

The Radioactive Materials Packaging and Transportation Standards Programs

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The American National Standards Institute (ANSI), Inc., is the central body responsible for the identification of a single, consistent set of voluntary standards called American National Standards. ANSI does not write standards; ANSI advises and approves the work of some 250 standards-developing organizations. Two key words describe the standards process under ANSI: *voluntary* and *consensus*. Participation in the process, from the writing of the standard, through the approval process, to the implementation of the standard in the work place, is *voluntary*. American National Standards have the force of law only when and if endorsed by legal authority, for example, in contracts or regulations. The approval process is based on the principle of *consensus*, which means that substantial agreement has been reached, and this determination is made by an appointed authority. ANSI approval of these standards is intended to verify that the principles of openness and due process have been followed in the approval procedure and that a consensus of those directly and materially affected by the standards has been achieved.

In order to be recognized as an American National Standard three requirements must be met (ANSI 1993): (1) the proposed standard must be submitted by an accredited method, (2) the standard must undergo public review and comment, and (3) consensus must be verified (Figure 1).

ACCREDITED METHODS

Three processes, or methods of standards development, have been determined by ANSI as appropriate for assuring due process. They are:

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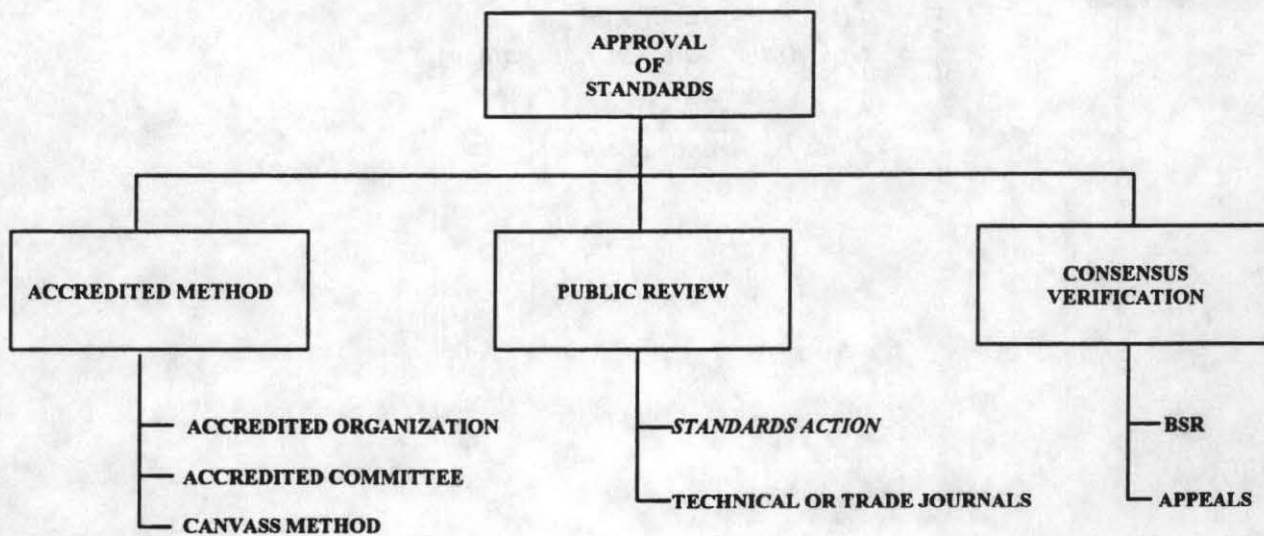


Figure 1. Development of American National Standards.

- accredited organizations such as American Nuclear Society or American Society of Mechanical Engineers;
- accredited committees such as N14 or N15 representing many organizations and interests; and
- canvass method, with a sponsor and a list of those with material interests; an example of a canvass sponsor is the Underwriters Laboratories.

The Executive Standards Council of ANSI has overall accreditation responsibility. The Nuclear Standards Board, a permanent member of the Executive Standards Council, monitors the nuclear standards work of eight accredited organizations, five accredited committees, and one canvass sponsor.

PUBLIC REVIEW

ANSI provides for public review and comment through publication of a notice of the proposed standard in ANSI's biweekly newsletter, *Standards Action*. The notice allows 60 days for submission of comment. Standards developing organizations are also encouraged to publish notice in technical and trade publications.

CONSENSUS VERIFICATION

Consensus verification is the responsibility of ANSI's Board of Standards Review (BSR). Each standard developer must submit, with the proposed standard, evidence of consensus through the approved, accredited procedures. All negative responses must

have been adequately addressed (although the negative response is not necessarily removed). Actions of the BSR may be appealed to the Board of Directors of ANSI.

Development of standards related to the packaging and transportation of radioactive materials in the United States is accomplished by the N14 Committee. The N14 Committee approved the use of model procedures for an accredited standards committee as published in the Reference, and N14 is accredited by ANSI. The N14 Committee has approved, by ballot, a widening of its scope to include nonnuclear hazardous waste and combinations thereof. The N14 scope does not include movement or handling during processing and manufacturing operations.

N14 follows the accredited committee method for standards approval (Figure 2). A proposed standard is prepared by the writing group. A standard then goes to the Secretary of the Committee, who reviews the submission for completeness and prepares a ballot. The standard then goes to the Committee for ballot and, at the same time, is submitted for public review and comment. The N14 Committee consists of 81 voting members, representing government agencies, vendors of equipment, shippers, carriers, regulators, utilities, and other interested organizations and individuals. Negative ballots and comments are referred back to the writing group for resolution. A substantive change to a standard as a result of the resolution process requires rebalancing of the standard. Once consensus is reached, the standard and supporting documentation of consensus is forwarded to the BSR. The BSR review will confirm the due process of method and recommend for or against approval of the proposal as an American National Standard. Barring any appeals, an approved standard will be published by ANSI.

N14 has seven standards approved by ANSI and is in the process of developing five other standards applicable to transportation and packaging operations for radioactive materials. The approved standards, and some background information regarding each, follows:

N14.1-1990 Packaging of Uranium Hexafluoride for Transport

This standard was first produced and approved in 1971 and has been in continuous use since that date. It has been incorporated into the U.S. Department of Transportation (DOT) regulations (49 CFR 173). The standard provides the criteria for packaging of uranium hexafluoride for transport. It includes specific information on design and fabrication requirements for the procurement of new packagings. It also defines the requirements for in-service inspections, cleanliness, and maintenance for packagings in service. Also included are cylinder loadings, shipping details, and requirements for valves and valve protectors. Use of this standard provides compatibility of the packaging among different users within the industry.

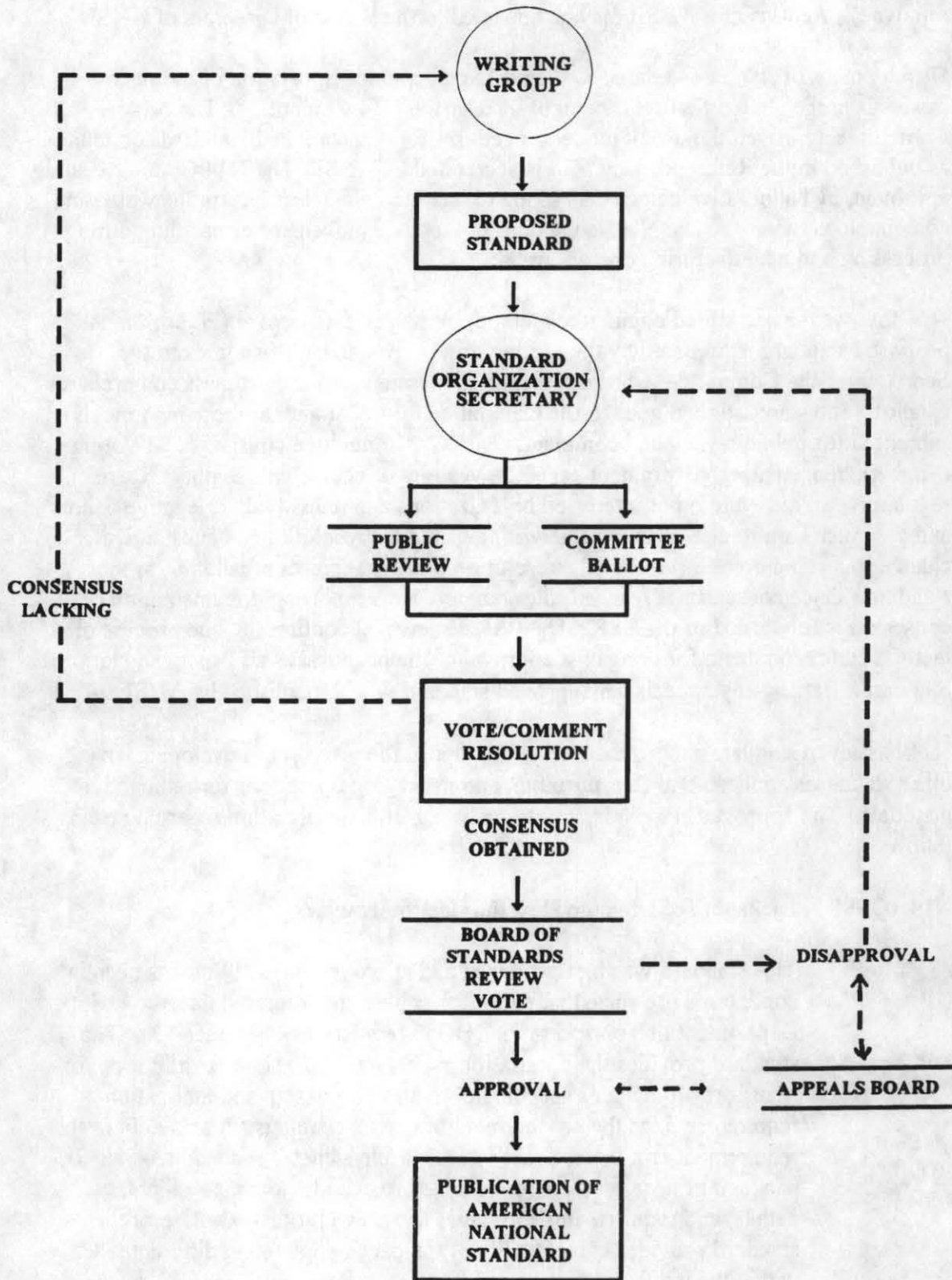


Figure 2. Accredited committee method of standards approval.

Mr. Randy Reynolds is the chairman of the N14.1 writing group, which has completed work on the 1995 revision to the standard. The 1995 revision was balloted by the N14 committee this spring and, after resolution of the comments, has been submitted to the BSR.

N14.5-1987 Leakage Tests on Packages for Shipment of Radioactive Materials

This standard was originally published in 1977 and revised in 1987. The standard specifies methods for demonstrating that Type B packages comply with the package containment requirements of the U.S. Nuclear Regulatory Commission (NRC) (10 CFR 71), the International Atomic Energy Agency (Safety Series No. 6, 1985), or both. It also specifies minimum requirements for packaging containment, release and leakage rate measurement procedures, and test procedures. Methods of relating package containment requirements to measured release and leakage rate are specified.

The writing group, under the chairmanship of Mr. Larry Fischer, has begun the process of revising N14.5. Recently, the international committee completed drafting an International Organization for Standardization (ISO) standard for leakage testing. The revised N14.5 will incorporate the best features of the ISO standard into the ANSI standard. The first step, currently under way, is to reorganize the ANSI standard so that it follows the same outline as the ISO standard. Additional committee meetings are scheduled throughout the remainder of 1995, with a goal of a consensus draft by the writing group in mid-1996.

N14.6-1993 Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More for Nuclear Materials

The first publication of this standard was in 1978. It was revised in 1986 and renewed in 1993. The standard sets forth requirements of the design, fabrication, testing, maintenance, and quality assurance programs for special lifting devices for containers weighing 10,000 pounds (4500 kg) or more for radioactive materials.

The chairman of the writing group, Mr. George Townes, has no activities currently on behalf of the standard.

N14.24-1985 Domestic Barge Transport for Highway Route Controlled
(R1993) Quantities of Radioactive Material.

This standard, first published in 1985 and reaffirmed in 1993, identifies the organizations, equipment, operation, and documentation that are involved in domestic (i.e., between U.S. ports) barge shipments of highway route controlled quantities of radioactive material on inland waterways and in coastwise and ocean service.

N14 plans to revise the standard contingent on NRC development of a document for low-specific-activity materials (reactor components will be considered). A new writing group chairman will be appointed and new scope prepared in early 1996.

N14.27-1986 Carrier and Shipper Responsibilities and Emergency Response
(R1993) Procedures for Highway Transportation Accidents

The scope of this standard encompasses the preparation and execution by carriers and shippers of their emergency response programs. It emphasizes the responsibilities of the carrier and the shipper in the emergency response effort. It does not include the actions or role of the local, State, or Federal agencies. Included in the standard are procedures for truckload quantities or "exclusive-use vehicles" only.

The 1986 version of the standard was reaffirmed in 1993. A new writing group chairman, Brady Lester, has been appointed, and the standard will be extensively revised, with a completion date of 1999.

N14.29-1988 Guide for Writing Operating Manuals for Packaging

The only standard of N14 with the word *guide* in the title, this standard describes the preparation and distribution of operating manuals for the use, maintenance, and inspection of packages for shipping radioactive material. It discusses the contents of such a manual, describes general requirements to include in operating procedures, and contains samples for a model. It is applicable primarily to Type B packaging manuals.

The writing group, under the guidance of Mr. Dennis McCall and Mr. Mike Burnside, is currently reviewing a draft revision.

N14.30-1992 Semi-Trailers Employed in the Highway Transport of Weight-
Concentrated Radioactive Loads — Design, Fabrication, and
Maintenance

This standard establishes the design, fabrication, and maintenance

requirements for the highway transport of weight-concentrated radioactive material loads. A weight-concentrated load is any payload that exceeds 1,000 pounds per lineal foot over any portion on the semi-trailer. The standard provides detailed procedures for in service inspections, testing, and quality assurance. The writing group for this standard is not currently active, and a new chairman is being sought.

In addition to the standards approved and published, as mentioned previously, the Committee has several active writing groups in the process of developing new standards. Some of these have been ongoing for some time. Current activities include:

- N14.2 Tiedowns for Transport of Fissile and Radioactive Containers Greater than One-Ton Truck Transport
- N14.7 Guide to the Design and Use of Shipping Packages for Type A Quantities of Radioactive Materials
- N14.23 Design Basis for Resistance to Shock and Vibration of Radioactive Material Packages Greater than One Ton in Truck Transport
- N14.26 Fabrication, Inspection, and Preventative Maintenance of Packaging for Radioactive Materials
- N14.31 Standard Tiedowns on Legal Weight Transport System (80,000 Pounds) for Packages Containing Hazardous Materials and Weighing Greater than 500 Pounds

ANSI is the U.S. member of the ISO, the International Electrotechnical Commission, the Pacific Area Standards Congress, and the Pan American Standards Commission. ANSI coordinates the activities involved in U.S. participation in these groups (see Figure 3). Working groups of ISO Subcommittee 5 of Technical Committee 85 are currently active in the development of three international standards relevant to transportation. Technical Committee 85 has as its charter standards related to Nuclear Energy, and Subcommittee 5 is concerned with the Nuclear Fuel Cycle. The three efforts under way relate to Trunions for Spent Fuel Shipping Casks; Leaktightness Definitions For and Leakage Tests on Packaging for the Transport of Radioactive Materials; and Principles of Criticality Safety in Storing, Handling, and Processing Fissile Material.

REFERENCE

American National Standard Institute, *Procedures for the Development and Coordination of American National Standards*, ANSI, New York, NY, (1993).

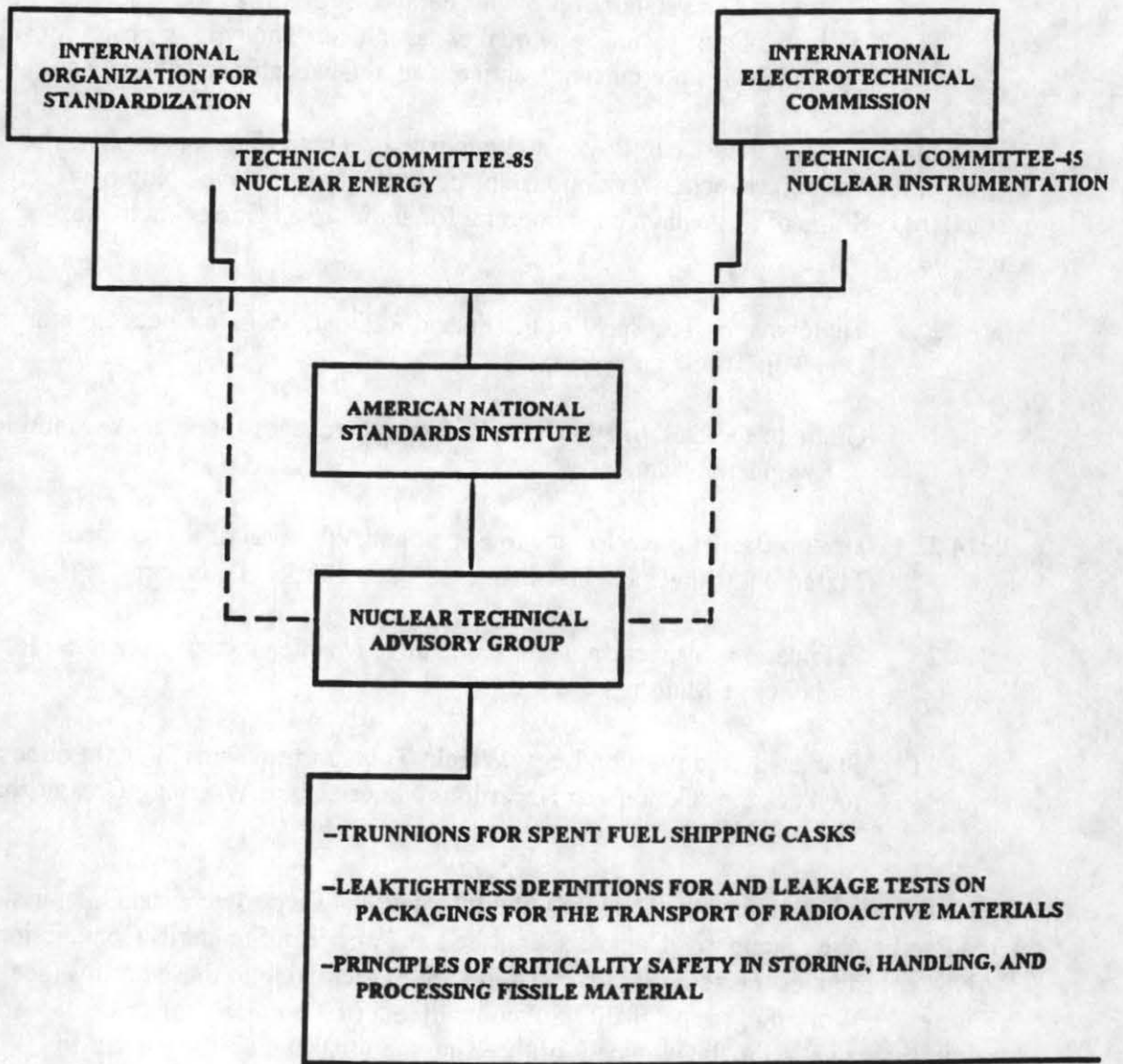


Figure 3. ANSI participation —International Standards Organizations.