequence assessment models and field monitoring plans, personnel, equipment, and resources are available to DOE/NNSA for integration into the site-wide consequence assessment capability.

### **Protective Actions and Reentry**

- *DOE/NNSA* should ensure that:
  - Pre-determined protective actions are identified for the leased facility based on site hazards that could impact the leased facility, and that these actions are coordinated with the lessee.
  - Pre-determined protective actions are identified for site facilities that could be impacted by hazards at the leased facility.
  - Provisions for protection (e.g., appropriate protective equipment, monitoring equipment, hazard information, potential exposure information, safe routes of entry/egress) of site and other emergency responders and security personnel are incorporated into plans and procedures, practiced during drills, and tested during exercises involving leased facility hazards.
  - Site evacuation planning includes consideration of personnel at the leased facility.
  - Plans and procedures for site medical facilities appropriately consider hazards and personnel at the leased facility.
  - Lessee plans for personnel accountability in event of emergency involving or affecting the leased facility are understood and integrated into site plans and procedures, practiced during drills, and tested during exercises involving the leased facility.
  - Potential responders have access to leased facility hazard information and building layout for safe search and rescue and emergency mitigation.
- The *lessee* should ensure:
  - Pre-determined protective actions are identified for the leased facility based on site hazards that could impact the leased facility, and that these actions are coordinated with the lessee.

- Protective actions are identified in accordance with OSHA requirements for hazards at the leased facility.
- The *lessee* should provide to DOE/NNSA:
  - Hazard information and building layout to permit safe search and rescue and emergency mitigation.
  - Plans for personnel accountability in the event of an emergency involving or affecting the leased facility.

### **Emergency Public Information**

- *DOE/NNSA* should provide to the lessee:
  - Access to the JIC for emergencies at the leased facility.
- *DOE/NNSA* should ensure:
  - Ongoing and coordinated planning between public information officers of the site and leased facilities.
  - Emergency information released through news releases and statements to the press is coordinated with leased facility representatives when the emergency directly impacts the lessee.
  - Site public information officers are aware of designated lessee emergency contacts as well as hazards specific to leased facilities.
- The *lessee* should ensure:
  - News releases and statements to the press regarding an emergency event at the leased facility are coordinated with the site public information officer.
  - Complete and accurate information concerning emergencies at the leased facility is made available in a timely manner to support DOE/NNSA response to public inquiries.

## 5. CLOSURE ACTIVITIES

### 5.1 Introduction

Closure activities and conditions can pose significant challenges to emergency planners. Often, the changes inherent in facility/site closure impact the planning basis for emergency response as well as response itself. The critical problem is to ensure that inevitable reductions in response capabilities (e.g., fire, medical, ERO staffing) do not overtake the decrease in hazards posed by the facility/site processes and materials, resulting in an inadequate emergency response capability. The planner should recognize that the resolution of issues included in this chapter should be in total concert with a basic tenant of the DOE emergency management systems, namely: Planning, preparedness, and response must be *specific to* and “*commensurate with the hazards.*”

The purpose of this chapter is to address some important issues that should be considered when planning changes to an emergency management program based on the projected closure of the facility/site. The approach for addressing closure’s impact on emergency management is to provide “precautionary” statements that give emergency planners thought provoking considerations that may apply for specific elements of emergency management at their “closure” facilities/sites. The following sections present a number of these important reminders related to the impact of closure activities on DOE emergency management program elements.

Note that there is a different impact on the emergency management program between the closure of an entire site and closure of a single facility or group of facilities on a site that will continue to operate. The closure of an entire site will affect both site-level and facility-level programs and assets, whereas the closure of a facility on a site may leave site-level programs intact, since they would likely support Hazardous Material Programs at other facilities on the site. When necessary, this distinction will be specifically addressed in the following sections.

### 5.2 Technical Planning Bases

**Hazards Surveys and EPHAs.** Frequent and often dramatic physical changes at closure facilities/sites challenge the efforts of emergency planners to keep hazards survey information current. It is imperative, therefore, that emergency planning be a priority consideration for managing change at a closure facility/site. Examples of physical changes that may impact emergency planning and preparedness include:

- Dismantling any item that will alter process unit safety, facilities, or information;
- Change in a critical instrumentation device or alarm;
- Dismantling that may reopen closed/sealed systems or components containing contamination;

- Addition or deletion of piping connections, drains;
- Change in fire fighting equipment and/or capacity; and
- Temporary use of equipment not covered by existing procedures.

The introduction of short-term hazards during the Decontamination and Decommissioning (D&D) process can add to the planning basis for the program, requiring temporary response measures. Facility/site changes can result in the introduction of common usage hazardous materials (e.g., propane, fuel, solvents) that pose a new threat as an initiator for a hazardous material release.

Since changing inventories of toxic chemicals may occur frequently at closure facilities/sites, administrative systems should be in place to ensure that emergency managers are informed of these changes in a timely manner. The importance of reliable and comprehensive methods of hazardous material identification during closure activities cannot be overemphasized. Past methods or systems may not be reliable for identifying changes in hazardous material inventories when a facility/site is involved in D&D. Communication of changes in hazards to emergency response personnel is critical and can only be ensured if a reliable system is in place to communicate change to those responsible for the technical planning basis for the program. One method for tracking progress is to have an emergency planner attend the periodic production planning meetings, which address the hazards that will be encountered with the next dismantling activities.

Changes may be subtle or can occur quickly at a closure facility/site. Barriers to release of hazardous materials, storage locations and mixes, engineering controls, administrative controls, and safeguards and inventory systems may change. A production facility may be closed and process equipment removed, but hazards may still reside as holdup in ductwork or piping. The release of those hazards becomes a potential emergency when piping is cut during final dismantlement. The EPHA that applies for a production facility does not apply when the same building is empty. If hazards still exist, based on a revised Hazards Survey, then a new EPHA may be needed. Similarly, the EPHA that applies when the building is empty would likely not apply after it is demolished. During the dynamic progression of D&D activities, a facility should not be expected to update the EPHA document constantly. However, the emergency management program must remain prepared to respond to whatever emergency current hazards present. Hence, as hazards are removed during closure, facilities/sites should develop and implement a timely, efficient, and effective process that facilitates the modification of the emergency management program utilizing associated criteria for initiating changes.

A possible approach for tracking changes associated with the closure activities is to ensure that emergency management is integrated with the safety hazards analysis and work order processes used by facility management [e.g., Integrated Safety Management System (ISMS)]. Before closure begins at a facility/site, a generic hazards analysis is required to identify potential hazards to be encountered. Additionally, at each step in the process of D&D, there should be a work order that includes a specific safety hazard

analysis for the work to be performed. For example, safety analyses of many DOE/NNSA facilities/sites, which use or store radioactive materials, will include criticality analyses to address accumulation and movement of nuclear materials in piping. If emergency planners at the closure facility/site are involved in review of these work orders and hazards analyses and are prepared to use this information to ensure readiness to respond to emergencies, then it is reasonable that they take credit for the safety management processes used during D&D.

### 5.3 Programmatic Elements

**Program Administration.** An emergency management administrator at a closure facility/site needs to ensure that changes taking place will not adversely impact the ability of the program to respond effectively to an emergency. Emergency administrators need to have access to the appropriate level of management to make decision makers aware, on an ongoing basis, of facility, equipment, materials, personnel and resource issues that may impact facility/site ability to respond to an emergency.

Also, emergency management administrators at closure facilities/sites may be tasked with collateral duties that could interfere with and impact responsibilities to ensure that the emergency management program readiness is maintained. *Efficient* planning by the program administrator becomes critically important. Administrators should ensure that provisions are in place for rapid development, approval, and issuance of changes to response procedures, and timely scheduling of training to ensure these changes are implemented. Maintaining plans and procedures can become a significant task when frequent change is occurring involving people, facilities, materials, and expertise at a facility/site.

**Training and Drills.** Emergency response training programs should be reviewed and updated periodically, based on the frequent changes characteristic of such facilities/sites. Emergency management administrators should have frequent input to General Employee Training (GET) for changes in basic emergency response. Drill programs should be dynamic to address the possibility of frequent changes at closure facilities/sites. For example, aggressive milestones may not allow time for a regular drill schedule. As a result, shorter drills that are focused on changes to areas and materials may provide a solution for some facilities/sites.

Facility and organizational experience and knowledge may be lost when a facility/site transitions from production to closure. Facilities/sites may need to put in place a means to capture critical knowledge before the transition is made and to incorporate some of this knowledge in training for emergency managers and responders.

Training of offsite emergency responders may become more critical as site resources for emergency response are reduced. Offsite responders may be expected to have an increased role in response to facility/site OEs.

**Exercises.** As a site undergoes changes from an operational site to a site focused on demolition and closure processes, the exercise requirements and community expectations

will change. However, exercises do help reassure the community that the site can still respond and mitigate the hazards in an emergency. Hence, participation in the annual site-level exercise should be maintained at an acceptable level to provide assurances that response will be adequate in the event of an emergency. This level of participation might be ensured by tracking a performance measure or as an explicit inclusion as part of contractual agreements.

The demolition and closure of an individual or group of facilities on an operating site should have no impact on the site-wide programs. However, closure facilities will, at some point, be excluded from being the source of the hazards but should still participate (as appropriate) in the exercise as a collocated facility responding (e.g., implementing protective actions) to an Operational Emergency event elsewhere on the site.

**Readiness Assurance.** Maintaining, updating, and testing/validating plans and procedures can become a virtually continuous task at a closure facility/site because the nature of closure activities may mean frequent changes in hazards, physical facilities, organizational expertise, management, number of personnel at the site, and ERO resources available to support response. Evaluation and improvement programs at closure facility/sites need to be vigilant in adjusting to change and its impact on the readiness of the facility/site to respond to emergencies, as well as on new vulnerabilities that require adjustments in resources. These programs will by necessity be driven by short-term objectives to ensure readiness through careful attention to focused evaluations of the *modified* aspects of the planned response. Improvements and lessons learned would be implemented on a schedule that should coincide with the schedule of changes caused by the closure activities.

## 5.4 Response Elements

**Emergency Response Organization.** Ensuring that an adequate number of primary and alternate response personnel are available, prepared, and qualified becomes a challenge for closure facilities/sites emergency management programs. Responsive and creative programs are needed in the ERO organizational structure when a site transitions from production to closure. For example, some programs may need to consider moving to a dedicated and specialized emergency response brigade when organizational changes create conditions in which the usual volunteer ERO is not available or reliable. Reduction in hazards may drive a facility/site to tailor its cadre of emergency responders. For example, management may decide to reduce the site fire department. These types of changes should be considered as part of the site “Closure Plan,” and emergency management professionals should have an active role in site closure planning.

Responsibility for control of operations, monitoring and repair teams should be vested with a single individual; however, at a closure facility/site, it is possible that personnel who would staff these teams will be subcontractors. In this case, organizational changes or provisions would need to be made to ensure resource availability and adequate organizational controls in an emergency.

The dynamic nature of closure facilities/sites may also create conditions in which tools, parts, and even PPE needed by repair and maintenance teams are not readily available for mitigating an emergency. There should be ongoing dialog with operations and maintenance managers on these types of issues. Emergency planners should be particularly cognizant of possible changes in the effectiveness of emergency fire response on closure sites. Changes in site/facility hazards due to closure activities should be communicated to the Fire Department. Physical facility and site changes may impact timely fire response (e.g., location and access to fire hydrants; the need for high angle rescue), as well as security. Facility/site changes could also impact the usability and reliability of pre-arranged fire preplans for facilities undergoing D&D.

**Offsite Response Interfaces.** Sites that are transitioning toward closure generally experience changes in the contracting process, budgeting for emergency management, management priorities and the nature of site hazards. These changes can result in significant changes in the relationship with local and state offsite emergency response organizations. If resources for emergency management are reduced overall, there may be an impact on agreements for mutual assistance and a site's ability to supplement offsite emergency response programs. However, during closure, Memorandums of Understanding (MOUs) for offsite resources, such as emergency medical support, often become even more critical as onsite resources diminish. These impacts may not result from the closure of a single facility or a group of facilities, since offsite interfaces may be implemented and maintained at the site-level.

In any closure situation, if facility/site hazards change significantly, there may be a need to inform offsite agencies. Similarly, the ultimate impact of closure on offsite communities may be significant and impact offsite relations that are important to emergency preparedness. Discussing these issues with offsite agency contacts early during the closure planning process will help preserve relationships that still must be maintained for effective response.

**Emergency Facilities and Equipment.** Within the D&D environment of a closure facility/site, there is still the need to maintain operational capability, staffing and support systems for communications, protection, and utilities at emergency operations facilities. Facility reference materials at the EOC, such as site maps and facility drawings, must be kept current and available to responders. The operability of public address systems and alarm systems need to be maintained and not allowed to become vulnerable in a deconstruction environment. Similarly, storage locations for response equipment may change. Emergency management staff must stay aware of such changes. Surveillance of emergency response facilities, communication systems, and equipment may be needed more frequently. Ultimately, as the site-wide hazards on a closure site are significantly reduced, the need to maintain a state-of-the-art EOC (if one exists) may not be warranted and a simple command center location (e.g., a conference room) may be adequate.

**Categorization and Classification.** At a closure facility/site, the readily available indications or observable conditions that provide decision-makers criteria for categorization of Operational Emergencies may change. Facility/site-specific criteria must be kept up to date and responsible persons kept informed and trained on the

changes. Site- /facility-specific EALs may also require updating and decision-makers must be knowledgeable of these changes.

Emergency planners may need to intensify programs for reviewing and testing criteria for categorization of Operational Emergencies and EALs for classification for closure facilities/sites, since initiating conditions and emergency scenarios may change.

**Notification and Communications.** Impacts on communication and notification systems can result from a D&D modified environment. This could involve changes to the effectiveness of facility/site public address systems, facility alarm systems, or offsite communications. Lines of communication and notification are essential for timely notifications. On a site where selected facilities are undergoing D&D, it is essential that workers at a closure facility not be isolated from the rest of the site, even if the closure facility emergency management program is no longer required for its own hazards. A release at a nearby operating facility can still impact the closure facility.

**Consequence Assessment.** Because of the potential dynamic conditions at closure facilities/sites, indicators necessary to assess emergency consequences continually may change, or at least the ability of responders to monitor the indicators may be impacted. Emergency planners should also be alert to the need for changes to input data requirements for the consequence assessment process (e.g., source term estimates) when hazards change. Emergency planners should ensure that the Consequence Assessment Team (CAT) has access to the most current planning basis documents (i.e., Hazards Surveys, EPHAs). A process should be developed and implemented to ensure that consequence assessment tools reflect changes in facility/site hazards due to closure activities in a timely manner.

**Protective Action and Reentry.** Changes to facility/site physical characteristics may impact worker and responder access and egress procedures. D&D conditions may force changes in evacuation routes. Emergency planners should look for facility/site changes that may pose new hazards along established evacuation routes or impediments. Any changes to these logistical aspects of protective actions need to be communicated to the workforce.

Similarly, receptor locations for predicted hazardous material consequences may change when physical facility/site changes occur. The potential for changes in the pre-planned (default) initial protective actions for onsite areas and protective action recommendations for offsite areas should also be recognized.

**Emergency Medical Support.** Emergency planners should be cognizant of facility/site changes on emergency medical response capabilities. Changes in facility hazards should be communicated to the site medical director. Physical facility/site changes may impact timely medical response; for example, location for landing a life-flight helicopter at a closure site could change. Facility/site changes could also impact the usability and location of pre-arranged decontamination facilities. Agreements with offsite medical providers may still be needed during the closure process and those offsite providers

should be made aware of the impact of facility/site changes on possible medical emergency needs.

**Emergency Public Information.** Emergency planners should ensure that the emergency public information staff (both onsite and offsite) is informed of any significant changes in facility/site hazards, emergency response capabilities, and plans/procedures, to be prepared to address these in the event of an emergency. A public information officer should be part of the closure planning team. As facilities/sites downsize during closure, adequate emergency public information resources may still be needed to provide public information response should an emergency occur. A media center should be designated and available for use in the event of an emergency, even when a closure site emergency management program reduces to a Base Program.

**Termination and Recovery.** The termination of an Operational Emergency on a closure site will be based on many of the same *general criteria* (e.g., stability, characterization) that an operational site will use. However, the criteria, and subsequently recovery, will not have as their ultimate goal to return a facility undergoing D&D to operating status, but to restart and continue the closure processes. Senior Management will need to determine the level of termination criteria that is consistent with protecting the workers, the public, and the environment, and performing the D&D activities safely. The termination criteria will likely be similar to criteria for planning, scheduling, and accomplishing D&D work on a daily basis. Recovery planning may only include the determination of the cause of the incident to prevent reoccurrence in future closure operations.

## 6. BIBLIOGRAPHY

### 6.1 DOE Directives and Publications

*DOE NIMS Implementation Plan.* February 2005.

DOE G 120.1-5. *Guidelines for Performance Measurement.* June 30, 1996.

DOE O 151.1C. *Comprehensive Emergency Management System.* November 2, 2005.

DOE O 225.1A. *Accident Investigations.* November 26, 1997.

DOE O 225.1A-1. *Implementation Guide for use with DOE Order 225.1A Accident Investigations.* November 26, 1997.

DOE P 226.1. *Department of Energy Oversight Policy.* June 10, 2005.

DOE O 226.1. *Implementation of Department of Energy Oversight Policy.* September 15, 2005.

DOE O 231.1A Chg 1. *Environment, Safety and Health Reporting Manual.* June 6, 2004.

DOE M 231.1-1A Chg 1. *Environment, Safety and Health Reporting Manual.* September 9, 2004.

DOE G 231.1-1. *Occurrence Reporting and Performance Analysis Guide.* August 20, 2003.

DOE M 231.1-2. *Occurrence Reporting and Processing of Operations Information.* August 19, 2003.

DOE G 231.1-2. *Occurrence Reporting and Causal Analysis Guide.* August 20, 2003.

DOE O 243.1. *Records Management Program.* February 3, 2006.

DOE O 243.2. *Vital Records.* February 2, 2006.

DOE M 251.1-1B. *Departmental Directives Program Manual.* August 16, 2006.

DOE O 251.1B. *Departmental Directives Program.* August 16, 2006.

DOE O 360.1B. *Federal Employee Training.* October 11, 2001.

DOE O 414.1C. *Quality Assurance.* June 17, 2005.

- DOE G 414.1-1A. *Management Assessment and Independent Assessment Guide*. May 31, 2001.
- DOE G 414.1-2A. *Quality Assurance Management System Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1C, Quality Assurance*. June 17, 2005.
- DOE G 414.1-4. *Safety Software Guide for Use with 10 CFR 830, Subpart A, Quality Assurance Requirements, and DOE O 414.1C, Quality Assurance*. June 17, 2005.
- DOE O 420.1B. *Facility Safety*. December 22, 2005.
- DOE G 420.1-1. *Nonreactor Nuclear Safety Design Criteria and Explosives Safety Criteria Guide for use with DOE O 420.1, Facility Safety*. March 28, 2000.
- DOE G 420.1-2. *Guide for the Mitigation of Natural Phenomena Hazards for DOE Nuclear Facilities and Non-Nuclear Facilities*. March 28, 2000.
- DOE O 420.2B. *Safety of Accelerator Facilities*. July 23, 2004.
- DOE G 421.1-2. *Implementation Guide for Use in Developing Documented Safety Analyses to Meet Subpart B of 10 CFR 830*. October 24, 2001.
- DOE G 424.1-1A. *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*. July 24, 2006.
- DOE O 440.1A. *Worker Protection Management for DOE Federal and Contractor Employees*. March 27, 1998.
- DOE G 440.1-1. *Worker Protection Management for DOE Federal and Contractor Employees Guide for use with DOE Order 440.1*. July 10, 1997.
- DOE G 440.1-4. *Contractor Occupational Medical Program Guide For Use With DOE Order 440.1*. June 26, 1997.
- DOE O 450.1, Chg 3. *Environmental Protection Program*. January 3, 2007.
- DOE O 460.1B. *Packaging and Transportation Safety*. April 4, 2003.
- DOE O 470.2B. *Independent Oversight and Performance Assurance Program*. October 31, 2002.
- DOE O 470.4. *Safeguards and Security Program*. August 26, 2005.
- DOE 5480.19 Chg 2. *Conduct of Operations Requirements for DOE Facilities*. October 10, 2001.
- DOE 5480.30. *Nuclear Reactor Safety Design Criteria*. January 19, 1993.

DOE-STD-1027-92 Chg 1. *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE 5480.23, Nuclear Safety Analysis Reports.* September 1997.

DOE-STD-1098-99 Chg 1. *Radiological Control.* March 2005.

DOE-STD-3009-94 Chg 3. *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses.* March 2006.

DOE-STD-3014-2006. *Accident Analysis for Aircraft Crash into Hazardous Facilities.* May 2006.

DOE-STD-7501-99. *The DOE Corporate Lessons Learned Program.* December 1999.

DOE-HDBK-1163-2003. *Integration of Multiple Hazard Analysis Requirements and Activities.* October 2003.

DOE-HDBK-3010-94 Chg 1. *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities.* March 2000.

DOE/EH-0173T. *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance.* January 1991.

## **6.2 Federal Regulations**

Title 10 CFR 30. *Rules of General Applicability to Domestic Licensing of Byproduct Material.* [Exemptions, 10 CFR 30.11-30.19 (e.g., timepieces, illumination devices, thermostats, etc.)]

Title 10 CFR 30.72, Schedule C. *Quantities of Radioactive Materials Requiring Consideration of the Need for an Emergency Plan for Responding to a Release.*

Title 10 CFR 830. *Nuclear Safety Management.*

Title 10 CFR 830.121. *Quality Assurance Program (QAP).*

Title 10 CFR 830.202. *Safety basis.*

Title 10 CFR 830.203. *Unreviewed safety question process.*

Title 10 CFR 830.204. *Documented safety analysis.*

Title 10 CFR 830 Subpart A. *Quality Assurance Requirements.*

Title 10 CFR 835. *Occupational Radiation Protection.*

Title 10 CFR 835.202. *Occupational dose limits for general employees.*

Title 10 CFR 835.204. *Planned special exposures.*

Title 10 CFR 835.205. *Determination of compliance for non-uniform exposure of the skin.*

Title 10 CFR 835.1302. *Emergency Exposure Situations.*

Title 10 CFR 835 Subpart N. *Emergency Exposure Situations.*

Title 10 CFR 851. *Worker Safety and Health Program.*

Title 10 CFR 851 Appendix A, 2. *Fire Protection.*

Title 10 CFR 851 Appendix A, 3. *Explosives Safety.*

Title 10 CFR 851 Appendix A, 6. *Industrial Hygiene.*

Title 10 CFR 851 Appendix A, 7. *Biological Safety.*

Title 10 CFR 851 Appendix A, 8. *Occupational Medicine.*

Title 29 CFR 1910.38. *Emergency action plans.*

Title 29 CFR 1910.119. *Process safety management of highly hazardous chemicals.*

Title 29 CFR 1910.120. *Hazardous waste operations and emergency response (HAZWOPER).*

Title 29 CFR 1910.120 Appendix B. *General Description and Discussion of the Levels of Protection and Protective Gear.*

Title 29 CFR 1910.132-138. *General requirements; Eye and face protection; Respiratory protection; Head protection; Foot protection; Electrical protective equipment; Hand protection.*

Title 29 CFR 1910.146. *Permit-required confined spaces.*

Title 29 CFR 1910.151. *Medical services and first aid.*

Title 29 CFR 1910.156. *Fire brigades.*

Title 29 CFR 1910.157. *Portable fire extinguishers.*

Title 29 CFR 1910 Subpart Z. *Toxic and Hazardous Substances.*

Title 29 CFR 1910.1020. *Access to employee exposure and medical records.*

Title 29 CFR 1910.1200. *Hazard communication.*

Title 29 CFR 1910.1450. *Occupational exposure to hazardous chemicals in laboratories.*

Title 36 CFR 1236. *Management of Vital Records.*

Title 40 CFR 68. *Chemical Accident Prevention Provisions.*

Title 40 CFR 68.115. *Threshold determination.*

Title 40 CFR 112.7. *General requirements for Spill Prevention, Control, and Countermeasure Plans.*

Title 40 CFR 265.37. *Arrangements with local authorities.*

Title 40 CFR 122. *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System (NPDES).*

Title 40 CFR 239-299. *Solid Wastes. [Resource Conservation and Recovery Act (RCRA)]*

Title 40 CFR 300. *National Oil and Hazardous Substances Pollution Contingency Plan.*

Title 40 CFR 300, Subparts B and C. *Superfund Amendments and Reauthorization Act (SARA) of 1986 Title III, Emergency Planning and Community-Right-to-Know Act (EPCRA).*

Title 40 CFR 355. *Emergency Planning and Notification.*

Title 42 CFR 73. *Select Agents and Toxins.*

Title 49 CFR 173.469. *Tests for special form Class 7 (radioactive) materials.*

Title 61 FR 20944 and 28583. *Federal Radiological Emergency Response Plan.*

Title 5 USC 552. *Freedom of Information Act.*

Title 5 USC 552a. *Privacy Act.*

Title 31 USC. 115 and 116. *Government Performance Results Act.*

Title 33 USC 1321. *Clean Water Act.*

Title 42 USC 103. *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).*

Title 42 USC 300. *Health Insurance Portability and Accountability Act (HIPAA).*

### **6.3 Other Publications**

Accreditation Association for Ambulatory Health Care. *Accreditation Handbook for Ambulatory Health Care.* 2007.

American Industrial Hygiene Association (AIHA). *2006 Emergency Response Planning Guidelines (ERPG) and Workplace Environmental Exposure Levels (WEEL)*.

American National Standards Institute/American Nuclear Society.  
ANSI/ANS-3.11-2000. *Determining Meteorological Information at Nuclear Facilities*. 2000.

American National Standards Institute/Health Physics Society. ANSI/HPS N43.6-1997. *Sealed Radioactive Source – Classification*. 1997.

Butman A.M. *Responding to the Mass Casualty Incident: A Guide for EMS Personnel*. 1982.

Centers for Disease Control and Prevention. National Institutes of Health. Department of Health and Human Services. *Biosafety in Microbiological and Biomedical Laboratories*. 5th edition. 2007.

Craig, D.K, Baskett, R.L., Davis, J.S., Dukes, L., Hanson, D.J., Petrocchi, A.J., Powell, T.J., Sutherland, P.J., Tuccinardi, Jr., T.E., *Recommended Default Methodology for Analysis of Airborne Exposures to Mixtures of Chemicals in Emergencies*. Applied Occupational and Environmental Hygiene, Volume 14(9), 609-617, 1999.

Craig, D.K, Davis, J.S., Hanson, D.J., Petrocchi, A.J., Powell, T.J., Tuccinardi, Jr., T.E., *Derivation of Temporary Emergency Exposure Limits (TEELs)*. Journal of Applied Toxicology, Volume 20, 11-20, 2000.

Defense Nuclear Facility Safety Board (DNFSB). Technical Report Number 25. *Quality Assurance for Safety-Related Software at Department of Energy Defense Nuclear Facilities*. 2000.

Department of Defense. DOD 6055.9 STD, *DOD Ammunition and Explosives Safety Standards*.

Department of Defense, US Army Soldier and Biological Chemical Command, Domestic Preparedness Office. *Planning Guide: Improving Local and State Agency Response to Terrorist Incidents Involving Biological Weapons*. October 2002.

Department of Homeland Security (DHS). *Homeland Security Exercise and Evaluation Program*. Volumes I – III. February 2007.

Department of Homeland Security (DHS). *National Response Plan*. December 2004.

Department of Transportation. *2004 Emergency Response Guidebook (ERG)*.

Environmental Protection Agency (EPA). EPA 400-R-92-001. *Manual of Protective Action Guides and Protective Actions for Nuclear Incidents*. May 1992.

Environmental Protection Agency (EPA). EPA-454/R-99-005. *Meteorological Monitoring Guidance for Regulatory Modeling Applications*. 1999.

Environmental Protection Agency (EPA). EPA 550-B-99-009. *Risk Management Program Guidance for Offsite Consequence Analysis*. April 1999.

Environmental Protection Agency (EPA). EPA-OSWER-88-0001. *Technical Guidance for Hazards Analysis*. December 1987.

Food and Drug Administration. Department of Health and Human Services. Center for Devices and Radiological Health. FDA 1998. *Accidental Radioactive Contamination of Human Foods and Animal Feeds: Recommendations for State and Local Agencies*. August 13, 1998.

General Services Administration (GSA). KKK-A-1822. *Federal Specifications for Ambulances*.

Joint Commission on Accreditation of Healthcare Organizations. *Accreditation Manual*. Oakbrook Terrace, IL. 2007.

Laul, J.C., Foppe, T.L., Mishima, J., *Applicability Of Airborne Release Fraction And Respirable Fraction Values To Particulate Toxic Chemical Material Releases at DOE Sites*. Journal of Chemical Health & Safety. November/December, 2006.

National Institute of Standards and Technology (NIST). Department of Commerce. Technical Note 1453. *Smoke Component Yields from Room-Scale Fire Tests*. April 2003.

National Oceanic and Atmospheric Administration (NOAA). National Ocean Service (NOS). Office of Response and Restoration. Department of Commerce. *Chemical Reactivity Worksheet*.

National Response Team. *Unified Command/Incident Command System Technical Assistance Document*. 1996.

National Council on Radioactive Protection and Measurement. NCRP Report No. 65, *Management of Persons Contaminated with Radionuclides*.

National Council on Radioactive Protection and Measurement. NCRP Report No. 138, *Management of Terrorist Events Involving Radioactive Material*. 2001.

National Fire Protection Association (NFPA). NFPA 99. *Health Care Facilities*. 2005

National Fire Protection Association (NFPA). NFPA 472. *Standard for Professional Competence of Responders to Hazardous Materials Incidents*. 2002.

National Fire Protection Association (NFPA). NFPA 473. *Standard for Competencies for EMS Personnel Responding to Hazardous Materials Incidents*. 2002.

- National Fire Protection Association (NFPA). NFPA 704. *Standard System for the Identification of the Hazards of Materials for Emergency Response*. 2007.
- National Fire Protection Association (NFPA). NFPA 1021. *Standard for Fire Officer Professional Qualifications*. 2003.
- National Fire Protection Association (NFPA). NFPA 1500. *Standard on Fire Department Occupational Safety and Health Program*. 2007.
- National Fire Protection Association (NFPA). NFPA 1561. *Standard on Emergency Services Incident Management System*. 2005.
- National Fire Protection Association (NFPA). NFPA 1710. *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*. 2004.
- National Fire Protection Association (NFPA). NFPA 1991. *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies*. 2005.
- National Fire Protection Association (NFPA). NFPA 1992. *Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies*. 2005.
- National Fire Protection Association (NFPA). NFPA 1999. *Standard on Protective Clothing for Emergency Medical Operations*. 2003.
- National Fire Protection Association (NFPA). *NFPA Fire Protection Handbook*, Seventeenth Edition. Quincy, MA. 1992.
- National Institutes of Health. Department of Health and Human Services. *NIH Guidelines for Research Involving Recombinant DNA Molecules*. April 2002.
- Nuclear Management and Resources Council. NUMARC/NESP-007. *Methodology for Development for Emergency Action Levels*. January 1992.
- Nuclear Regulatory Commission (NRC). NUREG-0396/EPA 520/1-78-016. *Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants*. December 1978.
- Nuclear Regulatory Commission and Federal Emergency Management Agency. NUREG-0654/FEMA-REP-1, Rev. 1. *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants*. March 2002.
- Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCMSSR). FCM-I3-1999. *Directory of Atmospheric Transport and Diffusion Consequence Assessment Models*. March 1999. Available at: [http://www.ofcm.gov/atd\\_dir/pdf/frontpage.htm](http://www.ofcm.gov/atd_dir/pdf/frontpage.htm).

Quigley, D., Simmons, F., Whyte, H., Boada-Clista, L., Laul, J.C., *Use and Misuse of Chemical Reactivity Spreadsheets*. Journal of Chemical Health & Safety. September/October, 2006.

*SAX's Dangerous Properties of Industrial Materials* (Lewis 1992).

Shleien, B. *Preparedness and Response in Radiation Accident*. Health and Human Services Publication. FDA 83-8211. August 1983.

Stannard, J. N., *Radioactivity and Health – A History*, Chapter 2, IV. DOE/RL/01830-T59. Battelle Memorial Institute. 1988.

Subcommittee on Consequence Assessment and Protective Actions (SCAPA). *Automated Chemical Mixtures Methodology*. Available from [www.ornl.gov/emi/scapa/WorkingGroups/chemmixtures.htm](http://www.ornl.gov/emi/scapa/WorkingGroups/chemmixtures.htm) and [www.ornl.gov/emi/scapa/healthcodenumbers.htm](http://www.ornl.gov/emi/scapa/healthcodenumbers.htm)

Thoman, D.C., O’Kula, K.R., Laul, J.C., Davis, M.W., Knecht, K.D. *Comparison of ALOHA and EPIcode for Safety Analysis Applications*. Journal of Chemical Health & Safety. November/December, 2006.

TRADE Performance-Based Management Special Interest Group (PBM-SIG). *How to Measure Performance. A Handbook of Techniques and Tools*. October 1995.

World Health Organization (WHO). *Laboratory Biosafety Manual*, 3<sup>rd</sup> Edition, Geneva, 2004.