

# American Nuclear Society

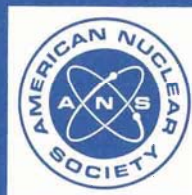
**WITHDRAWN**

December 2, 1987  
ANSI/ANS-15.12-1977

**design objectives for and monitoring of  
systems controlling research reactor effluents**

**an American National Standard**

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**American National Standard  
Design Objectives for and Monitoring of  
Systems Controlling Research Reactor Effluents**

**Secretariat  
American Nuclear Society**

**Prepared by the  
American Nuclear Society  
Standards Committee  
Working Group ANS-15.12**

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## Foreword

(This Foreword is not part of American National Standard Design Objectives for and Monitoring of Systems Controlling Research Reactor Effluents, ANS-15.12-1977).

The ANS Standards Secretariat established Subcommittee ANS-15 in the fall of 1970 with the task of preparing a standard for the operation of research reactors. In January, 1972 this charter was expanded to the multiple tasks of preparing all standards for research reactors. To implement this enlarged responsibility, a number of Subcommittee Working Groups have been established to develop standards for consideration and complementary action by Subcommittee ANS-15.

Working Group ANS-15.9 was formed in June of 1973 to begin development of this proposed Standard. Draft three was sent to approximately 80 research reactor facilities for comment in December, 1973. At the April, 1974 meeting of Subcommittee ANS-15, Working Groups 15.5 and 15.9 were combined and designated Working Group 15.12 which carried on the work. Draft six of this Standard was approved by ANS-15 in the fall of 1974 and was balloted by American National Standards Committee N17 in early 1975.

In preparing this Standard, the intent has been to specify objectives, which, if achieved, will give the following results:

a. The concentration of radioactivity in research reactor effluents, and the resulting doses to persons not occupationally involved, will be a small percentage of the maximums recommended by the National Council on Radiation Protection and Measurements (NCRP). In specifying these objectives, references are made to Title 10, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation," as the most accessible and comprehensive listing of concentrations based on NCRP recommendations.

b. Doses of those not occupationally involved will be a small percentage of natural background.

c. A level of activity in effluents which is as low as reasonably achievable without seriously restricting the operation of existing reactors (if the standard were to be applied to them) or discouraging the development of new research facilities. It is hoped that achievement of these objectives will relieve the majority of research reactor operators from the burden of individual cost benefit analyses, particularly those with minimal resources. It is recognized that the wide variety of reactors to which the description "research reactor" is applied makes it inevitable that some cannot meet the specified objectives, and may at some point be required to perform a cost-benefit analysis. It is believed that, in general, such cases will involve an organization with adequate resources to do the analysis.

The definition of research reactor in the standard is one which is somewhat arbitrary, but which is believed necessary to restrict the range of reactors covered by the standard to manageable proportions. Subcommittee ANS-15 is reexamining the definition of research reactors used in its standards.

In this process of creating standards against the background of established and varied practices in many operating facilities, it is important to consider that:

a. It is not intended that the standard be used as a demand model for backfitting purposes

b. It should be a vital aid for the new owner-agency

c. It should be helpful for the facility undergoing change/modification

d. Its thoughtful use by industry should ease the burden of regulatory agencies.

We affirm, further, that the use of any standard of performance, conduct or excellence is volitional. The decision to use a standard is a management matter, presumably on technical advisement. The institutionalizing of a standard can and almost must be conditional; i.e., high probability exists that some exception or addition will com-

promise the absolute, unconditional application of a document which was composed to cross lines of functional and material discipline.

It is a management function to ameliorate or mitigate conditional matters. It is not the function of a standard to attempt to accommodate the many different management systems. Neither is its function to preempt management prerogatives.

This Standard is promulgated in the context of these considerations, and in the context of a family of related research reactor standards, a Work Group and an actively participating Subcommittee in an atmosphere of direct exchange of ideas across multi-discipline and multi-system boundaries.

This Standard was developed by Working Group ANS-15.12 of the American Nuclear Society Standards Committee which had the participation of the following members during the major portion of the groups activity:

|                                                                    |                                                           |
|--------------------------------------------------------------------|-----------------------------------------------------------|
| George C. Geisler (Director), <i>Pennsylvania State University</i> | Richard Neff, <i>Texas A&amp;M</i>                        |
| Harold W. Berk, <i>University of Virginia</i>                      | Robert Schemel, <i>U.S. Nuclear Regulatory Commission</i> |

The family of standards and task assignments include:

ANS-15.1 (N378): Development of Technical Specifications  
ANS-15.2 (N398): Quality Verification for Plate-Type U-A1 Fuel Elements  
ANS-15.3 (N399): Records and Reports  
ANS-14.5 (N380): Selection and Training of Personnel  
ANS-15.6 (N401): Review of Experiments  
ANS-15.7 (N379): Site Evaluation  
ANS-15.8 (N402): Quality Assurance Program Requirements  
ANS-15.10 (N550): Decommissioning  
ANS-15.11 (N628): Radiological Control  
ANS-15.12 (N647): Design Criteria for Systems Controlling Effluents . . .  
ANS-15.14 (N700): Physical Security  
ANS-15.15 (N701): Core Protective Systems  
ANS-15.16 (N17.2): Emergency Planning

The membership of Subcommittee ANS-15 at the time of their approval of this Standard was:

|                                                                            |                                                              |
|----------------------------------------------------------------------------|--------------------------------------------------------------|
| Don F. Hanlen, Chairman, <i>Brown &amp; Root, Inc.</i>                     | George Geisler, <i>Pennsylvania State University</i>         |
| Mayhue A. Bell, <i>U.S. Energy Research and Development Administration</i> | Pat Kraker, <i>U.S. Geologic Survey</i>                      |
| James R. Bohannon, <i>North Carolina State University</i>                  | J. Lawrence Meem, <i>University of Virginia</i>              |
| Lloyd Bonzon, <i>Sandia Laboratory</i>                                     | Tawfik M. Raby, <i>U.S. National Bureau of Standards</i>     |
| James A. Cox, <i>Oak Ridge National Laboratory</i>                         | Wade J. Richards, <i>Lawrence Livermore Laboratories</i>     |
| Richard Curtis, <i>U.S. Nuclear Regulatory Commission</i>                  | Robert Schemel, <i>U.S. Nuclear Regulatory Commission</i>    |
| Monte V. Davis, <i>Georgia Institute of Technology</i>                     | Robert R. Walston, <i>U.S. Nuclear Regulatory Commission</i> |
| A. C. Ellingson, <i>Sandia Laboratory</i>                                  | William L. Whittemore, <i>Gulf General Atomic</i>            |
| Thomas P. Flood, <i>U.S. Nuclear Regulatory Commission</i>                 |                                                              |

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:

W. L. Whittemore, Chairman  
R. S. Carter, Secretary

| <i>Organization Represented</i>                              | <i>Name of Representative</i> |
|--------------------------------------------------------------|-------------------------------|
| American College of Radiology.....                           | Michel M. TerPogossian        |
| American Institute of Chemical Engineers.....                | Richard Duffy                 |
| American Nuclear Society .....                               | W. L. Whittemore              |
| American Physical Society .....                              | W. W. Havens, Jr.             |
|                                                              | Herbert Goldstein (Alt)       |
| American Public Health Association.....                      | Charles G. Amato              |
|                                                              | William A. Holt (Alt)         |
| American Society of Mechanical Engineers.....                | Roy A. Axford                 |
| American Society of Radiologic Technologists.....            | John H. Tolan                 |
| Health Physics Society .....                                 | Charles A. Willis             |
| Institute of Electrical & Electronics Engineers .....        | H. A. Thomas                  |
| National Bureau of Standards .....                           | R. S. Carter                  |
|                                                              | Tawfik M. Raby (Alt)          |
| National Council on Radiation Protection & Measurement ..... | Arthur B. Chilton             |
| U.S. Nuclear Regulatory Commission .....                     | Karl R. Goller                |
|                                                              | Robert J. Schemel (Alt)       |
| U.S. Energy Research & Development Administration .....      | Phillip B. Hemmig             |
|                                                              | John W. Lewellen (Alt)        |
| Individual Members.....                                      | J. E. Olhoeft                 |
|                                                              | Alfred M. Perry               |
|                                                              | E. A. Warman                  |

| <b>Contents</b> | <b>Section</b>                                     | <b>Page</b> |
|-----------------|----------------------------------------------------|-------------|
|                 | 1. Scope .....                                     | 1           |
|                 | 2. Definitions.....                                | 1           |
|                 | 3. Noble Gas Effluents .....                       | 1           |
|                 | 3.1 Design Objectives.....                         | 1           |
|                 | 3.2 Monitoring.....                                | 1           |
|                 | 4. Gaseous or Airborne Radioactive Materials ..... | 1           |
|                 | (other than noble gases) .....                     | 1           |
|                 | 4.1 Design Objectives.....                         | 1           |
|                 | 4.2 Monitoring.....                                | 1           |
|                 | 5. Liquid Effluents .....                          | 1           |
|                 | 5.1 Design Objectives.....                         | 2           |
|                 | 5.2 Monitoring.....                                | 2           |
|                 | 6. References .....                                | 2           |