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planning for research reactors

an American National Standard

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American National Standard for Emergency Planning for Research Reactors

Secretariat
American Nuclear Society

Prepared by the
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Working Group ANS-15.16

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Foreword

(This Foreword is not a part of the American National Standard for Emergency Planning for Research Reactors, ANSI/ANS-15.16-1982.)

The American Nuclear Society Standards Secretariat established Subcommittee ANS-15, Operation of Research Reactors, in the fall of 1970 for the purpose of preparing a standard for the operation of research reactors. In January 1972, this charter was expanded to include the multiple task of preparing all standards for research reactors. To implement this enlarged responsibility, a number of subcommittee working groups were established to develop standards for consideration and complementary action by Subcommittee ANS-15. ANS-15.16 is one of these groups.

In August 1980 the U.S. Nuclear Regulatory Commission published new rules for Title 10, "Energy," Code of Federal Regulations, Part 50, "Licensing of Production and Utilization Facilities," Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities".

The changes to the regulations place emphasis on emergency preparedness in regard to notifying offsite authorities and initiating protective actions on the basis of severity of facility damage and potential as well as actual radiological releases that are occurring or have occurred. The regulations also require the identification of a spectrum of radiological emergencies applicable to a reactor facility and the grouping of these emergencies into specified classes of emergencies. They also require that a facility's emergency plan identify emergency action levels which are to be used to initiate the planned emergency responses for each emergency. In addition, the regulations require the determination of the need for establishing an offsite emergency planning zone on a case-by-case basis, and require the identification of predetermined actions for protecting individuals within this zone.

In June 1980, as a result of the substantial changes to the regulations, Working Group ANS-15.16 was assigned the task of revising ANSI/ANS-15.16-1978. The working group currently consists of the following members:

W. J. Brynda, Chairman, *Brookhaven National Laboratory*
D. M. Alger, *University of Missouri*
E. F. Bates, *U. S. Nuclear Regulatory Commission*
W. R. Casey, *Brookhaven National Laboratory*
A. E. Desrosiers, *Battelle Pacific Northwest Laboratories*
R. D. Neff, *Texas A&M University*

This revision of ANSI/ANS-15.16 identifies elements of an emergency plan. It provides criteria and guidance that should be considered in formulating an emergency plan. The standard identifies the emergency classes that should be used to categorize the spectrum of radiological emergencies and provides guidance for establishing the emergency classification system. It provides examples of typical emergency action levels associated with each emergency and guidance for establishing an emergency planning zone.

The applicability of the emergency plan elements presented in this standard will vary from one research reactor facility to another depending upon the potential radiological consequences that result from postulated events. The risk from credible radiological emergency situations at many research reactor facilities is usually minimal and may not require the application of all the emergency plan elements in this standard, or the establishment of an emergency planning zone.

Subcommittee ANS-15, Operation of Research Reactors, of the American Nuclear Society Standards Committee had the following members at the time of its approval of this standard:

W. J. Richards, Chairman, *Argonne National Laboratory-West*
F. T. Binford, *Oak Ridge National Laboratory*
L. C. Brinkerhoff, *U. S. Department of Energy*
W. J. Brynda, *Brookhaven National Laboratory*
A. C. Ellingson, *Sandia National Laboratories*
J. P. Farrar, *University of Virginia*
J. R. Miller, *U. S. Nuclear Regulatory Commission*
R. D. Neff, *Texas A&M*
G. Nelson, *University of Arizona*
P. Nelson, *Rensselaer Polytechnic Institute*
T. M. Raby, *U. S. National Bureau of Standards*
J. D. Randall, *Texas A&M*
T. R. Schmidt, *Sandia National Laboratories*
R. R. Walston, *U. S. Department of Energy*
W. L. Whittemore, *General Atomic Company*

The American National Standards Committee N17, Research Reactors, Reactor Physics, and Radiation Shielding, had the following membership at the time it reviewed and approved this Standard:

R. S. Carter, Chairman
T. M. Raby, Secretary

Organization Represented	*Name of Representative*
American College of Radiology	M. M. Ter Pogossian
American Institute of Chemical Engineers	D. Duffey
American Nuclear Society	R. S. Carter
American Physical Society	W. W. Havens, Jr. H. Goldstein (Alt.)
American Public Health Association	W. A. Holt
American Society of Radiologic Technologists	J. H. Tolan
Health Physics Society	C. A. Willis
Institute of Electrical and Electronics Engineers, Inc. (Nuclear and Plasma Science Society)	E. A. Corte
National Bureau of Standards	T. M. Raby
National Council on Radiation Protection & Measurements	A. B. Chilton
U.S. Department of Energy	P. B. Hemmig J. W. Lewellen (Alt.)
U. S. Nuclear Regulatory Commission	J. R. Miller R. E. Carter (Alt.)
Individual Members	J. E. Olhoeft E. A. Warman W. L. Whittemore

Contents

Emergency Planning for Research Reactors

1. Scope

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 reactor facilities. The emphasis given each of these elements shall be commensurate with the potential risk involved. The emergency plan shall be implemented by emergency procedures.

2. Definitions

emergency. An emergency is a condition that calls for immediate action, beyond the scope of normal operating procedures, to avoid an accident or to mitigate the consequences of one.

emergency action levels. Specific instrument readings, or observations; radiological dose or dose rates; or specific contamination levels of airborne, waterborne, or surface-deposited radioactive materials that may be used as thresholds for establishing emergency classes and initiating appropriate emergency measures.

emergency classes. Emergency classes are classes of accidents grouped by severity level for which predetermined emergency measures should be taken or considered.

emergency plan. An emergency plan is a document that provides the basis for actions to cope with an emergency. It outlines the objectives to be met by the emergency procedures and defines the authority and responsibilities to achieve such objectives.

emergency planning zone (EPZ). Area for which offsite emergency planning is performed to assure that prompt and effective actions can be taken to protect the public in the event of an accident. The EPZ size depends on the distance beyond the site boundary at which the Protective Action Guide (PAG) could be exceeded.

emergency procedures. Emergency procedures are documented instructions that detail the implementation actions and methods required to achieve the objectives of the emergency plan.

offsite. The geographical area that is beyond the site boundary.

onsite. The geographical area that is within the site boundary.

operations boundary. The area within the site boundary such as the reactor building (or the nearest physical personnel barrier in cases where the reactor building is not a principal physical personnel barrier) where the reactor chief administrator has direct authority over all activities. The area within this boundary shall have prearranged evacuation procedures known to personnel frequenting the area.

protective action guides (PAG). Projected radiological dose or dose commitment values to individuals that warrant protective action following a release of radioactive material. Protective actions would be warranted provided the reduction in individual dose expected to be achieved by carrying out the protective action is not offset by excessive risks to individual safety in taking the protective action. The projected dose does not include the dose that has unavoidably occurred prior to the assessment.

research reactor. A device designed to support a self-sustaining neutron chain reaction for research, developmental, educational, training, or experimental purposes, and which may have provisions for production of nonfissile radioisotopes.

site boundary. The site boundary is that boundary, not necessarily having restrictive barriers, surrounding the operations boundary wherein the reactor administrator may directly initiate emergency activities. The area within the site boundary may be frequented by people unacquainted with the reactor operations.

shall, should and may. The word "shall" is used to denote a requirement; the word "should" to denote a recommendation; and the word "may" to denote permission, neither a requirement nor a recommendation.