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Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors

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ABSTRACT

This document provides a Standard Review Plan to assure that complete and uniform reviews are made of research and test reactor radiological emergency plans.

The report is organized under ten planning standards which correspond to the guidance criteria in American National Standard ANSI/ANS 15.16 - 1982 as endorsed by Revision 1 to Regulatory Guide 2.6. The applicability of the items under each planning standard is indicated by subdivisions of the steady-state thermal power levels at which the reactors are licensed to operate.

Standard emergency classes and example action levels for research and test reactors which should initiate these classes are given in an Appendix.

CONTENTS

STANDARD REVIEW PLAN FOR THE REVIEW AND EVALUATION OF EMERGENCY PLANS FOR RESEARCH AND TEST REACTORS

INTRODUCTION

Safety analyses for research and test reactors are based on the concept of a postulated Design Basis Event (DBE), an event for which the risk to the public health and safety is greater than that from any event that can be mechanistically postulated. The rationale for using the DBE for research and test reactors is to assess the potential effects to the public health and safety and is based on the determination that the offsite doses from the DBE be within the requirements of 10 CFR Parts 20 and 100. Consequently, if the requirements are met for a DBE condition, then the capability of the facility to withstand normal and abnormal operational transients and a broad spectrum of postulated credible accidents without undue risk to the public would also be defined within the DBE.

The postulated radioactive releases from credible accidents associated with the operation of research reactors will not result in offsite radiological doses to the general public exceeding the Protective Action Guides (PAGs) of 1 rem whole body or 5 rem thyroid. Therefore, these facilities would not include the General Emergency class of accidents requiring Federal assistance as part of their emergency plan.

Pursuant to 10 CFR 50.54(q), each licensee who is authorized to possess and/or operate a research or test reactor under a license of the type specified in 10 CFR 50.21(c), shall follow and maintain in effect emergency plans which meet the requirements in Appendix E to 10 CFR Part 50. Appendix E to 10 CFR Part 50, "Emergency Plans for Production and Utilization Facilities," establishes minimum requirements for emergency plans to attain an acceptable state of emergency preparedness and to provide reasonable assurance that protective measures can and will be taken to protect the health and safety of workers and the public.

Regulatory Guide 2.6 (Rev. 1, March 1983) "Emergency Planning for Research and Test Reactors," which is specified by Appendix E as the guidance to be used to determine the acceptability of research and test reactor radiological emergency plans, describes a method acceptable to the NRC staff for complying with the Commission's emergency planning regulations. Revision 1 to Regulatory Guide 2.6 (dated March 1983), endorses American National Standard, ANSI/ANS-15.16-1982, "Emergency Planning for Research Reactors."[1] This Standard identifies the elements of an emergency plan which describes the approach to coping with emergencies and minimizing the consequences of accidents at research and test reactor facilities. The emergency plan shall be implemented by emergency procedures.

[1] American National Standard for Emergency Planning for Research Reactors, ANSI/ANS-15.16-1982, American Nuclear Society, La Grange Park, IL.

This Standard Review Plan (SRP) has been prepared for performing reviews and evaluations for the acceptability of research and test reactor radiological emergency plans. The purpose of the SRP is to assure that uniform evaluations and complete reviews are made of each research or test reactor radiological emergency plan.

The report is organized under ten planning standards which correspond to the guidance criteria in ANSI/ANS-15.16-1982.[2]

Within the research and test reactor community, the licensed thermal power levels range from 0.1 W to 50 MW.[3] The inventory of radionuclides generated in reactor operations and the potential for accidents that result in a degraded core are largely dependent upon power level and operating history. Hence, the applicability of the planning standards to research and test reactors is also based upon power levels. Four ranges of power levels (equal to or less than 100 W, greater than 100 W to less than 100 KW, equal to or greater than 100 kW to equal to or less than 2 MW, and greater than 2 MW) are used in the text. The applicability of the items under each planning standard to reactors in each range is identified by an "X" in the appropriate column of the review sections.

It should be noted that the radiation dose levels of the emergency action levels established for the various emergency classes in Appendix I are slightly different from those specified for power reactors. However, in the judgment of the NRC staff, the radiation dose levels specified are adequate for the credible accidents associated with the operation of research and test reactors, and the specified action levels provide reasonable assurance that appropriate measures associated with the action levels specified can and will be taken, provided appropriate emphasis is also given to developing emergency action levels that relate directly to facility parameters, e.g., pool water levels and area radiation monitors.

Four standard emergency classes are defined in 10 CFR 50 Appendix E. The classes are Notification of Unusual Events, Alert, Site Area Emergency, and General Emergency.

The General Emergency class of accidents is not credible for most research or test reactors as this class is reserved for accidents which could have a significant radiological impact at substantial distances from the reactor. Therefore, most research or test reactors would not include this class as part of their emergency plan.

Acceptable sizes for Emergency Planning Zones (EPZs) are given in Appendix II as a function of authorized steady-state thermal power level. These are consistent with those given in ANSI/ANS-15.16-1982. The EPZ size will be determined on a case-by-case basis for any research or test reactors with power levels greater than 50 MW.

[2]The planning standards are extracted from American National Standard ANSI/ANS-15.16-1982, with permission of the publisher, the American Nuclear Society.

[3]Power level in this document means authorized steady-state thermal power level of the reactor.

CONTENT OF EMERGENCY PLAN

An emergency plan shall be prepared that addresses the necessary provisions for coping with radiological emergencies. Activation of the emergency plan or portions thereof shall be in response to the emergency action levels. In addition to addressing those severe emergencies that will fall within one of the standard emergency classes, the plan also shall discuss the necessary provisions to deal with radiological emergencies of lesser severity that can occur within the operations boundary. The emergency plan should allow for emergency personnel to deviate from actions described in the plan for unusual or unanticipated conditions.

The plan shall consist of the following elements and address, as applicable, the provisions identified for each element.

1.0 INTRODUCTION

PLANNING STANDARD

The plan should briefly introduce the type of reactor, the reactor's purpose, where it is located, and the purposes of the emergency plan. The purpose of the introduction is to provide a general orientation and common understanding about the reactor and the objective of the plan for those members of the reactor organization, the public, and local and federal agencies that will read and study the plan.

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	≥2 MW
1. The emergency plan should include the following:				
a. A description of the reactor including authorized power level.	X	X	X	X
b. A description of the location of the reactor facility including access routes.	X	X	X	X
c. Identification of the owner/operator.	X	X	X	X
d. A definition of the objective of the emergency plan.	X	X	X	X

2.0 DEFINITIONS

PLANNING STANDARD

Terms unique to the reactor facility or that have a special meaning when used in the plan should be defined in the plan.

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
1. The emergency plan should include definitions of words or phrases with meanings specific or unique to the plan or reactor.	X	X	X	X

3.0 ORGANIZATION AND RESPONSIBILITIES

PLANNING STANDARD

The plan should describe the emergency organization that would be activated to cope with radiological emergencies. This includes the onsite emergency organization and any augmentation from offsite groups. Persons or groups that will fill positions in the emergency organization should be identified by their normal everyday title. This organizational description should include as appropriate the following evaluation items.

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
1. The emergency plan should describe the following organizational considerations:[1]				
a. The functions as applicable to emergency planning of Federal, State, and local government agencies and the assistance that they would provide in the event of an emergency.			X	X
b. The reactor's emergency organization, including augmentation of the reactor staff to provide assistance for coping with the emergency situation, recovery from the emergency, and maintaining emergency preparedness.	X	X	X	X
c. The arrangements and agreements, confirmed in writing with local support organizations that would augment and extend the capability of the facility's emergency organization.	X	X	X	X

[1] One or more of these positions may be assigned to the same incumbent.

Evaluation Items	Applicability by Reactor Operating Power Levels: ≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
d. A block diagram that illustrates the interrelationship of the facility emergency organization to the total emergency response effort. Interfaces between reactor and other onsite emergency organization groups and offsite local support organizations and agencies should be specified.	X	X	X	X
e. The capability of the emergency organization to function around-the-clock for a protracted period of time following the initiation of emergencies that have or could have radiological consequences requiring around the clock emergency response.				X
f. The identification by title of the individual in charge of directing emergency operations, including a line of succession, and responsibilities and authorities and those responsibilities which may not be delegated (such as notification and protective action decisions).	X	X	X	X
g. The identification by title of the individual, including a line of succession, and authority and responsibilities for coordinating emergency preparedness planning, updating emergency plans and procedures, and coordinating plans with other applicable organizations.	X	X	X	X
h. The identification by title of the individual, with a line of succession, responsible for relating information about the emergency situation to the news media and the public.			X	X

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
i. The identification by title of the individual, with a line of succession, in charge of radiological assessments including his/her responsibilities and authority for onsite and offsite dose assessments and recommended protective actions.			X	X
j. The identification by title of the individual, who may authorize reentry into the reactor building or portions of the facility that may have been evacuated during the emergency.	X	X	X	X
k. The identification by title of the individual authorized to terminate an emergency and initiate recovery actions and be responsible for informing the emergency organization of planned organizational actions or changes.	X	X	X	X
l. The identification by title of the individual, who may authorize volunteer emergency workers to incur radiation exposures in excess of normal occupational limits.		X	X	X

4.0 EMERGENCY CLASSIFICATION SYSTEM

PLANNING STANDARD

The emergency plan should describe several classes of emergency situations covering the spectrum of emergency conditions that involve the alerting or activating of progressively larger segments of the emergency organization. To provide for improved communications between the licensee, Federal, State and local agencies and organizations, the most severe accidents are standardized in four classes of emergency conditions which group the accidents according to severity of offsite radiological consequences. Each emergency plan should include only those standard classes appropriate for dealing with accident consequences determined to be credible for the specific facility. Most research reactors have potential emergency situations which may occur (e.g., personnel injury with contamination, fire, etc.) that have less severe offsite consequences than the least severe standard class, "Notification of Unusual Events." For some research reactors, no credible accidents are postulated which result in consequence matching the least severe class. However, planning for onsite emergencies is important. Preparedness for the onsite emergencies should be accomplished by identifying them and including in the plan those elements of this standard commensurate with the postulated emergency situations.

Each class of emergency should be associated with particular emergency action levels and with particular immediate actions to provide appropriate graded response. In order of increasing severity, the four standard emergency classes are described in qualitative terms in the following subsections:

4.1 NOTIFICATION OF UNUSUAL EVENTS. Notification of unusal events may be initiated by either man-made events or natural phenomena that can be recognized as creating a significant hazard potential that was previously nonexistent. There is usually time available to take precautionary and corrective steps to prevent the escalation of the accident or to mitigate the consequences should it occur. No releases of radioactive material requiring offsite responses are expected.

One or more elements of the emergency organization are likely to be activated or notified to increase the state of readiness as warranted by the circumstances.

Although the situation may not have caused damage to the reactor, it may warrant an immediate shutdown of the reactor or interruption of nonessential routine functions.

Situations that may lead to this class include: (1) threats to or breaches of security, such as bomb threats or civil disturbances directed toward the reactor; (2) natural phenomena, such as tornados in the immediate vicinity of the reactor, hurricanes, or earthquakes felt in the facility; (3) facility emergencies, such as prolonged fires, fuel damage indicated by high coolant fission product activity, or high offgas activity.

4.2 ALERT. Events leading to an alert would be of such radiological significance as to require notification of the emergency organization and its response as appropriate for the specific emergency situation. Under this class it is unlikely that offsite response or monitoring would be necessary. Substantial modification of reactor operating status is a highly probable corrective action. Protective evacuations or isolation of certain areas within the operations boundary or within the site boundary may be necessary. Situations that may lead to this class include: (1) severe failure of fuel cladding or of fueled experiments where containment boundaries exist to reduce releases or less severe cladding failures in situations where fission products are not well contained, or (2) significant releases of radioactive materials as a result of experiment failures.

4.3 SITE AREA EMERGENCY. A site area emergency may be initiated when events such as major damage of fuel or cladding and actual or imminent failure of other physical barriers containing fission products in reactor fuel or fueled experiments have occurred and projected offsite radiological consequences exceed Appendix I action levels. Monitoring at the site boundary should be conducted to assess the need for offsite protective actions. Protective measures on site may be necessary.

4.4 GENERAL EMERGENCY. A general emergency may be initiated by accidents which result in an uncontrolled release of radioactive material into the air, water, or ground to the extent that protective actions offsite may be necessary. This class of accident is not credible for most research reactors. Therefore, most research reactors would not include this class as part of their emergency plans.

A protective action that may be recommended to offsite authorities may be to shelter the general public within the EPZ. State and local government response organizations have the ultimate responsibility for initiating and implementing any recommended offsite protective actions.

	Applicability by Reactor Operating Power Levels			
Evaluation Items	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
1. The emergency plan should contain:				
a. An emergency classification system consistent with the planning standard.	X	X	X	X
b. In an Appendix to the plan, a listing by title of implementing procedures for each class of emergency.	X	X	X	X

5.0 EMERGENCY ACTION LEVELS

PLANNING STANDARD

Because of the wide diversity in research reactors (power level, engineered safety features, site environment, etc.), those conditions which might initiate or signal a radiological incident having particular offsite consequences will vary widely among facilities. Action levels may be specified for effluent monitors or other plant parameters for which the dose rates and radiological effluent releases at the site boundary can be projected. To establish effluent action levels, facilities that have meteorological information available may base the action levels on actual meteorological conditions; otherwise, the criteria for downwind concentration, Section 4 of ANSI/ANS 15.7-1977, "Research Reactor Site Evaluation," should be used. Each emergency plan should establish emergency action levels appropriate for the specific facility and consistent with Appendix I. The emergency plan should include emergency action levels to initiate protective actions for members of the general public onsite. The protective action guide (PAG) shall be 1 rem whole body or 5 rem thyroid.[5]

	Applicability by Reactor Operating Power Levels			
Evaluation Items	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
1. Each licensee's emergency plan should contain:				
a. Emergency action levels which are appropriate to the specific facility and consistent with Appendix I. To the extent possible specify effluent monitors used to project dose rates and radiological effluent releases at the site boundary.	X	X	X	X

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[5]Manual of protective Action Guides and Protective Actions for Nuclear Incidents, EPA-520/1-75001, Sept. 1975, U.S. Environmental Protection Agency.

6.0 EMERGENCY PLANNING ZONES

PLANNING STANDARD

As part of emergency planning, the reactor owner/operator of a facility that identifies radiological emergencies which result in offsite plume exposures exceeding 1 rem whole body or 5 rem thyroid should identify an emergency planning zone (EPZ). The postulated radioactive release from credible accidents provides the basis for determining the need for an EPZ. The size of the EPZ should be established so that the dose to individuals beyond the EPZ is not projected to exceed the PAG. As an alternative to performing such calculations, the EPZ sizes in Appendix II may be adopted according to the power level.

	Applicability by Reactor Operating Power Levels			
Evaluation Items	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
1. Ensure that the emergency plan identifies the EPZ.	X	X	X	X
2. If the EPZ is not consistent with Appendix II, the plan shall include an acceptable basis for the EPZ.	X	X	X	X

7.0 EMERGENCY RESPONSE

PLANNING STANDARD

Emergency response measures should be identified for each emergency. These response measures should be related to the emergency class and action levels that specify what measures are to be implemented.

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
1. The emergency plan should cover the following notification information for emergency response:				
a. The actions to notify and mobilize the emergency organization and the applicable offsite support organizations for each emergency class.	X	X	X	X
b. The location(s) of current notification lists.	X	X	X	X
c. Describe the contents of initial and followup emergency messages to the NRC and, when applicable, to offsite authorities. To the extent known, these messages should include the following:				
(1) Name, title and telephone number of caller, and the location of the incident and the emergency class.			X	X
(2) Description of emergency event.			X	X
(3) Date and time of incident initiation.			X	X
(4) The type and quantity of radionuclides released or expected to be released.			X	X

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
(5) Impact of releases and recommended offsite emergency actions.				X
d. A method is established to insure that offsite authorities have received the initial message and that it is authentic.			X	X
2. The emergency plan should cover the following assessment considerations:				
a. A description of methods for gathering and processing information for assessment actions.			X	X
3. The emergency plan should provide a summary description of those actions that could be taken to mitigate or correct the problem for each emergency class.	X	X	X	X
4. The emergency plan should describe protective actions appropriate for the emergency class. The emergency plan should include the following:				
a. Conditions for either partial or complete onsite evacuation, evacuation routes, and primary and alternate assembly areas.	X	X	X	X
b. Methods to ensure personnel accountability and the segregation of potentially contaminated personnel.	X	X	X	X
c. Protective measures and exposure guidelines for emergency personnel.	X	X	X	X

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
d. Provisions for isolation and access control of facility areas to minimize exposures to radiation and the spread of radioactive contamination.	X	X	X	X
e. The methods for monitoring radiation dose rates and contamination levels, both onsite and offsite, including provisions for transmitting collected information and data to the element of the emergency organization responsible for accident assessment.	X	X	X	X

8.0 EMERGENCY FACILITIES AND EQUIPMENT

PLANNING STANDARD

The emergency plan should briefly describe the emergency facilities, types of equipment and their location.

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
1. The emergency plan should describe an emergency support center (ESC).	X	X	X	X
2. Representative types of monitoring and sampling equipment to be used for accident assessment and their location. These should include:				
a. Portable and fixed radiological monitors.	X	X	X	X
b. Sampling equipment.	X	X	X	X
c. Instrumentation for specific radionuclide identification and analysis.	X	X	X	X
d. Personnel monitoring equipment.	X	X	X	X
e. The plan should also describe nonradiological monitors or indicators that may provide pertinent information; for example:				
(1) Reactor instrumentation.				X
(2) Fire detectors, earthquake sensors, etc.	X	X	X	X
(3) Source of meteorological data representative of facility location.				X

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
3. The emergency plan should identify those measures that will be used to provide necessary assistance to persons injured or exposed to radiation. The capabilities for decontamination, administering first aid, transporting injured personnel, and arrangements for medical treatment should be described. The following items should be included:				
a. Facilities for personnel decontamination.	X	X	X	X
b. Methods for handling and transporting contaminated injured personnel.	X	X	X	X
c. Written agreements with hospitals to ensure that medical services are available and the staff is prepared to handle radiological emergencies.	X	X	X	X
4. The emergency plan should adequately identify the emergency communications systems that will be available to communicate instructions and information both onsite and offsite throughout the course of an emergency.	X	X	X	X
5. Facilities planning for a site area emergency should establish reliable means of communication, e.g., public telephone and radio, that is compatible with local offsite support groups.				X

9.0 RECOVERY

PLANNING STANDARD

This element of the emergency plan should describe the criteria for restoring the reactor facility to a safe status including reentry into the reactor building or portions of the facility that may have been evacuated because of the accident. The operations to recover from most severe accidents will be complex and depend on the actual conditions at the facility. It is not practicable to plan detailed recovery actions for all conceivable situations.

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
1. The emergency plan should specify:				
a. That recovery procedure(s) will be written and approved as needed.	X	X	X	X

10.0 MAINTAINING EMERGENCY PREPAREDNESS

PLANNING STANDARD

The emergency plan should describe the elements necessary for maintaining an acceptable state of emergency preparedness. A description should be provided of how the effectiveness of the emergency plan will be maintained, including training, review and update of the emergency plan and associated implementing procedures, and maintenance and inventory of equipment and supplies that would be used in emergencies.

	Applicability by Reactor Operating Power Levels			
Evaluation Items	≤100 W	>100 W to <100 kW	≧100 kW to ≤2 MW	>2 MW
1. The emergency plan should describe an initial training and periodic retraining program designed to maintain the ability of emergency response personnel to perform assigned functions for the following:				
a. Personnel responsible for decisionmaking and transmitting emergency information and instructions.	X	X	X	X
b. Personnel responsible for accident assessment.	X	X	X	X
c. Radiological monitoring and analysis teams.	X	X	X	X
d. First aid and rescue personnel.	X	X	X	X
e. Medical support personnel	X	X	X	X
f. Police, security, ambulance and fire fighting personnel.	X	X	X	X
2. The emergency plan should provide for:				

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
a. Annual onsite emergency drills, to be conducted as action drills.[6]	X	X	X	X
b. Provision for critiques of all drills, including timely evaluation of observer comments and correction of identified deficiencies.	X	X	X	X
c. Development of written scenarios for conducting annual action drills.	X	X	X	X
3. The emergency plan should provide for a biennial review and update of the emergency plan and implementing procedures and agreements with offsite support organizations and agencies including:				
a. Reviews and approvals by those responsible for emergency planning.	X	X	X	X
b. Incorporation of modifications resulting from action drills or changes in the facility or environs.	X	X	X	X
c. Timely forwarding of approved amendments to the plan, agreements, and implementing procedures to authorized individuals, agencies and support organizations.	X	X	X	X

[6]An action drill tests the integrated capability of the emergency plan, or a component thereof, and may include instruction periods to develop and maintain skills in a particular operation.

Evaluation Items	Applicability by Reactor Operating Power Levels			
	≤100 W	>100 W to <100 kW	≥100 kW to ≤2 MW	>2 MW
4. The emergency plan should describe the provisions to ensure operational readiness of emergency communications and emergency health physics equipment by including:				
a. Required maintenance and minimum calibration frequency.	X	X	X	X
b. Functional testing including minimum frequency.	X	X	X	X
c. Minimum frequency of inventory for equipment and supplies.	X	X	X	X

APPENDIX I

EMERGENCY CLASSES

Emergency Class	Action Level[1]	Purpose
Notification of Unusual Events	Actual or projected radiological effluents at the site boundary exceeding 10 MPC[2] when averaged over 24 hours, or 15 mrem whole body accumulated in 24 hours Report or observation of severe natural phenomenon Receipt of bomb threat	(1) Ensure that the first step in any response later found to be necessary has been carried out, (2) bring the operating staff to a state of readiness, and (3) provide systematic handling of unusual events information and decision-making
Alert	Actual or projected radiological effluents at the site boundary exceeding 50 MPC[2] when averaged over 24 hours, or 75 mrem whole body accumulated in 24 hours Actual or projected radiation levels at the site boundary of 20 mrem/hr for 1 hour whole body or 100 mrem thyroid dose	(1) Ensure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required, and (2) provide current offsite authorities status information
Site Area Emergency	Actual or projected radiological effluents at site boundary exceeding 250 MPC[2] when averaged over 24 hours, or 375 mrem whole body accumulated in 24 hours Actual or projected radiation levels at the site boundary of 100 mrem/hr for 1 hour whole body or 500 mrem thyroid dose.	(1) Ensure that response centers are manned, (2) ensure that monitoring teams are dispatched, (3) ensure that personnel required for evacuation of onsite areas are at duty stations, (4) provide consultation with offsite authorities and (5) provide information for the public through offsite authorities
General Emergency	Sustained actual or projected radiation levels at the site boundary of 500 mrem/hr whole body. Actual or projected dose at the site boundary in the plume exposure pathway of 1 rem whole body or 5 rem thyroid	(1) Initiate predetermined protective actions for the public, (2) provide continuous assessment of information from licensee and offsite organization measurements, (3) initiate additional measures as indicated by actual or potential releases, (4) provide consultation with offsite authorities, and (5) provide updates for the public through offsite authorities.

[1]The situations that may lead to an emergency class described in the subsections of Section 4.0 may be referenced as emergency actions levels appropriate to the emergency class

[2]Maximum Permissible Concentration (MPC) as listed in Title 10, of the Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation," Appendix B, Table II Column I

APPENDIX II

Alternate Method For Determining The Size of an EMERGENCY PLANNING ZONE[1]

Authorized Power Level	Acceptable EPZ Size
≤2 MW	Operations boundary
>2 MW and ≤10 MW	100 meters
>10 MW and ≤20 MW	400 meters
>20 MW and ≤50 MW	800 Meters
>50 MW	Will be determined on a case-by-case basis

[1]Calculations are based on:
D. Bruce Turner, Work Book of Atmospheric Dispension Estimates, Office of Air Programs. U.S. Environmental Protection Agency, Washington, D.C. (1970)

D. H. Slade, Ed., "Meteorology and Atomic Energy." U.S. Atomic Energy Commission, Washington, D.C. (1968); and

WASH 1400 (NUREG 75/014), "Reactor Safety Study," Appendix VI. U.S. Nuclear Regulatory Commission, Washington, D.C. (1975).

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16 ABSTRACT (200 words or less)

This document provides a Standard Review Plan to assure that complete and uniform reviews are made of research and test reactor radiological emergency plans. The report is organized under ten planning standards which correspond to the guidance criteria in American National Standard ANSI/ANS 15.16 - 1982 as endorsed by Revision 1 to Regulatory Guide.2.6. The applicability of the items under each planning standard is indicated by subdivisions of the steady-state thermal power levels at which the reactors are licensed to operate. Standard emergency classes and example.action levels for research and test reactors which should initiate these classes are given in an Appendix.

The involvement of the Federal Emergency Management Agency (FEMA) concerning emergency response of research and test reactors is not required. However, the NRC will request FEMA assistance in the review process if the NRC staff identifies a facility which postulates a credible accident that.could result in offsite radiological doses to the general public exceeding the Protective Action Guides of 1 rem whole body or 5 rem thyroid.

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