NRC Summary Status of NESCC Activities

Subject Area	Potential issues that might benefit from the development of a standard	What Actions/Discussions have Occurred?	What is status?	Opportunities for a standard	Next Steps (NRC suggestions)	ANS Standards Current Activities and Recommended Role/ Responsible CC/ Author
License Renewal	Light Water Reactor Sustainability (LWRS) Subsequent License Renewal (SLR) Aging management Programs (AMPS)	May 2015 NESCC meeting - Jeremy Busby provided a list of technical areas where standards need to be developed for aging plant monitoring Potential technical areas include: • reactor pressure vessel (ASTM) • thermal aging, core internals, piping (ASME), • environmentally assisted fatigue (ASME and EPRI), • concrete (ACI & AISC), • cable degradation and monitoring, particularly for radiation effects and other environmental factors (IEEE)	The following recommendations were made: <u>Reactor pressure vessel and low-alloy steels:</u> ASTM and ASME should revise existing standards with additional correlations and predictions of: • embrittlement following irradiation, • thermal ageing embrittlement considerations • Methodologies for complex fracture mechanics at locations like, nozzles, etc. *<u>Status:</u>* ASTM revised standards E185, E2215, & E900 in 2015. ASTM committee E10.02 is developing a standard on thermal ageing. ASME is revising Code Case N-830. <u>Piping:</u> ASME should continue their efforts to revise existing standards to consider: • Environmentally-assisted fatigue • Mechanism of crack initiation <u>Concrete:</u> ACI should consider developing standards that address: • ASR (RILEM committee currently working), • Irradiation effects - Possible that research and analysis could rule out this as an age related degradation mechanism that needs to	ASTM – possible standards: • Reactor pressure vessel and low-alloy steels • Piping ASME – possible standards: • Reactor pressure vessel and low-alloy steels • Piping • NDE techniques to better implement AMPs • Environmental specific qualification methodologies for weld repair AWS – possible standard: • Environmental specific qualification methodologies for weld repair ASNT– possible standards: • NDE techniques • NDE techniques to better implement AMPs	**SDO Champions Needed** • Have or will the SDOs publish the standards recommended in the "What is Status?" column? • What is the anticipated publication or completion date? • Will the publication be timely to support subsequent license renewal submissions to be reviewed by the NRC?	There are no current activities ongoing in these areas. However, most of our standards are applicable to the extent that any sustainability program should be based on compliance with the owner/plant committed standards. **LLWRCC** (Stamm/Reuland)

			be addressed in subsequent license renewal , and • Creep - May not be an applicable age related degradation mechanism if licensees can demonstrate that the concreate temperature is maintained at a temperature less than 150F • The NRC reviewed the NESCC Concrete Repair Report and identified 21 new or revised standards (ACI & ASME) - The NRC ranked 10 of the 21 standards identified in the report as high having high significance - Only 4 of the standards are endorsed in NRC Regulatory Guides - The NRC should consider endorsing standards that are of high significance in NRC documents - See Table 1 (separate document) for specific details of NRC review <u>Cables:</u> • IEEE should prepare a standard that defines an acceptable method to estimate the remaining useful life ASME and ASNT (RUL) curves for cables - IEEE standards (Cable qualification and aging standards) that might be affected are: IEEE Std 323 Equipment Qualification, IEEE Std 383 Class 1E Electric Cables, and IEEE P1682 Fiber Optic Cable	ACI – possible standards: • ASR • Irradiation effects • Creep • Published ACI standards identified in the Concrete Report that are not currently endorsed by the NRC recommend where they should be endorsed? IEEE – possible standards: - Estimate remaining cable life ✓ IEEE Std 323 Equipment Qualification ✓ IEEE Std 383 Class 1E Electric Cables ✓ IEEE P1682 Fiber Optic Cable NRC – Actions - The NRC is evaluating ASTM E185 and E2215 for use in 10 CFR 50 Appx. H. - The NRC is reviewing ASTM E900 and may cite it in Regulatory Guide 1.99. - The NRC assesses the need to update its guidance as part of		

			• The NESCC report on cables identified that IEEE 323-203 and 1202-2006 should be endorsed in RGs 1.189 and 1.89 - Based on the 5-year assessment of RG 1.89, the NRC plans to consider endorsement of IEEE 323 – 2003 by December 2016. - The NRC staff plans to revisit the updating of RG 1.189 in the fourth quarter of calendar year 2015. At that time consideration will be given to endorsing IEEE 1202-2006. <u>NDE techniques</u>: ASME and ASNT standards could be developed that use improved NDE methods to better implement Aging Management Programs (AMPs) used by licensees during the supplemental license renewal periods. <u>Mitigation techniques:</u> SDOs could develop standards that mitigate age related degradation; possible standards are: • ASME and AWS qualification methodologies for weld repair that are applicable for the specific environment • IEEE cable rejuvenation	periodic reviews, which includes consideration of anticipated licensing actions that warrant commitment of resources to review new or revised standards.		

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NESCC Task Group Reports	NESCC reports discussed status and needs (concrete, concrete repair, polymer piping, welding, and buried cable)	Concrete Report	Recommendations in the Concrete Report were made to: • Improve the clarity of the documents and minimize real or perceived inconsistencies between documents. • Numerous research recommendations were made can be done to improve cost-effective construction of safe and durable nuclear power plants. • New technologies available in the commercial marketplace (bridges to buildings) should be examined and adopted on a fast track as appropriate for nuclear power plants to increase constructability and reduce costs. • A primary recommendation is that the NRC needs to implement a process to ensure that the most up to date standards and codes available are used in the Regulatory Guides and other documents.	• Revisions to ACI 301, 311, 318, 349, 351, 359, and 447 appear appropriate. The initiation and schedule of this work is unknown. • The status of addressing the ASCI, ASME, and ASCE is unknown nor is it known if these SDOs have assumed ownership of the recommendations provided in the Concrete Report. • EPRI and the NRC are performing research on some of these recommended topics, but a crosswalk map of research and the Concrete Report has not been developed. • The NRC assesses the need to update its guidance as part of periodic reviews, which includes consideration of anticipated licensing actions that warrant commitment of	**SDO Champion Needed or Clarified on portions of the Concrete Report.** **SDO should provide a status on progress and resolution of the Concrete Report recommendations.**	ANS will review its standards to determine which applications should or may use polymer piping. **LLWRCC** (Stamm/Reuland)

		Concrete Repair Report	The Concrete Repair Report provided recommendations that SDOs, NRC and researchers should implement to improve the knowledge related to concrete repair in nuclear power plants. These included: • The NRC should update its regulatory guidance to eliminate obsolete versions of standards • Develop a concrete repair code for nuclear structures, similar to ACI 562 (necessary to define the unique characteristics for repair of nuclear structures) • Perform research on the long term effects of radiation and temperature on concrete • Develop a standardized process for the NRC to implement pre-approved new concrete technologies and materials, similar to that used by the DOT.	resources to review new or revised standards • In the 4th quarter 2016, NRC anticipates issuing a revised RG 1.142 that evaluates the endorsement of ACI 349-2012 • NRC is preparing DG-1304, which uses N690 and N9. The new RG is anticipated to be issued by 3rd quarter 2016 NRC: • The NRC assesses the need to update its guidance as part of periodic reviews, which includes consideration of anticipated licensing actions that warrant commitment of resources to review new or revised standards. • The status of SDO response to the other Concrete Repair Report recommendations is not currently understood, however	**SDO Champion(s) Needed, should develop a crosswalk of SDO Champion and defined actions that address the report recommendations**	

		Polymer Piping Report	• Develop models for prediction of service life or repairs, especially taking into account the interaction with the concrete substrate, are non-existent. Also, there is a need for models for evaluation of remaining service life of a damaged structure. • Develop standard test methods to evaluate a structure for repair, quality control and quality assurance are few or nonexistent. Thus, more research and development on this topic should be fostered. The Polymer Piping Report identified gaps that could be filled: • In some cases, the gaps require only a better specification of procedures to greatly increase the relevance and quality of the existing standard. • In other cases, a program to address gaps in the current understanding of HDPE performance must be addressed through the development of new materials science and measurements. • The PPTG has provided guidelines to address standards gaps and the increased performance requirements for nuclear piping. • The implementation and prioritization should be developed between operators, regulators, and SDO organizations. • This is especially true where the gaps are related to increasing material performance	some activities may be currently implemented as defined in various industry activities. • The ASME and NESCC developed a road map to address NRC concerns • The ASME Code approved Code Case N-755, but the NRC has not fully approved it due to technical concerns. • The NRC has conditionally approved Code Case N-755 with conditions on design, fusion and NDE.	**ASME is the SDO Champion**	

		Welding Report	or acceptance requirements rather than the development of a new standard. • Increases in performance and acceptance requirements are often explicitly stated within the code in order to maintain broad applicability of standards. • This can reduce efficiency since it requires maintenance of a significant database of documents related to specification, design, and quality assurance/quality control. • While this standards review was focused on HDPE piping, the gaps identified should apply to other non-metallic piping materials and systems. • The main lessons learned were that many of the questions developed in a code case can be answered when validated technical data is available to the industry and regulators concerning the specific materials, intended design specifications, and environmental conditions. • This technical data is crucial for the development of the technical basis for design and supporting the development of code requirements. • The best method to generate this data efficiently and in a manner that is accepted by material manufacturers, operators, and regulators is through the development of current and relevant standards. The Welding Report provided the following recommendations: • Harmonize procedures and welder qualifications (ASME & AWS)	The report recommended SDO Champions (ASME or AWS) for each topic. It is unknown if ASME and AWS have accepted the SDO Champion roles and what is the current resolution status of recommendations. • Updates to RGs 1.89 and 1.189 identified in	**SDO Champions are needed**	.

		Cable Report	• Expand the options for welding engineer certification within the U.S. (ASME & AWS) • Expand the personnel certification of welding supervisors (ASME & AWS) • Expand the allowed application of phased array ultrasonic testing (PAUT) inspection within codes (AWS) • Make more repair decisions based on fitness-for-service assessments (AWS & ASME) The Cable report recommended: • Revising RGs 1.89 and 1.189 to incorporate current versions of IEEE standards • Revising RG 1.218 to more clearly distinguish between techniques that can be used to give an indication of the current condition of a cable and those techniques that may be useful for condition-based qualification and projection of life. (Many times the techniques listed find installation damage or poor workmanship of splices and terminations even after years of installation.) • Provide more guidance to existing nuclear plants that are committed to RG 1.131 with regards to applying the requirements of RG 1.211 to their plants for new cables being procured or for life extension applications • Performing research on cable aging, cable aging characterization, LSZH cables, water submersion, activation energy, correlation between accelerated aging conditions and natural aging conditions • Developing definition of low and medium voltage	License Renewal section. • RG 1.131 has been withdrawn and superseded by RG 1.211	**SDO Champion Needed** **Industry Research needed (EPRI or IEEE?)**	**Cable Report:** ANS could contribute to implementing this recommendation in any standard activity that may be proposed by the champions. The integrated decision making process with a performance-based approach being discussed within RP3C could be the contribution from ANS. RP3C (Kadambi)

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Operating Licensed facilities (Reactors and Fuel)	Industry is requesting the use of polymer piping at operating plants
	
	Counterfeit, fraudulent and suspect items (CFSI)
		ASME has a committee that is developing a Code Case on the use of high density polyethylene (HDPE) polymer piping
		
		NRC has internal cross-office committee reviewing needs.
		• Potential technical areas include standards needed to test and confirm parts are not counterfeit
		• May require rulemaking or RG
			Polymer piping
			- ASME ST, LLC took lead for monthly telecons with multiple organizations;
			- EPRI funding research to address roadmap issues
			  - Workshop on an HDPE Roadmap for Current and Future Service (April 2013), EPRI reported that unresolved issues included:
			  - Essential Variables for fusion process
			  - Performance demonstration requirements
			  - Non-Destructive Examination
			  o Requirements for volumetric inspection of joints
			  o Acceptance criteria for volumetric flaws
			  o Qualification requirements for inspection personnel
			
			Beginning in 2009, the staff noted increasing CFSI activity in the industrial (non-nuclear) supply chain. The NRC's Office of the Inspector General (OIG) issued an audit report on September 28, 2010, OIG-10-A-20, "Audit of NRC's Vendor Inspection Program," that referenced many of the same non-nuclear CFSI events that the NRC staff were also monitoring. The OIG audit report recommended that the staff develop a formal agencywide strategy to monitor CFSI.
			
			SECY-15-0003, Staff Activities Related to Counterfeit, Fraudulent, and Suspect Items, document the multi-year effort to detect and prevent counterfeit,
				The ASME and EPRI are leading the effort to develop a basis for incorporation into the ASME Code with a sufficient technical basis that would permit the NRC to endorse the Code Case.
				
				None
					In progress
					Revisions of the ASME Code to adopt Mandatory Appendices and new Code Cases are in development with NRC participation. EPRI and the ASME ST, LLC are providing research results to support the Code development.
					
					Review completed, no further NESCC actions recommended - Completed
						ANS will review its standards to determine which applications should or may use polymer piping.
						LLWR CC
						(Stamm/Reuland)
						
						ANS will review its standards to determine if CSFI needs to be address in it QA standard.
						LLWRCC
						(Stamm/Reuland)

		endorsement to adopt new standards	fraudulent, and suspect items. In a joint effort with NEI and EPRI, a guidance document was developed for use by licensees to aid in preventing the introduction of CFSIs into nuclear facilities. After engaging other Federal agencies, industry organizations, and public stakeholders, the staff developed 19 actions to assess and enhance processes to address counterfeit, fraudulent, and suspect items. The staff presented these actions in SECY-11-0154, which includes information about the staff's use of working groups to identify and assess current practices, evaluate potential vulnerabilities, and develop planned actions. Of these 19 planned actions, 14 have been completed, and the remainder will be completed by December 2018. The NRC staff members participating on the NESCC reviewed the activities discussed above, and, in discussion with other NRC staff involved with the CFSI activities, concluded that identification of needed standards to assist in the prevention of CFSI components is not practical, as unlimited potential CFSI components could exist. Furthermore, most of the test methodologies that might be used for detecting CFSI components at receipt are likely already defined as part of existing manufacturing process and may be already defied in existing standards. The NRC staff therefore concludes that it is not practical to recommend to SDOs which additional standards might be created, as the need cannot be predicted.			

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New Reactors Advanced Reactor Designs	<u>Small Modular Reactors</u> • CORDEL report on SMRs • SMR Roadmap (a.k.a., Strategic gap analysis) led by ASME ST, LLC • IAEA SMR Regulators' Forum	Industry's CORDEL report on SMRs identified areas where there might be shortcomings in the standards used to design and construct SMRs. The ASME SMR Roadmap report was a more in-depth study to identify any potential ASME Codes and Standards issues that may impede the effective and timely SMR licensing. The IAEA SMR Regulators' Forum is similar to the SMR Roadmap process.	The ASME SMR Roadmap report was published in June 2014. Generally, the SMR vendors believe that their designs can comply with current ASME Codes and Standards because they are based on existing and licensed light-water-reactor (LWR) technology. However, this SMR Roadmap discusses Code areas in the ASME Boiler & Pressure Vessel Code (BPVC) and ASME Operation and Maintenance of Nuclear Power Plants Code (OM Code) where potential differences between vendors and NRC regarding the proper interpretation and application these Code requirements may present licensing issues. Particularly, this SMR Roadmap discusses potential issues in these codes. Potential issues that are identified include: Section III: • The acceptability of the Section III fracture toughness requirements exemption (paragraph NB-2311) for small parts used for Class 1 components should be reviewed by the Section III for applicability to SMR designs. • The rules of Subsection NE for the construction of metal containment vessels (Class MC) may need to be revisited for applicability to certain SMR designs. Section XI: • The Section XI Inservice Inspection (ISI) exemption for small Class 1 components and	To address these potential issues, the SMR Roadmap recommends that the vendors more thoroughly evaluate their designs against both BPVC and OM Code, and NRC requirements, and engage the ASME Code Committees early in the process to develop appropriate requirements if issues need resolution. This would provide a technical basis, developed through ASME's American National Standards Institute (ANSI)-approved Code consensus process that could be used to support their positions when engaging with the NRC during the design certification licensing process. In addition, some of these potential issues can be addressed through the development of ASME Code Cases. Currently, Code Cases are being developed that will	**ASME is the SDO Champion** Current status feedback from the ASME is needed to understand the progress being made on its topic.	ANS has 6 standards either issued or underdevelopment related to advanced reactor design. Three of these are directly correlated to the ongoing DOE/NRC program to develop an advanced reactor licensing framework. One is a joint effort between ASME and IEEE related to a categorization and characterization of SSCs. ANS can provide leadership in a number of standards areas related to advanced reactors. **RARCC** (Flanagan)

	Digital instrumentation and Controls (I&C)	May 2015 - Mr. Rich Reister was asked to review the list of I&C areas contained in NESCC 15-0011 and pair them to an	piping should be evaluated by Section XI for their applicability to SMRs. • The inspection of SMR reactor vessels may be problematic in some designs due to compactness of design and limited accessibility. • The soon-to-be-published (2015) Section XI, Division 2, “Reliability and Integrity Management” (RIM) program may benefit SMR ISI programs. However, reliance on the Division 2 methodology might cause an initial delay in the licensing process since it is a new approach to ISI not yet approved by the NRC. • SMR pressure vessels clad on both sides may present issues for application of Section XI, Subsections IWE and NB. OM Code: • Periodic testing requirements of the OM Code presents an issue to the (a) NuScale design, since opening the reactor vessel valves would produce a loss-of-coolant accident, and (b) mPower design, which has an extended fuel cycle. NESCC Identified that current ASME Code is not consistent with the industry request for the NRC to consider a four-year refueling interval for advanced reactor designs. Knowledge of what is occurring in the IAEA SMR Regulators’ Forum is limited. No current status is provided in this analysis.	address SMR extended fuel cycle issues. Sec XI passed Code Case N-842, "Alternative Inspection Program for Longer Fuel Cycles". This addresses the 4 year fuel cycle proposed by industry. As if this date, it is not published by ASME, nor endorsed by the NRC. IEEE – Possible standard	**SDO Champion Needed**	There may be opportunities for ANS to help by addressing issues such as risk-based versus risk-informed considerations relative to regulatory review. Also, this program appears to rely on a “systems-based code” approach that seems to have similarities with the current RP3C proposals.

		appropriate SDO for development (a roadmap).	I&C "Standards" that typically come in the form of "Guides", "Recommended Practices", and "Standards", through: • IEEE (Power Engineering Society, Nuclear Power Engineering Committee and various subcommittees), • American Nuclear Society, and • Periodically, as requested, through the IEC and IAEA (though not formal standards and guides, the "guidance" from IAEA is used by many as standards). Standards could be developed, revised, and maintained using the results of research stemming from our LWRS activities in the following areas: • Main Control Rooms: a) Human Factors Engineering for NPP Control Rooms; b) Methods and Measures for Verification and Validation of Critical Operator Functions in NPP Control Rooms; c) Method(s) for conducting Human Reliability Analysis for Nuclear Power Generating Stations (special emphasis on methods for collecting data from plant simulators) - e.g., updates to IEEE-1082 • Computer based procedures: a) Updates to existing IEEE standard on computer based procedures and IEC standards; b) Perhaps a new standard on "content" management for interchange of data	• Main Control Room • Computer base procedures • Outage Control Centers ISA – Possible standard • Online Monitoring SDO – TBD - Possible standard • Cost Benefit Methods • Digital Architecture		It should also be noted that good coordination is needed to assure that conflicts do not arise with the activity on ANS-3.13 on the Reliability. **Cost Benefit Methods**- ANS would lead the development of standards in this area. RARCC (Kadambi)

			among systems to support computer based systems. • Online Monitoring: a) ISA Standards are needed for online monitoring especially if industry is going to seek regulatory relief for calibration (e.g., extend calibration intervals), inspections, etc. b) This may be the biggest issue for standards in the entire pathway - also, probably the most technically contentious. • Outage Control Centers: a) Most of what is currently envisioned in outage control centers is covered by current standards (e.g., IEC standards for main control centers, IEEE standards on Human Factors engineering, etc.), b) The distributed nature of command and control due to work activities during outages may necessitate some revision to existing standards to account for distributed, asynchronous management of safety-critical activities not currently addressed under existing standards. More informal standards are likely to be developed as well, such as: • Cost Benefit Methods: a) Valuing advanced digital technologies for use in existing nuclear power plants.			

	Multi-National Design Evaluation Program (MDEP) efforts and next steps	No information currently available	i. This would be based on the work that EPRI is doing with Scott Madden and Associates with pilot project technologies at individual utilities. ii. Need to have some peer review and updates to the first applications. iii. This could become a "standard" approach to how the industry values and justifies the benefits of introducing digital technologies into existing plants. • Digital Architecture: a) This work is being done with a group representing a broad cross section of the nuclear industry and will propose a standard set of requirements for digital architectures needed for the Information b) Technology side of the house in order for digital technologies to be deployed in a way that enables them to leverage their potential value in their target settings.		**NRC to Get More Information**	

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Other Topics	Current Fuel Design Advanced Fuel Design	The NRC has written two draft regulatory guide in support of draft rulemaking on 10 CFR 50.46, Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors. _____ All-metal uranium fuel _____ Accident Tolerant Fuel	Draft regulatory guides are publicly available: • DG 1261, Conducting Periodic Testing for Breakaway Oxidation Behavior • DG 1262, Testing for Post Quench Ductility A related rule is being drafted. _____ All-metal uranium fuel is able to operate at lower temperatures and therefore, might be able to operate at higher power levels. Are the existing standards adequate for this development? _____ The DOE was/is performing research on Accident Tolerant Fuel, but this information is not at a mature state to support development of standards	These draft regulatory guides may identify opportunities for consensus standards _____ Unknown _____ The maturity level of this subject is insufficient to develop standards	**SDO Champion Needed** _____ **SDO Feedback Sought** _____ **SDO Feedback Sought**	**Current Fuel Design-** ANS, led by the FWDCC, should have the lead role and be the SDO champion. Between the ANS FWDCC, ANS Fuel and Waste Division, and other fuel design committees in the industry, the two DGs shown will be evaluated to determine standards opportunities. **FWDCC** (Eggett) **Advanced Fuel Design** The ANS Standards FWDCC will have the lead and work with fuel designers including NSSS companies to assess if the fuel was ever evaluated at high power levels and its feasibility for use. **FWDCC** (Eggett)

						Accident Tolerant Fuel The ANS Standards FWDCC will have the lead. This topic will be discussed with a fuel vendor, e.g. Westinghouse and DOE, to evaluate the current status herein stated and make a recommendation regarding the next actions to be taken including the need for standards. **FWDCC** (Eggett)

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Fukushima Related Topics	• Natural external hazards or natural phenomena hazards (NPH) • 10-year probabilistic site re-evaluations • Seismic analysis and design • Multiple-unit staffing	On November 30, 2012, U.S. Nuclear Regulatory Commission (NRC) staff held a public meeting to discuss processes and priorities for development of voluntary consensus standards related to the Fukushima Dai-Ichi nuclear power plant accident. Specifically, the American Nuclear Society (ANS) presented a proposal to develop consensus standards based on Tier 3 Near-Term Task Force (NTTF) recommendations.	Only the issue related to enhanced reactor and containment instrumentation was found to be a good fit to the capabilities and timeframe for consensus standards development. A development timeframe of 3-4 years would support the NRC's NTTF activity schedules.	IEEE – – possible standards: • Future updates of IEEE 497 to address design criteria for severe accident monitoring instrumentation channels would be beneficial to the Industry and the NRC. ASME & ANS - possible standards: • The NRC desires coordination with standards development organizations to develop more generalized approaches for assessing concurrent hazards on Seismically Induced Fires and Floods. ANS – possible standards on: • The ANS could support these activities for improved industry consensus standards	**SDO Champions Needed** By 2016: • Revised IEEE 497 to address design criteria for severe accident monitoring instrumentation channels • ANS develop guidance for Emergency Procedure Guidelines with Severe Accident Management and Extensive Damage Mitigation Guidelines	**Natural Events and Hazards** - ANS currently has a suite of standards related to natural events and hazard and should have the lead in these areas. Some of our ongoing activities are provided below: **Current Activities** **SEI-01: ANS-2.2-2016, "Earthquake Instrumentation Criteria for Nuclear Power Plants" -** Received ANSI certification on July 13, 2016. **HYG-01: ANS-2.8-201x, " Probabilistic Evaluation of External Flood Hazards for Nuclear Facilities"** – in ballot. . **SEI-02: ANSI/ANS-2.23-2016, "Nuclear Plant Response to an Earthquake" --** Issued **SEI-03: ANSI/ANS-2.26-2004(R2010),**

				on Enhanced Reactor and Containment Instrumentation by assisting in the development of consensus standards for severe accident analysis (including the use of best-estimate modeling techniques) to support identification of severe accident equipment needs including instrumentation as well as the analysis and identification of severe accident environment parameters and standardized methods for addressing severe accident equipment survivability analyses. • ANS could also continue to monitor the progress of efforts to integrate Emergency Procedure Guidelines with Severe Accident Management and Extensive Damage Mitigation Guidelines, and from that effort identify any perceived		**"Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design" -** Under revision to integrate and make consistent with other standards. **SEI-04: ANSI/ANS-2.27-2008(R2016), "Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments" --** Issued **SEI-05: ANSI/ANS-2.29-2008(R201x), "Probabilistic Seismic Hazard Analysis"--** in maintenance **ESCC** (Mazzola) **<u>Recommended Roles</u>** **A) Natural external hazards or NPH**: Develop new standards associated with External Man-Made Events (EMMEs) and volcanic and wild land fire hazards. Continue to reaffirm and

				gaps in reactor or containment instrumentation needed by plant operators to effectively transition among the procedures developed out of these guidelines.		revise existing extreme wind, flooding and seismic NPH standards which identify severe accident environment parameters. The standards on seismic instrumentation and response of nuclear facilities to an earthquake should be adopted by DOE in its standards program and by NRC in its regulatory guidance. B) **10-year probabilistic site re-evaluations**: Currently ANS standards HYG-01, SEI-03, SEI-04 and SEI-05 support DOE-STD-1020-2012 and the draft DOE NPH Handbook which provide DOE guidance on 10-year probabilistic site re-evaluations

						for flooding and seismic NPHs. These standards should be adopted by NRC in its regulatory guidance for application to the commercial nuclear industry. **C) Seismic analysis and design**: Coordinate future ANS hydrogeology and seismic subcommittee activities with the American Society of Civil Engineers (ASCE) SDO, in particular with its revisions of flooding and seismic design standards ASCE 7-10 and ASCE 43-05. **D) Develop more generalized approaches for assessing concurrent hazards on seismically-induced fires and floods:** Develop new standards to

						assess hazards associated with concurrent extreme wind, flooding, seismic, volcanic, and wild land fire NPHs. **ESCC** (Mazzola) **Severe Accident Analyses** – ANS has developed a number of standards on accident analysis and would be the logical SDO to lead the effort in this area. **SRACC (Stamm)** **Severe Accident EP** – ANS had developed numerous standards in the area of Emergency Planning and would be the logical SDO to manage this area. **LLWRCC (**Stamm/Reuland)

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Other Topics	EPRI Advanced Nuclear Technologies	At the November 2014 NESCC meeting, EPRI presented a list of its Advanced Nuclear Technology projects (active and planned) cross-walked to where the research results might be adopted by consensus standards. At the May 2015, NESCC meeting, EPRI was asked of it could provide more granularity and identify not only the SDO, but also identify specific standards or committees that might be used to codify the research results.	See attached EPRI table.	Even without the identification of specific standards or committees, SDO could initiate efforts to identify how they might use the research results identified in EPRI's November 2014 presentation.	**SDO Champion Needed**	ANS can champion this effort. ANS has interacted with the EPRI advanced nuclear technologies activities. The EPRI advanced reactors technology leader is on the ANS standards board. RARCC (Flanagan)

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Risk Related Standards	• Safety classifications of systems, structures and components (SSCs) • Reliability Assurance Program (RAP) • Probabilistic Risk Assessment (PRA) • Risk terminology	• ASME and ANS have discussed safety classifications of SSCs, RAP, PRA, risk terminology • ASME and ANS discussed the development of a risk terminology lexicon	• JCNRM to lead • JCNRM or NRMCC to lead	ASME/ANS (JCNRM or NRMCC) – possible standards: • Opportunity for JCNRM or NRMCC to develop risk terminology lexicon	**JCNRM is the SDO Champion**	This topic contains a set of topics. Several of these are assigned to JCNRM and others are managed by other ANS consensus committees. The overall SDO for this area should be ANS which will allocate work to the appropriate consensus committees. **LLWRCC/ RARCC/ RP3C/JCNRM** (Stamm)