



# REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

## REGULATORY GUIDE 1.141

### CONTAINMENT ISOLATION PROVISIONS FOR FLUID SYSTEMS

#### A. INTRODUCTION

General Design Criteria 54, 55, 56, and 57 of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Licensing of Production and Utilization Facilities," require that piping systems penetrating primary reactor containment be provided with isolation capabilities that reflect the importance to safety of isolating these piping systems. This guide describes a method acceptable to the NRC staff for complying with the Commission's requirements with respect to containment isolation of fluid systems.

#### B. DISCUSSION

Working Group ANS-56.2 of the American Nuclear Society Standards Committee ANS-50, Nuclear Power Plant Systems Engineering, has prepared a standard which specifies the minimum design requirements for containment isolation of fluid systems that penetrate the primary containment boundary of light-water-cooled reactors. This standard was approved by the American National Standards Institute (ANSI) Committee N18, Design Criteria for Nuclear Power Plants, and designated ANSI N271-1976, "Containment Isolation Provisions for Fluid Systems."\*

The provisions of ANSI N271-1976 include minimum design, testing, and maintenance requirements for the isolation of fluid systems that penetrate the primary containment of light-water-cooled reactors. Requirements for the design and testing of power supplies, qualifying of Class 1E equipment, and the design and testing of protection systems are outside the scope of this standard. These areas are not completely covered by the references given in ANSI N271-1976.

\* Copies may be obtained from the American Nuclear Society, 555 North Kensington Avenue, La Grange Park, Illinois 60525.

This standard contains requirements indicated by the verb "shall" and recommendations indicated by the verb "should." The recommendations as well as the requirements of the standard were evaluated with respect to importance to safety. All recommendations are considered to be of sufficient importance to safety to be endorsed along with the requirements given in the standard.

#### C. REGULATORY POSITION

The requirements and recommendations for containment isolation of fluid systems that penetrate the primary containment of light-water-cooled reactors as specified in ANSI N271-1976, "Containment Isolation Provisions for Fluid Systems," are generally acceptable and provide an adequate basis for complying with the pertinent containment isolation requirements of Appendix A to 10 CFR Part 50, subject to the following:

1. Section 3.6.4 of ANSI N271-1976 states: "The closed system shall be leak tested in accordance with 5.3 of this standard unless it can be shown by inspection that system integrity is being maintained for those systems operating at a pressure equal to or above the containment design pressure." This exception to system leak testing is also applicable to closed systems inside the containment.

2. Section 4.2.3 of ANSI N271-1976 states: "Sealed closed isolation valves are under administrative controls and do not require position indication in the control room for valve status." Since the containment isolation valves are components of the containment isolation system, which is an engineered-safety-feature system, all power-operated valves should have position indication in the control room.

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

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3. Section 4.2.5 of ANSI N271-1976 states: "Diversity in means of actuation of automatic isolation valves in series should be considered to preclude common mode failure. The NRC staff's position is that there should be diversity in the parameters sensed (i.e., types of isolation signals) for the initiation of containment isolation.

4. Section 4.4.8 of ANSI N271-1976 gives general design requirements for closed systems. In addition, all branch lines and their isolation valves in closed systems both inside and outside the containment should meet the design criteria of Section 3.5 or Section 3.6.7 if the branch lines constitute one of the containment isolation barriers.

5. In Section 4.6.3 of ANSI N271-1976, reference is made to Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a Loss-of-Coolant Accident," for guidance in determining radiation exposures for a loss-of-coolant accident. More appropriate guidance is given in Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants."

6. Section 4.14 of ANSI N271-1976 states: "The piping between isolation barriers or piping which forms part of isolation barriers shall meet the re-

quirements of 3.7 and applicable requirements for isolation barriers." Piping between isolation barriers should meet the applicable requirements of Section 3.5 or Section 3.7.

#### **D. IMPLEMENTATION**

The purpose of this section is to provide information to applicants regarding the NRC staff's plans for using this regulatory guide.

This guide reflects current NRC staff practice. Therefore, 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 is being and will continue to be used in the evaluation of submittals for construction permit applications until this guidance is revised as a result of suggestions from the public or additional staff review.

For those plants for which the second round of questions (Q2) on the construction permit application has been received by the date of issuance of this guide, the recommendations of this guide will be considered by the staff on a case-by-case basis pursuant to §50.109 of 10 CFR Part 50.