

# REGULATORY GUIDE

## OFFICE OF STANDARDS DEVELOPMENT

### REGULATORY GUIDE 2.4

#### REVIEW OF EXPERIMENTS FOR RESEARCH REACTORS

##### A. INTRODUCTION

Section 50.36, "Technical Specifications," of 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires that each applicant for a license authorizing operation of a production or utilization facility include in his application proposed technical specifications. If acceptable, these technical specifications, along with any other such specifications that the Commission finds appropriate, are incorporated into the facility license that is issued by the Commission and are conditions of the license.

Paragraph (c)(5), "Administrative controls," of § 50.36 of 10 CFR Part 50 requires that technical specifications for nuclear reactors include provisions relating to the organization and management procedures, recordkeeping, review and audit, and reporting necessary to ensure operation of the facility in a safe manner. Section 50.59, "Changes, tests and experiments," of 10 CFR Part 50 permits each holder of a license authorizing operation of a production or utilization facility to make changes in the facility and procedures as described in the safety analysis report (SAR) and to conduct tests or experiments not described in the SAR, without prior Commission approval, unless the proposed change, test, or experiment involves a change in the technical specification incorporated in the license or an unreviewed safety question.

This guide describes procedures acceptable to the NRC staff for the licensee's review and approval of experiments performed at research reactor facilities.

##### B. DISCUSSION

Standard ANSI N401-1974 (ANS-15.6), "Review of Experiments for Research Reactors,"\* was prepared by Work Group ANS-15.6 and sponsored by

\* Copies may be obtained from the American Nuclear Society, 244 East Ogden Avenue, Hinsdale, Illinois 60521.

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Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. However, comments on this guide, if received within about two months after its issuance, will be particularly useful in evaluating the need for an early revision.

Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Section.

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Subcommittee ANS-15 (Research Reactors) of the American Nuclear Society (ANS). This standard was approved by the American National Standards Committee N17, Research Reactors, Reactor Physics and Radiation Shielding, and its Secretariat in March 1974. It was subsequently approved and designated ANSI N401-1974 by the American National Standards Institute (ANSI) on November 19, 1974. The standard provides guidance for the licensee's review and approval of experiments performed at research reactor facilities by identifying substantive areas for each experiment that should be reviewed to provide assurance that the experiment (1) falls within the limits delineated in the technical specifications, (2) does not present an unreviewed safety question as defined in §50.59, "Changes, tests and experiments," of 10 CFR Part 50, (3) does not constitute a threat to the health and safety of any individuals, and (4) does not constitute a hazard to the reactor facility or other equipment. In addition, this standard recommends a system for classifying experiments to establish levels of licensee review and approval commensurate with the level of risk inherent in the experiment. Both the requirements and the recommendations of the standard have been evaluated by the staff in evaluating the acceptability of this standard.

#### C. REGULATORY POSITION

The requirements and recommendations provided in ANSI N401-1974, "Review of Experiments for Research Reactors," are generally acceptable to the NRC staff. The guidance provides an adequate basis for the review and approval of research reactor experiments performed in accordance with §§50.36 and 50.59 of 10 CFR Part 50, subject to the following:

1. The last sentence of the paragraph defining, "shall, should and may," as given in Section 3, "Definitions," of ANSI N401-1974 should be modified to read as follows: "To conform to this standard, experiment review shall be performed in accordance with the standard's requirements and recommendations."

2. The definition of non-secured experiment, as given in Section 3, "Definitions," should be modified to read as follows: "Any experiment, experimental facility, or component of an experiment is considered to be unsecured when it is not secured as defined under secured experiment in Section 3."

3. Subsection 4.1, "Classification System," should be modified by adding the following sentence: "The experiment classification system to determine level of approval for the experiments should be reviewed and approved by the Reactor Safety Committee designated in the Technical Specifications."

4. In addition to the experiment plan (Section 5, "The Experimental Plan"), there should also exist detailed procedures for carrying out an

experiment, and these procedures should be reviewed as required by the facility's technical specifications. A single experimental procedure may be used for more than one exposure or more than one identical experiment, but such a procedure should expire after a specified interval.

5. Subsection 6.1, "Review Procedure," should be modified by adding the following sentence: "The experiment review procedure should be reviewed and approved by the Reactor Safety Committee designated in the Technical Specifications."

6. Paragraph (3) of Subsection 6.2, "Considerations," should be replaced with the following: "Does the experiment meet all criteria regarding reactivity effects? These criteria include assurance that (1) the potential reactivity worth of each secured experiment would be less than that value of reactivity which, if introduced as a positive step change, could result in a transient that would be likely to lead to doses in any restricted or unrestricted area in excess of the limits set forth in 10 CFR Part 20; (2) the magnitude of the potential reactivity worth of each non-secured experiment would be less than that value which, if introduced as a positive step change in reactivity, would cause a violation of a safety limit or of the minimum shutdown margin; and (3) the rate of change and magnitude of reactivity of any moveable experiment, moveable parts of experiments, or any combination of such experiments introduced by intentionally setting the experiments in motion relative to the reactor would not exceed the capacity of the control system to provide compensation."

7. In Subsection 6.3, "Review Personnel," the last paragraph should be replaced with the following: "Members of the Committee should disqualify themselves from the review of experiments in which they are directly involved. They may act as consultants to the review group but should not be involved with the final decision for approval or disapproval of the experiment."

8. The specific applicability or acceptability of items 1, 3, 4, and 5 of Section 9, "References," of ANSI N401-1974 will be covered separately in other regulatory guides, where appropriate.

#### D. IMPLEMENTATION

The purpose of this section is to provide guidance to applicants regarding the NRC staff's plans for using this regulatory guide in the review of research reactor facility applications. The staff will use this guide in evaluating applications submitted after the date shown below. However, all or part of this guide may be used by the staff to the extent reasonable and practicable for evaluating prior applications. Such use is usually reflected in the staff review questions and subsequent evaluations

for specific cases. Backfitting action, if required, will be considered separately pursuant to Section 50.109 of 10 CFR Part 50.

Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff in evaluating applications in connection with research reactor facility construction permits, operating licenses, or proposed amendments thereto submitted for approval after March 1, 1977.

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