

List of Standards Identified for Advanced Reactors

SDO	Standard No.	Standard Name	Type	Rx Type	Activity	Technical Issues	Priority TWG	Priority NRC	Comments on priority
IEEE	1082	Human Action Reliability Analysis for Nuclear Power Generating Stations.	Revision		THE NEW REVISION WILL BE ADOPTED BY IEC				
IEEE	none yet	Nuclear power plants -- Instrumentation and control important to safety -- Electrical equipment condition monitoring methods. Part 6: Insulation resistance	New		Under project P62582-6				
ANSI/ANS	3.1-2014	Selection, Qualification, and Training of Personnel for Nuclear Power Plants	Revision	SFR	Requirements for experience at a comparable facility and equivalent position will need to be addressed for SRO and RO. Other managerial and staff requirements seem applicable.	SFR: The purpose of this standard is to provide guidance for functional levels and job positions as they exist in the operating organization. Qualification requirements include education, experience, and training. This standard provides qualification guidance to meet the particular organizational needs that are derived from the requirements contained in this standard. Limited Revision			
ASTM	D7167-05	Standard Guide for Establishing Procedures to Monitor the Performance of Safety-Related Coating Service Level III Lining Systems in an Operating Nuclear Power Plant	Revision	SFR	Coating Service Level III lining systems subject to this guide are generally those applied to metal substrates comprising raw water, condensate-quality water, or fuel oil wetted (that is, full or intermittent immersion) surfaces. The establishing procedures to monitor the performance applies to SFRs and the scope should be expanded to include SFRs.	SFR: This guide covers procedures for establishing a program to monitor the performance of Coating Service Level III lining (and coating) systems in operating nuclear power plants. Monitoring is an ongoing process of evaluating the condition of the in-service lining systems. Limited Revision			
NEI	00-04	10 CFR 50.69 SSC Categorization Guideline	Revision	SFR	The process for evaluating and identifying Risk Informed Safety Classifications (RISC) SSCs is applicable to SFRs. The examples are all LWR specific and would have to be updated to provide guidance for SFRs.	SFR: The objective of this regulatory initiative is to adjust the scope of equipment subject to special regulatory treatment (controls) to better focus licensee and NRC attention and resources on equipment that has safety significance. This guideline addresses the use of risk insights to define the scope of equipment that should be subject to NRC special treatment provisions as defined in §50.69. Limited Revision			
ASME	AG-1-2009	Code on Nuclear Air and Gas Treatment	Substantive Revision	SFR	Materials of construction for all components and accessories shall conform to the ASME or ASTM material specifications listed in Table AA-3100. Because of the presence of sodium, the list of allowable materials listed in Table AA-3100 may need to be updated for SFRs. The Process Gas section is incomplete and needs to be completed. The entire section needs to address the use of a cover gas such as helium.	SFR: This Code provides requirements for the performance, design, fabrication, installation, inspection, acceptance testing, and quality assurance of equipment used in air and gas treatment systems in nuclear facilities. The code is divided into the following divisions: Division I: General Requirements Division II: Ventilation Air Cleaning and Ventilation Division III: Process Gas Treatment Division IV: Testing Procedures. Substantive Revision			
ASME	BPVC Div 1,2, Subsection NCA	BPVC Section III-Rules for Constructions of Nuclear Facility Components-Subsection NCA-General Requirements for Division 1 and Division 2	Substantive Revision	SFR	The containment barrier is "...essentially leak-tight..." rather than an "...effective barrier..." to describe a flexible containment function for concepts that may rely on acceptable design condition leak rates.	SFR: The rules of Subsection NCA constitute requirements for the design, construction, stamping, and overpressure protection of items used in nuclear power plants and other nuclear facilities. This Section consists of the three divisions. Substantive Revision			

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ANSI/ISA	67.02.01-2014	Nuclear Safety-Related Instrument Sensing Line Piping and Tubing Standard for Use in Nuclear Power Plants	Substantive Revision	SFR	Pressure and level measurements may use different technologies or apply existing technology in a different manner. Pressure measurements may use impulse lines, bubblers, or use direct measurement sensors. Level measurements may use guided-wave microwave, guided-wave ultrasonic, or heated lance. Temperature alone will require changes to the methodology for pressure and level measurements. Sodium presents problems with visibility and does not boil which will eliminate some measurement techniques.	SFR: Routing of instrument sensing lines in the standard are concerned with water level indication during and after rapid depressurization involving flashing, degassing, or non-condensable gas events has been identified in industry as a concern, specifically in the pressurizer reference legs of PWRs and reactor vessel water level instrumentation of BWRs, and shall be considered. Sensing lines and level measurements will have different fluids and possibly types of sensors. Non-LWRs may also use optical sensors. In an SFR, the RCPB is the primary coolant boundary. Substantive Revision			
ANS	ANS 56.2-1984 (ANSI N271-1976)	Containment Isolation Provisions for Fluid Systems	Substantive Revision	SFR		SFR Gap Analysis			
ANS	ANSI/ANS 6.4-2006	Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants	Substantive Revision	SFR		SFR Gap Analysis			
ASME	ASME BPVC Section III	Rules for Construction of Nuclear Power Plant Components	Substantive Revision	SFR		SFR Gap Analysis			
ASME	ASME BPVC Section III Division 2, 2001 edition through 2003 Addenda	Rules for Construction of Nuclear Power Plant Components	Substantive Revision	SFR		SFR Gap Analysis			
ASME	ASME BPVC Section XI	Rules for Inservice Inspection of Nuclear Power Plant Components	Substantive Revision	SFR		SFR Gap Analysis			
ASME	ASME N509	Nuclear Power Plant Air-Cleaning Units and	Substantive Revision	SFR		SFR Gap Analysis			
ASME	ASME QME-1-2007	Qualification of Active Mechanical Equipment Used in Nuclear Power Plants	Substantive Revision	SFR		SFR Gap Analysis			
ASTM	ASTM D3911-16	Standard Test Method for Evaluating Coatings Used in Light-Water Nuclear Power Plants at Simulated Design-Basis Accident (DBA) Conditions	Substantive Revision	SFR		SFR Gap Analysis			
ASTM	ASTM D7491-08	Standard Guide for Management of Non-Conforming Coatings in Coating Service Level I Areas of Nuclear Power Plants	Substantive Revision	SFR		SFR Gap Analysis			
NEI	NEI 00-01 Rev. 2(b)	Guidance for Post-Fire Safe-Shutdown Circuit Analysis	Substantive Revision	SFR		SFR Gap Analysis			
NEI	NEI 04-02 Rev. 2	Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)	Substantive Revision	SFR		SFR Gap Analysis			
NEI	NEI 08-01 Rev. 5 - Corrected	Industry Guideline for the ITAAC Closure Process under 10 CFR Part 52	Substantive Revision	SFR		SFR Gap Analysis			
NEI	NEI 97-04 Appendix B	Guidelines and Examples for Identifying 10 CFR 50.2 Design Bases	Substantive Revision	SFR		SFR Gap Analysis			
NEI	NEI 99-03	Control Room Habitability Assessment Guidance	Substantive Revision	SFR		SFR Gap Analysis			

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NFPA	NFPA 251	Standard Methods of Tests of Fire Resistance of Building Construction and Materials	Substantive Revision	SFR		SFR Gap Analysis			
Unknown		Intermediate coolant system	New	SFR		SFR-DC 70: Intermediate coolant system			
Unknown		Reactor building design basis	New	SFR		SFR-DC 71: Reactor building design basis			
Unknown		Sodium heating systems	New	SFR		SFR-DC 72: Sodium heating systems			
Unknown		Sodium leakage detection and reaction prevention and mitigation	New	SFR		<p>SFR-DC 73: Sodium leakage detection and reaction prevention and mitigation</p> <p>SFR-DC 73 requires sodium leak detection and mitigation of reactions between sodium and air or concrete in the event of a leak to assure that safety functions of SSCs that could be affected by the leak are maintained.</p> <p>A new standard will be required to define the means to detect sodium leakage in inerted or air environments, the extent to which sodium-air and sodium-concrete reactions are limited and controlled, the degree to which the effects of fires are mitigated, and the means for evaluating the effectiveness of special features or conditions containing sodium to ensure that the safety functions of SSCs important to safety are maintained.</p>			
Unknown		Sodium/water reaction prevention/mitigation	New	SFR		SFR-DC 74: Sodium/water reaction prevention/mitigation			
Unknown		Quality of the intermediate coolant boundary	New	SFR		SFR-DC 75: Quality of the intermediate coolant boundary			
Unknown		Fracture prevention of the intermediate coolant boundary	New	SFR		SFR-DC 76: Fracture prevention of the intermediate coolant boundary			
Unknown		Inspection of the intermediate coolant boundary	New	SFR		SFR-DC 77: Inspection of the intermediate coolant boundary			
Unknown		Primary coolant system interfaces	New	SFR		SFR-DC 78: Primary coolant system interfaces			
Unknown		Cover gas inventory maintenance	New	SFR		SFR-DC 79: Cover gas inventory maintenance			
Unknown		standard for the design and analysis of concrete for passive heat removal systems.	New	SFR		<p>SFR: Higher energy neutrons and photons may affect the characteristics of the concrete. That is, the radiation and thermal environment of SFRs may be different from concrete used for LWR applications and result in different shielding and thermal properties. In addition, changes in the structural characteristics of concrete resulting from the radiation and thermal environment may affect the ability of concrete to meet its structural requirements.</p>			
Unknown		standard based on the review of ASME QME-1, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants." A standard should be developed for the qualification of passive equipment.	New	SFR		<p>SFR: A requirement of the qualification of passive equipment is needed.</p>			
ANS	3.2	Managerial, Administrative, and Quality Assurance Controls for the Operational Phase of Nuclear Power Plants	Revision	MSR		<p>MSR: Modify for typical procedures used by MSRs Referenced by RG 1.33</p>			
ANS	3.5	Nuclear Power Plant Simulators for Use in Operator Training and Examination	Revision	MSR		<p>MSR: Modify so it applies to MSR designs Referenced by RG 1.149</p>			
ANSI/ANS		Decay Heat Power in Light Water Reactors	New	MSR		<p>MSR: Develop standard similar to 5.1-2014 for MSRs Referenced in RG 1.157</p>			

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ANS	6.4	Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants	Revision	MSR		MSRs would utilize an update to this standard New temperature requirements, different spectrum Changes calculation of both dose and concrete thickness Referenced by RG 1.69			
ANS	15 Series	Standards for the Operation of Research Reactors	Revision or New	MSR		Need to be re-examined for applicability to MSRs Referenced by NUREG-1537 Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors			
ANS	20.2	Nuclear Safety Design Criteria and Functional Performance Requirements for Liquid-Fuel Molten-Salt Reactor Nuclear Power Plants		MSR		MSR: Request that NRC endorse this standard Alternative to Appendix A of 10 CFR Part 50 Equivalent of standards referenced in DG-1330 for HTGRs and SFRs			
ASTM	MULTIPLE	Standards related to material coatings	Revision or New	MSR		MSR			
ASTM	MULTIPLE	Standards related to determining physical and chemical properties of molten salts	Revision or New	MSR		MSR: A few exist but at wrong temperature range			
ASTM	MULTIPLE	Standards related to measuring volatiles specific to MSRs (off-gas system)	Revision or New	MSR		MSR			
ACI	MULTIPLE		Revision	MSR		MSR: Likely applicable to MSRs but may require research and testing Higher temperatures Additionally, fast flux and lack of water shielding could change requirements			
ASCE		Seismic standard	New	MSR		Japanese standard JEAG 4614 could be translated and implemented as ASCE standard			