

NFSC Standards Title Format for Consistency

November 2010

*Denotes a current standard that is being revised OR a standard in development. Scope/title copied from PINS and drafts if applicable.

1) the designation 2) title 3) scope

Q1: Active or Descriptive Title

1) designation type, and 2) title content (substance of material) 3) application

1) original, and 2) type designation of material) 3) final title proposed

Type

Standards

Characteristics

Guidelines

Evaluation

Criteria

Requirements

Nuclear Safety Criteria

Nuclear Design Criteria

Nuclear Safety Criteria and Design Process

Determining

Method

Application

Nuclear Power Plants

Nuclear Facility Sites

Power Reactor Sites

Nuclear Facilities

Nuclear Power Sites

Nuclear Facility Sites

Proposed:

[Designator] [Type][Content of Body]... for [type of facility/Application]

Standardize Format

*ANS-2.2-201x (Revision of Current standard ANSI/ANS-2.2-2002 – PINS approved)

*Earthquake Instrumentation **Criteria** for Nuclear Power Plants*

Criteria

Criteria for Earthquake Instrumentation at Nuclear Power Plants

*ANS-2.3-201x (Historic revision of ANSI/ANS-2.3-1983;W1993 – ballot @ NFSC)

Determining Tornado and Other Extreme Wind **Characteristics** at Nuclear Facility Sites

Characteristics

Characteristics for Determining Tornado and Other Extreme Wind at Nuclear Facility Sites

*ANS-2.6-201x (proposed new standard – currently inactive – PINS unapproved)

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Guidelines for Estimating Present & Forecasting Future Population Distributions Surrounding Power Reactor Sites

Guidelines

Guidelines for Estimating & Forecasting Population Distributions Surrounding Power Reactor Sites

*ANS-2.8-201x, (proposed revision of historical standard ANSI/ANS-2.8-1992 new standard – currently inactive – PINS would need to be prepared)

Determining Design Basis Flooding at Power Reactor Sites

[none]

[Guidelines for] Determining Design Basis Flooding at Power Reactor Sites

*ANS-2.9-201x (Historical revision of ANSI/ANS-2.9-1980; R1989; W2000 – PINS approved)

Evaluation of Ground Water Supply for Nuclear Facilities

Evaluation

Evaluation of Ground Water Supply for Nuclear Facilities

ANSI/ANS-2.10-2003

Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation

Criteria

Criteria for the Initial Evaluation and Handling of Seismic Instrumentation Records from Nuclear Power Plant

*ANS-2.13-201x (proposed revision of historical standard ANSI/ANS-2.13-1979; R1988 -- currently inactive – PINS would need to be prepared)

Evaluation of Surface-Water Supplies for Nuclear Power Sites

Evaluation

Evaluation of Surface-Water Supplies for Nuclear Power Sites

*ANS-2.15-201x (New standard in development – PINS approved)

Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities

Criteria

Criteria for Modeling Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities

*ANS-2.16-201x (New standard in development – PINS approved)

Criteria for Modeling Design-Basis Accidental Releases from Nuclear Facilities

Criteria

Criteria for Modeling Design-Basis Accidental Releases from Nuclear Facilities

*ANS-2.17-201x (Historical revision of ANSI/ANS-2.17-1980; R1989; W2000 – ballot @ NFSC)

Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants

Evaluation

Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants

*ANS-2.18-201x (proposed new standard – PINS would need to be prepared – title/scope may change)

Standards for Evaluating Radionuclide Transport in Surface Water for Nuclear Power Sites

Standards for Evaluating Radionuclide Transport in Surface Water for Nuclear Power Sites

*ANS-2.21-201x (New standard in development – ballot @ NFSC/comment resolution)

Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink

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Criteria

Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink for Nuclear Power Sites

ANSI/ANS-2.23-2002; R2009

*Nuclear Plant **Response** to an Earthquake*

Response [Guidance]

Guidance for the Evaluation of Nuclear Plant Response to an Earthquake

*ANS-2.25-201x (Historical Revision of ANSI/ANS-2.25-1982;R1989;W1999 – PINS approved)

Surveys of Ecology Needed to License Nuclear Facilities

Surveys

Guidance for Conducting Surveys of Ecology Needed to License Nuclear Facilities

ANSI/ANS-2.26-2004;R2010

Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design

Categorization

Categorization of Systems, Structures, and Components (SSC) for Seismic Design of Nuclear Facility

ANSI/ANS-2.27-2008

Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments

Criteria

Criteria for Investigations for Seismic Hazard Assessments at Nuclear Facility Sites

ANSI/ANS-2.29-2008

*Probabilistic Seismic Hazard **Analysis***

Analysis

Probabilistic Seismic Hazard Analysis

*ANS-2.30-201x (New standard in development – PINS approved)

*Assessing **Capability** for Surface Faulting at Nuclear Facilities*

Assessing

Assessing Capability for Surface Faulting at Nuclear Facilities

*ANS-2.31-201x (New standard in development -- PINS in approval)

*Standard for **Estimating** Extreme Precipitation at Nuclear Facility Sites*

Estimating Standard

Standard for Estimating Extreme Precipitation at Nuclear Facility Sites

*ANS-3.1-201x (Historical revision of ANSI/ANS-3.1-1993;R1999;W2009 – PINS approved)

*Selection, **Qualification, and Training** of Personnel for Nuclear Power Plants*

Selection, Qualification, and Training

Selection, Qualification, and Training of Personnel for Nuclear Power Plants

*ANS-3.2-201x (Revision of ANSI/ANS-3.2-2006 -- PINS in approval)

*Administrative **Controls and Quality Assurance** for the Operational Phase of Nuclear Power Plants*

Administrative

Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

Quality

Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

*ANS-3.4-201x (Revision of ANS-3.4-1996; R2002 -- PINS in approval)

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Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants

Certification and Monitoring

[Guidance for] Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants

*ANS-3.5-201x (Revision of ANSI/ANS-3.5-2009 – PINS in development)

Nuclear Power Plant Simulators for Use in Operator Training and Examination

Training Tools

[Guidance for]

[Guidance for] Nuclear Power Plant Simulators for Use in Operator Training and Examination Training Tools

*ANS-3.8.1-201x (Historical revision of ANSI/ANS-3.8.1-1995 – PINS in approval)

Criteria for Radiological Emergency Response Functions and Organizations for Nuclear Facilities

Criteria

Criteria for Radiological Emergency Response Functions and Organizations for Nuclear Facilities

*ANS-3.8.2-201x (Historical revision of ANSI/ANS-3.8.2-1995 – PINS in approval)

Criteria for Functional and Physical Characteristics of Radiological Emergency Response Facilities at Nuclear Facilities

Criteria

Criteria for Functional and Physical Characteristics of Radiological Emergency Response Facilities at Nuclear Facilities

*ANS-3.8.3-201x (Historical revision and consolidation of ANSI/ANS-3.8.3-1995 and ANSI/ANS-3.8.4-1995 – PINS in approval)

Criteria for Radiological Emergency Response Plans and Implementing Procedures and Maintaining Emergency Response Capability for Nuclear Facilities

Criteria

Criteria for Radiological Emergency Response Plans and Implementing Procedures and Maintaining Emergency Response Capability for Nuclear Facilities

*ANS-3.8.6-201x (Historical revision and consolidation of ANSI/ANS-3.8.5-1992 and ANSI/ANS-3.8.6-1995 – PINS in approval)

Criteria for the Conduct of Offsite Radiological Assessment for Emergency Response and Emergency Radiological Field Monitoring, Sampling and Analysis for Nuclear Facilities

Criteria

Criteria for the Conduct of Offsite Radiological Assessment for Emergency Response and Emergency Radiological Field Monitoring, Sampling and Analysis for Nuclear Facilities

*ANS-3.8.7-201x (Historical revision of ANSI/ANS-3.8.7-1998 – PINS in approval)

Criteria for Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness at Nuclear Facilities

Criteria

Criteria for Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness at Nuclear Facilities

*ANS-3.8.10-201x (New standard in development – PINS approved)

Criteria for Modeling Real-time Accidental Release Consequences at Nuclear Facilities

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Criteria

Criteria for Modeling Real-time Accidental Release Consequences at Nuclear Facilities

ANSI/ANS-3.11-2005

Determining Meteorological Information at Nuclear Facilities

Criteria for Determining

Determining Meteorological Information at Nuclear Facilities

*ANS-5.4-201x (Historic revision of ANSI/ANS-5.4-1982; W1993 – Ballot @ NFSC/comment resolutions)

Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel Method

Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel

ANSI/ANS-5.10-1998; R2006

Airborne Release Fractions at Non-Reactor Nuclear Facilities

[Standards for]

[Standards for Calculating] Airborne Release Fractions at Non-Reactor Nuclear Facilities

*ANS-18.1-201x (Historical revision of ANSI/ANS-18.1-1999; W2009 – PINS approved)

Radioactive Source Term for Normal Operation of Light Water Reactors

*ANS-29.1-201x (Proposed new standard – currently inactive)

Operational Reactivity Management and Oversight at Light Water, Pressurized Water Power Reactors

Standards for

Standards for Operational Reactivity Management and Oversight at Light Water, Pressurized Water Power Reactors

*ANS-40.21-201x (New standard in development – PINS in approval)

Siting, Construction and Operation of Commercial Low Level Radioactive Waste Burial Grounds

[Standards for]

Standards for Siting, Construction and Operation of Commercial Low Level Radioactive Waste Burial Grounds

*ANS-40.35-201x (Historical revision of ANSI/ANS-1991; W2001 – PINS to be prepared)

Volume Reduction of Low Level Radioactive Waste or Mixed Waste

[Standards for]

Standards for Volume Reduction of Low Level Radioactive Waste or Mixed Waste

ANSI/ANS-40.37-2009

Mobile Low-Level Radioactive Waste Processing Systems

[Standards for]

[Standards for] Mobile Low-Level Radioactive Waste Processing Systems

*ANS-51.10-201x (Revision of ANSI/ANS-51.10-1991; R2002; R2008 – PINS approved)

Auxiliary Feedwater System for Pressurized Water Reactors

*ANS-53.1-201x (New standard – ballot@NFSC/comment resolutions)

Nuclear Safety Criteria for the Design of Modular Helium-Cooled Reactor Plants

Nuclear Safety Criteria

Nuclear Safety Criteria for the Design of Modular Helium-Cooled Reactor Plants

*ANS-54.1-201x (Historical revision of ANSI/ANS-54.1-1989; W1999 – PINS approved)

Nuclear Safety Criteria and Design Process for Liquid-Sodium-Cooled-Reactor Nuclear Power Plants

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[Process] or [Nuclear Safety Criteria and Design Process]

Nuclear Safety Criteria and Design Process for Liquid-Sodium-Cooled-Reactor Nuclear Power Plants

ANSI/ANS-55.1-1992; R2000; R2009

Solid Radioactive Waste Processing System for Light-Water-Cooled Reactor Plants

[Guidance for]

Guidance for Solid Radioactive Waste Processing System for Light-Water-Cooled Reactor Plants

ANSI/ANS-55.4-1993; R1999; R2007

Gaseous Radioactive Waste Processing Systems for Light Water Reactor Plants

[Guidance for]

Guidance for Gaseous Radioactive Waste Processing Systems for Light Water Reactor Plants

ANSI/ANS-55.6-1993; R1999; R2007

Liquid Radioactive Waste Processing System for Light Water Reactor Plants

[Guidance for]

Guidance for Liquid Radioactive Waste Processing System for Light Water Reactor Plants

*ANS-56.8-201x (Revision of ANSI/ANS-56.8-2002 – PINS approved)

Containment System Leakage Testing Requirements

Requirements

Requirements for Containment System Leakage Testing Requirements

ANSI/ANS-57.1-1992; R1998; R2005

Design Requirements for Light Water Reactor Fuel Handling Systems

Requirements

Design Requirements for Light Water Reactor Fuel Handling Systems

ANSI/ANS-57.5-1996; R2006

Light Water Reactors Fuel Assembly Mechanical Design and Evaluation

Design and Evaluation

Light Water Reactors Fuel Assembly Mechanical Design and Evaluation

ANSI/ANS-57.8-1995; R2005

Fuel Assembly Identification

Requirements

Requirements for Fuel Assembly Identification

ANSI/ANS-57.10-1996; R2006

Design Criteria for Consolidation of LWR Spent Fuel

Design Criteria

Design Criteria for Consolidation of LWR Spent Fuel

ANSI/ANS-58.3-1992; R1998; R2008

Physical Protection for Nuclear Safety-Related Systems and Components

Criteria

Criteria for Physical Protection for Nuclear Safety-Related Systems and Components

ANSI/ANS-58.6-1996; R2001

Criteria for Remote Shutdown for Light Water Reactors

Criteria

Criteria for Remote Shutdown for Light Water Reactors

*ANS-58.8-201x (Revision of ANSI/ANS-58.8-1994; R2001; R2008 – PINS Approved)

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Time Response Design Criteria for Safety-Related Operator Actions

Criteria

Time Response Design Criteria for Safety-Related Operator Actions

ANSI/ANS-58.9-1981; R1987; R2002; R2009

Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems

Criteria

Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems

ANSI/ANS-58.11-1995; R2002

Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors

Criteria

Criteria for the Safe Shutdown Design Following Selected Design Basis Events in Light Water Reactors

*ANS-58.14-201x (Historical revision of ANSI/ANS-58.14-1993;W2003 – ballot @ NFSC/comment resolution)

Safety and Pressure Integrity Classification Criteria for Light Water Reactors

Criteria for

Safety and Pressure Integrity Classification Criteria for Light Water Reactors

*ANS-58.16-201x (New standard in development – PINS in process of reapproval)

Safety Classification and Design Criteria for Non- Reactor Nuclear Facilities

[Nuclear] Safety Classification and Design Criteria

Safety Classification and Design Criteria for Non- Reactor Nuclear Facilities

ANSI/ANS-59.3-1992; R2002

Nuclear Safety Criteria for Control Air Systems

Nuclear Safety Criteria

Nuclear Safety Criteria for Control Air Systems

ANSI/ANS-59.51-1997; R2007

Fuel Oil Systems for Safety-Related Emergency Diesel Generators

[Guidelines]

Guidelines for Fuel Oil Systems for Safety-Related Emergency Diesel Generators

ANSI/ANS-59.52-1998; R2007

Lubricating Oil Systems for Safety-Related Emergency Diesel Generators

[Guidelines]

Guidelines for Lubricating Oil Systems for Safety-Related Emergency Diesel Generators

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***ANS-2.2-201x (Revision of Current standard ANSI/ANS-2.2-2002 – PINS approved)**

Earthquake Instrumentation Criteria for Nuclear Power Plants

This standard specifies the required earthquake instrumentation used for the recording of seismic data and evaluation of the possible effects after a seismic event for the site and Category I structures of light water cooled and 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 shutdown a nuclear power plant at a predetermined ground acceleration and b) procedures for evaluating records obtained from seismic instrumentation and instructions for the treatment of data.

***ANS-2.3-201x (Historic revision of ANSI/ANS-2.3-1983;W1993 – ballot @ NFSC)**

Determining Tornado and Other Extreme Wind Characteristics at Nuclear Facility Sites

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.

***ANS-2.6-201x (proposed new standard – currently inactive – PINS unapproved)**

Guidelines for Estimating Present & Forecasting Future Population Distributions Surrounding Power Reactor Sites

This standard provides guidance on suitable methodologies for developing estimates and forecasts of human population distribution around civilian and Federal nuclear facility sites. The standard is intended to provide applicants and DOE/NSA professionals with methodologies that are generally acceptable in the demographic community and to facilitate the NRC review of site suitability relative to population considerations.

***ANS-2.8-201x, (proposed revision of historical standard ANSI/ANS-2.8-1992 new standard – currently inactive – PINS would need to be prepared)**

Determining Design Basis Flooding at Power Reactor Sites

This standard presents criteria to establish design basis flooding for nuclear safety-related features at power reactor sites. Methodology is described to evaluate the flood having virtually no risk of exceedance that can be caused by precipitation and snowmelt and any resulting dam failures; seismically induced dam failures; surge or seiche and attendant wind-generated wave activity; or a reasonable combination of these events. **(title/scope from 1992 standard)**

***ANS-2.9-201x (Historical revision of ANSI/ANS-2.9-1980; R1989; W2000 – PINS approved)**

Evaluation of Ground Water Supply for Nuclear Facilities

This standard provides criteria for the determination of the availability of ground water supplies for nuclear facilities with respect to both safety and non-safety related aspects.

ANSI/ANS-2.10-2003

Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation

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This standard provides criteria for the timely retrieval and the subsequent processing, handling, and storage of data obtained from seismic instrumentation specified in ANSI/ANS-2.2-2002. Also included are initial evaluation criteria to determine whether earthquake motion at the site has exceeded the plant's operating basis earthquake ground motion.

***ANS-2.13-201x (proposed revision of historical standard ANSI/ANS-2.13-1979; R1988 -- currently inactive – PINS would need to be prepared)**

Evaluation of Surface-Water Supplies for Nuclear Power Sites

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. **(title/scope from 1978 standard)**

***ANS-2.15-201x (New standard in development – PINS approved)**

Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities

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

***ANS-2.16-201x (New standard in development – PINS approved)**

Criteria for Modeling Design-Basis Accidental Releases from Nuclear Facilities

This standard establishes criteria for use of meteorological data collected at nuclear facilities to evaluate the atmospheric effects on accidental radioactive and chemical releases, inclusive of dilution, dispersion, plume rise, plume meander, aerodynamic effects of buildings, dry deposition, and wet deposition (e.g., precipitation scavenging). These criteria may also be useful in Department of Homeland Security (DHS) consequence assessments.

***ANS-2.17-201x (Historical revision of ANSI/ANS-2.17-1980; R1989; W2000 – ballot @ NFSC)**

Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants

This national 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.

***ANS-2.18-201x (proposed new standard – PINS would need to be prepared – title/scope may change)**

Standards for Evaluating Radionuclide Transport in Surface Water for Nuclear Power Sites

This standard presents guidelines for the determination of the transport of radionuclides in surface water resulting from both postulated accidental and routine releases from nuclear power plants and other nuclear facilities.

***ANS-2.21-201x (New standard in development – ballot @ NFSC/comment resolution)**

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Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink

This standard describes atmospheric effects that shall be considered when designing ultimate heat sinks for nuclear power generation facilities. This standard is intended to apply to new nuclear power generation facilities or the re-design of the cooling systems that serve as ultimate heat sinks at existing nuclear power generation facilities. The discussion primarily applies to cooling lakes, rivers, mechanical draft cooling towers and natural draft cooling towers, which are the most common nuclear plant heat dissipation systems.

ANSI/ANS-2.23-2002; R2009

Nuclear Plant Response to an Earthquake

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 ANSI/ANS-2.10-2003. The application of these standards provides a complete evaluation of the need for postearthquake 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 shutdown following an earthquake.

***ANS-2.25-201x (Historical Revision of ANSI/ANS-2.25-1982;R1989;W1999 – PINS approved)**

Surveys of Ecology Needed to License Nuclear Facilities

This standard discusses the process for completion of ecological, terrestrial and aquatic reviews of the environment for potential nuclear facilities. Facilities include uranium enrichment facilities, fuel fabrication facilities, power and research reactors, interim storage facilities, reprocessing facilities, low/high level waste disposal facilities, and other DOE owned/operated facilities. Site planners must collect information to predict and assess real and potential environmental impacts, and to site and design reactor and non-reactor nuclear facilities that avoid or reduce adverse effects of these potential impacts. Users of this standard will be guided through each stage of a survey with its corresponding requirements, the relationship of the ecologist and other specialists in a major project, sources of information, and the governing laws and regulations.

ANSI/ANS-2.26-2004;R2010

Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design

This standard provides: (i) criteria for selecting the Seismic Design Category for nuclear facility structures, systems, and components (SSCs) to achieve earthquake safety and (ii) 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.

ANSI/ANS-2.27-2008

Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments

This standard provides criteria and guidelines for conducting geological, seismological, and geotechnical investigations needed to provide information to support seismic source characterization input to a probabilistic seismic hazard analysis (PSHA); evaluation of surface fault rupture hazard; site response analysis; and seismic-induced ground failure hazard. These criteria are applicable for Seismic Design Category (SDC)-3, SDC-4, and SDC-5 structures,

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systems, and components (SSCs). This standard does not address the use of PSHA results or the selection of design basis events for nuclear facilities.

ANSI/ANS-2.29-2008

Probabilistic Seismic Hazard Analysis

This standard provides criteria and guidance for performing a probabilistic seismic hazard analysis (PSHA) for the design and construction of nuclear facilities. Criteria provided in this standard address various aspects of conducting PSHAs, including 1) selection of the process, methodology and the level of seismic hazard analysis appropriate for a given Seismic Design Category (SDC) structure, system, or component or facility and the geotechnical and seismological characteristics of the site; 2) seismic sources characterization; 3) ground motion estimation; 4) site response assessment; 5) assessment of aleatory and epistemic uncertainties in a PSHA; and 6) PSHA documentation requirements. The guidelines and requirements provided in this standard are applicable for the design and evaluation of SDC 3, 4, and 5 facilities. These can also be applied to SDC 1 and 2, or other non-DOE facilities if, for safety, economy, or other reasons, a site-specific seismic hazard determination becomes necessary.

***ANS-2.30-201x (New standard in development – PINS approved)**

Assessing Capability for Surface Faulting at Nuclear Facilities

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.

***ANS-2.31-201x (New standard in development -- PINS in approval)**

Standard for Estimating Extreme Precipitation at Nuclear Facility Sites

The scope of this standard address extreme natural site hazards associated with extreme precipitation (rain, snow, ice and their combination) while is applicable to important to nuclear safety structures with probabilities of exceedence or return periods consistent with extreme design basis wind and earthquake loads

***ANS-3.1-201x (Historical revision of ANSI/ANS-3.1-1993;R1999;W2009 – PINS approved)**

Selection, Qualification, and Training of Personnel for Nuclear Power Plants

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. Requirements of this standard may be applied to test, mobile, and research reactors and reactors not subject to U.S. Nuclear Regulatory Commission licensing at the users discretion.

***ANS-3.2-201x (Revision of ANSI/ANS-3.2-2006 -- PINS in approval)**

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Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

This standard defines quality assurance program requirements for operating commercial plants.

***ANS-3.4-201x (Revision of ANS-3.4-1996; R2002 -- PINS in approval)**

Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants

This standard defines the medical, psychological, 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.

***ANS-3.5-201x (Revision of ANSI/ANS-3.5-2009 – PINS in development)**

Nuclear Power Plant Simulators for Use in Operator Training and Examination

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

***ANS-3.8.1-201x (Historical revision of ANSI/ANS-3.8.1-1995 – PINS in approval)**

Criteria for Radiological Emergency Response Functions and Organizations for Nuclear Facilities

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

***ANS-3.8.2-201x (Historical revision of ANSI/ANS-3.8.2-1995 – PINS in approval)**

Criteria for Functional and Physical Characteristics of Radiological Emergency Response Facilities at Nuclear Facilities

This standard establishes functional and physical criteria for facilities needed to provide an adequate overall emergency response. The criteria 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.

***ANS-3.8.3-201x (Historical revision and consolidation of ANSI/ANS-3.8.3-1995 and ANSI/ANS-3.8.4-1995 – PINS in approval)**

Criteria for Radiological Emergency Response Plans and Implementing Procedures and Maintaining Emergency Response Capability for Nuclear Facilities

This standard establishes criteria for developing a radiological emergency response plan, emergency plan implementing procedures, and emergency plan administrative procedures for nuclear facilities. Criteria include exercises, drills, surveillance and training.

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***ANS-3.8.6-201x (Historical revision and consolidation of ANSI/ANS-3.8.5-1992 and ANSI/ANS-3.8.6-1995 – PINS in approval)**

Criteria for the Conduct of Offsite Radiological Assessment for Emergency Response and Emergency Radiological Field Monitoring, Sampling and Analysis for Nuclear Facilities

This standard establishes criteria for consequence assessment criteria, 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.

***ANS-3.8.7-201x(Historical revision of ANSI/ANS-3.8.7-1998 – PINS in approval)**

Criteria for Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness at Nuclear Facilities

This standard establishes criteria 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.

***ANS-3.8.10-201x (New standard in development – PINS approved)**

Criteria for Modeling Real-time Accidental Release Consequences at Nuclear Facilities

This Standard establishes criteria for use of meteorological data collected at nuclear facilities or nearby stations to evaluate in real time the atmospheric effects on all anticipated accidental radioactive and hazardous chemical releases during emergencies, inclusive of atmospheric transport and dispersion.

ANSI/ANS-3.11-2005

Determining Meteorological Information at Nuclear Facilities

This document provides criteria for gathering and assembling meteorological information at commercial nuclear electric generating stations, U.S. and Department of Energy / National Nuclear Security Administration nuclear facilities, and other national or international nuclear facilities. Meteorological data collected, stored, and displayed through implementation of this standard are utilized to support the siting, operation, and decommissioning of nuclear facilities. The meteorological data are employed in determining environmental impacts, consequence assessments supporting routine release and design-basis accident evaluations, emergency preparedness programs, and other applications.

***ANS-5.4-201x (Historic revision of ANSI/ANS-5.4-1982; W1993 – Ballot @ NFSC/comment resolutions)**

Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel

This standard provides an analytical method for calculating the release of volatile fission products from uranium dioxide (UO₂) fuel pellets during normal reactor operation. When used with nuclide yields, this method will give the release-to-birth ratio, R/B, or the so-called "gap release," which is the inventory of volatile radioactive fission products that could be available for release from the fuel rod if the cladding were breached. The standard considers high-temperature (up to 2500K) and low-temperature (less than 1000K where temperature-independent processes dominate) releases and distinguishes between short half-life (half-life less than one year) and long-half-life (half-life greater than one year) nuclides. This standard

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accounts for thermal diffusion and athermal diffusion coefficients that are added together for determining a total R/B ratio.

ANSI/ANS-5.10-1998; R2006

Airborne Release Fractions at Non-Reactor Nuclear Facilities

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.

***ANS-18.1-201x (Historical revision of ANSI/ANS-18.1-1999; W2009 – PINS approved)**

Radioactive Source Term for Normal Operation of Light Water Reactors

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

***ANS-29.1-201x (Proposed new standard – currently inactive)**

Operational Reactivity Management and Oversight at Light Water, Pressurized Water Power Reactors

This standard provides guidance for PWR operation and reactor engineering staffs regarding the care and prior planning of plant manipulations that can affect reactor reactivity as well as the review, post manipulation, to verify that reactivity performance met expectations and to improve processes and procedures.

***ANS-40.21-201x (New standard in development – PINS in approval)**

Siting, Construction and Operation of Commercial Low Level Radioactive Waste Burial Grounds

This standard provides a matrix of minimum criteria to be met in determining the siting, construction and operation of a commercial low level radioactive waste burial ground. The standard will balance siting (i.e., natural criteria), construction (i.e., engineered safeguards) and operation (i.e., acceptance criteria) to provide a safety matrix that provides for the containment of the facility.

***ANS-40.35-201x (Historical revision of ANSI/ANS-1991; W2001 – PINS to be prepared)**

Volume Reduction of Low Level Radioactive Waste or Mixed Waste

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

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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. **(title/scope from 1991 standard)**

ANSI/ANS-40.37-2009

Mobile Low-Level Radioactive Waste Processing Systems

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.

***ANS-51.10-201x (Revision of ANSI/ANS-51.10-1991; R2002; R2008 – PINS approved)**

Auxiliary Feedwater System for Pressurized Water Reactors

This standard specifies design requirements for the Auxiliary Feedwater System including system functions, performance requirements and system description.

***ANS-53.1-201x (New standard – ballot@NFSC/comment resolutions)**

Nuclear Safety Criteria for the Design of Modular Helium-Cooled Reactor Plants

The purpose of this standard is to define the process for specifying criteria to assure that Modular Helium-cooled Reactor (MHR) plants are designed so that they can be constructed and operated safely without undue risk to public health and safety. This purpose is achieved through the identification of applicable safety requirements from the national nuclear regulator, industrial codes and standards, and other published guidance and professional engineering practices. The MHR plant designer – hereinafter designer – is responsible for conformance to the criteria defined in this standard and supporting the design bases and expected operational characteristics by design analyses, experimental models, conformance with applicable standards and comparisons with accepted designs or experience gained from similar designs.

***ANS-54.1-201x (Historical revision of ANSI/ANS-54.1-1989; W1999 – PINS approved)**

Nuclear Safety Criteria and Design Process for Liquid-Sodium-Cooled-Reactor Nuclear Power Plants

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This standard establishes the nuclear safety criteria, functional performance requirements, and design requirements for liquid-sodium-cooled 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.

ANSI/ANS-55.1-1992; R2000; R2009

Solid Radioactive Waste Processing System for Light-Water-Cooled Reactor Plants

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 processing 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.

ANSI/ANS-55.4-1993; R1999; R2007

Gaseous Radioactive Waste Processing Systems for Light Water Reactor Plants

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

ANSI/ANS-55.6-1993; R1999; R2007

Liquid Radioactive Waste Processing System for Light Water Reactor Plants

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

***ANS-56.8-201x (Revision of ANSI/ANS-56.8-2002 – PINS approved)**

Containment System Leakage Testing Requirements

This standard specifies acceptable primary containment leakage rate test requirements to assure valid testing. The scope includes 1) leakage test requirements; 2) test instrumentation; 3) test procedures; 4) test methods; 5) acceptance criteria; 6) data analysis; 7) inspection and recording of test results; and 8) definition and determination of Appendix J Pathways.

ANSI/ANS-57.1-1992; R1998; R2005

Design Requirements for Light Water Reactor Fuel Handling Systems

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.

ANSI/ANS-57.5-1996; R2006

Light Water Reactors Fuel Assembly Mechanical Design and Evaluation

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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.

ANSI/ANS-57.8-1995; R2005

Fuel Assembly Identification

This standard describes requirements for the unique identification of fuel assemblies utilized in nuclear power plants. It defines the characters and proposed sequence to be used in assigning identification to fuel assemblies. This standard was developed primarily for commercial light-water reactor fuel, but may be used for any reactor fuel contained in discrete fuel assemblies that can be identified with a serial number as specified by this standard.

ANSI/ANS-57.10-1996; R2006

Design Criteria for Consolidation of LWR Spent Fuel

This standard provides design criteria for the process of consolidating light water reactor 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.

ANSI/ANS-58.3-1992; R1998; R2008

Physical Protection for Nuclear Safety-Related Systems and Components

This standard sets forth physical protection criteria for nuclear safety-related systems and components in stations using light water reactors. 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.

ANSI/ANS-58.6-1996; R2001

Criteria for Remote Shutdown for Light Water Reactors

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.

***ANS-58.8-201x (Revision of ANSI/ANS-58.8-1994; R2001; R2008 – PINS Approved)**

Time Response Design Criteria for Safety-Related Operator Actions

This standard establishes time response criteria for safety-related operator actions to be used in the design and evaluation of light water reactor (LWR) nuclear power plants. The criteria are used 1) to determine the minimum response time intervals for safety-related operator actions that are taken to mitigate design basis events (DBEs) and 2) to validate operator actions

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requirements for DBEs and Special Events

ANSI/ANS-58.9-1981; R1987; R2002; R2009

Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems

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 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.

ANSI/ANS-58.11-1995; R2002

Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors

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.

***ANS-58.14-201x (Historical revision of ANSI/ANS-58.14-1993;W2003 – ballot @ NFSC/comment resolution)**

Safety and Pressure Integrity Classification Criteria for Light Water Reactors

This standard specifies deterministic criteria for the safety classification of items (i.e., SSCs and parts (including consumables)) in a LWR NPP as either safety-related (Q), supplemented grade (S), or non-safety-related (N). Criteria provide and establish a procurement subclassification within Class Q, called commercial grade (C). In addition, pressure integrity classification criteria provide for the assignment of Classes 1 to 5 to the pressure-retaining portion of items.

***ANS-58.16-201x (New standard in development – PINS in process of reapproval)**

Safety Classification and Design Criteria for Non- Reactor Nuclear Facilities

This standard provides guidance for the safety classification of controls [such as, structures, systems, components (SSCs) and administrative controls] associated with nuclear safety in non-reactor nuclear facilities. This standard provides guidance on how to derive safety functions and the design and operational requirements to satisfy these functions. It also associates the safety classification of controls to engineering (e.g., civil/structural, mechanical, electrical) and programmatic (e.g., QA) classification levels. Finally this standard will define functional and boundary criteria for SSCs.

ANSI/ANS-59.3-1992; R2002

Nuclear Safety Criteria for Control Air Systems

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 applies only to the control air system

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and does not apply to air-operated devices or the emergency diesel generator starting air system.

ANSI/ANS-59.51-1997; R2007

Fuel Oil Systems for Safety-Related Emergency Diesel Generators

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.

ANSI/ANS-59.52-1998: R2007

Lubricating Oil Systems for Safety-Related Emergency Diesel Generators

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.

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***ANS-2.2-201x (Revision of Current standard ANSI/ANS-2.2-2002 – PINS approved)**

Earthquake Instrumentation Criteria for Nuclear Power Plants

This standard specifies the required earthquake instrumentation used for the recording of seismic data and evaluation of the possible effects after a seismic event for the site and Category I structures of light water cooled and 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 shutdown a nuclear power plant at a predetermined ground acceleration and b) procedures for evaluating records obtained from seismic instrumentation and instructions for the treatment of data.

***ANS-2.3-201x (Historic revision of ANSI/ANS-2.3-1983;W1993 – ballot @ NFSC)**

Determining Tornado and Other Extreme Wind Characteristics at Nuclear Facility Sites

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.

***ANS-2.6-201x (proposed new standard – currently inactive – PINS unapproved)**

Guidelines for Estimating Present & Forecasting Future Population Distributions Surrounding Power Reactor Sites

This standard provides guidance on suitable methodologies for developing estimates and forecasts of human population distribution around civilian and Federal nuclear facility sites. The standard is intended to provide applicants and DOE/NNSA professionals with methodologies that are generally acceptable in the demographic community and to facilitate the NRC review of site suitability relative to population considerations.

***ANS-2.8-201x, (proposed revision of historical standard ANSI/ANS-2.8-1992 new standard – currently inactive – PINS would need to be prepared)**

Determining Design Basis Flooding at Power Reactor Sites

This standard presents criteria to establish design basis flooding for nuclear safety-related features at power reactor sites. Methodology is described to evaluate the flood having virtually no risk of exceedance that can be caused by precipitation and snowmelt and any resulting dam failures; seismically induced dam failures; surge or seiche and attendant wind-generated wave activity; or a reasonable combination of these events. **(title/scope from 1992 standard)**

***ANS-2.9-201x (Historical revision of ANSI/ANS-2.9-1980; R1989; W2000 – PINS approved)**

Evaluation of Ground Water Supply for Nuclear Facilities

This standard provides criteria for the determination of the availability of ground water supplies for nuclear facilities with respect to both safety and non-safety related aspects.

ANSI/ANS-2.10-2003

Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation

This standard provides criteria for the timely retrieval and the subsequent processing, handling, and storage of data obtained from seismic instrumentation specified in ANSI/ANS-2.2-2002. Also included are initial evaluation criteria to determine whether earthquake motion at the site

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has exceeded the plant's operating basis earthquake ground motion.

***ANS-2.13-201x (proposed revision of historical standard ANSI/ANS-2.13-1979; R1988 -- currently inactive – PINS would need to be prepared)**

Evaluation of Surface-Water Supplies for Nuclear Power Sites

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. **(title/scope from 1978 standard)**

***ANS-2.15-201x (New standard in development – PINS approved)**

Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities

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

***ANS-2.16-201x (New standard in development – PINS approved)**

Criteria for Modeling Design-Basis Accidental Releases from Nuclear Facilities

This standard establishes criteria for use of meteorological data collected at nuclear facilities to evaluate the atmospheric effects on accidental radioactive and chemical releases, inclusive of dilution, dispersion, plume rise, plume meander, aerodynamic effects of buildings, dry deposition, and wet deposition (e.g., precipitation scavenging). These criteria may also be useful in Department of Homeland Security (DHS) consequence assessments.

***ANS-2.17-201x (Historical revision of ANSI/ANS-2.17-1980; R1989; W2000 – ballot @ NFSC)**

Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants

This national 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.

***ANS-2.18-201x (proposed new standard – PINS would need to be prepared – title/scope may change)**

Standards for Evaluating Radionuclide Transport in Surface Water for Nuclear Power Sites

This standard presents guidelines for the determination of the transport of radionuclides in surface water resulting from both postulated accidental and routine releases from nuclear power plants and other nuclear facilities.

***ANS-2.21-201x (New standard in development – ballot @ NFSC/comment resolution)**

Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink

This standard describes atmospheric effects that shall be considered when designing ultimate heat sinks for nuclear power generation facilities. This standard is intended to apply to new

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nuclear power generation facilities or the re-design of the cooling systems that serve as ultimate heat sinks at existing nuclear power generation facilities. The discussion primarily applies to cooling lakes, rivers, mechanical draft cooling towers and natural draft cooling towers, which are the most common nuclear plant heat dissipation systems.

ANSI/ANS-2.23-2002; R2009

Nuclear Plant Response to an Earthquake

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 ANSI/ANS-2.10-2003. The application of these standards provides a complete evaluation of the need for postearthquake 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 shutdown following an earthquake.

***ANS-2.25-201x (Historical Revision of ANSI/ANS-2.25-1982;R1989;W1999 – PINS approved)**

Surveys of Ecology Needed to License Nuclear Facilities

This standard discusses the process for completion of ecological, terrestrial and aquatic reviews of the environment for potential nuclear facilities. Facilities include uranium enrichment facilities, fuel fabrication facilities, power and research reactors, interim storage facilities, reprocessing facilities, low/high level waste disposal facilities, and other DOE owned/operated facilities. Site planners must collect information to predict and assess real and potential environmental impacts, and to site and design reactor and non-reactor nuclear facilities that avoid or reduce adverse effects of these potential impacts. Users of this standard will be guided through each stage of a survey with its corresponding requirements, the relationship of the ecologist and other specialists in a major project, sources of information, and the governing laws and regulations.

ANSI/ANS-2.26-2004;R2010

Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design

This standard provides: (i) criteria for selecting the Seismic Design Category for nuclear facility structures, systems, and components (SSCs) to achieve earthquake safety and (ii) 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.

ANSI/ANS-2.27-2008

Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments

This standard provides criteria and guidelines for conducting geological, seismological, and geotechnical investigations needed to provide information to support seismic source characterization input to a probabilistic seismic hazard analysis (PSHA); evaluation of surface fault rupture hazard; site response analysis; and seismic-induced ground failure hazard. These criteria are applicable for Seismic Design Category (SDC)-3, SDC-4, and SDC-5 structures, systems, and components (SSCs). This standard does not address the use of PSHA results or the selection of design basis events for nuclear facilities.

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ANSI/ANS-2.29-2008

Probabilistic Seismic Hazard Analysis

This standard provides criteria and guidance for performing a probabilistic seismic hazard analysis (PSHA) for the design and construction of nuclear facilities. Criteria provided in this standard address various aspects of conducting PSHAs, including 1) selection of the process, methodology and the level of seismic hazard analysis appropriate for a given Seismic Design Category (SDC) structure, system, or component or facility and the geotechnical and seismological characteristics of the site; 2) seismic sources characterization; 3) ground motion estimation; 4) site response assessment; 5) assessment of aleatory and epistemic uncertainties in a PSHA; and 6) PSHA documentation requirements. The guidelines and requirements provided in this standard are applicable for the design and evaluation of SDC 3, 4, and 5 facilities. These can also be applied to SDC 1 and 2, or other non-DOE facilities if, for safety, economy, or other reasons, a site-specific seismic hazard determination becomes necessary.

***ANS-2.30-201x (New standard in development – PINS approved)**

Assessing Capability for Surface Faulting at Nuclear Facilities

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.

***ANS-2.31-201x (New standard in development -- PINS in approval)**

Standard for Estimating Extreme Precipitation at Nuclear Facility Sites

The scope of this standard address extreme natural site hazards associated with extreme precipitation (rain, snow, ice and their combination) while is applicable to important to nuclear safety structures with probabilities of exceedence or return periods consistent with extreme design basis wind and earthquake loads

***ANS-3.1-201x (Historical revision of ANSI/ANS-3.1-1993;R1999;W2009 – PINS approved)**

Selection, Qualification, and Training of Personnel for Nuclear Power Plants

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. Requirements of this standard may be applied to test, mobile, and research reactors and reactors not subject to U.S. Nuclear Regulatory Commission licensing at the users discretion.

***ANS-3.2-201x (Revision of ANSI/ANS-3.2-2006 -- PINS in approval)**

Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

This standard defines quality assurance program requirements for operating commercial plants.

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***ANS-3.4-201x (Revision of ANS-3.4-1996; R2002 -- PINS in approval)**

Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants

This standard defines the medical, psychological, 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.

***ANS-3.5-201x (Revision of ANSI/ANS-3.5-2009 – PINS in development)**

Nuclear Power Plant Simulators for Use in Operator Training and Examination

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

***ANS-3.8.1-201x (Historical revision of ANSI/ANS-3.8.1-1995 – PINS in approval)**

Criteria for Radiological Emergency Response Functions and Organizations for Nuclear Facilities

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

***ANS-3.8.2-201x (Historical revision of ANSI/ANS-3.8.2-1995 – PINS in approval)**

Criteria for Functional and Physical Characteristics of Radiological Emergency Response Facilities at Nuclear Facilities

This standard establishes functional and physical criteria for facilities needed to provide an adequate overall emergency response. The criteria 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.

***ANS-3.8.3-201x (Historical revision and consolidation of ANSI/ANS-3.8.3-1995 and ANSI/ANS-3.8.4-1995 – PINS in approval)**

Criteria for Radiological Emergency Response Plans and Implementing Procedures and Maintaining Emergency Response Capability for Nuclear Facilities

This standard establishes criteria for developing a radiological emergency response plan, emergency plan implementing procedures, and emergency plan administrative procedures for nuclear facilities. Criteria include exercises, drills, surveillance and training.

***ANS-3.8.6-201x (Historical revision and consolidation of ANSI/ANS-3.8.5-1992 and ANSI/ANS-3.8.6-1995 – PINS in approval)**

Criteria for the Conduct of Offsite Radiological Assessment for Emergency Response and Emergency Radiological Field Monitoring, Sampling and Analysis for Nuclear Facilities

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This standard establishes criteria for consequence assessment criteria, 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.

***ANS-3.8.7-201x(Historical revision of ANSI/ANS-3.8.7-1998 – PINS in approval)**
Criteria for Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness at Nuclear Facilities

This standard establishes criteria 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.

***ANS-3.8.10-201x (New standard in development – PINS approved)**
Criteria for Modeling Real-time Accidental Release Consequences at Nuclear Facilities

This Standard establishes criteria for use of meteorological data collected at nuclear facilities or nearby stations to evaluate in real time the atmospheric effects on all anticipated accidental radioactive and hazardous chemical releases during emergencies, inclusive of atmospheric transport and dispersion.

ANSI/ANS-3.11-2005

Determining Meteorological Information at Nuclear Facilities

This document provides criteria for gathering and assembling meteorological information at commercial nuclear electric generating stations, U.S. and Department of Energy / National Nuclear Security Administration nuclear facilities, and other national or international nuclear facilities. Meteorological data collected, stored, and displayed through implementation of this standard are utilized to support the siting, operation, and decommissioning of nuclear facilities. The meteorological data are employed in determining environmental impacts, consequence assessments supporting routine release and design-basis accident evaluations, emergency preparedness programs, and other applications.

***ANS-5.4-201x (Historic revision of ANSI/ANS-5.4-1982; W1993 – Ballot @ NFSC/comment resolutions)**

Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel

This standard provides an analytical method for calculating the release of volatile fission products from uranium dioxide (UO₂) fuel pellets during normal reactor operation. When used with nuclide yields, this method will give the release-to-birth ratio, R/B, or the so-called "gap release," which is the inventory of volatile radioactive fission products that could be available for release from the fuel rod if the cladding were breached. The standard considers high-temperature (up to 2500K) and low-temperature (less than 1000K where temperature-independent processes dominate) releases and distinguishes between short half-life (half-life less than one year) and long-half-life (half-life greater than one year) nuclides. This standard accounts for thermal diffusion and athermal diffusion coefficients that are added together for determining a total R/B ratio.

ANSI/ANS-5.10-1998; R2006

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Siting, Construction and Operation of Commercial Low Level Radioactive Waste Burial Grounds

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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. **(title/scope from 1991 standard)**

ANSI/ANS-40.37-2009

Mobile Low-Level Radioactive Waste Processing Systems

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.

***ANS-51.10-201x (Revision of ANSI/ANS-51.10-1991; R2002; R2008 – PINS approved)**

Auxiliary Feedwater System for Pressurized Water Reactors

This standard specifies design requirements for the Auxiliary Feedwater System including system functions, performance requirements and system description.

***ANS-53.1-201x (New standard – ballot@NFSC/comment resolutions)**

Nuclear Safety Criteria for the Design of Modular Helium-Cooled Reactor Plants

The purpose of this standard is to define the process for specifying criteria to assure that Modular Helium-cooled Reactor (MHR) plants are designed so that they can be constructed and operated safely without undue risk to public health and safety. This purpose is achieved through the identification of applicable safety requirements from the national nuclear regulator, industrial codes and standards, and other published guidance and professional engineering practices. The MHR plant designer – hereinafter designer – is responsible for conformance to the criteria defined in this standard and supporting the design bases and expected operational characteristics by design analyses, experimental models, conformance with applicable standards and comparisons with accepted designs or experience gained from similar designs.

***ANS-54.1-201x (Historical revision of ANSI/ANS-54.1-1989; W1999 – PINS approved)**

Nuclear Safety Criteria and Design Process for Liquid-Sodium-Cooled-Reactor Nuclear Power Plants

This standard establishes the nuclear safety criteria, functional performance requirements, and design requirements for liquid-sodium-cooled nuclear power plants. The document uses performance-based, risk-informed criteria wherever possible. It also describes the design

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process to be followed to establish those criteria and perform structures, systems, and component classifications.

ANSI/ANS-55.1-1992; R2000; R2009

Solid Radioactive Waste Processing System for Light-Water-Cooled Reactor Plants

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 processing 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.

ANSI/ANS-55.4-1993; R1999; R2007

Gaseous Radioactive Waste Processing Systems for Light Water Reactor Plants

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

ANSI/ANS-55.6-1993; R1999; R2007

Liquid Radioactive Waste Processing System for Light Water Reactor Plants

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

***ANS-56.8-201x (Revision of ANSI/ANS-56.8-2002 – PINS approved)**

Containment System Leakage Testing Requirements

This standard specifies acceptable primary containment leakage rate test requirements to assure valid testing. The scope includes 1) leakage test requirements; 2) test instrumentation; 3) test procedures; 4) test methods; 5) acceptance criteria; 6) data analysis; 7) inspection and recording of test results; and 8) definition and determination of Appendix J Pathways.

ANSI/ANS-57.1-1992; R1998; R2005

Design Requirements for Light Water Reactor Fuel Handling Systems

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.

ANSI/ANS-57.5-1996; R2006

Light Water Reactors Fuel Assembly Mechanical Design and Evaluation

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

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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.

ANSI/ANS-57.8-1995; R2005

Fuel Assembly Identification

This standard describes requirements for the unique identification of fuel assemblies utilized in nuclear power plants. It defines the characters and proposed sequence to be used in assigning identification to fuel assemblies. This standard was developed primarily for commercial light-water reactor fuel, but may be used for any reactor fuel contained in discrete fuel assemblies that can be identified with a serial number as specified by this standard.

ANSI/ANS-57.10-1996; R2006

Design Criteria for Consolidation of LWR Spent Fuel

This standard provides design criteria for the process of consolidating light water reactor 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.

ANSI/ANS-58.3-1992; R1998; R2008

Physical Protection for Nuclear Safety-Related Systems and Components

This standard sets forth physical protection criteria for nuclear safety-related systems and components in stations using light water reactors. 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.

ANSI/ANS-58.6-1996; R2001

Criteria for Remote Shutdown for Light Water Reactors

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.

***ANS-58.8-201x (Revision of ANSI/ANS-58.8-1994; R2001; R2008 – PINS Approved)**

Time Response Design Criteria for Safety-Related Operator Actions

This standard establishes time response criteria for safety-related operator actions to be used in the design and evaluation of light water reactor (LWR) nuclear power plants. The criteria are used 1) to determine the minimum response time intervals for safety-related operator actions that are taken to mitigate design basis events (DBEs) and 2) to validate operator actions requirements for DBEs and Special Events

ANSI/ANS-58.9-1981; R1987; R2002; R2009

Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems

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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 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.

ANSI/ANS-58.11-1995; R2002

Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors

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.

***ANS-58.14-201x (Historical revision of ANSI/ANS-58.14-1993;W2003 – ballot @ NFSC/comment resolution)**

Safety and Pressure Integrity Classification Criteria for Light Water Reactors

This standard specifies deterministic criteria for the safety classification of items (i.e., SSCs and parts (including consumables)) in a LWR NPP as either safety-related (Q), supplemented grade (S), or non-safety-related (N). Criteria provide and establish a procurement subclassification within Class Q, called commercial grade (C). In addition, pressure integrity classification criteria provide for the assignment of Classes 1 to 5 to the pressure-retaining portion of items.

***ANS-58.16-201x (New standard in development – PINS in process of reapproval)**

Safety Classification and Design Criteria for Non- Reactor Nuclear Facilities

This standard provides guidance for the safety classification of controls [such as, structures, systems, components (SSCs) and administrative controls] associated with nuclear safety in non-reactor nuclear facilities. This standard provides guidance on how to derive safety functions and the design and operational requirements to satisfy these functions. It also associates the safety classification of controls to engineering (e.g., civil/structural, mechanical, electrical) and programmatic (e.g., QA) classification levels. Finally this standard will define functional and boundary criteria for SSCs.

ANSI/ANS-59.3-1992; R2002

Nuclear Safety Criteria for Control Air Systems

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 applies only to the control air system and does not apply to air-operated devices or the emergency diesel generator starting air system.

ANSI/ANS-59.51-1997; R2007

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Fuel Oil Systems for Safety-Related Emergency Diesel Generators

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.

ANSI/ANS-59.52-1998: R2007

Lubricating Oil Systems for Safety-Related Emergency Diesel Generators

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.

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***ANS-2.2-201x (Revision of Current standard ANSI/ANS-2.2-2002 – PINS approved)**

Earthquake Instrumentation Criteria for Nuclear Power Plants

This standard specifies the required earthquake instrumentation used for the recording of seismic data and evaluation of the possible effects after a seismic event for the site and Category I structures of light water cooled and 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 shutdown a nuclear power plant at a predetermined ground acceleration and b) procedures for evaluating records obtained from seismic instrumentation and instructions for the treatment of data.

***ANS-2.3-201x (Historic revision of ANSI/ANS-2.3-1983;W1993 – ballot @ NFSC)**

Determining Tornado and Other Extreme Wind Characteristics at Nuclear Facility Sites

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.

***ANS-2.6-201x (proposed new standard – currently inactive – PINS unapproved)**

Guidelines for Estimating Present & Forecasting Future Population Distributions Surrounding Power Reactor Sites

This standard provides guidance on suitable methodologies for developing estimates and forecasts of human population distribution around civilian and Federal nuclear facility sites. The standard is intended to provide applicants and DOE/NSA professionals with methodologies that are generally acceptable in the demographic community and to facilitate the NRC review of site suitability relative to population considerations.

***ANS-2.8-201x, (proposed revision of historical standard ANSI/ANS-2.8-1992 new standard – currently inactive – PINS would need to be prepared)**

Determining Design Basis Flooding at Power Reactor Sites

This standard presents criteria to establish design basis flooding for nuclear safety-related features at power reactor sites. Methodology is described to evaluate the flood having virtually no risk of exceedance that can be caused by precipitation and snowmelt and any resulting dam failures; seismically induced dam failures; surge or seiche and attendant wind-generated wave activity; or a reasonable combination of these events. **(title/scope from 1992 standard)**

***ANS-2.9-201x (Historical revision of ANSI/ANS-2.9-1980; R1989; W2000 – PINS approved)**

Evaluation of Ground Water Supply for Nuclear Facilities

This standard provides criteria for the determination of the availability of ground water supplies for nuclear facilities with respect to both safety and non-safety related aspects.

ANSI/ANS-2.10-2003

Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation

This standard provides criteria for the timely retrieval and the subsequent processing, handling, and storage of data obtained from seismic instrumentation specified in ANSI/ANS-2.2-2002. Also included are initial evaluation criteria to determine whether earthquake motion at the site

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has exceeded the plant's operating basis earthquake ground motion.

***ANS-2.13-201x (proposed revision of historical standard ANSI/ANS-2.13-1979; R1988 -- currently inactive – PINS would need to be prepared)**

Evaluation of Surface-Water Supplies for Nuclear Power Sites

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. **(title/scope from 1978 standard)**

***ANS-2.15-201x (New standard in development – PINS approved)**

Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities

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

***ANS-2.16-201x (New standard in development – PINS approved)**

Criteria for Modeling Design-Basis Accidental Releases from Nuclear Facilities

This standard establishes criteria for use of meteorological data collected at nuclear facilities to evaluate the atmospheric effects on accidental radioactive and chemical releases, inclusive of dilution, dispersion, plume rise, plume meander, aerodynamic effects of buildings, dry deposition, and wet deposition (e.g., precipitation scavenging). These criteria may also be useful in Department of Homeland Security (DHS) consequence assessments.

***ANS-2.17-201x (Historical revision of ANSI/ANS-2.17-1980; R1989; W2000 – ballot @ NFSC)**

Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Plants

This national 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.

***ANS-2.18-201x (proposed new standard – PINS would need to be prepared – title/scope may change)**

Standards for Evaluating Radionuclide Transport in Surface Water for Nuclear Power Sites

This standard presents guidelines for the determination of the transport of radionuclides in surface water resulting from both postulated accidental and routine releases from nuclear power plants and other nuclear facilities.

***ANS-2.21-201x (New standard in development – ballot @ NFSC/comment resolution)**

Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink

This standard describes atmospheric effects that shall be considered when designing ultimate heat sinks for nuclear power generation facilities. This standard is intended to apply to new

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nuclear power generation facilities or the re-design of the cooling systems that serve as ultimate heat sinks at existing nuclear power generation facilities. The discussion primarily applies to cooling lakes, rivers, mechanical draft cooling towers and natural draft cooling towers, which are the most common nuclear plant heat dissipation systems.

ANSI/ANS-2.23-2002; R2009

Nuclear Plant Response to an Earthquake

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 ANSI/ANS-2.10-2003. The application of these standards provides a complete evaluation of the need for postearthquake 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 shutdown following an earthquake.

***ANS-2.25-201x (Historical Revision of ANSI/ANS-2.25-1982;R1989;W1999 – PINS approved)**

Surveys of Ecology Needed to License Nuclear Facilities

This standard discusses the process for completion of ecological, terrestrial and aquatic reviews of the environment for potential nuclear facilities. Facilities include uranium enrichment facilities, fuel fabrication facilities, power and research reactors, interim storage facilities, reprocessing facilities, low/high level waste disposal facilities, and other DOE owned/operated facilities. Site planners must collect information to predict and assess real and potential environmental impacts, and to site and design reactor and non-reactor nuclear facilities that avoid or reduce adverse effects of these potential impacts. Users of this standard will be guided through each stage of a survey with its corresponding requirements, the relationship of the ecologist and other specialists in a major project, sources of information, and the governing laws and regulations.

ANSI/ANS-2.26-2004;R2010

Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design

This standard provides: (i) criteria for selecting the Seismic Design Category for nuclear facility structures, systems, and components (SSCs) to achieve earthquake safety and (ii) 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.

ANSI/ANS-2.27-2008

Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments

This standard provides criteria and guidelines for conducting geological, seismological, and geotechnical investigations needed to provide information to support seismic source characterization input to a probabilistic seismic hazard analysis (PSHA); evaluation of surface fault rupture hazard; site response analysis; and seismic-induced ground failure hazard. These criteria are applicable for Seismic Design Category (SDC)-3, SDC-4, and SDC-5 structures, systems, and components (SSCs). This standard does not address the use of PSHA results or the selection of design basis events for nuclear facilities.

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ANSI/ANS-2.29-2008

Probabilistic Seismic Hazard Analysis

This standard provides criteria and guidance for performing a probabilistic seismic hazard analysis (PSHA) for the design and construction of nuclear facilities. Criteria provided in this standard address various aspects of conducting PSHAs, including 1) selection of the process, methodology and the level of seismic hazard analysis appropriate for a given Seismic Design Category (SDC) structure, system, or component or facility and the geotechnical and seismological characteristics of the site; 2) seismic sources characterization; 3) ground motion estimation; 4) site response assessment; 5) assessment of aleatory and epistemic uncertainties in a PSHA; and 6) PSHA documentation requirements. The guidelines and requirements provided in this standard are applicable for the design and evaluation of SDC 3, 4, and 5 facilities. These can also be applied to SDC 1 and 2, or other non-DOE facilities if, for safety, economy, or other reasons, a site-specific seismic hazard determination becomes necessary.

***ANS-2.30-201x (New standard in development – PINS approved)**

Assessing Capability for Surface Faulting at Nuclear Facilities

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.

***ANS-2.31-201x (New standard in development -- PINS in approval)**

Standard for Estimating Extreme Precipitation at Nuclear Facility Sites

The scope of this standard address extreme natural site hazards associated with extreme precipitation (rain, snow, ice and their combination) while is applicable to important to nuclear safety structures with probabilities of exceedence or return periods consistent with extreme design basis wind and earthquake loads

***ANS-3.1-201x (Historical revision of ANSI/ANS-3.1-1993;R1999;W2009 – PINS approved)**

Selection, Qualification, and Training of Personnel for Nuclear Power Plants

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. Requirements of this standard may be applied to test, mobile, and research reactors and reactors not subject to U.S. Nuclear Regulatory Commission licensing at the users discretion.

***ANS-3.2-201x (Revision of ANSI/ANS-3.2-2006 -- PINS in approval)**

Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

This standard defines quality assurance program requirements for operating commercial plants.

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***ANS-3.4-201x (Revision of ANS-3.4-1996; R2002 -- PINS in approval)**

Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants

This standard defines the medical, psychological, 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.

***ANS-3.5-201x (Revision of ANSI/ANS-3.5-2009 – PINS in development)**

Nuclear Power Plant Simulators for Use in Operator Training and Examination

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

***ANS-3.8.1-201x (Historical revision of ANSI/ANS-3.8.1-1995 – PINS in approval)**

Criteria for Radiological Emergency Response Functions and Organizations for Nuclear Facilities

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

***ANS-3.8.2-201x (Historical revision of ANSI/ANS-3.8.2-1995 – PINS in approval)**

Criteria for Functional and Physical Characteristics of Radiological Emergency Response Facilities at Nuclear Facilities

This standard establishes functional and physical criteria for facilities needed to provide an adequate overall emergency response. The criteria 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.

***ANS-3.8.3-201x (Historical revision and consolidation of ANSI/ANS-3.8.3-1995 and ANSI/ANS-3.8.4-1995 – PINS in approval)**

Criteria for Radiological Emergency Response Plans and Implementing Procedures and Maintaining Emergency Response Capability for Nuclear Facilities

This standard establishes criteria for developing a radiological emergency response plan, emergency plan implementing procedures, and emergency plan administrative procedures for nuclear facilities. Criteria include exercises, drills, surveillance and training.

***ANS-3.8.6-201x (Historical revision and consolidation of ANSI/ANS-3.8.5-1992 and ANSI/ANS-3.8.6-1995 – PINS in approval)**

Criteria for the Conduct of Offsite Radiological Assessment for Emergency Response and Emergency Radiological Field Monitoring, Sampling and Analysis for Nuclear Facilities

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This standard establishes criteria for consequence assessment criteria, 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.

***ANS-3.8.7-201x(Historical revision of ANSI/ANS-3.8.7-1998 – PINS in approval)**
Criteria for Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness at Nuclear Facilities

This standard establishes criteria 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.

***ANS-3.8.10-201x (New standard in development – PINS approved)**
Criteria for Modeling Real-time Accidental Release Consequences at Nuclear Facilities

This Standard establishes criteria for use of meteorological data collected at nuclear facilities or nearby stations to evaluate in real time the atmospheric effects on all anticipated accidental radioactive and hazardous chemical releases during emergencies, inclusive of atmospheric transport and dispersion.

ANSI/ANS-3.11-2005

Determining Meteorological Information at Nuclear Facilities

This document provides criteria for gathering and assembling meteorological information at commercial nuclear electric generating stations, U.S. and Department of Energy / National Nuclear Security Administration nuclear facilities, and other national or international nuclear facilities. Meteorological data collected, stored, and displayed through implementation of this standard are utilized to support the siting, operation, and decommissioning of nuclear facilities. The meteorological data are employed in determining environmental impacts, consequence assessments supporting routine release and design-basis accident evaluations, emergency preparedness programs, and other applications.

***ANS-5.4-201x (Historic revision of ANSI/ANS-5.4-1982; W1993 – Ballot @ NFSC/comment resolutions)**

Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel

This standard provides an analytical method for calculating the release of volatile fission products from uranium dioxide (UO₂) fuel pellets during normal reactor operation. When used with nuclide yields, this method will give the release-to-birth ratio, R/B, or the so-called "gap release," which is the inventory of volatile radioactive fission products that could be available for release from the fuel rod if the cladding were breached. The standard considers high-temperature (up to 2500K) and low-temperature (less than 1000K where temperature-independent processes dominate) releases and distinguishes between short half-life (half-life less than one year) and long-half-life (half-life greater than one year) nuclides. This standard accounts for thermal diffusion and athermal diffusion coefficients that are added together for determining a total R/B ratio.

ANSI/ANS-5.10-1998; R2006

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Airborne Release Fractions at Non-Reactor Nuclear Facilities

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.

***ANS-18.1-201x (Historical revision of ANSI/ANS-18.1-1999; W2009 – PINS approved)**

Radioactive Source Term for Normal Operation of Light Water Reactors

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

***ANS-29.1-201x (Proposed new standard – currently inactive)**

Operational Reactivity Management and Oversight at Light Water, Pressurized Water Power Reactors

This standard provides guidance for PWR operation and reactor engineering staffs regarding the care and prior planning of plant manipulations that can affect reactor reactivity as well as the review, post manipulation, to verify that reactivity performance met expectations and to improve processes and procedures.

***ANS-40.21-201x (New standard in development – PINS in approval)**

Siting, Construction and Operation of Commercial Low Level Radioactive Waste Burial Grounds

This standard provides a matrix of minimum criteria to be met in determining the siting, construction and operation of a commercial low level radioactive waste burial ground. The standard will balance siting (i.e., natural criteria), construction (i.e., engineered safeguards) and operation (i.e., acceptance criteria) to provide a safety matrix that provides for the containment of the facility.

***ANS-40.35-201x (Historical revision of ANSI/ANS-1991; W2001 – PINS to be prepared)**

Volume Reduction of Low Level Radioactive Waste or Mixed Waste

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

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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. **(title/scope from 1991 standard)**

ANSI/ANS-40.37-2009

Mobile Low-Level Radioactive Waste Processing Systems

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.

***ANS-51.10-201x (Revision of ANSI/ANS-51.10-1991; R2002; R2008 – PINS approved)**

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ANSI/ANS-55.1-1992; R2000; R2009

Solid Radioactive Waste Processing System for Light-Water-Cooled Reactor Plants

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 processing 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.

ANSI/ANS-55.4-1993; R1999; R2007

Gaseous Radioactive Waste Processing Systems for Light Water Reactor Plants

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

ANSI/ANS-55.6-1993; R1999; R2007

Liquid Radioactive Waste Processing System for Light Water Reactor Plants

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

***ANS-56.8-201x (Revision of ANSI/ANS-56.8-2002 – PINS approved)**

Containment System Leakage Testing Requirements

This standard specifies acceptable primary containment leakage rate test requirements to assure valid testing. The scope includes 1) leakage test requirements; 2) test instrumentation; 3) test procedures; 4) test methods; 5) acceptance criteria; 6) data analysis; 7) inspection and recording of test results; and 8) definition and determination of Appendix J Pathways.

ANSI/ANS-57.1-1992; R1998; R2005

Design Requirements for Light Water Reactor Fuel Handling Systems

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.

ANSI/ANS-57.5-1996; R2006

Light Water Reactors Fuel Assembly Mechanical Design and Evaluation

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

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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.

ANSI/ANS-57.8-1995; R2005

Fuel Assembly Identification

This standard describes requirements for the unique identification of fuel assemblies utilized in nuclear power plants. It defines the characters and proposed sequence to be used in assigning identification to fuel assemblies. This standard was developed primarily for commercial light-water reactor fuel, but may be used for any reactor fuel contained in discrete fuel assemblies that can be identified with a serial number as specified by this standard.

ANSI/ANS-57.10-1996; R2006

Design Criteria for Consolidation of LWR Spent Fuel

This standard provides design criteria for the process of consolidating light water reactor 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.

ANSI/ANS-58.3-1992; R1998; R2008

Physical Protection for Nuclear Safety-Related Systems and Components

This standard sets forth physical protection criteria for nuclear safety-related systems and components in stations using light water reactors. 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.

ANSI/ANS-58.6-1996; R2001

Criteria for Remote Shutdown for Light Water Reactors

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.

***ANS-58.8-201x (Revision of ANSI/ANS-58.8-1994; R2001; R2008 – PINS Approved)**

Time Response Design Criteria for Safety-Related Operator Actions

This standard establishes time response criteria for safety-related operator actions to be used in the design and evaluation of light water reactor (LWR) nuclear power plants. The criteria are used 1) to determine the minimum response time intervals for safety-related operator actions that are taken to mitigate design basis events (DBEs) and 2) to validate operator actions requirements for DBEs and Special Events

ANSI/ANS-58.9-1981; R1987; R2002; R2009

Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems

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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 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.

ANSI/ANS-58.11-1995; R2002

Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors

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.

***ANS-58.14-201x (Historical revision of ANSI/ANS-58.14-1993;W2003 – ballot @ NFSC/comment resolution)**

Safety and Pressure Integrity Classification Criteria for Light Water Reactors

This standard specifies deterministic criteria for the safety classification of items (i.e., SSCs and parts (including consumables)) in a LWR NPP as either safety-related (Q), supplemented grade (S), or non-safety-related (N). Criteria provide and establish a procurement subclassification within Class Q, called commercial grade (C). In addition, pressure integrity classification criteria provide for the assignment of Classes 1 to 5 to the pressure-retaining portion of items.

***ANS-58.16-201x (New standard in development – PINS in process of reapproval)**

Safety Classification and Design Criteria for Non- Reactor Nuclear Facilities

This standard provides guidance for the safety classification of controls [such as, structures, systems, components (SSCs) and administrative controls] associated with nuclear safety in non-reactor nuclear facilities. This standard provides guidance on how to derive safety functions and the design and operational requirements to satisfy these functions. It also associates the safety classification of controls to engineering (e.g., civil/structural, mechanical, electrical) and programmatic (e.g., QA) classification levels. Finally this standard will define functional and boundary criteria for SSCs.

ANSI/ANS-59.3-1992; R2002

Nuclear Safety Criteria for Control Air Systems

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 applies only to the control air system and does not apply to air-operated devices or the emergency diesel generator starting air system.

ANSI/ANS-59.51-1997; R2007

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Fuel Oil Systems for Safety-Related Emergency Diesel Generators

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.

ANSI/ANS-59.52-1998: R2007

Lubricating Oil Systems for Safety-Related Emergency Diesel Generators

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.