



U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REGULATORY RESEARCH  
DRAFT REGULATORY GUIDE AND VALUE/IMPACT STATEMENT

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Division 1  
Task IC 131-5

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INSTALLATION OF TRANSDUCERS

A. INTRODUCTION

Section 50.34, "Contents of Applications; Technical Information," of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires, in part, that design criteria be established for those structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public.

Criterion 1, "Quality Standards and Records," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 requires, in part, that structures, systems, and components be erected (installed) to quality standards commensurate with the importance of the safety functions to be performed.

Criterion 13, "Instrumentation and Control," of Appendix A to 10 CFR Part 50 requires, in part, that instrumentation be provided to ensure adequate safety.

This regulatory guide describes a method acceptable to the NRC staff for complying with the Commission's regulations with regard to the installation of transducers in nuclear power plants.

B. DISCUSSION

ANSI/ISA-S67.01, "Transducer and Transmitter Installation for Nuclear Safety Applications," was prepared by Committee SP-67.01 of the Instrument Society of America (ISA). It was approved by the ISA Nuclear Power Plant

\*Copies are available from the Instrument Society of America, 400 Stanwix Street, Pittsburgh, PA 15222.

This regulatory guide and the associated value/impact statement are being issued in draft form to involve the public in the early stages of the development of a regulatory position in this area. They have not received complete staff review and do not represent an official NRC staff position.

Public comments are being solicited on both drafts, the guide (including any implementation schedule) and the value/impact statement. Comments on the value/impact statement should be accompanied by supporting data. Comments on both drafts should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch, by

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Standards Committee (NPPSC) on October 18, 1978, and by the ISA Standards and Practices Board on July 15, 1979. It was subsequently approved by the American National Standards Institute (ANSI) on February 19, 1981. The standard establishes requirements and recommendations for the installation of transducers for nuclear power plant applications outside of the reactor pressure vessel. It addresses mounting structures and materials, seismic design, separation, protection from mechanical damage, ambient environmental variations, signal and process connections, and service and test provisions.

### C. REGULATORY POSITION

Conformance with the requirements of ANSI/ISA-S67.01, "Transducer and Transmitter Installation For Nuclear Safety Applications," 1979, provides an adequate basis for meeting the Commission's requirements for the installation of transducers in nuclear power plants subject to the following:

1. Section 3 of ANSI/ISA-S67.01 defines the term "qualified" as "demonstrated to be acceptable for the design requirements." Guidance being developed by the NRC staff on the demonstration has been issued for public comment as Draft Regulatory Guide EE 042-2, Proposed Revision 1 to Regulatory Guide 1.89, "Environmental Qualification of Electric Equipment for Nuclear Power Plants."

2. Section 5 of ANSI/ISA-S67.01 on equipment mounting should be supplemented with the following:

Design Basis - A specific basis should be established for the design of the installation of each transducer in nuclear power plants. The design basis should include as a minimum:

- a. Environmental conditions to be endured at each location where a transducer, its auxiliary equipment, or sensing lines are to be installed (e.g., ambient and process temperature, pressure, radiation, humidity, vibration and seismic loads, chemical effects, time of exposure, and functional capability during and subsequent to the environmental exposure).

- b. Electric requirements (e.g., power source voltage and frequency, both steady state and transient).
- c. Physical constraints such as location relative to process and maximum sensing line length.

3. Sections 5.2.2, 5.2.3, 7.5.1, 8.2, and 8.3.1 of ANSI/ISA-S67.01 address the requirement that materials be compatible. Being compatible should be understood to mean that materials and equipment are capable of existing together under specified design basis environmental conditions without being affected to a degree that would prevent them from performing their intended function.

4. Section 5.4 of ANSI/ISA-S67.01 provides guidance on mounting transducers where isolation valves are not provided. Guidance being developed by the NRC staff on the installation of sensing lines has been issued for public comment as Draft Regulatory Guide IC 126-5, "Instrument Sensing Lines."

5. Section 6.3.1 of ANSI/ISA-S67.01 discusses the accessibility of transducers for periodic testing, servicing, and removal and replacement. The recommendation indicated by "should" in Section 6.3.1 has sufficient importance to be treated the same as a requirement of the standard.

6. Section 8.3.4, "Electric Cable and Wire," of ANSI/ISA-S67.01 provides guidance on the qualification of cables and wires used for hookups between transducers and auxiliary equipment. The qualification of cables and wires used for hookups should be in conformance with the recommendations of Regulatory Guide 1.131, "Qualification Tests of Electric Cables, Field Splices, and Connections for Light-Water-Cooled Nuclear Power Plants."

7. Section 11, "References and Bibliography," of ANSI/ISA-S67.01 lists additional applicable national standards. The specific applicability or acceptability of these referenced standards has been or will be covered separately in other regulatory guides, where appropriate.

#### D. IMPLEMENTATION

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

This proposed guide has been released to encourage public participation in its development. Except in those cases in which an applicant or licensee proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method to be described in the active guide reflecting public comments will be used by the NRC staff in its evaluation of the installation of transducers in nuclear power plants after the implementation date to be specified in the active guide. Implementation by the staff will, in no case, be earlier than June 1982.

## DRAFT VALUE/IMPACT STATEMENT

### 1. BACKGROUND

An applicant for a construction permit for a nuclear power plant is required by the Commission's regulations to provide principal design criteria for those structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. The staff has recognized a need for guidance in developing criteria for the installation of transducers important to safety. General guidance for developing design criteria is given in Regulatory Guide 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants." More definitive guidance on the installation of transducers, however, has been developed by the Instrument Society of America (ISA) in ANSI/ISA-S67.01, "Transducer and Transmitter Installation for Nuclear Safety Applications." The proposed action would endorse ANSI/ISA-S67.01, with appropriate supplementary material, in a regulatory guide.

### 2. VALUE/IMPACT ASSESSMENT

#### 2.1 General

The proposed action would provide definitive guidance for developing criteria for the installation of transducers important to safety.

Value - This proposed action should result in more effective installation of transducers and transmitters, thus providing more assurance that the transducers and transmitters will perform their functions important to safety under all service conditions. Endorsing a national consensus standard reduces the expenditure of staff resources in developing the guidance.

Impact - Most of the impact on industry has already occurred during development, review, and approval of the consensus standard. Additional impact associated with the NRC endorsement of the standard should be minimal.

## 2.2 Regulatory Positions 1, 4, and 6

Regulatory Positions 1, 4, and 6 were added to refer environmental qualification, sensor lines, and seismic considerations to appropriate regulatory guides.

Value - These positions relate certain sections of ANSI/ISA-S67.01 to related regulatory guides thus providing appropriate interrelationship of guides and more complete guidance to sections of the standard when such guidance is available.

Impact - There should be no impact since no new requirements are imposed.

## 2.3 Regulatory Position 2

Regulatory Position 2 was added to provide more detail on determining the design basis for installation design criteria.

Value - It is an implicit requirement of the standard to determine the design basis for an installation of a transducer, however, no guidance is provided. The addition of guidance for determining the design basis will enhance the usefulness of the standard and help maintain consistency. It will also bring the guidance into conformance with related standards.

Impact - There should be no impact since no new requirements are imposed.

## 2.4 Regulatory Position 3

Regulatory Position 3 was added to provide a definition for the word "compatible" as it is used in the standard.

Value - By defining what is meant by "compatible" as used in the standard, ambiguity is avoided and a more clear understanding is provided.

Impact - There is no impact since no new requirements are imposed.

## 2.5 Regulatory Position 5

Regulatory Position 5 was added to state that the recommendation in the standard on accessibility of a transmitter or transducer should be considered as a requirement.

Value.- An accessible transducer will enhance maintenance, repair, and replacement.

Impact - Any increase in cost of installation design due to making the transducer accessible will be offset by ease of maintenance, repair, and replacement. Consequently, there will be no impact.

## 2.6 Regulatory Position 7

Regulatory Position 7 was added to provide the NRC position regarding the referenced industry consensus standards.

Value - It provides the user of the standard with information, where applicable, regarding the NRC position on using the standards listed as references.

Impact - There is no impact since no new requirements are imposed.

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