NRC Responses to Public Comments

Japan Lessons-Learned Project Directorate Interim Staff Guidance JLD-ISG-2012-01: Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

(Docket ID NRC-2012-0068)

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Table of Contents

I. Introduction 4
II. Description of Types of Comment Submissions 4
Treatment of Late-Filed Comments 4
Unique Comment Submissions 4
Comment Submitter Summary Table 4
III. Overview of Public Comments 5
General Comments on ISG 5
1.0 Evaluation of External Hazards 15
2.0 Phased Approach 16
2.1 Initial Response Phase 18
2.1.1 Duration 18
2.1.2 Command, Control and Communications 19
2.1.3 Initial Operational Actions 21
2.1.4 Initial Damage Assessment 21
3.1 Removal of Decay Heat 23
3.1.1 Engineering Basis for Flow 24
3.1.2 Control of Cool Down/Depressurization Rates 25
3.2 Management of Reactor Coolant System Inventory 27
3.3 Monitoring of Fuel Condition 28
3.4 Human Factors 30
4.0 Spent Fuel Pool Cooling Strategies 31
5.1 Removal of Heat from Containment (Pressure Control) 33
5.2 Hydrogen Control for Protection of Containment Integrity Function 34
6.1 Equipment Protection, Storage, and Deployment 35

6.2 Equipment Quality 38
7.0 Off-site Resources 40
8.0 Strategy Maintenance 41
9.0 Guidance for AP1000 Design 42
10.0 Reporting Requirements 44

I. Introduction

This document presents the U. S. Nuclear Regulatory Commission's (NRC) responses to comments received on the Interim Staff Guidance: Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events. The Interim Staff Guidance (ISG) was published June 7, 2012 (77 FR 33779). The public comment period closed on July 7, 2012.

Comment submissions on this proposed rule are available electronically at the NRC's Electronic Reading Room at http://www.nrc.gov/reading-rm/adams.html. From this page, the public can gain entry into ADAMS, which provides text and image files of NRC's public documents.

This comment resolution document (CRD) is also available electronically at the NRC's Electronic Reading Room under ADAMS Accession No. ML12229A253.

II. Description of Types of Comment Submissions

Treatment of Late-Filed Comments

The NRC determined that it was practical to consider comment submissions received on or before August 7, 2012. The NRC received one comment submission after the July 7, 2012 end of the public comment period, but before August 7, 2012. This CRD provides the NRC's responses to these late-filed comment submissions.

Unique Comment Submissions

The NRC received eight comment submissions including the late-filed submission. The NRC-designated identifier for each unique comment submission, the name of the submitter, the submitter's affiliation (if any), and the ADAMS accession number is provided in Comment Submission Table included in this document.

Comment Submitter Summary Table		
1. Tom Gurdziel tgurdziel@twcny.rr.com ADAMS Accession No. ML12177A379	2. Anonymous ADAMS Accession No. ML12177A380	3. Adrian P. Heymer Nuclear Energy Institute ADAMS Accession No. ML121910390
4. Barbara ONeal Erwin Citizens Awareness Network, Inc. ADAMS Accession No. ML12192A161	5. David White AREVA ADAMS Accession No. ML12192A162	6. Edwin Lyman Union of Concerned Scientists ADAMS Accession No. ML12192A163
7. Michael Corradini American Nuclear Society ADAMS Accession No. ML12192A164	8. Scott A. Bauer Nuclear Energy Institute ADAMS Accession No. ML12221A204	

III. Overview of Public Comments

The NRC received eight comment submissions. Commenters included nuclear utility and generation companies; nuclear industry equipment vendors, industry organizations including Nuclear Energy Institute (NEI); non-governmental organizations; private citizens; and governmental bodies.

Some comments were considered out-of-scope of this ISG because the issue identified is being handled separately from Order EA-12-049. Nonetheless, the NRC has prepared a response for each comment.

General Comments on ISG		
Commenter	**Comment**	**NRC Response**
T. Gurdziel	15 Month Status Report Short term, long term, near term, far term .... after 15 months, does it matter what words are used? I don't think words are as important as progress. So, where are we? Unloading BWR elevated spent fuel pools We need to be able to act quickly to remove all fuel (and other items) that are in the elevated spent fuel pool of an accident-damaged BWR plant. Action taken to date: None Storing the removed fuel pool items We need an (already constructed) off-site place to store the removed fuel, at least for an intermediate time period. Action taken to date: None Finding the reactor core We need to have equipment available to go into the reactor building and primary containment to locate all corium deposits (shortly after an accident.) Action taken to date: Unknown Providing Off (multi-plant) site AC [alternating current] Electric power We need to determine which U.S. multi-plant sites have inadequate offsite power when	These comments are out-of-scope for JLD-ISG-2012-01.

General Comments on ISG		
Commenter	**Comment**	**NRC Response**
	all site plants need off site power at the same time. Action taken to date: None Dose Reduction to the General Public and the Environment We need a PRA to determine if initial accident venting of the BWR Mk I and BWR Mk II primary containments will preserve their long term structural integrity so that they can be flooded up (without leaks) and thus the overall dose to the public is reduced. Action taken to date: Unknown (Did you notice that each item above is or would be applicable to U.S. plants?) So, where do you think we are?	
A. Heymer	The ISG does not clearly delineate between Staff positions, clarifications and exceptions. In some cases it is not clear if there is an exception or clarification. Staff positions should clearly delineate when there is an exception or clarification and when the Staff position is simply acceptance of the industry guidance. Some of the descriptive material contains what could be interpreted to be an exception or clarification but which has not been delineated as such.	The ISG has been modified to clarify staff positions that differ from the endorsed guidance of NEI 12-06.
A. Heymer	ISG Position: Rationale 1.0- Licensees' emergency operating procedures and abnormal operating procedures provide guidance for use during the first phase of response to beyond-design-basis external events. Additional guidance and strategies are necessary for use during the second and third phases of response to such events. Industry Response: The plant emergency operating procedures will be relied upon for command and control throughout the event and will not be limited to use in the initial phase. The industry suggests the following revision to this wording: Licensee's emergency operating procedures will provide command and control in response to beyond-design-basis external events. Additional guidance documents will be developed for deployment of the FLEX strategies in support of the emergency operating procedures.	The staff finds this to be acceptable and has modified the wording of the ISG as suggested.

General Comments on ISG		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: Rationale 3- The specifications of NEI 12-06 for development and implementation of mitigating strategies for beyond-design-basis external events provide a framework and methodology for such strategies to address those events that are not covered within the requirements of 10 CFR 50.54(hh)(2). Industry Response: NEI 12-06 does not address all beyond-design-basis external events that are not covered by 10 CFR 50.54(hh)(2). Only those events of this type that could result in an extended loss of ac power and a loss of normal access to the ultimate heat sink have been addressed. The industry suggests the following change to this paragraph: The ~~specifications~~ guidance of NEI 12-06 for development and implementation of mitigating strategies for beyond-design-basis external events provides a framework and methodology for such strategies to address those events that result in an extended loss of ac power and loss of normal access to the UHS and that are not covered within the requirements of 10 CFR 50.54(hh)(2).	Order EA-12-049 requires in paragraph (1) of Attachments 2 and 3 that licensees and construction permit holders develop and implement guidance and strategies to maintain or restore core cooling, containment and spent fuel pool (SFP) cooling following a beyond-design-basis external event. Paragraph (2) of Attachments 2 and 3 include the requirement that these strategies be capable of mitigating a simultaneous loss of all alternating current (ac) power and loss of normal access to the ultimate heat sink (UHS). The additional requirement of paragraph (2) is not a limitation on the requirements of paragraph (1). The staff declines to make the suggested modification of the rationale because limiting the initiating events for which the guidance and strategies would be considered responsive to simultaneous extended losses of ac power and losses of normal access to the UHS would have the effect of moving away from a symptom-based set of guidance and strategies that would be beneficial to other beyond-design-basis external events (e.g., those that result only in a loss of normal access to the UHS).
B. ONeal	Ref: NRC Docket 07000143; License SNM-124, attention is called to NRC Integrated Inspection Report 70-143/2012-002 and Notice of Violation and Temporary Instruction 2600/015 Inspection Report No. 70-143/2012-006 (ML12122A1 86). See specifically Pages 11 and 12, which addresses Earthquake, Winds, and Floods for this licensee. Earthquake: Licensee located in the Appalachian Tectonic Belt with a Seismic Zone 2	These comments are out-of-scope for JLD-ISG-2012-01.

General Comments on ISG		
Commenter	**Comment**	**NRC Response**
	designation, indicating moderate damage corresponding to Intensity VII on the Modified Mercalli scale. Inspectors reviewed seismic design documentation for the Commercial Development Line and Uranyl Nitrate Bldg. Licensee could not provide seismic design information for Bldg 333 (corresponding to IROFS PREP-A and PREP-B). The sprinkler system in the UNB is designated as IROFS UNB-V. Design specification, Drawing No. 510-UNB-800, "BLEU Conversion Complex Uranyl Niatrate Bldg Fire Protection Plan and Details," Rev. 0 stated, in part, "Piping shall be braced per Zone 2 seismic forces in accordance with NFPA 13." Licensee was unable to provide detail installation documentation for the sprinkler system bracing by the end of the inspection. Wind. Licensee could not provide wind design information for Bldg 333. Flood. Northern portion of NFS site is within the 100-year flood plain of Martin Creek. Facilities on the northern portion of the site are below an elevation of approx 1640 ft. (laboratories and Waste Water Treatment Facility (WWTF)) may experience flooding conditions of 1 to 2 ft. for a 100-yr flood (Dewbey & Davis, Martin Creek Flood Plain, 1997). Operation of the WWTF andlaboratory facility may be affected due solely to the displacement of operating staff. Question compliance with Table 2.2 license application regarding management measures for IROFS PREPA and PREP-B, and if IROFS UNB-V seismic bracing was installed in accordance with NFPA 13 requirements.	
D. White	The Draft ISG should not be extended beyond the scope of those covered by Orders EA-049 and CLI-12-09. Recipients of Orders EA-049 and CLI-12-09 were afforded the opportunity to respond to the bases for the orders; and applicants outside the scope of Orders EA-049 and CLI-12-09 should be afforded the same opportunity. Additionally the draft ISG endorses, with exceptions, the methodologies described in industry guidance document, Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," (NEI 12-06), Revision B1. NEI 12-06 - B1 applies to Licensees, Construction Permit (CP) holders and Combined Operating License (COL) holders. The Draft ISG expands this scope to include nuclear reactor applicants.	The Draft ISG merely provides one acceptable means of meeting the requirements of Orders EA-12-049 and CLI-12-09 [Memorandum and Order, in the Matter of South Carolina Electric & Gas Co. and South Carolina Public Service Authority (Also referred to as Santee Cooper)]. The staff considers that this methodology is acceptable for use with currently licensed power reactors and may be used by applicants to the extent that it is applicable to them, which may depend on the means by which the

General Comments on ISG		
Commenter	**Comment**	**NRC Response**
		requirements are imposed. For example, AP1000 applicants may use the guidance of the appropriate section of the ISG and its underlying document, NEI 12-06, to propose the methods by which they would meet similar or identical requirements, should they be imposed. The Draft ISG does not expand the scope of the requirements.
D. White	The Draft ISG should clearly define performance based acceptance criteria for the three functions in Order EA-12-049 (core cooling, spent fuel cooling and containment). The ISG should accept coping strategies that manage an extended loss of AC power and loss of pumping power from the UHS without meeting entry conditions for Severe Accident Management Guidelines (SAMGs). Instead, the ISG unnecessarily prescribes deterministic surrogates for core cooling, spent fuel cooling and control of containment.	The staff considers that “cooling” and “heat removal” have essentially the same meaning in the context of the ISG. The ISG and the guidance it endorses provide a performance based acceptance criterion of removal of the heat generated for the cooling functions, which would be an acceptable method of meeting the requirements of Order EA-12-049 indefinitely. There may be methods of removing heat that would be adequate as well, and the staff will consider them as alternative approaches on a case-by-case basis. Examples provided are addressed in the appropriate section.
D. White	The Draft ISG and the endorsed NEI guidance use a number of terms, and definitions that remain subject to interpretation: a. The Draft ISG should replace the phrase "loss of power, motive force, and normal access to the ultimate heat sink" with "loss of the ability to transfer heat to the ultimate heat sink". While the Order uses the term 'motive force', AREVA would have asked for clarification if we had been subject to the Order. We believe the term 'motive force' could be improperly construed to include gravity, stored pneumatic energy, or even human energy, thus precluding any mitigating	a. The quoted phrase is used solely in the background section of the ISG, which does not provide any means of meeting the requirements of the Order. While there may be some potential for a reader to improper construe that usage, it is not in an area of the ISG that would impact the methods needed for a licensee to

General Comments on ISG		
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	strategy. b. Other terms and definitions subject to various interpretations include 'robust', 'baseline coping capability', 'onsite FLEX equipment', and 'FLEX capability' (for example, is FLEX capability the capability of baseline coping plus the additional coping possible with FLEX strategies, or just the coping with FLEX strategies alone?)	meet the requirements. The staff declines to modify the language because it accurately reflects the language of the Order. b. NEI 12-06 provides definitions of these terms and phrases in Appendix A, "Glossary of Terms." The staff believes that this provides sufficient clarity for those terms.
D. White	The Significance Determination Process (SDP) associated with this ISG should be developed concurrently with this ISG to ensure focus on the significant inspection characteristics. The SDP should also be offered for public comment.	The staff agrees that it is important to seek stakeholder input in the development of the SDP. This has been a topic of discussion at two public meeting during the ISG development process. The staff is following the SDP development process as laid out in Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Section 07.01, "SDP Development."
D. White	Some Staff positions are overly limited in scope or incomplete. Examples: a. While the ISG is intended to provide 'one acceptable approach' to meeting requirements, alternatives will be evaluated by the Staff on a 'case by case basis'. We believe regulatory efficiencies could be accrued if Staff positions accepted some expected alternatives on a generic basis. For example, one of the methods to provide reasonable protection in NEI 12-06, endorsed by the ISG, is to use design loads based on or evaluated equivalent to a certain ASCE standard. The Staff position should endorse the NEI use of the ASCE standard with the provision that codes that have been previously accepted for establishing building loads for the plant in question should be considered 'equivalent' for the purposes of the ISG. b. Staff positions for Section 5.1 of the ISG are incomplete in that they address only some of the addressee plants. (i.e., a staff position for some BWRs and not others).	a. The staff declines to adopt this proposal. The ISG allows licensees to propose alternatives for the staff to evaluate. However, staff development of alternatives would delay issuance of the ISG. b. Addressed in Section 5.1. c. The electrical distribution may not be relied upon if protected merely to the plant's design basis for a licensee using this ISG and NEI 12-06 to meet the requirements of the Order. This is implicit in the provisions of NEI 12-06 (Section 3.2.2 (13), Appendix C, Appendix D, and Appendix F, Section

General Comments on ISG		
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	c. The ISG should clearly state that the electrical distribution system can be relied upon if protected in accordance with the plant's design basis. d. Staff positions for Section 5.1 of the ISG need to be flexible enough to allow for heat removal methods other than containment spray based on plant features and designs.	F.3 1) regarding contingencies for loss of the electrical distribution system. d. Addressed in Section 5.1.
E. Lyman	The guidance for compliance with Order EA-12-049 is crucially important in determining the ultimate effectiveness of the Order in reducing the severe accident risk at U.S. nuclear power plants and the needless threat that these plants now pose to public health and safety. We agree with Chairman Schultz of the Advisory Committee on Reactor Safeguards' Fukushima Subcommittee that "this is something we need to get right at this time." If the guidance merely serves to rubber-stamp the industry window-dressing exercise known as FLEX, then the NRC will fail to do its duty to protect the public by fully addressing the safety vulnerabilities that were revealed by the Fukushima disaster. UCS has been concerned since late last year that the industry was creating "facts on the ground" when it began to procure equipment to be used for its FLEX strategy not only before the NRC had the opportunity to develop and issue requirements for such equipment, but even before the industry had come up with guidelines of its own. A cynic might interpret this haphazard approach as a "wag the dog" strategy that gave the industry the upper hand in setting the limits of any post-Fukushima regulatory requirements. (The reported cost of $1 to $2 million per plant for the FLEX equipment certainly would appear to be a bargain compared to what major safety upgrades would cost, such as the "hard core" in France.) Unfortunately, we believe that this in fact is what is happening. The NRC has proposed to endorse the NEI FLEX guidance, NEI 12-06 Rev. B 1, with only minor modifications for operating reactor licensees. (For AP1000 combined operating license holders, the NRC is rightly rejecting the industry's outrageous attempt to exempt FLEX equipment from the requirements that would apply at operating reactors.) The ACRS Fukushima Subcommittee pointed out numerous fundamental problems with NEI 12-06 Rev. B I in their June 20, 2012 meeting. We share these concerns and incorporate by reference that discussion in these comments (transcript, ADAMS accession number ML121850321, pages 21-81). We urge the NRC to fully address each instance where the staff told the ACRS that it would "take back" a comment for review.	Responses to the Advisory Committee on Reactor Safeguards (ACRS) comments, which are incorporated by reference as comments of the Union of Concerned Scientists, are addressed in the letter response to the ACRS. Discussions that have not been formally submitted as written comments have not been extracted from the transcript due to their informal nature.
E. Lyman	The boundary conditions to be considered in establishing requirements following	The staff agrees with the discussion of

General Comments on ISG		
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	postulated beyond-design-basis events should be at least as severe as those experienced at Fukushima Daiichi. Otherwise, the NRC cannot claim that it is addressing all the lessons of Fukushima. This means that guidance, strategies and procedures must be developed for mitigating not only a loss of AC power, but also immediate loss of DC power and failure of electrical distribution systems, as occurred at Fukushima Daiichi Units 1 and 2. We note that during an April 24, 2012 public meeting, the NRC staff stated that the guidance needed to address strategies for loss of distribution systems as part of the initiating event (ML12123A162), because the loss of all AC power specified in the Order encompasses a situation with a loss of the distribution system (i.e. it could be part of the reason for the loss of all AC, as was the case at Fukushima), but NEI representatives balked. The draft ISG appears to accept the NEI 12-06 Rev. B I assumption that the distribution system will be available provided it is protected according to the plant's design basis. We note that loss of distribution systems would also affect availability of DC power, even if the batteries themselves were to survive a beyond-design-basis flood; hence we see a need to consider a situation with no DC power as well.	the need to consider the potential for loss of distribution systems that would affect the availability of direct current (dc) power. This need is addressed in NEI 12-06, Section 3.2.2 (13) in the use of portable equipment to locally energize equipment and the use of portable pumps for RPV/RCS/SG makeup. Additionally, NEI 12-06, Appendix C provides for local manual initiation of reactor core isolation cooling/isolation condenser (RCIC/IC) and high-pressure coolant injection (HPCI), and Appendix D provides for local manual initiation of ac-independent auxiliary feedwater/emergency feedwater pumps.
M. Corradini	The American Nuclear Society (ANS) appreciates the opportunity to offer comments regarding guidance being proposed to implement requirements involved in the three Orders and the 10 CFR 50.54(f) letter referred to in the subject press release. The NRC is issuing the additional guidance to support the regulatory review of actions taken by U.S. commercial nuclear power plants responding to requirements deemed necessary as a consequence of information emanating from the Japanese earthquake, tsunami, and plant damage at four Fukushima Dai-ichi units. The ANS is the premier U.S. technical society and Standards Development Organization (SDO) that is responsible to the nuclear industry for consensus standards on siting, design, operations, analytic computations, emergency preparedness, decommissioning and remediation, and spent fuel and waste management. ANS is dedicated to all aspects of nuclear technology and is keenly interested in advancing the cause of nuclear safety by bringing the knowledge made available from the Fukushima accidents into its various activities. The Standards Committee of the ANS in particular, through the efforts of its volunteer experts in developing national consensus standards, can improve the effectiveness of NRC endeavors in learning the lessons from Fukushima. The Orders and letter issued by the NRC for post-Fukushima evaluations were	While the NRC fully supports the development and endorsement of consensus standards, the staff believes that a consensus standard may not offer substantial near-term regulatory value for this particular issue because of the limited time period to address and resolve this issue.

General Comments on ISG		
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	subsequently supported by NRC Draft Guidance Documents. The nuclear industry also developed four documents as implementation guidance as follows: 1. A Nuclear Energy Institute (NEI) document on diverse and flexible coping strategies in the context of Fukushima-like events (NEI 12-06), 2. A NEI document that supports the mandates on reliable spent fuel pool instrumentation (NEI 12-02 [Revision B]), 3. A NEI document on performing walkdowns to verify plant flood protection features (NEI 12-07 [Rev. 0]), and 4. An Electric Power Research Institute (EPRI) document that provides guidance on seismic walkdowns (EPRI Draft Report 1025286). In response to the subject invitation to comment on the proposed staff review guidance, the ANS recommends that the NRC give high priority to enabling appropriate nuclear SDOs to convert the technical content of the above mentioned industry documents into national consensus standards. An appropriate platform to pursue such an action would be the Nuclear Energy Standards Coordination Collaborative (NESCC), of which NRC is a member. The NESCC is co-chaired by the National Institute of Standards and Technology and the American National Standards Institute (ANSI). The NRC has supported the NESCC pursuant to national and policy objectives and has frequently voiced support for consensus standards as ameans of improving the robustness of regulatory documents. It is mentioned in the documents referenced in the subject press release that the interim staff guidance could be converted to more durable regulatory documents such as Regulatory Guides or Standard Review Plan sections. Hence, future regulatory guidance related to the Fukushima incident could then be effectively promulgated in like fashion as national consensus standards. The ANS is an SDO that is accredited under ANSI. ANS standards are widely used within the U.S. as well as internationally in all areas of nuclear science and technology. ANS strongly feels that greater merit must be accorded to voluntary consensus standards in relation to other non-consensus documents. This approach also offers opportunities for "harmonizing" U.S. safety standards with those of international standards-setting bodies such as safety guides issued by the International Atomic Energy Agency and consensus standards issued by the International Organization for Standardization. The approach is also justified by the broader representation of technical capabilities of experts as well as the more unbiased perspectives brought to bear on such standards. The NRC would also be justified to consider the economic factors whereby the professional volunteer efforts (which are an integral part of developing and	

General Comments on ISG		
Commenter	**Comment**	**NRC Response**
	maintaining voluntary consensus standards) are made available to the agency essentially at no cost. The other factors to consider include such qualitative factors as equitable representation of diverse views of standards writers and approvers and the attention to detail that is part of the thorough consensus standard comment and balloting process. The NRC should recognize that the processes that pertain to developing a voluntary consensus standard are analogous to the disciplined approach that agencies themselves require in rulemaking. The ANS Standards Committee stands ready to support the NRC's efforts to implement improvements to safety in light of the knowledge gained from the Fukushima events as well as others such as those at North Anna and Fort Calhoun. We consider this as a vital part of the Society's contributions to overcome the challenges posed by the Japanese earthquake and tsunami, the earthquake in Virginia, and the flooding of the Missouri River in 2011. In proposing that the ANS Standards Committee be charged with supporting the efforts to generate consensus standards from the above mentioned NEI and EPRI documents, we acknowledge the need to include representatives from NRC, NEI, EPRI, as well as other interested parties like owners groups, fabricators, vendors, and nuclear facility operators in the working groups constituted for this purpose. We also recognize that other ANSI-accredited bodies (for example, ASME on construction codes and IEEE for instrumentation) would be involved in executing the consensus standards approach to lessons learned and to future regulatory improvements. All nuclear SDOs and standards supporters mentioned above are currently participants in the NESCC. ANS recommends that this vehicle be used to implement cooperative improvements across the U.S. SDOs and to initiate harmonization with international activities.	
S. Bauer	On behalf of the nuclear industry, the Nuclear Energy Institute (NEI) is providing additional comments on Draft Interim Staff Guidance JLD-ISG-2012-01. These comments are included in Draft Revision 0 of NEI 12-06, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,” dated August 2012. A copy of the document is attached.	The staff considers that this modification to NEI 12-06 adopts the staff’s position relative to evaluation of delivery time for off-site resources, removal of decay heat, evaluation of pump seal leakage with respect to assessed delivery time for reactor coolant system makeup capability, and human factors, and has modified the ISG accordingly.

1.0 Evaluation of External Hazards		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 1.0 (1) Staff Position: Nuclear Energy Institute (NEI) document 12-06, Revision B1, Sections 5.0 through 9.0 and Appendix B provide an acceptable methodology for the evaluation of external hazards with the following clarifications and exceptions: 1. The assessment of external flooding impact in NEI 12-06, Section 6.0 includes considerations that include reference to the design basis flood level. For a multi-unit site or a single unit site in proximity to another licensed site, early site permit, or combined license application, the design basis flood level for storage and deployment of FLEX equipment must include an evaluation of the design basis flood levels established for adjacent licensed sites, early site permits and/or combined license applications. Industry Response: The industry agrees that the design basis flood height used to determine storage of FLEX equipment should consider such information from other sources as noted. Related changes to NEI 12-06 to address this exception: This exception has been addressed in Paragraph 6.2.3.1.1.a of NEI 12-06 as follows: Stored above the flood elevation from the most recent site flood analysis. The evaluation to determine the elevation for storage should be informed by flood analysis applicable to the site from early site permits, combined license applications, and/or contiguous licensed sites.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to consideration of flooding hazards and has modified the ISG accordingly.
E. Lyman	For all reactors where a credible common-cause seismic and flooding event can occur (e.g. upstream dam failures), the mitigations strategies should assume all the potential consequences of this event as its initial condition.	The staff declines to include this proposal in the ISG.. That hazard had been separately prioritized in SECY-11-0137 as a Tier 3 action item, with direction to initiate a PRA methodology to evaluate potential enhancements to the capability to prevent or mitigate the hazard as a Tier 1 activity, with implementation remaining in Tier 3.

2.0 Phased Approach		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 2.0 The NRC staff recognizes that for certain beyond design-basis-events, the damage state could prevent maintenance using the equipment intended for particular phases; in such circumstances prompt initiation of the follow-on phases to restore core and SFP cooling and containment functions is appropriate. Industry Response: The subject sentence could imply that deviations from the damage state assumed in the initial conditions could be successfully mitigated by accelerating the implementation of later phases of the FLEX strategies. This may not be sufficient to restore the safety function in all cases. The industry proposes the following changes to this ISG wording: The NRC staff recognizes that for certain beyond-design-basis-external events, the damage state could prevent maintenance of key safety functions using the equipment intended for particular phases; in such circumstances prompt initiation of the follow-on phases ~~to restore core and SFP cooling and containment functions~~ is appropriate.	The staff agrees to and has inserted the phrase “of key safety functions” as suggested. The staff declines to make the remainder of the suggested modifications because the potential for unsuccessful restoration of the safety functions is fully recognized in the ISG in the discussion of the need for monitoring for imminent or actual fuel damage to determine if transition to the Severe Accident Management Guidelines (SAMGs) is appropriate.
A. Heymer	ISG Position: 2.0 Staff Position: NEI 12-06 provides an acceptable method for developing the phased approach required by Order EA-12-049. Guidance and strategies developed using NEI 12-06 must provide a means to monitor for imminent or actual core damage as an input into the decision to manage the response to the event within those guidance and strategies or shift the management to the SAMGs. Industry Response: The industry agrees that the minimum set of instrumentation needs to provide a means to monitor for imminent or actual core damage for decision-making purposes. Related changes to NEI 12-06 to address this exception: Section 3.2.1.10 of NEI 12-06 was modified as follows to incorporate this clarification: Actions specified in plant procedures/guidance for loss of ac power are predicated on use of instrumentation and controls powered by station batteries. In order to extend battery life, a minimum set of parameters necessary to support strategy implementation should be defined. The instrumentation must be able to demonstrate the success of the	The staff considers that this modification to NEI 12-06 adopts the staff’s position relative to monitoring for imminent or actual core damage and has modified the ISG accordingly.

2.0 Phased Approach		
Commenter	**Comment**	**NRC Response**
	strategies at maintaining the key safety functions as well as provide a means to monitor for imminent or actual core damage to facilitate a decision to manage the response to the event within the Emergency Operating Procedures and FLEX Support Guidelines or within the SAMGs. The plant-specific evaluation may identify additional instrumentation that is needed in order to support key actions identified in the plant procedures/guidance (e.g., isolation condenser (IC) level), or to indicate imminent or actual core damage.	

2.1 Initial Response Phase		
Commenter	**Comment**	**NRC Response**
2.1.1 Duration		
A. Heymer	ISG Position: 2.1.1(1) An element of a set of strategies to maintain or restore core and SFP cooling and containment functions includes knowledge of the time for which a licensee can withstand challenges to these key safety functions using installed equipment during a beyond- design-basis external event. This knowledge provides an input to the choice of storage locations and conditions of readiness of the equipment required for the follow-on phases. This duration is related to, but distinct from the specified duration for the requirements of 10 CFR 50.63 because it represents the current capabilities of the licensee rather than a required capability. Industry Response: This exception addresses the need to identify in a timely manner when a station blackout (SBO) event has become an extended loss of ac power (ELAP) event in order to ensure that actions to maintain or restore key safety functions are taken consistent with the timelines of the ELAP analyses for the initial response phase. Related changes to NEI 12-06 to address this exception: The Caution box under subparagraph (1) of Section 3.2.2 has been removed and additional guidance added as follows: While initial actions following the event may initially focus on restoration of ac power to essential loads, procedural guidance needs to assure a timely decision is made on whether or not the beyond design basis (BDB) external event (BDBEE) has resulted in a SBO condition that is an ELAP. This is an important decision to ensure that actions to maintain or restore key safety functions are taken consistent with the timelines of the ELAP analyses for the initial response phase.	The staff agrees that the removal of the reference to a licensee's SBO coping period is appropriate, but retains the discussion of ISG Staff Position 2.1 in order to provide a clear criterion for use in operators' decisions on initiation of the transition phase of the mitigating strategies.
A. Heymer	ISG Position: 2.1.1 (1) In addition, licensees must 1) account for the SFP cooling function, which is not addressed by 10 CFR 50.63, and 2) assume the non-availability of alternate ac sources, which may be included in meeting the specified durations of 10 CFR 50.63. Industry Response: The additional capabilities required by Order EA-12-049 described	The intent of this sentence was to provide further clarification of the differences between the specified duration of 10 CFR 50.63 and the ELAP coping capabilities responsive to Order EA-12-049. This has been clarified in the ISG by combining this

2.1 Initial Response Phase		
Commenter	**Comment**	**NRC Response**
	in these two sentences are addressed in the guidance of NEI 12-06 and, as such, are not considered to be exceptions or clarifications to that guidance.	sentence with the prior one.
E. Lyman	Although we agree that the timelines for the three-phase approach should be site-specific and determined through analysis, we believe that minimum times for each phase should be established. In our comments on the Advance Notice of Proposed Rulemaking for the station blackout rule (SBO ANPR), we propose a minimum coping time of 24 hours for the first phase (installed equipment) and 7 days for the transition phase. We recommend the same durations be adopted here.	The staff declines to include minimum coping times in the ISG since they were not required as part of Order EA-12-049. The staff will consider this comment as part of the rulemaking effort discussed.
2.1.2 Command, Control and Communications		
A. Heymer	ISG Position: 2.1.2 In order to address the potential impacts on communications external to the plant, an adequate strategy for mitigation of a beyond-design-basis external event shall include the following: 1. Pre-planned mustering to organize available resources 2. Pre-planned on-site and off-site communication alternatives 3. Identification of available communication resources given the potential for damage beyond the site 4. Definition of the command and control structure taking into account potential casualties affecting its normal state 5. Guidance for notification of off-site responders, to include a. Utility emergency response organization (ERO) b. Local law enforcement agencies (LLEA) c. Local fire departments d. Off-site entities supplying equipment and consumables necessary for the indefinite sustainment of key safety functions Industry Response: Unlike the strategies for losses of large areas of the plant due to explosions or fire where normal procedures and command and control structures are assumed to not be available, the FLEX strategies in NEI 12-06 assume the normal procedures and command and control structures remain viable. These procedures and structures accomplish items 1, 4 and 5 noted in this exception. Assembly and accountability for personnel on the site is accomplished as part of activation of the emergency plan. Emergency Operating and Emergency Response Organization	Order EA-12-049 requires the development, implementation and maintenance of guidance and strategies following a beyond-design-basis external event. Such an event is not limited to those that leave the normal command and control structures viable. However, the staff considers that this modification to NEI 12-06 adopts the staff's position relative to command, control and communications and has modified the ISG accordingly.

2.1 Initial Response Phase		
Commenter	**Comment**	**NRC Response**
	procedures provide the structure for command and control of plant activities as well as on-site and off-site communications. Recommendation 9.3 of the NRC's Near-Term Task Force Report addresses, in part, the need for communication capability following a loss of all ac power, including widespread infrastructure damage. NEI 12-01, Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities was developed in response to Recommendation 9.3 and adequately addresses items 2 and 3 noted in this exception. NEI 12-01 has been endorsed by the NRC as an acceptable means for implementing Recommendation 9.3. Related changes to NEI 12-06 to address this exception: The following paragraph was added to Section 3.2.2: The overall plant response to an ELAP and LUHS will be accomplished through the use of normal plant command and control procedures and practices. The normal emergency response capabilities will be used as defined in the facility emergency plan, as augmented by NEI 12-01, Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities. As described in Section 11.4, the plant emergency operating procedures (EOPs) will govern the operational response. This ensures that a symptom-based approach is taken to the response, available capabilities are utilized, and control of the plant is consistent with EOP requirements, e.g., control of key parameters, cooldown rate, etc. The FLEX strategies will be deployed in support of the EOPs using separate FLEX Support Guidelines (FSGs) that govern the use of the portable FLEX equipment in maintaining or restoring key safety functions.	

2.1 Initial Response Phase		
Commenter	**Comment**	**NRC Response**
2.1.3 Initial Operational Actions		
A. Heymer	ISG Position: 2.1.3 Staff Position: NEI 12-06 provides an acceptable method for development of initial operator actions to address a beyond-design-basis external event. Industry Response: No exception noted.	The staff has deleted Section 2.1.3 from the ISG.
2.1.4 Initial Damage Assessment		
A. Heymer	ISG Position: 2.1.4 Staff Position: The general criteria and baseline assumptions of NEI 12-06 provide an appropriate starting point for the establishment of an adequate set of strategies for mitigating the effects of a beyond-design-basis external event. Due to the fundamentally unbounded nature of such an event, however, it is necessary to verify that the initial conditions of the event conform to these assumptions in order to determine whether to implement these strategies or rely on other guidance such as SAMGs or extensive damage mitigation guidelines. Therefore, an adequate set of strategies will include: 1. Assessment of the reactor and core cooling systems. 2. Assessment of containment and containment cooling and pressure control systems. 3. Assessment of emergency core cooling systems. 4. Assessment of SFP and SFP cooling systems. 5. Assessment of key support systems such as a. Electrical power b. Cooling water c. Control air 6. Assessment of key buildings. Industry Response: Unlike the strategies for losses of large areas of the plant due to explosions or fire where normal procedures and command and control structures are assumed to not be available, the FLEX strategies in NEI 12-06 assume the normal procedures and command and control structures remain viable. These procedures and structures accomplish items 1 through 5 noted in this exception. Emergency Operating procedures are symptom-based and do not burden operators with "assessments" that are not essential to event response. Impacts to critical safety equipment as a result of the event will be determined through the existing procedure steps, while ensuring those actions that are critical to performing the required safety	Order EA-12-049 requires the development, implementation and maintenance of guidance and strategies following a beyond-design-basis external event. Such an event is not limited to those that leave the normal command and control structures viable. However, the staff considers that this modification to NEI 12-06 adopts the staff's position relative to the need for initial damage assessment and has modified the ISG accordingly.

2.1 Initial Response Phase		
Commenter	**Comment**	**NRC Response**
	functions are prioritized. Similarly, other site impacts as a result of an external hazard would be addressed according to plant priorities and resource availability. Related changes to NEI 12-06 to address this exception: The following revision was made to the introductory paragraph of Section 3.2.1.7: Event response actions follow the command and control of the existing procedures and guidance based on the underlying symptoms that result from the event. The priority for the plant response is to utilize systems or equipment that provides the highest probability for success. Other site impacts as a result of the event would be addressed according to plant priorities and resource availability.	

3.1 Removal of Decay Heat		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 3.1 Core cooling strategies must be capable of removing decay heat that is expected for the conditions when the strategy will be implemented. Temperature of the make-up water for the determination of the required flow rate shall be selected at a conservative value representing the range of expected temperatures for the make-up source. Should the mechanism for removal of decay heat include the removal of water or steam from the reactor coolant system (RCS) or secondary inventory, a conservative value representing its expected temperature and pressure will be used. Industry Response: The industry agrees that core cooling strategies must be capable of removing decay heat that is expected for the conditions when the strategy will be implemented. The two examples provided, however, speak of the selection of conservative values for plant parameters associated with the determination of decay heat removal requirements. In keeping with other beyond-design-basis analyses, the analyses of plant response will be performed based on nominal or best-estimate plant conditions. Related changes to NEI 12-06 to address this exception: The following paragraph was added to 3.2.1.1 to clarify this general requirement: The conditions considered herein are beyond-design-basis. Consistent with other beyond-design-basis analyses, it is appropriate to base any analyses of plant response on nominal or best estimate plant conditions, e.g., tank levels, flows, temperatures, etc.	While the conditions considered for Order EA-12-049 are beyond the design bases, it is necessary to perform reasonable calculations using bounding inputs in order to size or set the capabilities of the equipment used to mitigate the challenges to core cooling. Such calculations are not beyond-design-basis analyses, but instead are a part of the equipment design and procurement process. The use of a “best estimate” or nominal value for plant conditions could result in equipment being incapable of performing its intended function. For example, the use of a nominal or “best estimate” for temperature of make-up water would effect the heat balance in a determination of how much heat would be removed by use of that water should the water source be at a higher temperature that is within the expected range of temperatures for that source of water. The staff disagrees with the added paragraph, but notes that it has been removed from later versions of NEI 12-06.

A. Heymer	ISG Position: 3.1 Staff Position: An adequate core cooling strategy shall be capable of removing decay heat from the core during the time it is expected to be used. For the initial phase, an evaluation should be performed assuming a loss of all ac power occurs while the reactor is operating at 100 percent rated thermal power and has been at this power for at least 100 days. Based upon the capability and duration of the initial phase to maintain or restore core cooling following such an event, the capabilities of the transition phase strategies should be determined. Industry Response: The industry agrees that the power history should stipulate the plant at 100 percent rated thermal power and has been at this power for at least 100 days. Related changes to NEI 12-06 to address this exception: Changed 3.2.1.2 to read as follows: Prior to the event the reactor has been operating at 100 percent rated thermal power for at least 100 days or has just been shut down from such a power history as required by plant procedures in advance of the impending event.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to the limiting power history at event initiation for determination of the decay heat load and has modified the ISG accordingly.
3.1.1 Engineering Basis for Flow		
A. Heymer	ISG Position: 3.1.1 Staff Position: Licensees shall have an engineering basis that provides reasonable assurance that the intended flow rate is adequate and can be provided. The basis should be auditable, but does not have to be a quality related calculation. However, licensees should ensure that the analytical method used has sufficient justification so as to provide reasonable assurance that all relevant physical phenomena are appropriately modeled. Licensees and applicants should consider the following factors that can affect the ability to provide the specified flow for the required period of time. Industry Response: The industry agrees the engineering basis should include the stated factors. Related changes to NEI 12-06 to address this exception: Section 11.2 changed to include the specific factors as follows: a. The basis for designed flow requirements should consider the following factors:	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to the engineering basis for flow and has modified the ISG accordingly.

	i. Pump design output performance (flow/pressure) characteristics. ii. Line losses due to hose size, coupling size, hose length, and existing piping systems. iii. Head losses due to elevation changes, especially for spray strategies. iv. Back pressure when injecting into closed/pressurized spaces (e.g., containment, steam generators). v. Capacity and availability of the suction sources needs to be considered given the specific external initiating events (condensate storage tank (CST)/refueling water storage tank (RWST)/circulating water basin/fire main/city water supply/lake/river, etc.) to provide an adequate supply for the pumps (fire engines, portable pumps, fire protection system pumps, etc.). vi. Potential detrimental impact on water supply source or output pressure when using the same source or permanently installed pump(s) for makeup for multiple simultaneous strategies. vii. Availability of sufficient supply of fuel onsite to operate diesel powered pumps for the required period of time. viii. Availability of an adequate and reliable source of electrical power to operate electric powered pumps for the required period of time. ix. Potential clogging of strainers, pumps, valves or hoses from debris or ice when using rivers, lakes, ocean or cooling tower basins as a water supply.	
3.1.2 Control of Cool Down/Depressurization Rates		
A. Heymer	ISG Position: 3.1.2 Staff Position: While the strategy must be capable of removing expected decay heat, a means of controlling the degree and rate of cool down/depressurization must be provided. Industry Response: Related changes were made to NEI 12-06 to address this exception: The following was added to the introductory material in Section 3.2.2:	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to the control of cool down/depressurization rates and has modified the ISG accordingly.

	The overall plant response to an ELAP and LUHS will be accomplished through the use of normal plant command and control procedures and practices. The normal emergency response capabilities will be used as defined in the facility emergency plan, as augmented by NEI 12-01, Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities. As described in Section 11.4, the plant emergency operating procedures (EOPs) will govern the operational response. This ensures that a symptom-based approach is taken to the response, available capabilities are utilized, and control of the plant is consistent with EOP requirements, e.g., control of key parameters, cooldown rate, etc. The FLEX strategies will be deployed in support of the EOPs using separate FLEX Support Guidelines (FSGs) that govern the use of the portable FLEX equipment in maintaining or restoring key safety functions.	
D. White	Staff positions should not unnecessarily complicate coping strategies by requiring control of variables within normal or even emergency operating bands if this is not actually essential to meet the acceptance criteria for very low probability BDBEEs. An example of this is the Staff position in section 3.1.2 requiring control of makeup/bleed down rates. This may not be needed by all coping strategies for all plants and could serve as a distraction from meeting the essential safety functions.	The control of variables within bands that have been previously approved for use in similar situations is appropriate and would be an acceptable approach to meet the requirements of Order EA-12-049, as proposed in NEI 12-06. Control of variables outside of these bands would require proposal of an alternative approach to meeting the requirements of the Order. The staff declines to formulate acceptance alternate approaches to meeting the requirements of the Order, but will consider them on a case-by-case basis.

3.2 Management of Reactor Coolant System Inventory		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 3.2 The capability to provide make-up water shall be maintained on-site unless site-specific expected leakage rates demonstrate that management of RCS inventory can be accomplished through management of cool down/depressurization rates until off-site resources can be delivered and installed to provide the necessary RCS make-up water. Industry Response: No exception or clarification noted.	The staff considers that the staff position in Section 3.2 of the draft ISG provided clarification that the use of Low Leak reactor coolant pump (RCP) Seals rather than providing an on-site reactor coolant system (RCS) make-up capability as specified by NEI 12-06 Table 3-2 must be justified by demonstrating that site-specific expected leakage rates allow management of RCS inventory prior to delivery and installation of an off-site make-up capability. As this staff position was adopted in NEI 12-06, Revision 0, Section 3.2 has been deleted from the ISG.

3.3 Monitoring of Fuel Condition		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 3.3 Core cooling strategies must provide a means to detect imminent or actual core damage and control venting/bleeding in order to allow appropriate control of radiological releases and initiation of SAMGs. Staff Position: Monitoring for imminent core damage is necessary in order to allow for control of radiological releases. Monitoring for actual core damage is necessary in order to determine whether exit criteria for the core cooling strategies and entrance criteria for the SAMGs have been met. If these criteria have been met, licensees shall manage the accident response following the SAMGs. Industry Response: The industry agrees that the minimum set of instrumentation needs to provide a means to monitor for imminent or actual core damage for decision-making purposes. Related changes to NEI 12-06 to address this exception: Section 3.2.1.10 of NEI 12-06 was modified as follows to incorporate this clarification: Actions specified in plant procedures/guidance for loss of ac power are predicated on use of instrumentation and controls powered by station batteries. In order to extend battery life, a minimum set of parameters necessary to support strategy implementation should be defined. The instrumentation must be able to demonstrate the success of the strategies at maintaining the key safety functions as well as provide a means to monitor for imminent or actual core damage to facilitate a decision to manage the response to the event within the Emergency Operating Procedures and FLEX Support Guidelines or within the SAMGs. The plant-specific evaluation may identify additional instrumentation that is needed in order to support key actions identified in the plant procedures/guidance (e.g., isolation condenser (IC) level), or to indicate imminent or actual core damage.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to monitoring for imminent or actual core damage and has modified the ISG accordingly.

3.3 Monitoring of Fuel Condition		
Commenter	**Comment**	**NRC Response**
E. Lyman	Mitigation strategies must also address scenarios in which core damage occurs and hence should also address the transition between the procedures for implementing the mitigation strategies and the Severe Accident Management Guidelines (SAMGs), as well as the adequacy of the SAMGs themselves. The current FLEX guidance considers only the prevention of core damage and ignores the very important complications that would arise if core damage could not be prevented.	The staff agrees with this comment and notes that this has been incorporated into NEI 12-06 and requires no modifications to the ISG.

3.4 Human Factors		
Commenter	**Comment**	**NRC Response**
Anonymous	The Mitigation Strategies must be able to be implemented without reguards to site conditions such as, high winds, flooding, extreme temperatures, ice, rain, snow, fog, lighting, dust and smoke.	Section 3.4 of the draft ISG provided a performance based approach to this comment, specifying that licensees shall ensure component accessibility and marking support timely and reliable operation. This staff position was adopted in NEI 12-06 and the ISG was modified accordingly.
A. Heymer	ISG Position: 3.4 Staff Position: Licensees shall ensure that component accessibility and marking supports timely and reliable operation given the potential unavailability of installed plant lighting and potentially high ambient temperatures and humidity. Industry Response: No exception or clarification noted.	The staff considers that later modifications to NEI 12-06 adopt the staff position of the draft ISG, Section 3.4, and the staff has modified the ISG accordingly.

4.0 Spent Fuel Pool Cooling Strategies		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 4.0 (1) Fire protection ring header limitation Industry Response: Related changes were made to NEI 12-06 to address this exception: The following was added to Section 3.2.1.3: Reliance on the fire protection system ring header as a water source is acceptable only if the header meets the criteria to be considered robust with respect to seismic events, floods, and high winds, and associated missiles.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to the availability of the fire protection ring header and has modified the ISG accordingly.
A. Heymer	ISG Position: 4.0 (2) The minimum SFP make-up capacity must be capable of compensating for boil off due to the design basis heat load for the SFP. Industry Response: Related changes were made to NEI 12-06 to address this exception: The following change was made to Section 3.2.1.6: (4) SFP heat load assumes the maximum design basis heat load for the site. Corresponding changes were made to Tables C-3 and D-3.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to the availability of the SFP heat load and has modified the ISG accordingly.
A. Heymer	ISG Position: 4.0(3) Shared SFPs minimum spray is "per unit" Industry Response: Related changes were made to NEI 12-06 to address this exception: Tables C-3 and D-3 were revised to stipulate SFP spray capacities were "per unit."	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to the SFP spray flow rates and has modified the ISG accordingly.
D. White	The Draft ISG requires spent fuel pool cooling rather than maintaining adequate heat removal from the spent fuel in the pool.	The ISG does not propose to require any specific form of spent fuel pool (SFP) cooling. Instead, it endorses the NEI 12-06 guideline for a means to accomplish the maintenance or restoration of SFP cooling using

4.0 Spent Fuel Pool Cooling Strategies		
Commenter	**Comment**	**NRC Response**
		makeup or spray to the SFP. The makeup portion of this supports heat removal through the removal of water from the SFP through evaporation or boiling while the spray portion supports direct heat removal from the fuel elements in the event of an inability to maintain SFP level.

5.1 Removal of Heat from Containment (Pressure Control)		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 5.1 Staff Position: For boiling-water reactors (BWRs) with Mark I and Mark II containments only; licensees shall provide a power-independent means to remove heat from containment by locally opening containment vent pathways using criteria developed in response to Order EA-12-050. Staff Position: For PWRs only; NEI 12-06 provides an acceptable method to develop strategies and guidance for removal of heat from containment. Industry Response: No exceptions noted in the two Staff Positions.	The staff notes that this staff position has been adopted in a later revision to NEI 12-06 and has modified the ISG accordingly
D. White	Some Staff positions are overly limited in scope or incomplete. Examples: b. Staff positions for Section 5.1 of the ISG are incomplete in that they address only some of the addressee plants. (i.e., a staff position for some BWRs and not others). d. Staff positions for Section 5.1 of the ISG need to be flexible enough to allow for heat removal methods other than containment spray based on plant features and designs.	b., d. Section 5.1 of the ISG has been modified to reflect adoption of the staff positions in NEI 12-06, which addresses these comments.

5.2 Hydrogen Control for Protection of Containment Integrity Function		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 5.2 Staff Position: Licensees with installed hydrogen igniters shall develop and maintain strategies to provide alternative power from generating equipment independent of the safety-related on-site power sources to supply electricity to one train of hydrogen igniter equipment. Independent alternative power generating equipment shall be accessible and capable of installation in the transition phase. Industry Response: Related changes were made to NEI 12-06 to address this exception: Section 3.2.2(15) was added to read as follows: Procedures/guidance for units with BWR Mark III and PWR Ice Condenser containments should address the deployment of portable power supplies for providing backup power to the containment hydrogen igniters, including a prioritization approach for deployment. Hydrogen igniters support maintenance of containment integrity following core damage. While the FLEX strategies are focused on prevention of fuel damage, the igniters need to be in-service prior to significant hydrogen generation due to fuel damage in order to be effective. However, in the extreme conditions postulated in this guidance, a prioritization approach should be outlined to support onsite staff decision-making on whether resources should focus on deployment of FLEX capabilities for fuel damage prevention versus for containment protection following fuel damage. For example, if there are indications that installed equipment reliability is compromised by the beyond-design-basis condition, then a priority might be placed on re-powering the hydrogen igniters. Similarly, if the plant staff determines that the installed plant equipment is functioning well, then priority could be given to deployment of coping equipment. Corresponding changes were made to Tables 3-1, C-2 and D-2	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to hydrogen control for protection of containment integrity and has modified the ISG accordingly.
E. Lyman	We strongly support the staff position that reliable backup power for hydrogen igniters for ice condenser PWRs and Mark **III** BWRs be incorporated into the mitigation strategies for both the initial and transition phases. The current voluntary initiative simply does not provide the level of assurance that is needed for maintaining the crucial containment integrity function. As UCS has repeatedly pointed out to the Commission, this should have been made a regulatory requirement long ago.	The staff agrees with this position. The staff notes that this approach has been incoporporated into NEI 12-06 and the staff has modified the ISG accordingly.

6.1 Equipment Protection, Storage, and Deployment		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 6.1 Storage locations chosen for the equipment must provide protection from external events as necessary to allow the equipment to perform its function without loss of capability. For example, if the evaluation of external hazards shows that it is appropriate to install connections for the equipment at a specific height above the design flood level for the plant, then the equipment should be stored in locations that are at or above that level. In addition, the licensee must provide a means to bring the equipment to the connection point under those conditions in time to initiate the strategy prior to expiration of the estimated capability to maintain core and spent fuel pool cooling and containment functions in the initial response phase. Industry Response: ISG position is that there are no issues with equipment storage provisions, however, the highlighted words saying the equipment should be stored above the flood elevation are not in agreement with wording in NEI 12-06. Per NEI 12-06 equipment can be stored below the flood elevation for slow developing flood scenarios if time is available and plant procedures /guidance address the needed actions to relocate the equipment. The industry suggests the following revision to this wording: Storage locations chosen for the equipment must provide protection from external events as necessary to allow the equipment to perform its function without loss of capability. ~~For example, if the evaluation of external hazards shows that it is appropriate to install connections for the equipment at a specific height above the design flood level for the plant, then the equipment should be stored in locations that are at or above that level.~~ In addition, the licensee must provide a means to bring the equipment to the connection point under those conditions in time to initiate the strategy prior to expiration of the estimated capability to maintain core and spent fuel pool cooling and containment functions in the initial response phase.	The staff considers this suggested modification to be appropriate and has updated the ISG accordingly.
E. Lyman	The ISG requires licensees to provide a "demonstration of how strategies will be implemented in all modes" and a "demonstration of the necessary procedures, guidance, training, acquisition, staging or installation of equipment needed for the strategies …". This begs the question of what will constitute an adequate "demonstration." UCS has maintained all along that a credible demonstration must involve the development of a baseline set of beyond-design-basis scenarios and a detailed evaluation of the multiple success paths proposed for each scenario, considering the potential site conditions as	The staff declines to make changes as a result of this comment. The staff considers a symptom-based approach to the development of mitigating strategies to be an acceptable means of compliance with Order EA-12-049. An event-based approach, as

6.1 Equipment Protection, Storage, and Deployment		
Commenter	**Comment**	**NRC Response**
	realistically as possible. This approach is outlined in more detail in our comments on the SBO ANPR (ADAMS accession number ML12128A290). We incorporate that discussion by reference in our comments here. We do not believe that the evaluations currently outlined in NEI 12-06 Rev. B1 for protection of FLEX equipment are comprehensive enough to fulfill this need. Assuming that compliance with this Order is only an interim measure until the rulemakings on SBO and integration of onsite emergency response are finalized, this analysis need not be as comprehensive as the analysis that should be required for compliance with these rules. However, the credibility of the mitigation strategies cannot be established without a concrete evaluation of the adequacy of the mitigation strategies with respect to at least a small number of challenging initiating events.	suggested in this comment, may be proposed by licensees as an alternative to the ISG and will be considered on a case-by-case basis.
E. Lyman	We have noted previously that the elimination of a requirement for "procedures" in addition to "guidance and strategies" in the final 10 CFR 50.54(hh)(2) rule resulted in a lack of specificity in licensees' compliance plans that raised doubts about their ultimate effectiveness. To that end, we appreciate that the mitigation strategies order specifies that full compliance includes "procedures." However, we question whether the procedure hierarchy described in NEI 12-06 Rev B1 actually fulfills this requirement. The document proposes the development of FLEX Support Guidelines (FSGs), which would be "similar in intent as the current 50.54(hh)(2) guides." The ISG should ensure that the FSGs will be detailed enough to establish the practical usability and effectiveness of the mitigation strategies.	The staff declines to make any changes to the ISG as a result of this comment. Section 11.4 of NEI 12-06 provides procedural guidance. Section 3.2.2 of NEI 12–06 provides guidelines to support the development of guidance to coordinate with the existing set of plant operating procedures and guidance. Several sections of NEI 12-06 identify procedural interfaces.
E. Lyman	Key to the demonstration of success paths is the availability of equipment under the extreme situations that may occur. We continue to be concerned about the reliance on commercial-grade equipment for implementation of FLEX strategies, since this implies that not only will it not be assured to survive beyond-design-basis events, but it may not even survive design-basis events. We do not believe that the N+1 rule is adequate given the wide range of potential external events that must be considered. If safety margin is to be sacrificed in favor of diversity of location, then N+1 in general does not provide enough independent units for adequate diversity. Instead of a fixed formula, the actual numbers should be determined on a site-specific basis based on the range of threats that the site faces. NEI 12-06 also proposes, completely arbitrarily as far as we can see,	The staff notes that NEI 12-06, Section 11.3 3 specifies that the “FLEX mitigation equipment should be stored in a location or locations informed by evaluations performed per [NEI 12-06] Sections 5 through 9 such that no one external event can reasonably fail the site FLEX capability (N).” This may require greater than N+1 sets of equipment.

6.1 Equipment Protection, Storage, and Deployment		
Commenter	**Comment**	**NRC Response**
	that equipment can be out of service for up to 90 days at a time provided that a FLEX (N) capability is maintained --- meaning that there would be large periods of time when even nominal margin would not be maintained.	The staff considers that this portion of NEI 12-06 alleviates the concern expressed in this comment. The staff further considers that the specification of a maximum out of service period of 90 days, so long as the FLEX (N) capability is maintained by redundant equipment, provides an appropriate risk management for low probability beyond-design-basis external events the equipment is intended to mitigate.

6.2 Equipment Quality		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 6.2 Equipment associated with the strategies developed to meet the requirements of Order EA-12-049 need not be treated as safety-related equipment or subject to special treatment requirements under 10 CFR such as Part 50 Appendix B quality assurance (QA), seismic, or Environmental Qualification. Staff Position: NEI 12-06 provides an acceptable method to control the quality of equipment associated with Order EA-12-049 with the following clarifications. Licensees must maintain a program that provides assurance that the equipment used to meet the requirements of Order EA-12-049 and not already covered by existing QA requirements in Appendix B or R of 10 CFR Part 50 is tested, maintained and operated so that they will function as intended. This equipment must be implemented so that it does not degrade the existing safety-related systems. This is accomplished by making the non-safety equipment as independent as practicable from existing safety-related systems. The guidance provided in this section outlines an acceptable QA program for non-safety equipment used for Order EA-12-049 and not already covered by existing QA requirements. Activities should be implemented from this section as appropriate, depending on whether the equipment is being added (new) or is existing. 1. Licensees shall control those commercial items that are commonly procured for use in the fire protection, such as fire hoses, spray nozzles, fire pumper trucks, and temporary fire pumps, using the fire protection QA program. Quality of the equipment being maintained shall be understood to be with respect to the associated strategies, rather than with respect to fire protection, as would be required by Regulatory Guide 1.189, “Fire Protection for Nuclear Power Plants,” Revision 2, Section C.4 of Branch Technical Position (BTP) CMEB 9.5-1, Revision 2, in the review and acceptance of approved Fire Protection Plans for plants licensed after January 1, 1979, or BTP APCSB 9.5-1, its Appendix A, and Generic Letter 77-02 for plants licensed before January 1, 1979. 2. Licensees may include other equipment used to meet the requirements of Order EA-12-049 in the Appendix B or fire protection QA programs or in a separate program implementing the following activities as appropriate. Industry Response: The discussion in the ISG as well as in the public meetings on this subject focused on ensuring the maintenance and testing performed on the portable FLEX equipment was delineated such that it would be consistent in the industry. The industry is proposing to perform maintenance and testing in accordance with the Institute of Nuclear Power Operations AP-913, Equipment Reliability Process. Standard industry	While the staff has not reviewed or endorsed the Institute of Nuclear Power Operations AP-913, Equipment Reliability Process, the staff generally considers the use of standard industry processes to be beneficial. The staff has modified the ISG to reflect this.

6.2 Equipment Quality		
Commenter	**Comment**	**NRC Response**
	templates are used in this process to define specific maintenance and testing activities. Related changes were made to NEI 12-06 to address this exception: The following change was made to Section 11.1: Equipment associated with these strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control as outlined in this section. If the equipment is credited for other functions (e.g., fire protection), then the quality attributes of the other functions apply. The following changes were made to Section 11.5: 2. Portable equipment that directly performs a FLEX mitigation strategy for the core, containment, or SFP should be subject to maintenance and testing in accordance with guidance provided in INPO AP 913, Equipment Reliability Process, to verify proper function. The maintenance program should ensure that the FLEX equipment reliability is being achieved. Standard industry templates (e.g., EPRI) and associated bases will be developed to define specific maintenance and testing including the following: a. Periodic testing and frequency should be determined based on equipment type and expected use. Testing should be done to verify design requirements and/or basis. The basis should be documented and deviations from vendor recommendations and applicable standards should be justified. b. Preventive maintenance should be determined based on equipment type and expected use. The basis should be documented and deviations from vendor recommendations and applicable standards should be justified. c. Existing work control processes may be used to control maintenance and testing. (e.g., PM Program, Surveillance Program, Vendor Contracts, work orders).	

7.0 Off-site Resources		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 7.0 The Final Phase of the guidance and strategies required by Order EA-12-049 requires use of off-site resources to sustain the strategies indefinitely. Staff Position: NEI 12-06 provides an acceptable means to meet the requirements of Order EA-12-049 subject to the following clarification: 1. Licensees shall establish an oversight mechanism to provide reasonable assurance that portable equipment necessary to sustain indefinite operation of the mitigating strategies can be deployed to the site, installed in sufficient time to allow overlap between the transition and final phases and capable of performing their intended functions. Industry Response: Related changes were made to NEI 12-06 to address this exception: The following were changed or added to Section 12.2: 3) A provision to inspect and audit the contractual agreements to reasonably assure the capabilities to deploy the FLEX strategies including unannounced random inspections by the Nuclear Regulatory Commission. 8) Provisions to ensure that the periodic maintenance, periodic maintenance schedule, testing, and calibration of off-site equipment is comparable/consistent with that of similar on-site FLEX equipment. 9) Provisions to ensure that equipment determined to be unavailable/non-operational during maintenance or testing is either restored to operational status or replaced with appropriate alternative equipment within 90 days. 10) Provision to ensure that reasonable supplies of spare parts for the off-site equipment are readily available if needed. The intent of this provision is to reduce the likelihood of extended equipment maintenance (requiring in excess of 90 days for returning the equipment to operational status).	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to oversight of off-site resources by the licensees and the NRC and has modified the ISG accordingly.

8.0 Strategy Maintenance		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: 8.0 no exceptions taken Industry Response: No exceptions noted.	This section has been deleted from the ISG as unnecessary.

9.0 Guidance for AP1000 Design		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: AP1000 Table F.3.2-1 Equipment to be provided. Industry Response: Related changes were made to NEI 12-06 to address this exception: Table F.3.2-1 was revised to include additional information on post-accident monitoring instrumentation. This instrumentation has also been included in footnote (4) to that table. The text in Section F.12 has also been clarified.	The modification to Table F.3.2-1 adds clarification to the AP1000 design regarding multiple connection points for power supply. However, the modification did not fully address the concern that the multiple connection points may still utilize common portions of the electrical distribution system that may be vulnerable to a single point of failure. While the AP1000 DCD discusses some protection (seismic and high wind) for the connection points, other external hazards were not specifically addressed. The staff notes that a later revision to NEI 12-06 adopts this staff position and has modified the ISG accordingly.
A. Heymer	ISG Position: AP1000 Hazard margin exception not endorsed Industry Response: Related changes were made to NEI 12-06 to address this exception: F.4 Step 2 was changed to remove the 2nd paragraph in response to the ISG comment, and to clarify the first paragraph.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to limiting assessment of an extreme external hazard for AP1000 plants and has modified the ISG accordingly.
A. Heymer	ISG Position: AP1000 Flooding margin not endorsed Industry Response: Related changes were made to NEI 12-06 to address this exception: F.6 Step 2B was changed to comply with the wording proposed in the ISG.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to treatment of external flooding for AP1000 plants and has modified the ISG accordingly.
A. Heymer	ISG Position: AP1000 Severe storms and high winds not endorsed Industry Respone: Related changes were made to NEI 12-06 to address this exception: F.7 Step 2C was changed to comply with the wording proposed in the ISG.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to treatment of severe storms and high winds for AP1000 plants and has modified the

9.0 Guidance for AP1000 Design		
Commenter	**Comment**	**NRC Response**
		ISG accordingly.
A. Heymer	ISG Position: AP1000 Snow, Ice and Cold not endorsed Industry Response: Related changes were made to NEI 12-06 to address this exception: F.8 Step 2D was changed to comply with the wording proposed in the ISG.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to treatment of snow, ice, and cold for AP1000 plants and has modified the ISG accordingly.
A. Heymer	ISG Position: AP1000 High temperature not endorsed Industry Response: Related changes were made to NEI 12-06 to address this exception: F.9 Step 2E was changed to comply with the wording proposed in the ISG.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to treatment of high temperature for AP1000 plants and has modified the ISG accordingly.

10.0 Reporting Requirements		
Commenter	**Comment**	**NRC Response**
A. Heymer	ISG Position: Integrated plan requirements Industry Response: Related changes were made to NEI 12-06 to address this exception: Section 13.1 was added to address the content of the integrated reports.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to integrated plans and the NRC and has modified the ISG accordingly.
A. Heymer	ISG Position: Initial and 6 mo. Status reports contents Industry Response: Related changes were made to NEI 12-06 to address this exception: Section 13.2 was added to address the content of the status reports.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to status reporting and the NRC and has modified the ISG accordingly.
A. Heymer	ISG Position: final report contents Industry Response: Related changes were made to NEI 12-06 to address this exception: Section 13.3 was added to address the content of the final report.	The staff considers that this modification to NEI 12-06 adopts the staff's position relative to final reporting and the NRC and has modified the ISG accordingly.