

# PUBLIC SUBMISSION

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Station Blackout Mitigation

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**Comment On:** NRC-2011-0299-0001  
Station Blackout

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**Document:** NRC-2011-0299-DRAFT-0031  
Comment on FR Doc # 2012-06665

OFFICE OF SECRETARY  
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ADJUDICATIONS STAFF

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## Submitter Information

**Name:** Patricia Campbell

**Address:**

1299 Pennsylvania Avenue, NW  
Ninth Floor - General Electric  
Washington, DC, 20004

**Organization:** GE Hitachi Nuclear Energy

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## General Comment

See attached file.

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## Attachments

77FR16175 ANPR SBO - GEH comments

Template = SEL4-067

DS 10

## GEH Comments on NRC Advance Notice of Proposed Rulemaking

77 Fed. Reg. 16175 (March 20, 2012; NRC-2011-0299)

ANPR Question Number (Section IV)	ANPR Question	GEH Comments
General Comments	General Comments on Advance Notice of Proposed Rulemaking (ANPR) 10 CFR Part 50, regarding regulations associated with Station Blackout (SBO)	
	Industry comments	GEH has participated in the NEI industry group for addressing lessons learned from the Fukushima Dai-ichi event and agrees with comments submitted on behalf of the commercial nuclear energy industry. None of the comments herein are intended to be contrary to the NEI comments.
	Existing body of knowledge and experience	Regulatory actions taken in regard to SBO should build on greater than 20 years of experience with implementation of current SBO regulations and guidance and not disregard the extensive body of existing knowledge, assessments and mitigation plans. While the ANPR is focused on amendments to regulations in 10 CFR §50.63, many of the questions relate to information and considerations that could be in regulatory guidance.
	Consideration of risk insights	Risk assessments provide valuable insights for evaluating the likelihood of SBO events and availability and effectiveness of mitigation measures and actions. Risk insights were inherently part of the original rulemaking for 10 CFR § 50.63 and its implementation.
	Use of terms	In the ANPR, the NRC uses the term "loss of all AC power" in many instances rather than referring to SBO. As recognized in the ANPR, not all AC power is lost in a SBO – specifically, 10 CFR §50.2 clarifies that the definition of Station Blackout Station blackout does not include the loss of available ac power to buses fed by station batteries through inverters or by alternate ac sources. Such a distinction may be important in the context of the questions posed in the ANPR and should be considered as the NRC proceeds with the process of amending regulations and guidance for addressing SBO requirements. For example, passive plants have extended battery capabilities as well as passive safety

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		features, and alternate AC power sources with varying capabilities may be available for including in mitigation action plans. It is also important that regulations and guidance are clear as to “coping time” what constitutes “coping” during SBO.
	Coronal mass ejection	GEH agrees with the NRC that PRM-50-96 proceed independently of the SBO rulemaking activity.
B.	Rulemaking Scope: The NRC would like external stakeholders to respond to the following questions to support the NRC’s efforts to define the scope of the regulatory framework.	
B.1.	Recognizing the uncertainties associated with natural phenomena and in the context of establishing a set of events upon which to base reference bounds for design, should SBO equipment be designed to withstand natural phenomena which the facility is not already designed to withstand, and should SBO mitigation strategies consider such natural phenomena? What severity of natural phenomena should be considered (e.g., length of return period or duration of the phenomena)? For example, flooding risks are of concern due to a “cliff-edge” effect, in that the safety consequences of a flooding event may increase sharply with only a small increase in the flooding level. Therefore, to address uncertainties for SBO events and to build in additional defense-in-depth margin to mitigate SBO for such events, should analysis of an SBO consider a flood elevation at some prescribed level above the level for which the plant is designed? If so, what criteria should be used to establish the prescribed level? What is the basis for your position?	NRC guidance could address these factors for site-specific assessments in implementing SBO regulation. Licensees could consider uncertainties associated with natural phenomena when assessing necessary measures for a specific site. For example, trends and uncertainties could be considered in determining the magnitude of natural phenomenon that should be considered in mitigation plans. NRC core damage frequency goals are on the order of 1 per thousands of years. The magnitude should be established for a return period corresponding to the NRC core damage frequency goal considering trends and uncertainties.
B.2.	If such an analysis (per the above question) is warranted, what margin in addition to that included in the reference bounds for design should be considered? For existing facilities, should such an analysis include factors such as the existence of nearby dams or water sources?	See B.1 comments above as related to bounds of the design. Regarding existence of dams or water sources, the magnitude and return period could consider nearby dams and water sources, and be site specific. These factors could be addressed in regulatory guidance.
B.3.	For events that do not fall within the reference bounds for design, but may result in SBO conditions, it may be necessary for licensees to take early action in order to increase the potential for successful mitigation. Recognizing that there are several actions that take time	The time to diagnose depends on the natural phenomena and the monitoring equipment available to the operator. Mitigation plans may involve additional monitoring equipment to speed diagnosis. The mitigation plan could

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	<p>during such events that include, but are not limited to (1) the need to properly identify and diagnose the event or situation, (2) the need to make the decision to implement actions or strategies to mitigate existing or imminent SBO conditions, and (3) the time for licensees to implement the strategies once the decision is made; what time constraints do stakeholders understand to be important in developing SBO mitigation requirements? For example, what should be the coping time with no mitigation for SBO conditions given time constraints that include the time to (1) identify and determine the need to take mitigative actions and (2) implement these strategies under worst case conditions? How long should mitigation strategies be expected to be deployed before the receipt of offsite assistance? If certain mitigation actions must be taken early in the event to avert core damage, how should those actions be determined and how should the time when they must be performed be determined?</p>	<p>include robust offsite assistance, in which case the transit time to the site and preparation time to begin transfer should be determined and used in the coping time. Secure communication between the site and support organization should be provided. Redundant support locations could provide additional confidence that actions are effective in the event of wide area natural phenomena, and sharing support between utilities offers advantages and credit for reliance on such additional resources should be allowed.</p>
B.4.	<p>Similar to question B.2, but from a broader perspective of establishing all the new SBO mitigation requirements: Different regions of the United States have different natural phenomena that are more significant in terms of potentially creating SBO conditions. Should the NRC construct a new regulatory framework containing criteria that enable licensees to establish the set of natural phenomena of concern for their sites? If so, what criteria should be used to determine whether an event needs to be considered at a particular site? Please provide the basis for your position.</p>	<p>The magnitude and set of natural phenomena could be specific to the site. Criteria could be risk informed and also consider the return period which can be common to all sites. However, as a matter of establishing a regulatory framework, set criteria for defining an extended loss of AC power until off-site resources are available could provide greater consistency in developing coping and recovery action plans.</p>
B.5.	<p>The current requirements in 10 CFR 50.63 for SBO are "unit-specific," meaning that the total loss of all ac is not assumed to extend to all the power reactors at a given site. Based on the lessons learned from the Fukushima Dai-ichi event, the NRC believes the SBO requirements may need to be expanded to consider an SBO for the entire site (i.e., assume the SBO condition occurs to all the units for multi-unit sites). What are stakeholder views on this matter, and how should it be addressed in the new SBO rule? Please provide the basis for your position.</p>	<p>If wide-area natural phenomena affecting multiple units, and or nearby sites are credible for the unit, they could be considered in mitigation planning. A risk-informed approach could provide additional insights for a specific site regarding the probability of a single event affecting multiple units, and may demonstrate that there are no high probability events for a particular site. Plant layout and distance between multi-units, as well as other factors, should be considerations in the site-specific assessment.</p>
B.6.	<p>The current provisions in 10 CFR 50.63 require a facility to withstand,</p>	<p>The coping period for spent fuel pools (SFPs) is very long</p>

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	for a specified duration, and recover from an SBO as defined in 10 CFR 50.2. Should the new SBO rule require long term cooling and water makeup to SFPs during an SBO? Please provide the basis for your position.	because of the inventory provided for shielding purposes. The ability of the pool to maintain leak-tightness and integrity during the natural phenomena should be confirmed in crediting the coping period. To extend to an indefinite coping time, robust/"hardened" makeup mitigation could be provided.
B.7.	Should the SBO rule address how external events would affect the "specific duration" of the SBO and the associated coping time? Specifically:	
	a. Should the NRC require consideration of the likelihood of external events that fall outside the bounding events selected for design purposes in the determination of SBO specified duration, or the capability to cope with an SBO for the specified duration, or both? If so, what should the rule require? What is the basis for your position?	a. If the external event/natural phenomenon damages the AC power distribution equipment, the coping time may be indefinite. The likelihood of this occurring could allow the licensee to demonstrate confidence it can address credible events.
	b. Should the NRC require consideration of additional margin in the probability or magnitude (or both) of bounding events selected for design purposes with respect to natural phenomena (e.g., design basis external flood plus 10 additional feet or extending the ability to withstand the total loss of ac power for longer durations) in the determination of SBO specified duration or the capability to cope with an SBO during the specified duration, or both? Provide any proposed rule provisions and a discussion that supports your position.	b. Additional margin should not be required if the magnitude is established at a return period consistent with the goals, considering trends and uncertainty.
	c. Should the SBO rule require applicants and licensees to address a more challenging condition such as the total loss of all ac, including ac from the dc batteries through inverters? Please provide the basis for your position.	c. No. Credit for power sources protected in the specific event should be allowed, as well as crediting a variety of mitigation features and actions. As noted above, passive plants have extended batteries, and plants have various options for alternative AC power for address a range of possible scenarios.
B.8.	If new requirements as discussed in this section should be imposed for existing licensees or with respect to existing certified designs, what	No comments.

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	sort of benefits or costs do stakeholders estimate could be incurred?	
C.	Rulemaking Objectives/Success Criteria: The NRC would like stakeholder views on specific regulatory objectives and success criteria for the potential rulemaking.	
C.1.	What specific objectives should the SBO rule be designed to achieve?	
	a. For example, should the objective of the SBO rule be to significantly reduce the frequency of core damage from a prolonged SBO, or would it be better to focus on the reduction of the frequency of large early release of radiation for low probability external events that result in SBO conditions? Please provide the basis for your position.	a. No Comments.
	b. Alternatively, should the SBO rule be designed to achieve a more qualitative safety objective such as increasing, as a defense-in-depth measure, requirements for the mitigating strategies to cope with prolonged SBO conditions stemming from events that do not fall within the reference bounds for the design, assuming GDC 2 (or the corresponding PDC) is satisfied? Please provide the basis for your position.	b. No Comments.
	c. Should the SBO rule provide increased assurance that the facility can achieve and maintain a safe shutdown condition under SBO conditions for a set of initiating events that lead to SBO conditions, and as one way of doing this, enable licensees to use a criterion for determining the set of conditions that apply to their plants or sites? Please provide the basis for your position.	c. Yes. Natural phenomenon/events and magnitudes should apply to a site. Also, using a standard set of initial conditions for developing mitigation strategies allows for a higher degree of consistency across the industry.
	d. Should the NRC adopt an SBO rule that is more performance-based and which would not specify the events that must be considered in determining the SBO duration or the capability for coping with an SBO of specified duration? Specifically should the NRC structure an SBO rule as follows: (1) Require each applicant and licensee to develop, implement, and maintain SBO procedures that describe how the licensee will address the following areas if the plant experiences an event that exceeds the values or does not fall within the ranges of values chosen for the reference	d. Yes. This could be addresses as an extension of the loss of large area mitigation strategies. Such an approach could address multiple natural phenomenon/events.

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	<p>bounds for the design of the facility:</p> <ul style="list-style-type: none"> <li>(i) Communication with onsite personnel and offsite entities providing support to mitigate the event;</li> <li>(ii) Onsite actions necessary to enhance the capability of the facility to mitigate the consequences of the loss of all ac power and other equipment damage;</li> <li>(iii) Dispersal of equipment and personnel, as well as rapid entry into site protected areas for essential onsite personnel and offsite responders who are necessary to mitigate the event; and</li> <li>(iv) Recall of site personnel.</li> </ul> <p>(2) Require each applicant and licensee to develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and SFP cooling capabilities under the circumstances associated with the loss of all ac power, from an event that does not fall within the reference bounds chosen for the design of the facility, including:</p> <ul style="list-style-type: none"> <li>(i) Station blackout coping and power restoration activities;</li> <li>(ii) Operations to mitigate fuel damage; and</li> <li>(iii) Actions to minimize radiological release.</li> </ul> <p>Please provide the basis for your position.</p>	
	<p>e. Recognizing that the SBO mitigation requirements could address a set of events that fall outside the reference bounds for design of the plant and may lead to SBO conditions, success criteria might be more readily established. Should the rule establish success criteria or requirements that apply as a function of the probability of the events? For example, for the more probable/common SBO events, such as those that 10 CFR 50.63 currently addresses, the current 10 CFR 50.63 requirements could largely remain in place. For the low probability, high consequence, hazard-driven SBOs, a different set of success criteria could be established that</p>	<p>e. Although 10 CFR §50.63 need not be amended, this could be addressed in regulatory guidance using risk insights. Success criteria could be established that recognize the lower probabilities of occurrence; for example, prevent core damage for more probable events, and prevent LERF in less probable events.</p>

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	recognize the lower probabilities of occurrence of these types of SBOs. Please provide the basis for your position.	
C.2.	How should actions taken to address the staff's recommended approach for NTTF Recommendation 4.2 be used to support the development of SBO mitigation requirements within a coherent, integrated regulatory framework? Provide a discussion that supports your position.	No comments.
C.3.	The NRC would like stakeholder's views on a regulatory approach to SBO mitigation that conceptually follows the NTTF proposal in NTTF Recommendation 4.1. Specifically, do stakeholders believe that the best conceptual approach for SBO mitigation is to establish requirements for an initial coping period (no ac power available), during which time licensees establish mitigation strategies; followed by an interim period during which time the mitigation strategies are employed for a duration sufficient to enable offsite relief to arrive; followed by a final phase where offsite relief has arrived and a stable shutdown condition is established? Alternatively, if stakeholders have alternative approaches or suggested changes to this conceptual approach, please provide the basis for them.	No comments.
C.4.	Recognizing that SBO mitigation may rely upon Emergency Operating Procedures (EOPs) and Severe Accident Management Guidelines (SAMGs), how should regulatory actions taken to address NTTF Recommendation 8 with regard to coordination of EOPs, SAMGs, and Extensive Damage Mitigation Guidelines be best integrated with SBO mitigation requirements to ensure that actions to address each of these NTTF recommendations do not unduly overlap or inadvertently introduce unnecessary redundancy, inconsistency, or other unintended consequences?	The mitigation actions which are credited should be incorporated in site procedures, and selected scenarios could be used during training, periodic drills, or exercises of beyond-design-bases events and emergency plans.
C.5.	Recognizing that the containment function is a key defense-in-depth measure for SBO events, how should regulatory actions to address NTTF Recommendation 5.1, which discusses installation of reliable hardened containment vent systems for boiling water reactors with Mark I and II containments designs, be integrated with potential SBO load-shedding mitigation activities to ensure that actions to address each of these NTTF recommendations do not unduly overlap or	The site-specific venting system and procedures for both when and how it is used should be considered and credited in the mitigation strategy in preventing LERF.

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	inadvertently introduce unnecessary redundancy, inconsistency, or other unintended consequences?	
C.6.	Recognizing the importance of SFP cooling and the need to understand the condition of the SFP, how should regulatory actions taken to address NTTF Recommendation 7.1, which addresses SFP instrumentation, be integrated into SBO mitigation plans to ensure that actions to address each of these NTTF recommendations do not unduly overlap or inadvertently introduce unnecessary redundancy, inconsistency, or other unintended consequences?	No comments.
D.	Functional Considerations and Requirements for Supporting Structures, System, and Components and Procedures: With regard to the requirements that would stem from identification of the SBO mitigation functions, the NRC would like stakeholder views on:	
D.1.	What requirements (e.g., design, inspection, testing, quality assurance, corrective action) should be applied to the SBO mitigation SSCs that perform the key safety functions to provide increased assurance that the functions can be performed? What constitutes increased assurance (i.e., what must be achieved with the additional treatment requirements) for the mitigation of SBO conditions stemming from either design basis events or from external events that exceed the events chosen as bounding for design purposes? Please provide the basis for your position.	No comments.
D.2.	What requirements for supporting procedures, guidelines, strategies, and training should be included within the SBO rule (also refer to question C.6)? Please provide the basis for your position.	SBO mitigation should be integrated into plant EPGs, SAMGs and EDMGs to assure procedures are consistent with each, and the transitions between procedures are rational. Initial and refresher training should be included.
D.3.	Should the SBO rule address licensee staffing requirements for SBO mitigation for an event involving more than a single unit (for multi-unit sites)? Please provide the basis for your position.	Licensees assess staffing and qualifications needed for plant operation and to implement mitigation plans, and determine whether present staffing may affect such plans, considering when augmentation by offsite workers could be available. Addressing this issue in regulatory guidance is appropriate.

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D.4.	Should the NRC require surveillance testing and limiting conditions for operation for some or all equipment credited for mitigating an SBO event? Alternatively, should the NRC use a different approach for testing of SBO equipment, such as either specific testing requirements in a new rule, use of 10 CFR 50.65 (Maintenance Rule), or other existing plant processes? Please provide the basis for your position.	Regulations are not necessary to assure that mitigation equipment readiness is maintained. A plant program could provide reasonable assurance that the equipment has high availability. Mitigation equipment readiness should not be tied directly to plant operation. NRC guidance could address expectations for such a readiness program.
D.5.	Should the NRC require applicants and licensees to describe the SSCs, supporting procedures, and programs used to implement the new SBO requirements in the Final Safety Analysis Report? Alternatively, should the NRC consider a special change control requirement for these SSCs, procedures, and programs? If stakeholders agree that such a requirement would be valuable, what criteria would be used to determine when changes could be made without prior NRC review and approval?	No comments.
D.6.	If new requirements under the items above were to be imposed for existing licensees or with respect to existing certified designs, what sort of benefits and costs do stakeholders estimate could be incurred?	No comments.
E.	Applicability to NRC Licenses and Approvals: The NRC would apply any new SBO requirements to power reactors, both currently operating and new reactors, and would like stakeholder input on this aspect of the rule.	
	Accordingly, the NRC envisions that this would include (but not be limited to): <ol style="list-style-type: none"> <li>1. Nuclear power plants currently licensed under 10 CFR parts 50 or 52;</li> <li>2. Nuclear power plants currently being constructed under construction permits issued under 10 CFR part 50, or whose construction permits may be reinstated;</li> <li>3. Current and future applications for standard design certification and standard design approval under 10 CFR part 52;</li> <li>4. Future nuclear power plants whose construction permits and operating licenses are issued under 10 CFR part 50;</li> </ol>	No comments.

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ANPR Question Number (Section IV)	ANPR Question	GEH Comments
	5. Future nuclear power plants whose combined licenses are issued under 10 CFR part 52, and 6. Future nuclear power plants that are manufactured under 10 CFR part 52.	
F.	Relationship Between Existing Station Blackout Requirements in Title 10 of the Code of Federal Regulations, Section 50.63 and the New Station Blackout Requirements: The NRC is considering how any new SBO requirements would relate to the existing SBO requirements in 10 CFR 50.63, and has identified three approaches. The NRC therefore seeks stakeholder views on which of these options is best suited for implementing new requirements recommended in response to ANPR Sections B, C, and D, above. What is the basis for your position?	
	<ol style="list-style-type: none"> <li>1. Approach 1 (Base Case— Supplementary SBO Requirements): The new SBO requirements would 1) address SBO issues which are separate from, and address scenarios which go beyond, the existing 10 CFR 50.63 requirements; and 2) be added to the existing 10 CFR 50.63 SBO requirements, possibly in a new section (e.g., 10 CFR 50.XX). This approach would not change the existing 10 CFR 50.63 requirements, with the exception of some conforming changes needed to ensure coordination between the existing, unchanged 10 CFR 50.63 requirements, and the newly-added SBO requirements.</li> <li>2. Approach 2 (Unified SBO Requirements): The new SBO requirements would: (1) Address SBO issues which are separate from, and address scenarios which go beyond, the existing 10 CFR 50.63 requirements (same as Element 1 of Approach 1); and (2) be integrated into a single rule, representing a unified overall approach to SBO. This differs from Approach 1 in that the NRC would develop new rule language that presents a single, unified approach to SBO covering the full spectrum of issues, accidents, plant conditions, and performance objectives that each nuclear power plant must meet. The new rule would include the current 10 CFR 50.63 requirements.</li> <li>3. Approach 3 (Superseding SBO Requirements): The new SBO</li> </ol>	As noted above, regulatory actions taken in regard to SBO should build on greater than 20 years of experience with implementation of current SBO regulations and guidance and not disregard the extensive body of existing knowledge, assessments and mitigation plans.

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	<p>requirements would envelope the full spectrum of issues, accidents, plant conditions, and performance objectives that each nuclear power plant must meet, so that the existing SBO requirements in 10 CFR 50.63 would be subsumed in the new rule. This approach differs from Approach 1 in that the new SBO requirements would address SBOs whose characteristics and scope may be more "severe" than originally envisioned in 10 CFR 50.63. Under Approach 3, the new SBO requirements would entirely supersede and displace the existing SBO requirements in 10 CFR 50.63. All existing SBO requirements would be removed from 10 CFR 50.63 and licensees would be required to change their SBO licensing bases (e.g., change or remove a Final Safety Analysis Report description, a technical specification, or a license condition) to comply with the new requirements.</p>	
G.	<p>Advisory Committee on Reactor Safeguards Recommendations:</p>	
	<p>The NRC is interested in stakeholder feedback regarding both current and projected future (i.e., considering other actions that could stem from the staff's recommendation to address NTTF Recommendation 4.2 as well as other relevant NTTF actions) capabilities for coping with an extended SBO, including system vulnerabilities. Additionally, the NRC would like stakeholder views concerning the capabilities to mobilize and deliver offsite resources (e.g., portable generators, fuel supplies, water pumping equipment) as contemplated by both the NTTF and by the industry conceptual approach described in the Nuclear Energy Institute (NEI) paper, "An Integrated, Safety-Focused Approach to Expediting Implementation of Fukushima Dai-ichi Lessons-Learned," dated December 16, 2011.</p>	<p>No comments.</p>

## **Rulemaking Comments**

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**From:** Gallagher, Carol  
**Sent:** Friday, May 04, 2012 11:24 AM  
**To:** Rulemaking Comments  
**Subject:** Comment on Station Blackout ANPR  
**Attachments:** NRC-2011-0299-DRAFT-0031.pdf

Attached for docketing is a comment from Patricia Campbell on the above noted ANPR (77 FR 16175; March 20, 2012) that I received via the regulations.gov website on May 4, 2012.

Thanks,  
Carol