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# REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 3.67  
(Task DG-3005)

## STANDARD FORMAT AND CONTENT FOR EMERGENCY PLANS FOR FUEL CYCLE AND MATERIALS FACILITIES

### A. INTRODUCTION

The Nuclear Regulatory Commission's (NRC's) regulations in 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"; Part 40, "Domestic Licensing of Source Material"; and Part 70, "Domestic Licensing of Special Nuclear Material," require some fuel cycle and materials licensees to prepare emergency plans. The information specified in this guide should be included in the licensee's emergency plan to comply with the requirements of 10 CFR 30.32(i)(3), 40.31(j)(3), or 70.22(i)(3).

This regulatory guide provides guidance acceptable to the NRC staff on the information to be included in emergency plans and establishes a format for presenting the information. Use of a standard format will help ensure uniformity and completeness in the preparation of emergency plans.

An acceptable emergency plan should describe the licensed activities, the facility, and the types of accidents that might occur. It should provide information on classifying postulated accidents and the licensee's procedures for notifying and coordinating with offsite authorities. The plan should provide information on emergency response measures that might be necessary, the equipment and facilities available to respond to an emergency, and how the licensee will

maintain emergency preparedness capability. It should describe the records and reports that will be maintained. There should also be a section on recovery after an accident, including plans for restoring the facility to a safe condition.

Detailed descriptive information on processes, materials storage areas and containers, ventilation, process controls, activity locations, vessels, and confinement of radioactive or other hazardous materials may be necessary for the NRC to evaluate the adequacy of the emergency plan. Detailed information that would help response organizations assess accident consequences and estimate releases should be included in the plan. Other detailed information that is needed primarily for the licensing review may be submitted separately as a supplement to the plan or incorporated by reference to other licensing submittals.

This regulatory guide supersedes Revision 1 of NUREG-0762, "Standard Format and Content for Emergency Plans for Fuel-Cycle and Materials Facilities" (Ref. 1). Licensees who prepared emergency plans in accordance with NUREG-0762 should review their plans against this guide. Preparing plans in accordance with this guide will facilitate NRC review and approval of applications made pursuant to 10 CFR 30.32, 40.31, or 70.22.

#### USNRC REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

This guide was issued after consideration of comments received from the public. Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience.

Written comments may be submitted to the Regulatory Publications Branch, DFIPS, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

The guides are issued in the following ten broad divisions:

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| 1. Power Reactors                 | 6. Products                       |
| 2. Research and Test Reactors     | 7. Transportation                 |
| 3. Fuels and Materials Facilities | 8. Occupational Health            |
| 4. Environmental and Siting       | 9. Antitrust and Financial Review |
| 5. Materials and Plant Protection | 10. General                       |

Copies of issued guides may be purchased from the Government Printing Office at the current GPO price. Information on current GPO prices may be obtained by contacting the Superintendent of Documents, U.S. Government Printing Office, Post Office Box 37082, Washington, DC 20013-7082, telephone (202)275-2060 or (202)275-2171.

Issued guides may also be purchased from the National Technical Information Service on a standing order basis. Details on this service may be obtained by writing NTIS, 5285 Port Royal Road, Springfield, VA 22161.

An effective response to an emergency comprises WHAT is to be done (procedures), BY WHOM (response personnel), and WITH WHAT (equipment in designated locations). The emergency plan reflects, in general terms, the preplanning done in preparing to cope with an emergency, but the details of the actual response are contained in the emergency plan's implementing procedures.

The implementing procedures are the heart of the emergency response. They must be clear, precise, and easily understood. Each procedure should pertain to a narrow, specific response action.

Throughout this guide, the licensee or applicant will be asked to describe procedures instead of submitting them to the NRC for approval. NRC uses this practice to eliminate the need for a license amendment every time the procedures need to be changed. Details contained in the procedures will need to be changed from time to time. If each change in a procedure required NRC approval, frequent and time-consuming license amendments would be required. Therefore, the license is issued on the basis of the descriptions of procedures in the emergency plan. The procedures may be changed within the scope of these descriptions. However, this practice makes it necessary for the licensee or applicant to give close attention to the way the implementing procedures are described. In preparing the implementing procedures, the applicant should be aware that the NRC may review them during the licensing process and during inspections to ensure that the procedures are current and workable and that they conform with the descriptions in the emergency plan.

Any changes to the emergency plan that decrease the effectiveness of the plan must have NRC approval before implementation pursuant to 10 CFR 30.34(f), 40.35(f), and 70.32(i). The licensee may change the emergency plan without prior NRC approval if the changes do not decrease the effectiveness of the plan. These changes should be submitted to the appropriate NRC licensing office and to affected offsite response organizations within six months after the changes are made. The submittals should include the date the changes became effective.

The licensee is encouraged to have a single emergency plan to meet the requirements of State agencies or the Community Right-To-Know Act as well as to comply with the regulations of the NRC. Additional material to meet these other regulations should either be included in the plan or referenced in the licensee's emergency plan submitted to the NRC. This additional material will be reviewed by the NRC only to ensure that it does not diminish compliance with the NRC's requirements.

Finally, the licensee should certify that it is in compliance with Title III of the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499, entitled "Emergency Planning and Community Right-to-Know Act of 1986," with respect to any hazardous materials possessed at the plant site.

Any information collection activities mentioned in this regulatory guide are contained as requirements in 10 CFR Parts 30, 40, or 70, which provide the regulatory basis for this guide. The information collection requirements in 10 CFR Parts 30, 40, and 70 have been cleared under OMB Clearance Nos. 3150-0017, 3150-0020, and 3150-0009, respectively.

## B. FORMAT

### Graphical Presentations

Graphical presentations such as drawings, maps, diagrams, sketches, and tables should be employed if the information may be presented more accurately or conveniently by such means. Due concern should be taken to ensure that all information presented is legible, that symbols are defined, and that scales are not reduced to the extent that visual aids are necessary to interpret pertinent items of information. These graphical presentations should be located in the section where they are primarily discussed.

References used may appear as footnotes to the page where discussed or at the end of each chapter.

### Physical Specifications

#### Paper size

- (1) Text pages: 8-1/2 x 11 inches.
- (2) Drawings and graphics: 8-1/2 x 11 inches; however, a larger size is acceptable provided the finished copy when folded does not exceed 8-1/2 x 11 inches.

*Paper stock and ink.* Suitable quality in substance, paper color, and ink density for handling and reproduction by microfilming or image-copying equipment.

*Page margins.* A margin of no less than 1 inch should be maintained on the top, bottom, and binding side of all pages submitted.

#### Printing

- (1) Composition: text pages should be single spaced.
- (2) Typeface and style: should be suitable for microfilming or image-copying equipment.
- (3) Reproduction: may be mechanically or photographically reproduced. All pages of text should be printed on both sides and the image printed head to head.

**Binding.** Pages should be punched for standard 3-hole loose-leaf binders.

**Page numbering.** Pages should be numbered with the digits corresponding to the chapter followed by a hyphen and a sequential number, e.g., the third page of Chapter 4 should be numbered 4-3. The chapter numbers should correspond to the chapters in this guide. Do not number the entire plan sequentially.

**List of Effective Pages.** A list of every page in the plan and the effective revision number or revision date of each page should be provided as a means of **December 1991** verifying that the plan is complete and current. The list should include the pages of any enclosures or attachments that are part of the plan.

**Table of contents.** A table of contents and an index of key items should be included.

### Procedures for Updating or Revising Pages

Data and text should be updated or revised by replacing pages. The changed or revised portion on each page should be highlighted by a "change indicator" mark consisting of a bold vertical line drawn in the margin opposite the binding margin. The line should be of the same length as the portion actually changed.

All pages submitted to update, revise, or add pages to the plan should show the revision number or revision date. Each revision should include a new list of effective pages and an instruction sheet listing the pages to be inserted and the pages to be removed. Readers should be instructed to check the plan against the list of effective pages to verify that the revised plan is complete.

## C. EMERGENCY PLANS

### 1. FACILITY DESCRIPTION

The information in this section is to provide perspective about the facility and the licensed activity such that the adequacy and appropriateness of the licensee's emergency planning, emergency organization, and emergency equipment can be evaluated.

#### 1.1 Description of Licensed Activity

Present briefly the principal aspects of the overall licensed activity. A general description of licensed and other activities conducted at the facility, the location of the facility, and the type, form, and quantities of radioactive and other hazardous materials normally present should be included. Any radioactive materials authorized under a State license should also be described.

### 1.2 Description of Facility and Site

Provide a detailed drawing of the site for the emergency plan. An enlarged duplicate of the drawing suitable for use as a wall map (24 x 30 inch minimum) should also be provided. The detailed drawing should be drawn to scale and show or indicate the following:

1. Onsite and near-site structures with building numbers (if applicable) and descriptive labels.
2. A bar scale in both meters and feet.
3. A compass indicating north.
4. Roads and parking lots onsite and main roads and highways near the site.
5. Site boundaries, showing fences and gates.
6. Exhaust stacks, storage areas, retention ponds, and other major site features.
7. Rivers, lakes, streams, or other ground-water sources onsite and within approximately 1 mile.

Provide a concise description of all site features affecting emergency response, including communication and assessment centers, assembly and relocation areas, and process and storage areas. Identify any additional site features likely to be of interest because they are related to the safety of site operations. The emergency plan should include a list of all hazardous chemicals used at the site, typical quantities possessed, locations of use and storage, and the hazardous characteristics (radioactivity, pH, other) of material in sediment and retention ponds. The stack heights, typical stack flow rates, and the efficiencies of any emission control devices should be summarized in the emergency plan to help response organizations assess releases.

#### 1.3 Description of Area Near the Site

Include a description of the principal characteristics of the area near the site at which licensed activities are conducted. Indicate the site on a general area map (approximately 10-mile radius) and on a United States Geological Survey 7.5' topographical map\* (approximately 1-mile radius). Provide a map or aerial photograph indicating onsite structures and near-site structures (about 1-mile radius). On this photograph or map, include the following:

\*Topographical maps can be obtained from the U.S. Geological Survey, Map Distribution, Denver Federal Center, P.O. Box 25286, Denver, CO 80225. The telephone number is (303) 236-7477.

1. Locations of population centers (towns, cities, office buildings, factories, schools, arenas, stadiums, etc.);
2. Locations of facilities that could present potential protective action problems (schools, arenas, stadiums, prisons, nursing homes, hospitals);
3. Identification of primary routes for access of emergency equipment or for evacuation, as well as potential impediments to traffic flow (rivers, drawbridges, railroad grade crossings, etc.);
4. Locations of fire stations, police stations, hospitals, and other offsite emergency support organizations (specify whether qualified to handle exposure to radioactive contamination or toxic chemicals);
5. The sites of potential emergency significance (e.g., liquefied petroleum gas (LPG) terminals, chemical plants, pipelines, electrical transformers, and underground cables);
6. Identification of the types of terrain and the land use patterns around the site.

## 2. TYPES OF ACCIDENTS

Emergency planning is concerned with individual and organizational responses to a range of potential accidents, including those accidents that have been hypothesized but that have a very low probability of occurrence.

### 2.1 Description of Postulated Accidents

Identify and describe each type of radioactive materials accident for which actions may be needed to prevent or minimize exposure of persons offsite to radiation or radioactive materials. Exposure levels at the site boundary should be treated as the levels potentially affecting persons offsite.

Describe the accidents in terms of the process and physical location where they could occur. Describe how the accidents could happen (equipment malfunction, instrument failure, human error, etc.), possible complicating factors, and possible onsite and offsite consequences. Accident descriptions should include nonradioactive hazardous material releases that could impact emergency response efforts. Facilities that can have criticality accidents should evaluate the direct radiation exposure from postulated criticality accidents in addition to the dose from released radioactive materials.

## 2.2 Detection of Accidents

Describe the means provided to detect and to alert the licensee's operating staff of any abnormal operating condition or of any other danger to safe operations (e.g., a severe weather warning). For each type of accident identified in the emergency plan, describe the means of detecting the accident, the means of detecting any release of radioactive or other hazardous material, the means of alerting the operating staff, and the anticipated response of the operating staff. Examples are visual observation, radiation monitors, smoke detectors, process alarms, and criticality alarms. Indicate at what stage of the accident it would be detected. Also indicate if the area of the postulated accidents or remote readouts of alarms or detectors located in such areas are under continuous visual observation.

## 3. CLASSIFICATION AND NOTIFICATION OF ACCIDENTS

Accidents should be classified as an alert or a site area emergency according to the definitions in 10 CFR 30.4, 40.4, and 70.4. In its emergency plan and in coordination meetings with offsite authorities, the licensee should convey the concept that fuel cycle and materials facilities do not present the same degree of hazard (by orders of magnitude) as are presented by nuclear power plants. Thus, the classification scheme for these facilities is different. The licensee should explain to offsite authorities the definitions of accident severity and the expected response actions associated with alert and site area emergency conditions. NUREG-1140, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees" (Ref. 2), contains a description of past incidents involving radioactive materials.

### 3.1 Classification System

An alert is defined as an incident that has led or could lead to a release to the environment of radioactive or other hazardous material, but the release is not expected to require a response by an offsite response organization to protect persons offsite. An alert reflects mobilization of the licensee's emergency response organization, either in a standby mode that will activate some portions of the licensee's organization or full mobilization, but does not indicate an expectation of offsite consequences. However, an alert may require offsite response organizations to respond to onsite condition such as a fire.

A site area emergency is defined as an incident that has led or could lead to a significant release to the environment of radioactive or other hazardous material and that could require a response by an offsite organization to protect persons offsite. A site area emergency reflects full mobilization of the licensee's

emergency response organization and may result in requests for offsite organizations to respond to the site.

In the emergency plan, identify the classification (alert or site area emergency) that is expected for each of the accidents postulated in Section 2.1 of this guide. Relate the classification to the accident description and detection means described in Section 2.2. Identify the emergency action levels (EALs) at which an alert or site area emergency will be declared. EALs are specific conditions that require emergency response measures to be performed. Licensees should establish specific initiating conditions relative to particular events or changes in instrument sensors. Appendix A provides a list of examples of initiating conditions for declaring an alert or site area emergency.

Although it is unlikely that a site area emergency requiring offsite actions will occur at a fuel cycle or materials facility, the licensee must be able to recognize potential offsite hazards and make the required notifications in such a manner that offsite response organizations can take appropriate actions, such as sheltering or evacuating persons in the affected area.

The NRC intends that licensees be allowed to have a single emergency plan that can apply to all licensee needs and regulatory requirements. To this end, it should be understood that a licensee may wish to include in the emergency plan some incidents that do not fall within the jurisdiction of the NRC. For example, the licensee may wish to include industrial accidents or fires unrelated to the licensee's work with nuclear materials. The licensee may include such incidents in the emergency plan.

The classification of emergencies involving potential or actual releases of nonradioactive hazardous materials should be coordinated with the local emergency planning committee established under the provisions of Section 301(c) of the Emergency Planning and Community Right-To-Know Act of 1986 (Title III of the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499). The licensee should clearly identify any part of the emergency plan that does not apply to activities licensed by the NRC.

## 3.2 Notification and Coordination

### 3.2.1 Alert

The purpose of declaring an alert is to ensure that emergency personnel are alerted and at their emergency duty stations to mitigate the consequences of the accident, that the emergency is properly assessed, that offsite officials are notified, and that steps can be taken to escalate the response quickly if nec-

essary. The licensee should describe how and by whom the following actions will be taken:

- Decision to declare an alert.
- Activation of onsite emergency response organization.
- Prompt notification of offsite response authorities that an alert has been declared (normally within 15 minutes of declaring an alert).
- Notification to the NRC Operations Center at 301-951-0550 immediately after notification of offsite authorities, and in any case within 1 hour of the declaration of an alert. (See 10 CFR Part 20 for additional notification requirements.)
- Decision to initiate any onsite protective actions.
- Decision to escalate to a site area emergency, if appropriate.
- Decision to request support from offsite organizations.
- Decision to terminate the emergency or enter recovery mode.

### 3.2.2 Site Area Emergency

The purpose of declaring a site area emergency is to ensure that offsite officials are informed of potential or actual offsite consequences, that offsite officials are provided with recommended actions to protect persons offsite, and that the licensee's response organization is augmented by additional personnel and equipment. The licensee should describe how and by whom the following actions will be taken:

- Decision to declare a site area emergency.
- Activation of onsite emergency response organization.
- Prompt notification of offsite response authorities that a site area emergency has been declared, including the licensee's initial recommendation for offsite protective actions (normally within 15 minutes of declaring a site area emergency).
- Notification to the NRC Operations Center at 301-951-0550 immediately after notification of the appropriate offsite response organizations and not later than 1 hour after the licensee has declared a site area emergency. (See 10 CFR Part 20 for additional notification requirements.)
- Decision on what onsite protective actions to initiate.

- Decision on what offsite protective actions to recommend.
- Decision to request support from offsite organizations.
- Decision to terminate the emergency or enter recovery mode.

### 3.3 Information To Be Communicated

The licensee should be prepared to provide clear, concise information to offsite response organizations. The communication should avoid technical terms and jargon and should be stated to prevent an under- or over-evaluation of the seriousness of the incident. Describe the types of information that will be communicated with respect to facility status, releases of radioactive or other hazardous materials, and recommendations for protective actions to be implemented by offsite response organizations. The emergency plan should contain the preplanned protective action recommendations the licensee will make to each appropriate offsite organization (including the NRC) for each postulated accident. The licensee should try to make protective action recommendations directly to State or local officials responsible for implementing the specific protective actions. The recommendations should specify the size of the area where the actions are to be taken. The licensee should obtain the input of offsite organizations to ensure that they recommend the most practical and efficient protective actions for each postulated accident. A standard reporting checklist should be developed to facilitate timely notification. Provide assurance to the NRC that the information has been received by offsite response organizations and that it is periodically reaffirmed and updated with these agencies.

The standard reporting checklist should be developed in cooperation with offsite officials to ensure that it meets their information needs and that their personnel are trained to receive and relay such information. The licensee should provide initial protective action recommendations at the same time it initially notifies offsite authorities of a site area emergency declaration.

## 4. RESPONSIBILITIES

In this section, describe the emergency organization to be activated onsite for possible events, as well as its augmentation and support offsite. Delineate the authorities and responsibilities of key individuals and groups, and identify the communication chain for notifying and mobilizing the necessary personnel during normal and nonworking hours.

### 4.1 Normal Facility Organization

Provide a brief description of the normal (day-to-day) facility organization and identify by position those individuals who have the responsibility and authority to declare an emergency and to initiate the appropriate response.

### 4.2 Onsite Emergency Response Organization

Describe the onsite emergency response organization for the facility, and include the organization for periods such as offshift, holidays, weekends, and extended outages when normal operations are not being conducted. Use organization charts and tables when appropriate. If the organization is activated in phases, describe the basic organization and each additional component that may be activated to augment the organization.

#### 4.2.1 Direction and Coordination

Designate the position of the person and alternates who have the overall responsibility for implementing and directing the emergency response. Discuss this person's duties and authority, including control of the situation, termination of the emergency condition, coordination of the staff and offsite personnel who augment the staff, communication with parties requesting information about the event, authority to request support from offsite agencies, and authority to delegate responsibilities. Indicate the individuals who may be delegated certain emergency responsibilities.

#### 4.2.2 Onsite Staff Emergency Assignments

Specify the organizational group or groups assigned to the functional areas of emergency activity listed below. Indicate the basis for personnel assignment for both working and nonworking time periods. For each group, describe duties, authority, and interface with other groups and outside assistance.

The organizational groups should provide capability in the following areas:

- Facility system operations
- Fire control
- Personnel evacuation and accountability
- Search and rescue operations
- First aid
- Communications
- Radiological survey and assessment (onsite and offsite)
- Personnel decontamination

- Facility decontamination
- Facility security and access control
- Facility repair and damage control
- Post-event assessment
- Recordkeeping
- Media contact
- Criticality safety assessment

#### 4.3 Local Offsite Assistance to Facility

Describe provisions and arrangements for assistance to onsite personnel during and after an emergency. Indicate the location of local assistance with respect to the facility if not previously stated. Ensure that exposure guidelines are clearly communicated to offsite emergency response personnel. Identify the services to be performed, means of communication and notification, and type of agreements that are in place for the following:

- Medical treatment facilities
- First aid personnel
- Fire fighters
- Law enforcement assistance
- Ambulance service

Describe the measures that will be taken to ensure that offsite agencies maintain an awareness of their respective roles in an emergency and have the necessary periodic training, equipment, and supplies to carry out their emergency response functions. Discuss any provisions to suspend security or safeguards measures for site access during an emergency.

#### 4.4 Coordination with Participating Government Agencies

Identify the principal State agency and other government (local, county, State, and Federal) agencies or organizations having responsibilities for radiological or other hazardous material emergencies at the facility. For each agency or organization, describe:

- Its authority and responsibility in a radiological or hazardous material emergency and its interface with others, if any;
- Its specific response capabilities in terms of personnel and resources available;
- Its location with respect to the facility;
- The rumor control arrangements that have been made with the agency or organization. (The emergency plan should describe where

the public and media can obtain information during an emergency.)

Typical agencies to be included are the local emergency planning committee established under the Emergency Planning and Community Right-To-Know Act of 1986; State departments of health, environmental protection, and emergency or disaster control; and local fire and police departments. Ensure that the licensee will meet at least annually with each offsite response organization to review items of mutual interest, including relevant changes in the licensee's emergency preparedness program. The licensee should discuss the emergency action level scheme, notification procedures, and overall response coordination process during these meetings.

### 5. EMERGENCY RESPONSE MEASURES

Specific emergency response measures should be identified for each class of emergency and related to action levels or criteria that specify when the measures are to be effected. Response measures include assessment actions, mitigative actions, onsite and offsite protective actions, exposure control, authorization of emergency exposures in excess of Part 20 limits, and aid to injured persons.

#### 5.1 Activation of Emergency Response Organization

Describe the means used to activate the emergency response organization for each class of emergency during both regular and nonregular hours. Include a description of the method used to authenticate messages. Identify the activation levels for each class and relate them to the responsibilities identified in Chapter 4. In this and subsequent sections, describe the specific written procedures to be used.

#### 5.2 Assessment Actions

For each class of emergency, discuss the actions to be taken to determine the extent of the problem and to decide what corrective actions may be required. Describe the types and methods of onsite and offsite sampling and monitoring that will be done in case of a release of radioactive or other hazardous material. Describe provisions for projection of offsite radiation exposures.

#### 5.3 Mitigating Actions

For the events identified in Chapter 2, briefly describe the means and equipment provided for mitigating the consequences of each type of accident. Include the mitigation of consequences to workers onsite as well as to the public offsite. In the event of a warning of impending danger, describe the criteria that will be used to decide whether a single process or

the entire facility will be shut down, the steps that will be taken to ensure a safe orderly shutdown of equipment, and approximate times required to accomplish a safe shutdown of processes. Mitigating actions could include steps to reduce or stop any releases and steps to protect personnel (e.g., evacuation, shelter, decontamination).

Means for limiting releases could include:

- Sprinkler systems and other fire-suppression systems
- Fire detection systems
- Firefighting capabilities
- Filtration or holdup systems
- Use of water sprays on airborne releases of radioactive material
- Automatic shutoff of process or ventilation flows
- Storage in fire-resistant containers
- Use of fire-resistant building materials
- Criticality controls

## 5.4 Protective Actions

The nature of onsite and offsite protective actions, the criteria for implementing those actions, the areas involved, and the procedures for notification to affected persons should be described in the plan. To prevent or minimize exposure to radiation, radioactive materials, and other hazardous materials, the plan should provide for timely relocation of onsite persons, timely recommendation of offsite actions, effective use of protective equipment and supplies, and use of appropriate contamination control measures.

### 5.4.1 Onsite Protective Actions

**5.4.1.1 Personnel Evacuation and Accountability.** This segment of the emergency plan should include:

- Criteria for ordering an evacuation
- The means and time required to notify persons involved
- Evacuation routes, transportation of personnel
- Locations of onsite and offsite assembly areas
- Search and rescue

- Monitoring of evacuees for contamination and control measures if contamination is found
- Criteria for command center and assembly area evacuation and reestablishment at alternate location
- Procedures for evacuating and treating injured personnel, including contaminated personnel
- Provisions for determining and maintaining the accountability of assembled and evacuated personnel.

**5.4.1.2 Use of Protective Equipment and Supplies.** Effective use of protective equipment and supplies, including the proper onsite distribution or availability of special equipment, is an important measure for minimizing the effects of exposure to or contamination by radioactive materials. Measures that should be considered are:

- Individual respiratory protection
- Use of protective clothing
- Communications equipment associated with any self-contained breathing apparatus
- Use of potassium iodide to block uptake of radioactive iodine (if appropriate).

For each measure that might be used, describe:

- Criteria for issuance of emergency equipment, if appropriate
- Locations of emergency equipment and supplies
- Inventory lists indicating the emergency equipment and supplies at each specified location
- Means for distribution of these items.

**5.4.1.3 Contamination Control Measures.** Describe provisions for preventing further spread of radioactive materials and for minimizing radiation exposures from radioactive materials that are unshielded or released by abnormal conditions.

Onsite protective actions should be described and should include isolation, area access control, and application of criteria for permitting return to normal use. Action criteria for implementing the planned measures should be described.

### 5.4.2 Offsite Protective Actions

Describe the conditions that would require protective actions offsite and list postulated accidents

that could meet any of the conditions. Discuss what protective action recommendations would be made to offsite authorities, when each recommendation would be made, and what area offsite would be affected. Protective action recommendations should be consistent with the analysis results in NUREG-1140 (Ref. 2) and the guidance in the EPA Manual of Protective Action Guides (Ref. 3).

## **5.5 Exposure Control in Radiological Emergencies**

In this section, describe the means for controlling radiological exposures for emergency workers.

### **5.5.1 Emergency Radiation Exposure Control Program**

**5.5.1.1 Radiation Protection Program.** Describe the onsite radiation protection program to be implemented during emergencies, including methods to comply with exposure guidelines. Identify individuals, by position or title, who can authorize workers to receive emergency doses. Procedures should be provided in advance for permitting onsite volunteers to receive radiation doses in the course of carrying out lifesaving and other emergency activities. Procedures should provide for expeditious decisionmaking and a reasonable consideration of relative risks.

**5.5.1.2 Exposure Guidelines.** Specify onsite exposure guidelines consistent with the EPA Manual of Protective Actions Guides (Ref. 3) to be used in actions to control fires, stop releases, or protect facilities. Guidelines for exposure to uranium, plutonium, or other toxic materials should be based on the chemical toxicity when the toxicity hazard is greater than the radiation hazard. Exposure guidelines should be provided for:

- Removing injured persons
- Undertaking mitigating actions
- Performing assessment actions
- Providing onsite first aid
- Performing personnel decontamination
- Providing ambulance service
- Providing offsite medical treatment.

**5.5.1.3 Monitoring.** Describe provisions for determining the doses and dose commitments from external radiation exposure and any internally deposited radioisotopes received by emergency personnel involved in any accidents, including volunteers and emergency workers from offsite support organizations who may receive radiation exposure while performing their duties at the licensee's facility. Include provisions for distribution of dosimeters, both self-reading

and permanent record devices, and means for assessing inhalation exposures.

Describe provisions for ensuring that dose and dose commitment records are maintained for licensee and offsite support organization's emergency workers involved in any nuclear accident.

### **5.5.2 Decontamination of Personnel**

Specify action levels for decontaminating personnel. Describe the means for decontaminating emergency personnel, supplies, instruments, and equipment; and describe the means for collecting and handling radioactive wastes. Describe provisions for surveying and decontaminating relocated onsite personnel, including providing extra clothing and decontaminates suitable for the type of contamination expected.

## **5.6 Medical Transportation**

Specify how injured personnel, who may also be radiologically contaminated, will be transported to medical treatment facilities. Describe how chemicals or hazardous materials used in conjunction with radioactive materials may impact medical transportation.

## **5.7 Medical Treatment**

Describe arrangements made for hospital and medical services, both local and backup, and their capabilities to evaluate and treat injuries from radiation, radioactive materials, and other hazardous materials used in conjunction with radioactive materials. The description should include the capabilities to control any contamination that may be associated with physical injuries. The licensee should be prepared to provide ambulance and hospital personnel with health physics support if needed. If needed during an emergency, the NRC can obtain physicians for consultation and other medical assistance through the Department of Energy (DOE).

## **6. EMERGENCY RESPONSE EQUIPMENT AND FACILITIES**

In this chapter, describe the onsite equipment and facilities designated for use during emergencies. Provide sufficient detail to allow the NRC staff to determine the adequacy of the equipment to perform its function during an emergency.

### **6.1 Command Center**

Describe the principal and alternative locations from which control and assessment for the emergency will be exercised. Identify the criteria used to predetermine the number and location of command centers in order to ensure that at least one will be habitable

during any emergency. Indicate the means for identifying which command center will be used in a given emergency. Specify the criteria for evacuating a command center and re-establishing control from an alternative location. Provide a description of the primary and alternative locations from which licensee emergency workers would be dispatched for radiation survey, damage assessment, emergency repair, or other mitigating tasks if these persons would not be dispatched from the command centers.

## **6.2 Communications Equipment**

### **6.2.1 Onsite Communications**

Describe the primary and any alternative onsite communication systems that would be used to transmit and receive information throughout the course of an emergency and the subsequent recovery. Discuss the frequency of operational tests.

### **6.2.2 Offsite Communications**

A backup means of offsite communication, other than commercial telephone, should be provided for notification of emergencies and requests for assistance. Operational tests of backup communications systems should be conducted periodically.

## **6.3 Onsite Medical Facilities**

Describe the facilities and medical supplies at the site designated for emergency first aid treatment and contamination control of injured individuals.

## **6.4 Emergency Monitoring Equipment**

List and describe the dedicated emergency equipment that will be available for personnel and area monitoring, as well as that for assessing the release of radioactive materials to the environment. The description should include the purpose of the equipment. The location of all monitoring equipment should be described. The emergency plan should discuss how the storage locations will ensure that sufficient emergency monitoring equipment will be accessible in a nonhazardous location for each type of postulated accident. Include similar descriptions of routine effluent monitors and meteorological measurement systems, if present. Describe how these are to be used to assess the magnitude and dispersion of releases. In addition to the radiological monitoring equipment, indicate, if applicable, the instrumentation to be used for monitoring chemically toxic materials. Describe available meteorological monitoring equipment, including locations of monitors, elevations of sensors, and location of readout.

## **7. MAINTAINING EMERGENCY PREPAREDNESS CAPABILITY**

### **7.1 Written Emergency Plan Procedures**

Identify the means for ensuring that written emergency plan procedures will be prepared, kept up to date, and distributed to all affected parties. Describe the review process that will ensure these procedures clearly state the duties, responsibilities, action levels, and actions to be taken by each group or individual in response to an emergency condition. Describe provisions for approval of the procedures, making and distributing changes to the procedures, and ensuring that each person responsible for an emergency response function has easy access to a current copy of each procedure that pertains to his or her functions.

### **7.2 Training**

Describe the topics and general content of training programs used for training the onsite emergency response staff. Specify the training afforded to those personnel who prepare, maintain, and implement the emergency plan. Ensure that the procedures include schedules and lesson plans for the training, frequency of retraining, and the estimated number of hours of initial training and retraining that will be provided. Include the training requirements for each position in the emergency organization. Describe training to be provided on the use of protective equipment such as respirators. Describe the training program for onsite personnel who are not members of the emergency response staff so that they are aware of what actions they may have to take following the declaration of an emergency. Discuss what special instructions and orientation tours the licensee will offer periodically to fire, police, medical, and other offsite emergency response personnel. Topics to be addressed during training for offsite emergency response personnel should include exposure guidelines, personnel monitoring devices, and basic contamination control principles.

### **7.3 Drills and Exercises**

Describe provisions for periodic drills and exercises to test the adequacy of implementing procedures, to test emergency equipment and instrumentation, and to ensure that the emergency personnel are familiar with their duties. Typically, drills are internal tests of specific licensee emergency response functions, related functions are often simulated, and offsite organizations are not invited to participate. Exercises are typically full-scale tests of the licensee's entire emergency response organization, and offsite organizations are invited to participate. Preplanned descriptions of accidents should be used to prepare

scenarios appropriate to the objective of each drill and exercise. The procedures should include a requirement for one or more nonparticipating observers to evaluate the effectiveness of the personnel, the procedures, the readiness of equipment and instrumentation, and to recommend needed changes. For those drills and exercises that involve simultaneous activities at more than one location, observers should be provided at each location. Describe how criteria for acceptable performance will be prepared and provided to observers for evaluating the performance of participants.

### 7.3.1 Biennial Exercises

Ensure that an exercise will be held biennially and that offsite response organizations will be invited to participate in the biennial exercise in order to exercise coordination with offsite assistance organizations, including testing procedures and equipment for notifying and communicating with local and State agencies. Ensure that the NRC will be invited to participate or observe if they wish. Ensure that exercise scenarios are not known by exercise participants and are plausible for the specific site. Discuss any provisions to suspend security or safeguards measures for site access during an exercise. These exercises should be planned so that all emergency response activities are adequately demonstrated. The exercise objectives and scenario should be provided to the NRC at least 60 days before the exercise to obtain NRC comments on how well the exercise will test the licensee's emergency response capabilities.

### 7.3.2 Quarterly Communications Checks

Ensure that checks are conducted with offsite response organizations each quarter to verify and update all necessary telephone numbers.

### 7.4 Critiques

Ensure that a critique will be prepared for each drill and exercise by one or more of the nonparticipating observers and that it will evaluate the appropriateness of the emergency plan, procedures, facilities, equipment, personnel training, and overall effectiveness. The emergency plan and implementing procedures should be reviewed after each exercise, based on the evaluation of the exercise. The emergency plan should be reviewed and revised, if necessary, whenever changes occur in processes, kinds of material at risk, or plant organization. Describe how deficiencies identified by the critique will be corrected in a timely manner. (See Chapter 8 for records of exercises and exercise critiques.)

## 7.5 Independent Audit

Discuss the program to be used annually to review and audit the licensee's emergency preparedness program, including the emergency plan and its procedures; training activities; emergency facilities, equipment, and supplies; and records associated with offsite support agency interface to ensure that the overall emergency preparedness program is being adequately maintained. Describe the minimum qualifications of the persons who will perform the annual audit and ensure that the audits will be made by persons not having direct responsibilities for implementing the emergency response program. Changes in plant layout should be included in the changes that would warrant revision of the emergency plan. Describe the provisions for initiating corrective actions based on audit findings and for ensuring completion of these actions.

## 7.6 Maintenance and Inventory of Emergency Equipment, Instrumentation, and Supplies

Describe the plans for ensuring that the equipment and instrumentation are in good working condition and that an adequate stock of supplies is maintained. A quarterly inventory should be made to ensure all emergency equipment and supplies are intact and in good operating condition, including instrumentation for operation and calibration, demand respirators, self-contained breathing apparatus, fire-fighting equipment and gear, supplemental lighting, and communications equipment. The procedures should include timely corrective actions to be taken when deficiencies are found during these checks.

## 7.7 Letters of Agreement

Changes to the emergency plan should be communicated to the appropriate offsite response organizations; ensure that letters of agreement with offsite agencies are reviewed annually and renewed at least every four years or more frequently if needed. Letters of agreement may be included in the emergency plan or maintained separately.

## 8. RECORDS AND REPORTS

### 8.1 Records of Incidents

Describe the assignment of responsibility for reporting and recording incidents of abnormal operation, equipment failure, and accidents that led to a plant emergency, including permanent retention with the licensee's decommissioning records. Provide a detailed description of the records that will be kept. The records should include the cause of the incident, personnel and equipment involved, extent of injury and damage (onsite and offsite) resulting from the incident, all locations of contamination with the final

decontamination survey results, corrective actions taken to terminate the emergency, and the action taken or planned to prevent a recurrence of the incident. The records should also include the onsite and offsite support assistance requested and received, as well as any program changes resulting from the lessons learned from a critique of emergency response activities. The titles of the personnel responsible for maintaining the records should be specified. Those records unique to a radiological emergency, not covered by existing NRC regulations or license conditions, should be retained until the license is terminated.

## 8.2 Records of Preparedness Assurance

Provide a description of the records that will be kept. These should include records of:

- Training and retraining (including lesson plans and test questions)
- Drills, exercises, and related critiques
- Inventory and locations of emergency equipment and supplies
- Maintenance, surveillance, calibration, and testing of emergency equipment and supplies
- Agreements with offsite support organizations
- Reviews and updates of the emergency plan
- Notification of all personnel and offsite agencies affected by an update of the plan or its implementing procedures.

## 9. RECOVERY AND PLANT RESTORATION

Describe plans for restoring the facility to a safe status. Although it is not possible to detail specific plans for every type of incident, the plans should include the general requirements for (1) assessing the damage to and the status of the facility's capabilities to control radioactive materials, (2) determining the actions necessary to reduce any ongoing releases of radioactive or other hazardous material and to prevent further incidents, (3) accomplishing the tasks to meet any required restoration action, and (4) describing in general the key positions in the recovery organization.

Specifically, recovery plans should include requirements for checking and restoring to normal operations all safety-related equipment involved in the incident (e.g., criticality alarms, radiation monitoring instruments, respiratory protection equipment, fire-suppression and fire-fighting equipment, containments, and air filters) and assignment of responsibility for compiling, evaluating, and ensuring retention of all records associated with the incident.

During any planned restoration operations, personnel exposures to radiation must be maintained within 10 CFR Part 20 limits and maintained as low as reasonably achievable.

## 10. COMPLIANCE WITH COMMUNITY RIGHT-TO-KNOW ACT

Show compliance with Title III of the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499, entitled "Emergency Planning and Community Right-To-Know Act of 1986," with respect to any hazardous materials possessed at the plant site.

### REFERENCES

1. U.S. Nuclear Regulatory Commission, "Standard Format and Content for Emergency Plans for Fuel-Cycle and Materials Facilities," NUREG-0762, Draft Revision 1, November 1987.\*
2. S. A. McGuire, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees," NUREG-1140, U.S. Nuclear Regulatory Commission, January 1988.\*\*
3. Environmental Protection Agency, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," EPA 520/1-75-001-A, January 1990.\*\*

\*Copies may be obtained, to the extent of supply, from the U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Distribution and Mail Services Section.

\*\*Copies may be purchased from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082; or from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

**APPENDIX A**  
**EXAMPLES OF INITIATING CONDITIONS**

Conditions that Initiate an Alert

1. Fire onsite that might affect radioactive material or safety systems.
2. Severe natural phenomenon that might affect radioactive material or safety systems (e.g., earthquake, flood, tsunami, hurricane, tidal surge, hurricane force winds, tornado striking facility).
3. Other severe incidents that might affect radioactive material or safety systems—aircraft crash into the facility, damage to the facility from explosives, uncontrolled release of toxic or flammable gas in the facility.
4. Elevated radiation levels or airborne contamination levels within the facility that indicate severe loss of control (factor of 100 over normal levels).
5. Ongoing security compromise (greater than 15 minutes).
6. Spent reactor fuel accident with release of radioactivity to containment or fuel-handling building.
7. Discovery of a critical mass quantity of special nuclear material in an unsafe geometry container or other condition that creates a criticality hazard.
8. Other conditions that warrant precautionary activation of the licensee's emergency response organization.

Conditions that Initiate a Site Area Emergency

1. Fire onsite that involves radioactive material or compromises safety systems.
2. Severe natural phenomenon that actually compromises safety systems or the integrity of radioactive material (e.g., earthquake, flood, tsunami, hurricane force winds, tornado striking facility).
3. Other severe incidents that actually compromise safety systems or the integrity of radioactive material—aircraft crash into the facility from explosives, uncontrolled release of toxic or flammable gas in the facility.
4. Elevated radiation levels or airborne contamination levels outside the facility that indicate a significant release to the environment (factor of 100 over normal levels).
5. Imminent or actual loss of physical control of the facility.
6. Major damage to spent reactor fuel with release of radioactivity outside of containment or fuel-handling building.
7. Imminent or actual occurrence of an uncontrolled criticality.
8. Other conditions that warrant activation of offsite emergency response organizations or precautionary notification of the public near the site.

## REGULATORY ANALYSIS

A draft value/impact statement was published with the draft of this guide when it was published for public comment (Task DG-3005, September 1990). No changes were necessary, so a separate value/impact statement for the final guide has not been prepared. A copy of the draft value/impact statement is available for inspection or copying for a fee in the Commission's Public Document Room at 2120 L Street, NW, Washington, DC, under DG-3005.

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