American Nuclear Society

Standards Committee Report of Activities

2022

Standards Committee Report of Activities 2022

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STANDARDS COMMITTEE

Report of Activities

2022

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Table of Contents

Introduction **1**

ANS Standards Development Process **2**

Standards Board Chair Report **5**

ANS Standards Committee **10**

Standards Board Membership **11**

Subcommittee Chairs **13**

Approved American National Standards Produced by the ANS Standards Committee **14**

Environmental and Siting Consensus Committee (ESCC) **19**
Environmental and Impact Assessment and Analysis Subcommittee 20
Siting: Atmospheric Subcommittee 21
Siting: General and Monitoring Subcommittee 23
Siting: Hydrogeologic Subcommittee 25
Siting: Seismic Subcommittee 27

Fuel, Waste, and Decommissioning Consensus Committee (FWDCC) **32**
New and Used Fuel (Design Only) Subcommittee 33
High Level, GTCC, Low Level and Mixed Waste Subcommittee 35
Decommissioning (Commercial and Research Facilities) Subcommittee 37

Large Light Water Reactor Consensus Committee (LLWRCC) **39**
Light Water Reactor and Reactor Auxiliary Systems Design Subcommittee 40
Power Generation and Plant Support Systems Subcommittee 43
Simulators, Instrumentation, Control Systems, Software and Testing Subcommittee 45
Emergency Planning and Response Subcommittee 49

Nonreactor Nuclear Facilities Consensus Committee **53**

Nuclear Criticality Safety Consensus Committee (NCSCC) **56**
Subcommittee 8 – Fissionable Material Outside Reactors Subcommittee 57

Research and Advanced Reactors Consensus Committee (RARCC) **66**
Advanced Initiatives Subcommittee (ANS-29) 67
Operation of Research Reactors Subcommittee (ANS-15) 70

Safety and Radiological Analyses Consensus Committee **75**
Mathematics and Computations Subcommittee (ANS-10) 76
Reactor Physics Subcommittee (ANS-19) 78
Shielding Subcommittee (ANS-6) 83

Joint Committee on Nuclear Risk Management (JCNRM) **88**
Subcommittee on Nuclear Risk Standards and Guidance (NURI-SC) 90
Standards Infrastructure Subcommittee (SI-SC) 94
Technical Requirements Subcommittee (TR-SC) 96
Subcommittee on Risk Applications (SCoRA) 99

Appendix

Appendix A – Standards Service Award 103

Figures

Figure 1 – Steps in the Development of a Standard 4
Figure 2 – ANS Standards Committee: Organizational Chart 12

Tables

Table 1 – ESCC Organizational Chart 31
Table 2 – FWDCC Organizational Chart 38
Table 3 – LLWRCC Organizational Chart 52
Table 4 – NRNFCC List of Standards/Projects 55
Table 5 – NCSCC List of Standards/Projects 65
Table 6 – RARCC Organizational Chart 74
Table 7 – SRACC Organizational Chart 87
Table 8 – JCNRM Organizational Chart 102

INTRODUCTION

The Report of Activities of the American Nuclear Society (ANS) Standards Committee represents a record of the Committee's achievements for the calendar year 2022. The Report provides information on ANS standards projects.

Over 900 volunteer members participate in the development of ANS-sponsored nuclear standards, of which there are over 120 in various phases of maintenance and development. As of the end of 2022, there were 88 current standards approved by the American National Standards Institute as American National Standards.

The ANS Standards Committee develops standards in accordance with the accredited organization method for developing evidence of consensus for their approval as American National Standards.

The work of the Standards Committee is managed by eight consensus committees:

ESCC: Environmental and Siting Consensus Committee

FWDCC: Fuel, Waste, and Decommissioning Consensus Committee

LLWRCC: Large Light Water Reactor Consensus Committee

NRNFCC: Nonreactor Nuclear Facilities Committee

NCSCC: Nuclear Criticality Safety Consensus Committee

RARCC: Research and Advanced Reactors Consensus Committee

SRACC: Safety and Radiological Analyses Consensus Committee

JCNRM: Joint Committee on Nuclear Risk Management

This report is presented in eight individual sections, each of which sets forth the details on those subcommittees and working groups active under its respective consensus committee.

ANS Standards Development Process

The mission of the American Nuclear Society (ANS) Standards Committee is to develop voluntary consensus standards to be certified by the American National Standards Institute (ANSI) as American National Standards. The ANSI has served as administrator and coordinator of the United States private sector voluntary standardization system for close to 100 years. Founded in 1918 by five engineering societies and three government agencies, the Institute remains a private, nonprofit membership organization supported by a diverse constituency of private and public sector organizations. Its prescribed process is set forth in the ANS Standards Committee Rules and Procedures, and it is also illustrated in the following flow chart presented as Figure 1.

The National Technology Transfer and Advancement Act of 1995 (NTTAA) requires all federal agencies and departments to use technical standards that are developed or adopted by voluntary consensus standards bodies, unless such use is impractical or inconsistent with law. To implement the Act, the Office of Management and Budget issued Circular A-119, which provides guidance to promote consistent application of the Act across federal agencies and departments. The NTTAA is available at https://www.gpo.gov/fdsys/granule/STATUTE-110/STATUTE-110-Pg775/content-detail.html. OMB Circular A-119 can be found at https://www.whitehouse.gov/wp-content/uploads/2020/07/revised_circular_a-119_as_of_1_22.pdf.

The process to produce an American National Standard requires time, patience, most of all dedication of many professionals. The birth of a standard begins with recognizing a need for a particular standard. Any individual or committee within the ANS Standards Committee may identify this need by completing a Project Initiation Notification System (PINS) form, which declares the purpose and need of the proposed standard. The document is reviewed, discussed, and most often approved by a select subcommittee (SubC) and a consensus committee (CC) that will oversee the standard. Last, the Standards Board (SB) will review the PINS form before it is submitted to ANSI.

Once the PINS form is approved and submitted to ANSI, a working group (WG) is assembled to commence the standards development process. Working group members comprise a small number of individuals recognized for their expertise in the subject. Although there is no requirement for a balance of representation on a WG, as required for the CC, WG membership should include those organizations having a significant interest in the project.

Subcommittees consist of members who have been appointed due to their expertise in one or more areas. They manage the development of several standards in closely related disciplines. Each SubC member is expected to lend his/her special expertise in the development of standards. Subsequent to drafting the standard, a formal ballot process within the SubC is not required but is often used as a preliminary review.

The SB has established eight consensus committees -- Environmental and Siting Consensus Committee (ESCC); Fuel, Waste, and Decommissioning Consensus Committee (FWDCC); Nonreactor Nuclear Facilities Consensus Committee (NRNFCC); Nuclear Criticality Safety Consensus Committee (NCSCC); Large Light Water Reactors Consensus Committee (LLWRCC); Research and Advanced Reactors Consensus Committee (RARCC); Safety and Radiological Analyses Consensus Committee (SRACC); and Joint Committee on Nuclear Risk Management (JCNRM) a joint consensus committee with the American Society of Mechanical Engineers (ASME). Consensus committees comprise a diverse balance of interest. Each CC supervises the development of proposed standards within their assigned scopes, and they achieve consensus approval of these projects. A formal ballot must be employed to ascertain each member's position on the standards brought before the committee.

The WG chair must respond to all "approved with comments" and "negative" comments received from the formal ballot period; the SubC may assist in resolving comments. Members who ballot negative, must review the attempted resolution of his/her negative ballot vote. If the negative balloter finds the response unacceptable, then the balloter may maintain that decision by formally stating his/her reasons for doing so. Any outstanding negative positions must be circulated to all members of the CC for review. A member holding an affirmative position may change his/her vote if he/she wishes to support negative balloters.

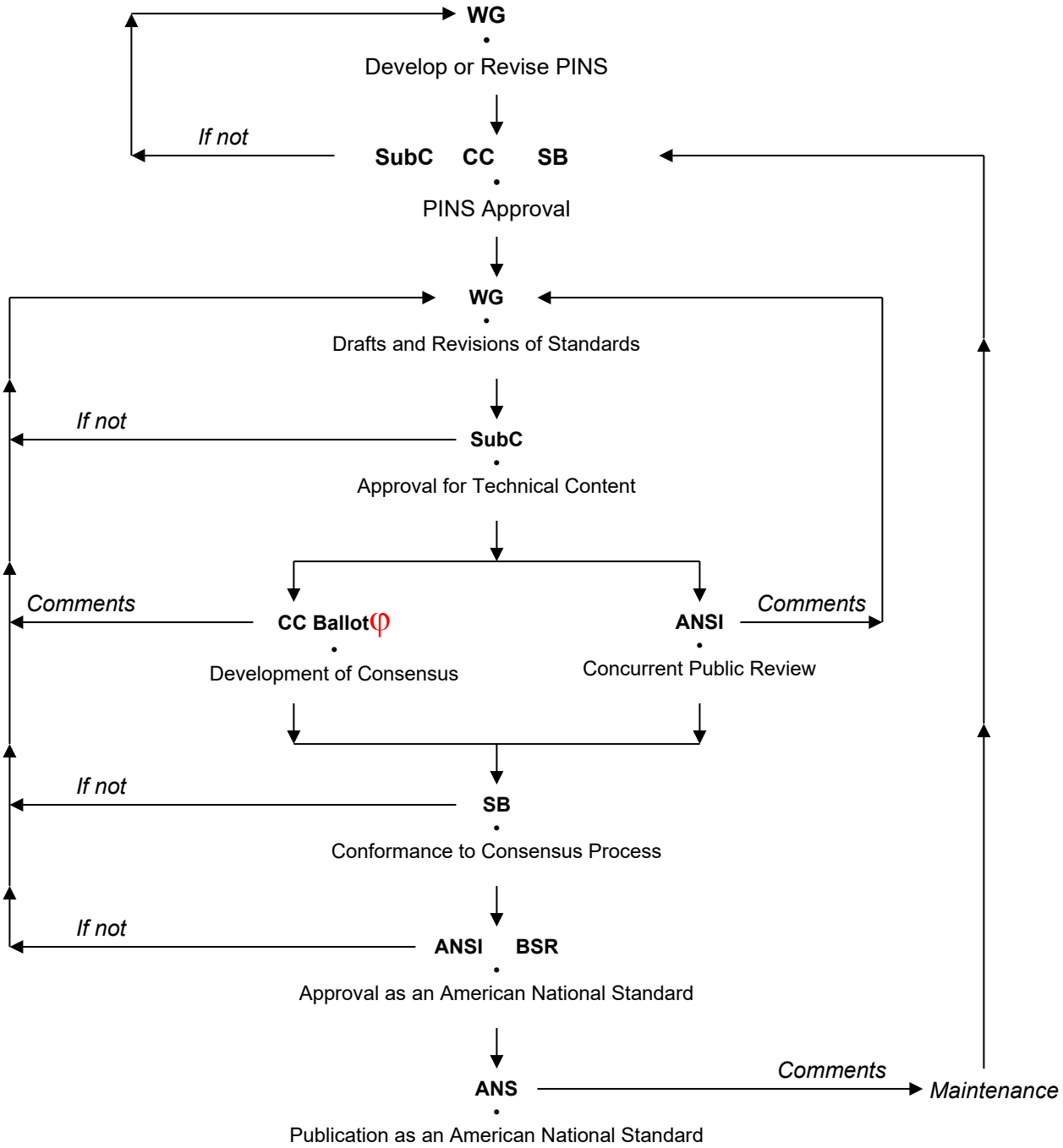
Simultaneous to the CC ballot, public review (PR) is conducted through the auspices of ANSI. ANSI announces a 45- or 60-day public review period for the proposed standard in its publication, *Standards Action*. As with CC comments, all comments from PR must be considered and resolved promptly.

Upon completion of the consensus process, a Letter Ballot is created for the SB to review and certify that all ANS procedures have been implemented to finalize the standard. The SB Letter Ballot summarizes the CC ballot tallies and other details during the ballot period.

The final step in the development of a proposed standard is to gain approval by the ANSI Board of Standards Review (BSR). Once certification by the SB has been granted, documentation is sent to the ANSI BSR with details of the ballot results to carefully scrutinize the case.

After ANSI notifies ANS of its approval, the proposed standard emerges as an American National Standard—a remarkable achievement and a credit to all the volunteers who made it possible.

Once approved, an American National Standard must be maintained to keep its certification. ANSI dictates that current standards be reviewed at least every five years to determine if the standard should be reaffirmed (reapproved), revised, or withdrawn. Standards that are found to be current and are not in need of any changes can be reaffirmed. A reaffirmation requires a consensus ballot, public review, and recertification by ANSI. Absolutely no changes can be made to the formal portion of a standard through the reaffirmation process. If any changes are deemed necessary, a revision should be initiated. If the evaluation of technical content reveals that strict application of one or more criteria could result in equipment inoperability or a violation of a safety or technical specification, withdrawal shall be recommended.



ANS: American Nuclear Society	**SubC:** Subcommittee
ANSI: American National Standards Institute	**SB:** Standards Board
BSR: Board of Standards Review	**WG:** Working Group
CC: Consensus Committee	

Figure 1 - Steps in the Development of a Standard

φ If a decision is made to issue a draft for trial use and application an additional CC ballot (w/o public review) as well as SB approval would be required. If approved by the CC & SB, the draft would be published and available for purchase. Once the trial-use period is completed, the working group would review the comments and determine the appropriate action. If seeking approval of the draft as an American National Standard, the draft would be revised to incorporate comments and continue to follow the process noted in the flow chart to gain ANSI certification.

Standards Board Chair Report
Donald Eggett

Formation of a Joint Industry Group to Support Advanced Reactor Standards Needs

The approved ANS Nuclear Standards Collaborative initiated in 2021 by the Standards Board to envision and collaborate with other standard development organizations (SDO) in order to develop those advanced reactor standards still needed by the designers has recently merged with the sponsored Nuclear Energy Institute (NEI)/Electric Power Research Institute (EPRI) North American Advanced Reactor Roadmap initiative. The resultant SDO-led industry Codes & Standards (C&S) group's major objective will be accelerating those C&Ss needed in the very near future by advanced reactor designers. The collaboration among SDOs and coordination with industry executives through NEI and EPRI advisory structures is intended to enhance visibility of C&S as part of the commercial success path for advanced reactors for increasing resources—especially for volunteers from key industry sectors. An SDO-led Advanced Reactor Codes and Standards Workshop was held December 1, 2022, at EPRI's office in Washington D.C. This workshop was a success with many periodic meetings and workshops to come involving both domestic and international stakeholder engagement.

2022 Standards Service Award Recipient

The Standards Board selected Douglas G. Bowen, Ph.D., for the 2022 Standards Service Award. Bowen was selected for his many significant contributions and meaningful technical guidance, always blended with professionalism, which have improved the quality of the ANS-8 series of standards to enhance the foundation from which nuclear criticality safety in operations with fissionable materials outside of reactors can be ensured for succeeding generations.

ANS Presentations at NRC Standards Forum

The U.S. Nuclear Regulatory Commission (NRC) held its annual NRC Standards Forum virtually on September 28, 2022. The Forum aims at facilitating discussions on codes and standards needs within the nuclear industry and exploring how to collaborate in accelerating the development of codes and standards and the NRC's endorsement of these codes and standards in its regulations and regulatory guides. A presentation was made on behalf of ANS by Standards Board Chair Don Eggett and Standards Board Vice Chair Andrew Sowder to inform attendees of the formation of an SDO-lead industry group that will identify C&Ss to assist developers in the design of their advanced reactors (discussed above). Research and Advanced Reactor Consensus Committee Chair George Flanagan updated attendees on ANS's advanced reactor standards and activities. Lastly, ANS-30.3 Working Group Chair Kent Welter, NuScale, provided an overview of new standard ANSI/ANS-30.3-2022, *Light-Water Reactor Risk-Informed Performance-Based Design*, which has been submitted to the NRC with a request to endorse.

Progress Made on Several Key Standards

The Standards Committee was excited to publish two very key standards and issue one for consensus committee ballot. The three standards include 1) ASME/ANS RA-S-1.1-2022, *Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications*, 2) ANSI/ANS-30.3-2022, *Light-Water Reactor Risk-Informed Performance-Based Design*, and 3) ANS-20.2, *Nuclear Safety Design Criteria and Functional Performance Requirements for Liquid-Fuel Molten Salt Reactor Nuclear Power Plants* (proposed new standard).

Joint standard ASME/ANS RA-S-1.1-2022 was approved by the American National Standards Institute (ANSI) on May 11, 2022, and published three weeks later. With the majority of the text stable for the last year, the editing process was started early to expedite publication and be responsive to the industry's need to get the standard on the street. The 2022 edition is a substantial revision of ASME/ANS RA-Sb-2013.

ANSI/ANS-30.3-2022 received ANSI approval on July 21, 2023. Production on the standard was started during an additional recirculation ballot and public review for only a few substantive changes enabling the standard to be published the same day it was approved. A request was made to the U.S. Nuclear Regulatory Commission to endorse the standard.

ANS-20.2 was issued for formal ballot to the Research and Advanced Reactors Consensus Committee on July 11, 2022. The ballot required several extensions finally closing on October 19, 2022, with nearly 40 comments, several submitted with objections. The ANS-20.2 Working Group anticipates the completion of all comment responses in early 2023 in hopes of approval of the draft standard on the second ballot.

ANS Standards Committee Reaccredited by ANSI

The Standards Committee was reaccredited under a revised set of rules and procedures approved by the American National Standards Institute (ANSI) on August 19, 2022. The revised rules and procedures comply with changes made by ANSI in their 2022 Essential Requirements. The most significant change is how consultants are classified for the purpose of balance of interest on consensus committees. Another change is the option to develop standards technical reports that can be registered with ANSI. Technical reports developed by the Standards Committee will convey scientific information about specific technical research in a fact-based manner to provide background on a current standard or for incorporation into a current or potential future standard.

Development of Guidance Standards, Guidance Documents, and Technical Reports

The “Policy on the Development of Guidance Standards and Guidance Documents in Support of Existing Standards and Potential Future Standards” was updated in June 2022 to clarify and recognize three standards-related document types—1) guidance standards, 2) guidance documents, and 3) technical reports. These three document types will be made available for purchase. This policy is specific to standards-related documents that do not contain requirements. Documents containing requirements are developed with the intent of seeking ANSI approval as American National Standards.

JCNRM Reorganization

ANS and ASME formed the Joint Committee on Nuclear Risk Management (JCNRM) in 2011 to harmonize the two societies’ probabilistic risk assessment (PRA) standards. When formed, the work of developing PRA standards was divided between two subcommittees—one for current standards approved by the American National Standards Institute (ANSI) and one for standards in development. With the majority of the standards in development nearing completion with expected ANSI approval in the near term, a reorganization plan was approved to balance the work and to support development of other new standards.

Guidance Document Issued for Trial Use by the Risk-informed Performance-based Principles and Policy Committee (RP3C)

The RP3C had a very productive 2022. A revised, much more mature guidance document titled “Incorporating Risk-Informed and Performance-Based Approaches/Attributes in ANS Standards” was issued for trial use in April 2022 with a directive to ANS standards working groups for its immediate use. Trial-use findings and lessons learned were incorporated into the latest revision and approved by both the RP3C and the Standards Board. The purpose of this guidance document is to identify the process for using risk-informed and performance-based (RIPB) approaches, as appropriate, when developing or revising ANS standards. This document also helps the consensus committees, subcommittees, and working groups decide if and how RIPB approaches can be incorporated into their standards. RP3C is now focusing its efforts on developing a training program for working group members based on the guidance document. Feedback from the training program will be used to finalize the guidance document.

RIPB Community of Practice

The Risk-informed, Performance-based Principles and Policy Committee (RP3C) Community of Practice (CoP) continues to gain momentum. The CoP was launched in February 2020 to support knowledge sharing on the development and application of risk-informed, performance-based (RIPB) principles and practices within the nuclear industry. Presentations and recordings are available on the RP3C public webpage. CoPs held this year include the following:

- "Risk-Informed, Performance-Based Aspects in Part 53 Draft Rule Package" by William Reckley with the U.S. Nuclear Regulatory Commission
- "Policy Challenges of Technology-Inclusive, Risk-Informed, Performance-Based Regulation" by Patrick White with the Nuclear Innovation Alliance
- "What Society Needs in 10 CFR Part 53" by Rani Franovich with the Breakthrough Institute
- "A Performance-Based Approach for 10 CFR Part 53" Research Institute" by N. Prasad Kadambi, RP3C Chair, and Rani Franovich with the Breakthrough Institute
- "Risk-Informed and Performance-Based I&C Design: A Modern and Integrated Approach" by Matt Gibson with Electric Power
- "Modernizing NASA's Space Flight Safety & Mission Success Assurance Framework" by Chris Everett with Idaho National Laboratory
- "NatriumTM SSC Classification Using the Licensing Modernization Project" by Brian Johnson with TerraPower
- "10 Part 53: Perspective on Rule Development" by Adam Stein with The Breakthrough Institute
- "Risk-Informed Performance-Based Approach to Managing Plant Operations: From Data to Decisions" by Diego Mandelli with Idaho National Laboratory
- "ANS's Advanced Reactors Working Group Addresses NEIMA" by N. Prasad Kadambi, Advanced Reactors Working Group Chair and RP3C Chair

Consensus Committee Performance Reports

The Standards Board reviewed the 2021 performance reports for all eight consensus committees at the June 2022 meeting. The performance reports include metrics for consensus committee member meeting and ballot participation, initiation of new standards, responses to inquiries on standards, delinquent standards, the time to staff a working group, and the length of time from initiation to approval of new standards. These metrics have been followed since 2016. The greatest challenge has been initiating new standards, but this is expected to change with the development of new reactors.

Standards Volunteer Database

The Standards Board has long recognized the need for a volunteer database to help staff many open positions within the Standards Committee (i.e., the collection of standards committees including working groups, subcommittees, consensus committees, and the Standards Board). Most openings are at the working group level needing specific expertise to write standards. ANS Collaborate has been customized to use as a volunteer database by adding standards volunteer capability categories to the profile section. Numerous requests were made for all Standards Committee members (~900) to populate their profiles in Collaborate with their bios and to add their capability categories. Bios and capabilities from new members are added by ANS staff. Over time, the database will grow to be a very useful tool to help find needed expertise for standards committees.

Staff Efforts

ANS standards staff completed an administrative action in 2022: an additional 200 ANS standards dating back to 1964 have now been digitized and made available in our partnered standards store with Techstreet. Adding all ANS standards to our store provides users with complete version histories and makes these documents available if needed for historical reference. In a somewhat similar effort to increase the visibility of ANS standards, in 2023, ANS will work with publisher Elsevier to index ANS standards in their Engineering Village platform, specifically, in their Compendex database. Engineering

Village is a search-and-discovery platform that provides high-quality content, data, and intelligence needed to answer engineering questions. ANS standards will be added to the collection of other ANS publications already included in the Compendex database. Compendex will include only basic details of ANS standards, such as title, scope, and keywords. Subscribers to Engineering Village will be directed to our partnered store to acquire the full-text document.

Standards Action Activities in 2022

The ANS Standards Committee initiated 5 projects, reaffirmed 8 standards, and published 8 new or revised standards in 2022. Between reaffirmations and revisions, none of our 88 current standards are considered delinquent by the American National Standards Institute (ANSI). The following recognizes initiated standard, reaffirmed standards, and published in 2022.

Projects Initiated

- ANS-2.3-202x, *Estimating Tornado, Hurricane, and Extreme Straight Line Wind Characteristics at Nuclear Facility Sites* (revision of ANSI/ANS-2.3-2011; R2021)
- ANS-2.15-202x, Criteria for Modeling Atmospheric Dispersion of Radiological Releases from Nuclear Facilities (revision of ANSI/ANS-2.15--2013 (R2021)
- ANS-2.18-202x, *Evaluating Radionuclide Transport in Surface Water for Nuclear Reactor and Nuclear Facility Sites* (new standard)
- ANS-GD-3.8.x-202x, *Guidance for Risk-Informing Emergency Preparedness Programs for Nuclear Facilities* (new guidance document)
- ANS-19.10, *Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals* (revision of ANSI/ANS-19.10-2009; R2021)

Reaffirmations Approved

- ANSI/ANS-2.10-2017 (R2022), *Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation* (reaffirmation of ANSI/ANS-2.10-2018)
- ANSI/ANS-3.2-2012 (R2022), *Managerial, Administrative, and Quality Assurance Controls for the Operational Phase of Nuclear Power Plants* (reaffirmation of ANSI/ANS-3.2-2017)
- ANSI/ANS-8.5-1996 (R2022), *Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material* (reaffirmation of ANSI/ANS-8.5-1996; R2017)
- ANSI/ANS-8.6-1983 (R2022), *Safety in Conducting Subcritical Neutron-Multiplication Measurements in Situ* (reaffirmation of ANSI/ANS-8.6-1983; R2017)
- ANSI/ANS-8.26-2007 (R2022), *Criticality Safety Engineer Training and Qualification Program* (reaffirmation of ANSI/ANS-8.26-2007; R2016)
- ANSI/ANS-19.4-2017 (R2022), *A Guide for Acquisition and Documentation of Reference Power Reactor Physics Measurements for Nuclear Analysis Verification* (reaffirmation of ANSI/ANS-19.4-2017)
- ANSI/ANS-19.11-2017 (R2022), *Calculation and Measurement of the Moderator Temperature Coefficient of Reactivity for Pressurized Water Reactors* (reaffirmation of ANSI/ANS-19.11-2017)
- ANSI/ANS-58.14-2011 (R2022), *Safety and Pressure Integrity Classification Criteria for Light Water Reactors* (reaffirmation of ANSI/ANS-58.14-2011; R2017)

New and Revised Standards Approved/Published

- ANSI/ANS-2.21-2022, *Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink* (revision)
- ANSI/ANS-8.3-2022, *Criticality Accident Alarm System* (revision)
- ANSI/ANS-8.7-2022, *Nuclear Criticality Safety in the Storage of Fissile Materials* (revision)
- ANSI/ANS-19.3-2022, *Steady-State Neutronics Methods for Power Reactor Analysis* (revision)
- ANSI/ANS-19.3.4-2022, *The Determination of Thermal Energy Deposition Rates in Nuclear Reactors* (revision)

- ANSI/ANS-30.3-2022, *Light-Water Reactor Risk-Informed Performance-Based Design* (new standard)
- ANSI/ANS-55.1-2021, *Solid Radioactive Waste Processing System for Light-Water-Cooled Reactor Plants* (revision – published in 2022)
- ANSI/ASME/ANS RA-S-1.1-2022, *Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications* (revision)

ANS Standards Committee

Scope:

The American Nuclear Society Standards Committee is responsible for the development and maintenance of standards that address the design, analysis, and operation of components, systems, and facilities related to the application of nuclear science and technology. The scope of the Standards Committee includes the development and maintenance of standards on the following subjects and closely related activities:

a. *Definitions of terminology used in nuclear science and technology*
b. *Siting requirements for nuclear facilities*
c. *Nuclear facility design and operations, including safety criteria for facilities, operator selection, and training*
    i. *Power production reactors*
    ii. *Research reactors and critical facilities*
    iii. *Nuclear fuel production, handling, and storage facilities*
d. *Facilities for handling radioactive isotopes, including remote handling of radioactive materials*
e. *Remediation and restoration of sites used for nuclear facilities*
f. *Emergency preparedness*
g. *Nuclear criticality safety*
h. *Reactor physics and radiation shielding*
i. *Computational analysis programs used in the nuclear field*
j. *Probabilistic risk assessment, risk management, and risk criteria*
k. *Fission product behavior*
l. *Radioactive waste management*

The Standards Committee does not develop standards for the application of radiation for medical purposes.

The Standards Committee reviews standards being developed or issued by other organizations on related topics to help ensure consistency and completeness and to avoid duplication.

Standards developed by the Standards Committee are intended to be issued as American National Standards.

The Standards Committee consists of consensus committees, subcommittees, and working groups, all of which are under the administrative control and policy direction of the ANS Standards Board.

Standards Board Membership

Donald R. Eggett, Chair, Eggett Consulting, LLC
Andrew G. Sowder, Vice Chair, Electric Power Research Institute
Amir Afzali, Member at Large, Individual
Robert Becse, Westinghouse Electric Company, LLC
Jennifer Call, Member at Large, Tennessee Valley Authority
George F. Flanagan, Ex Officio Member (RARCC), Individual
Michelle French, Ex Officio Member (LLWRCC), WECTEC
Dennis Henneke, Ex Officio Member (JCNRM), GE Hitachi
Robert Kalantari, Engineering Planning and Management, Inc.
Mark A. Linn, Member at Large, Individual
Jean-Francois Lucchini, Ex Officio Member (FWDCC), Los Alamos National Laboratory
Charles Martin, Ex Officio Member (NRNFCC), Longenecker and Associates
Carl A. Mazzola, Ex Officio Member (ESCC), Los Alamos National Laboratory (TRIAD National Security)
Mehdi Resi-Fard, U.S. Nuclear Regulatory Commission
Andrew O. Smetana, Ex Officio Member (SRACC), Individual
Larry L. Wetzel, Ex Officio Member (NCSCC), BWX Technologies, Inc.

Douglas Bowen, Observer, Oak Ridge National Laboratory
Robert J. Budnitz, Observer, Lawrence Berkeley National Laboratory (retired)
Sudesh Gambhir, Observer, Institute of Nuclear Power Operations
Raymond George, Liaison, Institute of Nuclear Power Operations
Calvin M. Hopper, Observer, Individual
N. Prasad Kadambi, ANSI Liaison, Kadambi Engineering Consultants
John Mahoney, ANS Board of Directors Liaison, High Expectations International, LLC
Frances Pimentel, Observer, Nuclear Energy Institute
Robert Roche-Rivera, Observer, U.S. Nuclear Regulatory Commission
Edward G. Wallace, Observer, GNBC Associates, Inc.

Ex Officio Member = *Consensus Committee Chair*

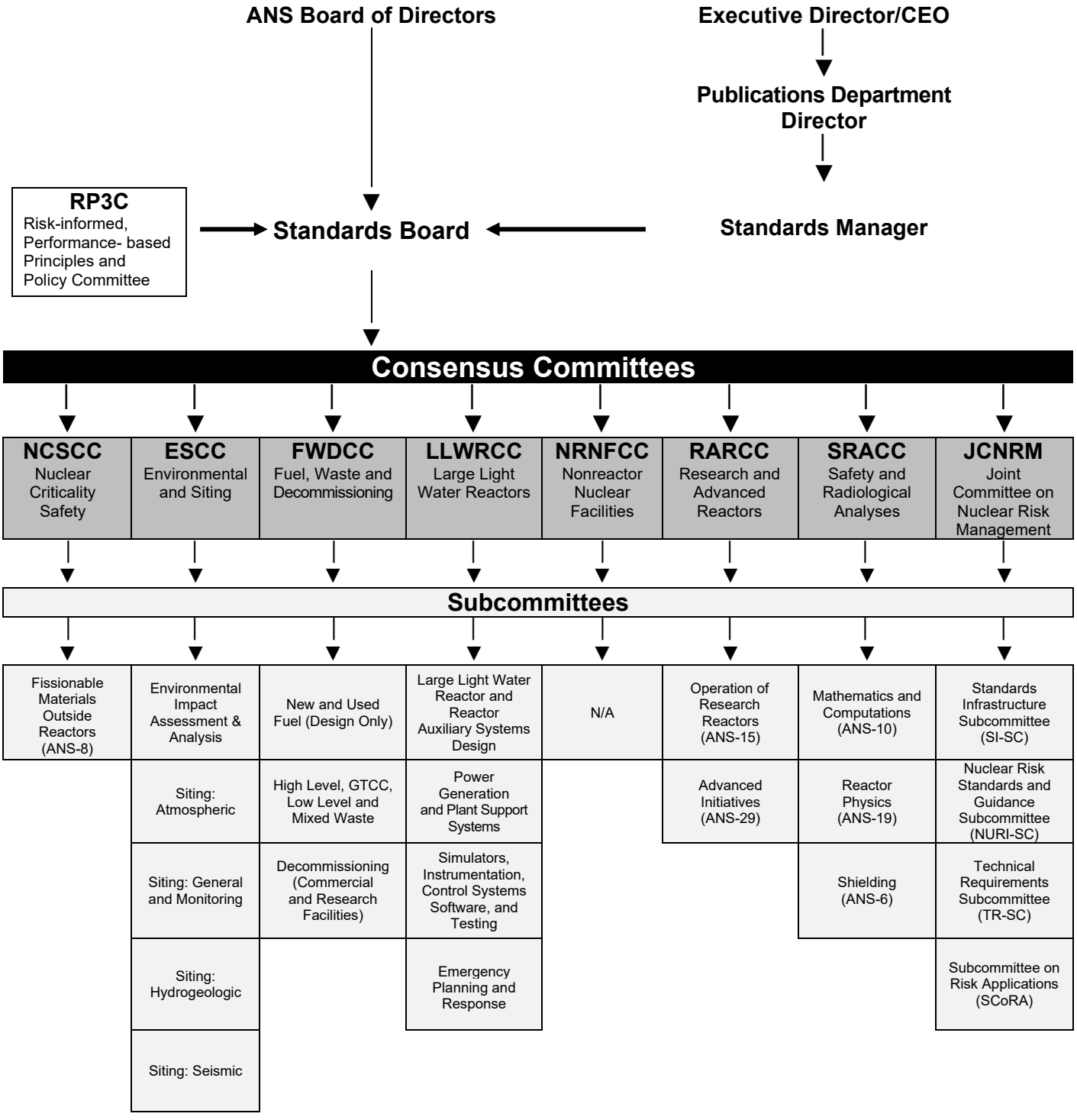


Figure 2 – ANS Standards Committee: Organizational Chart

SUBCOMMITTEE CHAIRS

Advanced Initiatives (ANS-29) (RARCC)	Bruce Bevard
Decommissioning (Commercial and Research Facilities) (FWDCC)	OPEN
Emergency Planning and Response (LLWRCC)	Ronald Markovich
Environmental and Impact Assessment (ESCC)	Leah Parks
Fissionable Material Outside Reactors (ANS-8) (NCSCC)	Douglas Bowen
High Level, GTCC, Low Level, and Mixed Waste (FWDCC)	Sven Bader
Light Water Reactor and Reactor Auxiliary Systems Design (LLWRCC)	Robert Burg
Mathematics and Computations (ANS-10) (SRACC)	Paul Hulse
New and Used Fuel (Design Only) (FWDCC)	Mitchell Sanders
Operation of Research Reactors (ANS-15) (RARCC)	Thomas Newton
Power Generation and Plant Support Systems (LLWRCC)	OPEN
Reactor Physics (ANS-19) (SRACC)	Dimitrios Cokinos
Shielding (ANS-6) (SRACC)	Charlotta Sanders
Simulators, Instrumentation, Control Systems, Software and Testing (LLWRCC)	Pranab Guha
Siting: Atmospheric (ESCC)	Jennifer Call
Siting: General and Monitoring (ESCC)	Leah Parks
Siting: Hydrogeologic (ESCC)	Yan Gao
Siting: Seismic (ESCC)	Jim Xu
Nuclear Risk Standards and Guidance Subcommittee (NURI-SC)	Reed LaBarge
Standards Infrastructure Subcommittee (SI-SC)	Matthew Denman
Subcommittee on Risk Applications (SCoRA)	Stuart Lewis
Technical Requirements Subcommittee (TR-SC)	Raymond Fine

APPROVED AMERICAN NATIONAL STANDARDS

Developed by the ANS Standards Committee

(through December 2022)

ANS-1-2000; R2007; R2012; R2019	*Conduct of Critical Experiments* (reaffirmed 8/12/2019)—$55.00
ANS-2.2-2016; R2020	*Earthquake Instrumentation Criteria for Nuclear Power Plants* (reaffirmed 11/13/2020)—$192.00
ANS-2.3-2011; R2016; R2021	*Estimating Tornado, Hurricane, and Extreme Straight-Line Wind Characteristics at Nuclear Facility Sites* (reaffirmed 7/19/2021)—$96.00
ANS-2.6-2018	*Guidelines for Estimating Present & Forecasting Future Population Distributions Surrounding Nuclear Facility Sites* (approved 3/16/2018)—$183.00
ANS-2.8-2019	*Probabilistic Evaluation of External Flood Hazards for Nuclear Facilities* (approved 12/17/2019)—$258.00
ANS-2.10-2017; R2022	*Criteria for Retrieval, Processing, Handling, and Storage of Records from Nuclear Facility Seismic Instrumentation* (approved 4/1/2022)—$150.00
ANS-2.15-2013; R2017; R2021	*Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities* (reaffirmed 11/11/2021)—$233.00
ANS-2.17-2010; R2016; R2021	*Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants* (reaffirmed 6/28/2021)—$189.00
ANS-2.21-2022	*Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink* (approved 1/27/2022)—$248.00
ANS-2.23-2016; R2020	*Nuclear Plant Response to an Earthquake* (reaffirmed 11/13/2020)—$224.00
ANS-2.26-2004; R2010; R2017; R2021	*Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design* (reaffirmed 12/10/2021)—$163.00
ANS-2.27-2020	*Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments* (approved 4/16/2020)—$195.00
ANS-2.29-2020	*Probabilistic Seismic Hazard Analysis* (approved 4/16/2020)—$230.00
ANS-2.30-2015; R2020	*Criteria for Assessing Tectonic Surface Fault Rupture and Deformation at Nuclear Facilities* (reaffirmed 5/4/2020)—$311.00
ANS-3.1-2014; R2020	*Selection, Qualification and Training of Personnel for Nuclear Power Plants* (reaffirmed 2/4/2020)—$175.00
ANS-3.2-2012; R2017; R2022	*Managerial, Administrative, and Quality Assurance Controls for the Operational Phase of Nuclear Power Plants* (reaffirmed 4/4/2017)—$175.00
ANS-3.4-2013; R2018	*Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants* (reaffirmed 7/2/2018)—$189.00

ANS-3.5-2018	*Nuclear Power Plant Simulators for Use in Operator Training and Examination* (approved 10/10/2019)—$171.00
ANS-3.11-2015; R2020	*Determining Meteorological Information at Nuclear Facilities* (reaffirmed 5/21/2020)—$300.00
ANS-3.14-2021	*Process for Aging Management and Life Extension for Nonreactor Nuclear Facilities* (approved 8/5/2021)—$215.00
ANS-5.1-2014; R2019	*Decay Heat Power in Light Water Reactors* (reaffirmed 2/5/2019)—$229.00
ANS-5.4-2011; R2020	*Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel* (reaffirmed 4/9/2020)—$107.00
ANS-5.10-1998; R2006; R2013; R2019	*Airborne Release Fractions at Non-Reactor Nuclear Facilities* (reaffirmed 10/3/2019)—$180.00
ANS-6.1.1-2020	*Photon and Neutron Fluence-to-Dose Conversion Coefficients* (approved 9/10/2020)—$97.00
ANS-6.1.2-2013; R2018	*Group-Averaged Neutron and Gamma-Ray Cross Sections for Radiation Protection and Shielding Calculations for Nuclear Power Plants* (reaffirmed 10/19/2018)—$76.00
ANS-6.3.1-1987; R1998; R2007; R2015; R2020	*Program for Testing Radiation Shields in Light Water Reactors* (LWR) (reaffirmed7/28/2020)—$107.00
ANS-6.4-2006; R2016; R2021	*Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants* (reaffirmed 8/5/2021)—$284.00
ANS-6.4.2-2006; R2016; R2021	*Specification for Radiation Shielding Materials* (reaffirmed 12/2/2021)—$107.00
ANS-6.6.1-2015; R2020	*Calculation and Measurement of Direct and Scattered Gamma Radiation from LWR Nuclear Power Plants* (reaffirmed 4/23/2020)—$197.00
ANS-8.1-2014; R2018	*Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors* (reaffirmed 11/27/2018)—$131.00
ANS-8.3-2022	*Criticality Accident Alarm System* (approved 9/9/2022)—$139.00
ANS-8.5-1996; R2002; R2007; R2012; R2017 R2022	*Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material* (reaffirmed 11/14/2017)—$87.00
ANS-8.6-1983; R1988; R1995; R2001; R2010; R2017; R2022	*Safety in Conducting Subcritical Neutron-Multiplication Measurements In Situ* (reaffirmed 9/8/2022)—$43.00
ANS-8.7-2022	*Nuclear Criticality Safety in the Storage of Fissile Materials* (approved 5/6/2022)—$134.00
ANS-8.10-2015; R2020	*Criteria for Nuclear Criticality Safety Controls in Operations with Shielding and Confinement* (reaffirmed 3/26/2020)—$76.00
ANS-8.12-1987; R1993; R2002; R2011; R2016; R2021	*Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors* (reaffirmed 8/16/2021)—$131.00

ANS-8.14-2004; R2011; R2016; R2021	*Use of Soluble Neutron Absorbers in Nuclear Facilities Outside Reactors* (reaffirmed 8/5/2021)—$65.00
ANS-8.15-2014; R2019	Nuclear Criticality Control of Special Actinide Elements (reaffirmed 9/12/2019)—$150.00
ANS-8.17-2004; R2009; R2014; R2019	*Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors* (reaffirmed 9/12/2019)—$65.00
ANS-8.19-2014; R2019	*Administrative Practices for Nuclear Criticality Safety* (reaffirmed 8/22/2019)—$69.00
ANS-8.20-1991; R1999; R2005; R2015; R2020	*Nuclear Criticality Safety Training* (reaffirmed 5/8/2020)—$65.00
ANS-8.21-1995; R2001; R2011; R2019	*Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors* (reaffirmed 4/9/2019)—$65.00
ANS-8.22-1997; R2006; R2011; R2016; R2021	*Nuclear Criticality Safety Based on Limiting and Controlling Moderators* (reaffirmed 12/7/2021)—$77.00
ANS-8.23-2019	*Nuclear Criticality Accident Emergency Planning and Response* (approved 9/16/2019)—$181.00
ANS-8.24-2017	*Validation of Neutron Transport Methods for Nuclear Criticality Safety* Calculations (approved 12/12/2017)—$167.00
ANS-8.26-2007; R2012; R2016; R2022	*Criticality Safety Engineer Training and Qualification Program* (reaffirmed 2/18/2022)—$55.00
ANS-8.27-2015; R2020	*Burnup Credit for LWR Fuel* (reaffirmed 8/7/2020)—$127.00
ANS-10.4-2008; R2016; R2021	*Verification and Validation of Non-Safety Related Scientific and Engineering Computer Programs for the Nuclear Industry* (reaffirmed 6/15/2021)—$177.00
ANS-10.5-2006; R2011; R2016; R2021	*Accommodating User Needs in Scientific and Engineering Computer Software Development* (reaffirmed 8/23/2021)—$78.00
ANS-10.7-2013; R2018	*Non-Real Time, High-Integrity Software for the Nuclear Industry—Developer Requirements* (reaffirmed 8/13/2018)—$150.00
ANS-10.8-2015; R2020	*Non-Real Time, High-Integrity Software for the Nuclear Industry—User Requirements* (reaffirmed 10/29/2020)—$165.00
ANS-14.1-2004; R2009; R2014; R2019	*Operation of Fast Pulse Reactors* (reaffirmed 8/12/2019)—$65.00
ANS-15.1-2007; R2007; R2013; R2018	*The Development of Technical Specifications for Research Reactors* (reaffirmed 4/10/2018)—$131.00
ANS-15.2-1999; R2009; R2016; R2021	*Quality Control for Plate-Type Uranium-Aluminum Fuel Elements* (reaffirmed 1/28/2021)—$87.00
ANS-15.4-2016; R2021	*Selection and Training of Personnel for Research Reactors* (approved 7/23/2021)—$127.00
ANS-15.8-1995; R2005; R2013; R2018	*Quality Assurance Program Requirements for Research Reactors* (reaffirmed 7/18/2018)—$87.00

ANS-15.11-2016; R2021	*Radiation Protection at Research Reactor Facilities* (approved 7/20/2021)—$204.00
ANS-15.16-2015; R2020	*Emergency Planning for Research Reactors* (reaffirmed 1/23/2020)—$97.00
ANS-15.21-2012; R2018	*Format and Content for Safety Analysis Reports for Research Reactors* (reaffirmed 2/27/2018)—$168.00
ANS-16.1-2019	*Measurement of the Leachability of Solidified Low-Level Radioactive Wastes Short-Term Test Procedure* (approved 2/22/2019)—$174.00
ANS-18.1-2020	*Radioactive Source Term for Normal Operation of Light Water Reactors* (approved 7/24/2020)—$139.00
ANS-19.1-2019	*Nuclear Data Sets for Reactor Design Calculations* (approved 3/8/2019)—$130.00
ANS-19.3-2022	*Steady-State Neutronics Methods for Power Reactor Analysis* (approved 10/6/2022)—$194.00
ANS-19.3.4-2022	*The Determination of Thermal Energy Deposition Rates in Nuclear Reactors* (approved 7/12/2022)—$145.00
ANS-19.4-2017; R2022	*A Guide for Acquisition and Documentation of Reference Power Reactor Physics Measurements for Nuclear Analysis Verification* (reaffirmed 8/24/2022)—$144.00
ANS-19.6.1-2019	*Reload Startup Physics Tests for Pressurized Water Reactors* (approved 12/19/2019)—$172.00
ANS-19.10-2009; R2016; R2021	*Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals* (reaffirmed 10/7/2021)—$73.00
ANS-19.11-2017; R2022	*Calculations and Measurement of the Moderator Temperature Coefficient of Reactivity for Pressurized Power Reactors* (reaffirmed 6/2/2022)—$159.00
ANS-30.3-2022	*Advanced Light-Water Reactor Risk-Informed Performance-Based Design Criteria and Methods* (approved 7/21/2022)—$211.00
ANS-40.37-2009; R2016; R2021	*Mobile Low Level Radioactive Waste Processing Systems* (reaffirmed 2/22/2021)—$200.00
ANS-41.5-2012; R2018	*Verification and Validation of Radiological Data for Use in Waste Management and Environmental Remediation* (reaffirmed 10/19/2018)—$220.00
ANS-51.10-2020	*Auxiliary Feedwater System for Pressurized Water Reactors* (approved 10/23/2020)—$183.00
ANS-53.1-2011; R2016; R2021	*Nuclear Safety Design Process for Modular-Helium Cooled Reactor Plants* (reaffirmed 10/7/2021)—$318.00
ANS-54.1-2020	*Nuclear Safety Criteria and Design Process for Liquid-Metal-Cooled Nuclear Power Plants* (approved 3/23/2020)—$199.00
ANS-55.1-2021	*Solid Radioactive Waste Processing Systems for Light Water Cooled Reactor Plants* (approved 12/2/2021)—$215.00
ANS-56.8-2020	*Containment System Leakage Testing Requirements* (approved 12/11/2020)—$192.00

ANS-57.1-1992; R1998; R2005; R2015; R2019	*Design Requirements for Light Water Reactor Fuel Handling System* (reaffirmed 612/6/19)—$96.00
ANS-57.3-2018	*Design Requirements for New Fuel Storage Facilities at Light Water Reactor Plants* (approved 2/27/2018)—$107.00
ANS-57.8-2020	*Fuel Assembly Identification* (approved 8/28/2020)—$172.00
ANS-57.10-1996; R2006; R2016; R2021	*Design Criteria for Consolidation of LWR Spent Fuel* (reaffirmed 1/28/2021)—$185.00
ANS-58.8-2019	*Time Response Criteria for Manual Actions at Nuclear Power Plants* (approved 8/8/2019)—$118.00
ANS-58.9-2002; R2009; R2015; R2020	*Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems* (reaffirmed 7/23/2020)—$65.00
ANS-58.14-2011; R2017 R2022	*Safety and Pressure Integrity Classification Criteria for Light Water Reactors* (reaffirmed 1/12/2017)—$265.00
ANS-58.16-2014; R2020	*Safety Categorization and Design Criteria for Nonreactor Nuclear Facilities* (reaffirmed 2/4/2022)—$210.00
ANS-59.51-1997; R2007; R2015; R2020	*Fuel Oil Systems for Safety-Related Emergency Diesel Generators* (reaffirmed 7/27/2020)—$107.00
ANS-59.52-1998; R2007; R2015; R2020	*Lubricating Oil Systems for Safety-Related Emergency Diesel Generators* (reaffirmed 7/24/2020)—$96.00

Approved ASME/ANS Joint American National Standard

ASME/ANS RA-S-1.1-2022	*Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications* (approved 5/11/2022)—$610.00
ASME/ANS RA-S-1.4-2021	*Probabilistic Risk Assessment Standard for Advanced Non-Light Water Reactor Nuclear Power Plants* (approved 1/28/2021)—$590.00

Approved ASME/ANS Joint Trial-Use Standards (not approved by ANSI)

ANS/ASME-58.22-2014	*Requirements for Low Power and Shutdown Probabilistic Risk Assessment* (approved for trial use by the JCNRM; not approved by ANSI)—$440.00
ASME/ANS RA-S-1.2-2014	*Severe Accident Progression and Radiological Release (Level 2) PRA Standard for Nuclear Power Plant Applications for Light Water Reactors (LWRs)* (approved for trial use by the JCNRM; not approved by ANSI)—$220.00
ASME/ANS RA-S-1.3-2017	*Standard for Radiological Accident Offsite Consequence Analysis (Level 3 PRA) to Support Nuclear Installation Applications* (approved for trial use by the JCNRM; not approved by ANSI)—$220.00

Environmental and Siting Consensus Committee (ESCC)

Carl A. Mazzola, Chair
Los Alamos National Laboratory (TRIAD National Security)

Scope: *The ESCC is responsible for the preparation and maintenance of voluntary consensus standards for all aspects of nuclear power plant and nonreactor nuclear facility siting, environmental assessment, environmental management, environmental monitoring, and the categorization and evaluation of natural phenomena hazards at these public and private sector nuclear facilities.*

Many of the ESCC standards presently support the siting and environmental needs of the civilian nuclear industry and the Department of Energy (DOE) in meeting 10 CFR 50, 10 CFR 51 and 10 CFR 52 licensing requirements and assisting with compliance to 40 CFR enabling regulations associated with the Clean Air Act, Clean Water Act, Safe Drinking Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response Compensation and Liability Act, Toxic Substances Control Act, and National Environmental Policy Act. The ANS Standards Committee Procedures Manual for Consensus Committees shall be used to guide the activities of this consensus committee.

The ESCC supervises the work of the following subcommittees. They are as follows:

- *Environmental and Impact Assessment*
- *Siting: Atmospheric*
- *Siting: General and Monitoring*
- *Siting: Hydrogeologic*
- *Siting: Seismic*

ESCC Membership:

Carl A. Mazzola, Chair, Los Alamos National Laboratory (TRIAD National Security)
Leah Parks, Vice Chair, U.S. Nuclear Regulatory Commission
Amir Bahadori, Kansas State University
Thomas Bellinger, Consolidated Nuclear Security, LLC
David Bruggeman, Los Alamos National Laboratory (TRIAD National Security)
Jennifer Call, Tennessee Valley Authority
Andrew Dewhurst, Kinectrics AES, Inc.
William Ebert, Argonne National Laboratory
Yan Gao, Dominion Energy
Brent Gutierrez, U.S. Department of Energy
Marsha Kinley, Duke Energy Corporation
Yong Li, Defense Nuclear Facility Safety Board
Kit Ng, Bechtel Power Corporation
James O'Brien, U.S. Department of Energy
Samuel Rosenbloom, Individual
Jean Savy, Individual
Ali Simpkins, Oak Ridge Associated Universities
Jim Xu, U.S. Nuclear Regulatory Commission

Report of the ESCC:

Three teleconferences were held in 2022 (March, July, and November). Sam Rosenbloom retired from Los Alamos National Laboratory and remained on the ESCC as an individual. Jim Xu retired from the NRC and from all standards activities on 12/31/22.

Approved in 2022:

ANSI/ANS-2.10-2017 (R2022), *Criteria for Retrieval, Processing, Handling, and Storage of Records from Nuclear Facility Seismic Instrumentation* (reaffirmation of ANSI/ANS-2.10-2017)

ANSI/ANS-2.21-2022, *Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink* (revision of ANSI/ANS-2.21-2012; R2016)

Active standards/projects (Approved PINS):

ANS-2.3, *Estimating Tornado, Hurricane, and Extreme Straight-Line Wind Characteristics at Nuclear Facility Sites* (revision of ANSI/ANS-2.3-2011; R2021)

ANS-2.15, *Criteria for Modeling Atmospheric Dispersion of Radiological Releases from Nuclear Facilities* (revision of ANSI/ANS-2.15-2013; R2021)

ANS-2.18, *Evaluating Radionuclide Transport in Surface Water for Nuclear Reactor and Nuclear Facility Sites* (proposed new standard)

ANS-2.22, *Environmental Radiological Monitoring at Nuclear Facilities* (proposed new standard)

ANS-2.26, *Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design* (revision of ANSI/ANS-2.26-2004; R2021)

ANS-2.32, *Guidance on the Selection and Evaluation of Remediation Methods for Subsurface Contamination* (proposed new standard)

ANS-2.34, *Characterization and Probabilistic Analysis of Volcanic Hazards* (proposed new standard)

ANS-2.35, *Guidelines for Estimating Present & Projecting Future Socioeconomic Impacts from Construction, Operations, and Decommissioning of Nuclear Facilities* (proposed new standard)

ANS-3.11, *Determining Meteorological Data for Nuclear Facilities* (revision of ANSI/ANS-3.11-2005; R2020)

Environmental and Impact Assessment and Analysis Subcommittee

Membership:
Leah Parks, Chair, U.S. Nuclear Regulatory Commission
David Anderson, Pacific Northwest National Laboratory

The Environmental and Impact Assessment and Analysis Subcommittee managed the following project:

ANS-2.35, *Guidelines for Estimating Present & Projecting Future Socioeconomic Impacts from the Construction, Operations, and Decommissioning of Nuclear Sites* (proposed new standard)

Scope: *This standard provides civilian and government professionals with acceptable methodologies for determining and reporting potential socioeconomic impacts from constructing, operating, and decommissioning nuclear facilities including, but not limited to, LWRs, SMRs, advanced reactors, and nuclear fuel cycle facilities.*

Membership:
David Anderson, Chair, Pacific Northwest National Laboratory; Daniel Mussatti, Vice Chair, U.S. Nuclear Regulatory Commission; Linda Andrews, Framatome Inc.; Bandana Kar, U.S. Department of Energy; Archie (Archana) Manoharan, BWX Technologies, Inc.; Leah Parks, Jerry Riggs, Enercon; U.S. Nuclear Regulatory Commission; Amy Rose, Oak Ridge National Laboratory; Rachel Turney-Work, Enercon Services, Inc.; Kevin Weinisch, KLD Engineering, P.C.; Trevor Wind (Associate Member); Daniel Yurman, Individual

Status: We are in the formative stages of developing ANS-2.35. PINS submitted to ANSI on 5/20/2019. The working group met approximately quarterly in 2022. In September 2022, the first draft text of the standard was developed and circulated among the working group for review and comment. At the October meeting, additional writing and review assignments were made with report out scheduled for January 2023.

Siting: Atmospheric Subcommittee

Membership:
Jennifer Call, Chair, Tennessee Valley Authority
OPEN, Vice Chair
Thomas Bellinger, Consolidated Nuclear Security, LLC
David Bruggeman, Los Alamos National Laboratory
John Ciolek, Los Alamos National Laboratory
Marsha Kinley, Duke Energy Corporation
Carl Mazzola, Los Alamos National Laboratory
Kevin Quinlan, U.S. Nuclear Regulatory Commission
Steven Weinbeck, Savannah River National Laboratory

The Siting: Atmospheric Subcommittee oversees the following projects:

ANSI/ANS-2.3-2011 (R2021), ***Estimating Tornado, Hurricane, and Extreme Straight Line Wind Characteristics at Nuclear Facility Sites*** **(proposed new standard, historical revision of ANSI/ANS-2.3-1983)**

Scope: *This standard defines site phenomena caused by (1) extreme straight winds, (2) hurricanes, and (3) tornados in various geographic regions of the U.S. These phenomena are used for the design of nuclear facilities.*

Membership:
Steven Weinbeck, Chair, Savannah River National Laboratory; Jeffrey Baum, ABSG Consulting Inc.; Ashley Bruggeman, Triad National Security, LLC: Mark Carroll, ChemStaff; Michelle Evans, Simpson Gumpertz & Heger Inc.; Antonio Godoy, Individual; Brent Gutierrez, U.S. Department of Energy; Charles Hunter, Individual; Shannon Jasim-Hanif, U.S. Department of Energy; Mark Levitan, National Institute of Standards & Technology; Alex Markivich, Westinghouse Electric Company, LLC; Carl Mazzola, Los Alamos National Laboratory; Larry Twisdale, Applied Research Associates, Inc.; Elena Yegorova, U.S. Nuclear Regulatory Commission

Status:
This standard was reaffirmed 7/19/2021. A PINS was submitted to ANSI on 10/25/22. Steven Weinbeck replaced Jeff Baum as working group chair. The working group has been awaiting new and emerging tornado research conducted by the National Institute of Standards and Technology and ASCE before undertaking a major revision.

ANSI/ANS-2.15-2013 (R2021), ***Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities*** **(new standard)**

Scope: *This standard establishes criteria for using meteorological data collected at nuclear facilities to evaluate the atmospheric effects on routine radioactive releases, including dilution, dispersion, plume rise, plume meander, aerodynamic effects of buildings, dry, deposition, and wet deposition (e.g., precipitation scavenging).*

Membership:
John Ciolek, Chair, Los Alamos National Laboratory; Mark Abrams, ABS Consulting, Inc.; Thomas Bellinger, Consolidated Nuclear Security, LLC; David Brown, National Institute of Standards & Technology; Mark Carroll, ChemStaff; Toree Cook, Tennessee Valley Authority; Cliff Glantz, Pacific Northwest National Laboratory; Chuck Hunter, Individual; Marsha Kinley, Duke Energy; Mike Mazaika, U.S. Nuclear Regulatory Commission; Carl Mazzola, Los Alamos National Laboratory; Doyle Pittman, Individual; Jeremy Rishel, Pacific Northwest National Laboratory; Ali Simpkins, Oak Ridge Associated Universities

Status: This standard was reaffirmed on 11/11/2021. A PINS for the next revision was submitted to ANSI on 10/25/22. The ESCC and the Standards Board approved a ballot to terminate work on ANS-2.16 and ANS-3.8.10. Relevant material will be included in the next revision of ANS-2.15.

ANSI/ANS-2.21-2022, *Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink* (revision of ANSI/ANS-2.21-2012; R2016)

Scope: *This standard establishes criteria for the use of meteorological and hydrological data by nuclear facilities to evaluate the atmospheric effects from meteorological parameters on ultimate heat sinks. These input parameters may include dry-bulb temperature; wet-bulb temperature; dewpoint, cloud-cover, relative humidity, precipitation, wind speed, incoming short-wave solar radiation, incoming long-wave radiation, surface water temperature, and atmospheric pressure.*

Membership:
Marsha Kinley, Chair, Duke Energy; Chuck Bowman, Chuck Bowman Associates, Inc.; Edward Buchak, Environmental Resources Management; Jennifer Call, Tennessee Valley Authority.; Mark Carroll, Chemstaff; Richard Codell, Individual; Andrew Dewhurst, Kinectrics AES, Inc.; Chang Li, U.S. Nuclear Regulatory Commission; Michael Mazaika, U.S. Nuclear Regulatory Commission; Carl Mazzola, Los Alamos National Laboratory; Rajiv Prasad, Pacific Northwest National Laboratory; Kevin Quinlan, U.S. Nuclear Regulatory Commission

Status:. The revision was approved by ANSI on 1/27/2022. The working group held 10 virtual meetings between January-April 2022, resolving comments from the Standards Board and the ANS editor, updating references, and approving a final version of the proposed revision. Many thanks to everyone who contributed to this effort over the years (2018-2022).

ANSI/ANS-3.11-2015 (R2020) *Determining Meteorological Information at Nuclear Facilities* (revision of ANSI/ANS-3.11-2005; R2010)

Scope: *The standard includes the identification of which meteorological parameters should be measured, parameter accuracies, meteorological tower siting considerations, data monitoring methodologies, data reduction techniques and quality assurance requirements.*

Membership:
Thomas Bellinger, Co-Chair, Consolidated Nuclear Solutions, LLC; David Bruggeman, Co-Chair, Los Alamos National Laboratory; Mark Abrams, ABS Consulting; Kevin Birdwell, Oak Ridge National Laboratory; Patrick Brennan, Meteorological Evaluation Services; Jennifer Call, Tennessee Valley Authority; Mark Carroll, ChemStaff; John Ciolek, Los Alamos National Laboratory; Thomas Coulter, Coulter Air Quality Services; Paul Fransioli, Individual; Cliff Glantz, Pacific Northwest National Laboratory; Frank Hickey, Susquehanna Nuclear, LLC; James Holian, Holian Environmental, LLC; Charles Hunter, Savannah River National Laboratory; Rachael Ishaya, BRYZA Wind Laboratory; David Katz, Climatronics Corporation; Stanton Lanham, Duke Energy; Stanley Levinson, Individual; Stanley Marsh, Southern California Edison; Michael Mazaika, U.S. Nuclear Regulatory Commission; Carl Mazzola, Los Alamos National Laboratory; Edward McCarthy, E.F. McCarthy & Associates; Doyle Pittman, Individual; Kevin Quinlan, U.S. Nuclear Regulatory Commission; Walter Schalk, U.S. Department of Energy; Adam Smith, Tennessee Valley Authority; Ping Wan, Individual; Ken Wastrack, Tennessee Valley Authority; Steve Weinbeck, Savannah River National Laboratory

Status: The standard was approved by ANSI on 8/20/2015 and was reaffirmed on 5/21/2020. This standard was moved from the subcommittee Siting: General & Monitoring to the subcommittee Siting: Atmospheric in 2018. A PINS to initiate the revision of the standard was submitted to ANSI on 12/3/2020, and a PIP was prepared in 2021. The working group is in the process of writing and reviewing the standard.

ANS-3.16, *Meteorology and Wildland Fires* (proposed new standard)

Scope: *The broad scope of this standard is to provide guidance to the user and point the user to the applicable references where more detailed information can be found related to the meteorological / atmospheric impacts and forecasting considerations on wildland fires. (This will be further refined as the PINS is developed.)*

Membership:
Rodman Linn, Chair, Los Alamos National Laboratory; Jeffrey Baum, ABSG Consulting Inc.; David Bruggeman, Los Alamos National Laboratory; Christopher Fiebrich, University of Oklahoma; Todd Lindley, National Oceanic and Atmospheric Administration; Scott McDonald, Washington State Department of Health; Rhett Milne, Individual; Bill Shields, Individual; John Snow, Snow & Associates, LLC; Brian Viner, Savannah River National Laboratory

Status: In August 2022, the ESCC unanimously agreed via ballot to terminate work on this proposed standard. The following justification was provided:

> In January 2017, ESCC leadership working with representatives of the Department of Energy (DOE), envisioned the need for a national consensus standard on the meteorological aspects of wildland fires. A comprehensive White Paper was prepared and after socialization, a decision to develop a national consensus standard, ANS-3.16, was made. However, during the early discussions it became clear that the interest in the standard would be limited to DOE which has several large reservations that are prone to wildland fires. Nuclear power plants were sited in locations that were not prone to this natural phenomenon hazard.
>
> Over the past five and one-half years, little progress has been made in the standards development process, as there has been a large turnover in working group chairs for various reasons. A PINS was finally developed in 2021, and it was met with numerous comments from ESCC and later by the Standards Board. The ESCC comments were successfully adjudicated. Some of the Standards Board comments suggested that the industry does not even need such a standard. Based on the very slow progress of the initial steps of developing this standard, coupled with the recognition that it is plausible that the standard may not generate enough interest in solving wildland fire issues at nuclear installations, ESCC proposes to terminate ANS-3.16 before further human capital is expended. Based on the projection that the working group has struggled to make any significant progress over the last five years, there is concern that many more years would be required to even develop this standard which may not survive ballot scrutiny. During these five years, ESCC leadership has had to intervene on many occasions to rescue the languishing working group. Numerous discussions were held to narrow the scope of the standard and better define the purpose and end users, yet the PINS still received several comments from the Standards Board voicing disapproval of the stated scope, purpose, and end user group. Therefore, ESCC has decided that the investment of any additional volunteer time and effort relative to this project is no longer merited, as it is perceived to be likely that there will be continued resistance to this standard in the future.

Siting: General and Monitoring Subcommittee

Membership:
Leah Parks, Chair, U.S. Nuclear Regulatory Commission
Teresa Eddy, Savannah River Nuclear Solutions
Andrew Garrabrants, Vanderbilt University
David Kosson, Vanderbilt University
Daniel Mussatti, U.S. Nuclear Regulatory Commission
Brooke Stagich, Savannah River National Laboratory

The Siting: General and Monitoring Subcommittee manages the following projects and current standards:

ANSI/ANS-2.6-2018, *Guidelines for Estimating Present and Projecting Future Population Distributions Surrounding Nuclear Facility Sites* (new standard)

Scope: *This standard provides civilian and government professionals with generally accepted demographic methodologies for the estimation and projection of human population distributions and densities near nuclear facility sites in order to facilitate the regulatory authority's review of site suitability relative to population considerations.*

Membership:
Daniel Mussatti, Chair, U.S. Nuclear Regulatory Commission; Leah Parks, Vice Chair, U.S. Nuclear Regulatory Commission; David Anderson, Pacific Northwest National Laboratory; Linda Andrews, Framatome, Inc.; Nate Bixler, Sandia National Laboratories; Olufemi Omtaomu, Oak Ridge National Laboratory; Mary Richmond, Bechtel Corporation; Amy Rose, Oak Ridge National Laboratory; Robert Sachs, Individual; Bo Saulsbury, Oak Ridge National Laboratory; Harold Stiles, Enercom Services Inc.; Seshagiri Tammara, U.S. Nuclear Regulatory Commission; Rachel Turney, Enercon Services, Inc.; Kevin Weinisch, KLD Engineering, P.C.

Status: The standard was approved by ANSI on 3/16/2018. Documents were submitted to ANSI for their approval of a reaffirmation on 12/27/22. Approval of the reaffirmation is expected in early 2023.

ANS-2.22, *Environmental Radiological Monitoring at Nuclear Facilities* (proposed new standard)

Scope: *This standard establishes criteria for use in developing and implementing an integrated radiological environmental monitoring program focusing on ambient air, surface water, and biota. It also provides criteria on the use of resultant environmental data collected near nuclear facilities to evaluate the impact of facility operations on the surrounding population and environment.*

Membership:
Teresa Eddy, Co-Chair, Savannah River Nuclear Solutions; Brooke Stagich, Co-Chair, Savannah River National Laboratory; Yasmeen Arafeh, Southern Nuclear; Janet Aremu-Cole, Duke Energy Corporation; Amir Bahadori, Kansas State University; James Bland, Chesapeake Nuclear Services, Inc.; Zachary Harvey, Lawrence Berkeley National Laboratory; Jerry Hiatt, Individual; Frank Hickey, Susquehanna Nuclear, LLC; Gary Huff, Gilbert Consulting Services Inc.; Xiaodong Jiang, Defense Nuclear Facilities Safety Board; James Key, Key Solutions, Inc.; Karen Kim-Stevens, Electric Power Research Institute; Robert Litman, Radiochemestry Laboratory Basics; Michael McDonald, RSI EnTech, LLC; Erik Merchant, American Electric Power; Brittany Owensby, Savannah River Nuclear Solutions; Tanya Oxenberg, TPO Technical Services, LLC; Ralph Perona, Neptune and Company Inc.; Michael Stewart, U.S. Department of Energy; Wendy Thompson, Hanford Mission Integration Solutions; Jared Wicker, Savannah River Nuclear Solutions; Kevin Witt, U.S. Department of Energy

Status: The PINS was submitted to ANSI on 4/24/2018. Theresa Eddy and Brooke Stagich are co-chairing the working group. They have reorganized the working group and kickstarted monthly meetings. An updated outline for the standard has been developed. A working copy of NCRP Report 169 for the working group to use as reference has been obtained. A Teams Share Site to provide a central location for all working files and references has been created. The working group has performed research reviews for the standard development process and developed a draft for some sections of the standard.

ANSI/ANS-16.1-2019, *Measurement of the Leachability of Solidified Low-Level Radioactive Wastes by a Short-Term Test Procedure* (revision of ANSI/ANS-16.1-2003; R2017)

Scope: *This standard provides a procedure to measure and index the release rates of non-volatile radionuclides from low–level radioactive waste forms in demineralized water over a test period. It can be applied to any material from which test specimens can be prepared by casting or cutting into a shape for which the surface area and volume can be determined. The results of this procedure do not represent waste form degradation in any specific environmental situation or represent waste form performance. The test method presented in this standard is an adaptation of the method published in the 1986 version of this standard but constrains test parameter values and data analyses to support direct comparisons of test responses of different waste form materials.*

Membership:
David Kosson, Co-chair, Vanderbilt University; Andrew Garrabrants, Co-chair, Vanderbilt University; Leah Parks, Vice Chair, U.S. Nuclear Regulatory Commission; Kevin Brown, Vanderbilt University; William Ebert, Argonne National Laboratory; Mark Fuhrmann, U.S. Nuclear Regulatory Commission; Albert Kruger, U.S. Department of Energy; Hans van der Sloot, Hans van der Sloot Consultancy

Status: This standard was approved by ANSI on February 22, 2019.

ANSI/ANS-41.5-2012 (R2018), *Verification and Validation of Radiological Data for Use in Waste Management and Environmental Remediation* (new standard)

Scope: *This standard establishes criteria and processes for determining the validity of radioanalytical data for waste management and environmental remediation. These applications include site characterization, waste acceptance, waste certification, waste treatment design, process control, risk communication, litigation, and other applications as deemed necessary.*

Membership:
OPEN

Status: This standard was reaffirmed by ANSI on 10/19/2018. This standard was formerly under the SRACC, Mathematics & Computations Subcommittee.

Siting: Hydrogeologic Subcommittee

Membership:
Yan Gao, Chair, Dominion Energy
Thomas Aird, U.S. Nuclear Regulatory Commission
Matt Darois, Radiation Safety & Control Services, Inc.
Todd Rasmussen, University of Georgia
Lisa Schleicher, U.S. Geological Survey
Raymond Schnieder, Westinghouse Electric Company, LLC

The Siting: Hydrogeologic Subcommittee manages the following projects and current standards:

ANSI/ANS-2.8-2019, *Probabilistic Evaluation of External Flood Hazards for Nuclear Facilities* (new standard, historical revision of ANSI/ANS-2.8-1992)

Scope: *This standard addresses necessary external flood conditions, technical parameters, and applicable methodologies required to evaluate/determine external flooding hazards for nuclear facilities.*

Membership:
Yan Gao, Co-Chair, Dominion Energy; Raymond Schnieder, Co-Chair, Westinghouse Electric Company, LLC, Victoria Anderson, Nuclear Energy Institute; James August, Individual; Meredith Carr, U.S. Nuclear Regulatory Commission; Lawrence Cieslik, HDR Company; Jemie Dababneh, U.S. Army Core of Engineers; David Finnicum, Consultant; Quazi Hossain, Individual; LLC; Kevin Hyde, Individual; Sharon Jasim-Hanif, Department of Energy; Joseph Kanney, Individual; Gregory Lowe, Consultant; Carl Mazzola, Los Alamos National Laboratory; Marty McCann, Jack Benjamin & Associates, Inc.; Gerald Meyers, Individual; Kit Ng, Bechtel Power Corporation; Robert Rishel, Duke Energy Corporation; Jery Stedinger, Cornell University

Status: The standard was approved by ANSI on 12/17/2019.

ANS-2.9, *Evaluation of Ground Water Supply for Nuclear Facilities* (proposed new standard, historical revision of ANSI/ANS-2.9-1980; R1989)

Scope: *This standard presents guidelines for the determination of the availability of ground water supplies for nuclear power plant operations with respect to both safety and non-safety related aspects.*

Membership:
OPEN, Chair; Janet Aremu-Cole, Duke Energy; Thomas J. Nicholson, U.S. Nuclear Regulatory Commission; Todd Rasmussen, University of Georgia

Status: The project has not been active due to the lack of a working group chair.

ANS-2.13, *Evaluation of Surface-Water Supplies for Nuclear Power Sites* (proposed new standard, historical revision of ANSI/ANS-2.13-1979; R1988)

Scope: *From historical standard: This standard presents criteria for determining: The availability of a surface water supply for plant operation with respect to both safety and nonsafety-related aspects. Water supply related effects of low flows and low levels on plant operation with respect to both safety and nonsafety-related systems.*

Membership:
OPEN, Chair; Edward Bruce, Duke Energy Corporation; Fehmida Mesania, NuScale Power, LLC

Status: Revision of historical standard being considered. A chair would be needed to initiate.

ANSI/ANS-2.17-2010 (R2021), *Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants* (new standard, historical revision of ANSI/ANS-2.17-1980; R1989)

Scope: *This standard establishes the requirements for evaluating the occurrence and movement of radionuclides in the subsurface resulting from abnormal radionuclide releases at commercial nuclear power plants. This standard applies to abnormal radionuclide releases that affect groundwater, water supplies derived from groundwater, and surface waters affected by subsurface transport, including exposure pathways across the groundwater–surface-water transition zone.*

Membership:
Todd Rasmussen, Chair, University of Georgia; James Bollinger, Savannah River National Laboratory; Philip Meyer, Pacific Northwest National Laboratory; Thomas Nicholson, U.S. Nuclear Regulatory Commission;

Status: This standard was reaffirmed on 6/28/2021.

ANS-2.18, *Standards for Evaluating Radionuclide Transport in Surface Water for Nuclear Power Sites* (proposed new standard)

Scope: *This new standard aims at establishing the requirements and providing a framework and recommended methodologies for the evaluation of the surface water transport and dilution of radionuclides in liquid effluent releases from nuclear power sites and nuclear facilities to demonstrate regulatory compliance of the dose limits. The approach can also be used to evaluate transport and migration of radionuclides from other reactor facilities that do not need to meet 10CFR20 dose limits.*

Membership: Thomas Aird, Chair, U.S. Nuclear Regulatory Commission; Janet Aremu-Cole, Duke Energy Corporation; Angelos Findikakis, Bechtel National, Inc.; Michael Lee, U.S. Nuclear Regulatory Commission; Kit Ng, Bechtel Power Corporation; Kevin O'Kula, Amentum Technical Services

Status: A PINS was submitted to ANSI on 3/9/2022.

ANS-2.19, *Guidelines for Establishing Site-Related Parameters for Site Selection and Design of ISFSIs* (proposed new standard, historical revision of ANSI/ANS-2.19-1981; R1990)

Scope: *From historical standard: This standard presents guidelines for establishing site-related parameters for site selection and design of an independent spent fuel storage installation (ISFSI). This installation provides storage of spent light water reactor (LWR) fuel that has aged a minimum of one year after discharge from the reactor core in a water basin type structure. Such an installation may be independent of both a nuclear power station and a reprocessing facility, or located adjacent to these facilities in order to share selected support systems. Aspects considered include flooding, geology, seismology, ground water, foundation engineering, earthwork engineering, and extreme wind conditions. These guidelines identify the basic site-related parameters to be considered in site evaluation, and in the design, construction, and operation of the ISFSI.*

Membership:
OPEN

Status: Resurrection of historical standard is being considered.

ANS-2.32, *Guidance on the Selection and Evaluation of Remediation Methods for Subsurface* (proposed new standard)

Scope: *Draft scope from unapproved PINS: This guidance would address how to determine whether or not to remediate subsurface residual radioactivity sources within defined hydrogeologic systems at nuclear facilities both for operational and decommissioning stages. This standard would build on ANS-2.17 and provide decision criteria for evaluating when, where and how to remediate subsurface contamination at nuclear facilities in accordance with risk and performance-based considerations. Specific guidance would be provided for identifying, selecting, implementing, and monitoring the efficacy of remediation methods.*

Membership:
Matthew Darois, Chair, Radiation Safety and Control Services Inc.; Kate Amrheim, U.S. Department of Energy; Kim Anthony, Energy Solutions; Janet Aremu-Cole, Duke Energy; Joseph Carlson, U.S. Department of Energy; Randall Fedors, U.S. Nuclear Regulatory Commission; Yan Gao, Dominion Energy; Jerry Hiatt, Individual; Chris Johnson, Pacific Northwest National Laboratory; Hilary Lane, Nuclear Energy Institute; Jack McCarthy, Holtec–Oyster Creek; Thomas Nicholson, U.S. Nuclear Regulatory Commission; Nebiyu Tiruneh, U.S. Nuclear Regulatory Commission; Haruko Wainwright, Massachusetts Institute of Technology; Stuart Walker, U.S. Environmental Protection Agency

Status: The PINS was submitted to ANSI on 5/20/2020. Early in the year the committee resolved comments on the initial outline and standard content based on the PINS. The committee agreed to a detailed standard outline, in the third quarter, with initial content suggestions/notes input for most outline sections. The committee ended the year with a meeting to discuss draft outline section assignments.

Siting: Seismic Subcommittee

Membership:
Jim Xu, Chair, U.S. Nuclear Regulatory Commission
Brent Gutierrez, Vice Chair, U.S. Department of Energy
Douglas Clark, Consolidated Nuclear Security, LLC
Emily Gibson, Schnabel Engineering
Vladimir Graizer, U.S. Nuclear Regulatory Commission
Kathryn Hanson, KL Hanson Consulting LLC
Stephen McDuffie, U.S. Department of Energy
Hanh Phan, U.S. Nuclear Regulatory Commission
Ivan Wong, Lettis Consultants International

The Siting: Seismic Subcommittee manages the following projects and current standards:

ANSI/ANS-2.2-2016 (R2020), *Earthquake Instrumentation Criteria for Nuclear Power Plants* (new standard, historic revision of ANSI/ANS-2.2-2002)

Scope: *This standard specifies the required earthquake instrumentation for the site and structures of light water cooled, land based nuclear power plants. It may be used for guidance at other types of nuclear facilities. This standard does not address the following: (a) Instrumentation to automatically shut down a nuclear power plant at a predetermined ground acceleration. (b) Procedures for evaluating records obtained from seismic instrumentation and instructions for the treatment of data. These procedures and instructions are specified in American National Standard, Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation, ANSI/ANS-2.10-2003.*

Membership:
Vladimir Graizer, Chair, U.S. Nuclear Regulatory Commission; John Ake, U.S. Nuclear Regulatory Commission; Roger Kenneally, Individual; Richard Lee, Los Alamos National Laboratory; Robert Nigbor, University of California-Los Angeles; Farhang Ostadan, Bechtel Corporation

Status: The standard was approved by ANSI on 7/14/2016. ANSI approved a reaffirmation of this standard on 11/16/2020.

ANSI/ANS-2.10-2017 (R2022), ***Criteria for the Retrieval, Processing, Handling and Storage of Records from Nuclear Power Plant Seismic Instrumentation*** **(new standard, historical revision of ANSI/ANS-2.10-2003)**

Scope: *This standard provides criteria for retrieval, processing, handling, and storage of data obtained from seismic instrumentation specified in ANSI/ANS 2.2-2016. The criteria will address both digital and analog seismic instrumentation. The standard focuses on strong ground motion data and is intended for use at nuclear power plants, and non-power nuclear facilities that utilize strong ground motion instrumentation.*

Membership:
Jim Xu, Chair, Chair, U.S. Nuclear Regulatory Commission; Tarek Elkhoraibi, Bechtel National Inc.; Vladimir Grazier, U.S. Nuclear Regulatory Commission; Brent Gutierrez, U.S. Department of Energy; Alidad Hashemi, Bechtel National Inc.; Robert Kassawara, Individual; Roger Kenneally, Individual; Robert Nigbor, University of California-Los Angeles; Lisa Schleicher, U.S. Geological Survey

Status: Standard was approved by ANSI on 12/19/201 and a reaffirmation on 4/1/2022.

ANSI/ANS-2.23-2016 (R2020), ***Nuclear Plant Response to an Earthquake*** **(revision of ANSI/ANS-2.23-2002; R2009)**

Scope: *This standard specifies actions that the owner of a nuclear power plant should take in the event of an earthquake. The requirements of this standard supplement those given in American National Standard Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation, ANSI/ANS-2.10-2003. The application of these standards provides a complete evaluation of the need for post-earthquake plant shutdown in a timely manner. This standard also provides guidelines that will enable the owner to develop plant-specific procedures for determining the condition of components, systems, and structures needed for shutdown and criteria for restart when a nuclear power plant is required to shut down following an earthquake. This standard does not cover those operator actions performed in connection with the operation and control of the nuclear power plant following an earthquake. These actions are specified in plant operating procedures, emergency operating procedures, and alarm response procedures.*

Membership:
Jim Xu, Chair, U.S. Nuclear Regulatory Commission; Greg Hardy, Simpson, Gumpertz and Heger, Inc.; Robert Kassawara, Individual; Robert Kenneally, Individual

Status: The revised standard was approved by ANSI on 4/7/2016 and reaffirmed on 11/16/2020.

ANSI/ANS-2.26-2004 (R2021), ***Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design*** **(new standard)**

Scope: *This standard provides: (a) criteria for selecting the seismic design category for nuclear facility structures, systems, and components (SSCs) to achieve earthquake safety and (b) criteria and guidelines for selecting Limit States for these SSCs to govern their seismic design. The Limit States are selected to ensure the desired safety performance in an earthquake.*

Membership:
Douglas Clark, Co-Chair, Consolidated Nuclear Security, LLC; Hahn Phan, Co-Chair, U.S. Nuclear Regulatory Commission; Amir Afzali, Southern Nuclear Operating Company; David Andersen, Defense Nuclear Facilities Safety Board; Todd Anselmi, Battelle Energy Alliance/INL; Chris Chaves, U.S. Department of Energy; Nilesh Chokshi, Individual; Brent Gutierrez, U.S. Department of Energy; Nicholas Hansing, U.S. Nuclear Regulatory Commission; Greg Hardy, Simpson Gumpertz & Heger Inc.; Rahsean Jackson, Defense Nuclear Facilities Safety Board; Sharon Jasim-Hanif, U.S. Department of Energy; Brian McDonald, Exponent, Inc.; Heather Morgan, International Atomic Energy Agency; Lisa Schleicher, U.S. Geological Survey; Shilp Vasavada, U.S. Nuclear Regulatory Commission; Andrew Whittaker, University at Buffalo

Status: The standard was reaffirmed on 12/10/2021. A PINS was submitted to ANSI 10/1/2019. A revision of this standard is underway.

ANSI/ANS-2.27-2020, *Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments* (revision of ANSI/ANS-2.27-2008; R2016)

Scope: *This standard provides criteria and guidelines for conducting geological, seismological, geophysical, and geotechnical investigations needed to provide information to support the following: (1) seismic source characterization input to a probabilistic seismic hazard analysis (PSHA); (2) evaluation of tectonic permanent ground deformation (PGD) hazard using probabilistic fault displacement hazard analysis (PFDHA) for surface-faulting sources and probabilistic tectonic deformation hazard analysis (PTDHA) for blind fault sources; (3) site response analysis input to PSHAs; (4) nontectonic, earthquake-induced ground failure hazard; (5) foundation stability.*

Membership:
Kathryn Hanson, Chair, KL Hanson Consulting LLC; William Savage, Vice Chair, Individual; Jon Ake, U.S. Nuclear Regulatory Commission; M. Logan Cline, Rizzo International, Inc.; Carl Costantino, Individual; Richard Lee, Los Alamos National Laboratory; Yong Li, Defense Nuclear Facilities Safety Board; Clifford Munson, U.S. Nuclear Regulatory Commission; Robert Nigbor, Individual; Susan Olig, Olig Seismic Geology, Inc.; Ellen Rathje, University of Texas–Austin; ;Adrian Rodriguez-Marek, Virginia Tech; Lisa Schleicher, U.S. Geological Survey; Kenneth Stokoe, University of Texas–Austin; Stephen Thompson, Lettis Consultants International

Status: The revised standard was approved by ANSI on 4/16/2020. No activity in 2022.

ANSI/ANS-2.29-2020, *Probabilistic Seismic Hazard Analysis* (revision of ANSI/ANS-2.29-2008; R2016)

Scope: *This standard provides criteria and guidance for performing a Probabilistic Seismic Hazard Analysis (PSHA) that is used in the design and construction of nuclear facilities, i.e., facilities that store, process, test, or fabricate radioactive materials in such form and quantity that a nuclear risk to the workers, to the off-site public, or to the environment may exist. These include, but are not limited to, nuclear fuel manufacturing facilities; nuclear material waste processing, storage, fabrication, and reprocessing facilities; uranium enrichment facilities; tritium production and handling facilities; radioactive materials laboratories; and nuclear reactors.*

Membership:
Emily Gibson, Chair, Schnabel Engineering, LLC; Lisa Schleicher, Vice Chair, U.S. Geological Survey; Jon Ake, U.S. Nuclear Regulatory Commission; Nilesh Chokshi, Individual; Kevin Coppersmith, Coppersmith Consulting Inc.; Carl Costantino, Individual; C.B. Crouse, AECOM Technical Services, Inc.; Russell Green, Virginia Tech; Nicholas Gregor, Individual; Thomas Houston, Individual; Annie Kammerer, Individual; Jeffrey Kimball, Rizzo International, Inc.; Yong Li, Defense Nuclear Facilities Safety Board; James Marrone, Bechtel Corporation; Stephen McDuffie, U.S. Department of Energy; Clifford Munson, U.S. Nuclear Regulatory Commission; Suzette Payne, Idaho National Laboratory; Jean Savy, Individual; John Stamatakos, Southwest Research Institute; Gabriel Toro, Lettis Consultants International; Ivan Wong, Lettis Consultants International; Robert Youngs, Wood Environmental & Infrastructure Solutions

Status: A revision of this standard was approved by ANSI on 4/16/2020.No activity in 2022.

ANSI/ANS-2.30-2015 (R2020), *Criteria for Assessing the Tectonic Surface Fault Rupture and Deformation at Nuclear Facilities* (new standard)

Scope: *This standard provides criteria and guidelines for investigations to assess potential for surface and near-surface faulting and associated near-fault deformation at nuclear facilities, referencing considerable new experience. The standard is an up-to-date compilation of techniques to evaluate fault offset potential and a valuable resource for planning and conducting site characterization studies for future nuclear facilities. It supplements a group of standards (i.e., ANS-2.26, -2.27, -2.29, ASCE 43-05) whose focus is on vibratory ground motion rather than fault offset hazard.*

Membership:
Ivan Wong, Chair, Lettis Consultants International; Rui Chen, California Geological Survey; Timothy Dawson, California Geological Survey; Keith Kelson, U.S. Army Core of Engineers; Jeffrey Kimball, Rizzo Associates; Joseph Litehiser, Individual; Susan Olig, Olig Seismic Geology Inc.; David Schwartz, U.S. Geological Survey; Stephen Thompson, Lettis Consultants International, Inc.

Status: The standard was approved by ANSI on 5/28/2015 with a reaffirmation approved on 5/4/2020. No activity in 2022.

ANS-2.34, *Characterization and Probabilistic Analysis of Volcanic Hazards* (proposed new standard)

Scope: *This standard provides criteria and guidance for performing a probabilistic volcanic hazard analysis (PVHA) for the design and construction of nuclear facilities. Criteria provided in this standard address several aspects of conducting PVHAs, including 1) selection of the methodology and level of investigative and analytical rigor appropriate for an analysis, including a deterministic screening; 2) characterization of the hazards posed by existing volcanic vents and potential newly emerging volcanic vents; and 3) characterization of the unique hazards posed by several volcanic phenomena including ashfall, lava flows, lahars, and asphyxiating gases.*

Membership:
Stephen McDuffie, Chair, U.S. Department of Energy; Laurel Bauer, U.S. Nuclear Regulatory Commission; Michael Cline, Rizzo International, Inc.; Charles Connor, University of South Florida; Kevin Coppersmith, Coppersmith Consulting Inc.; Mihai Diaconeasa, North Carolina State University; William Hackett; Individual; Brittain Hill, Individual; Larry Mastin, U.S. Geological Survey; Suzette Payne, Idaho National Laboratory; Frank Perry, Los Alamos National Laboratory; Lisa Schleicher, U.S. Geological Survey; Emily Schultz-Fellenz, Los Alamos National Laboratory; John Stamatakos, Southwest Research Institute; Arash Zandieh, Lettis Consultants International, Inc.

Status: The PINS was submitted to ANSI on 9/28/2017. The project plan to develop the standard, and an initial outline, were finalized in May 2019. In 2020, several sections of the draft standard were completed and reviewed by the team. In March 2022, the working group chair provided the group an updated version of the document that incorporated working group comments. A further update including a section on quality assurance was provided in December 2022. We had hoped to provide a draft standard for subcommittee review by March 2023. However, after consulting with several key contributors, the chair agrees with the members that completion should be delayed for approximately one year. Two major volcanic hazard analysis projects are ongoing in the Western U.S., and several group members are working on one or both of these studies. The members are gaining tremendous knowledge and experience from these studies, and we believe the standard will benefit by waiting for this knowledge to be incorporated into the standard. The larger study will be completed in late 2023, so the group should be able to update the current draft standard soon after.

Environmental and Siting Consensus Committee (ESCC) Organizational Chart

Chair: Carl A. Mazzola — **Vice Chair: Leah Parks**

Siting: Atmosphere	*Siting: Hydrogeologic*	*Siting: Seismic*	*Siting: General and Monitoring*	Environmental Impact Assessment & Analysis
Jennifer Call (Chair)	**Yan Gao (Chair)**	**Jim Xu (Chair)**	**Leah Parks (Chair)**	**Leah Parks (Chair)**
OPEN (Vice Chair)	**OPEN (Vice Chair)**	**Brent Gutierrez (Vice Chair)**	**OPEN (Vice Chair)**	**OPEN (Vice Chair)**
Ⓟ = PINS submitted to ANSI				
2.3-2011 (R2021) Estimating Tornado, Hurricane, and Extreme Straight Line Wind Characteristics at Nuclear Facility Sites RF 7/19/2021 (WGC: S. Weibeck)	2.8-2019 Probabilistic Evaluation of External Flood Hazards for Nuclear Facilities App'd: 12/17/2019 (WGC: Y. Gao & R. Schneider)	2.26-2004 (R2021) Ⓟ (A1) Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design RF 12/10/2021 (WGC: D. Clark & H. Phan)	2.6-2018 (A2) Guidelines for Estimating Present & Projecting Future Population Distributions Surrounding Nuclear Facility Sites App'd 3/16/2018 (WGC: D. Mussatti)	2.35 (NEW) Ⓟ (B1) Estimating the Socioeconomic Impacts of Construction, Operation, and Decommissioning at a Nuclear Facility (WGC: D. Anderson)
2.15-2013 (R2021) Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities RF 11/11/2021. (WGC: J. Ciolek)	2.17-2010 (R2021) Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants RF 6/28/2021 (WGC: T. Rasmussen)	2.2-2016 (R2020) (A2) Earthquake Instrumentation Criteria for Nuclear Power Plants RF 11/16/2020 (WGC: V. Graizer)	16.1-2019 (A2) Measurement of the Leachability of Solidified Low-Level Radioactive Wastes by a Short-Term Test Procedure App'd 2/22/2019 (WGCs: D. Kosson & A. Garrabrants)	
3.11-2015 (R2020) Ⓟ Determining Meteorological Information at Nuclear Facility Sites RF 5/21/2020 (WGC: T. Bellinger & D. Bruggeman)	2.18 (NEW) Standards for Evaluating Radionuclide Transport in Surface Water for Nuclear Power Sites (WGC: T. Aird)	2.10-2017 (R2022) (A2) Criteria for Retrieval, Processing, Handling, and Storage of Records from Nuclear Facility Seismic Instrumentation RF 4/1/2022 (WGC: J. Xu)	41.5-2012 (R2018) (A2) V&V of Radiological Data for Use in Waste Management and Environment RF 10/19/2018 (WGC: L. Parks)	
2.21-2022 (A2) Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink App'd 2/4/2022 (WGC: M. Kinley)	2.32 (NEW) Guidance on the Selection and Evaluation of Remediation Methods for Subsurface Contamination (WGC: M. Darois)	2.23-2016 (R2020) (A2) Nuclear Power Plant Response to an Earthquake RF 11/16/2020 (WGC: J. Xu)	2.22 (NEW) Ⓟ (B1) Environmental Radiological Monitoring at Operating Nuclear Facilities (WGC: T. Eddy & B. Stagich)	
	2.9 (W2000) Ⓟ (C2) Evaluation of Ground Water Supply for Nuclear Facilities (WGC: OPEN)	2.27-2020 (A2) Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments App'd 4/16/2020 (WGC: K. Hanson)		
	2.13 (W1998) (C2) Evaluation of Surface-Water Supplies for Nuclear Power Sites (project being considered) (WGC: OPEN)	2.29-2020 (A2) Probabilistic Seismic Hazard Analysis App'd 4/16/2020 (WGC: E. Gibson)		
	2.19 (W2001) (C2) Guidelines for Establishing Site-Related Parameters for Site Selection and Design of ISFSIs (Water Pool Type) (project being considered) (WGC: OPEN)	2.30-2015 (R2020) (A2) Criteria for Assessing Tectonic Surface Fault Rupture and Deformation at Nuclear Facilities RF 5/4/2020 (WGC: I. Wong)		
		2.34 (NEW) Ⓟ (B1) Characterization and Probabilistic Analysis of Volcanic Hazards (WGC: S. McDuffie)		

(A1) Current Being Worked On Standards
(A2) Current Not Being Worked On Standards
(B1) Proposed Being Worked On Standards
(B2) Proposed Not Being Worked On Standards
(C1) Withdrawn Being Worked On Standards
(C2) Withdrawn Not Being Worked On Standards

Table 1 – ESCC Organizational Chart

Fuel, Waste, and Decommissioning Consensus Committee (FWDCC)

Jean Francois Lucchini, Chair
Los Alamos National Laboratory

Scope: *The FWDCC is responsible for the preparation and maintenance of voluntary consensus standards for the design, operation, maintenance, operator selection and training, quality requirements of new and used fuel transport, storage and related handling facilities; including high level/TRU, greater-than-Class C, low level, and mixed waste processing and facilities, and for the decommissioning of commercial, educational, research and government facilities. The ANS Standards Committee Procedures Manual for Consensus Committees shall be used to guide the activities of this consensus committee.*

The FWDCC supervises the work of the following three subcommittees:

- *New and Used Fuel (Design Only)*
- *High Level GTCC, Low Level and Mixed Waste*
- *Decommissioning (Commercial and Research Facilities)*

Each subcommittee has established various working groups to develop specific proposed standards and maintain existing standards within its respective area of responsibility. These working groups create the text of FWDCC standards and resolve review and ballot comments.

FWDCC Membership:
Jean Francois Lucchini, Chair, Los Alamos National Laboratory
Maryanne Stasko, Vice Chair, Duke Energy Corporation
Kim Anthony, Energy Solutions
Sven O. Bader, Orano Federal Services
Sam Brinton, Individual
Harry D. Felsher, U.S. Nuclear Regulatory Commission
Steven Frey, Individual
Jerry Golden, Individual
Gale Hauck, Oak Ridge National Laboratory
D. Wayne Lewis, Westinghouse Government Services, LLCColeman C. Miller, Pacific Gas & Electric Company
Jon Mitchell, Westinghouse Electric Company, LLC
Corey Munz, TLG Services Inc.
Mitchell Sanders, Individual
Steven W. Schithelm, BWX Technologies, Inc.
Thomas Smedra, Westinghouse Electric Company, LLC

Observer:
Anoop Kota, Individual
Rounette Nader, Duke Energy

Report of FWDCC:

The FWDCC held meetings on June 13, 2022, and November 16, 2022. Kim Anthony, Jon Mitchell, and Corey Munz were confirmed as new FWDCC members. Rounette Nader was added as an observer. David Hillyer resigned as the Decommissioning (Commercial and Research Facilities) Subcommittee Chair and as a member of the FWDCC.

Approved in 2022:

No standards were approved in 2022.

Active Standards/Projects (Approved PINS):

ANS-55.6, *Liquid Radioactive Waste Processing System for Light-Water Cooled Reactor Plants* (new standard/historical revision of ANS-55.6-1993; R2007)

ANS-57.2, *Design Requirements for Light Water Reactor Spent Fuel Facilities at Nuclear Power Plants* (proposed new standard, historical revision of ANSI/ANS-57.2-1983)

ANS-57.9, *Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)* (new standard, historical revision of ANSI/ANS-57.9-1992; W2010)

New and Used Fuel (Design Only) Subcommittee

Membership:
Mitchell Sanders, Chair, Individual
Sam Brinton, Core Solutions Consulting
Matt Keene, Duke Energy Carolinas, LLC
Rosemary Montgomery, Oak Ridge National Laboratory
John Scaglione, Spectra Tech, Inc.

The New and Used Fuel (Design Only) Subcommittee manages the following projects and standards:

ANSI/ANS-57.1-1992 (R2019), *Design Requirements for Light Water Reactor Fuel Handling Systems* (revision of ANSI/ANS-57.1-1980)

Scope: *This standard sets forth the required functions of fuel handling systems at light water reactor nuclear power plants. It provides minimum design requirements for equipment and tools to handle nuclear fuel and control components safely.*

Membership:
Mitchell Sanders, Chair, Individual; Timothy Ake, Framatome, Inc.; Douglas Eisterhold, Westinghouse Electric Company, LLC; Wayne Lewis, Westinghouse Government Services, Robert Pinkston, Westinghouse Electric Company, LLC; Thomas Smedra, Westinghouse Electric Company, LLC;

Status: Reaffirmation was approved by ANSI on 12/6/2019. A PINS is in the process of being developed to revise this standard.

ANS-57.2, *Design Requirements for Light Water Reactor Spent Fuel Facilities at Nuclear Power Plants* (proposed new standard, historical revision of ANSI/ANS-57.2-1983)

Scope: *This standard defines design requirements for spent fuel pool storage and handling facilities at nuclear power plants for pool storage and preparation for shipment of spent fuel from light-water reactor nuclear power stations. It contains requirements for the design of: Fuel storage pool; Fuel storage racks; Pool makeup, instrumentation / cleanup systems; Pool structure / integrity; Radiation shielding; Residual heat removal; Ventilation, filtration and radiation monitoring systems; Shipping cask handling and decontamination; Building structure and integrity; Fire protection and communication.*

Membership:
Mitchell Sanders, Chair, Individual; Wayne Lewis, Vice Chair, Westinghouse Government Services; Timothy Ake, Framatome, Inc.; Gordon Bjorkman, U.S. Nuclear Regulatory Commission; Paul Cantonwine, Oak Ridge National Laboratory; Brian Gutherman, Gutherman Technical Services; Nathan Hottle, Framatome, Inc.; Ed Knuckles, Individual; Christian Lobscheid, NuScale Power; Mark Peres, Kairos Power LLC; Justin Schulte, Energy Solutions; Maryanne Stasko, Duke Energy Corporation; Robert Tucker, Individual

Status: The PINS was submitted to ANSI 2/8/13. Mitchell Sanders took over as working group chair to continue with the revision of this standard.

ANSI/ANS-57.3-2018, *Design Requirements for New Fuel Storage Facilities at LWR Plants* (new standard, historical revision of ANSI/ANS-57.3-1983)

Scope: *This standard defines the required functions of wet or dry storage facilities for new fuel at light water reactor nuclear power plants. It provides minimum design requirements for safe storage of new nuclear fuel and control components at such plants. The fuel storage facilities covered by this standard are used for receiving, inspecting and storing fuel containing new and recycled uranium and mixed oxides.*

Membership:
Mitchell Sanders, Chair, Individual; Brian Gutherman, Vice Chair, Gutherman Technical Services; Timothy Ake, Framatome, Inc.; Gordan Bjorkman, U.S. Nuclear Regulatory Commission; Brian Gutherman, Gutherman Technical Services; Nathan Hottle, Framatome, Inc.; Edward Knuckles, Individual; Wayne Lewis, Westinghouse Government Services; Christian Lobscheid, NuScale Power; Mark Peres, Peres Engineering; Justin Schulte, Energy Solutions; Maryanne Stasko, Duke Energy Corporation; Robert Tucker, Individual

Status: This standard was approved by ANSI on 2/27/2018. A reaffirmation was approved by the FWDCC and is pending ANSI approval expected in early January 2023.

ANS-57.5, *Light Water Reactors Fuel Assembly Mechanical Design and Evaluation* (proposed new standard, historical revision of ANSI/ANS-57.5-1996; R2006; W2016)

Scope: *This standard sets forth a series of design conditions and functional requirements for the design of fuel assemblies for light water cooled commercial power reactors. It includes specific requirements for design, as well as design criteria to ensure adequate fuel assembly performance. The standard establishes a procedure for performing an evaluation of the mechanical design of fuel assemblies. It does not address the various aspects of neutronic or thermal-hydraulic performance except where these factors impose loads or constraints on the mechanical design of the fuel assemblies.*

Membership:
Rosemary Montgomery, Chair, Oak Ridge National Laboratory

Status: This standard was administratively withdrawn by ANSI on 2/27/2016 for lack of maintenance. There was no progress in 2022.

ANS-57.7, *Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type)*, (proposed new standard, historical revision of ANSI/ANS-57.7-1998; W2007)

Membership:
OPEN

Status: Revision of historical standard being considered.

ANSI/ANS-57.8-2020, *Fuel Assembly Identification* (revision of ANSI/ANS-57.8-1995; R2017)

Scope: *This standard provides requirements and detailed information for uniquely identifying nuclear fuel assemblies/elements, and the corresponding fuel plates or rods inside the assemblies. Detailed recommendations and requirements are provided for the numbering of the geometric orientation for the fuel plates, or fuel rods, inside the fuel assemblies. This standard is a detailed revision of ANSI/ANS-57.8-1995 (R2017).*

Membership:
John Scaglione, Chair, Spectra Tech, Inc.; Caroline Duncan, Westinghouse Electric Company, LLC; Josh Jarrell, Idaho National Laboratory; Steven Maheras, Pacific Northwest National Laboratory; Robert Sachs, Individual

Status: A revision was approved by ANSI on 8/28/2020. No activity in 2022.

ANS-57.9, *Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type)* (proposed new standard, supersedes ANSI/ANS-57.9-1992)

Scope: *This standard is intended to be used by the owner and operator of a dry storage-type independent spent fuel storage installation (ISFSI) in specifying the design requirements and by the designer in meeting the minimum requirements of such installations. The standard includes requirements for the following: the design of major buildings and structures, shipping cask unloading and handling facilities, cask decontamination, loading and unloading areas, spent fuel storage areas and racks, fuel handling equipment, radiation shielding, special equipment and area layout configurations, air or gas quality, storage area integrity, air or gas cleanup, fuel inspection, ventilation, residual heat removal, radiation monitoring, prevention of criticality, radwaste control and monitoring systems, provisions to facilitate decommissioning, quality assurance, materials accountability, and physical security. This standard continues the set of American National Standards on spent fuel storage. Similar standards are: (1) Design Requirements for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Plants, ANSI/ANS-57.2-1983. (2) Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type), ANSI/ANS-57.7-1988. (3) Guidelines for Establishing Site-Related Parameters for Site Selection and Design of an independent Spent Fuel Storage Installation (Water Pool Type), ANSI/ANS-2.19-1988(R1990); and (4) Design Criteria for Consolidation of LWR Spent Fuel, ANSI/ANS-57.10-1987.*

Membership:
Mitchell Sanders, Acting Chair, Individual; Kaushik Banerjee, Pacific Northwest National Laboratory; Justin Clarity, Pacific Northwest National Laboratory; Gabriel Grant, Southern Nuclear Operating Company; Brian Gutherman, Gutherman Technical Services, LLC; Raheel Haroon, Orano TN Americas; Kurt Harris, Flibe Energy Inc.; Robert Howard, Pacific Northwest National Laboratory; Wayne Lewis, Westinghouse Government Services; William Murphy, Duke Energy Corporation; John Stamatakos, Southwest Research Institute; Peter Stefanovic, Oak Ridge National Laboratory

Status: A PINS was submitted to ANSI on 2/12/2020. Mitchell. Sanders has taken on the acting working group chair role until a new chair is confirmed.

ANSI/ANS-57.10-1996 (R2021), *Design Criteria for Consolidation of LWR Spent Fuel* (revision of ANSI/ANS-57.10-1987)

Scope: *This standard provides design criteria for the process of consolidating LWR spent nuclear fuel in either a wet or a dry environment. It addresses processes for consolidating fuel either horizontally or vertically. The standard sets forth requirements for utilizing equipment and systems to perform consolidation, handle fuel rods and nonfuel-bearing components, and handle broken fuel rods. This standard also contains requirements for facility or installation interfaces, nuclear safety, structural design, thermal design, accountability, safeguards, decommissioning, and quality assurance. The standard is not concerned with the storage of the spent fuel either before or after the consolidation process. These areas are covered in the following American National Standards: Design Requirements for Light Water Reactor Spent Fuel Facilities at Nuclear Power Plants, ANSI/ANS-57.2-1992. Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type), ANSI/ANS-57.7-1992. Design Criteria for an Independent Spent Fuel Storage Installation (Dry Storage Type), ANSI/ANS-57.9-1992.*

Membership:
Sam Brinton, Chair, Individual; Debasish Chowdhury, Lappeenranta University of Technology; David Orr, Duke Energy Corporation; Ryan Smith, UCOR; Sai Zhang, Idaho National Laboratory

Status: Reaffirmation was approved by ANSI on 1/28/2021. Sam Brinton was appointed as working group chair in 2021. Working group formation in process.

High Level, GTCC, Low Level and Mixed Waste Subcommittee

Membership:
Sven O. Bader, Acting Chair, Orano Federal Services
D. Mark Gerboth, Washington River Protection Solutions
Coleman Miller, Pacific Gas & Electric Company

The High Level, GTCC, Low Level and Mixed Waste Subcommittee manages the following projects and standards:

ANS-15.19, *Shipment and Receipt of Special Nuclear Material (SNM) by Research Reactor* (historical standard considered for reinvigoration)

Scope from historical standard: *This standard provides the necessary information for the shipping, receiving, and storing of fuel and other fabricated special nuclear material for research reactors. The areas addressed are data collection and analysis, packaging selection, preparation of the package or shipment, or both, safeguards, internal material control, records, and quality assurance for shipping.*

Membership:
OPEN

Status: Historical standard to be considered for reinvigoration.

ANS-40.35, *Volume Reduction of Low-Level Radioactive Waste or Mixed Waste* (proposed new standard, historical revision of ANSI/ANS-40.35-1991)

***Scope from historical standard*:** *This standard sets forth the general design specifications, procurement, and performance requirements for operation of low-level waste (LLW) and mixed waste (MW) volume reduction (VR) processing systems for nuclear power plants and other nuclear facilities. This standard may be applied to the specification of other LLW VR systems (such as government nuclear facilities) if consideration is given to any additional design features required by the hazardous nature of the wastes to be processed by them. For the purpose of this standard, a nuclear facility's LLW VR processing systems begin at the point where treatment of aqueous waste generates a solid waste, or where solid, slurry, or liquid organics wastes are collected, and ends at a waste storage, shipping, or disposal area. VR techniques may include processes such as drying, incineration, chemical decomposition, flash boiling, mechanical, or high-temperature reduction or destruction techniques, or both. Some VR systems may include, as an integral part of the system, a means for immobilization of the waste. Compaction and solidification techniques are in the scope of American National Standard Solid Radioactive Waste Processing Systems for Light Water Reactor Plants, ANSI/ANS-55.1-1992.*

Membership:
Mark Gerboth, Chair, Washington River Protection Solutions; Mike Akins, Individual

Status: Inactive project to be considered for reinvigoration.

ANSI/ANS-40.37-2009 (R2021) *Mobile Low-Level Radioactive Waste Processing Systems* (new standard, historical revision of ANSI/ANS-40.37-1993)

Scope: *This standard sets forth design, fabrication, and performance recommendations and requirements for mobile low-level radioactive waste processing (MRWP) systems (including components) for nuclear facilities that generate low-level radioactive wastes (LLWs) as defined by the Atomic Energy Act as amended. The purpose of this standard is to provide guidance to ensure that the MRWP systems are designed, fabricated, installed, and operated in a manner commensurate with the need to protect the health and safety of the public and plant personnel.*

Membership:
Coleman Miller, Chair, Pacific Gas & Electric Company; Paul Saunders, Suncoast Solutions, Inc.

Status: Reaffirmation was approved by ANSI on 2/22/2021.

ANSI/ANS-55.1-2021, *Solid Radioactive Waste Processing System for Light Water Cooled Reactor Plants* (revision of ANSI/ANS-55.1-1992; R2017)

***Scope*:** *This standard sets forth the design, construction, and performance requirements for a solid radioactive waste processing system for light water cooled reactor plants. For the purposes of this standard, the solid radioactive waste system begins at the interface with the liquid radioactive waste processing system boundary and at the inlets to the spent resin, filter sludge, evaporator concentrate, and phase separator tanks. In addition, this standard pertains to dry active waste, mixed waste, and other solid radioactive waste forms that are generated as part of the operation and maintenance of light water cooled reactor plants. The system includes facilities for temporary (up to 30 days of anticipated normal waste generation) on-site storage of packaged waste but terminates at the point of loading the filled drums and other containers on a vehicle for shipping off-site to a licensed disposal site or transfer to interim (up to 5 yr) on-site storage facilities. The solid radioactive waste processing system is*

not a safety-class system as defined by American National Standard Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants, ANSI/ANS-51.1-1983 (R1988) or as defined in American National Standard Nuclear Safety Criteria for the Design of Stationary Boiling Water Reactor Plants, ANSI/ ANS-52.1-1983 (R1988).

Membership:
Coleman Miller, Chair, Pacific Gas & Electric Company; Calvin Hendrix, AvanTech Inc.; Chad Hendrix, Individual; Stephen Liebenow, Energy Solutions; Kent Novotny, Sargent & Lundy; Nidamarthi Saikiran, Bureau Veritas India Pvt. Ltd.; Paul Saunders, Suncoast Solutions, Inc.

Status: The revision of the standard was approved by ANSI on 12/2/2021. No activity in 2022.

ANS-55.4, *Gaseous Radioactive Waste Processing System for Light Water Cooled Reactor Plants* (proposed new standard, historical revision of ANSI/ANS-55.4-1993)

***Scope*:** *This standard sets forth minimum design, construction, and performance requirements, with due consideration for operation, for gaseous radioactive waste processing systems (GRWPS) for light water reactor (LWR) plants. It is applicable for routine operation, design basis fuel leakage, and other design basis occurrences.*

Membership:
NA

Status: This standard was administratively withdrawn on 5/14/2017 for lack of maintenance. The FWDCC does not feel there is a current need to reinvigorate this standard.

ANS-55.6, *Liquid Radioactive Waste Processing System for Light Water Reactor Plants* (proposed new standard, historical revision of ANSI/ANS-55.6-1993)

Scope: *This standard sets forth minimum design, construction, and performance requirements, with due consideration for operation, of the Liquid Radioactive Waste Processing System (LRWPS) for light water reactor (LWR) plants for design basis inputs. It is applicable to routine operation, including design basis fuel leakage and other design basis occurrences.*

Membership:
Coleman Miller, Chair, Pacific Gas & Electric; Calvin Hendrix, AVANTech Inc.; Chad Hendrix, Individual; Stephen Liebenow, Energy Solutions; Kent Novatny, Sargent & Lundy; Nidamarthi Saikiran, TUV-India Pvt Ltd.; George Wilhelmsen, Sargent & Lundy, LLC

Status: This standard was administratively withdrawn on 5/13/2017 for lack of maintenance. A PINS was submitted to ANSI on 5/4/2021 to resurrect this standard. A draft has been completed for large reactors. The working group is seeking input on liquid quantities for light water SMRs to finish the work.

Decommissioning (Commercial and Research Facilities) Subcommittee

Membership:
OPEN, Subcommittee Chair
Rounette Nader, Duke Energy

The Decommissioning (Commercial and Research Facilities) Subcommittee manages the following standard:

ANS-15.10, *Decommissioning of Research Reactors* (proposed new standard, historic revision of standard under consideration)

Scope from historical standard: *This standard provides requirements and criteria for the decommissioning of research reactors and includes decommissioning alternatives, planning, radiation criteria, surveillance and maintenance, environmental impacts, quality assurance, and reports and documentation.*

Status: Reinvigoration of historical standard being considered.

Fuel, Waste, and Decommissioning Consensus Committee (FWDCC) Organizational Chart

Chair: Jean Francois Lucchini Vice Chair: Maryanne Stasko

New and Used Fuel (Design Only)	*High Level, GTCC, Low Level, and Mixed Waste*	*Decommissioning (Commercial and Research Facilities)*
Mitchell Sanders, Chair **Vice Chair (TBD)**	**Sven Bader, Acting Chair** **Vice Chair (TBD)**	**OPEN, Chair** **Vice Chair (TBD)**
Ⓟ = PINS submitted to ANSI		
ANS-57.1-1992 (R2019) (A2) Design Requirements for LWR Fuel Handling Systems RF 12/6/19 (WGC: M. Sanders)	ANS-40.37-2009 (R2021) (A2) Mobile Low-Level Radioactive Waste Processing Systems RF 2/22/21 (WGC: C. Miller)	ANS-15.10 (W2004) (C2) Decommissioning of Research Reactors (reinvigoration being considered)
ANS-57.3-2018 (R2023) (A2) Design Requirements for New Fuel Storage Facilities at LWR Plants RF 1/3/23 (Acting WGC: M. Sanders)	ANS-55.1-2021 (A2) Solid Radioactive Waste Processing Systems for Light Water Cooled Reactor Plants App'd 12/2/21 (WGC: C. Miller)	
ANS-57.8-2020 (A2) Fuel Assembly Identification App'd 8/8/20 (WGC: J. Scaglione)	ANS-55.6 (W2017) @ (C1) Liquid Radioactive Waste Processing Systems for Light Water Reactor Plants (WGC: C. Miller)	
ANS-57.10-1996 (R2021) (A2) Design Criteria for Consolidation of LWR Spent Fuel RF 1/28/21 (WGC: S. Brinton)	ANS-15.19 (W2001) (C2) Shipment and Receipt of Special Nuclear Material (SNM) by Research Reactor (reinvigoration being considered)	
ANS-57.2 (W1993) @ (C1) Design Requirements for LWR Spent Fuel Facilities at Nuclear Power Plants (Acting WGC: M. Sanders)	ANS-40.35 (W2001) (C2) Volume Reduction of Low-Level Radioactive Waste or Mixed Waste (WGC: M. Gerboth)	
ANS-57.9 (W2010) @ (C1) Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type) (Acting WGC: M. Sanders)	ANS-55.4 (W2017) (C2) Gaseous Radioactive Waste Processing Systems for Light Water Cooled Reactor Plants (WGC: OPEN)	
ANS-57.5 (W2016) (C2) LWR Fuel Assembly Mechanical Design and Evaluation (WGC: R. Montgomery)		
ANS-57.7 (W2007) (C2) Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type) (reinvigoration being considered) (WGC: OPEN)		

(A1) Current Being Worked On Standards

(A2) Current Not Being Worked On Standards

(B1) Proposed Being Worked On Standards

(B2) Proposed Not Being Worked On Standards

(C1) Withdrawn Being Worked On Standards

(C2) Withdrawn Not Being Worked On Standards

Table 2 – FWDCC Organizational Chart

Large Light Water Reactor Consensus Committee (LLWRCC)

Michelle French, Chair
WECTEC

Scope: *The LLWRCC is responsible for the preparation and maintenance of voluntary consensus standards for the design, operation, maintenance, operator selection and training, and quality requirements for current operating nuclear power plants and future nuclear power plants that employ large station light water moderated, water-cooled reactors. The standards include the reactor island, balance of plant, and other systems within the plant boundary that affect safety and operations. The ANS Standards Committee Procedures Manual for Consensus Committees shall be used to guide the activities of this consensus committee.*

The LLWRCC supervises the work of the following subcommittees:

- *Large Light Water Reactor and Reactor Auxiliary Systems Design*
- *Power Generation and Plant Support*
- *Simulators, Instrumentation, Control Systems, Software and Testing*
- *Emergency Planning and Response*

Each subcommittee has established various working groups to develop specific proposed standards and maintain existing standards within its respective area of responsibility. These working groups create the text of LLWRCC standards and resolve review and ballot comments.

LLWRCC Membership:

Michelle French, Chair, WECTEC
Mark A. Linn, Vice Chair, Individual
Robert Becse, Westinghouse Electric Company, LLC
(Alternate: Larkin Ison, Jr., Westinghouse Electric Company, LLC)
Robert Burg, Engineering Planning & Management, Inc.
David Desauliniers, U.S. Nuclear Regulatory Commission
James Florence, Nebraska Public Power District
Darrell Gardner, Kairos Power LLC
Steven Gebers, Quantum Nuclear Services
James Glover, Fluxion Technologies
Pranab Guha, Individual
Earnestine Johnson-Turnipseed, Entergy Corporation
Richard Lagdon, Bechtel National, Inc.
Ronald Markovich, Contingency Management Consultant

Observers:
J. Mike Bonfiglio, Framatome, Inc.
Charles H. Moseley, Jr., Individual
R. Michael Ruby, Individual
James C. Saldarini, Eden Radioisotopes LLC

Report of LLWRCC:

The LLWRCC held three teleconferences March 14, 2022, July 12, 2022, and November 8, 2022. Evan Lloyd passed away in October 2022. William Reuland and Steven Stamm stepped down from the committee.

Approved in 2022:

ANSI/ANS-3.2-2012 (R2022), *Managerial, Administrative, and Quality Assurance Cpontrols for the Operatyional Phase of Nuclear Power Plants* (reaffirmation of ANS-3.2-2012; R2017)

ANSI/ANS-30.3-2022, *Light-Water Reactor, Risk-Informed, Performance-Based Design* (new standard)

ANSI/ANS-58.14-2011 (R2022), *Safety and Pressure Integrity Classification Criteria for Light Water Reactors* (reaffirmation of ANSI/ANS-58.14-2011; R2017)

Active Standards/Projects (Approved PINS):

ANS-3.5.1, *Nuclear Power Plant Simulators for Use in Simulation Assisted Engineering and Non-Operator Training* (proposed new standard)

ANS-3.13, *Nuclear Facility Reliability Assurance Program (RAP) Development* (proposed new standard)

ANS-3.15, *Cyber Security Criteria for Critical Digital Assets (CDAs) for Nuclear Power Plant Systems* (proposed new standard)

ANS-56.2, *Containment Isolation Provisions for Fluid Systems after a LOCA* (proposed new standard, historic revision of ANSI/ANS-56.1984; W1999)

ANS-60.1, *Civilian Nuclear Export Controls* (new standard)

ANS-GD-3.8.X *Guidance for Risk-Informing Emergency Preparedness Programs for Nuclear Facilities* (proposed new guidance document)

Light Water Reactor and Reactor Auxiliary Systems Design Subcommittee

Membership:
Robert Burg, Chair, Engineering, Planning & Management, Inc.
Kenneth Geelhood, Pacific Northwest National Laboratory
Earnestine Johnson-Turnipseed, Entergy Corporation
Mark Linn, Individual
Kent Welter, Nuscale Power, Inc.

The Light Water Reactor and Reactor Auxiliary Systems Design Subcommittee manages the following projects and current standards:

ANSI/ANS-18.1-2020, *Radioactive Source Term for Normal Operation of Light Water Reactors* (revision of ANSI/ANS-18.1-2016)

Scope: *This standard provides a set of typical radionuclide concentrations for estimating the radioactivity in the principal fluid systems of light water reactors and for projecting the expected releases of radioactivity from nuclear plants. It is not intended that the values be used as the sole basis for design but be used in environmental reports and elsewhere where expected operating conditions over the life of the plant would be appropriate.*

Membership:
Kenneth Geelhood, Chair, Pacific Northwest National Laboratory; Luis Benevides, U.S. Navy; Elijah Dickson, U.S. Nuclear Regulatory Commission; David Hindera, GE Hitachi; Dennis Hussey, Electric Power Research Institute; Timothy Lloyd, Westinghouse Electric Company, LLC; Mark Shaver, NuScale Power Inc.

Status: A response to an inquiry on ANSI/ANS-18.1-2020 received 11/21/22 is in development.

ANSI/ANS-30.3-2022, *Light-Water Reactor Risk-Informed Performance-Based Design* (new standard)

Scope: *This standard provides requirements for using RIPB methods to support (1) definition of safety requirements; (2) licensing-basis event (LBE) selection; (3) design-basis safety analysis; (4) probabilistic risk assessments (PRAs); (5) severe accident analysis; (6) classification and categorization of structures, systems, and components (SSCs); (7) systematic defense-in-depth (DID) evaluations; and (8) performance-based decision analysis.*

The plant designer is responsible for selecting and implementing specific design requirements necessary for implementation of this standard, including support for defining accidents and expected operational characteristics through design analyses, models, conformance with applicable industrial codes and standards, or experience gained from similar designs. The designer is also responsible for the use of alternate or additional criteria and requirements to accommodate unique technologies, designs, or site characteristics not covered (or referenced) by this standard or its related documents. The inclusion of RIPB practices also supports a greater understanding of uncertainties surrounding deterministic safety evaluations and establishing compensatory actions for risk-significant uncertainties.

Membership:
Kent Welter, Chair, NuScale Power, LLC; David Blanchard, Vice Chair, Applied Reliability Engineering, Inc.; James August, Individual; Donald Dube, Individual; Mark Linn, Individual; Gary Locklear, Kinectrics AES Inc.; Paul Sicard, Entergy Corporation; Douglas Van Bossuyt, Naval Postgraduate School; Patrick White, Nuclear Innovation Alliance; Cindy Williams, NuScale Power LLC

Status: At the close of 2021, the revised draft with ~200 changes was under review by the LLWRCC Chair to determine substantive changes. Two recirculation ballots were issued in 2022 due to substantive changes. Consensus was reached with the close of the second recirculation ballot on 6/3/22. The standard was approved by ANSI on 7/22/2023 and published the next day. The standard was approved and issued after 5 years of hard work by the working group. A letter was sent from the ANS Standards Board to the NRC for endorsement via RG 1.206 and RG 1.233.

ANSI/ANS-51.10-2020, *Auxiliary Feedwater System for Pressurized Water Reactors* (revision of ANSI/ANS-51.10-1991; R2018)

Scope: *This standard sets forth the safety-related functional requirements, performance requirements, design criteria, design requirements for testing and maintenance, and interfaces for the safety-related portion of the auxiliary feedwater system (AFS) of pressurized water reactor (PWR) plants. This standard is written for new facilities that rely on an auxiliary (emergency) feedwater system for a safety-related function.*

Membership:
Earnestine Johnson-Turnipseed, Chair, Entergy Corporation; Ralph Hill, Individual

Status: The revision was approved by ANSI on 10/23/2020. No activity in 2022.

ANS-58.6, *Criteria for Remote Shutdown for Light Water Reactors Facilities* (proposed new standard, historical revision of ANSI/ANS-58.6-1996; R2001)

Scope from historical standard: *This standard provides design criteria for controls and monitoring instrumentation necessary to shut down a reactor and maintain it in a safe shutdown condition from outside the control room. The design criteria require that: (a) specific controls and monitoring instrumentation be provided; (b) these controls be installed at a location (or locations) that is physically separate from the control room and cable spreading areas; (c) simultaneous control from both locations be prevented by devices for transfer of control from the control room to the remote location(s); and (d) the remote controls be used as a defense-in-depth measure in addition to the control room shutdown controls and as a minimum provide for one complete channel of shutdown equipment.*

Membership:
OPEN

Status: Inactive project to be considered for reinvigoration.

ANSI/ANS-58.9-2002; (R2020), *Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems* (new standard, historical revision of ANSI/ANS-58.9-1981; R1987)

Scope: *This standard provides criteria for the designer which interpret the requirements of Title 10, Code of Federal Regulations, Part 50, "Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," with respect to design against single failures in safety-related Light Water Reactor (LWR) fluid systems. Means of treating both active and passive failures are addressed for safety-related fluid systems following various initiating events. Current acceptable practice is used as a basis for these criteria.*

Failure criteria for the electric power systems and the protection systems are provided in IEEE Std 308-1980 "IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations", IEEE Std 279-1971 "IEEE Standard Criteria for Protection Systems for Nuclear Power Generating Stations" (N42.7-1972), IEEE Std 379-1977 "IEEE Standard for Application of the Single-Failure Criterion to Nuclear Power Generating Station Class IE Systems", and IEEE Std 603-1980 "Standard Criteria for Safety Systems for Nuclear Power Generating Stations." Failures of structural components, such as braces, supports, or restraints, as well as occurrences involving common mode failures, are excluded.

Membership:
OPEN, Chair; Robert Burg, Engineering Planning and Management, Inc.; Tim Dodson, Engineering Planning & Management, Inc.; Matthew Hertel, X-Energy, LLC; Ethan Hunt, Nuclear Energy Consultants, Inc.; Earnestine Johnson-Turnipseed, Entergy Corporation; Prasad Kadambi, Individual; Cherie Paugh, Westinghouse Electric Company, LLC

Status: Reaffirmation was approved by ANSI on 7/23/2020. The reaffirmation of ANSI/ANS-58.9-1981 (R1987) was not completed before the standard was administratively withdrawn; therefore, ANSI/ANS-58.9-1981 (R1987) was processed as new standard receiving the designation of ANSI/ANS-58.9-2002. No activity in 2022.

ANS-58.11, *Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors* (proposed new standard, historical revision of ANSI/ANS-58.11-1995; R2002)

Scope from historical standard: *This standard provides design criteria for systems that perform the safety-related functions necessary to shut down a reactor and maintain it in a safe shutdown condition for selected design basis events; i.e., any design basis events that do not require operation of engineered safety features. For design basis events that require operation of engineered safety features, this standard can be selectively applied because of plant features specifically designed for these conditions. For systems that serve multiple functions, the design criteria associated with the most limiting function shall be applied.*

The following safety-related functions are required for safe shutdown and are addressed in this standard: (1) Reactor core reactivity control; (2) Reactor core heat removal; (3) Reactor coolant pressure boundary integrity provided by: (a) Temperature control (b) Pressure control, and (c) Inventory control.

Membership:
OPEN, Chair; Robert Kalantari, EPM, Inc.

Status: The standard was administratively withdrawn by ANSI on 7/23/2012 for lack of maintenance. A new working group chair and members are needed to update the standard.

ANSI/ANS-58.14-2011 (R2022), *Safety and Pressure Integrity Classification Criteria for Light Water Reactors* (new standard, historical revision of ANSI/ANS-58.14-1993)

Scope: *This standard specifies deterministic criteria for the safety classification of items (SSCs and parts, including consumables) in a light water reactor (LWR) nuclear power plant as either safety-related (Q), non-safety-related (N), or supplemented (S). In addition, pressure integrity classification criteria are provided for the assignment of Classes 1 to 5 to the pressure-retaining portions of items.*

Membership:
Mark Linn, Chair, Individual; David Blanchard, Applied Reliability Engineering; Paul Sicard, Entergy Corporation

Status: The standard was reaffirmed by ANSI on 2/4/2022.

Power Generation and Plant Support Systems Subcommittee

Membership:
OPEN, Chair
OPEN, Vice Chair
James Glover, Fluxion Technologies
Margaret Harding, 4 Factor Consulting, LLC
Earnestine Johnson-Turnipseed, Entergy Corporation
Dong Zheng, Bechtel Power Corporation

The Power Generation and Plant Support Systems Subcommittee manages the following projects and current standards:

ANS-56.1, *Containment Hydrogen Control* (proposed title) (proposed new standard)

Scope: *TBD*

Membership:
James Glover, Chair, Fluxion Technologies; James Gleason, GLSEQ, LLC; Sam Gyepi-Garbrah, Canadian Nuclear Safety Commission; Wison Luangdilok, H2Technology, LLC; Robert Pinkston, Westinghouse Electric Company, LLC; Edward Rodriguez, Global Nuclear Network Analysis LLC.; James Scobel, Westinghouse Electric Company, LLC; Andrew Smirnov, Ariadne LLC

Status: The LLWRCC is considering the need and direction for this proposed standard.

ANS-56.2, *Containment Isolation Provisions for Fluid Systems After a LOCA* (proposed new standard, supersedes ANSI/ANS-56.2-1984; R1989; W1999)

Scope from historic standard: *This standard specifies minimum design, actuation, testing, and maintenance requirements for the containment isolation of fluid systems after a LOCA. These fluid systems penetrate the primary containment of light water reactors and include piping systems (including instrumentation and control) for all fluids entering or leaving the containment. Electrical systems are not included. The provisions for containment isolation impose additional requirements which are not required for the fluid system function. This standard does not consider any isolation requirements that may exist for controlled leakage areas either enclosing the primary containment isolation requirements for events other than LOCAs.*

Membership:
Earnestine Johnson-Turnipseed, Chair, Entergy Corporation; Robert Binz, Sunshine Consulting; James Bradford, Southern Nuclear Operating Company; Robert Fuller, Entergy Operations, Inc.; Jonathan Gomes, NuScale Power, LLC; Gary McGee, NuScale Power; Robert McGowan, True North Consulting, LLC; Lana Miller, Entergy; Paul Nichols, GE Hitachi; Glenda Patzch-Velasquez, DTE Energy; Wyatt Schuldheiss (Associate Member)

Status: A PINS was submitted to ANSI on 6/27/2019. The standard has been revised to incorporate outstanding comments from the NRC and updated info and terminology considering the positions also of new technology. Final comments will be in early 2023, and it will be submitted for subcommittee review.

ANS-58.2, *Design Basis for Protection of Light Water Nuclear Power Plants Against the Effects of Postulated Pipe Rupture* (proposed new standard, historic revision of ANSI/ANS-58.2-1988; W1998)

Scope: *This standard addresses the design basis for the protection of light water reactor nuclear power plants from the potentially adverse effects of postulated pipe ruptures.*

Membership:
Dong Zheng, Chair, Bechtel Power Corporation; Temi Adeyeye, NuScale Power; Butch Bornt, Southern Nuclear Operating Company; Joseph Halackna, Westinghouse Electric Company, LLC; Julie Jarvis, Defense Nuclear Facilities Safety Board; Manoj Karki, Duke Energy; Wai Law, Tennessee Valley Authority; Simona Miteva

(Associate Member), Technical University of Sofia; Anthony Trupiano, Westinghouse Electric Company, LLC; Oscar Vinals Atienza, Westinghouse Electric Company, LLC

Status: A PINS is needed to initiate a historical revision.

ANS-58.3, *Physical Protection for Nuclear Safety-Related Systems and Components* (proposed new standard, historical revision of revision of ANS-58.3-1992; W2019)

Scope: *This standard sets forth physical protection criteria for nuclear safety-related systems and components in stations using light water reactors (LWRs). This standard includes an identification of potential hazards to nuclear safety-related systems and components and acceptable means of ensuring the protection of this equipment from these hazards.*

Membership:
OPEN, Chair; Robert Burg, EPM, Inc.; Anthony Trupiano, Westinghouse Electric Company, LLC

Status: The standard was administratively withdrawn on 2/21/2019. Further discussion has determined that a revised standard on physical protection for safety-related systems and components is unnecessary since ANS-30.1, ANS-30.2 and ANS-30.3 will include these criteria as the new standards are developed.

ANS-59.3, *Nuclear Safety Criteria for Control Air Systems* (proposed new standard, historical revision of ANSI/ANS-59.3-1992; R2002)

Scope: *This standard provides criteria for the control air system that furnishes compressed air to nuclear safety-related components and other equipment that could affect any nuclear safety-related function in nuclear power plants. This standard provides: (1) the system nuclear safety design requirements and the non-nuclear safety design recommendations for equipment, piping, instruments, and controls that constitute the control air system; and (2) the nuclear safety design requirements and the non-nuclear safety design recommendations to accommodate the testing and maintenance necessary to ensure adequate performance of the control air system.*

Membership:
OPEN, Chair; Todd Anselmi, Battelle Energy Alliance/INL; James August, Individual; Chad Boyer, Electric Power Research Institute; Robert Burg, EPM, Inc.; Raul Hernandez, U.S. Nuclear Regulatory Commission; Matthew Hertel, X-Energy, LLC; Edward Knuckles, Individual;

Status: The PINS was submitted to ANSI 1/10/2019. The project is currently on hold. No activity in 2022.

ANSI/ANS-59.51-1997 (R2020) *Fuel Oil Systems for Safety-Related Emergency Diesel Generators* (revision of ANSI/ANS-59.51-1989)

Scope: *This standard provides functional, performance, and initial design requirements for the fuel oil system for diesel generators that provide safety-related emergency onsite power for light water reactor nuclear power plants. This standard addresses the mechanical equipment associated with the fuel oil system, with the exception of the engine mounted components. These components, which are mounted directly to the engine structure itself, are excluded except to define interface requirements. It also includes the instrumentation and control functional requirements. The standard excludes motors, motor control centers, switchgear, cables, and other electrical equipment used in the operation of the fuel oil system, except to define interface requirements.*

Membership:
OPEN, Chair

Status: Reaffirmation received ANSI approval 7/27/2020. No activity in 2022.

ANSI/ANS-59.52-1998 (R2020) *Lubricating Oil Systems for Safety-Related Emergency Diesel Generators* (new standard)

Scope: *This standard provides functional, performance, and design requirements for lubricating oil systems for diesel generators that provide emergency onsite power for light water reactor nuclear power plants. The standard addresses all mechanical equipment associated with the lubricating oil system, with the exception of engine mounted components. These components, which are mounted directly to engine structure itself, are excluded, except to define interface requirements. This standard also includes the lubricating oil system instrumentation and control functional requirements. It excludes motors, motor control centers, switchgear, cables, and other electrical equipment used in the operation of the lubricating oil system, except to define interface requirements.*

Membership:
OPEN, Chair

Status: Reaffirmation received ANSI approval 7/27/2020. No activity in 2022.

ANS-60.1, *Civilian Nuclear Export Controls* (proposed new standard)

Scope: *This standard addresses the requirements for compliance with U.S. export control regulations for civilian nuclear technology, equipment, and materials, as governed by 10 CFR Part 110 and 10 CFR Part 810. This includes various types of export information required by the NRC and DOE and reporting requirements that exist before and after an export has occurred. The standard also provides guidance for establishing and maintaining internal compliance programs, including as related to classification and jurisdictional determinations, personnel, security, information technology, records management, contractual provisions and certifications, and training.*

Membership:
Margaret Harding, Chair, 4 Factor Consulting, LLC; Elina Teplinsky, Vice Chair, Pillsbury Winthrop Shaw Pittman LLP; Jennifer Hart, Secretary, Pacific Northwest National Laboratory; Georgia Adams, Pacific Northwest National Laboratory; Stefani Buster, Duke University; Adam Deatherage, AMS Corporation; Paul Dickman, Argonne National Laboratory; Tom Gray, Pacific Northwest National Laboratory; Chelsea Gunter, Global Nuclear Energy Advisory; Peter Habighorst, U.S. Nuclear Regulatory Commission; Andrea Jones, U.S. Nuclear Regulatory Commission; Prasad Kadambi, Kadambi Engineering Consultants; Ajay Kuntamukkala, Hogan Lovells US LLP; Trudy Overlin, NuScale Power; Mark Peters, Pacific Northwest National Laboratory; Jo Anna Sellen Bredenkamp, Oak Ridge National Laboratory; William Wharton; Studsvik Scandpower

Status: The PINS was submitted to ANSI on 8/5/2021. The working group has been actively meeting in 2022 to develop the draft.

Simulators, Instrumentation, Control Systems, Software and Testing Subcommittee

Membership:
Pranab Guha, Chair, Individual
OPEN, Vice Chair
James August, Individual
James Florence, Nebraska Public Power District
James Glover, Fluxion Technologies
Huafei (Harry) Liao, X-energy, LLC
Michael Muhlheim, Oak Ridge National Laboratory
Timothy Riti, Nuclear Energy Institute
Kashmir Singh, EDF Energy
Barbara Stevens, Constellation Nuclear

The Simulators, Instrumentation, Control Systems, and Software Testing Subcommittee manages the following current standards and projects:

ANSI/ANS-3.1-2014 (R2020), *Selection, Qualification, and Training of Personnel for Nuclear Power Plants* (new standard, historic revision of ANSI/ANS-3.1-1993; R1999)

Scope: *This standard provides criteria for the selection, qualification, and training of personnel for nuclear power plants. The qualifications of personnel in the operating organizations appropriate to safe and efficient operation of a nuclear power plant are addressed in terms of the minimum education, experience, and training requirements.*

Membership:
Timothy Riti, Chair, Nuclear Energy Institute; Ahmad Al Rashdan, Idaho National Laboratory; Heather Davis, Constellation Nuclear; Michael Petersen, Xcel Energy; Brian Tindell, U.S. Nuclear Regulatory Commission;

Status: A reaffirmation was approved by ANSI on 2/4/2020. Revision 4 of RG 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," was issued in June of 2019 endorsing ANSI/ANS-3.1-2014. The working group has been responding to an inquiry from Crane Nuclear into how a high school vocation program can be used as a substitute for related experience. A draft response is currently being reviewed by working group members.

ANSI/ANS-3.2-2012 (R2022), *Managerial, Administrative, and Quality Assurance Controls for the Operational Phase of Nuclear Power Plants* (revision of ANSI/ANS-3.2-2006)

Scope: *This standard provides requirements and recommendations for managerial and administrative controls to ensure that activities associated with operating a nuclear power plant are carried out without undue risk to the health and safety of the public.*

This standard provides requirements for implementing managerial and administrative controls consistent with requirements of 10 CFR 50, Appendix B.

This standard is not specifically intended for application to test, mobile, or experimental reactors, nor reactors not subject to U.S. Nuclear Regulatory Commission (NRC) licensing. Although this standard is based on NRC requirements, the approach is applicable with modifications to reflect the regulatory requirements in the country of application. Applicable sections of this standard may be used in those cases for activities similar to those addressed herein.

Membership:
OPEN, Chair, OPEN; Clint Eldridge, Vice Chair, Furgo USA Land Inc.; Aaron England, Tennessee Valley Authority; Charles H. Moseley, Individual; Paul Prescott, U.S. Nuclear Regulatory Commission; Rob Radulovich, Constellation Generation; Kerry Rhoads, Individual; David Taggart, Taggart Quality Consulting; Gordon Vytacil, Kairos Power LLC; Dennis Winchester, Winchester Nuclear Consulting Inc.

Status: Reaffirmation approved by ANSI on 5/26/2022. The appointment of a new working group chair is pending.

ANSI/ANS-3.4-2013 (R2018), *Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants* (revision of ANSI/ANS-3.4-1996; R2002)

Scope: *This standard defines and updates medical, mental health, and physical requirements for licensing of nuclear power plant reactor operators and senior operators. It also addresses the content, extent, methods of examination, and continual monitoring of licensed operators' medical health.*

Membership:
Barbara Stevens, Chair, Constellation Nuclear; George Rombold, Vice Chair, Scientech Inc.; Michael Ardaiz, U.S. Department of Energy, Sam Hansell, Constellation Nuclear; Thomas Jetzer, Occupational Medicine Consultants; Laurie Kubec, NextEra Energy Corp.; Hironori Peterson, U.S. Nuclear Regulatory Commission; Julianne Peterson, Xcel Energy; William Pilkey, Constellation Nuclear; Carole Revelle, U.S. Nuclear Regulatory Commission; Jennifer Veytia, Individual; Michael Zaruba, Auburn Family Health Center

Status: This standard was reaffirmed by ANSI on 7/2/2018. ANSI/ANS-3.4-2013 was endorsed by the U.S. Nuclear Regulatory Commission in Regulatory Guide (RG) 1.134, *Medical Assessment of Licensed Operators or Applicants for Operator Licenses at Nuclear Power Plants*, (Revision 4), published September 2014. The working group plans to seek another reaffirmation in 2023.

ANSI/ANS-3.5-2018, *Nuclear Power Plant Simulators for Use in Operator Training and Examination* (new standard, supersedes ANSI/ANS-3.5-2009)

Scope: *This standard establishes the functional requirements for full scope nuclear power plant control room simulators that are subject to U.S. Nuclear Regulatory Commission Regulation for use in operator training and examination. The standard also establishes criteria for the scope of simulation, performance, and functional capabilities of nuclear power plant control room simulators. This standard does not establish criteria for the use of simulators in operator training programs.*

Membership:
James Florence, Chair, Nebraska Public Power District-Cooper; Keith Welchel, Secretary, Individual; F. J. (Butch) Colby, Editor, Individual; Theresa Buchanan, U.S. Nuclear Regulatory Commission; Shih-Kao Chang, Individual; William Fraser, Individual; Robert Goldman, Individual; David Goodman, Luminant; Dennis Koutouzis, Institute of Nuclear Power Operations; Jody Lawter, South Carolina Electric & Gas; George McCullough, GSE Systems, Inc.; Mac McDade, Progress Energy–Harris Nuclear Plant; Michael Petersen, Excel Energy; Pablo Rey, Tecnatom, S.A.; James Sale, Individual; Frank Tarselli, Individual; Lawrence Vick, Individual; Dong (Allen) Wang, Shandong Nuclear Power Company Ltd.

Status: ANSI approved ANSI/ANS-3.5-2018 on 10/10/2019. The American Nuclear Society is currently coordinating with the NRC for a review of ANSI/ANS-3.5-2018 with a request for endorsement (via RG 1.149).

ANS-3.5.1, *Nuclear Power Plant Simulators for Use in Simulation-Assisted Engineering and Non-Operator Training* (proposed new standard)

Scope: *This standard establishes the requirements for the use of nuclear power plant control room simulators in applications other than operator training and examination. Applications considered in this Standard include plant engineering design and modification verification and validation, engineering design optimization, plant performance optimization, control loop tuning, trip risk reduction, power uprate/ downrate pre-testing, human-factors engineering, safety assessment studies, procedure development and verification, and training of plant personnel other than operators. This standard does not establish criteria for the use of simulators in operator training programs.*

Membership:
Kashmir Singh, Chair, EDF Energy; Ossama Ashy, WSC, Inc.; Rama Deljouravesh, Ontario Power Generation; David Desauliniers, U.S. Nuclear Regulatory Commission; James Florence, Nebraska Public Power District; Steven Freel, Ultra Energy; Gil Grady, GSE Systems; Prasad Kadambi, Kadambi Engineering Consultants; Wayne Marquino, Individual; George McCullough, Exitech Corporation; Donald Mitchell, Individual; Bernard Panfil, Corys Inc.; Hal Paris, L3 MAPPS Inc.; David Rahn, U.S. Nuclear Regulatory Commission; Jose Antonio Ruiz, Technatom S.A.; Dong (Allen) Wang, Shandong Nuclear Power Company Ltd.; Joseph Yarbrough, Xcel Energy

Note: Evan Lloyd passed away on October 13, 2022. Working Group members recorded their appreciation of his contribution to the nuclear industry over many years, other ANS committees, and to the Utility Simulator Users Group (USUG) Executive.

Status: The PINS was submitted to ANSI on 12/14/2018. Copies of the draft standard were sent out widely to increase awareness of the multi-million dollar benefits experienced by other nuclear utilities and review comments were welcomed, e.g. Utility Simulator Users Group (USUG) nuclear industry members worldwide, PWR Users Group, BWR User Group, and EPRI. A copy of the draft standard has also been put on the USUG website.

The draft standard was presented at a number of international conferences, e.g., Nuclear Power Plant Simulation Conference in Las Vegas in January 2022, and the European Union Nuclear Power Plant Simulation Forum in Barcelona, October 2022.

Revisions and updates have continued, and there have been video meetings of the working group every 3 months. All the sections of the draft standard have now been written and are being finalized.

ANS-3.13, *Nuclear Facility Reliability Assurance Program (RAP) Development* (proposed new standard)

Scope: *This standard provides criteria to describe nuclear facility reliability assurance programs and to perform scheduled maintenance and/or monitoring of operating conditions. This standard identifies and provides for scheduled maintenance based upon design principles. It provides guidance on how to select components' failure modes and maintenance requirements.*

Membership:
James August, Chair, Individual; Todd Anselmi, Battelle Energy Alliance/INL; John Dowling, Ameren Missouri-Callaway Energy Center; Aaron England, Tennessee Valley Authority; James Halderman, Bechtel Power Corporation; N. Prasad Kadambi, Individual; Dong Thai Nguyen, Southern Nuclear Operating Company; Mark Paul, Dominion Energy; Andrei Smirnov, Booz Allen Hamilton

Status: A lengthy draft (~150 pages) was developed in 2014 but was overly focused on NRC expectations and not industry need. Little progress was made in 2016-2020 due to working group member work commitments. Renewed focus needs to establish appropriate goals and cut the original draft materials down. The original goal and work were too regulatory oriented to be useful to industry. We have reconstituted the approach to "RAP" and are in the process of reforming the working group. The entire process has been reviewed and evaluated for continued need and utility. The working group is meeting bi-monthly to develop the draft.

ANS-3.15, *Risk-Informing Critical Digital Assets (CDAs) for Nuclear Power Plant Systems* (proposed new standard)

Scope: *This standard will establish the principle criteria for achieving a level of cyber security that provides reasonable assurance for safe operation of a nuclear power plant. This approach takes advantage of the unique features of nuclear systems, including, reactor physics such as reactivity feedback mechanisms; mechanical systems design, such as safety valves; operator response, such as manual trip actions; non-digital I&C, such as interlocks; and structural features, such as shielding structures.*

Membership:
Michael Muhlheim, Chair, Oak Ridge National Laboratory; Gregory Hudson, Vice Chair, Metcalfe PLLC; Robert Youngblood, Vice Chair, Idaho National Laboratory; Ahmad Al Rashdan, Idaho National Laboratory; Eric Ball, Energy Research, Inc.; Ralph Branscomb, Florida Power & Light; Michael Brown, U.S. Nuclear Regulatory Commission; Andrew Clark, Sandia National Laboratories; Ronald Cole, Enercon Federal Services; Shannon Eggers, Idaho National Laboratory; Nathan Faith, Constellation Generation Corporation, LLC; George Flanagan (Observer), Individual; Matthew Hertel, X-Energy, LLC; Jodine Jansen-Vehec, JTV Nuclear Consultants; Gary Locklear, Kinetrics AES, Inc.; Frederich McCrory, Individual; Edward Quinn, Technology Resources; Michael Rowland, Sandia National Laboratories; Michael Woodridge, Curtiss-Wright Corporation; Robert Youngblood, Idaho National Laboratory; Fan Zhang, Georgia Institute of Technology

Status: The working group is collaborating with JCNRM to produce a guidance document for nuclear power plants. In 2019, The PINS was submitted to ANSI on 5/26/2020. In 2022, the working group reviewed and had presentations on 14 methodologies for consideration for risk-informing the selection of critical digital assets (CDAs). Based on this work, the working group is evaluating 3 paths forward: use of current plant PRAs with existing event trees/fault trees for selected plant systems, modify those ETs/FTs to include CDAs, and determine the path sets to risk-inform the selection of CDAs; perform a prevention analysis of the same systems evaluated using event trees/fault trees with the minimal cut sets; and using a list of CDAs identified at an existing NPP use event analysis to risk-inform that selection.

ANSI/ANS-56.8-2020, *Containment System Leakage Testing Requirements* (revision of ANSI/ANS-56.8-2002; R2016)

Scope: *This standard provides design criteria for controls and monitoring instrumentation necessary to shut down a reactor and maintain it in a safe shutdown condition from outside the control room. The design criteria require that: (a) specific controls and monitoring instrumentation be provided; (b) these controls be installed at a location (or locations) that is physically separate from the control room and cable spreading areas; (c) simultaneous control from both locations be prevented by devices for transfer of control from the control room to the remote location(s); and (d) the remote controls be used as a defense-*

in-depth measure in addition to the control room shutdown controls and as a minimum provide for one complete channel of shutdown equipment.

Membership:
James Glover, Chair, Fluxion Technologies; Jerome Bettle, U.S. Nuclear Regulatory Commission; Kenneth Clark, Individual; Alexis Courtois, Electricite de France; Mark Gowin, Tennessee Valley Authority; Kelvin Green, Tennessee Valley Authority; Jeremy Gustafson, BWX Technologies, Inc.; Howard Hill, BCP Technical Services, Inc.; Gary Holtz, Pacific Gas & Electric Company; Murray Jennex, University of Arizona; Earnestine Johnson-Turnipseed, Entergy Corporation; Daniel Oakley, Constellation Corporation; Babul Patel, Individual

Status: The revision was approved by ANSI on 12/11/2020. No activity in 2022.

ANSI/ANS-58.8-2019, *Time Response Criteria for Manual Actions at Nuclear Power Plants* (revision of ANSI/ANS-58.8-1994; R2017)

Scope: *This standard establishes criteria and methods for identifying, calculating, validating, tracking, and documenting time requirements for the performance of nuclear power plant time-limited manual actions that are associated with either design basis events (DBEs) or licensing basis.*

Membership:
Huafei (Harry) Liao, Chair, X-energy LLC; David Desaulniers, U.S. Nuclear Regulatory Commission; Stephen Fleger, U.S. Nuclear Regulatory Commission; Jonathan Ford, Framatome; Robert Fuld, Individual; Susan Sallade, Constellation Corporation; Logan Schulze, Xcel Energy; Rachel Vail, AECOM; Michael Weiner, Duke Energy

Status: This standard was approved by ANSI on 8/8/2019. No activity in 2022.

Emergency Planning and Response Subcommittee

Membership:
Ronald Markovich, Chair, Contingency Management Consulting
Steven Gebers, Vice Chair, Quantum Nuclear Services

Manit Shah, Canadian Nuclear Laboratories

The Emergency Planning and Response Subcommittee manages the following projects and current standards:

ANS-GD-3.8-202x, *Guidance for Risk-Informing Emergency Preparedness Programs for Nuclear Facilities* (proposed Guidance Document)

Scope: *The Guidance Documents will provide recommended practices for using risk analysis methods and insights to influence the properties of emergency preparedness and response functions for nuclear power plants and non-power nuclear facilities. Initial work products will focus on risk-informing development of site Emergency Response Organizations (e.g., identification of necessary functions, positions and response times) and technical bases for sizing Emergency Planning Zones (including the selection of accident sequences). This guidance may be provided as a logically integrated set of work products rather than a single document. In the event the Work Group identifies a need for EP Standards, a PINS form will be completed for each proposed Standard. All other RIEP work products will be prepared with concurrence of the sponsoring consenous committees.*

Membership:
Ronald Markovich, Co-Chair, Contingency Management Consulting; Gregory Hudson, Co-Chair, Metcalf PLLC; Amir Afzali, Individual; David Grabaskas, Argonne National Laboratory; Jordan Hagaman, Kairos Power LLC; Gary Hayner, Jensen Hughes Inc.; Kyle Hope, Westinghouse Electric Company; Svetlana Lawrence, Idaho National Laboratory; Roy Linthicum, Constellation Energy Corporation; Herbert Massie, Massie Consulting, LLC; Michael Norris, U.S. Nuclear Regulatory Commission; Robert Rishel, Duke Energy Corporation; Susan Sallade, Framatome, Inc.; Raymond Schneider, Westinghouse Electric Company LLC; Julia Sharma, X-Energy LLC

Status: The Standards Board approved the ANS-GD-3.8 RIEP PINS without comment.

A Risk-Informed Emergency Preparedness Working Group (RIEP WG) has been established as a collaborative effort between the ANS Large Light Water Consensus Committee's (LLWRCC) Emergency Planning and Response Subcommittee and the ASME/ANS Joint Committee on Nuclear Risk Management's (JCNRM) Subcommittee on Risk Applications. The RIEP WG mission is to develop guidance for using risk analysis methods and insights to influence emergency preparedness and response functions for nuclear facilities.

The initial two task groups and their draft scope statements are:

- EPZ Task Group: Risk-inform technical bases for sizing Emergency Planning Zones including spectrum of accident sequences to be considered.
- ERO Task Group: Risk-inform site Emergency Response Organizations (e.g., identification of necessary functions, positions and response times to the event at hand, etc.)

Jeremiah Doyle from NuScale Power has agreed to chair the EPZ Task Group and Ed Collins from Dominion Energy has agreed to chair the ERO Task Group.

Since methodology will be key to the success of these guidance documents, it's important that the task group have a balanced membership that is representative of new reactor design developers and potential owner/operators … producing a work product that is broadly applicable to and accepted by applicable sectors of the nuclear power industry. Given the importance of task group membership, the RIEP WG is proactively soliciting interested parties to participate in this task group.

ANS-3.8.1, *Properties of Radiological Emergency Response Functions and Organizations for Nuclear Facilities* (proposed new standard, historic revision of ANSI/ANS-3.8.1-1995)

Scope: *This standard establishes properties for identifying emergency response functions and subsequently developing an overall pre-planned emergency response organization for nuclear facilities. The properties address a) basic emergency response functions, b) emergency response support functions, c) emergency response organization, and d) personnel responsibilities.*

Membership:
Ronald Markovich, Contingency Management Consulting Group, LLC; Steve Hook, Individual

Status: Project Initiation Notification System (PINS) forms were approved and submitted to ANSI for historical revisions to seven emergency preparedness standards; ANS-3.8.1, ANS-3.8.2, ANS-3.8.3 (to incorporate ANS-3.8.4), ANS-3.8.6 (to incorporated ANS-3.8.5), and ANS-3.8.7. These projects are not currently active.

ANS-3.8.2, *Properties of Functional and Physical Characteristics of Radiological Emergency Response Facilities at Nuclear Facilities* (proposed new standard, historic revision of ANSI/ANS-3.8.2-1995)

Scope: *This standard establishes functional and physical properties for facilities needed to provide an adequate overall emergency response. The properties address a) emergency response facilities, b) facility features and requirements, and c) parameters needed to provide a basis for determining an adequate inventory of equipment and supplies for anticipated emergency responses.*

Membership:
Ronald Markovich, Chair, Contingency Management Consulting Group, LLC; Steve Hook, Individual

Status: Project Initiation Notification System (PINS) forms were approved and submitted to ANSI for historical revisions to seven emergency preparedness standards; ANS-3.8.1, ANS-3.8.2, ANS-3.8.3 (to incorporate ANS-3.8.4), ANS-3.8.6 (to incorporated ANS-3.8.5), and ANS-3.8.7. These projects are not currently active.

ANS-3.8.3, *Properties of Radiological Emergency Response Plans and Implementing Procedures and Maintaining Emergency Response Capability for Nuclear Facilities* (proposed new standard, historic revision and consolidation of ANSI/ANS-3.8.3-1995 and ANSI/ANS-3.8.4-1995)

Scope: *This standard establishes properties for developing a radiological emergency response plan, emergency plan implementing procedures, and emergency plan administrative procedures for nuclear facilities. Properties include exercises, drills, surveillance, and training.*

Membership:
Ronald Markovich, Chair, Contingency Management Consulting Group, LLC; Steve Hook, Individual

Status: Project Initiation Notification System (PINS) forms were approved and submitted to ANSI for historical revisions to seven emergency preparedness standards; ANS-3.8.1, ANS-3.8.2, ANS-3.8.3 (to incorporate ANS-3.8.4), ANS-3.8.6 (to incorporated ANS-3.8.5), and ANS-3.8.7. These projects are not currently active.

ANS-3.8.6 *Properties of the Conduct of Offsite Radiological Assessment for Emergency Response and Emergency Radiological Field Monitoring, Sampling and Analysis for Nuclear Facilities* (proposed new standard, historic revision and consolidation of ANSI/ANS-3.8.5-1992 and ANSI/ANS-3.8.6-1995)

Scope: *This standard establishes properties for consequence assessment properties, as well as field monitoring, and sampling and analysis strategy during all phases of and after an emergency to be used for Protective Action Recommendations for nuclear facilities.*

Membership:
Ronald Markovich, Chair, Contingency Management Consulting Group, LLC
Status: Project Initiation Notification System (PINS) forms were approved and submitted to ANSI for historical revisions to seven emergency preparedness standards; ANS-3.8.1, ANS-3.8.2, ANS-3.8.3 (to incorporate ANS-3.8.4), ANS-3.8.6 (to incorporated ANS-3.8.5), and ANS-3.8.7. These projects are not currently active.

ANS-3.8.7, *Properties of Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness at Nuclear Facilities* (proposed new standard, historic revision of ANSI/ANS-3.8.7-1998)

Scope: *This standard establishes properties for the planning, development, conduct and evaluation of radiological emergency response drills and exercises in support of emergency preparedness at nuclear facilities. In addition, this standard will incorporate the requirements for the conduct of Hostile Action-Based Emergency Response drills.*

Membership:
Ronald Markovich, Chair, Contingency Management Consulting Group, LLC; Steve Hook, Individual; Eric Schrader, U.S. Nuclear Regulatory Commission

Status: ANS-3.8.7 was initiated as a pilot for the proposed emergency preparedness standards. It was to be used by both the commercial nuclear industry and DOE. The concept was to develop the standard (since the NRC new rulemaking addressed this area) and then present for incorporation of their requirements. Unfortunately, push back was received by the commercial nuclear industry, and the working group was unable to engage DOE to provide input. Issuance of this standard without DOE involvement would not serve a purpose as the commercial nuclear industry is not supportive of its development/issuance. This project is currently on hold. No activity in 2022.

Large Light Water Reactor Consensus Committee (LLWRCC)
Organizational Chart

Chair: Michelle French Vice Chair: Mark Linn

Light Water Reactor and Reactor Auxiliary Systems Designs	Power Generation and Plant Support Systems	Simulators, Instrumentation, Control Systems, Software and Testing	Emergency Planning and Response
Chair: Robert Burg **Vice Chair: OPEN**	**Chair: OPEN** **Vice Chair: OPEN**	**Chair: Pranab Guha** **Vice Chair: OPEN**	**Chair: Ronald Markovich** **Vice Chair: Steven Gebers**
Ⓟ = PINS submitted to ANSI			
ANS-18.1-2020 (A2) Radioactive Source Term for Normal Operation of Light Water Reactors App'd 7/24/2020 (WGC: K. Geelhood)	ANS-59.51-1997 (R2020) (A2) Fuel Oil Systems for Safety-Related Emergency Diesel Generators RF 7/27/20 (WGC: OPEN)	ANS-3.1-2014 (R2020) (A2) Selection, Qualification, and Training of Personnel for Nuclear Power Plants RF 2/4/2020 (WGC: T. Riti)	ANS-GD-3.8.x Ⓟ (B1) Guidance for Risk-Informing Emergency Preparedness Programs for Nuclear Facilities (new guidance document) (WGCs: R. Markovich & G. Hudson)
ANS-30.3-2022 (A2) Light-Water Reactor Risk-Informed Performance-Based Design App'd 7/21/2022 (WGC: K. Welter)	ANS-59.52-1998 (R2020) (A2) Lubricating Oil Systems for Safety-Related Emergency Diesel Generators RF 7/24/2020 (WGC: OPEN)	ANS-3.2-2012 (R2022) (A2) Managerial, Administrative, and Quality Assurance Controls for the Operational Phase of NPPs RF 5/26/22 (WGC: A. England)	ANS-3.8.1 (W2005) Ⓟ (C2) Properties of Radiological Emergency Response Functions and Organizations for Nuclear Facilities (WGC: R. Markovich) ON HOLD
ANS-51.10-2020 (A2) Auxiliary Feedwater System for Pressurized Water Reactors App'd 10/23/20 (WGC: E. Johnson)	ANS-60.1 (NEW) Ⓟ (B1) Civilian Nuclear Export Controls (WGC: M. Harding)	ANS-3.4-2013 (R2018) (A2) Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants RF 7/2/2018 (WGC: B. Stevens)	ANS-3.8.2 (W2005) Ⓟ (C2) Properties of Functional and Physical Characteristics of Radiological Emergency Response Facilities at Nuclear Facilities (WGC: R. Markovich) ON HOLD
ANS-58.9-2002 (R2020) (A2) Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems RF 7/23/2020 (WGC: OPEN)	ANS-56.1 (NEW) (B2) Containment Hydrogen Control (WGC: J. Glover) (project in consideration)	ANS-3.5-2018 (A2) Nuclear Power Plant Simulators for Use in Operator Training and Examination App'd 10/10/2019 (WGC: J. Florence)	ANS-3.8.3 (W2005) Ⓟ (C2) Properties of Radiological Emergency Response Plans and Implementing Procedures and Maintaining Emergency Response Capability for Nuclear Facilities (WGC: R. Markovich) ON HOLD
ANS-58.14-2011 (R2022) (A2) Safety and Pressure Integrity Classification Criteria for Light Water Reactors RF 2/4/2022 (WGC: M. Linn)	ANS-56.2 (W1999) Ⓟ (C1) Containment Isolation Provisions for Fluid Systems After a LOCA (WGC: E. Johnson-Turnipseed)	ANS-56.8-2020 (A2) Containment System Leakage Testing Requirements App'd 12/11/2020 (WGC: J. Glover)	ANS-3.8.6 (W2005) Ⓟ (C2) Properties of the Conduct of Offsite Radiological Assessment for Emergency Response and Emergency Radiological Field Monitoring, Sampling and Analysis for Nuclear Facilities (WGC: R. Markovich) ON HOLD
ANS-58.6 (W2011) (C2) Criteria for Remote Shutdown for Light Water Reactors Facilities (WGC: OPEN)	ANS-58.2 (W1998) (C2) Design Basis for Protection of Light Water Nuclear Power Plants Against the Effects of Postulated Pipe Rupture (WGC: D. Zheng)	ANS-58.8-2019 (A2) Time Response Criteria for Manual Actions at Nuclear Power Plants App'd 8/8/2019 (WGC: H. Liao)	
ANS-58.11 (W2012) (C2) Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors (WGC: OPEN) ON HOLD	ANS-58.3 (W2019) (C2) Physical Protection for Nuclear Safety-Related Systems and Components (WGC: OPEN)	ANS-3.5.1 (NEW) Ⓟ (B1) Nuclear Power Plant Simulators for Use in Simulation Assisted Engineering and Non-Operator Training (WGC: K. Singh)	
	ANS-59.3 (W2012) Ⓟ (C2) Nuclear Safety Criteria for Control Air Systems (WGC: OPEN) ON HOLD	ANS-3.13 (NEW) Ⓟ (B1) Nuclear Facility Reliability Assurance Program Development (WGC: J. August)	
		ANS-3.15 (NEW) Ⓟ (B1) Risk-Informing Critical Digital Assets (CDAs) for Nuclear Power Plant Systems (WGC: M. Muhlheim)	
(A1) Current Being Worked On Standards			
(A2) Current Not Being Worked On Standards			
(B1) Proposed Being Worked On Standards			
(B2) Proposed Not Being Worked On Standards			
(C1) Withdrawn Being Worked On Standards			
(C1) Withdrawn Being Worked On Standards			

Table 3 – LLWRCC Organizational Chart

Nonreactor Nuclear Facilities Consensus Committee (NRNFCC)

Charles Martin, Chair
Longenecker and Associates, Inc.

Scope: *The NRNFCC is responsible for the preparation and maintenance of voluntary consensus standards for the safety analysis, design, maintenance, operator selection and training, and quality requirements for nonreactor nuclear facilities including facilities using radioactive isotopes, remote handling of radioactive materials, fuel processing, mixed oxide fuel processing and other fuel cycle facilities other than spent fuel handling and storage. The ANS Standards Committee Procedures Manual for Consensus Committees shall be used to guide the activities of this consensus committee.*

NRNFCC Membership:

Charles Martin, Chair, Longenecker and Associates, Inc.
Andrew De La Paz, Vice Chair, U.S. Department of Energy
Todd M. Anselmi, Battelle Energy Alliance/INL
David Andersen, Defense Nuclear Facilities Safety Board
Nima Ashkeboussi, Nuclear Energy Institute
Lawrence Berg, U.S. Department of Energy
Mukesh K. Gupta, Amentum Technical Services
H. M. Hashemian, AMS Corporation
(Alternate: Adam Deatherage, AMS Corporation)
Mark Joseph, TechSource
Herbert Massie, Jr., Massie Consulting, LLC
Carl A. Mazzola, Los Alamos National Laboratory
Mohammad Modarres, University of Maryland
James O'Brien, U.S. Department of Energy

Observer:
Margaret Kotzalas, Chair, U.S. Department of Energy

Report of NRNFCC:

The NRNFCC held two virtual meetings on June 15, 2022, and November 16, 2022. Roman Kazban resigned from the NRNFCC. David Andersen replaced Roman Kazban for the Defense Nuclear Facilities Safety Board.

Approved in 2022:

No standards were approved in 2022.

Active Standards/Projects (Approved PINS):

ANS-2.36, *Accident Analysis for Aircraft Crash into Reactor and Nonreactor Nuclear Facilities* (proposed new standard)

ANS-57.11, *Integrated Safety Assessments for Fuel Cycle Facilities* (proposed new standard)

The NRNFCC supervises the work of the following projects:

ANS-2.36, *Accident Analysis for Aircraft Crash into Reactor and Nonreactor Nuclear Facilities* (proposed new standard)

Scope: This standard's broad reactor and nonreactor nuclear facility applicability provides the user the requirements and guidance to evaluate and assess the significance of aircraft crash risk on nuclear facility safety and provides a framework of stepwise increases in analytical sophistication aimed to demonstrate that an aircraft crash either does or does not exceed a risk level of concern equivalent to other generally applied sources of risk from the operation of nuclear facilities.

Membership:
Mark Joseph, Chair, TechSource; William Walker, Secretary, Oak Ridge National Laboratory; David Andersen, Defense Nuclear Facilities Safety Board; Firdu Bati, Federal Aviation Administration; Ronald Beaulieu, Mission Support & Test Services; Kermit Bunde, U.S. Department of Energy; Nestor Castaneda, Simpson Gumpertz & Heger Inc.; Andrew De La Paz, U.S. Department of Energy; Patrick Frias, U.S. Department of Energy; Richard Funk, Naval Nuclear Laboratory–Bettis; Amitava Ghosh, U.S. Nuclear Regulatory Commission; Ian Goethert, Oak Ridge National Laboratory; Loren Groff, National Transportation Safety Board; Paul Kalowski, Federal Aviation Administration; Roman Kazban, National Nuclear Security Administration; Oscar Martinez, Individual; Devlan Maxwell, Federal Aviation Administration; John McAllister, HukariAscendent; Jinsuo Nie, Individual; Kevin O'Kula, Individual; David Pinkston, Lawrence Livermore National Laboratory; Jacob Platfoot, Oak Ridge National Laboratory; Troy Reiss, Idaho National Laboratory; Samuel Rosenbloom, Individual; Kristofer Torgerson, Oak Ridge National Laboratory; Peter Washburn, U.S. Department of Energy

Status: PINS submitted to ANSI 7/13/2021. The working group created writing groups that met monthly in 2022.

ANSI/ANS-3.14-2021, *Process for Aging Management and Life Extension for Nonreactor Nuclear Facilities* (new standard)

Scope: *This standard addresses requirements for systematically evaluating structures, systems, and components (SSCs) for extending the life of nonreactor nuclear facilities. This standard is applicable to facilities that are 15 to 30 years old and expect to operate for an additional 20 to 30 years. This standard provides a systematic process to determine the scope of the aging management/life extension program in terms of SSCs. For those SSCs, a process for the evaluation of remaining lifetime and determining the need for additional analysis, repairs, inspections, and replacements is developed.*

Membership:
Todd Anselmi, Co-Chair, Idaho National Laboratory; Craig McMullin, Co-Chair, Individual; Brendan Burns, U.S. Department of Energy; Joseph Crociata, Consolidated Nuclear Security, LLC; Margie Kotzalas, U.S. Department of Energy; Herbert Massie, Massie Consulting, LLC; Michael Mudlock, Simpson Gumpertz & Heger, Inc.; James O'Brien, U.S. Department of Energy; Cameron Samuelson-Sanford, Simpson Gumpertz & Heger;

Status: This standard received ANSI approval on 8/5/2021. No specific revision activity in 2022; currently monitoring for questions and interpretation needs.

ANS-57.11, *Integrated Safety Assessments for Nonreactor Nuclear Facilities* (proposed new standard)

Scope: *This standard provides an ISA method consistent with 10 CFR Part 70 regulations to identify credible accident sequences that can lead to "high" or "intermediate" consequences as outlined in performance requirements. The ISA also specifies safety controls to prevent or mitigate those potential accidents and assess the likelihood that the facilities would meet the performance requirements, and management measures a facility operator will rely on to ensure that safety controls are available to perform their function. ISAs evaluate not just radiological and nuclear criticality hazards, but chemical and fire hazards as well.*

The emphasis of this standard is aimed at making nonreactor nuclear facility safety requirements more risk-informed, performance-based, predictable and objective. The results of this standard, i.e., identification of hazards and design events can be integrated into that of ANS-58.16 Safety Categorization and Design Criteria for Nonreactor Nuclear Facilities.

Membership:
Margaret Kotzalas, Chair, U.S. Department of Energy; Todd Anselmi, Battelle Energy Alliance/INL; Sven Bader, Orano Federal Services; Michael Dunlevy, Defense Nuclear Facilities Safety Board; Rani Franovich, The Breakthrough Institute; Chelsea Gunter, Global Nuclear Energy Advisory; Thomas Hiltz, U.S. Department of Energy; Gary Kaplan, RSL Safety; Arielle Miller, Dr. Arielle Miller Coaching & Consulting; April Smith, The MITRE Corporation; Robert Youngblood, Idaho National Laboratory

Status: A PINS was submitted to ANSI on 2/27/2013 with a revision resubmitted to ANSI on 2/25/20215. A draft was issued to the NRNFCC for a preliminary review in November of 2015. A revised draft was issued to the NRNFCC for formal ballot on 4/3/2019. The draft was also provided to the RP3C and the NCSCC for review and comments. Significant comments and objections were received. The working group substantially revised the draft and will resubmit for a new ballot in 2023.

ANSI/ANS-58.16-2014 (R2020), *Safety Categorization and Design Criteria for Nonreactor Nuclear Facilities* (new standard)

Scope: *This standard provides guidance and criteria for safety categorization of items structures, systems, components (SSCs) and administrative controls associated with nuclear safety in nonreactor nuclear facilities such as: nuclear storage and processing facilities, nuclear material and radioactive waste facilities, and nuclear fuel examination facilities. This standard elaborates on how to derive safety functions and develop design and operational requirements to satisfy these functions. It also associates the safety categorization of items to engineering (e.g., civil/structural, mechanical, electrical) and programmatic (e.g., QA) classification levels. Finally, this Standard defines functional and boundary criteria for safety SSCs to include associated SSCs necessary for the operation of a safety SSC when called upon to provide its safety function.*

Membership:
Todd Anselmi, Chair, Battelle Energy Alliance/INL; Douglas Clark, Consolidated Nuclear Security; Pranab Guha, U.S. Department of Energy; Jonathan Marcano Lozada, U.S. Department of Energy; James O'Brien, U.S. Department of Energy

Status: ANSI approved the reaffirmation of this standard on 4/9/2020. Currently, monitoring work on the revision of ANSI/ANS-2.26-2004 (R2021), *Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design*, to determine whether a revision is needed. No activity in 2022.

Nonreactor Nuclear Facilities Consensus Committee (NRNFCC)
List of Standards/Projects

Chair: Chip Martin — Vice Chair: Andrew De La Paz

Ⓟ = PINS submitted to ANSI

ANS-3.14-2021 (A2)	Process for Infrastructure Aging Management and Life Extension of Nonreactor Nuclear Facilities	APP'D 8/5/2021 (WGCs: T. Anselmi & C. McMullin)
ANS-58.16-2014 (R2020) (A2)	Safety Classification and Design Criteria for Nonreactor Nuclear Facilities	RF 4/9/2020 (WGC: T. Anselmi)
ANS-2.36 (NEW) Ⓟ (B1)	Accident Analysis for Aircraft Crash into Hazardous Facilities	Active Project (WGC: M. Joseph)
ANS-57.11 (NEW) Ⓟ (B1)	Integrated Safety Assessments for Nonreactor Nuclear Facilities	Active Project (WGC: M. Kotzalas)
ANS-3.6 (NEW) (B2)	Requirements for Preoperational and Startup Testing	(Project in Consideration) (WGC: OPEN)

(A1) Current Being Worked On Standards
(A2) Current Not Being Worked On Standards
(B1) Proposed Being Worked On Standards
(B2) Proposed Not Being Worked On Standards
(C1) Withdrawn Being Worked On Standards
(C2) Withdrawn Not Being Worked On Standards

Table 4 – NRNFCC List of Standards/Projects

Nuclear Criticality Safety Consensus Committee (NCSCC)

Larry L. Wetzel, Chair
BWX Technologies, Inc.

Scope: *To develop standards for determining the potential for nuclear criticality of fissile fissionable material outside reactors, for the prevention of accidental criticality, and for coping with accidents should they occur.*

NCSCC Membership:
Larry L. Wetzel, Chair, BWX Technologies, Inc.
William R. Shackelford, Vice Chair, Paschal Solutions Inc.
Roger W. Bartholomay, C.S. Engineering, Inc.
Lawrence J. Berg, U.S. Department of Energy
Douglas Bowen, Oak Ridge National Laboratory
Robert D. Busch, University of New Mexico
William Doane, Framatome Inc.
Ernest Elliott, Spectra Tech, Inc.
Calvin M. Hopper, Individual
Kevin Kimball, Individual
Ronald A. Knief, INMM Representative (Individual)
John A. Miller, Sandia National Laboratories
Jeremy Munson, U.S. Nuclear Regulatory Commission
Scott P. Murray, HPS Representative (employed by General Electric Co.)
Robert E. Wilson, U.S. Department of Energy

Observer:
Andrew Prichard, TradeWind Services, Inc.

Report of NCSCC:

The NCSCC held a virtual meeting on November 14, 2022.

Approved in 2022

ANSI/ANS-8.3-2022, *Criticality Accident Alarm System* (revision of ANSI/ANS-8.3-1997; R2017)

ANSI/ANS-8.5-1996 (R2022), *Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material* (reaffirmation of ANSI/ANS-8.5-1996; R2017)

ANSI/ANS-8.6-1983 (R2022), Safety in Conducting Subcritical Neutron-Multiplication Measurements in Situ (reaffirmation of ANSI/ANS-8.6-1983; 2017)

ANSI/ANS-8.7-2022, *Nuclear Criticality Safety in the Storage of Fissile Materials* (revision of ANSI/ANS-1998; R2017)

ANSI/ANS-8.26-2007 (R2022), *Criticality Safety Engineer Training and Qualification Program* (reaffirmation of ANSI/ANS-8.26-2007; R2016)

Active Standards/Projects (Approved PINS):

ANS-8.1, *Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors* (revision of ANSI/ANS-8.1-2014; R2018)

ANS-8.12, *Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors* (revision of ANSI/ANS-8.12-1987; R1993; R2002; R2016; R2021)

ANS-8.20, *Nuclear Criticality Safety Training* (revision of ANSI/ANS-8.20-1991; R1999; R2005; R2015; R2020)

ANS-8.21, *Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors* (revision and consolidation of ANSI/ANS-8.21-1995; R2001 and ANSI/ANS-8.5-1996; R2002; R2007; R2011; R2019)

ANS-8.22, *Nuclear Criticality Safety Based on Limiting and Controlling Moderators* (revision of ANSI/ANS-8.22-1997; R2016; R2021)

ANS-8.26, *Criticality Safety Engineer Training and Qualification Program* (revision of ANSI/ANS-8.26-2007; R2012; R2016; R2022)

ANS-8.28, *Administrative Practices for the Use of Non-Destructive Assay Measurements for Nuclear Criticality Safety* (proposed new standard)

Subcommittee 8 – Fissionable Material Outside Reactors Subcommittee
(This subcommittee is sponsored by the ANS Nuclear Criticality Safety Division.)

Scope: *The aim of this committee is to establish standards providing guidance in the prevention of nuclear chain reactions in all procedures for handling, storing, transporting, processing, and treating fissionable nuclides. ANS-8 is responsible to the consensus committee N16, Nuclear Criticality Safety.*

Membership:
Douglas Bowen, Chair, Oak Ridge National Laboratory
Kevin Reynolds, Vice Chair, Consolidated Nuclear Security, LLC
Michael Crouse, Secretary, Consolidated Nuclear Security, LLC
James Baker, Spectra Tech, LLC
Marvin Barnett, Savannah River Nuclear Solutions
Nicholas Brown, Nuclear Fuel Services, Inc.
Theresa Cutler (Associate Member), Los Alamos National Laboratory
David Erickson, Savannah River Nuclear Solutions
Christopher Haught, Consolidated Nuclear Security
Jerry Hicks, Individual
Thomas McLaughlin, Individual
James Morman, Argonne National Laboratory
Lon Paulson, GE Hitachi/Global Nuclear Fuel-Americas
Catherine Percher, Lawrence Livermore National Laboratory
Andrew Prichard, TradeWind Services, LLC
Tracy Stover, Savannah River Nuclear Solutions, LLC
Dominic Winstanley, Sellafield Ltd. (UK)

Observers:
Peter Angelo, Consolidated Nuclear Security, LLC
Jeffrey Chapman, Oak Ridge National Laboratory
Ernest Elliott, Spectra Tech, Inc.
Deborah Hill, National Nuclear Laboratory, U.K.
Kevin Kimball, Individual
Ronald Knief, Individual
James Kuropatwinski, Individual
Dale Lancaster, NuclearConsultants.com
John Miller, Sandia National Laboratories
Charles Rombough, CTR Technical Services, Inc.
Ellen Saylor, Oak Ridge National Laboratory
Christopher Tripp, Tripp Nuclear Consulting Services
Kristan Wessels, Consolidated Nuclear Security, LLC
Larry Wetzel, BWX Technologies, Inc.

Fissionable Material Outside Reactors Subcommittee (ANS-8) Report:

At the ANS NCSD topical in Anaheim, CA, Bowen presented a paper regarding an overview of domestic and international consensus standards for NCS. Bowen held one, three-hour ANS-8 Subcommittee meeting about a week prior to the 2022 Winter ANS meeting. We discussed membership, the status of ANS-8 series standards, the NCS glossary being developed by Bowen and the NCSCC to be used by ANS-8 working groups during standards revisions to enhance consistency, effort on requirement/recommendation basis statements, progress on the CSSG recommendation 2016-04, and a poster session about end user's application examples of ANS-8 standards. At the 2022 ANS Winter meeting, a similar meeting was held for the NCS community about the status of ANS-8 standards. An update was also provided about progress on ISO TC85/SC5/WG8 ISO standards for Nuclear Criticality Safety. In 2023, ANS-8 subcommittee meetings are planned at the ANS Annual and Winter meetings.

Current Standards and Active Projects:

ANSI/ANS-8.1-2014 (R2018), *Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors* (revision of ANSI/ANS-8.1-1998; R2007)

Scope: *This standard is applicable to operations with fissionable materials outside nuclear reactors, except for the assembly of these materials under controlled conditions, such as in critical experiments. Generalized basic criteria are presented and limits are specified for some single fissionable units of simple shape containing ^{233}U, ^{235}U, or ^{239}Pu, but not for multiunit arrays. Requirements are stated for establishing the validity and areas of applicability of any calculational method used in assessing nuclear criticality safety. This standard does not include the details of administrative controls, the design of processes or equipment, the description of instrumentation for process control, nor detailed criteria to be met in transporting fissionable materials.*

Membership:
Nicholas Brown, Chair, Nuclear Fuel Services; Andrew Arend (Associate Member), NuScale Power; Lawrence Berg, U.S. Department of Energy; Douglas Bowen, Oak Ridge National Laboratory; Shane Broyles (Associate Member), Nuclear Fuel Services, Inc.; Katherine Golouglu, C.S. Engineering, Inc.; Chris Haught, Consolidated Nuclear Solutions, LLC; Jerry Hicks, Individual Tom Marenchin, National Nuclear Security Administration; Joshua Marshall, Grounded Engineering Consultants; Thomas McLaughlin (Observer), Individual; John Miller, Sandia National Laboratories; James Morman, Argonne National Laboratory; Dallas Moser, Y-12 National Security Complex; Quentin Newell (Associate Member), Urenco USA; Christopher Odum (Associate Member), Nuclear Fuel Services, Inc.; Andrew Prichard, TradeWind Services, LLC; Kevin Reynolds, Consolidated Nuclear Security, LLC; Ellen Saylor, Individual; Matthew Wilson, Paschal Solutions, Inc., Dominic Winstanley, Sellafield Ltd.; Ning Zhang (Associate Member), Los Alamos National Laboratory

Status: Reaffirmation of this standard was approved on 11/28/2018. The PINS was resubmitted to ANSI on 11/29/2018 after the reaffirmation. The working group continues to move forward with a revision to the standard to include additional subcritical limits for the intermediate enriched U-235 compounds. Final wording changes have been agreed upon to enhance the use and applicability of the standard. Additional subcritical limits have been calculated and changes to the limits are being drafted to extend the U-235 lower enrichment values up to 20 wt. %. The standard will be reaffirmed in 2023 to allow the final technical editing of the revised standard and anticipated comment resolution during approval of the revision.

ANSI/ANS-8.3-2022, *Criticality Accident Alarm System* (revision of ANSI/ANS-8.3-1997; R2017)

Scope: *This standard is applicable to operations with fissionable materials in which inadvertent criticality leading to a radiation dose to personnel immediately dangerous to life and health could occur. This standard is not applicable to the operation of nuclear reactors or the conduct of critical experiments.*

Membership:
Jerry Hicks, Chair, Individual; Peter Angelo, Consolidated Nuclear Security, LLC; James Baker, Spectra Tech, Inc.; James Banfield, Global Nuclear Fuel; Lawrence Berg, U.S. Department of Energy; Debdas Biswas, Lawrence Livermore National Laboratory; Douglas Bowen, Oak Ridge National Laboratory; Kermit Bunde, U.S. Department of Energy; Konner Casanova, Idaho National Laboratory; Jeffrey Chapman, National Nuclear Security Administration; Joseph Christianson, U.S. Department of Energy; Theresa Cutler, Los Alamos National Laboratory; Matthieu Duluc, Institute for Radiological Protection & Nuclear Safety; Scott Finfrock, Fluor Government Group; John Kirkpatrick,

Mirion Technologies Inc.; Thomas McLaughlin, Individual; James Miller-Marquez, Naval Nuclear Laboratory; Hannah Morbach (Associate Member), Los Alamos National Laboratory; Bruce Pierson, Pacific Northwest National Laboratory; Andrew Prichard, TradeWind Services, LLC; Timothy Sippel, U.S. Nuclear Regulatory Commission; Daniel Speaker, Savannah River Nuclear Solutions; Jingjing Wang, Canadian Nuclear Laboratories; William Zywiec (Associate Member), Lawrence Livermore National Laboratory

Status: The revised standard was approved by ANSI on 9/9/2022 and published shortly after. Work on basis statements for the requirements and recommendations will begin in 2023. This work will serve the working group and consensus committee if interpretations are needed. The basis statements are not intended to be public.

ANSI/ANS-8.5-1996 (R2022), *Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material* (revision of ANSI/ANS-8.5-1986)

Scope: *This standard provides guidance for the use of borosilicate-glass Raschig rings as a neutron absorber for criticality control in ring-packed vessels containing solutions of ^{235}U, ^{239}Pu, or ^{233}U. The chemical and physical environment, properties of the rings and packed vessels, maintenance inspection procedures, and operating guidelines are specified.*

Membership:
Jerry Hicks, Chair, Individual

Status: Reaffirmation received ANSI approval on 9/8/2022. If a revision of the standard is necessary, the working group will have to be reconstituted.

ANSI/ANS-8.6-1983 (R2022), *Safety in Conducting Subcritical Neutron-Multiplication Measurements in Situ* (revision of N16.3-1975)

Scope: *This standard provides safety guidance for conducting subcritical neutron-multiplication measurements where physical protection of personnel against the consequences of a criticality accident is not provided. The objectives of in situ measurements are either to confirm an adequate safety margin or to improve an estimate of such a margin. The first objective may constitute a test of the criticality safety of a design that is based on calculations. The second may affect improved operating conditions by reducing the uncertainty of safety margins and providing guidance to new designs.*

Membership:
Theresa Cutler, Chair, Los Alamos National Laboratory; Ernie Elliott, Spectra Tech Inc.; Christopher Haught, Consolidated Nuclear Security, LLC; David Hayes, Los Alamos National Laboratory; Jerry Hicks, Individual; Jesson Hutchinson, Los Alamos National Laboratory; John Miller, Sandia National Laboratories; William Myers, Los Alamos National Laboratory; Norman Schwers, Sandia National Laboratories

Status: Reaffirmation received ANSI approval on 9/9/2022. No response to solicited feedback from anyone currently using the standard was received.

ANSI/ANS-8.7-2022, *Nuclear Criticality Safety in the Storage of Fissile Materials* (revision of ANSI/ANS-8.7-1998; R2017)

Scope: *This standard is applicable to the storage of fissile materials. Mass and spacing limits are tabulated for uranium containing greater than 30 wt-% ^{235}U, and for plutonium, as metals and oxides. Criteria for the range of application of these limits are provided.*

Membership:
Kevin Kimball, Chair, Individual; Kermit Bunde, U.S. Department of Energy; James Cole (Associate Member), Sandia National Laboratories; Denise Edwards, U.S. Nuclear Regulatory Commission; William Gerding (Associate Member), Paducah Gaseous Diffusion Plant; Christy Gibson, Consolidated Nuclear Security, LLC; James Kuropatwinski, Los Alamos National Laboratory; Ellen Saylor, Oak Ridge National Laboratory; Trevor Stewart (Associate Member), Los Alamos National Laboratory; Brittany Williamson, Spectra Tech/SRNS; Travis Wilson (Associate Member), X-Energy

Status: The revised standard was approved by ANSI on 5/6/2022 and published shortly after.

ANSI/ANS-8.10-2015 (R2020), ***Criteria for Nuclear Criticality Safety Controls in Operations with Shielding and Confinement*** **(revision of ANSI/ANS-8.10-1983; R2012)**

Scope: *This standard provides criteria that may be used for operations outside of nuclear reactors with ^{235}U, ^{233}U, ^{239}Pu, and other fissile and fissionable materials in which shielding and confinement are provided for protection of personnel and the public, except for the assembly of these materials under controlled conditions (e.g., critical experiments). The standard does not include details of administrative procedures for control (i.e., management prerogatives) nor details regarding design of processes and equipment or descriptions of instrumentation for process control.*

Membership:
Andrew Prichard, Chair, TradeWind Services, LLC; Linda Andrews, Framatome, Inc.; James Baker, Spectra Tech, Inc.; Andrew Barto, U.S. Nuclear Regulatory Commission; Douglas Bowen, Oak Ridge National Laboratory; Nicholas Brown, Nuclear Fuel Services, Inc.; Joseph Christensen, GE-Hitachi; Jason Crye (Associate Member), Consolidated Nuclear Security, LLC; Theresa Cutler, Los Alamos National Laboratory; Jerry Hicks, Individual; Krista Kaiser (Associate Member), Pacific Northwest National Laboratory; Darby Kimball, Lawrence Livermore National Laboratory; Thomas McLaughlin, Individual; Lon Paulson, GE Hitachi, Nuclear Energy

Status: ANSI approved the reaffirmation of this standard on 3/26/2020. It is anticipated that a revision will be initiated.

ANSI/ANS-8.12-1987 (R2021), ***Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors*** **(revision of ANSI/ANS-8.12-1978)**

Scope: *This standard is applicable to operations with homogeneous mixtures of plutonium and uranium. The mixtures may be solutions, suspended solids, precipitates, or may have been formed mechanically. Basic criteria are presented for plutonium-uranium fuel mixtures containing no more than 30 wt% plutonium combined with uranium containing no more than 0.71 wt% ^{235}U. This standard does not include the details of administrative controls, the design of processes or equipment, the description of instrumentation for process control, or detailed criteria to be met in transporting fissionable materials. The limits of this standard are not applicable to heterogeneous systems such as lattices of rods in water, mixtures in which particles are large enough to introduce lumping effects, or mixtures in which the concentrations of components are nonuniform. The limits are applicable, however, to homogeneous mixtures and slurries in which the particles constituting the mixture are uniformly distributed and have a diameter no larger than 127 mm (0.005 in.), i.e., are capable of being passed through a 120 mesh screen.*

Membership:
Christopher Tripp, Chair, Tripp Nuclear Consulting Services; Tracy Stover, Vice Chair, Savannah River Nuclear Solutions, LLC; Kermit Bunde, U.S. Department of Energy, Katherine McCurry, U.S. Nuclear Regulatory Commission; Dennis Mennerdahl, E. Mennerdahl Systems; Arielle Miller, Defense Nuclear Facilities Safety Board; Quentin Newell (Associate Member), Urenco USA; Scott Revolinski, Atkins; Dominic Winstanley, Sellafield Limited

Status: Reaffirmation received ANSI approval 8/16/2021. A PINS for the revision was submitted to ANSI on 9/27/2007 and resubmitted after subsequent reaffirmations. The ANS-8.12 standard was first approved in July 1978 and was revised in 1987. It was reaffirmed in 2002, 2011, 2016, and most recently in 2021. A major revision activity was initiated. A decision was made to follow the ISO MOX standard specifications (related to MOX density and isotopics) and develop a new set of subcritical limits for homogeneous systems for the revision of ANS-8.12. The working group has completed MCNP and SCALE calculations for six (6) sets of subcritical data. This is a significant progress in generating subcritical limits by Monte Carlo calculations using the ISO MOX specifications. A set of critical benchmark experiments was selected for validation work. Paucity of benchmark experiments in certain energy region was identified. Work is continuing to validate the calculated values and to come up with a set of subcritical parameters.

ANSI/ANS-8.14-2004 (R2021), ***Use of Soluble Neutron Absorbers in Nuclear Facilities Outside Reactors*** **(new standard)**

Scope: *This standard provides guidance for the use of soluble neutron absorbers for criticality control. This standard addresses neutron absorber selection, system design and modifications, safety evaluations, and quality control programs.*

Membership:
Kristan Wessels, Consolidated Nuclear Security, LLC, Chair; Lawrence Berg, U.S. Department of Energy; Joshua Butler (Associate Member), Consolidated Nuclear Security, LLC; Justin Clarity, Pacific Northwest National

Laboratory; Darwin Damba, U.S. Department of Energy; Victor Lollar, BWX Technologies, Inc.; Josiah Moore, U.S. Department of Energy; Jeremy Smith, U.S. Nuclear Regulatory Commission; Ryan Smith, UCOR; Clifford Stanley, Los Alamos National Laboratory; Clifford Stanley, Los Alamos National Laboratory

Status: The standard received ANSI approval of a reaffirmation on 8/5/2021. The chair is reforming the working group to initiate a revision of the standard.

ANSI/ANS-8.15-2014 (R2019), *Nuclear Criticality Control of Selected Actinide Nuclides* (revision of ANSI/ANS-8.15-1981; R1987; R1995; R2005)

Scope: *This standard is applicable to operations with the following nuclides:* ^{232}U, ^{234}U, ^{237}Np, ^{236}Pu, ^{238}Pu, ^{240}Pu, ^{241}Pu, ^{242}Pu, ^{241}Am, ^{242m}Am, ^{243}Am, ^{242}Cm, ^{243}Cm, ^{244}Cm, ^{245}Cm, ^{246}Cm, ^{247}Cm, ^{249}Cf, and ^{251}Cf. *Subcritical mass limits are presented for isolated units. The limits are not applicable to interacting units.*

Membership:
Charles Rombough, Chair, CTR Technical Services, Inc.; Giovanni Lozano (Associate Member), Los Alamos National Laboratory; Hiroshi Okuno, Japan Atomic Energy Research Institute; Timothy Sippel, U.S. Nuclear Regulatory Commission; Ning Zhang, Los Alamos National Laboratory

Status: The standard was approved by ANSI on 10/10/14 and reaffirmation on 9/12/2019. The ANS-8.15 standard was initially approved in 1981 (with reaffirmations in 1987, 1995, and 2005). The 2014 revision revises most of the subcritical limits for the original 14 nuclides in the 1981 standard and adds 5 additional nuclides bringing the total number of nuclides to 19.

ANSI/ANS-8.17-2004 (R2019), *Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors* (revision of ANSI/ANS-8.17-1984; R1989; R1997)

Scope: *This standard provides nuclear criticality safety criteria for the handling, storage, and transportation of light water reactor fuel rods and units outside reactor cores.*

Membership:
Ellen Saylor, Chair, Individual; Andrew Barto, U.S. Nuclear Regulatory Commission; Deborah Hill, National Nuclear Laboratory; Dale Lancaster, NuclearConsultants.com; Calvin Manning, Framatome, Inc.; William Marshall, Oak Ridge National Laboratory; Austin McGee, Consolidated Nuclear Facilities, LLC; Cecil Parks, Boston Government Services; Kristina Spencer (Associate Member), Idaho National Laboratory; Joshua Thomas, Global Nuclear Fuel

Status: A reaffirmation received ANSI approval on 9/12/2019. No activity for 2022. The working group will hold regular online meetings focused on developing a “basis statements” document in 2023, with the discussions from these meetings also determining future activities for the working group.

ANSI/ANS-8.19-2014 (R2019), *Administrative Practices for Nuclear Criticality Safety* (revision of ANSI/ANS-8.19-2005)

Scope: *This standard provides criteria for the administration of a nuclear criticality safety program for outside-of-reactor operations in which there exists a potential for criticality accidents. Responsibilities of management, supervision, and the nuclear criticality safety staff are addressed. Objectives and characteristics of operating and emergency procedures are included.*

Membership:
John Miller, Chair, Sandia National Laboratories; Jeremy Munson, Vice Chair, U.S. Nuclear Regulatory Commission; Gary Ly (Secretary), U.S. Department of Energy; Kelsey Amundson, Los Alamos National Laboratory; James Baker, Spectra Tech, LLC; James Bunsen, Los Alamos National Laboratory; Matthew Chapa, Novarei Solutions, LLC; Darwin Damba (Associate Member), U.S. Department of Energy; Jerry Hicks, Individual; Spencer Jordan, Y-12 National Security Complex; Ronald Knief, Individual; Sandi Larson, 21 Consulting Group Inc.; Jennifer Lyons, Pacific Northwest National Laboratory; Thomas Marenchin (Observer), U.S. Department of Energy-NNSA; Andrew Prichard (Observer), TradeWind Services, LLC; Ellen Saylor, Individual

Status: A reaffirmation received ANSI approval on 8/22/2019. In 2021, the working group held regular online meetings focused on developing a “basis statements” document, per an ANS-8 Subcommittee request. This

documentation is now in place for internal use only and will be maintained as necessary by the working group. This effort was time-consuming but very beneficial for the working group, as it helped build a common foundation and identified topics for consideration during a future revision. The working group is waiting on the chair to draft a PINS and Project Implementation Plan that should set the stage for both a reaffirmation (2024) and afterwards a future revision. In 2022, several associate members were promoted to full status and a new member added.

ANSI/ANS-8.20-1991 (R2020), *Nuclear Criticality Safety Training* (new standard)

Scope: *This standard provides criteria for nuclear criticality safety training for personnel associated with operations outside reactors where a potential exists for criticality accidents. It is not sufficient for the training of nuclear criticality safety staff.*

Membership:
Deborah Hill, Chair, National Nuclear Laboratory (UK); Nichole Ellis, Vice Chair, Ellis Nuclear Engineering, Inc.; Kelsey Amundson, Los Alamos National Laboratory; Paul Burdick, C.S. Engineering, Inc.; Theresa Cutler, Los Alamos National Laboratory; Christopher Haught, Consolidated Nuclear Security, LLC; Ronald Knief, Individual; Jesse McBurney-Rebol, Naval Nuclear Laboratory; Christine McNally, CALIAN; Catherine Percher, Lawrence Livermore National Laboratory; Randy Shackelford, Paschal Solutions, Inc.; Robert Taylor, Atkins Nuclear Solutions; Brittany Williamson, Spectra Tech/SRNS

Status: ANSI approved the reaffirmation of this standard on 5/8/2020. The working group has been actively working on a revision of ANSI/ANS-8.20-1991 for a number of years. The draft was issued to ANS-8 for ballot in 2019. In parallel with this, the existing standard was reaffirmed to allow more time to work on the revision. The key working group activity in 2021 was the resolution of the outstanding ANS-8 ballot comments. The latest version of the draft went to NCSCC for ballot in late January 2022, receiving 7 affirmative votes and 7 negative votes. An initial proposed response to the comments was formulated in late 2022, with working group meetings scheduled for January 2023 to work through those comments.

ANSI/ANS-8.21-1995 (R2019), *Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors* (new standard)

Scope: *This standard provides guidance for the use of fixed neutron absorbers as an integral part of nuclear facilities and fissionable material process equipment outside reactors, where such absorbers provide criticality safety control.*

Membership:
David Erickson, Chair, Savanah River Nuclear Solutions; James Bunsen, Los Alamos National Laboratory; Kevin Carroll, Pacific Northwest National Laboratory; Phillip Chou, Lawrence Livermore National Laboratory; Katherine Goluoglu, C.S. Engineering, Inc.; Jerry Hicks, Individual; Dennis Mennerdahl, E. Mennerdahl Systems-Sweden; Jeremy Smith, U.S. Nuclear Regulatory Commission; Robert Wilson, U.S. Department of Energy

Status: Reaffirmation received ANSI approval 4/9/2019. The PINS, supporting a revision, was submitted to ANSI 2/12/2008 and resubmitted after each reaffirmation with the last submittal on 4/23/2019. A revision to ANS-8.21, incorporating comments from the reaffirmation and also including the salient requirements from ANS-8.5, was sent to NCSCC for ballot in August 2017 and resubmitted to NCSCC ballot in 2021. The working group has been resolving NCSCC ballot comments. A revised draft addressing final NCSCC comments has been submitted to commenters. The working group is awaiting official responses before proceeding to the next step.

ANSI/ANS-8.22-1997 (R2021), *Nuclear Criticality Safety Based on Limiting and Controlling Moderators* (new standard)

Scope: *This standard applies to limiting and controlling moderators to achieve criticality safety in operations with fissile materials in a moderator control area. This standard does not apply to concentration control of fissile materials.*

Membership:
Michael Crouse, Co-Chair, Consolidated Nuclear Security, LLC; Lon Paulson, Co-Chair, GE Power Portfolio; Brannen Adkins, U.S. Nuclear Regulatory Commission; Marvin Barnett, Savannah River Nuclear Solutions; Derrick

Faunce, Nuclear Safety & Technology Services; Michael Fendler (Associate Member), Pacific Northwest National Laboratory; Chris Haught, Consolidated Nuclear Security, LLC; Deborah Hill, National Nuclear Laboratories, UK; Tom Lewis, Nevada National Security Site; Alan Wilkinson, Consolidated Nuclear Security, LLC

Status: This standard was reaffirmed on 8/5/2021. A PINS was submitted to ANSI on 11/22/2019 and was resubmitted after the reaffirmation was approved. This revision reduces duplication and ensures terminology consistency with other ANS standards on nuclear criticality safety, updates moderation control guidance, requirements, and references. A draft was submitted to ANS-8 for ballot at the end of 2021. The draft was revised to incorporate comments and issued to ANS-8 for a second ballot that closed 11/29/22. The second ballot received a response of 15/16 = 93.8% with 11 Affirmative and 4 Negative votes. A telecon was also held prior to the 2022 ANS Winter meeting to discuss comments that remain unresolved. The working group will be actively meeting in 2023 to resolve second round ballot comments.

ANSI/ANS-8.23-2019, *Nuclear Criticality Accident Emergency Planning and Response* (revision of ANSI/ANS-8.23-2007; R2012)

Scope: *This standard provides criteria for minimizing risks to personnel during emergency response to a nuclear criticality accident outside reactors. This standard applies to those facilities for which a criticality accident alarm system, as specified in American National Standard Criticality Accident Alarm System, ANSI/ANS-8.3-1997 (R2017),is in use. This standard does not apply to nuclear power plant sites, or to those licensed research reactor facilities, which are addressed by other standards.*

Membership:
James Baker, Chair, Spectra Tech, LLC; Peter Angelo, Consolidated Nuclear Security, LLC; Konner Casanova, Idaho National Laboratory; James Cole (Associate Member), Sandia National Laboratories; Theresa Cutler, Los Alamos National Laboratory; Patricia Glenn, U.S. Nuclear Regulatory Commission; Jerry Hicks, Individual; Timothy Jackson, ; Krista Kaiser, ; Ashley Luksic, : Patrick Moss, U.S. Department of Energy; Brandon O'Donnell, BWX Technologies, Inc.; Blaine Rice, Paschal Solutions, Inc.; Ellen Saylor, Oak Ridge National Laboratory; Jingjing Wang, Canadian Nuclear Laboratories; Ralph Winiarski, Paschal Solutions, Inc.; Dominic Winstanley, Sellafield Ltd.

Status: ANSI approved a revision of the standard on 9/16/2019. The working group has not received any comments or inquiries since publication. The working group is not currently active, except that the chair has made an initial draft of the basis statements for each of the criteria. This will provide knowledge transfer to new working group members when the next revision cycle begins, anticipated in mid-2023.

ANSI/ANS-8.24-2017, *Validation of Neutron Transport Methods for Nuclear Criticality Safety Calculations* (revision of ANSI/ANS-8.24-2007; R2012)

Scope: *This standard provides requirements for validation, including establishing applicability, of neutron transport calculational methods used in determining critical or subcritical conditions for nuclear criticality safety analyses.*

Membership:
Larry Wetzel, Chair, BWX Technologies, Inc.; Robert Busch, University of New Mexico; Scott Finfrock, Fluor Government Group;; Shawn Henderson (Associate Member), Sandia National Laboratories; Jerry Hicks, Individual; Derek Hounshel, Los Alamos National Laboratory; Timothy Jackson (Associate Member), Consolidated Nuclear Security, LLC; Jeremy Munson, U.S. Nuclear Regulatory Commission; Cecil Parks, Boston Government Services; Christopher Perfetti, University of New Mexico; Andrew Prichard, TradeWind Services, LLC Christopher Tripp, Tripp Nuclear Consulting Services

Status: The standard was approved by ANSI on 12/12/2017. The working group has begun working on basis statements for the current version of the standard. NCSCC and Standards Board approval of a reaffirmation was completed at the end of 2022 with ANSI approval expected in early January 2023.

ANSI/ANS-8.26-2007 (R2022), *Criticality Safety Engineer Training and Qualification Program* (new standard*)*

Scope: *This standard presents the fundamental content elements of a training and qualification program for Individuals with responsibilities for performing the various technical aspects of criticality safety engineering. The standard presents a flexible*

array of competencies for use by management to develop tailored training and qualification programs applicable to site-specific job functions, facilities and operations.

Membership:
Kevin Reynolds, Chair, Consolidated Nuclear Security; James Baker, Spectra Tech, LLC; Douglas Bowen, Oak Ridge National Laboratory; Kevin Carroll, Pacific Northwest National Laboratory; Theresa Cutler, Los Alamos National Security, LLC; David Erickson, Savannah River Nuclear Solutions; Makenzie Gorham, Idaho State University; David Hayes, Los Alamos National Laboratory; Jerry Hicks, Individual; Ronald Knief, Individual; Gary Ly, U.S. Department of Energy; James Morman, Argonne National Laboratory; Lon Paulson, GE Hitachi Nuclear Energy; Nicholas Peterka, U.S. Nuclear Regulatory Commission; Chad Pope, Idaho State University; Andrew Prichard, TradeWind Services, LLC; Robert Wilson, U.S. Department of Energy

Status: The standard was reaffirmed by ANSI on 12/15/2016and 2/10/2022. A PINS was submitted to ANSI 8/20/2013 and resubmitted after each reaffirmation. Work on the revision continues.

ANSI/ANS-8.27-2015 (R2020), *Burnup Credit for LWR Fuel* (revision of ANSI/ANS-8.27-2008)

Scope: *The standard provides criteria for processes and techniques used for criticality safety evaluations of irradiated light water reactor fuel assemblies in storage, transportation and disposal.*

Membership:
Dale Lancaster, Chair, NuclearConsultants.com; Charles Rombough, Secretary, CTR Technical Services, Inc.; Stefan Anton, Hotlec International; Steve Baker, TransWare Enterprises; Andrew Barto, U.S. Nuclear Regulatory Commission; Kristin Bennett, GE Hitachi; Mark DeHart, Idaho National Laboratory; Sarah Gibboney, Orano Federal Services LLC; John Hannah, Global Nuclear Fuels; Ed Knuckles, Individual; William Marshall, Oak Ridge National Laboratory; Zita Martin, Tennessee Valley Authority; John Massari, Individual; Dennis Mennerdahl, E. Mennerdahl Systems; Prakash Narayanan, Orano TN; Greg O'Connor, Office for Nuclear Regulation; Cecil Parks, Boston Government Services; Holger Pfiefer, NAC International; Meraj Rahimi, U.S. Nuclear Regulatory Commission; Alan Wells, Individual; Kent Wood, U.S. Nuclear Regulatory Commission; John Zino, GE Hitachi

Status: ANSI approved a reaffirmation of this standard on 8/27/2020.

ANS-8.28, *Administrative Practices for the Use of Non-Destructive Assay Measurements for Nuclear Criticality Safety* (proposed new standard)

Scope: *This standard provides administrative practices covering the interface between the criticality safety community and the NDA community including in-situ measurements and measurements of containerized materials.*

Membership:
Jeffrey Chapman, Co-chair, Oak Ridge National Laboratory; Ernest Elliott, Co-chair, Spectra Tech, LLC; Roger Bartholomay, C.S. Engineering Inc.; Lawrence Berg, U.S. Department of Energy; Douglas Bowen, Oak Ridge National Laboratory; Ashby Bridges, Reveam, Inc. ; David Dolin, Savannah River Solutions; Michael Dunn, Spectra Tech, Inc.; A. Nichole Ellis, Ellis Nuclear Engineering, LLC; Patricia Glenn, U.S. Nuclear Regulatory Commission; Katherine Goluoglu, C.S. Engineering, Inc.; Christopher Haught, Consolidated Nuclear Security, LLC; Jerry Hicks, Individual; David Kupferer, Consolidated Nuclear Solutions; Sandra Larson, 21 Consulting Group, Inc.; Megan Pritchard, Nuclear Safety & Technology Services; Thomas Sampson, Sampson Professional Services; Wade Scates, Idaho National Laboratory; Gladys Udenta, U.S. Department of Energy; Robert Wilson, U.S. Department of Energy; John Winkel, CPCC; Dominic Winstanley, Sellafield, Limited

Status: The PINS form was submitted to ANSI on 1/28/2011. The draft was submitted for ANS-8 ballot in February 2021. The working group responded to and resolved ANS-8 comments. The draft was subsequently submitted for NCSCC ballot in October 2021. The working group is in the process of resolving the NCSCC comments.

Nuclear Criticality Safety Consensus Committee (NCSCC)
List of Standards/Projects

Chair: Larry L. Wetzel Vice Chair: William R. Shackelford

Fissionable Materials Outside Reactors Subcommittee (ANS-8)
Subcommittee Chair: Douglas Bowen

Ⓟ = PINS submitted to ANSI

ANS-8.1-2014 (R2018) Ⓟ (A1)	Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors	RF 12/29/2018 (WGC: N. Brown)
ANS-8.12-1987 (R2021) Ⓟ (A1)	Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors	RF 8/16/2021 (WGC: C. Tripp)
ANS-8.20-1991 (R2020) Ⓟ (A1)	Nuclear Criticality Safety Training	RF 5/8/2020 (WGC: D. Hill)
ANS-8.21-1995 (R2019) Ⓟ (A1)	Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors	RF 4/9/2019 (WGC: D. Erickson)
ANS-8.22-1997 (R2021) Ⓟ (A1)	Nuclear Criticality Safety Based on Limiting and Controlling Moderators	RF 12/7/2021 (WGC: M. Crouse/ L. Paulson)
ANS-8.26-2007 (R2022) Ⓟ (A1)	Criticality Safety Engineer Training and Qualification Program	RF 2/10/2022 (WGC: K. Reynolds)
ANS-8.3-2022 (A2)	Criticality Accident Alarm System	RV 9/8/2022 (WGC: J. Hicks)
ANS-8.5-1996 (R2022) (A2)	Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material	RF 9/8/2022 (WGC: J. Hicks)
ANS-8.6-1983 (R2022) (A2)	Safety in Conducting Subcritical Neutron-Multiplication Measurements In Situ	RF 9/9/2022 (WGC: T. Cutler)
ANS-8.7-2022 (A2)	Nuclear Criticality Safety in the Storage of Fissile Materials	RV 5/6/2022 (WGC: J. Kuropatwinski)
ANS-8.10-2015 (R2020) (A2)	Criteria for Nuclear Criticality Safety Controls in Operations with Shielding and Confinement	RF 3/26/2020 (WGC: A. Prichard)
ANS-8.14-2004 (R2021) (A2)	Use of Soluable Neutron Absorbers in Nuclear Facilities Outside Reactors	RF 8/5/2021 (WGC: K. Wessels)
ANS-8.15-2014 (R2019) (A2)	Nuclear Criticality Control of Special Actinide Elements	RF 9/12/2019 (WGC: C. Rombough)
ANS-8.17-2004 (R2019) (A2)	Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors	RF 9/12/2019 (WGC: E. Saylor)
ANS-8.19-2014 (R2019) (A2)	Administrative Practices for Nuclear Criticality Safety	RF 8/22/2019 (WGC: J. Miller)
ANS-8.23-2019 (A2)	Nuclear Criticality Accident Emergency Planning and Response	RV 9/16/2019 (WGC: J. Baker)
ANS-8.24-2017(A2)	Validation of Neutron Transport Methods for Nuclear Criticality Safety Calculations	RV 12/12/2017 (WGC: L. Wetzel)
ANS-8.27-2015 (R2020) (A2)	Burnup Credit for Light Water Reactor Fuel	RF 8/7/2020 (WGC: D. Lancaster)
ANS-8.1-2014 (R2018) Ⓟ (A1)	Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors	RF 12/29/2018 (WGC: N. Brown)
ANS-8.28 (NEW) Ⓟ (B1)	Administrative Practices for the Use of Non-Destructive Assay Measurements for Nuclear Criticality Safety	Active Project (WGCs: J. Chapman / E. Elliott)

(A1) Current Being Worked On Standards
(A2) Current Not Being Worked On Standards
(B1) Proposed Being Worked On Standards
(B2) Proposed Not Being Worked On Standards
(C1) Withdrawn Being Worked On Standards
(C2) Withdrawn Not Being Worked On Standards

Table 5 – NCSCC List of Standards/Projects

Research and Advanced Reactors Consensus Committee (RARCC)

George Flanagan, Chair
Individual

Scope: *The RARCC is responsible for the preparation and maintenance of voluntary consensus standards for the design, operation, maintenance, operator selection and training, and quality requirements for current and future research and test reactors including pulsed critical facilities, reactors used for the production of isotopes for industrial, educational, and medical purposes and current and advanced non-large LWRs. The scope includes but is not limited to: water-cooled and non-water cooled Small Modular Reactors, Generation III+ and IV reactors, and future non-light water cooled/moderated large commercial reactors.*

The RARCC standards include but are not limited to the design and operation of the nuclear island, the balance of plant, and other systems within the plant boundary affecting safety and operations. The ANS Standards Committee Procedures Manual for Consensus Committees shall be used to guide the activities of this consensus committee.

Subcommittees have been established to manage the activities of working groups and to perform detailed reviews of proposed standards for technical need, relevance, and acceptability. Each subcommittee has been assigned a unique and specific area of technical responsibility.

These subcommittees have been organized as follows:

- *Operation of Research Reactors (ANS-15)*
- *Advanced Initiatives (ANS-29)*

Each subcommittee has established various working groups to develop specific proposed standards and maintain existing standards within its respective area of responsibility. These working groups create the text of RARCC standards and resolve review and ballot comments.

RARCC Membership:
George Flanagan, Chair, Individual
Bruce B. Bevard, Vice Chair, Oak Ridge National Laboratory
Thomas Newton, Vice Chair, National Institute of Standards & Technology
Amir Afzali, Individual
Jason Andrus, Idaho National Laboratory
James August, Individual
Edward Blandford, Kairos Power, LLC
Leslie Foyto, University of Illinois
Tony Grenci, Salt River Project
Brian Grimes, Individual
Matthew Hertel, X-Energy, LLC
William Kennedy, U.S. Nuclear Regulatory Commission
David Lawson, U.S. Department of Energy
Mark A. Linn, Individual
D. Sean O'Kelly, Idaho National Laboratory
Mark Peres, Peres Engineering
Steven Reese, Oregon State University
Donald Spellman, Xcel Engineering
Anthony Veca, General Atomics

Observer:
David E. Holcomb, Oak Ridge National Laboratory

Report of RARCC:

The RARCC met via Zoom on November 7, 2022, prior to the 2022 ANS Winter Meeting. Jan Mazza retired from NRC and from the RARCC. Mark Peres retired from Kairos Power but remains on the RARCC as an individual. Rick

Turk (member) and Steve Stamm (observer) resigned from RARCC. Both RARCC Chair George Flanagan and RARCC Co-chair Bruce Bevard will be stepping down from their roles when their terms end in 2023.

Approved in 2022:

No standards were approved in 2022.

Active Standards/Projects (Approved PINS):

ANS-1, *Conduct of Critical Experiments* (revision of ANSI/ANS-1-2000; R2019)

ANS-15.22, *Classification of Structures, Systems, and Components for Research Reactors* (proposed new standard)

ANS-20.2, *Nuclear Safety Design Criteria and Functional Performance Requirements for Liquid-Fuel Molten Salt Reactor Nuclear Power Plants* (proposed new standard)

ANS-GS-30.1, *Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs* (proposed new guidance standard)

ANS-30.2, *Structures, Systems, and Component Classification for Nuclear Power Plants* (proposed new standard)

ANS-53.1, *Nuclear Safety Criteria for the Design of High Temperature Gas-Cooled Reactor Plants* (revision of ANSI/ANS-53.1-2011; R2021)

Advanced Initiatives Subcommittee (ANS-29)

Membership:
Bruce Bevard, Chair, Oak Ridge National Laboratory
James August, Individual
Edward Blandford, Kairos Power LLC
Matthew Denman, Kairos Power LLC
George Flanagan, Individual
David Holcomb, Oak Ridge National Laboratory
Mark Linn, Individual
Robert Sachs, Individual
Kent Welter, NuScale Power

The Advanced Initiatives Subcommittee manages the following projects and current standards:

ANS-20.1, *Nuclear Safety Design Criteria for Fluoride Salt-Cooled High-Temperature Reactor Nuclear Power Plants* (proposed new standard)

Scope: *This standard establishes the nuclear safety design criteria and design requirements for a fluoride salt-cooled, high-temperature reactor. The standard reflects performance-based, risk-informed criteria wherever possible. It also describes the design process to establish those criteria and addresses structures, systems, and component classifications.*

Membership:
Edward Blandford, Co-Chair, Kairos Power LLC; Matthew Denman, Co-Chair, Kairos Power LLC

Status: The PINS was submitted to ANSI on 5/31/2013. Project on indefinite hold.

ANS-20.2, *Nuclear Safety Design Criteria and Functional Performance Requirements for Liquid-Fuel Molten Salt Reactor Nuclear Power Plants* (proposed new standard)

Scope: *This standard establishes the nuclear safety design criteria and functional performance requirements for liquid-fuel molten salt reactor nuclear power plants. The document uses performance-based, risk-informed criteria wherever possible. It also describes the design process to be followed to establish those criteria and perform structures, systems, and component classifications.*

Membership:
David Holcomb, Chair, Oak Ridge National Laboratory; Vincent Lackowski (Secretary), Thorium Energy Alliance; Abdalla Abou-Jaoude, Idaho National Laboratory; Amir Afzali, Individual; Francis Akstulewicz, Terrestrial Energy USA; Edward Blandford, Kairos Power LLC; Daniel Carleton, Terrestrial Energy USA; Bernard Carluec, Framatome, Inc.; Kun Chen, Atomoverde Canada Inc.; Brandon Chisholm, Southern Nuclear Operating Company; Ondrej Chvala, University of Tennessee; Bernat Ciera (Associate Member), Seaborg Technologies; Stephen Cook, Individual; Ronald English, Individual; George Flanagan, Individual; Charles Forsberg, Massachusetts Institute of Technology; Massimilano Fratoni, University of California–Berkley; Jess Gehin, Idaho National Laboratory; Kurt Harris, Flibe Energy, Inc.; Chris Johns, TerraPower LLC; Brian Johnson, TerraPower LLC; Lars Jorgensen, Thorcon Power;Takashi Kamei, Research Institute for Applied Science; John Kutsch, Thorium Energy Alliance; Vince Lackowski, Thorium Energy Alliance; Imtiaz Madni; U.S. Nuclear Regulatory Commission; Stewart Magruder, Individual; Zander Mausolff, TerraPower, LLC; Ashkhen Nalbandyan, DTU Physics; Thomas Pederson, Copenhagen Atomics; Per Peterson, University of California–Berkley; Edward Pheil, Exodys Energy; Wendy Reed, U.S. Nuclear Regulatory Commission; Raluca Scarlat, University of California–Berkley; Shayan Shahbazi, Argonne National Laboratory; Vikram Singh (Associate Member), University of Tennessee; Nicholas Smith, Idaho National Laboratory; Andrew Sowder, Electric Power Research Institute; Aslak Stubsgaard, Copenhagen Atomics; Nam-il Tak, Korea Atomic Energy Institute; Christopher Van Wert, U.S. Nuclear Regulatory Commission; Lorenzo Vergari (Associate Member), University of California–Berkley; Edward Wallace, GNBC Associates, Inc.

Status: The PINS was approved and submitted to ANSI on 7/7/2016. The draft was issued for subcommittee ballot and non-developing consensus committee reviews in September of 2021. Comments were resolved allowing the draft to be issued to RARCC for approval ballot on 7/11/2022. The ballot closed 10/19/22 after 4 extensions. The vote tally is 4 affirmative votes, 9 negative votes, 3 abstentions, and 2 non responses. The working group is meeting regularly working on resolutions.

ANS-GS-30.1, *Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs* (proposed new guidance standard)

Scope: *This guidance standard is technology-neutral and applicable to new reactor designs. It specifies objectives for augmenting deterministic nuclear safety design practices using risk-informed, performance-based (RIPB) methods. The application of RIPB methods to high level safety criteria selection, nuclear safety functions and margin, licensing-basis-event selection, equipment classification, and defense-in-depth adequacy is described to ensure RIPB-augmentation of nuclear safety design practices is consistently applied for all new reactor technologies. The application of this standard to existing reactors is beyond the scope of this standard.*

Membership*:*
Mark Linn, Chair, Individual; David Johnson, Vice Chair, Individual; Mihai Diaconeasa, North Carolina University; Jordan Hagaman, Kairos Power LLC; Ralph Hill, Individual; Ian Jung, U.S. Nuclear Regulatory Commission; Darvin Kapitz, Individual; Andrea Maioli, Westinghouse Electric Company, LLC; Patrick O'Regan, Electric Power Research Institute; Russell Williston, Individual

Status: The PINS was submitted to ANSI on 8/11/2015. The Standards Board held several long discussions on the path forward for this project in 2021 in light of comments received from the subcommittee ballot and non-developing consensus committee reviews. The Standards Board directed that the project continues to be pursued as a guidance standard. The document has been revised accordingly and will be reballoted in 2023.

ANS-30.2, *Categorization and Classification of Structures, Systems, and Components for New Nuclear Power Plants* (proposed new standard)

Scope: *This standard provides a single technology neutral categorization and classification process for SSCs for new nuclear power plants that is, where possible, risk informed and performance based. This process will then be used to determine special treatment of SSCs to meet the safety basis. This standard applies only to those new design facilities (i.e., greater than Generation III) that must obtain an operating license from the proper regulatory authority. It provides a complete (e.g., necessary and sufficient) repeatable logical process based upon risk-informed, performance-based objectives. Other voluntary consensus standards (VCS) may often be required in order to complete the entire process for all SSCs. Those standards are incorporated by reference.*

Membership:
Kent Welter, Chair, NuScale Power, Inc.; Amir Afzali, Individual; Jason Andrus, Idaho National Laboratory; James August, Individual; David Blanchard, Applied Reliability Engineering; Matthew Brenner Bechtel Power Corporation; Robert Burg, EPM, Inc.; William Culp, Fluor Enterprises; Zachary Deziel (Associate Member), Texas A&M University; Mihai Diaconeasa, North Carolina State University; Matthew Hertel, X-Energy, LLC; Ralph Hill, Hill Engineering Solutions LLC; Brian Johnson, TerraPower LLC; Prasad Kadambi, Kadambi Engineering Consultants; Bryce Kelly, Idaho National Laboratory; Vicken Khatchadourian (Alternate), EPM, Inc.; Gary Locklear, Kinectrics AES, Inc.; Patrick O'Regan, Electric Power Research Institute; James Pappas (Observer), Westinghouse Electric Company, LLC; Hanh Phan, U.S. Nuclear Regulatory Commission; Johannes Pickelmann, Framatome GmbH; Alexandra Renner, Oklo, Inc.; Donald Spellman, Excel Engineering; Edward Wallace, GNBC Associates

Status: PINS was submitted to ANSI on 7/7/2016.Excellent progress was made in development of the draft standard. Seeking a new working group chair as the current chair is stepping down January 2023.

ANSI/ANS-53.1-2011 (R2021), *Nuclear Safety Design Process for Modular Helium-Cooled Reactor Plants* (new standard)

Scope: *This standard applies to the safety design process for MHR nuclear power plants. This standard provides a process for establishing top-level safety criteria (TLSC), safety functions, top-level design criteria (TLDC), licensing basis events (LBEs), design basis accidents (DBAs), safety classification of systems, structures, and components (SSC), safety analyses, defense-in-depth (DID), and adequate assurance of special treatment requirements for safety-related SSC throughout the operating life of the plant. The standard does not provide detailed guidance for design; other existing standards cover those.*

Membership:
James August, Chair, Individual; John Fletcher, Ultrasafe Nuclear Corporation; Izabela Gutowska, Oregon State University; Matthew Hertel, X-Energy, LLC; Howard Iskyan, Iskyan LLC; William Kennedy, U.S. Nuclear Regulatory Commission; Brendan Kochunas, University of Michigan-Ann Arbor; Ben Lindley, University of Wisconsin-Madison; Fatih Sarikurt, TerraPower; Liang Shi, Constellation Nuclear; Donald Spellman, Xcel Engineering; Boyce Travis, U.S. Nuclear Regulatory Commission

Status: The standard was reaffirmed on 10/7/2021. Interest was expressed at the September 2018 NRC Standards Forum for this standard. A discussion at the RARCC November 2018 meeting recommended that a revision should be initiated. The working group has been reformed. A PINS has been prepared and is expected to be submitted to ANSI in early January 2023. The PINS changes the title for the revision of the standard to *Nuclear Safety Criteria for the Design of High Temperature Gas-Cooled Reactor Plants*. Based on suggestions, the working group will identify top areas for review and update development, and once approved, set about developing revisions for those. The working group expects that the basic content of ANS-53.1 will remain the same but that the overall length and complexity of the existing standard will fall. The revision will be an improved version of ANS-53.1 that will be more useful to all MHR designers. The working group developed a focus scope, goals, assigned sections, and developed a project plan. The working group has been meeting every other week.

ANSI/ANS-54.1-2020, *Nuclear Safety Criteria and Design Process for Sodium Fast Reactor Nuclear Power Plants* (new standard, historical revision of ANSI/ANS-54.1-1989)

Scope: *The scope of this standard covers the nuclear safety of these facilities, meaning the elements of the design aimed at preventing or mitigating accidental damage to the facility which could lead to radiological releases that would harm the public or the facility's workers. Any facility design must also be concerned with preventing and mitigating damage caused by a security breach arising from either inside or outside the facility, and a general criterion related to that subject is included in the scope of this standard.*

Membership:
George Flanagan, Chair, Individual, Robert Budnitz, Vice Chair, Lawrence Berkley National Laboratory; Robert Bari, Brookhaven National Laboratory; Peter Gaillard, TerraPower; Michael Garrett, Individual; Christopher Grandy, Argonne National Laboratory; Tony Grenci Salt River Project; Prasad Kadambi, Individual; Thomas King, Information Systems Laboratory, Inc; Christian Lobscheid, Advent Engineering Services; Imitiaz Madni, U.S. Nuclear Regulatory Commission; Hisato Matsumiya, Toshiba Corporation; Jan Mazza, U.S. Nuclear Regulatory Commission; Yasushi Okano, Japan Atomic Energy Agency; Roald Wigeland, Idaho National Laboratory

Status: This standard was approved by ANSI on 3/23/2020.

Operation of Research Reactors Subcommittee (ANS-15)

Membership:
Thomas Newton, Chair, National Institute of Standards & Technology
Michael Balazik, U.S. Nuclear Regulatory Commission
Matthew Burger, Sandia National Laboratories
Byron Curnutt, Idaho National Laboratory
Leslie Foyto, University of Missouri
Gary Harms, Sandia National Laboratories
Jere Jenkins, Texas A&M University
Bryce Kelly, Idaho National Laboratory
Sean O'Kelly, Idaho National Laboratory
Steven Reese, Oregon State University
Randolph Strader, National Institute of Standards & Technology

Operation of Research Reactors Subcommittee manages the following projects and current standards:

ANSI/ANS-1-2000 (R2019), *Conduct of Critical Experiments* (revision of ANSI/ANS-1-1987; R1992)

Scope: *This standard provides for the safe conduct of critical experiments. Such experiments study neutron behavior in a fission device where the energy produced is insufficient to require auxiliary cooling, and the power history is such that the inventory of long-lived fission products is insignificant.*

Membership:
Gary Harms, Chair, Sandia National Laboratories; Lawrence Berg, U.S. Department of Energy; Robert Busch, University of New Mexico; Theresa Cutler, Los Alamos National Laboratory; John Ford, Sandia National Laboratories; David Hayes, Los Alamos National Laboratory; Ronald Knief, Individual; Thomas McLaughlin, Individual; Abraham Weitzberg, Individual

Status: ANSI approved a reaffirmation on 8/12/2019. A PINS for a revision was submitted to ANSI on 7/7/2017 and resubmitted 8/15/2019 after the reaffirmation. The reaffirmation was processed to keep the standard current while the revision is completed.

ANSI/ANS-14.1-2004 (R2019), *Operation of Fast Pulse Reactors* (revision of ANSI/ANS-14.1-1975; R1982; R1989; R2000)

Scope: *This standard is for those involved in the design, operation, and review of fast pulse reactors. It has been formulated in general terms to be applicable to all current fast pulse reactors. This standard does not apply to periodically pulsed reactors or booster assemblies.*

Membership:
Matthew Burger Chair, Sandia National Laboratories; Richard Anderson, Los Alamos National Laboratory; James Bryson, Sandia National Laboratories; Michael Flanders, White Sands Missile Range; John Ford, Sandia National Laboratories; Joetta Goda, Los Alamos National Laboratory; Ronald Knief, Individual; Douglas Minnema, Defense Nuclear Facilities Safety Board

Status: ANSI approved a reaffirmation on 8/12/2019. No activity in 2022.

ANSI/ANS-15.1-2007 (R2018), *The Development of Technical Specifications for Research Reactors* (revision of ANSI/ANS-15.1-1990; R1999)

Scope: *This standard identifies and establishes the content of technical specifications (TS) for research and test reactors. Areas addressed are: Definitions, Safety Limits (SL), Limiting Safety System Settings (LSSS), Limiting Conditions for Operation (LCO), Surveillance Requirements (SR), Design Features, and Administrative Controls. Sufficient detail is incorporated so that applicable specifications can be derived or extracted.*

Membership:
Les Foyto, Chair, University of Illinois–Champagne Urbana; Evan Beese, RiskIQ; Leo Bobek, University of Massachusetts–Lowell; Justin Hudson, Jr., U.S. Nuclear Regulatory Commission; William Kennedy, U.S. Nuclear Regulatory Commission; Sean O'Kelly, Idaho National Laboratory; Steve Reese, Oregon State University; Brian Shea, University of Florida

Status: This standard received ANSI approval of a reaffirmation on 4/10/2018. The working group will be working with the NRC in the near future to incorporate "lessons learned" during relicensing of facilities.

ANSI/ANS-15.2-1999 (R2021), *Quality Control for Plate-Type Uranium-Aluminum Fuel Elements* (revision of ANSI/ANS-15.2-1990)

Scope: *This standard sets forth general requirements for the establishment and execution of a program designed to verify that the quality of plate-type uranium-aluminum fuel elements being purchased for research reactors conforms to the requirements of the contract and applicable technical documents, including specifications, standards, and drawings.*

Membership:
Bryon Curnutt, Chair, Idaho National Laboratory; Clinton Cooper, Idaho National Laboratory; Daniel Pinkston, Oak Ridge National Laboratory; Randolph Strader, National Institute of Standards and Technology

Status: The reaffirmation of this standard was approved by ANSI on 8/18/2016 and 1/28/2021. The reaffirmation will keep the standard current while progress is made on new high power LEU conversions. A revision to ANSI/ANS-15.2-1999 (R2009) was issued for ballot to N17 (previous consensus committee). Significant comments were received directing that new high power LEU conversion fuel be incorporated into the next revision of the standard. The revision was put on hold until sufficient progress is made on the new fuel type. This progress has yet to be made and is not expected to be available for some time. The subcommittee and working group chairs do not recommend that the PINS, as previously approved, be administratively resubmitted to ANSI and have committed to submitting a new PINS form acknowledging the incorporation of LEU fuel type and possibly other changes when sufficient information is available.

ANSI/ANS-15.4-2016 (R2021), *Selection and Training of Personnel for Research Reactors* (revision of ANSI/ANS-15.4-2007)

Scope: *This standard sets the qualification, training, and certification criteria for operations personnel at research reactors and establishes the elements of a program for periodic re-qualification and re-certification. The standard is predicated on levels of responsibility rather than on a particular organizational concept.*

Membership:
Jere Jenkins, Chair, Idaho National Laboratory; Leo Bobek, University of Massachusetts–Lowell; Paul Brand, National Institute of Standards & Technology; Michelle DeSouza, U.S. Nuclear Regulatory Commission; Cameron Goodwin, Rhode Island Nuclear Science Center; Christopher Heysel, McMaster University; Christopher Hines, Nuclear Science Center; Amber Johnson, University of Maryland; George Miller, University of California–Irvine; Meagan Nydegger, National Institute of Standards & Technology; Celia Oney, Oregon State University; Sean Schaefer, University of Missouri Research Reactor; Randolph Strader, National Institute of Standards & Technology; Jonathan Wallick, U.S. Geological Survey

Status: ANSI approved a reaffirmation on 7/23/2021.

ANSI/ANS-15.8-1995 (R2018), *Quality Assurance Program Requirements for Research Reactors* (revision of ANSI/ANS-15.8-1976; R1986)

Scope: *The standard provides criteria for quality assurance in the design, construction, operation, and decommissioning of research reactors.*

Membership:
Randolph Strader, Chair, National Institute of Standards and Technology; Gary Kirk, Oak Ridge National Laboratory; Daniel Menchaca, Texas A&M University; Richard Pratt, Sandia National Laboratory

Status: A reaffirmation was approved by ANSI on 7/18/2018.

ANSI/ANS-15.11-2016 (R2021), *Radiation Protection at Research Reactor Facilities* (revision of ANSI/ANS-15.11-2009)

Scope: *This standard establishes the elements of a radiation protection program and the criteria necessary to provide an acceptable level of radiation protection for personnel at research reactor facilities and the public consistent with keeping exposures and releases as low as is reasonably achievable (ALARA).*

Membership:
Steven Reese, Chair, Oregon State University; Craig Bassett, U.S. Nuclear Regulatory Commission; David Brown, National Institute of Standards & Technology; Ronald Dobey, Individual; Wesley Frey, University of California–Davis

Status: ANSI approved a reaffirmation on 7/20/2021. It is anticipated that the standard will be reviewed in 2024.

ANSI/ANS-15.16-2015 (R2020), *Emergency Planning for Research Reactors* (revision of ANSI/ANS-15.16-2008)

Scope: *This standard identifies the elements of an emergency plan which describes the approach to coping with emergencies and minimizing the consequences of accidents at research reactor facilities. The emphasis given each of these elements shall be commensurate with the potential risk involved. The emergency plan shall be implemented by emergency procedures.*

Membership:
Steven Reese, Chair, Oregon State University; Leo Bobek, University of Massachusetts–Lowell; James Bryson, Sandia National Laboratories; Les Foyto, University of Illinois–Champagne Urbana; Michael Norris, U.S. Nuclear Regulatory Commission; Sean O'Kelly, Idaho National Laboratory

Status: The revised standard was approved by ANSI on 2/11/2015 with a reaffirmation approved on 1/23/2020.

ANSI/ANS-15.21-2012 (R2018)*, Format and Content for Safety Analysis Reports for Research Reactors* (revision of ANSI/ANS-15.21-1996; R2006)

Scope: *This standard identifies specific information and analyses for inclusion in the safety analysis report for research reactors and establishes a uniform format for the report. This standard provides the criteria for the format and content for safety analysis reports for research reactors.*

Membership:
Michael Balazik, Chair, U.S. Nuclear Regulatory Commission; Steven Reese, Oregon State University; Clifford Stanley, Idaho National Laboratory

Status: The standard was reaffirmed by ANSI on 2/27/2018.

ANS-15.22, *Classification of Structures, Systems, and Components for Research Reactors* (proposed new standard)

Scope: *This standard provides one technology neutral SSC classification process for research reactors that is, where possible, performance-based and risk-informed. This standard applies to existing and future research and test reactors.*

Membership:
Bryce Kelly, Chair, Idaho National Laboratory; Leo Bobek, University of Massachusetts-Lowell; Mihai Diaconeasa, North Carolina State University; Duane Hardesty, U.S. Nuclear Regulatory Commission; Brenden Heidrich, Idaho National Laboratory; Jere Jenkins, Texas A&M University; Mark Linn, Individual; Steven Reese, Oregon State University; Andrew Smolinski, Armed Forces Radiobiology Research Institute; Patrick Snouffer, Zeno Power Systems, Inc.; Clifford Stanley, Los Alamos National Laboratory; Randy Strader, National Institute of Standards & Technology; Carroll Trull, Westinghouse Electric Company, LLC; Guanyi Wang (Associate Member), Argonne National Laboratory

Status: The PINS was submitted to ANSI on 3/27/2017. B. Kelly took over the chair role for ANS-15.22 on 10/7/22. He will be ramping up productivity in the next calendar year starting heavily on definitions for the standard.

Research Advanced Reactors Consensus Committee (RARCC) Organizational Chart

Chair: George F. Flanagan
Vice Chairs: Bruce B. Bevard, Thomas Newton

ANS-15 Operation of Research Reactors Thomas Newton (Chair)	ANS-29 Advanced Initiatives Bruce B. Bevard (Chair)
Ⓟ = PINS submitted to ANSI	
ANS-1-2000 (R2019) Ⓟ (A1) Conduct of Critical Experiments RF 8/12/2019 (WGC: G. Harms)	ANS-53.1-2011 (R2021) Ⓟ (A1) Nuclear Safety Design Process for Modular Helium-Cooled Reactor Plants RF 10/7/2021 (WGC: J. August)
ANS-14.1-2004 (R2019) (A2) Operation of Fast Pulse Reactors RF 8/12/2019 (WGC: M. Burger)	ANS-54.1-2020 (A2) Nuclear Safety Criteria and Design Process for Sodium Fast Reactor Nuclear Power Plants APP'D 3/23/2020 (WGC: G. Flanagan)
ANS-15.1-2007 (R2018) (A2) Development of Technical Specifications for Research Reactors RF 4/10/2018 (WGC: L. Foyto)	ANS-20.2 (NEW) Ⓟ (B1) Nuclear Safety Design Criteria and Functional Performance Requirements for Liquid-Fuel, Molten-Salt Reactor Nuclear Power Plants (WGC: D. Holcomb)
ANS-15.2-1999 (R2021) (A2) Quality Control for Plate-Type Uranium-Aluminum Fuel Elements RF 1/28/2021 (WGC: B. Curnutt)	ANS-GS-30.1 (NEW) Ⓟ (B1) Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs (Guidance Standard) (WGC: M. Linn)
ANS-15.4-2016 (R2021) (A2) Selection and Training of Personnel for Research Reactors RF 7/23/2021 (WGC: J. Jenkins)	ANS-30.2 (NEW) Ⓟ (B1) Classification and Categorization of Structures, Systems, and Components for New Nuclear Power Plants (WGC: K.Welter)
ANS-15.8-1995 (R2018) Ⓟ (A2) Quality Assurance Program Requirements for Research Reactors RF 7/18/2018 (WGC: R. Strader)	ANS-20.1 (NEW) Ⓟ (B2) **PROJECT ON INDEFINITE HOLD** Nuclear Safety Design Criteria for Fluoride Salt-Cooled High-Temperature Reactor NPPs (WGC: E. Blandford)
ANS-15.11-2016 (R2021) (A2) Radiation Protection at Research Reactors RF 7/20/2021 (WGC: S. Reese)	
ANS-15.16-2015 (R2020) (A2) Emergency Planning for Research Reactors RF 1/23/2020 (WGC: S. Reese)	
ANS-15.21-2012 (R2023) (A2) Format and Content for Safety Analysis Reports for Research Reactors RF 1/19/2023 (WGC: M. Balazik)	
ANS-15.22 (NEW) Ⓟ (B1) Classification of Structures, Systems and Components for Research Reactors (WGC: B. Kelly)	
(A1) Current Being Worked On Standards	
(A2) Current Not Being Worked On Standards	
(B1) Proposed Being Worked On Standards	
(B2) Proposed Not Being Worked On Standards	
(C1) Withdrawn Being Worked On Standards	
(C2) Withdrawn Not Being Worked On Standards	

Table 6 – RARCC Organizational Chart

Safety and Radiological Analyses Consensus Committee (SRACC)

Andrew O. Smetana, Chair
Individual

Scope: *The SRACC is responsible for the preparation and maintenance of voluntary consensus standards for physics methods and measurements for nuclear facilities, shielding materials and methods for shielding analyses, safety analyses and for the associated computational methods and computer codes. Input data for calculations and codes, such as nuclear cross sections, are included in this scope. The ANS Standards Committee Procedures Manual for Consensus Committees shall be used to guide the activities of this consensus committee.*

Subcommittees have been established to manage the activities of working groups and to perform detailed reviews of proposed standards for technical need, relevance, and acceptability. Each subcommittee has been assigned a unique and specific area of technical responsibility.

These subcommittees have been organized as follows:

- *Mathematics and Computation (ANS-10)*
- *Reactor Physics (ANS-19)*
- *Shielding (ANS-6)*

Each subcommittee has established various working groups to develop specific proposed standards and maintain existing standards within its respective area of responsibility. These working groups create the text of SRACC standards and resolve review and ballot comments.

SRACC Membership:
Andrew O. Smetana, Chair, Individual
Julie Jarvis, Vice Chair, Defense Nuclear Facilities Safety Board
F. Arzu Alpan, Oak Ridge National Laboratory
Richard S. Amato, Individual
John Bess, JFoster and Associates, LLC
Dimitrios M. Cokinos, Individual
Donald J. Dudziak, Los Alamos National Laboratory
Christopher Graham, Health Physics Society Representative (Individual)
Mukesh K. Gupta, Amentum Technical Services
Nolan E. Hertel, Georgia Institute of Technology
Paul Hulse, Sellafield, Limited
Moussa Mahgerefteh, Constellation Corporation
Donald E. Palmrose, U.S. Nuclear Regulatory Commission
Charles T. Rombough, CTR Technical Services, Inc.
Charlotta E. Sanders, University of Nevada, Las Vegas
Abraham Weitzberg, Individual

Report of SRACC:

The SRACC held a meeting during the ANS Winter Meeting on November 10, 2022. John Bess and Moussa Mahgerefteh were appointed to the SRACC. Dimitrios Cokinos retired from Brookhaven National Laboratory in 2022 and remains a member in the Individual Category.

Approved in 2022:

ANSI/ANS-19.3-2022, *Determination of Steady-State Neutron Reaction-Rate Distributions and Reactivity of Nuclear Power Reactors* (revision of ANSI/ANS-19.3-2011; R2017)

ANSI/ANS-19.3.4-2022, *The Determination of Thermal Energy Deposition Rates in Nuclear Reactors* (revision of ANSI/ANS-19.3.4-2002; R2017)

ANSI/ANS-19.4-2017 (R2022), *A Guide for Acquisition and Documentation of Reference Power Reactor Physics Measurements for Nuclear Analysis Verification* (reaffirmation of ANSI/ANS-19.4-2017)

ANSI/ANS-19.11-2017(R2022), *Calculation and Measurement of the Moderator Temperature Coefficient of Reactivity for Pressurized Water Reactors* (reaffirmation of ANSI/ANS-19.11-2017)

Active Standards/Projects (Approved PINS):

ANS-6.4.2, *Specification for Radiation Shielding Materials* (revision of ANSI/ANS-6.4.2-2006)

ANS-6.4.3, *Gamma-Ray Attenuation Coefficients and Buildup Factors for Engineering Materials* (historical revision of ANSI/ANS-6.4.3-1991–proposed new standard)

ANS-10.4, *Verification and Validation of Non-Safety-Related Scientific and Engineering Computer Programs for the Nuclear Industry* (revision of ANSI/ANS-10.4-2008; R2021)

ANS-19.10, *Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals* (revision of ANSI/ANS-19.10-2009; R2021)

ANS-19.13, *Initial Fuel Loading and Startup Tests for FOAK Advanced Reactors* (proposed new standard)—Standards Board approval pending

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Mathematics and Computations Subcommittee (ANS-10)

Scope: *The scope of the Mathematics and Computations Subcommittee includes the development of standards which will promote effective utilization and enhance the reliability of computer programs throughout the nuclear community. The intent of such standards is to improve the ease of use, facilitate the exchange, and simplify the conversion of programs.*

Membership:
Paul Hulse, Chair, Sellafield Ltd.
Mark Baird, Oak Ridge National Laboratory
Phillip Ellison, GE-Hitachi Nuclear Energy
Nima Fathi, University of New Mexico
Byron Frank, Westinghouse Electric Company, LLC
Bernadette Kirk, Kirk Nuclear Information Services
Charles Martin, Longenecker & Associates, Inc.
Yuri Orechwa, U.S. Nuclear Regulatory Commission
Paul Romano (Associate Member), Argonne National Laboratory
Robert Singleterry, NASA Langley Research Center
Andrew Smetana, Individual
Charles Sparrow, Mississippi State University

The Mathematics and Computations Subcommittee manages the following active projects and current standards:

ANS-10.2, *Portability of Scientific and Engineering Software* (new standard, historical revision to be considered)

Scope: *This standard provides recommended programming practices and requirements to facilitate the portability of computer programs prepared for scientific and engineering computations.*

Membership:
Robert Singleterry, Chair, NASA Langley Research Center

Status: The standard was administratively withdrawn 8/14/2019. The working group recommended letting the standard be withdrawn administratively on its 10th anniversary. This is because the standard will need a major re-write to remain current, and this is not currently possible given the changes that are occurring in software development at this time. A revision will be considered at a later date.

ANSI/ANS-10.4-2008 (R2021), *Verification and Validation of Non-Safety Related Scientific and Engineering Computer Programs for the Nuclear Industry* (new standard, historical revision of ANSI/ANS-10.4-1987; R1998)

Scope: *This standard provides requirements for the verification and validation (V&V) of scientific and engineering computer programs developed for use by the nuclear industry.*

Membership:
Nima Fathi, Chair, University of New Mexico; Patrick McDaniel, Vice Chair, University of New Mexico; Byron Frank, Westinghouse Electric Company, LLC; Douglas Hardtmayer (Associate Member), MPR Associates, Inc.; Paul Hulse, Sellafield Ltd.; Ana Jambrina (Associate Member). VTT Technical Research Centre of Finland; Brian Krystek, GE-Hitachi; Wai Law, Tennessee Valley Authority; Giulio Malinverno (Associate Member), FIMAc; Charles Martin, Longenecker & Associates, Inc.; Salvador Rodriguez, Sandia National Laboratories; Paul Romano (Associate Member), Argonne National Laboratory; Ralph Schwartzbeck, Highland TEMS, LLC; Andrew Smetana, Individual

Status: The standard was reaffirmed on 6/15/21. A PINS to initiate a revision was submitted to ANSI on 7/17/2018. Work on the draft continues.

ANSI/ANS-10.5-2006 (R2021), *Accommodating User Needs in Scientific and Engineering Computer Software Development* (new standard, historical revision of ANSI/ANS-10.5-1994)

Scope: *This standard presents criteria for accommodating user needs in the preparation of computer software for scientific and engineering applications.*

Membership:
Andrew Smetana, Chair, Individual

Status: The standard was reaffirmed on 8/23/2021.No activity in 2022.

ANSI/ANS-10.7-2013 (R2018), *Non-Real Time, High Integrity Software for the Nuclear Industry—Developer Requirements* (new standard)

Scope: *This standard addresses rigorous, systematic development of high integrity, non-real time safety analysis, design, simulation software which includes calculations or simulations that can have critical consequences if errors are not detected, but that are so complex that typical peer reviews are not likely to identify errors. This may include nuclear design and performance codes, codes used to assign safety classification levels to systems, structures and components at nuclear facilities, computational fluid dynamics or structural mechanics codes, complex Monte Carlo simulations, radiation dosimetry analysis codes, and nuclear medical physics analytical codes.*

Membership:
Bernadette Kirk, Chair, Kirk Nuclear Information Services; Amani Cheniour, Oak Ridge National Laboratory; Mason Fox (Associate Member), University of Tennessee; Paul Hulse, Sellafield Limited; Ana Jambrina, VTT Technical Research Centre of Finland; Brendan Kochunas, University of Michigan; Giulio Malinverno, FIMAc SpA; Ryan McClarren, University of Notre Dame; Duy-Thien Nguyen, Oak Ridge National Laboratory; Vince Penkrot, Westinghouse Electric Company, LLC; Charles Sparrow (Observer), Mississippi State University; Peter Stefanovic, Oak Ridge National Laboratory

Status: Reaffirmation of this standard was approved by ANSI on 8/13/2018. The standard is up for maintenance in 2023. The working group is reviewing the standard to see if a revision is needed.

ANSI/ANS-10.8-2015 (R2020), *Non-Real Time, High-Integrity Software for the Nuclear Industry—User Requirements* (new standard)

Scope: *This standard provides minimum requirements for assurance that high-integrity design and analysis software developed for use by the nuclear industry meets state of the practice expectations for quality when employed by end users to solve complex physical problems. Final validation of such software for its intended use is ultimately the responsibility of the user. The developer is responsible for validation of the software over the parameter space defined by the developer; however, the end user may extrapolate beyond the intended validation envelope providing additional benchmarks or appropriate non-dimensional scaling analysis. The requirements in this standard may be graded or tailored for less significant applications than high-integrity software. The intent is to set a minimum level of quality assurance and critical technical process requirements to satisfy due diligence.*

Membership:
OPEN, Chair; Mark Baird, Oak Ridge National Laboratory; Byron Frank, Westinghouse Electric Company, LLC; Paul Hulse, Sellafield Ltd.; Charles Martin, Longenecker & Associates, Inc.; Ryan McClarren, University of Notre Dame; Vincent S. Penkrot, Westinghouse Electric Company, LLC; Shivajli Seth, U.S. Department of Energy; John Shultz, U.S. Department of Energy; Andrew Smetana, Savannah River Nuclear Solutions; Peter Stefanovic, Oak Ridge National Laboratory

Status: ANSI approved the reaffirmation of this standard on 10/29/2020.This standard is a complement to ANSI/ANS-10.7-2013, *Non-Real Time, High-Integrity Software Industry—Developer Requirements.* No activity in 2022.

Reactor Physics Subcommittee (ANS-19)

Membership:
Dimitrios Cokinos, Chair, Individual
Charles Rombough, Secretary, CTR Technical Services, Inc
John Bess, J Foster and Associates, LLC
Ren-Tai Chiang, Individual
Mark DeHart, Idaho National Laboratory
David Diamond, Brookhaven National Laboratory
Mark Eckenrode, Framatome, Inc.
Ian Gauld, Individual
Alireza Haghighat, Virginia Tech Research Center
Edward Knuckles, Individual
Robert Little, Los Alamos National Laboratory
Moussa Mahgerefteh, Constellation Nuclear
Eleodor Nichita, University of Ontario Institute of Technology
Georgeta Radulescu, Oak Ridge National Laboratory
Benjamin Rouben, Individual
Abraham Weitzberg, Individual

Note: The following ANS-19 standards have now become international standards and are designated as ISO 18075, ISO 18077, and ISO 19226, respectively with the same titles as in their ANS versions:

- ANS-19.3, *Steady State Neutronics Methods for the Analysis of Power Reactors*
- ANS-19.6.6, *Reload Startup Physics Tests in Pressurized Water Reactors*
- ANS-19.10, *Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals*

The Reactor Physics Subcommittee manages the following projects and current standards:

ANSI/ANS-5.1-2014 (R2019), *Decay Heat Power in Light Water Reactors* (revision of ANSI/ANS-5.1-2005)

Scope: *This standard sets forth values for the decay heat power from fission products and ^{239}U and ^{239}Np following shutdown of light water reactors containing ^{235}U, ^{238}U, and plutonium. The decay heat power from fission products is presented in tables and equivalent analytical representations. Methods are described that account for the reactor operating history, for the*

effect of neutron capture in fission products, and for assessing the uncertainty in the resultant decay heat power. Decay heat power from other actinides and activation products in structural materials, and fission power from delayed neutron-induced fission, are not included in this standard.

Membership:
Ian Gauld, Co-Chair, Individual; Jesse Klingensmith, Co-Chair, Westinghouse Electric Company, LLC; Ryan Buratti, Framatome Inc.; Anna Jambrina (Associate Member), VTT Technical Research Centre of Finland; Edward Knuckles, Individual; John Lehning, U.S. Nuclear Regulatory Commission; Dmitri Ziabletsev, AREVA NP

Status: Reaffirmation was approved by ANSI on 2/5/2019. Jesse Klingensmith has become co-chair in a transition to replace Ian Gauld on his retirement from the working group. A survey of active users of the standard in industry, research, and regulatory agencies was completed in 2022 to help assess user needs and the future direction of the standard's development. Based on industry feedback and discussion with working group members, no new enhancements of ANS-5.1 are planned in the near future. Communication will continue with international consensus committees (i.e., ISO).

ANSI/ANS-19.1-2019, *Nuclear Data Sets for Reactor Design Calculations* (revision of ANSI/ANS-19.1-2002; R2011)

Scope: *The purpose of this standard is to provide criteria for the use of nuclear data in reactor design calculations. Thus, the standard identifies and describes the specifications for developing, preparing, and documenting nuclear data sets. The nuclear data sets considered are evaluated data sets, processed continuous data sets and processed averaged data sets. These data sets enable the analysts to generate cross section data which are used as input in neutronics codes.*

Membership:
Robert Little, Chair, Los Alamos National Laboratory; F. Arzu Alpan, Oak Ridge National Laboratory; John Bess, J Foster and Associates, LLC; Dimitrios Cokinos, Individual; Ian Gauld, Individual; Edward Knuckles, Individual; Georgetta Radulescu, Oak Ridge National Laboratory; Benjamin Rouben, Individual

Status: The revision of the standard was approved by ANSI on 3/8/2019.

ANSI/ANS-19.3-2022, *Steady-State Neutronics Methods for Power Reactor Analysis* (revision of ANSI/ANS-19.3-2011; R2017)

Scope: *This standard provides guidance for performing and validating the sequence of steady-state calculations leading to prediction, in all types of commercial nuclear reactors, of (1) reaction-rate spatial distributions; 2) reactivity; 3) change of isotopic compositions with time. The standard provides 1) guidance for the selection of computational methods; 2) criteria for verification and validation of calculational methods used by reactor core analysts; 3) criteria for evaluation of accuracy and range of applicability of data and methods; 4) requirements for documentation of the preceding.*

Membership:
Eleodor Nichita, Chair, University of Ontario Institute of Technology; John Bess, JFoster Associates, LLC; Ren-Tai Chiang, Individual; Dimitrios Cokinos, Individual; Ronald Ellis, Individual; Godfree Gert, Lawrence Livermore National Laboratory; Greg Hobson, Framatome, Inc.; Guy Marleau, Ecole Polytechnique de Montreal; Charles Rombough, CTR Technical Services; Benjamin Rouben, 12 & 1 Consulting; Wei Shen, Candu Owners Group; William Walters, Pennsylvania State University; Peter Yarsky, U.S. Nuclear Regulatory Commission; Baocheng Zhang, Westinghouse Electric Company, LLC

Status: ANSI approval of the revision was received 10/10/2022 after incorporating all comments from the SRACC ballot and consensus being declared.

ANSI/ANS-19.3.4-2022, *The Determination of Thermal Energy Deposition Rates in Nuclear Reactors* (revision of ANSI/ANS-19.3.4-2002; R2017)

Scope: *It is the purpose of this standard to provide criteria for 1) determination of the energy allocation among the principal particles and photons produced in fission, both prompt and delayed; 2) adoption of appropriate treatment of heavy charged*

particle and electron slowing down in matter; 3) determination of the spatial energy deposition rates resulting from the interactions of neutrons; 4) calculation of the spatial energy deposition rates resulting from the various interactions of photons with matter; and 5) presentation of the results of such computations, including verification of accuracy and specification of uncertainty. This standard addresses the energy generation and deposition rates for all types of nuclear reactors where the neutron reaction rate distribution and photon and beta emitter distributions are known. Its scope is limited to the reactor core, including blanket zones, control elements and core internals, pressure vessel, and the thermal and biological shielding.

Membership:
Georgeta Radulescu, Chair, Oak Ridge National Laboratory; F. Arzu Alpan, Oak Ridge National Laboratory; John Bess, JFoster and Associates; Dimitrios Cokinos, Individual; Adolpho Ferrer, Studsvik Scandpower Inc.; Ana Jambrina (Associates Member), VTT Technical Research Centre of Finland; Yuxuan Liu, University of Michigan; Joel Rhodes, Studsvik Scandpower Inc.; Meng-Jen Wang (Associate Member), University of Utah; Baocheng Zhang, Westinghouse Electric Company, LLC

Status: Standard received ANSI approval on 6/12/2022. The current revision contains editorial changes to the standard. An appendix, which contains no requirements of the standard, has been added. The appendix contains reference energy deposition calculations.

ANSI/ANS-19.4-2017 (R2022), *A Guide for Acquisition and Documentation of Reference Power Reactor Physics Measurements for Nuclear Analysis Verification* (new standard, supersedes ANSI/ANS-19.4-1976; R2000)

Scope: *This standard specifies and provides requirements for the reference measurements of reactor geometry, reactivity, and operation parameters in light water power reactors. The measurement data are used in the verification of reactor physics computational methods used for nuclear core designs and analyses. This standard identifies the types of parameters, a brief description of test conditions and experimental data required for such reference measurements, problems and concerns that may affect the accuracy or interpretation of the data, and the criteria to be used in documenting the results of reference measurements.*

Membership:
Edward Knuckles, Chair, Individual; John Bess, JFoster and Associates, LLC; Ren-Tai Chiang, Individual, Dimitrios Cokinos, Individual; Dwayne Fitts, Framatome, Inc.; Moussa Mahgerefteh, Individual; Jeremy Roberts, Kansas State University; Charles Rombough, CTR Technical Services, Inc.; Benjamin Rouben, 12 & 1 Consulting; Patrick Sebastiani, Westinghouse Electric Company, LLC

Status: The standard received ANSI approval on 8/24/2017 with a reaffirmation approved by ANSI on 8/24/2022. The working group believes that the standard would benefit from modifications to improve its clarity in some areas and has forwarded recommendations to the chair for further action.

ANS-19.5, *Requirements for Reference Reactor Physics Measurements* (proposed new standard, historical revision of ANSI/ANS-19.5-1995)

Scope: *This standard provides criteria for the qualification of reference reactor physics measurements obtained from subcritical (including non-multiplying), critical and experiments performed in any nuclear facility for verification of nuclear design and analysis methods. It also provides criteria for documentation of reference data and review of proposed reference reactor physics data to ensure compliance with this standard. The burden falls upon the user to determine the applicability and relevance of such experimental data to a given reactor design.*

Membership:
OPEN, Chair; Anthony Attard, U.S. Nuclear Regulatory Commission; John Bess, JFoster and Associates, LLC; Jeffrey Brown, Westinghouse Electric Company, LLC; Mark DeHart, Idaho National Laboratory; Sedat Goluoglu, University of Florida; Albert Hanson, Brookhaven National Laboratory; Germina Ilas, Oak Ridge National Laboratory; Edward Knuckles, Individual; Patrick Sebastiani, Westinghouse Electric Company, LLC; Abu Shakil, Individual; Alan Wells, Individual

Status: A PINS was approved and submitted to ANSI on 11/6/2012 for a resurrection of historic standard ANSI/ANS-19.5-1995 (W2005). Work will restart when a new chair is found.

ANSI/ANS-19.6.1-2019, *Reload Startup Physics Tests for Pressurized Water Reactors* (revision of ANSI/ANS-19.6.1-2011 (R2016)

Scope: *This standard applies to the reactor physics tests that are performed following a refueling or other core alteration of a PWR for which nuclear design calculations are required. This standard does not address the physics test program for the initial core of a commercial PWR.*

This standard specifies the minimum acceptable startup reactor physics test program to determine if the operating characteristics of the core are consistent with the design predictions, which provides assurance that the core can be operated as designed. This standard does not address surveillance of reactor physics parameters during operation or other required tests, such as mechanical tests of system components (for example, the rod drop time test), visual verification requirements for fuel assembly loading, or the calibration of instrumentation or control systems (even though these tests are an integral part of an overall program to ensure that the core behaves as designed).

This standard assumes that the same previously accepted analytical methods are used for both the design of the reactor core and the startup test predictions. It also assumes that the expected operation of the core will fall within the historical database established for the plant and/or sister plants.

Membership:
Charles Rombough, Chair, CTR Technical Services, Inc.; Paul Adam, Individual; Aaron Austin, Duke Energy–McGuire Nuclear Station; Kaushik Banerjee, Oak Ridge National Laboratory; John Bess, J Foster and Associates, LLC; Robert Borchert, Individual; Ryan Buratti, Framatome, Inc.; Anthony Campos, Framatome, Inc.; Charles Cohen, Naval Nuclear Laboratory; Jason Dever, Framatome, Inc.; Mark Eckenrode, Framatome, Inc.; Moussa Mahgerefteh, Constellation Nuclear; Michael Presnell, Duke Energy Corporation; Michael Prible, Westinghouse Electric Company, LLC; Ken Sahadewan, Constellation Nuclear; Patrick Sebastiani, Westinghouse Electric Company, LLC: John Singleton, Constellation Energy

Status: A revision of the standard was approved by ANSI on 12/19/2019. No activity since standard was revised in 2019. The international version of the standard has been approved and will be issued by ISO shortly (the standard is numbered 18077, and the 2019 version was edited to meet international requirements, mainly formatting).

ANS-19.8, *Fission Product Yields for 235U, 238U, and 239P* (proposed new standard)

Proposed Scope: *This standard provides a reference set of fission yield data for thermal and fast neutron-induced fission of ^{233}U, ^{235}U, ^{239}Pu, and ^{241}Pu; fast neutron-fission of ^{232}Th, ^{238}U, and ^{240}PU; and spontaneous fission of ^{252}CF. The standard includes an extensive compilation of mass chain yields and uncertainties in tabular form. This new standard is particularly important in the characterization of radioactive wastes, predicting radiation source terms production of delayed neutrons, reactor spectra, burnup calculations, and various dosimetry applications including medical applications.*

Membership:
Robert Little, Chair, Los Alamos National Laboratory; Dimitrios Cokinos, Individual

Status: ANS-19.8 was previously designated ANS-5.2. A PINS will be the first task is the decision is made to proceed with this proposed standard.

ANS-19.9, *Delayed Neutron Parameters for Light Water Reactors* (proposed new standard)

Scope: *This standard provides energy-dependent delayed neutron yield and decay data for Light Water Reactor design and control. The standard addresses the identification and characterization of fission products leading to delayed neutron emission; the total delayed neutron yield as a function of energy for U-233, U-235, U-238 and Pu-239; and fractions associated with Individual emitters, half-lives and spectra for the classical group representation of delayed neutron data.*

Membership:
Dimitrios Cokinos, Chair pro temp, Individual; Anthony Attard, U.S. Nuclear Regulatory Commission

Status: A PINS was submitted to ANSI on 3/6/2006. A skeleton of the standard has been completed. A working group of active participants is needed to move forward.

ANSI/ANS-19.10-2009 (R2021), *Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals* (new standard)

Scope: *This standard provides criteria for performing and validating the sequence of calculations required for the prediction of the fast neutron fluence t in the reactor vessel. Applicable to PWR and BWR plants the standard addresses flux attenuation from the core through the vessel to the cavity and provides criteria for generating cross sections, spectra, transport and comparisons with in- and ex-vessel measurements, validation, uncertainties and flux extrapolation to the inside vessel surface.*

Membership:
Alireza Haghighat, Chair, Virginia Tech; Fariz Abdul Rahman, GE Hitachi; F. Arzu Alpan, Oak Ridge National Laboratory; Jianwei Chen, Westinghouse Electric Company; LLC; Dimitrios Cokinos, Individual; Christopher Edgar, GE Hitachi; Ari Foley, Los Alamos National Laboratory; Edward Knuckles, Individual; Robert Little, Los Alamos National Laboratory; Moussa Mahgerefteh, Constellation Nuclear; Benjamin Parks, U.S. Nuclear Regulatory Commission; Amrit Patel, Individual; Joes Risner, Oak Ridge National Laboratory; Brandon Wise, U.S. Nuclear Regulatory Commission

Status: A reaffirmation was approved by ANSI on 10/7/2021. A PINS for a revision was approved and submitted to ANSI on 4/15/2022. The working group started to develop the draft before the PINS was approved. The draft has essentially been completed and is expected to be issued for subcommittee ballot in early 2023.

ANSI/ANS-19.11-2017 (R2022), *Calculation and Measurement of the Moderator Temperature Coefficient of Reactivity for Pressurized Water Reactors* (revision of ANSI/ANS-19.11-1997; R2011)

Scope: *This standard provides guidance and specifies criteria for determining the MTC in water moderated power reactors. Measurement of the isothermal temperature coefficient of reactivity (ITC) at hot zero power (HZP) conditions is covered in ANSI/ANS-19.6.1-2005, Reload Startup Physics Tests for Pressurized Water Reactors. This standard therefore addresses the calculation of the ITC at HZP and the calculation and measurement of the MTC at power. At present, this standard addresses the calculation and measurement of the MTC only in PWRs, because that is the only type of power reactor currently sited in the United States for which measurement of the MTC is required.*

Membership:
Moussa Mahgerefteh, Chair, Constellation Nuclear; Dimitrios Cokinos, Individual; Mark Eckenrode, Framatome, Inc.; Edward Knuckles, Individual; Patrick Sebastiani, Westinghouse Electric Company, LLC; Robert St. Clair, Duke Energy Corporation

Status: The revision was approved by ANSI on 4/11/2017 and a reaffirmation on 6/2/2022.

ANS-19.12, *Nuclear Data for the Production of Radioisotope* (proposed new standard)

Scope: *This standard establishes criteria for developing evaluated neutron cross section and branching ratio data for isotope production pathways for fast and thermal reactor systems, providing the data needed to calculate production of the desired medical and other isotopes and associated impurities.*

Membership:
Dimitrios Cokinos, Chair pro temp, Individual

Status: PINS was approved and submitted to ANSI on 11/1/2007. The project is in need of a permanent chair and members to proceed.

ANS-19.13, *Initial Fuel Loading and Startup Tests for FOAK Advanced Reactors* (proposed new standard)

Scope: *This standard will provide best practices for reactor startup of First-of-a-Kind (FOAK) Advanced Reactors (AR) to confirm basic safety, operational, and fundamental property data for technical and safety specifications. The standard will also provide guidance leveraging startup procedures to support software validation methods to retire the operational and regulatory risk associated with the validation performed during reactor design.*

Best practices for startup of heritage reactors and modern light water reactors (LWR) will be assimilated into generic recommended startup procedures for future FOAK-ARs. This standard will provide traceability between such recommended best practices and the identified key datasets. It will thus allow auditing the methodology of new FOAK ARs.

Membership:
Samuel Bays, Chair, Idaho National Laboratory; Nicolas Martin, Co-chair, Idaho National Laboratory; Abraham Weitzberg, Co-chair, Consultant; Hany Abdel-Khalik, Purdue University; Andrea Alfonsi, Ultra Safe Nuclear Corporation; John Bess, Jfoster and Associates, LLC; Benjamin Betzler (Associate Member), Radiant Nuclear; Marie Cuvelier, TerraPower; David Diamond, Brookhaven National Laboratory; Thomas Downar, University of Michigan; Ibrahim Ezelarab, Westinghouse; Massimiliano Fratoni, Individual; Nozomu Fujimoto Kyushu University; Hans Gougar, X-Energy, LLC; Kurt Harris, Flibe Energy; Ayman Hawari, North Carolina State University; David Hayes, Los Alamos National Laboratory; Mustafa Jaradat, Idaho National Laboratory; Timothy Kiefer, Individual Necdet Kurul, GE Hitachi; Matthew Lund, Idaho National Laboratory; JonMcWhirter, TerraPower; Scott Palmtag, Individual; H. Peter Planchon, Individual; Charles Rombough, CTR Technical Services, Inc.; John Sackett, Individual; Nader Satvat, Kairos Power, LLC; Jeffrey Schmidt, U.S. Nuclear Regulatory Commission; Shane Stimpson, BWX Technologies, Inc.; Matthew Wargon, TerraPower; Michael Zerkle, Naval Nuclar Laboratory; Haihua Zhao, Kairos Power, LLC

Status: A PINS for this project was approved by the SRACC and then issued to the Standards Board for approval. The Standards Board ballot closed 12/22/2022 with only one comment. It is expected that the PINS will be submitted to ANSI in early 2023.

Shielding Subcommittee (ANS-6)

Scope: *The purpose of this committee is to establish standards in connection with radiation shields, radiation analysis, and radiation protection insofar as it affects design of structures or equipment containing or near radiation sources, to provide shielding information to other standards groups, and to prepare and make available recommended related nuclear data and test problem solutions.*

Membership:
Charlotta Sanders, Chair, University of Nevada, Las Vegas
F. Arzu Alpan, Oak Ridge National Laboratory
Richard Amato, Individual
Paul Bergstrom, National Institute of Standards and Technology
Donald Duziak, Los Alamos National Laboratory
Mukesh Gupta, Amentum Technical Services
Nolan Hertel, Georgia Institute of Technology
Brian Hinderliter, University of Minnesota–Duluth
Sharad (Ken) Jha, Bechtel Power Corporation
Steven Nathan, Savannah River Nuclear Solutions
Jeffrey C. Ryman, Individual
Ali Simpkins, HPS Liaison (Employed by Oak Ridge Associated Universities)

Shielding Subcommittee (ANS-6) Report

The Shielding Subcommittee (ANS-6) activities fall under the shielding track of the Safety & Radiological Analyses Consensus Committee (SRACC). The International Organization of Standardization (ISO), Subcommittee 6 (Reactor Technology), Working Group 1, work item ISO-DIS-23018 is being submitted for international balloting. This work item/project involves issuing a standard titled, *Group-Averaged Neutron and Gamma-Ray Cross Sections for Radiation Protection and Shielding Calculations for Nuclear Reactors*, which is based on ANSI/ANS-6.1.2-2013 (R2018), *Neutron and Gamma-Ray Cross Sections for Nuclear Radiation Protection Calculations for Nuclear Power Plants*. Reports on all subcommittee projects are found below.

The Shielding Subcommittee manages the following active and current standards:

ANSI/ANS-5.4-2011 (R2020), *Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel* (new standard, historical revision of ANSI/ANS-5.4-1982)

Scope: *This standard provides an analytical method for calculating the release of volatile fission products from oxide fuel pellets during normal reactor operation. When used with nuclide yields, this method will give the so-called "gap activity," which is the inventory of volatile fission products that could be available for release from the fuel rod if the cladding were breached. The standard considers high-temperature (up to the melting point) and low-temperature (where temperature-independent processes dominate) releases and distinguishes between short-halflife (halflife less than one year) and long-halflife (halflife greater than one year) nuclides. This standard requires that releases for nuclides of interest be calculated with both the high-temperature and the low-temperature models, and the larger of the two calculated releases is to be taken as the result.*

Membership:
OPEN, Chair; Yun Long, Westinghouse Electric Company, LLC

Status: ANSI approved a reaffirmation of this standard on 4/9/2020.

ANSI/ANS-5.10-1998 (R2019), *Airborne Release Fractions at Non-Reactor Nuclear Facilities* (new standard)

Scope: *This standard provides criteria for defining Airborne Release Fractions (ARFs) for radioactive materials under accident conditions (excluding nuclear criticalities) at non-reactor nuclear facilities. The criteria in this standard provide requirements for selecting ARFs based on the calculated or assumed forms of radioactive material released. This standard may be applied to determine the ARFs for certain applicable reactor plant events for which alternative methodologies are not mandated by regulatory requirements. Because the predominant physical forms of radioactive materials in non-reactor facilities are solids and liquids, the standard focuses on these forms. Criteria are also provided for gases and materials that can be converted into the form of a vapor.*

Membership:
Mukesh Gupta, Chair, Amentum Technical Services; James Dishaw, MeV Technology Consulting

Status: Reaffirmation approved by ANSI on 10/3/2019.

ANSI/ANS-6.1.1-2020, *Neutron and Photon Fluence-to-Dose Conversion* (new standard, historical revision of ANSI/ANS-6.1.1-1991)

Scope: *This standard presents data recommended for computing the biologically relevant dosimetric quantity in photon and neutron radiation fields. Specifically, this standard is intended for use by radiation shielding designers for the calculation of effective dose. Fit coefficients are given for evaluating whole body effective dose per unit fluence for photons with energy between 10 keV to 10 GeV and for neutrons with energy between 0.001 eV to 10 GeV. Eight different irradiation geometries are considered. Establishing exposure limits is outside the scope of this standard.*

Membership:
Paul Bergstrom, Co-chair, National Institute of Standards and Technology; Nolan Hertel, Co-chair, Georgia Institute of Technology; Elijah Dickson, U.S. Nuclear Regulatory Commission; Matthew Mille, National Cancer Institute

Status: This standard was approved by ANSI on 9/10/2020.

ANSI/ANS-6.1.2-2013 (R2018), *Group-Averaged Neutron and Gamma-Ray Cross Sections for Radiation Protection and Shielding Calculations for Nuclear Power Plants* (revision of ANSI/ANS-6.1.2-1999; R2009)

Scope: *This standard provides information on acceptable evaluated nuclear data and group-averaged neutron and gamma-ray cross section libraries based on the energy range and materials of importance in nuclear radiation protection and shielding calculations for nuclear power plants.*

Membership:
F. Arzu Alpan, Chair, Oak Ridge National Laboratories; Alireza Haghighat, Virginia Tech; Robert Little, Los Alamos National Laboratory; Yuri Orechwa, U.S. Nuclear Regulatory Commission; Jeffrey Ryman, Individual

Status: A reaffirmation was approved by ANSI on 10/19/2018.

ANSI/ANS-6.3.1-1987 (R2020), *Program for Testing Radiation Shields in Light Water Reactors (LWR)* (revision of ANSI/ANS-6.3.1-1980)

Scope: *This standard describes a test program to be used in evaluating biological radiation shielding in nuclear reactor facilities under normal operating conditions including anticipated operational occurrences. The program encompasses examining and testing to be performed before startup, during startup, and testing subsequent to the startup phase. Post startup tests are required for the shielded components which do not contain sufficient radioactivity during the startup phase to allow valid testing. Shielding of these components is to be tested when radiation sources develop or are introduced into sufficient strength to allow meaningful measurements. Post startup shield tests are also required whenever radioactive or potentially radioactive equipment which could affect the adequacy of the installed shielding is introduced into the plant or relocated within the plant, or when previously tested shielding has been modified. One special category of post start-up testing is the testing of shielding during refueling operations.*

Membership:
OPEN

Status: Reaffirmation received ANSI approval on 7/28/2020. A working group chair and members are being sought.

ANSI/ANS-6.4-2006 (R2021), *Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants* (revision of ANSI/ANS-6.4-1997; R2004)

Scope: *This standard contains methods and data needed to calculate the concrete thickness required for radiation shielding in nuclear power plants. Where possible, specific recommendations are made regarding radiation attenuation calculations, shielding design, and standards of documentation. The standard provides guidance to architect engineers, utilities, and reactor vendors who are responsible for the shielding design of stationary nuclear plants. This standard does not consider sources of radiation other than those associated with nuclear power plants. It also excludes considerations of economic aspects of shielding design.*

Concrete is a mixture of materials, the exact proportions of which will differ from application to application. This standard includes a discussion of the nature of concrete, emphasizing those variable aspects of the material which are important to the shield designer. The document discusses methods of analysis and the shielding input data appropriate to each method. Applications of the analytical methods are given, including bulk transport, radiation heating, streaming, and reflection problems.

Membership:
Sharad (Ken) Jha, Chair, Bechtel Corporation; Julie Jarvis, Defense Nuclear Facilities Safety Board

Status: Reaffirmation of the standard was approved by ANSI on 8/5/2021. No activity in 2022.

ANSI/ANS-6.4.2-2006 (R2021), *Specification for Radiation Shielding Materials* (revision of ANSI/ANS-6.4.2-1985; R1997; R2004)

Scope: *This standard sets forth physical and nuclear properties that shall be reported by the supplier as appropriate for a particular application in order to form the basis for the selection of radiation shielding materials.*

Membership:
Steven Nathan, Co-Chair, Savannah River Nuclear Solutions; Peter Caracappa, Co-Chair, Columbia University; Amir Bahadori, Kansas State University; Brian Hinderliter, University of Minnesota-Duluth; Ahmad Ibrahim, Oak Ridge National Laboratory; Timothy Lloyd, Westinghouse Electric Company, LLC; Kathryn Robertson-DeMers, Spectrum Technical Services, Inc.

Status: The standard was reaffirmed on 12/7/2021. A PINS was submitted to ANSI in 2012 and resubmitted after the 2021 reaffirmation. No activity report provided.

ANS-6.4.3, *Gamma-Ray Attenuation Coefficients and Buildup Factors for Engineering Materials* (proposed new standard, historical revision of ANSI/ANS-6.4-3-1991)

Scope: *This standard provides evaluated gamma-ray elemental attenuation coefficients and single material buildup factors for selected engineering materials for use in shielding calculations.*

Membership:
Jeffrey C. Ryman, Co-Chair, Individual; Donald Dudziak, Co-Chair, Laboratory Fellow-Los Alamos National Laboratory; F. Arzu Alpan, Oak Ridge National Laboratory; Adam Davis, Los Alamos National Laboratory; Elijah Dickson, U.S. Nuclear Regulatory Commission; Alex Gil, Perma-Fix; Jack Higginbotham, Oregon State University; Brian Hinderliter, University of Minnesota–Duluth; Dominic Napolitano, Individual; Charlotta Sanders, Sanders Engineering; Sylvia Wang, Westinghouse Electric Company, LLC

Status: The PINS for a historical revision of ANSI/ANS-6.4.3-1991 was approved and submitted to ANSI on 3/15/2012. A copy of the Japanese buildup factor standard was purchased and provided to ANS-6 Subcommittee Chair Charlotta Sanders for review.

ANSI/ANS-6.6.1-2015 (R2020), *Calculation and Measurement of Direct and Scattered Gamma Radiation from LWR Nuclear Power Plants* (revision of ANSI/ANS-6.6.1-1987)

Scope: *This standard defines calculational requirements and discusses measurement techniques for estimates of dose rates near light water reactor (LWR) nuclear power plants due to direct and scattered gamma-rays from contained sources onsite. Onsite locations outside plant buildings and locations in the offsite unrestricted area are considered. All sources that contribute significantly to dose rates are identified and methods for calculating the source strength of each are discussed. Particular emphasis is placed on 16N sources as they are significant sources of direct and scattered radiation for boiling water reactors (BWR). The standard specifically excludes radiation from gaseous and liquid effluents. The standard describes the considerations necessary to compute dose rates, including component self-shielding, shielding afforded by walls and structures, and scattered radiation. The requirements for measurements and data interpretation of measurements are given. The standard includes normal operation and shutdown conditions but does not address accident or normal operational transient conditions.*

Membership:
Dick Amato, Chair, Individual; Joseph John Bevelacqua, Bevelacqua Resources; Peter Caracappa, Columbia University; Jianwei Chen, Westinghouse Electric Company, LLC; Brian Hinderliter, University of Minnesota–Duluth; Sylvia Wang, Westinghouse Electric Company, LLC

Status: ANSI approved a reaffirmation of the standard on 5/23/2020.

Safety and Radiological Analyses Consensus Committee (SRACC) Organizational Chart

Chair: Andrew O. Smetana Vice Chair: Julie Jarvis

Shielding (ANS-6) Chair: Charlotta Sanders	Mathematics and Computations (ANS-10) Chair: Paul Hulse	Reactor Physics (ANS-19) Chair: Dimitrios Cokinos
Ⓟ = PINS submitted to ANSI		
ANS-6.4.2-2006 (R2021) Ⓟ (A1) Specification for Radiation Shielding Materials RF 12/2/2021 (WGC: S. Nathan)	ANS-10.4-2008 (R2021) Ⓟ (A1) Verification and Validation of Non-Safety-Related Scientific and Engineering Computer Programs for the Nuclear Industry RF 6/15/2021 (WGC: N. Fathi)	ANS-19.10-2009 Ⓟ (R2021) (A1) Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals RF 10/7/2021 (WGC: A. Haghighat)
ANS-5.4-2011 (R2020) (A2) Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel RF 4/9/2020 (WGC: OPEN)	ANS-10.5-2006 (R2021) (A2) Accommodating User Needs in Scientific and Engineering Computer Software Development RF 8/23/2021 (WGC: A. Smetana)	ANS-5.1-2014 (R2019) (A2) Decay Heat Power in Light Water Reactors RF 2/5/2019 (WGC: J. Klingensmith)
ANS-5.10-1998 (R2019) (A2) Airborne Release Fractions at Non-Reactor Nuclear Facilities RF 10/3/2019 (WGC: M. Gupta)	ANS-10.7-2013 (R2018) (A2) Non-Real-Time, High-Integrity Software for the Nuclear Industry--Developer Requirements RF 8/13/2018 (WGC: B. Kirk)	ANS-19.1-2019 (A2) Nuclear Data Sets for Reactor Design Calculations RF 3/8/2019 (WGC: R. Little)
ANS-6.1.1-2020 (A2) Photon and Neutron Fluence-to-Dose Conversion Coefficients App'd 9/10/2020 (WGC: N. Hertel/P. Bergstrom)	ANS-10.8-2015 (R2020) (A2) Non-Real Time, High Integrity Software for the Nuclear Industry--User requirements App'd 10/29/2020 (WGC: Open)	ANS-19.3-2022 (A2) Steady-State Neutronics Methods for Power Reactor Analysis RV 10/6/2022 (WGC: E. Nichita)
ANS-6.1.2-2013 (R2018) (A2) Group-Averaged Neutron and Gamma-Ray Cross Sections for Radiation Protection and Shielding Calculations for NPPs RF 10/19/2018 (WGC: A. Alpan)	ANS-10.2 (W2019) (C2) **Revision to be considered** Portability of Scientific and Engineering Software (WGC: R. Singleterry)	ANS-19.3.4-2022 (A2) The Determination of Thermal Energy Deposition Rates in Nuclear Reactors RV 7/12/2022 (WGC: G. Radulescu)
ANS-6.3.1-1987 (R2020) (A2) Program for Testing Radiation Shields in Light Water Reactors (LWR) RF 7/28/2020 (WGC: Open)		ANS-19.4-2017 (R2022) (A2) A Guide for Acquisition and Documentation of Reference Power Reactor Physics Measurements for Nuclear Analysis Verification RF 8/24/2022 (WGC: E. Knuckles)
ANS-6.4-2006 (R2021) (A2) Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants RF 8/5/2021 (WGC: K. Jha)		ANS-19.6.1-2019 (A2) Reload Startup Physics Tests for PWRs App'd 12/19/2019 (WGC: C. Rombough)
ANS-6.6.1-2015 (R2020) (A2) Calculation and Measurements of Direct and Scattered Gamma Radiation from LWR NPPs RF 5/23/2020 (WGC: R. Amato)		ANS-19.11-2017 (R2022) (A2) Calculation and Measurement of the Moderator Temperature Coefficient of Reactivity for PWRs RF 6/2/2022 (WGC: M. Mahgerefteh)
ANS-6.4.3 (W2001) Ⓟ (C2) Gamma-Ray Attenuation Coefficients & Buildup Factors for Engineering Materials (WGC: J. Ryman/D. Dudziak)		ANS-19.13 (NEW) Ⓟ Initial Fuel Loading and Startup Tests for FOAK Advanced Reactors (WGC: S. Bays)
		ANS-19.8 (NEW) (B2) (Project considered) Fission Product Yields for 235U, 238U, and 239P (WGC: R. Little)
		ANS-19.9 (NEW) Ⓟ (B2) Delayed Neutron Parameters for Light Water Reactor (WGC: Open)
		ANS-19.12 (NEW) Ⓟ (B2) Nuclear Data for the Production of Radioisotope (WGC: Open)
		ANS-19.5 (W2005) Ⓟ (C2) Requirements for Reference Reactor Physics Measurements (WGC: Open)
(A1) Current Being Worked On Standards		
(A2) Current Not Being Worked On Standards		
(B1) Proposed Being Worked On Standards		
(B2) Proposed Not Being Worked On Standards		
(C1) Withdrawn Being Worked On Standards		
(C2) Withdrawn Not Being Worked On Standards		

Table 7 – SRACC Organizational Chart

JCNRM
American Nuclear Society (ANS) / American Society of Mechanical Engineers (ASME) Joint Committee on Nuclear Risk Management (JCNRM)

Dennis Henneke, ANS Co-chair
GE Hitachi Nuclear Energy

C. Rick Grantom, ASME Co-chair
C.R. Grantom P.E. & Associates, LLC

Scope: *The JCNRM Consensus Committee is responsible for the preparation and maintenance of voluntary consensus standards that establish safety and risk criteria and methods for completion of probabilistic risk analysis (PRA) and risk assessments. Additional related standards activities may be performed as upon concurrence of the ANS Standards Board and the ASME Standards and Certification Board. These criteria and methods are applicable to design, development, construction, operation, decontamination, decommissioning, waste management, and environmental restoration for nuclear facilities. Activities of the consensus committee shall be guided by the Procedures for ASME Codes and Standards Development Committees but shall also meet the intent of ANS Standards Committee Procedures Manual for Consensus Committees unless specifically authorized by the ANS Standards Board.*

The JCNRM may be tasked with reviewing / commenting on risk technology related proposed provisions of standards developed by other ASME / ANS Standards Committees at the request of those standards committees.

JCNRM Membership:
JCNRM Membership (as of December 2022):
Dennis Henneke, ANS Co-chair, GE Hitachi Nuclear Energy
Rick Grantom, ASME Co-chair, Individual (C.R. Grantom P.E. Associates, LLC)
Andrea Maioli, ANS Co-vice-chair, Westinghouse Electric Company
Pamela F. Nelson, ASME Co-vice-chair, National Autonomous University of Mexico
Paul J. Amico, Jensen Hughes, Inc.
Vincent Andersen, Jensen Hughes
Victoria K. Anderson, Nuclear Energy Institute
George Apostolakis, Nuclear Risk Research Center
Michelle Bensi, University of Maryland
Sarah Bristol, NuScale Power
Robert Budnitz, Lawrence Berkeley National Laboratory (retired)
Gary Demoss, PSEG Nuclear
Matthew R. Denman, Kairos Power
Fernando Ferrante, Electric Power Research Institute
(Alternate: Douglas C. Hance, Electric Power Research Institute)
K. Raymond Fine, Energy Harbor Nuclear
Karl N. Fleming, KNF Consulting Services
David Grabaskas, Argonne National Laboratory
H. Alan Hackerott, Consultant
Jordan Hagaman, Kairos Power
Matthew Humberstone, U.S. Nuclear Regulatory Commission
Jodine Jansen Vehec, Holtec
Gerry W. Kindred, Tennessee Valley Authority
(Alternate: Bradley Dolan, Tennessee Valley Authority)
Nathan (Reed) LaBarge, Westinghouse Electric Company
Stanley H. Levinson, Individual
Stuart R. Lewis, Consultant
Roy Linthicum, Constellation
Robert I. Rishel, Duke Energy
Martin Sattison, Individual

Raymond E. Schneider, Westinghouse Electric Company
Jeffrey L. Stone, Constellation
(Alternate: Suzanne Loyd, Constellation)

Report of JCNRM:

In 2022, the JCNRM held two 4-day meetings. The meeting February 28 – March 3 was held virtually. The meeting held September 19 – 22 was hosted by Tennessee Valley Authority in Chattanooga, Tennessee, with the main committee meeting held at the Marriott Chattanooga Downtown on September 22. Participation included multiple attendees from the Japan International Working Group (JIWG) and the International Atomic Energy Agency (IAEA). The JCNRM's Executive Committee has been meeting via Zoom bi-weekly to discuss current activities and to plan the future activities. The next JCNRM meeting is expected to be held physically February 27 - March 2, 2023, in Albuquerque, New Mexico.

The JCNRM Subcommittee on Standards and Guidance (NURI-SC) has been working on the issuance of two light water reactor (LWR) standards, previously issued as Trial-Use Pilot Application (TUPA) including the Level 2 (Severe Accident Progression and Radiological Release) PRA Standard RA-S-1.2 and the Level 3 (Radiological Accident Offsite Consequence Analysis) PRA Standard RA-S-1.3. The Level 2 Standard was balloted in late 2022 and is going through final comment resolution with hopes of a final recirculation ballot in early 2023. The Level 3 draft is scheduled for a ballot readiness review in early 2023 and should be ready for ballot in April 2023. Additional efforts under NURI-SC include the finalization of the Low Power Shutdown (LPSD) PRA standard, currently issued as TUPA, the Multi-Unit PRA Standard, and the Advanced Light Water Reactor (ALWR) standard. The LPSD standard is scheduled for ballot in late 2023. Finally, NURI-SC is working on an update to the newly issued ASME/ANS RA-S-1.1-2022 which will correct some minor inconsistencies in the issued standard.

The Subcommittee on Technical Requirements (TR-SC) includes the working groups for specific technical specialties, such as Fire PRA, Internal Flooding PRA, Seismic PRA, High Winds PRA, External Flooding PRA, and other external hazards PRA. The subcommittee has supported the issuance of the standards discussed, including ensuring the issued standards consistently develop high level and supporting requirements related to specific hazard groups. Members from each of the working groups have been assigned to support each NURI-SC working groups to ensure consistency between the standards.

The Standards Infrastructure Subcommittee (SI-SC) is responsible for the development and revision of standard content between each PRA standard, including the development of Part 1 of each standard. The working groups underneath SI-SC include the Universal Content WG, Data Management WG and Interpretations WG.

The Subcommittee on Risk Applications (SCoRA) continued to fulfill its charter to be the JCNRM interface with ANS and ASME (and other standards development organizations in the future), and to provide assistance to other standards-development projects whenever a new standard (or modification to an existing standard) utilizes risk-informed or performance-based (RIBP) requirements. This JCNRM subcommittee is the JCNRM interface with the ANS Standards Board's Risk-informed and Performance-based Principles Policy Committee (RP3C) and has supported the development of the RP3C Guidance Document for RIPB standards development. Finally, in 2022, SCoRA has continued to support development of guidance for application of risk-informed techniques to nuclear power plant physical security and guidance on risk-informed emergency planning, with the later working group under the ANS Large Light Water Reactor Consensus Committee.

For several years, a series of grants to the ANS from the NRC have provided financial support for the work of the JCNRM Standards Committee, mainly to cover travel costs of participants who have no other travel financial support, as well as certain administrative costs and a few other selected expenses. The latest in this series of grants will run until 2025.

It is a pleasure to report that there continues to be no "friction" between the two societies (ANS and ASME) in terms of how this merger has worked so far or will work in the future. The two co-chairs and the staff of the two societies are working well together and rather little in the way of a legacy of the two societies' former roles remains as an impediment. The business agreement between ASME and ANS has now been in place for several years and is working well.

Approved in 2022

ASME/ANS RA-S-1.1-2022, *Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications* (revision of ASME/ANS RA-S-2008 (R2019))

Active Standards/Projects (Approved PINS)

ASME/ANS RA-S-1.2, *Standard for Severe Accident Progression and Radiological Release (Level 2) PRA Methodology to Support Nuclear Installation Applications* (revision of trial-use standard ASME/ANS RA-S-1.2-2014)

ASME/ANS RA-S-1.3, *Standard for Radiological Accident Offsite Consequence Analysis (Level 3 PRA) to Support Nuclear Installation Applications* (revision of trial-use standard ASME/ANS RA-S-1.3-2017).

ASME/ANS RA-S-1.5, *Advanced Light Water Reactor PRA Standard* (proposed new trial-use standard)

ASME/ANS RA-S-1.6 (formerly ANS/ASME-58.22*), Standard for Low Power and Shutdown Methodology for PRA Applications.* (revision of trial use standard ANS/ASME-58.22-2014; to be redesignated.)

ASME/ANS RA-S-1.7, *Multi-Unit PRA Standard* (proposed new trial use standard)

The above standards are discussed in more detail in the subcommittee discussions below.

Subcommittee on Nuclear Risk Standards and Guidance (NURI-SC)

Charter: To assist in the development of standards and guides on probabilistic risk assessment (PRA) methods supporting risk-informed and performance-based applications for nuclear facilities

Membership:
Nathan LaBarge, Chair, Westinghouse Electric Company, LLC
Zhegang Ma, Vice Chair, Idaho National Laboratory
Victoria K. Anderson, Nuclear Energy Institute
Sarah Bristol, Nuscale Power
Heather L. Detar, Westinghouse Electric Company, LLC
Karl N. Fleming, KNF Consulting Services, LLC
David Grabaskas, Argonne National Laboratory
Dennis W. Henneke, GE Hitachi Nuclear Energy
Matthew Humberstone, U.S. Nuclear Regulatory Commission
Andrea Maioli, Westinghouse Electric Company, LLC
Martin Sattison, Individual
Raymond E. Schneider, Westinghouse Electric Company, LLC
Ricky Summitt, ENERCON
Taeyong Sung, Southern Nuclear
Grant A. Teagarden, Jensen Hughes

Report: NURI-SC is currently responsible for developing and maintaining seven authorized PRA standards in various stages of development, trial use, and maintenance. In addition to development of the new standards by separate writing groups (project teams) that report to SC-SD, the subcommittee has developed a trial-use procedure adopted by JCNRM for use in consistently interacting with users of trial-use standards during the trial-use periods. The status of the seven standards is provided in the following paragraphs.

ANSI/ASME/ANS RA-S-1.1-2022, *Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications* (revision of ASME/ANS RA-S- 2008 (R2019)/Addenda A&B)

Scope: *PRA of internal and external hazards for all plant operating modes (low power and shutdown modes will be included at a future date). In addition, this Standard establishes requirements for a limited Level 2 PRA sufficient to evaluate large early release frequency (LERF). The only hazards explicitly excluded from the scope are accidents resulting from purposeful human-induced security*

threats (e.g., sabotage). This Standard applies to PRAs used to support applications of risk-informed decision-making related to design, licensing, procurement, construction, operation, and maintenance. These requirements are written for operating power plants. They may be used for plants under design or construction, for advanced LWRs, or for other reactor designs, but revised or additional requirements may be needed. This version of the PRA Standard provides specific requirements for the following hazard groups:

a) Internal Events (Part 2)
b) Internal Floods (Part 3)
c) Internal Fires (Part 4)
d) Seismic Events (Part 5)
e) High Winds (Part 7)
f) External Floods (Part 8)
g) Other Hazards (Part 9)

Membership:
Andrea Maioli, Chair, Westinghouse Electric Company; Jodine Jansen Vehec, Vice Chair, Holtec; Paul J. Amico, Jensen Hughes, Vincent Andersen, Jensen Hughes; Michelle Bensi, University of Maryland; John M. Biersdorf, Terrapower; Scott A. Brinkman, Duke Energy; Robert J. Budnitz, Lawrency Berkeley National Laboratory-retired; Stephen Eder, Facility Risk Consultants, Inc.; Jonathan E. Evans, U.S. Nuclear Regulatory Commission; Alan Hackerott, Individual; Jason Hall, Entergy Operations, Inc.; Francisco J. Joglar, Jensen Hughes; Douglas C. Hance, Electric Power Research Institute; Dennis W. Henneke, GE Hitachi Nuclear Energy; Annie M. Kammerer, Annie Kammerer Consulting, LLC; James C. Lin, ABSG Consulting Inc.; Nicholas Lovelace, Jensen Hughes; David N. Miskiewicz, Engineering Planning and Management, Inc.; Alexander A. Rubbicco, Duke Energy; Raymond E. Schneider, Westinghouse Electric Co. LLC; Michael Szoke, Individual; Matthew Degonish, Alternate, Ameren; Michelle Gonzalez, Alternate, U.S. Nuclear Regulatory Commission

Status: ANSI/ASME/ANS RA-S-2008 was initially published in 2008. Addendum A was released in 2009 and endorsed by the NRC in RG 1.200 Revision 2. Addendum B (of RA-S) was approved and published in 2013. ANSI/ASME/ANS RA-S-1.1-2022 is a full replacement of Addendum B and represents a significant update of the standard and contains many substantive changes based on feedback from recent users of the standard, along with extensive re-formatting, including elimination of Capability Category III. Extensive efforts have been made to improve consistency in requirements, terminology, and clarity. The seismic PRA Code Case already reflected many of the features in the newly released version RA-S-1.1-2022. In addition, Parts 7 (High Winds), 8 (External Flood), and 9 (Other Hazards), having not been changed since their original publication in the ANS RISC external hazards standard in 1999, were completely replaced to reflect the almost 20 years of experience since then. Finally, Part 10 (Seismic Margins) has been deemed inappropriate for a PRA standard and is being deleted. The L1 Standard was approved by ANSI on May 11, 2022, and published May 31, 2022. A minor revision for a few corrections and updates is in works and is expected to be ready for ballot in June 2023.

ASME/ANS RA-S-1.2-2014, *Severe Accident Progression and Radiological Release (Level 2) PRA Methodology to Support Nuclear Installation Applications* (previously ANS/ASME-58.24) (previously ANS/ASME- 58.24) (proposed new standard)

Scope: *Criteria and acceptable methods are defined for the evaluation of containment performance and radiological releases to the environment from accidents in a nuclear power plant that result in damage to fuel within the reactor vessel for use in risk-informed applications requiring Level 2 probabilistic risk assessment (PRA). The standard will address sequences initiated by internal or external events during all modes of reactor operation. The initial scope will focus on full power operations.*

Membership:
Raymond E. Schneider, Chair, Westinghouse;
Nathan LaBarge, Vice Chair, Westinghouse;
Aram Hakobyan, Dominion Resources Inc.;
John R. Lehner, Individual;
Wison Luangdilok, Fauske & Associates, LLC.;
Ricky Summitt, Enercon;
Carroll Trull, Engineering Planning and Management, Inc.;
Jeffery J. Wood, U.S. Nuclear Regulatory Commission;
Michelle L. Hart, Alternate, U.S. Nuclear Regulatory Commission;

Status: The recirculation ballot closed 11/3/22 with a number of comments that need to be addressed before consensus is declared. A re-recirculation ballot for a limited number of changes is expected to be issued in April 2023 and is expected to be successful.

ASME/ANS RA-S-1.3-2017, *Standard for Radiological Accident Offsite Consequence Analysis (Level 3 PRA) to Support Nuclear Installation Applications* (previously ANS/ASME-58.25) (trial-use standard to be revised and seek ANSI approval)

Scope: *This standard provides requirements for application of risk-informed decisions related to the consequences of accidents involving atmospheric release of radioactive materials to the environment. The standard is envisioned to apply to current and future light water reactor designs, other reactor designs, and nonreactor applications such as radiological dispersion device (RDD) incidents. The consequences to be addressed include health effects (early and late) and longer term environmental and economic impacts. The required capabilities allow determination of the efficacy of mitigation strategies on reducing consequences.*

Membership:
Grant A. Teagarden, Chair, Jensen Hughes; Nathan E. Bixler; Sandia National Laboratories; Keith Compton, U.S. Nuclear Regulatory Commission; Kyle Hope, Westinghouse; Gerry W. Kindred, Tennessee Valley Authority; Carl Mazzola, Los Alamos National Laboratory; Vinod Mubayi, Brookhaven National Laboratory; Kevin O'Kula, Individual; Joel Robinson, Office for Nuclear Regulation

Status: The L3 PRA Standard WG started off the year working to prepare the draft L3 Standard for review by the Readiness Review Team (RRT) in preparation for ballot. The L3 WG submitted the draft to the RRT in February. The RRT provided a number of helpful comments to the L3 WG following its review, many pertaining to additional changes to improve consistency with the other PRA Standards, which continue to evolve with time. The L3 WG spent the remaining portion of 2022 generally meeting weekly to resolve the RRT comments and expect the L3 Standard to go to ballot in the Spring of 2023.

ASME/ANS RA-S-1.4-2021, *Probabilistic Risk Assessment Standard for Advanced Non-LWR Nuclear Power Plants* (revision of trial-use standard ASME/ANS RA-S-2013)

Scope: *This standard establishes requirements for a PRA for advanced non-LWR nuclear power plants. The requirements in this standard were developed for a broad range of PRA scopes that may include:*

a) *Different sources of radioactive material both within and outside the reactor core but within the boundaries of the plant whose risks are to be determined in the PRA scope selected by the user. The technical requirements in this trial use version of the Standard are limited to sources of radioactive material within the reactor coolant system pressure boundary. Technical requirements for other sources of radioactive material such as the spent fuel system are deferred to future editions of this Standard.*
b) *Different plant operating states including various levels of power operation and shutdown modes.*
c) *Initiating events caused by internal hazards, such as internal events, internal fires and internal floods, and external hazards such as seismic events, high winds, and external flooding*
d) *Different event sequence end states including core or plant damage states, and release categories that are sufficient to characterize mechanistic source terms, including releases from event sequences involving two or more reactor units or modules for PRAs on multi-reactor or multi-unit plants.*
e) *Evaluation of different risk metrics including the frequencies of modeled core and plant damage states, release categories, risks of offsite radiological exposures and health effects, and the integrated risk of the multi-unit plant if that is within the selected PRA scope. The risk metrics supported by this Standard are established metrics used in existing LWR Level 3 PRAs such as frequency of radiological consequences (e.g., dose, health effects) which are inherently technology neutral. Surrogate risk metrics used in LWR PRAs such as core damage frequency and large early release frequency are not used as they may not be applicable to non-LWR PRAs.*
f) *Quantification of the event sequence frequencies, mechanistic source terms, offsite radiological consequences, risk metrics, and associated uncertainties, and using this information in a manner consistent with the scope and applications PRA.*

Membership:
David Grabaskas, Chair, Argonne National Laboratory; Karl. N. Fleming, Co-Vice Chair, KNF Consulting Services, LLC; John Biersdorf, Co-Vice Chair, TerraPower; Robert J. Budnitz, Lawrence Berkeley National Laboratory (retired); Matthew Denman, Kairos Power LLC; Jordan Hagaman, Kairos Power; Dennis Henneke, General Electric Co.; Alexander Huning, Oak Ridge National Laboratory; Brian Johnson, TerraPower; Ken Muramatsu, Tokyo City University; Hanh Phan, U.S. Nuclear Regulatory Commission; Martin B. Sattison, Individual; Jiejuan Tong, Tsinghua University; Matthew Warner, Kairos Power; Peiwen Whysall, Kairos Power; Ben Chen, Argonne National Laboratory; Jon Facemire, X-Energy; Harry Liao, X-Energy; Fred Grant, Simpson Gumpertz & Heger; Antonio Godoy, James J Johnson and Associates; Drew Nigh, X-Energy; Annie Kammerer, Annie Kammerer Consulting, LLC; Ben Kosbab, Simpson Gumpertz & Heger; Emma Redfoot, Oklo; Hiroyuki Sato, Japan Atomic Energy Agency; Andrew Whittaker, University of Buffalo; Emre Tatli, Westinghouse Electric Company; Askin Guler Yigitoglu, Oak Ridge National Laboratory; Sai Zhang, Idaho National Laboratory; Heather Detar, Westinghouse Electric Company; Michelle Gonzalez, U.S. Nuclear Regulatory Commission

Status: This standard received ANSI approval on 1/28/21 and was published on 2/8/21. The standard was formally endorsed by the U.S. Nuclear Regulatory Commission in Trial Use Regulatory Guide 1.247, released in Spring 2022. The working group is currently focused on collecting user feedback regarding the standard as advanced reactor vendors initiate the licensing process. The next edition of this standard will not occur until revisions of the LPSD, L2, and L3 standards are issued as ANSI standards, currently estimated to be in 2025.

ASME/ANS RA-S-1.5, *Advanced Light Water Reactor PRA Standard* (proposed new standard)

Scope: *This standard sets forth the requirements for PRAs used to support risk-informed decisions for commercial, advanced light water reactor (ALWR) nuclear power plants in the preoperational phase. It is ultimately expected to be a mandatory appendix to the existing PRA standard RA-S, for advanced light water reactors in the design to operational phases.*

Membership:
Sarah Bristol, NuScale Power, Chair; Heather L. Detar, Westinghouse Electric Company, Vice Chair; Michelle Gonzalez, U.S. Nuclear Regulatory Commission; Dennis W. Henneke, GE Hitachi Nuclear Energy; Jodine Jansen Vehec, Holtec; Benny J. Ratnagaran, Southern Nuclear Operating Company; Ram Srinivasan, Individual; Alissa Neuhausen, Alternate, U.S. Nuclear Regulatory Commission

Status This draft standard was planned to be balloted starting in September 2013 but has been delayed several times to accommodate changes in scope [i.e., to engage light water small modular reactor (SMR) vendors to ensure that the standard would address their needs, and also to accommodate significant changes requested by the U.S. Nuclear Regulatory Commission to accommodate their intended application of that standard to the new plant licensing process]. In 2023, the main focus of the ALWR WG will be to align this standard with ASME/ANS RA-S-1.1-2022, with an expected ballot for approval by late 2023. The ALWR appendix will be issued initially for a 3-year trial use once approved.

RA-S-1.6, *Requirements for Low Power and Shutdown Probabilistic Risk Assessment* (revision of trial use standard ANS/ASME-58.22-2014; to be redesignated)

Scope: *This standard sets forth criteria and specific methods for plant-specific probabilistic risk assessments (PRAs) to be used to develop risk-informed decisions regarding low power and shutdown (LPSD) operations at light water nuclear power plants. It addresses those attributes of a PRA that will ensure that the scope and level of quality of the assessment are appropriate to the decision being considered. The standard addresses the use of risk information for making plant improvements, the risk, ranking of components, and the development of decisions that can benefit from risk information. The scope of this standard is limited to internal and external events (excluding internal fires) while operating at low power and shutdown conditions. Both requirements for quantitative and qualitative methods are included.*

Membership:
Taeyong Sung, Chair, Southern Nuclear; Jeffrey Julius, Vice Chair, Jensen Hughes; Leo Shanley, Vice Chair, Jensen Hughes; Douglas Hance, Electric Power Research Institute; Dennis Henneke, General Electric; Kristin Kaspar, South Texas Project; Kenneth Kiper, Westinghouse; Greg Kvamme, Excel Energy; Jonathan Li, General

Electric; Zhegang Ma, Idaho National Laboratory; Mario Martinez, Westinghouse; Jeff Mitman, Individual; Marie Pohida, U.S. Nuclear Regulatory Commission; Keith Tetter, U.S. Nuclear Regulatory Commission; Vaibhav Yadav, Idaho National Laboratory; Jeff Wood, Alternate, U.S. Nuclear Regulatory Commission

Status: This standard was issued for a 3-year, trial-use period in March 2015. Seven different outside groups used the standard in a trial-use mode and provided feedback. The LPSD WG resolved trial-use comments in a couple of technical areas (at-initiator HRA and QLRA). The team has proposed a three-phased approach to address all comments and get ready for the next ballot: phase 1 mainly for the comment resolutions and gathering all inputs, phase 2 for resolving all comments and merge technical pieces and collapse CCs as well as finalize decision on inclusion of hazards, phase 3 for revising LPSD PRA sections to be consistent with main PRA standard and to comply with all guidance documents. The WG is currently in phase 3. Balloting of the final standard is expected in early to late-2023.

ASME/ANS RA-S-1.7, *Multi-Unit PRA Standard* (proposed new standard)

***Scope**: This standard will set forth requirements for a PRA with a scope similar to the scope of ASME/RA-S but concentrating on requirements necessary to capture the risk arising from multi-unit accident sequences.*

Membership:
Ricky Summitt, Chair, Enercon; Paul J. Amico, Jensen Hughes; Sarah Bristol, NuScale Power; Karl N. Fleming, KNF Consulting Services; Anne-Marie Grady, U.S. Nuclear Regulatory Commission
Dennis W. Henneke, GE Hitachi Nuclear Energy; Kenneth Kiper; Westinghouse; Andrea Maioli, Westinghouse; Hiromichi Miura, Central Research Institute of Electric Power Industry; Shahen Poghosyan, International Atomic Energy Agency; Marie A. Pohida, U.S. Nuclear Regulatory Commission; Shota Soga, Central Research Institute of Electric Power Industry; Taeyong Sung, Southern Nuclear; Michael Szoke, Individual; Cindy Williams, NuScale Power; Jooneon Yang, Korea Atomic Energy Research Institute; Susan E. Cooper, Alternate, U.S. Nuclear Regulatory Commission; Mark B. Wishart, Alternate, Electric Power Research Institute

Status:
-Meeting on average once / week
-Developed drafts for Part 1 and Part 2
-Internal review wrapping up
-Consistency check and align with final L1
-Vice Chair appointed: Mark Wishart, EPRI
-Plan to finalize Parts 1 and 2 March 2023 – Writer Guide
-Parts 3-9 in 2nd Qtr 2023; rely on liaisons
-Target for final draft of all Parts completed by July 2023
-Readiness Review: August instead of July

Standards Infrastructure Subcommittee (SI-SC)

***Charter:** To develop standard-inclusive hazard-group or risk application-specific related content, using approved SI-SC framework and guidance, supporting JCNRM Standards Product development. SI-SC is responsible for addressing other identified subcommittee needs, facilitating the development and approval of JCNRM Standards products supporting risk-informed and performance-based applications for nuclear facilities.*

Membership:
Matthew Denman, Chair, Kairos Power; Douglas C. Rapp, Vice Chair, Energy Harbor; Alan Hackerott, Individual; Matthew Humberstone, U.S. Nuclear Regulatory Commission; Raymond E. Schneider, Westinghouse Electric Co., LLC; Jonathan Dejesus Segarra, U.S. Nuclear Regulatory Commission

Report: SC-SI is JCNRM's newest working group focused exclusively on providing tools and processes to streamline the standards development effort. Formed in the second half of 2022, SC-SI has focused on setting up its own processes, procedures, and membership to effectively interface with JCNRM's standards development efforts.

Database Development Working Group

Charter: *To ensure consistency in the form, structure, and content of JCNRM Standards products. The DDM WG develops, maintains, and deploys a database of JCRNM Standards products content. This database is the approved content source for all JCNRM Standards products. NURISC and TR-SC WGs interface with the DDM WG to ensure that evolving technical content is adequately communicated and reflected in the database. The USC WG interfaces with the DDM WG to ensure that consistency guidance is appropriately implemented and validated for across JCRNM Standards products. The DDM WG is responsible for producing the ballot-ready and ballot-supporting documents for NURI-SC.*

Membership:
Matthew Denman, Chair, Kairos Power; Robert W. Drsek, Vice Chair, Energy Harbor; Dave Grabaskas, Argonne National Laboratory; Jordan E. Hagaman, Kairos Power; Matthew Humberstone, U.S. Nuclear Regulatory Commission; Douglas C. Rapp, Energy Harbor; Michael Szoke, Individual

Status: The Database Working Group spent 2022 setting up the basic infrastructure to ingest JCNRM standards into a structured database format. Once the standards are ingested, the Database Working Group will begin the task of building documents from the structured data.

Interpretation Working Group

Charter: *To assist with Interpretation as they relate to all active JCNRM Standards.*

Membership: H. Alan Hackerott, Chair, Individual; Paul J. Amico, Jensen Hughes; Adrienne F. Brown, U.S. Nuclear Regulatory Commission; David N. Miskiewicz, Engineering Planning and Management, Inc.

Status: No inquiries were received in 2022.

Universal Supporting Content (USC) Working Group

Charter: *To maintain common and consistent content for all the JCNRM Standards products being developed or maintained by JCNRM to the extent appropriate and practical. This includes common definitions, action verbs, screening criteria, level of detail, peer review requirements, as well as requirements for configuration control and newly developed methods.*

To assist with the maintenance of the RA-S Standard Part 1.

Membership:
Raymond E. Schneider, Chair, Westinghouse; Mark B. Wishart, Vice Chair, Electric Power Research Institute; Paul J. Amico, Jensen Hughes; Mihaela Biro, U.S. Nuclear Regulatory Commission; Fernando Ferrante, Electric Power Research Institute; Nathan LaBarge, Westinghouse; Andrea Maioli, Westinghouse; Lawrence A. Mangan, Firstenergy Nuclear Operating Co.; Harold A. Stiles, Engineering Planning & Management; Ricky Summitt, Enercon; Ian B. Wall, Individual; Jonathan E. Evans, Alternate, U.S. Nuclear Regulatory Commission

Status: The USC continues to work on maintaining consistency among Part 1 for all JCNRM standards, updating and tracking of action verbs and definitions, updating the JCNRM Writer's Guide, and supporting readiness reviews as needed.

Technical Requirements Subcommittee (TR-SC)

Charter: *To develop JCNRM Standards products inclusive content associated with specific technical requirements, using approved the SI-SC framework and guidance, supporting the needs of the NURI-SC's Standards products. TR-SC is responsible for developing technical requirements, facilitating the development and approval of JCNRM Standards products supporting risk-informed and performance-based applications for nuclear facilities.*

TR-SC is responsible for identifying which technical elements are common to multiple standard products and assessing their associated level of consistency. TR-SC is then responsible to recommend changes, as appropriate, to ensure technical requirement consistency across JCNRM Standards products, as applicable. Technical requirements that are only applicable to one Standard product are identified by TR-SC and managed directly by the Product WG responsible for that Product.

One dedicated WG is established for each Technical Element.

To develop or to maintain the technical requirements (i.e., high level requirements and supporting requirements) associated with a specific PRA Technical Element.

Each Technical Requirement WG assigns a liaison for every Product WG, as applicable. The Technical Requirements WG reviews proposed changes to the technical requirements with respect to each individual Standards product(s) and evaluates the Product with the WG to modify the Technical Requirements, as needed. Standards products readiness reviews are not permitted until the Technical Requirements WG has agreed on the acceptability of the technical requirements.

Membership:
K. Raymond Fine, Chair, Energy Harbor
Matthew Degonish, Vice Chair, Ameren
Michelle Bensi, University of Maryland
Frederic Grant, Simpson Gumpertz & Heger, Inc.
H. Alan Hackerott, Individual
Francisco J. Joglar, Jensen Hughes
James C. Lin, ABSG Consulting, Inc.
Nicholas Lovelace, Jensen Hughes
Ram Srinivasan, Individual
Jodine Jensen Vehec, Alternate for Hackerott, Holtec
Pierre Macheret, Alternate for Andersen, Jensen Hughes
Alexander A. Rubbicco, Alternate for Lin, Duke Energy

Report: We have successfully transitioned to the new organizational structure and working groups have consolidated their rosters. We have engaged the NURI-SC working groups directly by assigning liaisons to each working group from each of the TR-SC working groups to ensure technical consistency across all standards being developed. The liaisons will bring back to the associated TR-SC working group any assigned tasks to complete with consensus of the group and return that feedback to the NURI-SC working group. Current roster levels are sufficient for the assigned tasks and there are currently no challenges.

External Flood Technical Requirements Working Group

Charter: *To assist with the maintenance of the RA-S Standard Part 8.*

Membership:
Michelle Bensi, Chair, University of Maryland; Jemie Dababneh, U.S. Army Corps of Engineers; Joseph Kanney, U.S. Nuclear Regulatory Commission; Svetlana Lawrence, Idaho National Laboratory; Suzanne M. Loyd, Constellation; Zhegang Ma, Idaho National Laboratory; Pierre Macheret, Jensen Hughes; Sean McCloskey, Holtec; Artur Mironenko, Duke Energy; Raymond E. Schneider, Westinghouse Electric Co., LLC; John E. Weglian, Electric Power Research Institute; De (Wes) Wu, Alternate, U.S. Nuclear Regulatory Commission

Status: We are working to transition to the new organizational structure and are reaching out to working group leads to provide technical support/direction and address various issues that have arisen. Our ultimate goal is to engage the NURI-SC working groups directly by assigning liaisons to each working group from each of the TR-SC working groups to ensure technical consistency across all standards being developed. The liaisons will bring back

to the associated TR-SC working group any assigned tasks to complete with consensus of the group and return that feedback to the NURI-SC working group. Current roster levels are sufficient for the assigned tasks, and we are working through engagement challenges. Activities in 2022 focused on completing the Level 1 LWR Standard, addressing errata and consistency items that have arisen as part of development efforts associated with other standards, and providing input (when requested) to other working groups on topics of relevance to external flooding.

High Winds Technical Requirements Working Group

Charter: *To assist with the maintenance of the RA-S Standard Part 7.*

Membership:
Nicholas Lovelace, Chair, Jensen Hughes; Fernando Ferrante, Electric Power Research Institute; Stephen M. Hess, Jensen Hughes; Kyle Hope, Westinghouse Electric Company; John Lane, U.S. Nuclear Regulatory Commission; Artur Mironenko, Duke Energy; Chris Rochon, Electric Power Research Institute; Raymond E. Schneider, Westinghouse Electric Co. LLC; Alissa Neuhausen, Alternate, U.S. Nuclear Regulatory Commission

Status: We have successfully transitioned to the new organizational structure and working groups have consolidated their rosters. We have engaged the NURI-SC working groups directly by assigning liaisons to each working group from each of the TR-SC working groups to ensure technical consistency across all standards being developed. The liaisons will bring back to the associated TR-SC working group any assigned tasks to complete with consensus of the group and return that feedback to the NURI-SC working group. Current roster levels are sufficient for the assigned tasks and there are currently no challenges.

Internal Events Technical Requirements Working Group

Charter: *To assist with the maintenance of the RA-S Standard Part 2.*

Membership:
H. Alan Hackerott, Chair, Individual; Jodine Jansen Vehec, Vice Chair, Holtec; John M. Biersdorf, Terrapower; Adrienne F. Brown, U.S. Nuclear Regulatory Commission; Matthew Denman, Kairos Power; Fernando Ferrante, Electric Power Research Institute; Douglas C. Hance, Electric Power Research Institute; Gerry W. Kindred, Tennessee Valley Authority; Sean McCloskey, Holtec; Pamela F. Nelson, UNAM; Hideyuki Sunada, Central Research Institute of Electric Power Industry; Kent Sutton, INGRID Consulting Services, LLC.; Susan E. Cooper, Alternate, U.S. Nuclear Regulatory Commission

Status: We have successfully transitioned to the new organizational structure and working groups have consolidated their rosters. We have engaged the NURI-SC working groups directly by assigning liaisons to each working group from each of the TR-SC working groups to ensure technical consistency across all standards being developed. The liaisons will bring back to the associated TR-SC working group any assigned tasks to complete with consensus of the group and return that feedback to the NURI-SC working group. Current roster levels are sufficient for the assigned tasks and there are currently no challenges.

Internal Fire Technical Requirements Working Group

Charter: *To assist with the maintenance of the RA-S Standard Part 4.*

Membership:
Francisco J. Joglar, Chair, Jensen Hughes; Michele L. Reed, Vice Chair, Westinghouse; John M. Biersdorf, Terrapower; Scott A. Brinkman, Duke Energy; Dennis W. Henneke, GE Hitachi; William Jameson, Exelon; Gregory A. Kvamme, Xcel Energy; Ashley M. Lindeman, Electric Power Research Institute; Nicholas B. Melly, U.S. Nuclear Regulatory Commission; Jeffrey D. Miller, Enercon; David N. Miskiewicz, Engineering Planning and Management, Inc.; Jamal Mohmand, Sandia National Laboratories; Charles E. Moulton, U.S. Nuclear Regulatory Commission; Jeffrey L. Stone, Exelon; Richard Stremple, Energy Harbor; Kiang Zee, Individual

Status: We have successfully transitioned to the new organizational structure and working groups have consolidated their rosters. We have engaged the NURI-SC working groups directly by assigning liaisons to each working group from each of the TR-SC working groups to ensure technical consistency across all standards being developed. The liaisons will bring back to the associated TR-SC working group any assigned tasks to complete with consensus of the group and return that feedback to the NURI-SC working group. Current roster levels are sufficient for the assigned tasks and there are currently no challenges.

Internal Flood Technical Requirements Working Group

Charter: *To assist with the maintenance of the RA-S Standard Part 3.*

James C. Lin, Chair, ABSG Consulting, Inc.; Alexander Rubbicco, Vice Chair, Duke Energy; Matthew Degonish, Ameren; Jason Hall, Entergy; Joseph Kanney, U.S. Nuclear Regulatory Commission; Douglas C. Rapp, Energy Harbor; Adrienne F. Brown, Alternate, U.S. Nuclear Regulatory Commission

Status: We have successfully transitioned to the new organizational structure and working groups have consolidated their rosters. We have engaged the NURI-SC working groups directly by assigning liaisons to each working group from each of the TR-SC working groups to ensure technical consistency across all standards being developed. The liaisons will bring back to the associated TR-SC working group any assigned tasks to complete with consensus of the group and return that feedback to the NURI-SC working group. Current roster levels are sufficient for the assigned tasks and there are currently no challenges.

Other Hazards Technical Requirements Working Group

***Charter*:** To assist with the maintenance of the RA-S Standard Parts 6 & 9.

Vincent Andersen, Chair, Jensen Hughes; Pierre Macheret, Vice Chair, Jensen Hughes; Robert J. Budnitz, Lawrence Berkeley National Laboratory-retired; Matthew Denman, Kairos Power; Kyle Hope, Westinghouse Electric Company; Suzanne M. Loyd, Constellation; Keith Tetter, U.S. Nuclear Regulatory Commission; John Lane, Alternate, U.S. Nuclear Regultory Commission

Status: Consistent with other JCNRM groups, the Other Hazards TR Working Group has been in the process in 2022 of transitioning to the JCNRM new organizational structure. Liaisons to other WGs have been assigned but not to all; this aspect is challenged by the number of such liaisons the new organizational structure is seeking compared to the Other Hazards TR Working Group size, as well as NRC management stating that NRC personnel are not allowed to fulfill such roles. Other Hazards TR Working Group members have participated virtually and in-person to the two annual JCNRM meetings in 2022. The Other Hazards TR Working Group expects to review NRC comments on a draft of the NLWR PRA Standard in the 1st quarter of 2023 for their applicability to Parts 6 and 9 of the L1 PRA Standard. The Other Hazards TR Working Group provided wording editing and review of RA-S-1.1 Standard (Part 9 and Part 5 SRs) in mid-2022 and will continue to support a potential revision of RA-S-1.1 in 2023.

Seismic Technical Requirements Working Group

Charter: *To assist with the maintenance of the RA-S Standard Part 5.*

Membership:
Frederic Grant, Chair, Simpson Gumpertz & Heger Inc.; Paul J. Amico, Jensen Hughes; Vincent Andersen, Jensen Hughes; Robert J. Budnitz, Lawrence Berkeley National Laboratory; Parthasarathy Chandran, Individual; Nilesh Chokshi, Individual; Ovidiu Coman, Individual; Robert W. Drsek, Energy Harbor; Stephen Eder, Facility Risk Consultants Inc.; Calin Eftimie, Individual; K. Raymond Fine, Energy Harbor; Eddie M Guerra, RIZZO International; Justin W. Hiller, Ameren; Annie M. Kammerer, Annie Kammerer Consulting, LLC; Jeffrey K. Kimball, RIZZO Associates; Benjamin Kosbab, Simpson Gumpertz & Heger; Andrea Maioli, Westinghouse Electric Company; Ching Hang Ng, U.S. Nuclear Regulatory Commission; John M. Richards, Electric Power Research Institute; Ram

Srinivasan, Individual; Wen Tong, Simpson Gumpertz & Heger; Gabriel R. Toro, Simpson Gumpertz & Heger; Andrew S. Whittaker, University at Buffalo; De (Wes) Wu, Alternate, U.S. Nuclear Regulatory Commission

Status: We have successfully transitioned to the new organizational structure and working groups have consolidated their rosters. We have engaged the NURI-SC working groups directly by assigning liaisons to each working group from each of the TR-SC working groups to ensure technical consistency across all standards being developed. The liaisons will bring back to the associated TR-SC working group any assigned tasks to complete with consensus of the group and return that feedback to the NURI-SC working group. Current roster levels are sufficient for the assigned tasks and there are currently no challenges.

Subcommittee on Risk Applications (SCoRA)

Charter: *To support the application of risk methods using JCRNM Standards products, as appropriate or requested and the need for new JCNRM Standards products. SCoRA will evaluate new JCNRM Standards products proposals identified by individual JCNRM members or other industry stakeholders. SCoRA will appoint and staff an investigation Project Team to determine product scope, purpose, and need to provide recommendations to JCNRM for further product development. If SCoRA concludes that a new product requires development, then the JCNRM approves further development. SCoRA then performs the necessary process to generate a Project Initiation Notification System (PINS) form. When the PINS form is approved by JCNRM, then a new Product WG, under NURI-SC is formed and tasked with the development of the Product.*

SCoRA periodically revisits the need for additional JCNRM Standards products and other supporting JCNRM products in development to ensure that they satisfy the original objectives justifying the product's development. If the Product need changes or is determined to no longer be appropriate, then the Product in development is recommended to be cancelled or paused to the JCNRM.

JCNRM with SCoRA support will interface with the ANS Standards Board, the ASME Board on Nuclear Codes and Standards, and their subordinate groups, and other standards developing organizations (SDOs) regarding nuclear-related standards that include or plan to include risk assessment methods, risk management approaches, or risk-informed, performance-based applications. The work of SCoRA is focused on supporting these SDOs in the development and updating of risk-informed standards, as requested by the cognizant SDO. The objective is to strive for value added to the nuclear industry, technical acceptability, and consistency in other nuclear-related standards using risk management principles both within JCNRM and outside of JCNRM.

When SCoRA organizes a technical interface with a specific nuclear-related standard (regardless of the originating SDO), it will draw upon the membership of the JCNRM, but need not be limited to JCNRM membership. The interface activity can be informal without a written product, but if a written review product is produced, the report itself is intended to be a product of the SCoRA, as approved by JCNRM, even if developed mainly by an ad hoc subsidiary group. Part of the interface activity includes an education function, for which SCoRA will avail itself of resources that exist among the broader JCNRM membership.

SCoRA will also consider mechanisms to disseminate "lessons learned" from reviewing and commenting on nuclear-related standards to other SDOs and writing groups who have similar needs.

Membership:
Stuart R. Lewis, Chair, Consultant
Gary M. Demoss, Vice Chair, PSEG-Salem & Hope Creek
F Gregory Hudson, Vice Chair, Metcalfe PLLC
George Apostolakis, NRRC
Robert J. Budnitz, Lawrency Berkeley National Laboratory (retired)
Bradley Dolan, Tennessee Valley Authority
Fernando Ferrante, Electric Power Research Institute
Rick Grantom, C.R. Grantom P.E. & Assoc. LLC
Jordan E. Hagaman, Kairos Power
Jodine Jansen Vehec, Holtec
Gerry W. Kindred, Tennessee Valley Authority
Nathan LaBarge, Westinghouse Electric Company, LLC
Stanley H. Levinson, Consultant
Roy Linthicum, Constellation

Andrea Maioli, Westinghouse Electric Company, LLC
Pamela F. Nelson, UNAM
James O'Brien, U.S. Department of Energy
Robert I. Rishel, Duke Energy
Timothy D. Sande, Enercon
Jeffrey L. Stone, Exelon
Ricky Summitt, Enercon
Kent Sutton, INGRID Consulting Services, LLC
Dr. Carroll Trull, Engineering Planning and Management, Inc.
Milton Valentin, U.S. Nuclear Regulatory Commission
Victoria Warren, Jensen Hughes
Yasunori Yamanaka, Unclear Damage Compensation and Decommissioning Facilitation
Anne-Marie Grady (Alternate), U.S. Nuclear Regulatory Commission

Report: SCoRA continues to engage actively with other standards developing organizations as a resource for helping them to incorporate risk-informed elements in appropriate and consistent ways into their standards and other documents. Among these, in 2022, the SCoRA continued to provide inputs relating to the evolving efforts to produce Guidance Standard ANS-30.1 and renewed engagement with the Institute of Electrical and Electronic Engineers. SCoRA also continues to oversee the activities of the Risk Informed Emergency Planning (RIEP) Working Group, which is a joint effort of the JCNRM and the ANS Large Light Water Reactor Consensus Committee (LLWRCC). The ANS, with review by the JCNRM, approved a PINS in 2022 to continue the development of guidance documents related incorporating risk-informed concepts into emergency planning. SCoRA is also responsible for the JCNRM Risk-Informed Security Working Group. In 2022, this working group, with separate task groups devoted to physical and cyber security, has continued to define the focus of its activities and to communicate its efforts to the broader nuclear community. SCoRA members also support the ASME Plant System Design Standard and the ANS Standards Board's Risk-Informed, Performance-Based Principles and Policy Committee (RP3C). These activities will continue in 2023 as will efforts to engage with additional standards developing organizations. As an example of the latter, SCoRA will perform a review of a technical report relating to cyber security (which has a significant risk-informed component) that has been drafted by the Instrument Society of America.

Guidance Document for Risk Informing Physical Security and Cyber Security Programs at Nuclear Facilities

Charter: *This guidance document will provide methods/processes to risk-inform nuclear facility physical-security and cyber-security programs, including implementation guidance for these methods/processes. It will also potentially provide part of the technical basis on which a future standard covering these methods/processes could be based.*

Membership:
Joseph D. Rivers, Chair, Rivers Security Services, LLC; F. Gregory Hudson, Vice Chair, Metcalfe PPLC; Stephen J Reed, Vice Chair, Westinghouse Electric Company; George Apostolakis, NRRC; Robert J. Budnitz, Lawrency Berkeley National Laboratory (retired); Yung Hsien J. Chang, U.S. Nuclear Regulatory Commission; Jonathon Corwin, X-energy; Lon A. Dawson, Sandia National Laboratories; Kevin Deyette, NuScale Power, LLC; Bradley Dolan, Tennessee Valley Authority; Shannon Eggers, Idaho National Laboratory; Nathan Faith, Exelon; Fernando Ferrante, Electric Power Research Institute; Ismael Garcia, U.S. Nuclear Regulatory Commission; Rick Grantom, C.R. Grantom P.E. & Assoc. LLC; Justin W. Hiller, Ameren Missouri-Callaway Energy Center; Pamela F. Nelson, UNAM; James Raines, ARES Security Corporation; Timothy D. Sande, Enercon; Michael R. Sleigh, Westinghouse Electrical Company; Ricky Summitt, Enercon; Kent Sutton, INGRID Consulting Services, LLC; Grant A. Teagarden, Jensen Hughes; Carroll Trull, Engineering Planning and Management, Inc.; Rob White, Xcel Energy; Vaibhav Yadav, Idaho National Laboratory; Robert W. Youngblood, Battelle Energy Alliance, LLC; Milton Valentin Alternate), U.S. Nuclear Regulatory Commission

Status: The Risk-Informed Physical and Cyber Security (RIS) Working Group consists of two task groups, one devoted to physical security and the other cyber security. In general, during 2022 this working group continued to define the focus of its activities and to communicate its efforts to the broader nuclear community. Mores pacifically, the RIPS TASK GROUP developed two draft Risk Applications Tools and Methods documents. The first provided

guidance on using release as a target set objective versus the current use of fuel damage. The second was draft guidance on using EMRALD for incorporating FLEX equipment into Vulnerability Assessments and inclusion of Operator Actions. Late in 2022, RIPS was asked to develop a Product Development Plan. Subsequent discussions determined that the best course of action for 2023 is development on a “Security Effectiveness Standard.” The primary focus of the RICS TASK GROUP was organizing an industry cyber security workshop. The objectives of this workshop included: (1) industry outreach by task group, (2) understanding industry cyber security activities and initiatives, as well as (3) identifying and understanding cyber security issues that owner/operators and AR developers are facing. The workshop is targeted for early 2023.

ANS/ASME Joint Committee on Nuclear Risk Management (8/11/22)

Cochair: Dennis W. Henneke — Cochair: C. Rick Grantom
Vice Cochair: Andrea Maioli — Vice Cochair: Pamela F. Nelson

Standards Infrastructure Subcommittee (SI-SC)	Nuclear Risk Standards and Guidance Subcommittee (NURI-SC)	Technical Requirements Subcommittee (TR-SC)	Subcommittee on Risk Applications (SCoRA)
Matthew Denman (Chair)	N. Reed LaBarge (Chair)	Raymond Fine (Chair)	Stuart Lewis (Chair)
Douglas Rapp (Vice Chair)	Zhegang Ma (Vice Cochair)	Matt Degonish (Vice Chair)	Gary Demoss (Vice Chair) Greg Hudson (Vice Chair)
Universal Supporting Content (WGC: R. Schneider)	**Product Working Group: Level 1 LWR** (WGC: A. Maioli)	**Internal Events** (WGC: A. Hackerott)	**Risk-Informed Security*** (WGC: J. Rivers)
Database Development and Management (WGC: M. Denman)	**Product Working Group: Level 2 LWR** (WGC: R. Schneider)	**Internal Flood** (WGC: J. Lin)	
Interpretation (WGC: A. Hackerott)	**Product Working Group: Level 3 LWR** (WGC: G. Teagarden)	**Internal Fire** (WGC: F. Joglar)	
	Product Working Group: Advanced LWR PRA (WGC: S. Bristol)	**Seismic** (WGC: F. Grant)	
	Product Working Group: Non LWR (WGC: D. Grabaskas)	**High Winds** (WGC: N. Lovelace)	
	Product Working Group: Multi-Unit PRA (WGC: R. Summitt)	**External Floods** (WGC: M. Bensi)	
	Product Working Group: Low Power/Shutdown PRA (WGC: T. Sung)	**Other Hazards** (WGC: V. Andersen)	

**Working groups will be moved out of SCoRA when the topic has been deemed sufficiently mature to initiate draft development.*

Table 8 – JCNRM Organizational Chart

Appendix A
Standards Service Award

Established in 1984, the ANS Standards Service Award recognizes outstanding achievement by individuals in the generation and use of ANS standards in the field of nuclear science and engineering. The purpose of the award is to identify and honor those individuals who have made significant contributions to the development of ANS nuclear Standards accepted by recognized authorities as the most practical and appropriate solution of a recurring problem. Any member of the Society can nominate worthy candidates for the ANS Standards Service Award. The nominees shall be current or past members of the Society in good standing. Past recipients of the award include the following individuals:

Year Awarded	Recipients
2022	Douglas Bowen
2021	Stanley H. Levinson
2020	George Flanagan N. Prasad Kadambi
2019	James B. Florence Ian B. Wall
2018	Robert D. Busch
2017	Abraham Weitzberg
2016	Andrew O. Smetana
2015	Jerry E. Hicks Donald J. Wakefield
2014	Steven L. Stamm
2013	Carl A. Mazzola
2012	Elizabeth B. Johnson (posthumously) Patricia A. Schroeder
2011	No recipient selected
2010	Allen L. Camp Thomas P. McLaughlin
2009	Calvin M. Hopper
2008	Donald J. Spellman
2007	William L. Whittemore (posthumously)
2006	Robert J. Budnitz
2005	James F. Mallay
2004	Charles H. Moseley
2003	Wade J. Richards
2002	Francis M. Alcorn
2001	Michael J. Wright
2000	William C. Hopkins
1999	Dimitrios Cokinos
1998	Marilyn D. Weber
1997	David R. Smith
1996	Tawfik M. Raby
1995	Hugh K. Clark
1994	George L. Wessman
1993	Joseph T. Thomas
1992	J. Ed Smith (posthumously)
1991	David K. Trubey
1990	James F. Mallay
1989	Walter H. D'Ardenne
1988	A. Dixon Callihan Ralph G. Chalker Miles C. Leverett