

NUCLEAR REGULATORY COMMISSION

[10 CFR Part 50 and
10 CFR Part 50, Appendix E]

EMERGENCY PLANNING

AGENCY: U.S. Nuclear Regulatory Commission

ACTION: Proposed Rule Changes

SUMMARY: The Nuclear Regulatory Commission is proposing to amend its regulations in order to provide an interim upgrade of NRC emergency planning regulations as well as to specifically:

- a. Require, that an applicant's emergency plans, including State and local governmental emergency response plans, be submitted to and concurred in by the NRC as a condition of operating license issuance. Additionally:
 1. An operating plant may be required to cease operation or reduce power levels if a State or local emergency response plan has not received NRC concurrence within 180 days of the effective date of the final amendments.
 2. An operating plant may be required to cease operation or reduce power levels if a State or local emergency response plan does not warrant continued NRC concurrence and the State or locality does not correct the deficiencies within 4 months of notification of NRC concurrence withdrawal.
- b. Require that emergency planning considerations be extended to Emergency Planning Zones.

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- c. Require that applicants' and licensees' detailed emergency planning implementing procedures be submitted for NRC review.

DATES: Comments should be submitted on or before (45 days after publication).

ADDRESSES: Interested persons are invited to submit written comments and suggestions on the proposed rule changes and/or the supporting value/impact analysis to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch. Single copies of the value/impact analysis may be obtained on request from Mr. I. C. Roberts, 301-443-5985. Copies of the value/impact analysis and of comments received by the Commission may be examined in the Commission's Public Document Room at 1717 H Street, NW., Washington, D.C.

FOR FURTHER INFORMATION CONTACT: Mr. I. C. Roberts, Assistant Director for Siting Standards, Office of Standards Development, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 (phone: 301-443-5981)

SUPPLEMENTARY INFORMATION: By memorandum dated July 31, 1979, the Commission requested that the NRC staff undertake expedited rulemaking on the subject of State and local emergency response plans and those of licensees. The rulemaking described in this notice responds to that request. Time constraints have precluded the careful review and consideration normally given to proposed rulemaking actions of comparable significance. Consequently, considerations related to the workability of the proposed rule changes may have been overlooked and significant impacts to NRC, applicants, licensees, and State and local governments may not have been

uncovered. Therefore, the NRC seeks comments particularly addressed to these points and intends to hold a workshop during the public comment period (to be announced) to (a) present the proposed rule changes to State and local governments, utilities, and other interested parties and (b) to obtain comments, for inclusion in the public record, concerning the costs, impacts, and practicality of the proposed rule changes. The NRC believes it is likely, as a result of expected public comment, that significant changes may have to be made in the rule as proposed.

The Nuclear Regulatory Commission is considering the adoption of amendments to its regulation, "Domestic Licensing of Production and Utilization Facilities," 10 CFR Part 50, that would require that emergency response planning considerations be extended to Emergency Planning Zones (discussed in NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants") the amendments also require, as a condition of operating license issuance, that State and local governmental emergency response plans be submitted to and concurred in by the NRC. The proposed rule changes would also require a determination on continued operations of plants where relevant State and local emergency response plans have not received NRC concurrence. In addition, the Nuclear Regulatory Commission is considering revising 10 CFR Part 50, Appendix E, "Emergency Plans for Production and Utilization Facilities," in order to clarify, expand, and upgrade the Commission's emergency planning regulations.

The NRC presently requires that power reactor licensees and applicants plan for radiological emergencies within their plant sites and make

arrangements with State and local organizations to respond to accidents that might have consequences beyond the site boundary. In this way, offsite emergency response planning has been related to the nuclear licensing process.

To aid State and local governments in the development and implementation of adequate emergency response plans, the NRC, in conjunction with several other Federal agencies, has attempted, on a cooperative and voluntary basis, to provide for training and instruction of State and local government personnel and to establish criteria to guide the preparation of emergency response plans. However, in the past, the NRC has not made NRC concurrence in State and local emergency response plans a condition of operating license issuance; the proposed rule changes would do so. They would also require a determination on continued operation of plants where relevant State and local emergency response plans have not received NRC concurrence.

The accident at Three Mile Island has raised a number of questions about the adequacy of radiological emergency response plans. Even before the accident the GAO had recommended that "NRC not license new power plants for operation unless offsite emergency plans have been concurred in by the NRC" (Report to the Congress by the Comptroller General, "Areas Around Nuclear Facilities Should Be Better Prepared For Radiological Emergencies," EMD-78-110, March 30, 1979). The proposed rule changes adhere to that recommendation. The Commission is also proposing to incorporate in its regulations the concept of the Emergency Planning Zone which is based on a joint NRC/EPA Task Force Report, "Planning Basis for Development of State

and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," NUREG-0396/EPA 520/1-78-016, December 1978.

Furthermore, Congress has voiced its concern about the problems associated with the emergency preparedness area in the Senate Bill S.562 as well as in the House Report No. 96-413 titled, "Emergency Planning Around U.S. Nuclear Powerplants; Nuclear Regulatory Commission Oversight." The Commission's proposed rule changes address many of the concerns mentioned in these Congressional documents.

Advance Notice of Rulemaking

On July 17, 1979, the Commission published an Advance Notice of Proposed Rulemaking (44 FR 41483) on the subject of State and local emergency response plans and those of licensees. The Commission directed that an emergency planning rulemaking be considered a matter of high priority and that the rulemaking procedure be completed expeditiously.

To date, approximately 90 comment letters have been received from the public in response to the Advance Notice of Proposed Rulemaking. A NUREG containing analyses of these comments will be published shortly. The Commission is now publishing for public comment the proposed rule changes in the Federal Register. We consider that the proposed rule changes meet many of the concerns discussed in the above mentioned reports and publications. However, the Commission notes that the proposed rule changes are considered as an interim upgrade of NRC emergency planning regulations and, in essence, clarify and expand areas that have been perceived to be deficient as a result of past experiences. These

proposed rule changes are deemed interim because the Commission anticipates that further changes in the emergency planning regulations may be proposed as more experience is gained with implementing these revised regulations. Also, changes may be proposed as the various Three Mile Island investigations are concluded and the results become available for efforts in such areas as instrumentation and monitoring and generic studies of accident models.

The action taken by publication of the proposed rule changes in the Federal Register supersedes and thus eliminates the need to continue development of the proposed rule change to 10 CFR Part 50, Appendix E (43 FR 37473), published on August 23, 1978, regarding Emergency Planning considerations outside the Low Population Zone (LPZ).

In cases where a construction permit has already been issued, the emergency plans will be reviewed at the operating license stage. The Commission regards dealing with this matter at the operating license stage, as opposed to reopening construction permit reviews, to be appropriate.

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, and section 553 of title 5 of the United States Code, notice is hereby given that adoption of the following amendments to 10 CFR Part 50 and Appendix E to 10 CFR Part 50 is contemplated.

Copies of comments received on the proposed amendment may be examined in the Commission's Public Document Room at 1717 H Street, NW., Washington, D.C.

DISCUSSION OF MAJOR PROPOSED CHANGES TO THE
EMERGENCY PLANNING REGULATION

1. Major Proposed Change - That an applicant's emergency plans, including State and local governmental emergency response plans, be submitted to and concurred in by the NRC as a condition of operating license issuance.

Additionally:

- a. An operating plant may be required to cease operation or reduce power levels if a State or local emergency response plan has not received NRC concurrence within 180 days of the effective date of the final amendments.

- b. An operating plant may be required to cease operation or reduce power levels if a State or local emergency response plan does not warrant continued NRC concurrence and the State or locality does not correct the deficiencies within 4 months of notification of NRC concurrence withdrawal.

Discussion:

In carrying out its mandate to protect the public health and safety, the NRC has, to date, focused its primary attention on the site characteristics and design features of nuclear facilities which are proposed by license applicants. Our licensing process has been structured accordingly, with

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a view toward ensuring substantial conservatisms in the design and operational safety margins of nuclear power plants. In addition to ensuring that the proposed facility site and design meet our licensing standards and criteria, we review the applicant's emergency plans, which are designed to provide an additional margin of protection for the public living in the vicinity of the facility.

The NRC's licensing requirements related to an applicant's emergency plans are set forth in Appendix E to 10 CFR Part 50, "Emergency Plans for Production and Utilization Facilities," and in Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants." In addition to establishing plans and procedures for coping with emergencies within the boundary of the nuclear power plant site, applicants are required to make certain emergency readiness arrangements with State and local organizations to cope with plant-related emergencies outside the site boundary, with particular emphasis on the low population zone. In this context, we have regarded offsite emergency response plans to be related to the nuclear licensing process.

The NRC, with the cooperation of several other Federal agencies, has had some success in assisting State and local governments in the preparation and evaluation of their radiological emergency response plans and in other activities to improve State and local preparedness efforts. This activity does not rest on any specific statutory authority, however, and has been accomplished on a cooperative and voluntary basis. Such plans are desirable since they do provide an added assurance to the State and local officials

and to the general public in the vicinity of nuclear power plants that appropriate protective measures are available in the event of an accident with offsite consequences.

NRC has formulated basic guidance documents to assist State and local governments to improve their capabilities to respond to the offsite effects of a nuclear power plant radiological accident. However, until now, we have not considered it necessary to require that State and local radiological emergency response plans contain all the Commission's essential planning elements as a condition precedent to issuing a nuclear power plant operating license.

The GAO has recommended that the NRC should not license additional nuclear power plants for operation unless the associated State and local emergency response plans have been concurred in by the NRC.

On the other hand, one must consider that a State that has an NRC "concurred-in" emergency response plan does not in itself necessarily provide any more "...reasonable assurance that appropriate measures can and will be taken in the event of an emergency to protect the public health and safety..." than now exists as a result of our current licensing and inspection process. The concurrence function, in fact, only indicates that a State has adequately addressed in its emergency plans the "essential elements" in NUREG 75/111. This was brought up in the hearing on May 14, 1979, before the Subcommittee on Environment, Energy and Natural Resources, when Chairman Moffett asked what it really meant to have an NRC concurrence.

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Does it indicate that a plan is a good one? Or are we just creating an "illusion of protection"? That was a phrase used by Mr. Moffett several times--an "illusion of protection." Mr. Moffett noted that three counties surrounding Indian Point did not have emergency plans for dealing with a nuclear accident despite an NRC concurred-in State plan. He asked how a State plan can be considered adequate if it does not include local government involvement. He noted that the GAO will be investigating what it means to have an NRC concurred-in plan and just how adequate such a plan might be for responding to an actual emergency.

The staff has also looked at the history of past evacuations and notes that evacuation of people is a common occurrence (about one per week) in our society. These evacuations, many times, occurred without plans or drills, some of which are noted below:

On January 19, 1973, 3,000 out of an overall population of 3,300 people were evacuated from Morgan City, Louisiana, in 4 hours. On June 2, 1972, 8,700 out of an overall population of 9,000 people were evacuated from Rapid City, North Dakota, in 1 hour; and in 1971, 80,000 out of an overall population of 81,000 people were evacuated from an area in Los Angeles in 6 hours. The first two of these evacuations were conducted with the use of existent evacuation plans. The Los Angeles evacuation was performed due to an impending collapse of a dam and without the benefit of an evacuation plan.*

*Source: EPA-520/6-74-002, "Evacuation Risks - An Evaluation."

Nonetheless, since Three Mile Island, our current way of doing business has raised a number of questions about the requirements for and the adequacy of NRC's, licensees', and State and local governmental emergency response plans.

Several arguments can be offered in support of changing the regulations to require, as a condition of operating license issuance, that an application include State and local emergency response plans concurred in by NRC and that the Commission determine whether to allow continued operation of plants where relevant State or local plans have not received NRC concurrence or such concurrence has been withdrawn. The following are supportive arguments:

- o The linkage between licensee and offsite organization emergency response plans and preparedness for response to radiological emergencies is formalized.
- o There is a growing sentiment in the Congress to legislate NRC concurrence.
- o There would be an increased recognition of the importance of offsite consequences of accidents at nuclear power plants.

The following are arguments for not supporting the recommendation:

- o State and local authorities could thwart licensing process (and shut down facilities) by refusing to develop emergency plans, particularly

those in States which have no nuclear power plants within their borders, but are adjacent to States having such facilities.

- o Commission and staff have not sufficiently evaluated the implementation of the proposal to know enough of the implications and ramifications that are necessary for a knowledgeable decision. That is the operational feasibility and practicability of the regulation have not been determined.
 - o The present voluntary procedure of dealing with the States is working reasonably well and is producing acceptable results. States have shown increased and renewed interest in plan preparation and NRC concurrence since TMI.
 - o NRC staff requirements would increase because of the need for formalizing regulatory procedures to implement this proposal.
 - o Further delays in licensing of plants could result.
 - o Greater strain will be placed on State and local governments to meet the more formal, and perhaps more stringent, requirements that would result if proposed change is adopted.
2. Major Proposed Change - That applicants' and licensees' emergency preparedness implementation procedures be submitted to NRC for review.

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Discussion:

In the past, the staff has not found it necessary to have detailed implementation information submitted for review along with the emergency response plans provided in the FSAR. These details have been kept onsite where specific items such as phone numbers and personnel assignments can be promptly modified to reflect various minor day-to-day changes. This detail can be provided to the staff (or in a hearing, if relevant) if there should be some serious question as to whether the applicant can actually carry out the plans set forth in the FSAR.

The implementing procedures maintained onsite are reviewed customarily by the Office of Inspection and Enforcement (IE) to determine whether they are consistent with the plans set forth in the FSAR. Prior to issuing an operating license and annually thereafter for the life of the plant, the NRC inspection program looks into the adequacy of the details of the emergency response plan and the implementing procedures. Assurance is provided through these inspections that the commitments made in the emergency response plan are, in fact, met, and reasonable assurance is obtained that appropriate measures can and will be taken in the event of an emergency. The inspection program includes verification that implementing procedures have been developed, and representative procedures are reviewed by NRC personnel, at this time. Furthermore, the NRC inspection program verifies by observation and review of records that the implementing procedures are tested and evaluated for adequacy when actually used.

The staff believes that effective review is provided by IE inspectors who are familiar with the individual site specifics. Accordingly, the staff recommends that the implementing procedures be submitted to the appro-

priate IE Regional Office for review. This submittal should occur at least 180 days prior to operating license issuance. For licensees holding operating licenses, this submittal should occur within 30 days of the effective date of the final amendments. The staff does not believe that the amendments should require approval as a condition of operating license issuance or continuance since other site-specific implementing procedures (e.g., in operations, radiological protection, safeguards) are not subject to approval as a condition of license issuance or continuance.

Arguments in favor of the staff's recommendations include:

1. No added burden and effort for the NRC staff.
2. No added burden and effort for licensees or State and local agencies.
3. No added burden for the Office of Inspection and Enforcement; they will continue to review the licensee's detailed implementing procedures.

The argument against the review-only requirement is that it does not provide the NRC staff an opportunity to approve an applicant's or licensee's detailed implementing procedures as part of the licensing process.

Arguments against an approval requirement, in addition to review, include:

1. An added burden and effort for licensees.

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2. A substantial added burden and effort for the NRC staff.
 3. Additional Commission and staff evaluation of the implementation of the proposal to know enough of the implications and ramifications that are necessary for a knowledgeable decision.
3. Major Proposed Change - That emergency planning considerations be extended to Emergency Planning Zones.

Discussion:

In December 1978, the Joint NRC/EPA Task Force on Emergency Planning issued its report, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants" (NUREG-0396/EPA 520/1-78-016). The report provides a basis for Federal, State and local government emergency preparedness organizations to determine the appropriate degree of emergency response planning efforts in the environs of nuclear power plants.

The report introduces the concept of Emergency Planning Zones as a basis for the planning of response actions that would result in radiological dose savings in the environs of nuclear facilities in the event of a serious power reactor accident. Application of the Task Force guidance should result in the development of more uniform emergency plans from site to site. The Emergency Planning Zone concept provides a needed framework within which existing planning elements can be developed for

State and local governmental authorities as well as applicants and licenses. The concepts of Emergency Planning Zones have received wide acceptance and a number of States have indicated that the planning basis is already being used in their current emergency preparedness efforts.

The Task Force concluded that both the design basis accidents and less severe core-melt accidents should be considered when selecting a basis for planning predetermined protective actions and that certain features of the more severe core-melt accidents should be considered in planning to ensure that some capability exists to reduce the consequences of even the most severe accidents.

The staff believes that our emergency planning regulations should take into consideration the principal characteristics of a spectrum of design basis and core-melt accidents (such as nuclides released and distances likely to be involved). This need for a capability to accommodate emergency situations beyond the design basis accidents used in plant and site evaluation makes emergency planning zones in the emergency planning regulation appropriate. However, the staff recommends that judgement should be used in determining the distance and configuration based upon considerations of local conditions such as demography, topography, land characteristics, access routes, and local jurisdictional boundaries. The staff concludes that the recommended Emergency Planning Zones (EPZs) will include those areas which could require immediate protective actions for the releases of radioactive material from design basis accidents used in the safety evaluation of nuclear reactors as well as from some core-melt

accidents. The distances recommended in NUREG-0396 are large enough to provide a flexible response base that could support actions outside the planning zones should this ever be needed.

In developing perspectives on the extent to which the consequences of core-melt accidents would be encompassed by the various planning areas, the task force used part of the methodology developed from the Reactor Safety Study (WASH-1400) to illustrate the likelihood of dose levels at various distances from a reactor site which could result from a spectrum of core-melt scenarios. The task force properly noted the uncertainties in the probabilities and consequence models and did not rely solely on the Reactor Safety Study in reaching its conclusions. The staff regards this use of the Reactor Safety Study as warranted and appropriate, taking into account the report of the Risk Assessment Review Group and the Commission policy statement on this subject.

Therefore, the staff recommends that the Commission approve publication of the enclosed proposed rule changes in the Federal Register which will promulgate this major change to our emergency planning regulations.

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BASIS FOR EMERGENCY ACTION LEVELS FOR NUCLEAR POWER FACILITIES

This document is provided for interim use during the initial phases of the NRC effort to promptly improve emergency preparedness at operating nuclear power plants. Changes to the document can be expected as experience is gained in its use and public comments are received. Further, the Commission has initiated a rulemaking procedure, now scheduled for completion in January 1980 in the area of Emergency Planning and Preparedness. Additional requirements are to be expected when rulemaking is completed and some modifications to this document may be necessary.

Four classes of Emergency Action Levels are established which replace the classes in Regulatory Guide 1.101, each with associated examples of initiating conditions. The classes are:

Notification of Unusual Event

Alert

Site Emergency

General Emergency

The rationale for the notification and alert classes is to provide early and prompt notification of minor events which could lead to more serious consequences given operator error or equipment failure or which might be indicative of more serious conditions which are not yet fully realized. A gradation is provided to assure fuller response preparations for more serious indicators. The site emergency class reflects conditions where some significant releases are likely or are occurring but where a core melt situation is not indicated based on current information. In this situation full mobilization of emergency personnel in the near site environs is indicated as well as dispatch of monitoring teams and associated communications. The general emergency class involves actual or imminent substantial core degradation or melting with the potential for loss of containment. The immediate action for this class is sheltering (staying inside) rather than evacuation until an assessment can be made that (1) an evacuation is indicated and (2) an evacuation, if indicated, can be completed prior to significant release and transport of radioactive material to the affected areas.

The example initiating conditions listed after the immediate actions for each class are to form the basis for establishment by each licensee of the specific plant instrumentation readings which, if exceeded, will initiate the emergency class.

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Some background information on release potential and expected frequencies for the various classes is provided in this material. Note that there is a wide band of uncertainty associated with the frequency estimates. The release potential given reflects the amount that could be released over a long time period or under favorable meteorological conditions without exceeding the exposure criteria of a more severe class. Release of these amounts in a short time period under unfavorable meteorological dispersion conditions might trigger the criteria of a more severe class.

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<u>Class</u>	<u>Licensee Actions</u>	<u>State and/or Local Offsite Authority Actions</u>
Notification of unusual event	<ol style="list-style-type: none"> 1. Promptly inform State and local off-site authorities of nature of unusual condition as soon as discovered 2. Augment on-shift resources 3. Assess and respond 4. Close out with verbal summary to offsite authorities; followed by written summary within 24 hours 	<ol style="list-style-type: none"> 1. Provide fire or security assistance if requested 2. Standby until verbal closeout <p style="text-align: center;"><u>or</u></p> <ol style="list-style-type: none"> 3. Escalate to a more severe class
<u>Class Description</u>	<p style="text-align: center;"><u>or</u></p> <ol style="list-style-type: none"> 5. Escalate to a more severe class 	
Unusual events are in process or have occurred which indicate a potential degradation of the level of safety of the plant.		
<u>Purpose</u>		
Purpose of offsite notification is to (1) assure that the first step in any response later found to be necessary has been carried out, (2) provide current information on unusual events, and (3) provide a periodic unscheduled test of the offsite communication link.		
<u>Release Potential</u>		
No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.		
<u>Expected Frequency</u>		
Once or twice per year per unit.		

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EXAMPLE INITIATING CONDITIONS: NOTIFICATION OF UNUSUAL EVENT

1. ECCS initiated
2. Radiological effluent technical specification limits exceeded
3. Fuel damage indication. Examples:
 - a. High offgas at BWR air ejector monitor (greater than 500,000 uci/sec; corresponding to 16 isotopes decayed to 30 minutes; or an increase of 100,000 uci/sec within a 30 minute time period)
 - b. High coolant activity sample (e.g., exceeding coolant technical specifications for iodine spike)
 - c. Failed fuel monitor (PWR) indicates increase greater than 0.1% equivalent fuel failures within 30 minutes.
4. Abnormal coolant temperature and/or pressure or abnormal fuel temperatures
5. Exceeding either primary/secondary leak rate technical specification or primary system leak rate technical specification
6. Failure of a safety or relief valve to close
7. Loss of offsite power or loss of onsite AC power capability
8. Loss of containment integrity requiring shutdown by technical specifications
9. Loss of engineered safety feature or fire protection system function requiring shutdown by technical specifications (e.g., because of malfunction, personnel error or procedural inadequacy)
10. Fire lasting more than 10 minutes
11. Indications or alarms on process or effluent parameters not functional in control room to an extent requiring plant shutdown or other significant loss of assessment or communication capability (e.g., plant computer, all meteorological instrumentation)
12. Security threat or attempted entry or attempted sabotage
13. Natural phenomenon being experienced or projected beyond usual levels
 - a. Any earthquake
 - b. 50 year flood or low water, tsunami, hurricane surge, seiche
 - c. Any tornado near site
 - d. Any hurricane

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14. Other hazards being experienced or projected
 - a. Aircraft crash on-site or unusual aircraft activity over facility
 - b. Train derailment on-site
 - c. Near or onsite explosion
 - d. Near or onsite toxic or flammable gas release
 - e. Turbine failure
15. Other plant conditions exist that warrant increased awareness on the part of State and/or local offsite authorities or require plant shutdown under technical specification requirements or involve other than normal controlled shutdown (e.g., cooldown rate exceeding technical specification limits, pipe cracking found during operation)
16. Transportation of contaminated injured individual from site to offsite hospital
17. Rapid depressurization of PWR secondary side.

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<u>Class</u>	<u>Licensee Actions</u>	<u>State and/or Local Offsite Authority Actions</u>
Alert	<ol style="list-style-type: none"> 1. Promptly inform State and/or local authorities of alert status and reason for alert as soon as discovered 2. Augment resources by activating on-site technical support center, on-site operations center and near-site emergency operations center (EOC) 3. Assess and respond 4. Dispatch on-site monitoring teams and associated communications 5. Provide periodic plant status updates to offsite authorities (at least every 15 minutes) 6. Provide periodic meteorological assessments to offsite authorities and, if any releases are occurring, dose estimates for actual releases 7. Close out by verbal summary to offsite authorities followed by written summary within 8 hours 	<ol style="list-style-type: none"> 1. Provide fire or security assistance if requested 2. Augment resources by activating near-site EOC and any other primary response centers 3. Alert to standby status key emergency personnel including monitoring teams and associated communications 4. Provide confirmatory offsite radiation monitoring and ingestion pathway dose projections if actual releases substantially exceed technical specification limits 5. Maintain alert status until verbal closeout <p style="text-align: center;"><u>or</u></p> <ol style="list-style-type: none"> 6. Escalate to a more severe class
<u>Class Description</u>		
Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant.		
<u>Purpose</u>		
Purpose of offsite alert is to (1) assure that emergency personnel are readily available to respond if situation becomes more serious or to perform confirmatory radiation monitoring if required, (2) provide offsite authorities current status information, and (3) provide possible unscheduled tests of response center activation.		
<u>Release Potential</u>		
Limited releases of up to 10 curies of I-131 equivalent or up to 10 ⁴ curies of Xe-133 equivalent.	<u>or</u>	
<u>Expected Frequency</u>	8. Escalate to a more severe class	
Once in 10 to 100 years per unit.		

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EXAMPLE INITIATING CONDITIONS: ALERT

1. Severe loss of fuel cladding
 - a. High offgas at BWR air ejector monitor (greater than 5 ci/sec; corresponding to 16 isotopes decayed 30 minutes)
 - b. Very high coolant activity sample (e.g., 300 uci/cc equivalent of I-131)
 - c. Failed fuel monitor (PWR) indicates increase greater than 1% fuel failures within 30 minutes or 5% total fuel failures.
2. Rapid gross failure of one steam generator tube with loss of offsite power
3. Rapid failure of more than 10 steam generator tubes (e.g., several hundred gpm primary to secondary leak rate)
4. Steam line break with significant (e.g., greater than 10 gpm) primary to secondary leak rate or MSIV malfunction
5. Primary coolant leak rate greater than 50 gpm
6. High radiation levels or high airborne contamination which indicate a severe degradation in the control of radioactive materials (e.g., increase of factor of 1000 in direct radiation readings)
7. Loss of offsite power and loss of all onsite AC power
8. Loss of all onsite DC power
9. Coolant pump seizure leading to fuel failure
10. Loss of functions needed for plant cold shutdown
11. Failure of the reactor protection system to initiate and complete a scram which brings the reactor subcritical
12. Fuel damage accident with release of radioactivity to containment or fuel handling building
13. Fire potentially affecting safety systems
14. All alarms (annunciators) lost
15. Radiological effluents greater than 10 times technical specification instantaneous limits (an instantaneous rate which, if continued over 2 hours, would result in about 1 mr at the site boundary under average meteorological conditions)
16. Ongoing security compromise

17. Severe natural phenomena being experienced or projected
 - a. Earthquake greater than OBE levels
 - b. Flood, low water, tsunami, hurricane surge, seiche near design levels
 - c. Any tornado striking facility
 - d. Hurricane winds near design basis level
18. Other hazards being experienced or projected
 - a. Aircraft crash on facility
 - b. Missile impacts from whatever source on facility
 - c. Known explosion damage to facility affecting plant operation
 - d. Entry into facility environs of toxic or flammable gases
 - e. Turbine failure causing casing penetration
19. Other plant conditions exist that warrant precautionary activation of technical support center and near-site emergency operations center
20. Evacuation of control room anticipated or required with control of shutdown systems established from local stations

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Class

Site Emergency

Class Description

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public.

Purpose

Purpose of the site emergency warning is to (1) assure that response centers are manned, (2) assure that monitoring teams are dispatched, (3) assure that personnel required for evacuation of near-site areas are at duty stations if situation becomes more serious, (4) provide current information for and consultation with offsite authorities and public, and (5) provide possible unscheduled test of response capabilities in U. S.

Release Potential

Releases of up to 1000 ci of I-131 equivalent or up to 10⁶ ci of Xe-133 equivalent.

Expected Frequency

Once in one hundred to once in 5000 years per unit.

Licensee Actions

1. Promptly inform State and/or local off-site authorities of site emergency status and reason for emergency as soon as discovered.
 2. Augment resources by activating on-site technical support center, on-site emergency operations center and near-site emergency operations center (EOC)
 3. Assess and respond
 4. Dispatch on-site and offsite monitoring teams and associated communications
 5. Provide a dedicated individual for plant status updates to offsite authorities and periodic press briefings (perhaps joint with offsite authorities)
 6. Make senior technical and management staff onsite available for consultation with NRC and State on a periodic basis
 7. Provide meteorological and dose estimates to offsite authorities for actual releases via a dedicated individual or automated data transmission
 8. Provide release and dose projections based on available plant condition information and foreseeable contingencies
 9. Close out or recommend reduction in emergency class by briefing of offsite authorities at EOC and by phone followed by written summary within 8 hours
- or
10. Escalate to general emergency class

State and/or Local Offsite Authority Actions

1. Provide any assistance requested
 2. Activate immediate public notification of emergency status and provide public periodic updates
 3. Augment resources by activating near-site EOC and any other primary response centers
 4. Dispatch key emergency personnel including monitoring teams and associated communications
 5. Alert to standby status other emergency personnel (e.g., those needed for evacuation) and dispatch personnel to near-site duty stations
 6. Provide offsite monitoring results to licensee and others and jointly assess them
 7. Continuously assess information from licensee and offsite monitoring with regard to changes to protective actions already initiated for public and mobilizing evacuation resources
 8. Recommend placing milk animals within 2 miles on stored feed and assess need to extend distance
 9. Provide press briefings, perhaps with licensee
 10. Maintain site emergency status until closeout or reduction of emergency class
- or
11. Escalate to general emergency class

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EXAMPLE INITIATING CONDITIONS: SITE EMERGENCY

1. Known loss of coolant accident greater than makeup pump capacity
2. Degraded core with possible loss of coolable geometry (indicators should include instrumentation to detect inadequate core cooling, coolant activity and/or containment radioactivity levels)
3. Rapid failure of more than 10 steam generator tubes with loss of offsite power
4. BWR steam line break outside containment without isolation
5. PWR steam line break with greater than 50 gpm primary to secondary leakage and indication of fuel damage
6. Loss of offsite power and loss of onsite AC power for more than 15 minutes
7. Loss of all vital onsite DC power for more than 15 minutes
8. Loss of functions needed for plant hot shutdown
9. Major damage to spent fuel in containment or fuel handling building (e.g., large object damages fuel or water loss below fuel level)
10. Fire affecting safety systems
11. All alarms (annunciators) lost for more than 15 minutes and plant is not in cold shutdown or plant transient initiated while all alarms lost
12. a. Effluent monitors detect levels corresponding to greater than 50 mr/hr for 1/2 hour or greater than 500 mr/hr W.B. for two minutes (or five times these levels to the thyroid) at the site boundary for adverse meteorology
b. These dose rates are projected based on other plant parameters (e.g., radiation level in containment with leak rate appropriate for existing containment pressure) or are measured in the environs
13. Imminent loss of physical control of the plant
14. Severe natural phenomena being experienced or projected with plant not in cold shutdown
 - a. Earthquake greater than SSE levels
 - b. Flood, low water, tsunami, hurricane surge, seiche greater than design levels or failure of protection of vital equipment at lower levels
 - c. Winds in excess of design levels

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15. Other hazards being experienced or projected with plant not in cold shutdown
 - a. Aircraft crash affecting vital structures by impact or fire
 - b. Severe damage to safe shutdown equipment from missiles or explosion
 - c. Entry of toxic or flammable gases into vital areas
16. Other plant conditions exist that warrant activation of emergency centers and monitoring teams and a precautionary public notification
17. Evacuation of control room and control of shutdown systems not established from local stations in 15 minutes

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<u>Class</u>	<u>Licensee Actions</u>	<u>State and/or Local Offsite Authority Actions</u>
General Emergency		
<u>Class Description</u>		
Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.		
<u>Purpose</u>		
Purpose of the general emergency warning is to (1) initiate pre-determined protective actions for public, (2) provide continuous assessment of information from licensee and offsite measurements, (3) initiate additional measures as indicated by event releases or potential releases, and (4) provide current information for and consultation with offsite authorities and public.		
<u>Release Potential</u>		
Releases of more than 1000 ci of I-131 equivalent or more than 10^6 ci of Xe-133 equivalent.		
<u>Expected Frequency</u>		
Less than once in about 5000 years per unit. Life threatening doses offsite (within 10 miles) once in about 100,000 years per unit.		
	<ol style="list-style-type: none"> 1. Promptly inform State and/or local offsite authorities of general emergency status and reason for emergency as soon as discovered (Parallel notification of State/local) 2. Augment resources by activating on-site technical support center, on-site emergency operations center and near-site emergency operations center (EOC) 3. Assess and respond 4. Dispatch on-site and offsite monitoring teams and associated communications 5. Provide a dedicated individual for plant status updates to offsite authorities and periodic press briefings (perhaps joint with offsite authorities) 6. Make senior technical and management staff onsite available for consultation with NRC and State on a periodic basis. 7. Provide meteorological and dose estimates to offsite authorities for actual releases via a dedicated individual or automated data transmission 8. Provide release and dose projections based on available plant condition information and foreseeable contingencies 9. Close out or recommend reduction of emergency class by briefing of offsite authorities at EOC and by phone followed by written summary within 8 hours 	<ol style="list-style-type: none"> 1. Provide any assistance requested 2. Activate immediate public notification of emergency status and provide public periodic updates 3. Recommend sheltering for 2 mile radius and 5 miles downwind and assess need to extend distances 4. Augment resources by activating near-site EOC and any other primary response centers 5. Dispatch key emergency personnel including monitoring teams and associated communications 6. Dispatch other emergency personnel to duty stations within 5 mile radius and alert all others to standby status 7. Provide offsite monitoring results to licensee and others and jointly assess these 8. Continuously assess information from licensee and offsite monitoring with regard to changes to protective actions already initiated for public and mobilizing evacuation resources 9. Recommend placing milk animals within 10 miles on stored feed and assess need to extend distance 10. Provide press briefings, perhaps with licensee 11. Consider relocation to alternate EOC if actual dose accumulation in near-site EOC exceeds lower bound of EPA PAGs 12. Maintain general emergency status until closeout or reduction of emergency class

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EXAMPLE INITIATING CONDITIONS: GENERAL EMERGENCY

1. a. Effluent monitors detect levels corresponding to 1 rem/hr W.B. or 5 rem/hr thyroid at the site boundary under actual meteorological conditions
- b. These dose rates are projected based on other plant parameters (e.g., radiation levels in containment with leak rate appropriate for existing containment pressure with some confirmation from effluent monitors) or are measured in the environs.

Note: Consider evacuation only within about 2 miles of the site boundary unless these levels are exceeded by a factor of 10 or projected to continue for 10 hours

2. Loss of 2 of 3 fission product barriers with a potential loss of 3rd barrier, (e.g., loss of core geometry and primary coolant boundary and high potential for loss of containment).

Note: Consider 2 mile precautionary evacuation. If more than gap activity released, extend this to 5 miles downwind.

3. Loss of physical control of the facility.

Note: Consider 2 mile precautionary evacuation.

4. Other plant conditions exist, from whatever source, that make release of large amounts of radioactivity in a short time period possible, e.g., any core melt situation. See the specific PWR and BWR sequences.

- Notes:
- a. For sequences where significant releases are not yet taking place and large amounts of fission products are not yet in the containment atmosphere, consider 2 mile precautionary evacuation. Consider 5 mile downwind evacuation (45° to 90° sector) if large amounts of fission products are in the containment atmosphere. Recommend sheltering in other parts of the plume exposure Emergency Planning Zone under this circumstance.
 - b. For sequences where significant releases are not yet taking place and containment failure leading to a direct atmospheric release is likely in the sequence but not imminent and large amounts of fission products in addition to noble gases are in the containment atmosphere, consider precautionary evacuation to 5 miles and 10 mile downwind evacuation (45° to 90° sector).
 - c. For sequences where large amounts of fission products other than noble gases are in the containment atmosphere and containment failure is judged imminent, recommend shelter for those areas where evacuation cannot be completed before transport of activity to that location.

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- d. As release information becomes available adjust these actions in accordance with dose projections, time available to evacuate and estimated evacuation times given current conditions.

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EXAMPLE PWR SEQUENCES

1. Small and large LOCA's with failure of ECCS to perform leading to severe core degradation or melt. Ultimate failure of containment likely for melt sequences. (Several hours available for response)
2. Transient initiated by loss of feedwater and condensate systems (principal heat removal system) followed by failure of emergency feedwater system for extended period. Core melting possible in several hours. Ultimate failure of containment likely if core melts.
3. Transient requiring operation of shutdown systems with failure to scram. Core damage for some designs. Additional failure of core cooling and makeup systems would lead to core melt.
4. Failure of offsite and onsite power along with total loss of emergency feedwater makeup capability for several hours. Would lead to eventual core melt and likely failure of containment.
5. Small LOCA and initially successful ECCS. Subsequent failure of containment heat removal systems over several hours could lead to core melt and likely failure of containment.

NOTE: Most likely containment failure mode is meltthrough with release of gases only for dry containment; quicker and larger releases likely for ice condenser containments for melt sequences or for failure of containment isolation system for any PWR.

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EXAMPLE BWR SEQUENCES

1. Transient (e.g., loss of offsite power) plus failure of requisite core shut down systems (e.g., scram or standby liquid control system). Could lead to core melt in several hours with containment failure likely. More severe consequences if pump trip does not function.
2. Small or large LOCA's with failure of ECCS to perform leading to core melt degradation or melt. Loss of containment integrity may be imminent.
3. Small or large LOCA occurs and containment performance is unsuccessful affecting longer term success of the ECCS. Could lead to core degradation or melt in several hours without containment boundary.
4. Shutdown occurs but requisite decay heat removal systems (e.g., RHR) or non-safety systems heat removal means are rendered unavailable. Core degradation or melt could occur in about ten hours with subsequent containment failure.
5. Any major internal or external events (e.g., fires, earthquakes, etc.) which could cause massive common damage to plant systems resulting in any of the above.

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PLANTS UNDER CONSTRUCTION

1. Palo Verde 1/2/3	50-528, 50-529, 50-530
2. Perry 1/2	50-440, 50-441
3. Cherokee 1/2/3	50-491, 50-492, 50-493
4. Beaver Valley 2	50-412
5. St. Lucie	50-389
6. Vogtle 1/2	50-424, 50-425
7. River Bend	50-458, 50-459
8. Clinton 1/2	50-461, 50-462
9. Forked River	50-363
10. Wolf Creek 1	50-482
11. Jamesport 1/2	50-516, 50-517
12. Nine Mile Point 2	50-410
13. Millstone 3	50-423
14. Bailly 1	50-367
15. Limerick 1/2	50-352, 50-353
16. Hope Creek	50-354, 50-355
17. Marble Hill 1/2	50-546, 50-547
18. Seabrook 1/2	50-443, 50-444
19. Sterling	50-485
20. Hartsville 1/2/3/4	50-518, 50-519, 50-520, 50-521
21. Phipps Bend 1/2	50-553, 50-554
22. Yellow Creek 1/2	50-566, 50-567
23. North Anna 3/4	50-404, 50-405
24. WPPSS 1/3/4/5	50-460, 50-508, 50-513, 50-509
25. Callaway 1/2	50-483, 50-486
26. Harris 1/2/3/4	50-400, 50-401, 50-402, 50-403

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PLANTS UNDER OL REVIEW

1. Farley 2	50-364
2. Byron/Braidwood	50-454, 455, 456, 457
3. LaSalle 1/2	50-373, 374
4. Zion 1/2	50-295, 304
5. Midland 1/2	50-329/330
6. Catawba	50-413, 414
7. McGuire	50-369, 370
8. So. Texas 1/2	50-498, 499
9. Shoreham	50-322
10. Waterford	50-382
11. Grand Gulf 1/2	50-416, 417
12. Diablo Canyon 1/2	50-275, 323
13. Susquehana 1/2	50-387, 388
14. Salem 2	50-311
15. Summer 1	50-395
16. San Onofre 2/3	50-361, 362
17. Bellefonte 1/2	50-438, 439
18. Watts Bar 1/2	50-390, 391
19. Sequoyah 1/2	50-327, 328
20. Comanche Peak 1/2	50-445, 446
21. North Anna 2	50-339
22. WPPSS-2	50-397
23. Fermi 2	50-341
24. Zimmer 1	50-358