



U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REGULATORY RESEARCH

September 1990
Division 3
Task DG-3005

DRAFT REGULATORY GUIDE

Contact: C. M. Ferrell (301) 492-3944

DRAFT REGULATORY GUIDE DG-3005

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

FOR COMMENT

This regulatory guide is being issued in draft form to involve the public in the early stages of the development of a regulatory position in this area. It has not received complete staff review and does not represent an official NRC staff position.

Public comments are being solicited on the draft guide (including any implementation schedule) and its associated regulatory analysis or value/impact statement. Comments should be accompanied by appropriate supporting data. Written comments may be submitted to the Regulatory Publications Branch, DFIPS, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Copies of comments received may be examined at the NRC Public Document Room, 2120 L Street NW., Washington, DC. Comments will be most helpful if received by **November 30, 1990.**

Requests for single copies of draft guides (which may be reproduced) or for placement on an automatic distribution list for single copies of future draft guides in specific divisions should be made in writing to the U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Director, Division of Information Support Services.



TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION.....	1
1. FACILITY DESCRIPTION.....	5
1.1 Description of Licensed Activity.....	5
1.2 Description of Area Near the Site.....	5
1.3 Description of Facility and Site.....	6
2. TYPES OF ACCIDENTS.....	7
2.1 Description of Postulated Accidents.....	7
2.2 Detection of Accidents.....	7
3. CLASSIFICATION AND NOTIFICATION OF ACCIDENTS.....	8
3.1 Classification System.....	8
3.2 Notification and Coordination.....	9
3.3 Information To Be Communicated.....	11
4. RESPONSIBILITIES.....	12
4.1 Normal Facility Organization.....	12
4.2 Onsite Emergency Response Organization.....	12
4.3 Local Offsite Assistance to Facility.....	13
4.4 Coordination with Participating Government Agencies.....	14
5. EMERGENCY RESPONSE MEASURES.....	15
5.1 Activation of Emergency Response Organization.....	15
5.2 Assessment Actions.....	15
5.3 Mitigating Actions.....	15
5.4 Protective Actions.....	16
5.5 Exposure Control in Radiological Emergencies.....	18
5.6 Medical Transportation.....	19
5.7 Medical Treatment.....	19
6. EMERGENCY RESPONSE EQUIPMENT AND FACILITIES.....	20
6.1 Command Center.....	20
6.2 Communications Equipment.....	20
6.3 Onsite Medical Facilities.....	20
6.4 Emergency Monitoring Equipment.....	21

TABLE OF CONTENTS (Continued)

	<u>Page</u>
7. MAINTAINING EMERGENCY PREPAREDNESS CAPABILITY.....	21
7.1 Written Emergency Plan Procedures.....	21
7.2 Training.....	21
7.3 Drills and Exercises.....	22
7.4 Critiques.....	23
7.5 Independent Audit.....	23
7.6 Maintenance and Inventory of Emergency Equipment, Instrumentation, and Supplies.....	24
7.7 Verification of Emergency Telephone Numbers.....	24
7.8 Letters of Agreement.....	24
8. RECORDS AND REPORTS.....	24
8.1 Records of Incidents.....	24
8.2 Records of Preparedness Assurance.....	25
9. RECOVERY AND PLANT RESTORATION.....	25
10. COMPLIANCE WITH COMMUNITY RIGHT-TO-KNOW ACT.....	26
REFERENCES.....	26
APPENDIX A--EXAMPLES OF INITIATING CONDITIONS.....	27
DRAFT VALUE/IMPACT STATEMENT.....	29

INTRODUCTION

The 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 an emergency plan. 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 is being developed to provide guidance acceptable to the NRC staff on the information to be included in emergency plans and to establish 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 conducted at 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 and 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. This information need not be a part of the plan itself but should be submitted as a supplement if such information is not already available as a part of other license submissions. Additional information may be incorporated by specific reference.

This regulatory guide contains guidance different from the information provided in 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 the guidance in NUREG-0762 should review their plans against this guide. Preparing plans in accordance with this guide will facilitate NRC review and approval.

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 will subsequently review them during inspections to ensure that they 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. 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 furnished to NRC within six months after the changes are made and should be in the form of a license amendment application. The amendment must 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 Nuclear Regulatory Commission (NRC). Additional material to meet these other requirements should either be included 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 interfere 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 draft 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.

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 so 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 report sequentially.

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 report should show the date of change and change or amendment number. A guide page listing the pages to be inserted and the pages to be removed should accompany the revised pages. When major changes or additions are made, a revised table of contents should be provided.

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.

1.2 Description of Area Near the Site

Include a description of the principal characteristics of 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:

- (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., liquified petroleum gas (LPG) terminals, chemical plants, pipelines).

1.3 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, and locations of use and storage. The stack heights, typical stack flow rates, and the efficiencies of any emission control devices should be summarized in the emergency plan, if such information is not readily available from other licensee submittals.

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. 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 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 earlier 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 conditions, such as a fire.

A site area emergency is defined as an incident that has led or could lead to a 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. 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

*This definition differs from
10CFR50 App E.*

*EALs are to be used as
criteria for determining how the
emergency is classified and what the
response will be.*

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 highly unlikely that a site area emergency will occur at a fuel cycle or materials facility, the licensee must be prepared to 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 Nuclear Regulatory Commission (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 Sec. 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 necessary. The licensee should describe how and by whom the following actions will be taken:

- (1) Decision to declare an alert.
- (2) Activation of onsite emergency response organization.
- (3) Notification to offsite response authorities, if required by local or State regulations, within one hour of declaration of an alert, or as specified by local or State regulations.
- (4) Notification to the NRC immediately after notification of offsite authorities, and in any case within one hour of the declaration of an alert. (See 10 CFR 20.403 for additional notification requirements.)
- (5) Decision to initiate any onsite protective actions.
- (6) Decision to escalate to a site area emergency, if appropriate.
- (7) Decision to request support from offsite organizations.
- (8) 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:

- (1) Decision to declare a site area emergency.
- (2) Activation of onsite emergency response organization.
- (3) Notification to State and local offsite response authorities of the status and reason for the emergency within 15 minutes after the declaration of a site area emergency.

- (4) Notification to the NRC immediately after notification of the appropriate offsite response organizations and not later than one hour after the licensee has declared a site area emergency. (See 10 CFR 20.403 for additional notification requirements.)
- (5) Decision to initiate onsite protective actions.
- (6) Decision to recommend offsite protective actions.
- (7) Decision to request support from offsite organizations.
- (8) 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 pre-planned protective action recommendations the licensee will make to each appropriate offsite organization (including the NRC) for each postulated accident. 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 that offsite authorities are initially notified of a site area emergency declaration.

4. RESPONSIBILITIES

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

4.1 Normal Facility Organization

Provide a brief description of the 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 each emergency, including periods such as offshift, holidays, weekends, and extended outages when normal operations are not being conducted. Use organization charts and tables when appropriate.

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 what emergency responsibilities, if any, cannot be delegated by the person in overall charge of emergency response. Indicate which individuals, if any, 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 accountability
- Rescue operations
- First aid
- Communications
- Radiological survey onsite and offsite and assessment
- Decontamination of personnel
- Facility security and access control
- Facility repair and damage control
- Facility decontamination
- Post-event assessment
- Recordkeeping
- Media contact

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 emergency response 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;
- What rumor control arrangements 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 and State departments of health, environmental protection, and emergency or disaster control. 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.

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, corrective 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 vapor releases of uranium hexafluoride
- Automatic shutoff of process or ventilation flows
- Storage in fire-resistant containers
- Use of fire-resistant building materials.

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 unshielded or released by abnormal conditions. Onsite protective actions should be described and should include isolation and area access control and 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.

5.5 Exposure Control in Radiological Emergencies

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

5.5.1 Emergency Radiation Exposure Control Program

5.5.1.1 Radiation Protection Program. Describe an 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 decision making 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:

- Removal of 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 the need for personnel decontamination. Describe the means for radiological decontamination of 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.

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 and radioactive materials. The description should include their 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, the licensee should request NRC to provide physicians 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 location or 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.

6.2.2 Offsite Communications

Identify a backup means for offsite communications, other than commercial telephone, for notification of emergencies or requests for assistance.

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. 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 during exercises 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 exercise results.

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 parti-

cipants 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. In order to better ensure that it can adequately test the licensees' emergency response capabilities, the NRC should be provided with a copy of the scenario one to two months in advance.

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 to annually 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 Verification of Emergency Telephone Numbers

Ensure that emergency telephone numbers will be verified at least quarterly.

7.8 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 contingency, 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
- 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 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.

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 a severe loss of control (factor of 100 over normal levels).

Conditions that Initiate a Site Area Emergency

1. Fire onsite that involves radioactive material or compromises safety systems.
2. Severe natural phenomenon that compromises safety systems or the integrity of radioactive material (e.g., earthquake, flood, tsunami, hurricane, tidal surge, hurricane force winds, tornado striking facility).
3. Other severe incidents that compromise safety systems or the integrity of radioactive material -- aircraft crash into the facility, known damage to 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).

Conditions that Initiate an Alert

5. Ongoing security compromise (greater than 15 minutes).
6. Spent reactor fuel accident with release of radioactivity to containment or fuel-handling building.
7. Other conditions that warrant precautionary activation of the licensee's emergency response organization.

Conditions that Initiate a Site Area Emergency

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. Other conditions that warrant activation of offsite emergency response organizations or precautionary notification of the public near the site.

DRAFT VALUE/IMPACT STATEMENT

1. PROPOSED ACTION

1.1 Description

The proposed action is to issue a regulatory guide, "Standard Format and Content for Emergency Plans for Fuel-Cycle and Materials Facilities," for comment. This regulatory guide would provide guidance on the Commission's regulations on emergency preparedness for fuel cycle and material licensees. On June 3, 1981, the Commission published in the Federal Register (46 FR 29712) an advance notice of proposed rulemaking on emergency preparedness for certain fuel cycle and other radioactive material licensees. On April 20, 1987, a notice of proposed rulemaking was published in the Federal Register (52 FR 12921) that discussed the comments on the advance notice in more detail. The final rule was published in the Federal Register (54 FR 14051) on April 7, 1989. One reason for publishing the rule was to establish a basis for fuel cycle and other materials licensees to develop and maintain emergency plans in order to protect the public health and safety if an accident occurs.

1.2 Need for Proposed Action

During the Commission's deliberations concerning nuclear power plant emergency preparedness after the Three Mile Island accident, the Commission directed the staff to evaluate the need to change the emergency preparedness regulations for fuel cycle and other radioactive material licensees. In 1980, the staff evaluated the emergency plans for fuel fabrication plants for radioactive releases and found many apparent weaknesses. Final regulations were published in 1989 that required emergency planning at some fuel cycle and material licensee facilities. NUREG-0762, Draft Revision 1, "Standard Format and Content for Emergency Plans for Fuel-Cycle and Materials Facilities" (Ref. 1), was issued for comment in November 1987 in connection with the proposed rule. This regulatory guide would provide guidance on the final regulations on emergency preparedness.

1.3 Value/Impact

1.3.1 NRC

A regulatory guide will set forth the information needed by the staff for the review and approval of emergency plans for fuel cycle and other radioactive material licensees. This would ensure more complete and efficient review and would be helpful to the NRC staff in their contacts with the licensees.

1.3.2 Other Government Agencies

The guidance is applicable to any government agency submitting an application for a license under Parts 30, 40, or 70. The value/impact for government agencies would be similar to that for industry.

1.3.3 Industry

This guidance is useful to industry in that it facilitates the preparation of emergency plans. It ensures the submittal of more complete information, which will expedite review and approval of the emergency plan.

1.3.4 Public

Publication of this guide will improve the health and safety of the public by aiding in the development and use of emergency preparedness plans for certain fuel cycle and materials licensees possessing large quantities of radioactive material.

2. TECHNICAL APPROACH

After reviewing the lengthy reports of lessons learned from the Three Mile Island reactor accident for generic issues applicable to fuel cycle and other materials licensees, the staff began a detailed regulatory analysis of potential accidents at these licensees. NUREG-1140, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Materials Licensees" (Ref. 2), provided the results of the staff's analysis of 15 types of licensees. The staff also reviewed lessons learned from actual accidents. NUREG-1198, "Release of UF₆ from a Ruptured Model 48Y Cylinder at Sequoyah Fuels Corporation Facility:

Lessons-Learned Report" (Ref. 3), provides information on an actual occurrence of what NUREG-1140 concluded was the most potentially hazardous accident. Experience gained from observing and participating in licensee field exercises since 1980 has also been used in preparing this regulatory guide.

3. PROCEDURAL APPROACH

The proposed action is to issue a regulatory guide on the standard format and content of emergency preparedness plans. No other procedure is considered appropriate. While NUREGs are used to provide information, a regulatory guide is the appropriate method to provide guidance on acceptable methods of implementing the Commission's regulations.

4. NRC AUTHORITY

Authority for this proposed action is derived from the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, and is implemented through the Commission's Regulations in Title 10 of the Code of Federal Regulations as cited in the introduction to this guide.

4.1 Need for NEPA Assessment

Issuance or amendment of guides for the implementation of regulations in Title 10, Chapter I, of the Code of Federal Regulations is a categorical exclusion under paragraph 51.22(c)(16) of 10 CFR Part 51 and also under 10 CFR 51.13. Thus, an environmental impact statement or assessment is not required for this action.

5. RELATIONSHIP TO OTHER EXISTING OR PROPOSED REGULATIONS OR POLICIES

NUREG-0810, "Standard Review Plan for the Review of Radiological Contingency Plans for Fuel Cycle and Materials Facilities" (Ref. 4), provides background information on this topic. On April 7, 1989, the Commission published revisions to 10 CFR Parts 30, 40, and 70 (54 FR 14059), (54 FR 14061), and (54 FR 14062) respectively. A regulatory guide would provide guidance on the requirements of these rules.

6. SUMMARY AND CONCLUSIONS

A regulatory guide to provide guidance on emergency preparedness plans for fuel cycle and other radioactive material licensees should be prepared.

7. 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. U.S. Nuclear Regulatory Commission, "Release of UF_6 from a Ruptured Model 48Y Cylinder at Sequoyah Fuels Corporation Facility: Lessons Learned Report," NUREG-1198, June 1986.
4. U.S. Nuclear Regulatory Commission, "Standard Review Plan for the Review of Radiological Contingency Plans for Fuel Cycle and Materials Facilities," NUREG-0810, July 1981.

THIS DOCUMENT WAS PRINTED USING RECYCLED PAPER.

**UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555**

**OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300**

**FIRST CLASS MAIL
POSTAGE & FEES PAID
USNRC**

PERMIT No. G-67