NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Meeting Agenda
Project 2012-13 NUC-001-2 Standards

June 13, 2013 | 8:30 – 4:00 PM ET
Washington, DC

Dial-in: 866.740.1260 | Access Code: 4458510 | Security Code: 0812

Webinar for remote participants:
Go to www.readytalk.com and enter access code 4458510 (same one as above)

Administrative

1. **Introductions**
2. **Review NERC Antitrust Compliance Guidelines and Public Announcement***
3. **FYRT Participant Conduct Policy***
4. **FYRT E-mail List Policy***
5. **Review Meeting Agenda and Objectives**

Agenda Items

1. **Review and discuss discussion document***
   a. Definition of Protection Systems
   b. Paragraph 81 retirements
      i. Original rationale*
      ii. Guidance document
   c. PER and PRC standards*
2. **Tentative Recommendations**
   a. Affirm, revise, or retire
3. **Informal Outreach**
4. **Future Meeting(s) – All dates are tentative and members / observers should not make travel plans until dates are confirmed.**
   a. Conference call, June 24-28, 2013 (TBD)
   b. Conference call, July 9-12, 2013, (TBD)

5. **Adjourn**

*Background materials included.

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Standards Development Process Participant Conduct Policy

I. General

To ensure that the standards development process is conducted in a responsible, timely and efficient manner, it is essential to maintain a professional and constructive work environment for all participants. Participants include, but are not limited to, members of the standard drafting team and observers.

Consistent with the NERC Rules of Procedure and the NERC Standard Processes Manual, participation in NERC's Reliability Standards development balloting and approval processes is open to all entities materially affected by NERC's Reliability Standards. In order to ensure the standards development process remains open and to facilitate the development of reliability standards in a timely manner, NERC has adopted the following Participant Conduct Policy for all participants in the standards development process.

II. Participant Conduct Policy

All participants in the standards development process must conduct themselves in a professional manner at all times. This policy includes in-person conduct and any communication, electronic or otherwise, made as a participant in the standards development process. Examples of unprofessional conduct include, but are not limited to, verbal altercations, use of abusive language, personal attacks or derogatory statements made against or directed at another participant, and frequent or patterned interruptions that disrupt the efficient conduct of a meeting or teleconference.

III. Reasonable Restrictions in Participation

If a participant does not comply with the Participant Conduct Policy, certain reasonable restrictions on participation in the standards development process may be imposed as described below.
If a NERC Standards Developer determines, by his or her own observation or by complaint of another participant, that a participant's behavior is disruptive to the orderly conduct of a meeting in progress, the NERC Standards Developer may remove the participant from a meeting. Removal by the NERC Standards Developer is limited solely to the meeting in progress and does not extend to any future meeting. Before a participant may be asked to leave the meeting, the NERC Standards Developer must first remind the participant of the obligation to conduct himself or herself in a professional manner and provide an opportunity for the participant to comply. If a participant is requested to leave a meeting by a NERC Standards Developer, the participant must cooperate fully with the request.

Similarly, if a NERC Standards Developer determines, by his or her own observation or by complaint of another participant, that a participant's behavior is disruptive to the orderly conduct of a

teleconference in progress, the NERC Standards Developer may request the participant to leave the teleconference. Removal by the NERC Standards Developer is limited solely to the teleconference in progress and does not extend to any future teleconference. Before a participant may be asked to leave the teleconference, the NERC Standards Developer must first remind the participant of the obligation to conduct himself or herself in a professional manner and provide an opportunity for the participant to comply. If a participant is requested to leave a teleconference by a NERC Standards Developer, the participant must cooperate fully with the request. Alternatively, the NERC Standards Developer may choose to terminate the teleconference.

At any time, the NERC Director of Standards, or a designee, may impose a restriction on a participant from one or more future meetings or teleconferences, a restriction on the use of any NERC-administered list server or other communication list, or such other restriction as may be reasonably necessary to maintain the orderly conduct of the standards development process. Restrictions imposed by the Director of Standards, or a designee, must be approved by the NERC General Counsel, or a designee, prior to implementation to ensure that the restriction is not unreasonable. Once approved, the restriction is binding on the participant. A restricted participant may request removal of the restriction by submitting a request in writing to the Director of Standards. The restriction will be removed at the reasonable discretion of the Director of Standards or a designee.

Any participant who has concerns about NERC's Participant Conduct Policy may contact NERC's General Counsel.

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NERC Email List Policy

NERC provides email lists, or "listservs," to NERC committees, groups, and teams to facilitate sharing information about NERC activities; including balloting, committee, working group, and drafting team work, with interested parties. All emails sent to NERC listserv addresses must be limited to topics that are directly relevant to the listserv group's assigned scope of work. NERC reserves the right to apply administrative restrictions to any listserv or its participants, without advance notice, to ensure that the resource is used in accordance with this and other NERC policies.

Prohibited activities include using NERC-provided listservs for any price-fixing, division of markets, and/or other anti-competitive behavior.[1] Recipients and participants on NERC listservs may not utilize NERC listservs for their own private purposes. This may include announcements of a personal nature, sharing of files or attachments not directly relevant to the listserv group's scope of responsibilities, and/or communication of personal views or opinions, unless those views are provided to advance the work of the listserv's group. Use of NERC's listservs is further subject to NERC's Participant Conduct Policy for the Standards Development Process.

- *Updated April 2013*

[1] Please see NERC's Antitrust Compliance Guidelines for more information about prohibited antitrust and anti-competitive behavior or practices. This policy is available at http://www.nerc.com/commondocs.php?cd=2

A. Introduction

1. Title: **Nuclear Plant Interface Coordination**

2. Number: NUC-001-2

3. Purpose: This standard requires coordination between Nuclear Plant Generator Operators and Transmission Entities for the purpose of ensuring nuclear plant safe operation and shutdown.

4. Applicability:

4.1. Nuclear Plant Generator Operator.

4.2. Transmission Entities shall mean all entities that are responsible for providing services related to Nuclear Plant Interface Requirements (NPIRs). Such entities may include one or more of the following:

4.2.1 Transmission Operators.

4.2.2 Transmission Owners.

4.2.3 Transmission Planners.

4.2.4 Transmission Service Providers.

4.2.5 Balancing Authorities.

4.2.6 Reliability Coordinators.

4.2.7 Planning Coordinators.

4.2.8 Distribution Providers.

4.2.9 Load-serving Entities.

4.2.10 Generator Owners.

4.2.11 Generator Operators.

5. Effective Date: April 1, 2010

B. Requirements

R1. The Nuclear Plant Generator Operator shall provide the proposed NPIRs in writing to the applicable Transmission Entities and shall verify receipt [*Risk Factor: Lower*]

R2. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall have in effect one or more Agreements[1] that include mutually agreed to NPIRs and document how the Nuclear Plant Generator Operator and the applicable Transmission Entities shall address and implement these NPIRs. [*Risk Factor: Medium*]

R3. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall incorporate the NPIRs into their planning analyses of the electric system and shall communicate the results of these analyses to the Nuclear Plant Generator Operator. [*Risk Factor: Medium*]

R4. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall: [*Risk Factor: High*]

1. Agreements may include mutually agreed upon procedures or protocols in effect between entities or between departments of a vertically integrated system.

R4.1. Incorporate the NPIRs into their operating analyses of the electric system.

R4.2. Operate the electric system to meet the NPIRs.

R4.3. Inform the Nuclear Plant Generator Operator when the ability to assess the operation of the electric system affecting NPIRs is lost.

R5. The Nuclear Plant Generator Operator shall operate per the Agreements developed in accordance with this standard. [*Risk Factor: High*]

R6. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities and the Nuclear Plant Generator Operator shall coordinate outages and maintenance activities which affect the NPIRs. [*Risk Factor: Medium*]

R7. Per the Agreements developed in accordance with this standard, the Nuclear Plant Generator Operator shall inform the applicable Transmission Entities of actual or proposed changes to nuclear plant design, configuration, operations, limits, protection systems, or capabilities that may impact the ability of the electric system to meet the NPIRs. [*Risk Factor: High*]

R8. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall inform the Nuclear Plant Generator Operator of actual or proposed changes to electric system design, configuration, operations, limits, protection systems, or capabilities that may impact the ability of the electric system to meet the NPIRs. [*Risk Factor: High*]

R9. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall include, as a minimum, the following elements within the agreement(s) identified in R2: [*Risk Factor: Medium*]

R9.1. Administrative elements: (Retirement approved by NERC BOT pending applicable regulatory approval.)

R9.1.1. Definitions of key terms used in the agreement. (Retirement approved by NERC BOT pending applicable regulatory approval.)

R9.1.2. Names of the responsible entities, organizational relationships, and responsibilities related to the NPIRs. (Retirement approved by NERC BOT pending applicable regulatory approval.)

R9.1.3. A requirement to review the agreement(s) at least every three years. (Retirement approved by NERC BOT pending applicable regulatory approval.)

R9.1.4. A dispute resolution mechanism. (Retirement approved by NERC BOT pending applicable regulatory approval.)

R9.2. Technical requirements and analysis:

R9.2.1. Identification of parameters, limits, configurations, and operating scenarios included in the NPIRs and, as applicable, procedures for providing any specific data not provided within the agreement.

R9.2.2. Identification of facilities, components, and configuration restrictions that are essential for meeting the NPIRs.

R9.2.3. Types of planning and operational analyses performed specifically to support the NPIRs, including the frequency of studies and types of Contingencies and scenarios required.

R9.3. Operations and maintenance coordination:

R9.3.1. Designation of ownership of electrical facilities at the interface between the electric system and the nuclear plant and responsibilities for operational control coordination and maintenance of these facilities.

R9.3.2. Identification of any maintenance requirements for equipment not owned or controlled by the Nuclear Plant Generator Operator that are necessary to meet the NPIRs.

R9.3.3. Coordination of testing, calibration and maintenance of on-site and off-site power supply systems and related components.

R9.3.4. Provisions to address mitigating actions needed to avoid violating NPIRs and to address periods when responsible Transmission Entity loses the ability to assess the capability of the electric system to meet the NPIRs. These provisions shall include responsibility to notify the Nuclear Plant Generator Operator within a specified time frame.

R9.3.5. Provision for considering, within the restoration process, the requirements and urgency of a nuclear plant that has lost all off-site and on-site AC power. .

R9.3.6. Coordination of physical and cyber security protection of the Bulk Electric System at the nuclear plant interface to ensure each asset is covered under at least one entity's plan.

R9.3.7. Coordination of the NPIRs with transmission system Special Protection Systems and underfrequency and undervoltage load shedding programs.

R9.4. Communications and training:

R9.4.1. Provisions for communications between the Nuclear Plant Generator Operator and Transmission Entities, including communications protocols, notification time requirements, and definitions of terms.

R9.4.2. Provisions for coordination during an off-normal or emergency event affecting the NPIRs, including the need to provide timely information explaining the event, an estimate of when the system will be returned to a normal state, and the actual time the system is returned to normal.

R9.4.3. Provisions for coordinating investigations of causes of unplanned events affecting the NPIRs and developing solutions to minimize future risk of such events.

R9.4.4. Provisions for supplying information necessary to report to government agencies, as related to NPIRs.

R9.4.5. Provisions for personnel training, as related to NPIRs.

C. Measures

M1. The Nuclear Plant Generator Operator shall, upon request of the Compliance Enforcement Authority, provide a copy of the transmittal and receipt of transmittal of the proposed NPIRs to the responsible Transmission Entities. (Requirement 1)

M2. The Nuclear Plant Generator Operator and each Transmission Entity shall each have a copy of the Agreement(s) addressing the elements in Requirement 9 available for inspection upon request of the Compliance Enforcement Authority. (Requirement 2 and 9)

M3. Each Transmission Entity responsible for planning analyses in accordance with the Agreement shall, upon request of the Compliance Enforcement Authority, provide a copy of the planning analyses results transmitted to the Nuclear Plant Generator Operator, showing incorporation of the NPIRs. The Compliance Enforcement Authority shall refer to the Agreements developed in accordance with this standard for specific requirements. (Requirement 3)

M4. Each Transmission Entity responsible for operating the electric system in accordance with the Agreement shall demonstrate or provide evidence of the following, upon request of the Compliance Enforcement Authority:

M4.1 The NPIRs have been incorporated into the current operating analysis of the electric system. (Requirement 4.1)

M4.2 The electric system was operated to meet the NPIRs. (Requirement 4.2)

M4.3 The Transmission Entity informed the Nuclear Plant Generator Operator when it became aware it lost the capability to assess the operation of the electric system affecting the NPIRs. (Requirement 4.3)

M5. The Nuclear Plant Generator Operator shall, upon request of the Compliance Enforcement Authority, demonstrate or provide evidence that the Nuclear Power Plant is being operated consistent with the Agreements developed in accordance with this standard. (Requirement 5)

M6. The Transmission Entities and Nuclear Plant Generator Operator shall, upon request of the Compliance Enforcement Authority, provide evidence of the coordination between the Transmission Entities and the Nuclear Plant Generator Operator regarding outages and maintenance activities which affect the NPIRs. (Requirement 6)

M7. The Nuclear Plant Generator Operator shall provide evidence that it informed the applicable Transmission Entities of changes to nuclear plant design, configuration, operations, limits, protection systems, or capabilities that would impact the ability of the Transmission Entities to meet the NPIRs. (Requirement 7)

M8. The Transmission Entities shall each provide evidence that it informed the Nuclear Plant Generator Operator of changes to electric system design, configuration, operations, limits, protection systems, or capabilities that would impact the ability of the Nuclear Plant Generator Operator to meet the NPIRs. (Requirement 8)

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

Regional Entity.

1.2. Compliance Monitoring Period and Reset Time Frame

Not applicable.

1.3. Compliance Monitoring and Enforcement Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

The Responsible Entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- For Measure 1, the Nuclear Plant Generator Operator shall keep its latest transmittals and receipts.
- For Measure 2, the Nuclear Plant Generator Operator and each Transmission Entity shall have its current, in-force agreement.
- For Measure 3, the Transmission Entity shall have the latest planning analysis results.
- For Measures 4.3, 6 and 8, the Transmission Entity shall keep evidence for two years plus current.
- For Measures 5, 6 and 7, the Nuclear Plant Generator Operator shall keep evidence for two years plus current.

If a Responsible Entity is found non-compliant it shall keep information related to the noncompliance until found compliant.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information

None.

2. Violation Severity Levels

2.1. Lower: Agreement(s) exist per this standard and NPIRs were identified and implemented, but documentation described in M1-M8 was not provided.

2.2. Moderate: Agreement(s) exist per R2 and NPIRs were identified and implemented, but one or more elements of the Agreement in R9 were not met.

2.3. High: One or more requirements of R3 through R8 were not met.

2.4. Severe: No proposed NPIRs were submitted per R1, no Agreement exists per this standard, or the Agreements were not implemented.

E. Regional Differences

The design basis for Canadian (CANDU) NPPs does not result in the same licensing requirements as U.S. NPPs. NRC design criteria specifies that in addition to emergency on-site electrical power, electrical power from the electric network also be provided to permit safe shutdown. This requirement is specified in such NRC Regulations as 10 CFR 50 Appendix A — General Design Criterion 17 and 10 CFR 50.63 Loss of all alternating current power. There are no equivalent Canadian Regulatory requirements for Station Blackout (SBO) or coping times as they do not form part of the licensing basis for CANDU NPPs.
Therefore the definition of NPLR for Canadian CANDU units will be as follows:

Nuclear Plant Licensing Requirements (NPLR) are requirements included in the design basis of the nuclear plant and are statutorily mandated for the operation of the plant; when used in this

standard, NPLR shall mean nuclear power plant licensing requirements for avoiding preventable challenges to nuclear safety as a result of an electric system disturbance, transient, or condition.

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
1	May 2, 2007	Approved by Board of Trustees	New
2	To be determined	Modifications for Order 716 to Requirement R9.3.5 and footnote 1; modifications to bring compliance elements into conformance with the latest version of the ERO Rules of Procedure.	Revision
2	August 5, 2009	Adopted by Board of Trustees	Revised
2	January 22, 2010	Approved by FERC on January 21, 2010 Added Effective Date	Update
2	February 7, 2013	R9.1, R9.1.1, R9.1.2, R9.1.3, and R9.1.4 and associated elements approved by NERC Board of Trustees for retirement as part of the Paragraph 81 project (Project 2013-02) pending applicable regulatory approval.	

*** FOR INFORMATIONAL PURPOSES ONLY ***

Enforcement Dates: Standard NUC-001-2 — Nuclear Plant Interface Coordination

United States

Standard	Requirement	Enforcement Date	Inactive Date
NUC-001-2	All	04/01/2010	

Printed On: May 14, 2013, 12:36 PM

A. Introduction

1. Title: **Nuclear Plant Interface Coordination**

2. Number: NUC-001-2.1

3. Purpose: This standard requires coordination between Nuclear Plant Generator Operators and Transmission Entities for the purpose of ensuring nuclear plant safe operation and shutdown.

4. Applicability:

4.1. Nuclear Plant Generator Operator.

4.2. Transmission Entities shall mean all entities that are responsible for providing services related to Nuclear Plant Interface Requirements (NPIRs). Such entities may include one or more of the following:

4.2.1 Transmission Operators.

4.2.2 Transmission Owners.

4.2.3 Transmission Planners.

4.2.4 Transmission Service Providers.

4.2.5 Balancing Authorities.

4.2.6 Reliability Coordinators.

4.2.7 Planning Coordinators.

4.2.8 Distribution Providers.

4.2.9 Load-serving Entities.

4.2.10 Generator Owners.

4.2.11 Generator Operators.

5. Effective Date: April 1, 2010

B. Requirements

R1. The Nuclear Plant Generator Operator shall provide the proposed NPIRs in writing to the applicable Transmission Entities and shall verify receipt [*Risk Factor: Lower*]

R2. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall have in effect one or more Agreements[1] that include mutually agreed to NPIRs and document how the Nuclear Plant Generator Operator and the applicable Transmission Entities shall address and implement these NPIRs. [*Risk Factor: Medium*]

R3. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall incorporate the NPIRs into their planning analyses of the electric system and shall communicate the results of these analyses to the Nuclear Plant Generator Operator. [*Risk Factor: Medium*]

R4. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall: [*Risk Factor: High*]

1. Agreements may include mutually agreed upon procedures or protocols in effect between entities or between departments of a vertically integrated system.

R4.1. Incorporate the NPIRs into their operating analyses of the electric system.

R4.2. Operate the electric system to meet the NPIRs.

R4.3. Inform the Nuclear Plant Generator Operator when the ability to assess the operation of the electric system affecting NPIRs is lost.

R5. The Nuclear Plant Generator Operator shall operate per the Agreements developed in accordance with this standard. [*Risk Factor: High*]

R6. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities and the Nuclear Plant Generator Operator shall coordinate outages and maintenance activities which affect the NPIRs. [*Risk Factor: Medium*]

R7. Per the Agreements developed in accordance with this standard, the Nuclear Plant Generator Operator shall inform the applicable Transmission Entities of actual or proposed changes to nuclear plant design, configuration, operations, limits, Protection Systems, or capabilities that may impact the ability of the electric system to meet the NPIRs. [*Risk Factor: High*]

R8. Per the Agreements developed in accordance with this standard, the applicable Transmission Entities shall inform the Nuclear Plant Generator Operator of actual or proposed changes to electric system design, configuration, operations, limits, Protection Systems, or capabilities that may impact the ability of the electric system to meet the NPIRs. [*Risk Factor: High*]

R9. The Nuclear Plant Generator Operator and the applicable Transmission Entities shall include, as a minimum, the following elements within the agreement(s) identified in R2: [*Risk Factor: Medium*]

R9.1. Administrative elements:

R9.1.1. Definitions of key terms used in the agreement.

R9.1.2. Names of the responsible entities, organizational relationships, and responsibilities related to the NPIRs.

R9.1.3. A requirement to review the agreement(s) at least every three years.

R9.1.4. A dispute resolution mechanism.

R9.2. Technical requirements and analysis:

R9.2.1. Identification of parameters, limits, configurations, and operating scenarios included in the NPIRs and, as applicable, procedures for providing any specific data not provided within the agreement.

R9.2.2. Identification of facilities, components, and configuration restrictions that are essential for meeting the NPIRs.

R9.2.3. Types of planning and operational analyses performed specifically to support the NPIRs, including the frequency of studies and types of Contingencies and scenarios required.

R9.3. Operations and maintenance coordination:

R9.3.1. Designation of ownership of electrical facilities at the interface between the electric system and the nuclear plant and responsibilities for operational control coordination and maintenance of these facilities.

R9.3.2. Identification of any maintenance requirements for equipment not owned or controlled by the Nuclear Plant Generator Operator that are necessary to meet the NPIRs.

R9.3.3. Coordination of testing, calibration and maintenance of on-site and off-site power supply systems and related components.

R9.3.4. Provisions to address mitigating actions needed to avoid violating NPIRs and to address periods when responsible Transmission Entity loses the ability to assess the capability of the electric system to meet the NPIRs. These provisions shall include responsibility to notify the Nuclear Plant Generator Operator within a specified time frame.

R9.3.5. Provision for considering, within the restoration process, the requirements and urgency of a nuclear plant that has lost all off-site and on-site AC power. .

R9.3.6. Coordination of physical and cyber security protection of the Bulk Electric System at the nuclear plant interface to ensure each asset is covered under at least one entity's plan.

R9.3.7. Coordination of the NPIRs with transmission system Special Protection Systems and underfrequency and undervoltage load shedding programs.

R9.4. Communications and training:

R9.4.1. Provisions for communications between the Nuclear Plant Generator Operator and Transmission Entities, including communications protocols, notification time requirements, and definitions of terms.

R9.4.2. Provisions for coordination during an off-normal or emergency event affecting the NPIRs, including the need to provide timely information explaining the event, an estimate of when the system will be returned to a normal state, and the actual time the system is returned to normal.

R9.4.3. Provisions for coordinating investigations of causes of unplanned events affecting the NPIRs and developing solutions to minimize future risk of such events.

R9.4.4. Provisions for supplying information necessary to report to government agencies, as related to NPIRs.

R9.4.5. Provisions for personnel training, as related to NPIRs.

C. Measures

M1. The Nuclear Plant Generator Operator shall, upon request of the Compliance Enforcement Authority, provide a copy of the transmittal and receipt of transmittal of the proposed NPIRs to the responsible Transmission Entities. (Requirement 1)

M2. The Nuclear Plant Generator Operator and each Transmission Entity shall each have a copy of the Agreement(s) addressing the elements in Requirement 9 available for inspection upon request of the Compliance Enforcement Authority. (Requirement 2 and 9)

M3. Each Transmission Entity responsible for planning analyses in accordance with the Agreement shall, upon request of the Compliance Enforcement Authority, provide a copy of the planning analyses results transmitted to the Nuclear Plant Generator Operator, showing incorporation of the NPIRs. The Compliance Enforcement Authority shall refer to the Agreements developed in accordance with this standard for specific requirements. (Requirement 3)

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M4.1 The NPIRs have been incorporated into the current operating analysis of the electric system. (Requirement 4.1)

M4.2 The electric system was operated to meet the NPIRs. (Requirement 4.2)

M4.3 The Transmission Entity informed the Nuclear Plant Generator Operator when it became aware it lost the capability to assess the operation of the electric system affecting the NPIRs. (Requirement 4.3)

M5. The Nuclear Plant Generator Operator shall, upon request of the Compliance Enforcement Authority, demonstrate or provide evidence that the Nuclear Power Plant is being operated consistent with the Agreements developed in accordance with this standard. (Requirement 5)

M6. The Transmission Entities and Nuclear Plant Generator Operator shall, upon request of the Compliance Enforcement Authority, provide evidence of the coordination between the Transmission Entities and the Nuclear Plant Generator Operator regarding outages and maintenance activities which affect the NPIRs. (Requirement 6)

M7. The Nuclear Plant Generator Operator shall provide evidence that it informed the applicable Transmission Entities of changes to nuclear plant design, configuration, operations, limits, Protection Systems, or capabilities that would impact the ability of the Transmission Entities to meet the NPIRs. (Requirement 7)

M8. The Transmission Entities shall each provide evidence that it informed the Nuclear Plant Generator Operator of changes to electric system design, configuration, operations, limits, Protection Systems, or capabilities that would impact the ability of the Nuclear Plant Generator Operator to meet the NPIRs. (Requirement 8)

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

Regional Entity.

1.2. Compliance Monitoring Period and Reset Time Frame

Not applicable.

1.3. Compliance Monitoring and Enforcement Processes:

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

The Responsible Entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

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If a Responsible Entity is found non-compliant it shall keep information related to the noncompliance until found compliant.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information

None.

2. Violation Severity Levels

2.1. Lower: Agreement(s) exist per this standard and NPIRs were identified and implemented, but documentation described in M1-M8 was not provided.

2.2. Moderate: Agreement(s) exist per R2 and NPIRs were identified and implemented, but one or more elements of the Agreement in R9 were not met.

2.3. High: One or more requirements of R3 through R8 were not met.

2.4. Severe: No proposed NPIRs were submitted per R1, no Agreement exists per this standard, or the Agreements were not implemented.

E. Regional Differences

The design basis for Canadian (CANDU) NPPs does not result in the same licensing requirements as U.S. NPPs. NRC design criteria specifies that in addition to emergency on-site electrical power, electrical power from the electric network also be provided to permit safe shutdown. This requirement is specified in such NRC Regulations as 10 CFR 50 Appendix A — General Design Criterion 17 and 10 CFR 50.63 Loss of all alternating current power. There are no equivalent Canadian Regulatory requirements for Station Blackout (SBO) or coping times as they do not form part of the licensing basis for CANDU NPPs.
Therefore the definition of NPLR for Canadian CANDU units will be as follows:

Nuclear Plant Licensing Requirements (NPLR) are requirements included in the design basis of the nuclear plant and are statutorily mandated for the operation of the plant; when used in this standard, NPLR shall mean nuclear power plant licensing requirements for avoiding preventable challenges to nuclear safety as a result of an electric system disturbance, transient, or condition.

F. Associated Documents

Version History

Version	Date	Action	Change Tracking
1	May 2, 2007	Approved by Board of Trustees	New
2	To be determined	Modifications for Order 716 to Requirement R9.3.5 and footnote 1; modifications to bring compliance elements into conformance with the latest version of the ERO Rules of Procedure.	Revision
2	August 5, 2009	Adopted by Board of Trustees	Revised
2	January 22, 2010	Approved by FERC on January 21, 2010 Added Effective Date	Update
2.1	April 11, 2012	Errata approved by the Standards Committee; (Capitalized “Protection System” in accordance with Implementation Plan for Project 2007-17 approval of revised definition of “Protection System”)	Errata associated with Project 2007-17

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Team Roster

Project 2012-13 NUC-001-2 Five-Year Review Team

	Participant	Entity
Chair	John Gyrath	Exelon Generation LLC (Nucler)
Vice Chair	George Attarian	Duke Energy
Member	Mukund “Mookie” Chander	Entergy Services Inc.
Member	Kevin Donnelly	Consolidated Edison of NY
Member	Pete Jenkins	Luminant Generation Company LLC
Member	Jerry Whooley	PJM Interconnection
Member	Les Carter	Ontario Power Generation
NERC Staff	Sean Cavote (Lead Standards Developer)	NERC
NERC Staff	Mallory Huggins (Supporting Standards Developer)	NERC
NERC Staff	Stephen Crutchfield (Supporting Standards Developer)	NERC
NERC Staff	Laura Hussey (Director of Standards Development)	NERC

Version	Date	Description

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Conference Call Notes
Project 2012-13 Nuclear Plant Interface Coordination Five-Year Review Team

June 3, 2013 | 10:00 a.m. to 12:00 p.m. ET

Administrative

1. **Introductions**

   NERC Staff initiated the meeting and reviewed the NERC Antitrust Compliance Guidelines, Public Announcement, Participant Conduct Policy, and E-mail List Policy. Participants included:

Name	Company	Member/Observer
John Gyrath (Chair)	Exelon Generation	M
George Attarian (Vice Chair)	Duke Energy	M
Les Carter	Ontario Power	M
Mukund “Mookie” Chander	Entergy Services	M
Kevin Donnelly	ConEd	M
Pete Jenkins	Luminant Generation	M
Jerry Whooley	PJM	M
Charles Jen	CenterPoint Energy	O
Lisa Martin	Austin Energy	O
Jeff Schraufnagel	ATC	O
Jennifer Weber	TVA	O
Mike Gandolfo	FERC	O
Sean Cavote	NERC	M
Mallory Huggins	NERC	M
Stephen Crutchfield	NERC	M

2. **Review Meeting Agenda and Objectives**

   Chair John Gyrath reviewed the agenda. There were no proposed changes. Mookie Chander advised that he would be unable to attend the June 13, 2013 FYRT meeting in DC and indicated he may ask a colleague to attend as an observer.

Agenda Items

1. **Review FYRT Roster Changes**

   a. John introduced new FYRT member Les Carter, Ontario Power Generation.

2. **Review Discussion Document**

   a. Paragraph 81 retirements pending regulatory approval*:* The team discussed pending Paragraph 81 retirments and questioned whether requirements designated for retirement should be retired, retained, or moved to a guidance document. The team also discussed retiring additional requirements.

   b. Approved errata changes: Several members and observers expressed concern about incorporating the NERC glossary definition of "Protection System." The team noted that the original SDT had a more focused definition than the glossary definition, specifically, "protection systems" was intended to just be an example of a type of change that may impact the NPIRs. According to the team, it was not intended to refer to a specifically defined term that has other NERC compliance implications.

   c. Additional discussion points: The team briefly discussed implications of the Fukishima disaster and opined that subsequent NRC rulemaking activity in response to the disaster likely will not impact NUC-001-2. Several members also expressed caution about reordering or consolidating requirements, noting that reordering could cause the standard to be out of step with existing contracts.

3. **Informal Outreach**

   a. Discuss soliciting input from industry with regard to NUC-001-2: John asked team members and observers to reach out to their contacts throughout the industry for feedback on the NUC standard. George Attarian indicated he would contact his generator-side contacts on his IEEE forum.

4. **Discuss Future Meeting Dates**

   a. 8:30 a.m.-4 p.m., June 13, 2013 at the NERC offices at 1325 G Street NW, Suite 600, Washington, DC 20005

5. **Adjourn**

   The meeting was adjourned at noon.

Project 2012-13 Nuclear Plant Interface Coordination (NUC-001-2) Action Plan

Effort	Task	Description	Lead Organization	Deliverables	Estimated Completion
Internal Standards Process Preparation	Brief the Standards Committee	Informally discuss the work plan for this project with the SC	Standards	SC Talking Points document Five-Year Review Template Standards Announcement	Complete (2/28)
	Issue Standards Announcement	Invite industry SMEs to serve on the Five-Year Review Team	Standards	Standards Announcement	Complete (3/6)
	Informal outreach	Engage prospective FYRT members, including previous SDT members	Standards	Preliminary FYRT roster	Complete (3/29)
	Webinar notice	Issue notice of industry webinar	Standards	Webinar notice	Complete
	Report on FYRT nominations	Provide FYRT nomination spreadsheet to Laura Hussey's group	Wendy Muller	FYRT nominations spreadsheet	Complete (3/28)
	Informally Propose FYRT members	Review FYRT nominations with SC leadership	Standards	Draft FYRT Roster recommendation	Complete (4/9)

Effort	Task	Description	Lead Organization	Deliverables	Estimated Completion
	Propose FYRT members	Recommend FYRT members to the SC	Standards	Final FYRT Roster recommendation	Complete (4/16)
	Internal conference call to discuss five-year review	Develop plan for NERC review of directives, RBS, and P81	Standards	Five-Year Review Template	Complete (4/22)
	Finalize FYRT	Obtain SC approval of Review Team members	Standards Committee	Review Team Approval	Complete (4/22)
	Internal conference call to discuss five-year review	Finalize recommendations on directives, RBS, and P81	Standards	Preliminary Five-Year Review recommendations	Complete
Five-Year Review Preparation	Industry Training webinar	Train industry and FYRT on the five-year review process	Standards	Five-Year Review PowerPoint Five-Year Review Template	Complete (5/7)
	Advise FYRT members	Advise FYRT members and leadership of status, date range of initial FYRT conference call and face-to-face meeting (Doodle poll), and provide documents	Standards	E-mail to FYRT members Five-Year Review Template Project Action Plan	Complete (5/14)

Effort	Task	Description	Lead Organization	Deliverables	Estimated Completion
	Initial FYRT conference call	FYRT introductions, confirm receipt of documents, discuss Action Plan, discuss initial NERC recommendations, schedule first face-to-face meeting	Review Team	Meeting Notes Updated Five-Year Review Template	Complete (5/14)
	FYRT conference call	Review discussion document, discuss FYRT DC meeting agenda		Draft NUC-001-2 FYR Discussion Document	Complete (6/3)
Formal Five-Year Review	FYRT meeting	First Five-Year Review Team meeting to develop Draft Five-Year-Review Recommendation	Review Team	Draft Five-Year Review Recommendation	June 13, 2013
	Review Team conference call (if necessary)	Further develop Draft Five-Year-Review Recommendation	Review Team	Revised draft Five-Year Review Recommendation	June 24-28, 2013
	Review Team conference call or meeting	Finalize posting for comment	Review Team	Five-Year Review Recommendation	July 9-12, 2013
	Post recommendation for 45-day comment period	Recommend whether the Reliability Standard should be reaffirmed, revised, or withdrawn (comments due September 5, 2013)	Standards	Five-Year Review Recommendation	July 22, 2013
	Webinar	Advise industry of Review Team recommendation	Review Team Chair / Standards	NUC-001-2 Five-Year Review Final Recommendation PowerPoint	August 5-9, 2013

Effort	Task	Description	Lead Organization	Deliverables	Estimated Completion
Post Review Activities	Review Team conference call or Review Team Meeting	Respond to comments on original recommendation; revise as necessary	Review Team	Five-Year Review Consideration of Comments and Final Recommendation document	September 9-13, 2013
	Report to Standards Committee	Complete Five-Year Review (SC meeting is on September 19, 2013)	Review Team	Provide to Standards Committee industry comments, FYRT response to comments, and recommendation on whether the Reliability Standard should be reaffirmed, revised (SAR), or withdrawn (SAR)	September 12, 2013
	Standards Committee action	Act on FYRT recommendation	Standards Committee	Reaffirmation to the BOT or act on SAR	September 19, 2013
	Develop SAR (If necessary)				TBD
	Initial Ballot (if necessary)				TBD
	Recirculation Ballot (if necessary)				TBD
	Present to the BOT				TBD

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Five-Year Review Template

Updated February 26, 2012

Introduction

NERC has an obligation to conduct a five-year review of each Reliability Standard developed through NERC's American National Standards Institute-accredited Reliability Standards development process.[1] The Reliability Standard identified below is due for a five-year review. Your review team should use the background information and the questions below, along with any associated worksheets or reference documents, to guide a comprehensive review that results in a recommendation that the Reliability Standard should be (1) affirmed as is (i.e., no changes needed); (2) revised (which may include revising or retiring one or more requirements); or (3) withdrawn. If the team recommends a revision to the Reliability Standard, it should also submit a draft Standard Authorization Request (SAR) outlining the proposed scope and technical justification for the revision.

A completed five-year review template and any associated documentation should be submitted by email to Laura Hussey, Director of Standards Development at laura.hussey@nerc.net.

Applicable Reliability Standard:
Team Members (include name, organization, phone number, and email address): 1. 2. 3. 4. 5. 6. 7. 8.
Date Review Completed:

[1] NERC *Standard Processes Manual*, posted at http://www.nerc.com/files/Appendix_3A_Standard_Processes_Manual_20110825.pdf, at page 41.

Background Information ***(to be completed by NERC staff)***

1. Are there any outstanding Federal Energy Regulatory Commission directives associated with the Reliability Standard? (If so, NERC staff will attach a list of the directives with citations to associated FERC orders for inclusion in a SAR.)

   ☐ Yes

   ☐ No

2. Have stakeholders requested clarity on the Reliability Standard in the form of an Interpretation (outstanding, in progress, or approved), Compliance Application Notice (CAN) (outstanding, in progress, or approved), or an outstanding submission to NERC's Issues Database? (If there are, NERC staff will include a list of the Interpretation(s), CAN(s), or stakeholder-identified issue(s) contained in the NERC Issues Database that apply to the Reliability Standard.)

   ☐ Yes

   ☐ No

3. Is the Reliability Standard one of the most violated Reliability Standards? If so, does the root cause of the frequent violation appear to be a lack of clarity in the language?

   ☐ Yes

   ☐ No

   Please explain:

4. Does the Reliability Standard need to be converted to the results-based standard format as outlined in *Attachment 1: Results-Based Standards*? (Note that the intent of this question is to ensure that, as Reliability Standards are reviewed, the formatting is changed to be consistent with the current format of a Reliability Standard. If the answer is yes, the formatting should be updated when the Reliability Standard is revised.)

   ☐ Yes

   ☐ No

Questions for SME Review Team

If NERC staff answered "Yes" to any of the questions above, the Reliability Standard probably requires revision. The questions below are intended to further guide your review. Some of the questions reference documents provided by NERC staff as indicated in the Background questions above.

1. **Paragraph 81**: Does one or more of the requirements in the Reliability Standard meet criteria for retirement or modification based on Paragraph 81 concepts? Use *Attachment 2: Paragraph 81 Criteria* to make this determination.

   ☐ Yes

   ☐ No

   Please summarize your application of Paragraph 81 Criteria, if any:

2. **Clarity:** If the Reliability Standard has an Interpretation, CAN, or issue associated with it, or is frequently violated because of ambiguity, it probably needs to be revised for clarity. Beyond these indicators, is there any reason to believe that the Reliability Standard should be modified to address a lack of clarity? Consider:

   a. Is this a Version 0 Reliability Standard?
   b. Does the Reliability Standard have obviously ambiguous language or language that requires performance that is not measurable?
   c. Are the requirements consistent with the purpose of the Reliability Standard?

   ☐ Yes

   ☐ No

   Please summarize your assessment:

3. **Definitions**: Do any of the defined terms used within the Reliability Standard need to be refined?

   ☐ Yes

   ☐ No

   Please explain:

4. **Compliance Elements:** Are the compliance elements associated with the requirements (Measures, Data Retention, VRFs, and VSLs) consistent with the direction of the Reliability Assurance Initiative and FERC and NERC guidelines? If you answered "No," please identify which elements require revision, and why:

   ☐ Yes
   ☐ No

5. **Consistency with Other Reliability Standards:** Does the Reliability Standard need to be revised for formatting and language consistency among requirements within the Reliability Standard or consistency with other Reliability Standards? If you answered "Yes," please describe the changes needed to achieve formatting and language consistency:

   ☐ Yes
   ☐ No

6. **Changes in Technology, System Conditions, or other Factors:** Does the Reliability Standard need to be revised to account for changes in technology, system conditions, or other factors? If you answered "Yes," please describe the changes and specifically what the potential impact is to reliability if the Reliability Standard is not revised:

   ☐ Yes
   ☐ No

7. **Consideration of Generator Interconnection Facilities:** Is responsibility for generator interconnection Facilities appropriately accounted for in the Reliability Standard?

   ☐ Yes
   ☐ No

   Guiding Questions:

   If the Reliability Standard is applicable to GOs/GOPs, is there any ambiguity about the inclusion of generator interconnection Facilities? (If generation interconnection Facilities could be perceived to be excluded, specific language referencing the Facilities should be introduced in the Reliability Standard.)

If the Reliability Standard is not applicable to GOs/GOPs, is there a reliability-related need for treating generator interconnection Facilities as transmission lines for the purposes of this Reliability Standard? (If so, GOs and GOPs that own or operate relevant generator interconnection Facilities should be explicit in the applicability section of the Reliability Standard.)

Recommendation

The answers to the questions above, along with a preliminary recommendation of the SMEs conducting the review of the Reliability Standard, will be posted for a 45-day informal comment period, and the comments publicly posted. The SMEs will review the comments to evaluate whether to modify their initial recommendation, and will document the final recommendation which will be presented to the Standards Committee.

Preliminary Recommendation (to be completed by the SME team after its review and prior to posting the results of the review for industry comment):

- ☐ AFFIRM
- ☐ REVISE
- ☐ RETIRE

Technical Justification *(If the SME team recommends that the Reliability Standard be revised, a draft SAR may be included and the technical justification included in the SAR)*:

Preliminary Recommendation posted for industry comment (date):

Final Recommendation (to be completed by the SME team after it has reviewed industry comments on the preliminary recommendation):

- ☐ AFFIRM *(This should only be checked if there are no outstanding directives, interpretations or issues identified by stakeholders.)*
- ☐ REVISE
- ☐ RETIRE

Technical Justification *(If the SME team recommends that the Reliability Standard be revised, a draft SAR may be included and the technical justification included in the SAR)*:

Date submitted to NERC Staff:

Attachment 1: Results-Based Standards

The fourth question for NERC staff asks if the Reliability Standard needs to be converted to the results-based standards (RBS) format. The information below will be used by NERC staff in making this determination, and is included here as a reference for the SME team and other stakeholders.

RBS standards employ a defense-in-depth strategy for Reliability Standards development where each requirement has a role in preventing system failures and the roles are complementary and reinforcing. Reliability Standards should be viewed as a portfolio of requirements designed to achieve an overall defense-in-depth strategy and comply with the quality objectives identified in the resource document titled, "Acceptance Criteria of a Reliability Standard."

A Reliability Standard that adheres to the RBS format should strive to achieve a portfolio of performance-, risk-, and competency-based mandatory reliability requirements that support an effective defense-in-depth strategy. Each requirement should identify a clear and measurable expected outcome, such as: a) a stated level of reliability performance, b) a reduction in a specified reliability risk, or c) a necessary competency.

a. **Performance-Based**—defines a particular reliability objective or outcome to be achieved. In its simplest form, a results-based requirement has four components: who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome?

b. **Risk-Based**—preventive requirements to reduce the risks of failure to acceptable tolerance levels. A risk-based reliability requirement should be framed as: who, under what conditions (if any), shall perform what action, to achieve what particular result or outcome that reduces a stated risk to the reliability of the bulk power system?

c. **Competency-Based**—defines a minimum set of capabilities an entity needs to have to demonstrate it is able to perform its designated reliability functions. A competency-based reliability requirement should be framed as: who, under what conditions (if any), shall have what capability, to achieve what particular result or outcome to perform an action to achieve a result or outcome or to reduce a risk to the reliability of the bulk power system?

Additionally, each RBS-adherent Reliability Standard should enable or support one or more of the eight reliability principles listed below. Each Reliability Standard should also be consistent with all of the reliability principles.

1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.

2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.

3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.

4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.

6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.

8. Bulk power systems shall be protected from malicious physical or cyber attacks.

If the Reliability Standard does not provide for a portfolio of performance-, risk-, and competency-based requirements or consistency with NERC's reliability principles, NERC staff should recommend that the Reliability Standard be reformatted in accordance with RBS format.

Attachment 2: Paragraph 81 Criteria

The first question for the SME Review Team asks if one or more of the requirements in the Reliability Standard meet(s) criteria for retirement or modification based on Paragraph 81 concepts.[2] Use the Paragraph 81 criteria explained below to make this determination. Document the justification for the decisions throughout and provide them in the final assessment in the Five-Year Review worksheet.

For a Reliability Standard requirement to be proposed for retirement or modification based on Paragraph 81 concepts, it must satisfy **both**: (i) Criterion A (the overarching criterion) and (ii) at least one of the Criteria B listed below (identifying criteria). In addition, for each Reliability Standard requirement proposed for retirement or modification, the data and reference points set forth below in Criteria C should be considered for making a more informed decision.

Criterion A (Overarching Criterion)

The Reliability Standard requirement requires responsible entities ("entities") to conduct an activity or task that does little, if anything, to benefit or protect the reliable operation of the BES.

Section 215(a) (4) of the United States Federal Power Act defines "reliable operation" as: "… operating the elements of the bulk-power system within equipment and electric system thermal, voltage, and stability limits so that instability, uncontrolled separation, or cascading failures of such system will not occur as a result of a sudden disturbance, including a cybersecurity incident, or unanticipated failure of system elements."

Criteria B (Identifying Criteria)

B1. Administrative

The Reliability Standard requirement requires responsible entities to perform a function that is administrative in nature, does not support reliability and is needlessly burdensome.

This criterion is designed to identify requirements that can be retired or modified with little effect on reliability and whose retirement or modification will result in an increase in the efficiency of the ERO compliance program. Administrative functions may include a task that is related to developing procedures or plans, such as establishing communication contacts. Thus, for certain requirements, Criterion B1 is closely related to Criteria B2, B3 and B4. Strictly administrative functions do not inherently negatively impact reliability directly and, where possible, should be eliminated or modified for purposes of efficiency and to allow the ERO and entities to appropriately allocate resources.

[2] In most cases, satisfaction of the Paragraph 81 criteria will result in the retirement of a requirement. In some cases, however, there may be a way to modify a requirement so that it no longer satisfies Paragraph 81 criteria. Recognizing that, this document refers to both options.

B2. Data Collection/Data Retention
These are requirements that obligate responsible entities to produce and retain data which document prior events or activities, and should be collected via some other method under NERC's rules and processes.

This criterion is designed to identify requirements that can be retired or modified with little effect on reliability. The collection and/or retention of data do not necessarily have a reliability benefit and yet are often required to demonstrate compliance. Where data collection and/or data retention is unnecessary for reliability purposes, such requirements should be retired or modified in order to increase the efficiency of the ERO compliance program.

B3. Documentation
The Reliability Standard requirement requires responsible entities to develop a document (*e.g.,* plan, policy or procedure) which is not necessary to protect BES reliability.

This criterion is designed to identify requirements that require the development of a document that is unrelated to reliability or has no performance or results-based function. In other words, the document is required, but no execution of a reliability activity or task is associated with or required by the document.

B4. Reporting
The Reliability Standard requirement obligates responsible entities to report to a Regional Entity, NERC or another party or entity. These are requirements that obligate responsible entities to report to a Regional Entity on activities which have no discernible impact on promoting the reliable operation of the BES and if the entity failed to meet this requirement there would be little reliability impact.

B5. Periodic Updates
The Reliability Standard requirement requires responsible entities to periodically update (*e.g.,* annually) documentation, such as a plan, procedure or policy without an operational benefit to reliability.

This criterion is designed to identify requirements that impose an updating requirement that is out of sync with the actual operations of the BES, unnecessary, or duplicative.

B6. Commercial or Business Practice
The Reliability Standard requirement is a commercial or business practice, or implicates commercial rather than reliability issues.

This criterion is designed to identify those requirements that require: (i) implementing a best or outdated business practice or (ii) implicating the exchange of or debate on commercially sensitive information while doing little, if anything, to promote the reliable operation of the BES.

B7. Redundant
The Reliability Standard requirement is redundant with: (i) another FERC-approved Reliability Standard requirement(s); (ii) the ERO compliance and monitoring program; or (iii) a governmental regulation (*e.g.,* Open Access Transmission Tariff, North American Energy Standards Board ("NAESB"), etc.).

This criterion is designed to identify requirements that are redundant with other requirements and are, therefore, unnecessary. Unlike the other criteria listed in Criterion B, in the case of redundancy, the task or activity itself may contribute to a reliable BES, but it is not necessary to have two duplicative requirements on the same or similar task or activity. Such requirements can be retired or modified with little or no effect on reliability and removal will result in an increase in efficiency of the ERO compliance program.

Criteria C (Additional data and reference points)
Use the following data and reference points to assist in the determination of (and justification for) whether to proceed with retirement or modification of a Reliability Standard requirement that satisfies both Criteria A and B:

C1. Was the Reliability Standard requirement part of a FFT filing?
The application of this criterion involves determining whether the requirement was included in a FFT filing.

C2. Is the Reliability Standard requirement being reviewed in an ongoing Standards Development Project?
The application of this criterion involves determining whether the requirement proposed for retirement or modification is part of an active Standards Development Project, with consideration for the status of the project. If the requirement has been approved by Registered Ballot Body and is scheduled to be presented to the NERC Board of Trustees, in most cases it will not need to be addressed in the five-year review. The exception would be a requirement, such as the Critical Information Protection ("CIP") requirements for Version 3 and 4, that is not due to be retired for an extended period of time. Also, for informational purposes, whether the requirement is included in a future or pending Standards Development Project should be identified and discussed.

C3. What is the VRF of the Reliability Standard requirement?
The application of this criterion involves identifying the VRF of the requirement proposed for retirement or modification, with particular consideration of any requirement that has been assigned as having a Medium or High VRF. Also, the fact that a requirement has a Lower VRF is not dispositive that

it qualifies for retirement or modification. In this regard, Criterion C3 is considered in light of Criterion C5 (Reliability Principles) and C6 (Defense in Depth) to ensure that no reliability gap would be created by the retirement or modification of the Lower VRF requirement. For example, no requirement, including a Lower VRF requirement, should be retired or modified if doing so would harm the effectiveness of a larger scheme of requirements that are purposely designed to protect the reliable operation of the BES.

C4. In which tier of the most recent Actively Monitored List (AML) does the Reliability Standard requirement fall?

The application of this criterion involves identifying whether the requirement proposed for retirement or modification is on the most recent AML, with particular consideration for any requirement in the first tier of the AML.

C5. Is there a possible negative impact on NERC's published and posted reliability principles?

The application of this criterion involves consideration of the eight following reliability principles published on the NERC webpage.

Reliability Principles

NERC Reliability Standards are based on certain reliability principles that define the foundation of reliability for North American bulk power systems. Each reliability standard shall enable or support one or more of the reliability principles, thereby ensuring that each standard serves a purpose in support of reliability of the North American bulk power systems. Each reliability standard shall also be consistent with all of the reliability principles, thereby ensuring that no standard undermines reliability through an unintended consequence.

Principle 1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.

Principle 2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.

Principle 3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.

Principle 4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained, and implemented.

Principle 5. Facilities for communication, monitoring, and control shall be provided, used, and maintained for the reliability of interconnected bulk power systems.

Principle 6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

Principle 7. The reliability of the interconnected bulk power systems shall be assessed, monitored, and maintained on a wide-area basis.

Principle 8. Bulk power systems shall be protected from malicious physical or cyber attacks. (footnote omitted).

C6. Is there any negative impact on the defense in depth protection of the BES?
The application of this criterion considers whether the requirement proposed for retirement or modification is part of a defense in depth protection strategy. In order words, the assessment is to verify whether other requirements rely on the requirement proposed for retirement or modification to protect the BES.

C7. Does the retirement or modification promote results or performance based Reliability Standards?
The application of this criterion considers whether the requirement, if retired or modified, will promote the initiative to implement results- and/or performance-based Reliability Standards.

Rationale for NUC-001-2 R9.1 retirements under Paragraph 81

Petition:

- The reliability purpose of NUC-001-2 is to ensure the coordination between Nuclear Plant Generator Operators and Transmission Entities for nuclear plant safe operation and shutdown. The reliability purpose of NUC-001-2 is unaffected by the proposed retirement of Requirements 9.1, 9.1.1, 9.1.2, 9.1.3 and 9.1.4. Requirement 9.1 and its sub-requirements specify certain administrative elements that must be included in the agreement (required by R2) between the Nuclear Plant Generator Operator and the applicable Transmission Entities. These are a mix of technical, communication, training and administrative requirements. Requirement R9.1 and its sub-requirements are administrative tasks and the proposed retirement of these Requirements will not adversely impact reliability. Further, requiring via a mandatory Reliability Standard the inclusion of boilerplate provisions is unnecessarily burdensome relative to the other significant requirements in NUC-001-2 that pertain to performance based reliability coordination and protocols between Transmission Entities and Nuclear Plant Generator Operators. Therefore, the proposed retirement of NUC-001-2 R9.1 and all its sub-requirements creates no reliability gap.

Technical White Paper at 55-56:

The reliability purpose of NUC-001-2 is to ensure the coordination between Nuclear Plant Generator Operators and Transmission Entities for nuclear plant safe operation and shutdown. The reliability purpose of NUC-001-2 is unaffected by the proposed retirement of requirements 9.1, 9.1.1, 9.1.2, 9.1.3 and 9.1.4. Requirement 9.1 and its subrequirements specify certain administrative elements that must be included in the agreement (required by R2) between the Nuclear Plant Generator Operator and the applicable Transmission Entities. These are a mix of technical, communication, training and administrative requirements. Of those that may be classified as administrative, R9.1 and its sub-requirements clearly stand out as unnecessarily burdensome administrative tasks that do little, if anything, to benefit or protect the reliable operation of the BES. (Criteria A and B1). R9.1 and its sub-requirements are a check list of certain nontechnical boilerplate provisions generally included in modern agreements. These provisions do not directly relate to protecting BES reliability. Further, requiring via a mandatory Reliability Standard the inclusion of boilerplate provisions is unnecessarily burdensome relative to the other significant requirements in NUC-001-2 that pertain to performance based reliability coordination and protocols between Transmission Entities and Nuclear Plant Generator Operators. Therefore, the retirement of NUC-001-2 R9.1 and all its sub-requirements creates no reliability gap and are the type of provisions that would likely be in a modern agreement anyway. For these same reasons, the ERO compliance program efficiency will increase with the retirement of NUC-001-2 R9.1 and its sub-requirements because compliance monitoring time and resources will not be spent conducting a checklist of whether an agreement includes boilerplate provisions, and instead, the time and resources may be spent reviewing adherence with the technical, substantive coordination and protocol provisions of NUC-001-2.

Rulemaking for Station Blackout Mitigation Strategies

RIN number: 3150-AJ08

NRC Docket ID: NRC-2011-0299

Regulatory Basis Document

April 2013

Table of Contents

Acronyms

10 CFR	Title 10 of the *Code of Federal Regulations*
AEC	Atomic Energy Commission
ac	Alternating current
ADAMS	Agencywide Documents Access and Management System
ANPR	Advance notice of proposed rulemaking
COL	Combined License
CP	Construction permit
DBA	Design basis accident
DC	Design certification
dc	Direct current
ELAP	Extended loss of ac power
EOP	Emergency operating procedures
FLEX	Diverse and flexible coping strategies
GDC	General design criterion
ISG	Interim Staff Guidance
LOOP	Loss of offsite power
ML	Manufacturing license
NEI	Nuclear Energy Institute
NTTF	Near-Term Task Force
NRC	Nuclear Regulatory Commission
NUMARC	Nuclear Management and Resources Council
OMB	Office of Management and Budget
OL	Operating license
PDC	Principal design criteria
PRM	Petition for rulemaking
RCS	Reactor coolant system
RG	Regulatory Guide
SBO	Station blackout
SDA	Standard design approval
SFP	Spent fuel pool
SRM	Staff requirements memorandum
SSC	Structure, system, and component

1. Executive Summary

The Nuclear Regulatory Commission (NRC), in the staff requirements memorandum (SRM) on SECY-11-0124, dated October 18, 2011, approved the NRC staff's proposed actions to implement without delay the development of a regulatory basis, proposed rule, and implementing guidance to enhance the capability of nuclear power plants to maintain safety through a prolonged station blackout (SBO) (Ref. 1). The anticipated regulatory actions originate in large measure from Recommendations 4 and 7 of *The Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident* (NTTF report), Enclosure (1) to SECY-11-0093, *The Near-Term Report and Recommendations for Agency Actions Following the Events in Japan*, dated July 12, 2011 (Ref. 2). In SRM-SECY-2011-0124, the Commission directed the NRC staff to: initiate a rulemaking for recommendation 4.1, *Station blackout regulatory actions*, as an advance notice of proposed rulemaking (ANPR); designate the SBO rulemaking associated with Near-Term Task Force(NTTF) Recommendation 4.1 as a high-priority rulemaking; craft recommendations that continue to realize the strengths of a performance-based system as a guiding principle and consider approaches that are flexible and able to accommodate a diverse range of circumstances and conditions.

In SRM-COMSECY-13-002, dated March 4, 2013, the Commissioners instructed the NRC staff to consolidate rulemaking activities associated with NTTF Recommendation 4 (strengthening station blackout mitigation capability at all operating and new reactors for design-basis and beyond-design-basis external events) and NTTF Recommendation 7 (enhancing spent fuel pool (SFP) makeup capability and instrumentation for the spent fuel pool) into one rulemaking, entitled the *Station Blackout Mitigation Strategies Rulemaking* (Ref. 3).

This regulatory basis document concludes that there is sufficient basis to fulfill the Commission's explicit direction, as documented in SRM-SECY-11-0124 and SRM-COMSECY-13-002, to address station blackout mitigation strategies in a rulemaking.

2. Introduction

The alternating current (ac) electric power for essential and nonessential service in a nuclear power plant is supplied primarily by offsite power. Redundant onsite emergency ac power systems also are provided in the event that all offsite power sources are lost. These systems provide power for various safety systems, including reactor core decay heat removal and containment heat removal systems that are important for preserving the integrity of the reactor core and the containment building, respectively. The reactor core decay heat also can be removed for a limited time period by safety systems that are independent of ac power.

Under the current regulatory framework, the term "station blackout" means the loss of offsite ac power to the essential and nonessential electrical buses concurrent with a turbine trip and the unavailability of the redundant onsite emergency ac power system (e.g., as a result of units out of service for maintenance or repair, failure to start on demand, or failure to continue to run after start) except for available ac power to buses fed by station batteries through inverters or by alternate ac sources as defined in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.2 (Ref. 4). If an SBO persists for longer than the ac-independent systems are capable of removing decay heat, core melt and containment failure could result. Current regulations require nuclear power plants to be able to withstand, and recover from, an SBO of a duration determined in accordance with 10 CFR 50.63 (Ref. 4), "Loss of all alternating current power" (sometimes referred to as the SBO rule) and to ensure core cooling and appropriate containment integrity for the specified duration. For a multiunit site, station blackout was assumed to occur only at one unit.

The events that occurred at the Fukushima Dai-ichi Nuclear Power Plant site, however, highlight the possibility that extreme natural phenomena could challenge the prevention, mitigation, and emergency preparedness defense-in-depth layers that are currently in place under the NRC's regulatory framework. On March 11, 2011, a magnitude 9.0 earthquake struck off the coast of the Japanese island of Honshu. The earthquake resulted in a large tsunami which inundated the Fukushima Dai-ichi site. The earthquake and tsunami produced widespread devastation across northeastern Japan and significantly affected the infrastructure and industry in the northeastern coastal areas of Japan. When the earthquake occurred, Fukushima Dai-ichi Units 1, 2, and 3 were in operation; and Units 4, 5, and 6 were shut down for routine refueling and maintenance activities. The Unit 4 reactor fuel had been offloaded into the Unit 4 spent fuel pool to facilitate maintenance activities in the reactor pressure vessel.

Shortly after the earthquake, the three operating units automatically shut down, and offsite power was lost to the entire facility. The emergency diesel generators started at all six units, providing ac electrical power to critical systems at each unit. Approximately 40 minutes after the earthquake and shutdown of the operating units, the first large tsunami wave inundated the site, followed by additional waves. The tsunami caused extensive damage to site facilities and resulted in a complete loss of all ac electrical power at Units 1 through 5 (i.e., an SBO). In addition, all direct current (dc) electrical power was lost early in the event at Units 1 and 2, and after some period of time at Units 3 through 6. Unit 6 retained the function of one air-cooled emergency diesel generator. Despite their actions, the operators lost the ability to cool the fuel in the Unit 1 reactor after several hours, in the Unit 3 reactor after about 36 hours, and in the Unit 2 reactor after about 70 hours, resulting in damage to the nuclear fuel shortly after the loss of cooling capabilities.

The limitations in time and unpredictable conditions associated with the accident significantly challenged attempts by the responders to preclude core damage and containment failure.

As discussed in this regulatory basis, the NRC's assessment of insights from the events at Fukushima Dai-ichi leads the NRC ----staff to conclude that requirements are necessary for all licensees and applicants (both current and new reactor licensees and applicants including design certifications) to mitigate an extended loss of all ac power condition, including the loss of normal access to the ultimate heat sink resulting from beyond-design-basis external events. Regarding loss of access to the ultimate heat sink, it should be noted that the NRC required passive new reactor designs that have the atmosphere as the ultimate heat sink to take a different approach. The NRC staff plans to issue a proposed rule amending NRC regulations to address these scenarios.

2.1 NRC's Response to Fukushima

In the days following the Fukushima Dai-ichi nuclear accident in Japan, the NRC Chairman directed the NRC staff to establish a senior-level agency task force to conduct a methodical and systematic review of the NRC's processes and regulations to determine whether the agency should make additional improvements to its regulatory system and to offer recommendations to the Commission for its policy direction. This direction was provided in a tasking memorandum (COMGBJ-11-0002), dated March 23, 2011, from the NRC Chairman to the NRC Executive Director for Operations (Ref. 32). In response to this tasking memorandum, the NRC chartered the NTTF.

In SECY-11-0093, the NTTF provided a number of recommendations, including a specific proposal for long term station blackout mitigation to the Commission. The recommendation regarding SBO and the need for revising 10 CFR 50.63, sometimes referred to as the SBO rule (Ref. 2), was subsequently endorsed by the Natural Resources Defense Council in a petition for rulemaking (PRM), PRM-50-101 (Ref. 5). The NTTF suggested enhanced station blackout mitigation strategies, within NTTF Recommendation 4.1, as follows:

> Initiate rulemaking to revise 10 CFR 50.63 to require each operating and new reactor licensee to: (1) establish a minimum coping time of 8 hours for a loss of all ac power,[1] (2) establish the equipment, procedures, and training necessary to implement an "extended loss of all ac" coping time of 72 hours for core and spent fuel pool cooling and for reactor coolant system and primary containment integrity as needed, and (3) preplan and prestage offsite resources to support uninterrupted core and spent fuel pool cooling, and reactor coolant system and containment integrity as needed, including the ability to deliver the equipment to the site in the time period allowed for extended coping, under conditions involving significant degradation of offsite transportation infrastructure associated with significant natural disasters.

In the same section of the report, the NTTF made another key recommendation that significantly impacts this rulemaking activity, identified as Recommendation 4.2:

[1] Recommendation 4.1 also called for protecting coping systems and equipment from damage from all design-basis events and extended beyond-design-basis events by either locating the equipment one level (i.e., 5 to 6 meters (15 to 20 feet)) above the plant design-basis flooding level or in water-tight enclosures. This issue is under consideration as part of the NRC's response to NTTF Recommendation 2.1, the re-evaluation of the design-basis flood levels.

> Order licensees to provide reasonable protection for equipment currently provided pursuant to 10 CFR 50.54(hh)(2) from the effects of design-basis external events and to add equipment as needed to address multiunit events while other requirements are being revised and implemented.

The SRM- SECY-11-0093, dated August 19, 2011, directed the NRC staff to identify and "make recommendations regarding any Task Force recommendations that can, and in the staff's judgment, should be implemented, in part or in whole, without unnecessary delay" (Ref. 6). Accordingly, in SECY-11-0124, dated September 9, 2011, and SECY-11-0137 dated October 3, 2011, (Ref. 7 and Ref. 8, respectively), with regard to NTTF Recommendation 4, the staff recommended that the Commission undertake the following as near-term actions:

> Engage stakeholders in support of rulemaking activities to enhance the capability to maintain safety through a prolonged SBO. These activities will include the development of the regulatory basis, a proposed rule, and implementing guidance [related to NTTF Recommendation 4.1].
>
> Develop and issue Orders to licensees to provide reasonable protection of the equipment used to satisfy the requirements of 10 CFR 50.54(hh)(2) from the effects of external events, and to establish and maintain sufficient capacity to mitigate multi-unit events. This would include stakeholder interactions to define acceptance criteria for reasonable protection of 10 CFR 50.54(hh)(2) equipment from design basis external hazards [related to NTTF Recommendation 4.2].

In SRM-SECY-11-0124 (Ref. 1), the Commission approved the NRC staff's proposed actions to implement without delay the NTTF recommendations as described in SECY-11-0124 (Ref. 7). The Commission approved the NRC staff's proposed prioritization of the NTTF recommendations, including the staff's proposals for addressing the NTTF recommendations. With regard to the portions of the SRM having relevance to this regulatory action, the Commission directed the staff to:

- Initiate a rulemaking for recommendation 4.1, Station blackout regulatory actions, as an ANPR rather than as a proposed rule.

- Designate the SBO rulemaking associated with NTTF Recommendation 4.1 as a high-priority rulemaking with a goal of completion within 24 to 30 months.

- Craft recommendations that continue to realize the strengths of a performance-based system as a guiding principle. In developing these recommendations, the Commission directed the NRC staff to consider approaches that are flexible and able to accommodate a diverse range of circumstances and conditions. The Commission noted that "[i]n consideration of events beyond the design basis, a regulatory approach founded on performance-based requirements will foster development of the most effective and efficient, site-specific mitigation strategies, similar to how the agency approached the approval of licensee response strategies for the "loss of large area" event under its B.5.b program (Ref. 1)."

- Monitor nuclear industry efforts underway to strengthen SBO coping times and consider whether any interim regulatory controls (e.g., commitment letters or confirmatory action

letters) for coping strategies for SBO events would be appropriate while rulemaking activities are in progress.

- For NTTF Recommendations 4.2 and 5.1, provide the Commission with notation vote papers for its approval of the Orders once the NRC staff has engaged stakeholders and established the requisite technical bases and acceptance criteria.

Order EA-12-049

In accordance with SRM-SECY-11-0124, the NRC staff provided SECY-12-0025, *Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami*, to the Commission on February 17, 2012 (Ref. 9), including the proposed Order to implement enhanced mitigation strategies. As directed by SRM-SECY-12-0025, the NRC staff issued Order EA-12-049, *Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, on March 12, 2012 (Refs. 31 and 10). Order EA-12-049 imposed new requirements to implement mitigating strategies for beyond-design-basis external events as defense-in-depth measures to address the uncertainties associated with such events. The Order significantly expanded the regulatory scope under NTTF Recommendation 4.2 in SECY-11-0124, as discussed below in the section entitled, *Consolidation of Recommendation 4 and 7 Regulatory Activities*.

The Order requires a three-phase approach for mitigating beyond-design-basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool cooling. The transition phase requires provision of sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely. The Commission concluded that the EA-12-049 requirements were necessary for ensuring continued adequate protection of public health and safety.

On March 30, 2012, the Commission issued Memorandum and Order CLI-12-09, *In the Matter of South Carolina Electric & Gas Co. and South Carolina Public Service Authority (Also Referred to as Santee Cooper; Virgil C. Summer Nuclear Station, Units 2 and 3),* which includes requirements for mitigation strategies as a license condition for Virgil C. Summer Nuclear Station, Units 2 and 3 (Ref. 11).

In response to Order EA-12-049, the Nuclear Energy Institute (NEI) developed an industry implementation guidance document for NRC's review. NEI 12-06 Rev. 0, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide* provides one approach for complying with the mitigating strategies order (Ref. 12). The NRC staff endorsed the industry guidance in Interim Staff Guidance (ISG), JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond-Design-Basis External Events* (Ref. 13).

Advanced Notice for Proposed Rulemaking

To gather information for the SBO rulemaking, the NRC published an ANPR in the *Federal Register* on March 20, 2012. This ANPR began the process for considering amendments to the NRC's regulations that address SBO (Ref. 14). The ANPR provided background on the Fukushima Dai-ichi event and the NRC response, as well as background information on the

current requirements related to SBO. The ANPR sought public comment on specific questions and issues with respect to possible revisions of the NRC's requirements addressing SBO conditions and this regulatory basis. The NRC considered the ANPR comments as part of the effort to formulate this regulatory basis.

August 2012 Commission Direction

Following a Commission briefing on August 7, 2012, the NRC staff received further direction from the Commission's SRM on the briefing (Ref. 15). The Commission directed that:

> In developing the proposed rule on mitigating strategies, the staff should ensure that potential failures or challenges to the implementation of these strategies are identified and resolved appropriately.

Consolidation of NTTF Recommendation 4 and 7 Regulatory Activities

COMSECY-13-0002, *Consolidation of Japan Lessons-Learned Near-Term Task Force Recommendations 4 and 7 Regulatory Activities*, dated January 25, 2013, requested approval to consolidate regulatory activities associated with NTTF Recommendations 4 and 7 into a single rulemaking (Ref. 16). The request included a schedule adjustment to enable the rulemaking activity to be informed by the implementation of the mitigating strategies Order EA-12-049. The request was approved by the Commission in an SRM dated March 4, 2013 (Ref. 3).

Order EA-12-049 imposed new requirements to implement mitigating strategies as defense-in-depth measures to address the uncertainties associated with beyond-design-basis external events (Ref. 10). The Order was a significant expansion of the regulatory action envisioned in NTTF Recommendation 4.2, and as recommended by the NRC staff in SECY-11-0124, because the scope of the Order goes beyond augmenting the equipment required by 10 CFR 50.54(hh)(2) and protecting it from external events. External stakeholder feedback collected from public meetings held in December 2011 and January 2012 helped shape the regulatory scope of the Order. As a result of this feedback, the Order's scope includes the following requirements:

- Develop, implement, and maintain mitigating strategies designed to maintain or restore the key functional capabilities following beyond-design-basis external events (i.e., core cooling, containment, and spent fuel pool cooling);
- Implement strategies capable of mitigating a simultaneous loss of all ac power and loss of normal access to the ultimate heat sink;
- Assume that ac power sources will not be restored;
- Implement strategies that have adequate capacity to address challenges to core cooling, containment, and spent fuel pool cooling at all units on site;
- Reasonably protect equipment relied upon for mitigation of external events;
- Establish the ability to implement mitigation strategies in any mode;

- Implement a three-phase approach that enables mitigation for an indefinite time period: the first phase uses installed equipment, the second phase uses portable and onsite equipment, and the final phase allows for offsite assistance.

The above requirements exceed the initial regulatory concept of procuring additional portable equipment and using existing Section 50.54(hh)(2) strategies, in part because Section 50.54(hh)(2) strategies are not designed to handle a site-wide external event for which offsite ac power is lost indefinitely (Ref. 4). As explained below, the broad scope of the order largely encompasses all of NTTF Recommendation 4, including NTTF Recommendations 4.1 and 4.2.

With regard to recommendation 7 and its consolidation within this rulemaking effort, the NTTF recommended that the Commission direct the NRC staff to: [2]

7.1 Order licensees to provide sufficient safety-related instrumentation, able to withstand design-basis natural phenomena, to monitor key spent fuel pool parameters (i.e., water level, temperature, and area radiation levels) from the control room.

7.2 Order licensees to provide safety-related ac electrical power for the spent fuel pool makeup system.

7.3 Order licensees to revise their technical specifications to address requirements to have one train of onsite emergency electrical power operable for spent fuel pool makeup and spent fuel pool instrumentation when there is irradiated fuel in the spent fuel pool, regardless of the operational mode of the reactor.

7.4 Order licensees to have an installed seismically qualified means to spray water into the spent fuel pools, including an easily accessible connection to supply the water (e.g., using a portable pump or pumper truck) at grade outside the building.

7.5 Initiate rulemaking or licensing activities or both to require the actions related to the spent fuel pool described in detailed recommendations 7.1–7.4.

The NRC staff, in SECY-11-0137, recommended the following regulatory activities to address the Recommendation 7 concerns (Ref. 8):

- The NRC, as a near-term action, should undertake regulatory activities to engage stakeholders to inform the determination of (1) what constitutes reliable (potentially

[2] On July 26, 2011, the Natural Resources Defense Council submitted PRM-50-100, "Require Licensees To Improve Spent Nuclear Fuel Pool Safety," requesting that the NRC institute a rulemaking to require licensees to (1) provide sufficient safety-related instrumentation, able to withstand design-basis natural phenomena, to monitor key spent fuel pool parameters (i.e., water level, temperature, and area radiation levels) from the control room; (2) provide safety-related ac electrical power for the spent fuel pool makeup system; (3) revise their technical specifications to address requirements to have one train of onsite emergency electrical power operable for spent fuel pool makeup and spent fuel pool instrumentation when there is irradiated fuel in the spent fuel pool, regardless of the operational mode of the reactor; and (4) have an installed seismically qualified means to spray water into the spent fuel pools, including an easily accessible connection to supply the water (e.g., using a portable pump or pumper truck) at grade outside the building (Ref. 17). This PRM is related to the actions called for under Recommendation 7.

safety-related) SFP instrumentation, (2) what conditions the instrumentation must withstand to fulfill its intended function, (3) which SFP parameters should be monitored (e.g., water level, temperature, and area radiation levels), (4) what makeup strategies could be implemented, and (5) where indications are needed (e.g., control room and/or remote location) (associated with NTTF recommendation 7.1).

- Develop and issue order to licensees to provide reliable SFP instrumentation (associated with NTTF recommendation 7.1).

- Once sufficient technical information is available, the staff recommends that the NRC undertake regulatory activities to engage stakeholders in support of rulemaking activities to provide reliable SFP instrumentation and makeup capabilities. These activities will include the development of the regulatory basis, a proposed rule, and implementing guidance consistent with the rulemaking process established in SECY-11-0032 .

The NRC issued EA-12-051, *Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation* on March 12, 2012, to address the regulatory issues stemming from NTTF Recommendation 7.1 (Ref. 18). Regarding the remaining regulatory issues stemming from NTTF Recommendation 7, the expansive scope of the mitigating strategies Order also resulted in the NRC addressing a majority of the actions related to the spent fuel pool in NTTF Recommendation 7. Specifically, the Order requires mitigating strategies that maintain or restore spent fuel pool cooling capabilities. The resulting mitigating strategies provide increased capability to maintain or restore spent fuel pool cooling, independent of ac power. The spent fuel pool strategies include the use of self-powered, portable pumps through multiple connection points, including connections diverse from the spent fuel pool deck to provide makeup to the pool. These strategies make use of spent fuel pool level instrumentation required by EA-12-051. Accordingly, the NRC staff concluded that it was most efficient to address Recommendation 7 within the Recommendation 4 rulemaking activities (i.e., the Station Blackout Mitigation Strategies rulemaking that is the subject of this regulatory basis).

Table 1 attached to COMSECY-13-0002 describes how NTTF Recommendation 4 and Recommendation 7 are being addressed through implementation of the mitigating strategies Order and through a rulemaking of similar regulatory scope (Ref. 16). The rulemaking (for which this regulatory basis is developed) would make the Order requirements generically applicable and would consider external stakeholder feedback and lessons learned from implementation of the mitigating strategies Order, including whether there are any potential failures or challenges associated with the implementation of the mitigating strategies per direction in the August 2012 SRM (Ref.15).

2.2 Current SBO-Related Regulatory Requirements

This section discusses the NRC's current SBO-related regulatory requirements and guidance. Current NRC licensees, construction permits (CP) holders, and Combined License (COL) holders authorized to operate or construct nuclear power plants in accordance with the Atomic Energy Act of 1954, as amended, and 10 CFR Part 50, *Domestic Licensing of Production and Utilization Facilities* (Ref. 4), and Part 52, *Licenses, Certifications, and Approvals for Nuclear Power Plants* (Ref. 19), are required to comply with a variety of regulatory requirements related to station blackout mitigation. (Any new rulemaking addressing SBO mitigating strategies also would affect these same entities.)

General Design Criteria [3,4]

The general design criteria relevant to a potential SBO rulemaking are general design criterion (GDC) 2, which governs consideration of natural phenomena, and GDC 17, which governs electrical system design.[5]

General Design Criterion 2 requires nuclear power plants designed in accordance with appendix A to 10 CFR Part 50 to be protected against natural phenomena. Specifically, GDC-2 requires:

> *Criterion 2—Design bases for protection against natural phenomena.* Structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. The design bases for these structures, systems, and components shall reflect: (1) Appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena and (3) the importance of the safety functions to be performed.

General Design Criterion 17 governs electric power systems for nuclear power plants designed in accordance with appendix A to 10 CFR Part 50. GDC 17 states:

> An onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor

[3] As defined in 10 CFR 50.2, "design basis" means that information that identifies (1) the specific functions to be performed by a facility structure, system, or component (SSC), and (2) the specific values or ranges of values chosen for controlling parameters as reference bounds for design. The actual detailed design of facility SSCs must reflect the assigned design basis functions and assure performance of those functions within the reference bounds for design. An applicant for a construction permit or combined license for a facility is required, pursuant to 10 CFR 50.34(a)(3) or 52.79(a)(4)(i), respectively, to describe the principal design criteria (PDC) for the proposed facility. The PDC generally identify facility SSCs and their functions, which are part of the design bases described above. U.S. facilities for which construction permits were issued before 1971 had plant-specific PDC because the Atomic Energy Commission (AEC), the regulatory divisions of which was the predecessor to the NRC, had yet to develop generic requirements for facility design criteria at that time.

[4] On February 20, 1971, the AEC published the final GDC and added appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR part 50 (36 FR 3255) (Ref. 20). The GDC provide minimum requirements for facility PDC and form part of the facility design basis because they identify SSCs and their required functions at a high level. NRC regulations, including the GDC and plant-specific PDC, set general minimum standards for the values or ranges of values chosen for controlling parameters as reference bounds for design, which is the second element of the design bases defined in 10 CFR 50.2. As a practical matter, these values or ranges of values are normally determined in accordance with detailed NRC guidance applicable to the particular SSCs found in nuclear power facilities.

[5] For facilities with construction permits issued before 1971, plant-specific PDC, which differ in certain respects from GDC 2 and 17, identify facility SSCs and their functions. A significant fraction of currently operating nuclear power facilities were licensed in accordance with plant-specific PDC rather than the GDC.

> coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.
>
> The onsite electric power sources, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.
>
> Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available in sufficient time following a loss of all onsite alternating current power supplies and the other offsite electric power circuit, to assure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits shall be designed to be available within a few seconds following a loss-of-coolant accident to assure that core cooling, containment integrity, and other vital safety functions are maintained.
>
> Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.

GDC 17 (and its predecessor plant-specific, principle design criterion) establishes requirements for the design of onsite and offsite electric power systems that are intended to reduce the probability of losing all ac power to an acceptable level. GDC 17 establishes the design basis for the ac electric systems and does not address events beyond the design basis.

In the 1970s and 1980s, as operating experience accumulated, the NRC staff developed concerns over the reliability of both the onsite and offsite emergency ac power systems. The NRC staff learned of many events in which operating plants experienced a total loss of offsite power (LOOP), which is a design basis event under GDC 17. Some events involved failure of diesel generators. A few events involved a complete loss of both the offsite and the onsite ac power systems. Since the design basis in GDC 17 accounts for a single failure in the onsite ac power system, the complete failure of the onsite ac power system concurrent with a loss of offsite power is a beyond-design-basis event. Although ac power was restored in a short time without any serious consequences in those few events, the NRC staff identified a need for an SBO rulemaking to require operating plants to cope with such events, as discussed in the next section.

Station Blackout Rule (Section 50.63)

The term “station blackout” is defined in 10 CFR 50.2 as follows (Ref. 4):

> the complete loss of alternating current (ac) electric power to the essential and nonessential switchgear buses in a nuclear power plant (i.e., loss of offsite

> electric power system concurrent with turbine trip and unavailability of the onsite emergency ac power system). Station blackout does not include the loss of available ac power to buses fed by station batteries through inverters or by alternate ac sources as defined in 10 CFR 50.2, nor does it assume a concurrent single failure or design basis accident [DBA]. At single unit sites, any emergency ac power source(s) in excess of the number required to meet minimum redundancy requirements (i.e., single failure) for safe shutdown (non-DBA) is assumed to be available and may be designated as an alternate power source(s) provided the applicable requirements are met. At multi-unit sites, where the combination of emergency ac power sources exceeds the minimum redundancy requirements for safe shutdown (non-DBA) of all units, the remaining emergency ac power sources may be used as alternate ac power sources provided they meet the applicable requirements. If these criteria are not met, station blackout must be assumed on all the units.

The SBO rule was developed based on insights gained from several plant-specific probabilistic safety studies; operating experience; and reliability, accident sequence, and consequence analyses completed between 1975 and 1988. The final rule containing SBO requirements was published on July 21, 1988 (Ref. 21). The Commission issued the SBO rule based on operating experience suggesting that both onsite emergency ac power systems and offsite power from the transmission network might be less reliable than originally anticipated, even for plants designed to meet GDC 17 of appendix A to 10 CFR part 50. The objective of the rule was to reduce the risk of severe accidents resulting from SBO by maintaining highly reliable ac electric power systems and, as additional defense-in-depth, assuring that plants can cope with an SBO for a specified duration. As indicated above, the SBO rule addresses an event involving a loss of offsite power (a design basis event) concurrent with the loss of all onsite ac power sources (a beyond-design-basis internal event). NRC guidance for implementing the SBO rule can be found in Regulatory Guide (RG) 1.155, *Station Blackout* (Ref. 22), which endorses Nuclear Management and Resources Council (NUMARC) 8700, *Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors,* dated November 1987, with certain exceptions and clarifications (Ref. 23).

The SBO rule requires that nuclear power plants have the capability to withstand an SBO and maintain core cooling and containment integrity for a specified duration.[6] The specified SBO duration for a plant is determined based on (1) the redundancy of the onsite emergency ac power sources, (2) the reliability of the onsite emergency ac power sources, (3) the expected frequency for a loss of offsite power event at the particular site, and (4) the probable time needed to restore offsite power. The assumption used for a loss of offsite power event at a plant site was an initiating event resulting from a switchyard-related or grid-related event due to random faults or an external event, such as a grid disturbance, or weather events such as high winds, snow, and ice loading that affect the offsite power system either throughout the grid or at the plant.

During the development of the SBO rule, the NRC staff concluded that there was a sufficiently low likelihood of a loss of offsite power generated by a fire, flood, or seismic activity and that preexisting licensing requirements specified sufficient protective measures such that loss of

[6] The existing SBO rule does not address spent fuel pool cooling. Presumably, this was a result of the relative short duration of the maximum determined SBO event duration of 16 hours and the ability of the spent fuel pool inventory to continually cover the fuel for this duration.

offsite power events from such causes need not be considered under the SBO rule requirements. See NUREG-1032 (Ref. 24) for further detail.

In order to meet the requirements of the SBO rule, licensees modified some stations in order to cope with their specified duration for an SBO event, depending on the station's existing capability. For example, licensees added an alternate ac power source or increased the capacity of the station batteries, plant instrument air system, or condensate storage tank. The SBO rule allows licensees to rely on an alternate ac source to cope with an SBO. Alternate ac source is defined in Section 50.2 as follows (Ref. 4):

> Alternate ac source means an alternating current (ac) power source that is available to and located at or nearby a nuclear power plant and meets the following requirements:
>
> (1) Is connectable to but not normally connected to the offsite or onsite emergency ac power systems;
>
> (2) Has minimum potential for common mode failure with offsite power or the onsite emergency ac power sources;
>
> (3) Is available in a timely manner after the onset of station blackout; and
>
> (4) Has sufficient capacity and reliability for operation of all systems required for coping with station blackout and for the time required to bring and maintain the plant in safe shutdown (non-design basis accident).

The SBO rule also requires that alternate ac sources at multiunit sites where onsite emergency ac sources are shared between units (i.e., where there exists excess capacity of the non-SBO unit's emergency ac power system) have the capability to bring all units to, and maintain them in, safe shutdown (non-design basis accident (non-DBA)). Safe shutdown (non-DBA) is defined in Section 50.2 as follows (Ref. 4):

> *Safe shutdown* (non-design basis accident (non-DBA)) for station blackout means bringing the plant to those shutdown conditions specified in plant technical specifications as Hot Standby or Hot Shutdown, as appropriate (plants have the option of maintaining the [reactor coolant system] RCS at normal operating temperatures or at reduced temperatures).

In addition, licensees enhanced station procedures and training for restoring both offsite and onsite ac power sources. The NRC and licensees also increased their emphasis on establishing and maintaining high reliability of onsite emergency power sources. The SBO rule does not require systems and equipment used to cope with SBO to meet 10 CFR part 50 quality assurance requirements for safety-related equipment (Ref. 4); instead, Appendix A of RG 1.155 provides the applicable quality assurance guidance for non-safety systems and equipment used to meet the SBO rule requirements (Ref. 22).

After a licensee or applicant has submitted the information required by the SBO rule regarding the "specified duration" of an SBO for its facility and the NRC has determined that information adequate, the SBO rule does not require the licensee to update either the specified duration or the coping analysis. If the licensee, on its own volition, chooses to modify the facility, and that

significantly impacts how the plant mitigates the consequence of an SBO event, then NRC review and approval could be involved, and then this information would be updated as part of that review. Nonetheless, the parameters that were used for inputs into both the determination of the specified duration and the SBO coping analysis are subject to change over time. These parameters include the number of loss of offsite power events expected at a particular site, recovery time for offsite power, frequency of grid blackout events, and diesel generator reliability. Changes to these parameters may have a significant effect on the SBO duration and coping analyses, and these may differ from the original determination performed by a licensee.[7] If the NRC determines that a licensee's plans for coping with an SBO are no longer adequate, the NRC can require a licensee to modify its SBO plans or related equipment as necessary, so long as the NRC satisfies the requirements of the Backfit Rule in 10 CFR 50.109 (Ref. 4).

3. Technical Basis for Incorporating Mitigating Strategies Requirements into Regulations

The NRC's existing rules address many aspects related to SBO mitigating strategies that the NRC staff is considering in this potential rulemaking, as discussed in the previous section. However, the types of events addressed by the existing SBO regulations in 10 CFR 50.63 only include switchyard-related or grid-related events, due to random faults or other grid disturbance, or weather events, such as high winds, snow, and ice loading that affect the offsite power system either throughout the grid or at the plant. Typically, these events involve recovery of offsite or onsite power within a few hours. While the existing SBO rule does require consideration of a loss of offsite power and the probable time to restore offsite power in determining the specified duration, it does not require consideration of a loss of offsite power caused by a fire, flood, or seismic activity because the NRC concluded that the likelihood of such events was sufficiently low. The SBO rule also does not address maintaining or restoring SFP cooling. As such, NRC regulations do not currently contain requirements to address the mitigation of extended loss of all ac power, including loss of normal access to the ultimate heat sink due to beyond-design-basis external events of the type Order EA-12-049 was issued to address.

Section 50.63 also does not fully cover events that impact more than one unit at a site with two or more units. Based on its review of recent loss of offsite power data and the Fukushima event, the NRC staff has determined that loss of offsite power events can affect all nuclear power plants on a multiunit site. Understanding that the probability of all emergency power sources failing would generally be low, consideration must be given to those nuclear power plants with less robust electrical power system designs, including those with extended allowed outage times for performing online maintenance of the emergency power systems. The SBO rule was intended to require measures to cope with a loss of offsite power concurrent with the loss of all onsite ac power sources, which is a beyond-design-basis internal event, but not a beyond-design-basis external event such as occurred at Fukushima Dai-ichi.

Table 1 provides a comparison of the requirements and corresponding guidance for the existing SBO rule (10 CFR 50.63) and Order EA-12-049 (and corresponding license conditions for

[7] Current operating reactor licensees without alternate ac power sources were required to perform coping analyses to determine the SBO durations, typically resulting in 4 hours. Coping analyses performed using more recent information and assumptions based on current operating experience would result in longer specified durations, typically up to 16 hours.

subsequent COLs granted, hereinafter referred to collectively as EA-12-049). The table shows that the Order requirements cover scenarios that Section 50.63 was not intended to cover.

Table 1. Comparison of Section 50.63 and Order EA-12-049

	10 CFR 50.63	EA-12-049
Regulatory guidance	RG 1.155 and NUMARC 87-00	JLD-ISG-2012-01and NEI-12-06
Initiating event	LOOP due to grid-centered, switchyard-centered, and severe weather events	Beyond-design-basis external events
Initial plant condition	Loss of all ac power (not including the loss of ac power from buses fed by batteries through inverters, or as supplied by alternate ac power sources)	Loss of all ac power and loss of normal access to the ultimate heat sink (not including the loss of ac power from buses fed by batteries through inverters)
General requirement	Ability to withstand and recover from a loss of all ac power for a specified duration (determined in accordance with supporting guidance) based on plant characteristics and local grid reliability	Ability to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities for all of a licensee's units at the site following a loss of all ac power for an indefinite period of time from all modes of operation
Analysis requirement	Determine a specified duration (coping time) based on: • Onsite ac system configuration • Average diesel reliability • Expected frequency of LOOP • Probable restoration time for offsite power (This was a single determination accomplished at the time of implementation.) Evaluate the plant's actual ability to cope with loss of all ac power	Engineering analysis sufficient to provide a technical basis for equipment capability/capacity and identification of time constraints Demonstrate ability to transition between phases of strategies

	10 CFR 50.63	EA-12-049
Requirements on plant procedures and equipment	-Highly reliable ac power system -Procedures and training to restore offsite and onsite power -Plant capability to cope with an SBO for a specified duration -Maintain diesel generator reliability	Development of a three-phased strategy: -Phase 1: installed equipment -Phase 2: onsite portable equipment and supplies -Phase 3: offsite portable equipment and supplies Implementation guidance builds on the coping procedures already developed for 10 CFR 50.63 (e.g., loss of all heating, ventilation, and air conditioning) and extends these to an indefinite time period
Acceptable options	-Enhancements to plant equipment and procedures to meet the specified duration (ac-independent heat removal systems, battery capacity, water sources) -New and enhanced plant procedures and training -Alternate ac power sources that can be connected within 10 minutes were allowed to eliminate the need to demonstrate the ability to withstand and recover from the loss of all ac power for an evaluated specified duration	Use of installed equipment that is safety-related is assumed for the initial phase. Use of reasonably protected equipment is assumed for the second phase. Replenishing and supplementing equipment from offsite sources is provided in the third phase.
Hardening of onsite ac to prevent loss of power	No specific requirements for alternate ac power sources to be protected from external design basis events except for severe weather. However, NUMARC-8700 includes a discussion of the need to protect SBO equipment (including alternate ac power sources) from known environmental hazards.	Existing emergency ac power sources could not be credited for compliance with EA-12-049 - specifically the EA-12-049 requirement that Class 1E onsite emergency ac power sources and alternate ac power sources (per 10 CFR 50.63) be assumed unavailable.
Postulated loss of equipment required for coping	10 CFR 50.63 does not require consideration of single failures beyond the assumed failure of the redundant onsite emergency ac power sources.	Licensees must provide reasonable protection for mitigation equipment from external events. Guidance in step 2 of NEI-12-06 approach

	10 CFR 50.63	EA-12-049
Characteristics of coping equipment	Detailed guidance on system characteristics and regulatory treatment for dedicated SBO equipment in RG 1.155, Appendix B	Detailed guidance on equipment/system characteristics and regulatory treatment in NEI 12-06, Section 11.
Maintenance and testing requirements	Guidance on maintenance and testing for dedicated SBO equipment in RG 1.155, Appendix B; no change in required testing for existing safety-related equipment such as station batteries to demonstrate SBO load profiles.	Guidance on maintenance and testing in NEI 12-06, Section 11.
Single implementation or continuing configuration control requirement	-One-time coping assessment unless a licensee revises the means by which they mitigate an SBO (e.g., plant modifications). -There are requirements to maintain diesel generator reliability	-One time modifications to plant equipment -One-time addition of onsite and offsite portables -Continuing configuration/design control requirements -Possible ongoing commitments

To protect public health and safety from the inadvertent release of radioactive materials, the NRC's defense-in-depth strategy includes multiple layers of protection: (1) prevention of accidents by virtue of the design, construction, and operation of the plant; (2) mitigation features to prevent radioactive releases should an accident occur; and (3) emergency preparedness programs that include measures such as sheltering and evacuation. The defense-in-depth strategy also provides for multiple physical barriers to contain the radioactive materials in the event of an accident. The barriers are the fuel cladding, the reactor coolant pressure boundary, and the containment. These defense-in-depth features are embodied in the existing regulatory requirements and thereby provide adequate protection of the public health and safety.

As previously discussed in this document, the strategies implemented to meet 10 CFR 50.54(hh)(2) are potentially useful to mitigate the effects of prolonged station blackout events; however, these were not intended to address beyond-design-basis external events such as the event that occurred at Fukushima. These strategies, for loss of large areas of the plant due to explosions and fires, are not designed to address events that: (1) impact more than one unit at a site with two or more units, (2) involve multiple safety functions at each of several units located on the same site, and (3) can last for much longer periods of time.

The events at Fukushima further highlight the possibility that extreme natural phenomena could challenge the prevention, mitigation, and emergency preparedness defense-in-depth layers. To address the uncertainties associated with beyond-design-basis external events, the NRC imposed by Order EA-12-049 (Ref. 10) new requirements that require additional defense-in-depth measures at licensed nuclear power reactors so that the NRC can continue to have reasonable assurance of adequate protection of public health and safety in mitigating the consequences of a beyond-design-basis external event.

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The NRC concluded that the strategies and guidance developed and implemented in response to the EA-12-049 requirements provide the necessary capabilities to supplement those of the

permanently installed plant structures, systems, and components that could become unavailable following beyond-design-basis external events. The NRC concluded that the strategies and guidance enhance the safety and preparedness capabilities established following September 11, 2001, and made generically-applicable in 10 CFR 50.54(hh)(2). In order to address the potential for more widespread effects of beyond-design-basis external events, EA-12-049 requires strategies with increased capacity to implement protective actions concurrently at multiple units at a site. The strategies (currently being implemented) are intended to add multiple ways to maintain or restore core cooling, containment, and SFP cooling capabilities in order to improve the defense-in-depth of licensed nuclear power reactors. Hence, this provides the context for the Commission's direction to the NRC staff to initiate rulemaking activities to incorporate these requirements into the NRC regulations to ensure that these requirements are applied to future nuclear power plant designs and licensing applications.

3.1 Regulatory Objectives

As discussed above, the current regulations do not incorporate sufficient defense-in-depth requirements to address the uncertainties associated with beyond-design-basis external events and the adverse effects that such events could have on the safety-related SSCs at nuclear power reactors. A rulemaking would apply the requirements of Order EA-12-049 to all existing and proposed nuclear power plants. The regulatory objectives of the rulemaking would be as follows:

- Make the EA-12-049 requirements generically applicable. The principle objective of a rulemaking would be to place into the NRC's regulations requirements that reflect the EA-12-049 Order requirements (Ref. 10), which are already issued and imposed on licensees, giving consideration to stakeholder feedback and lessons-learned obtained through the implementation of the Order requirements (i.e., make the Order requirements "generically applicable"). In doing so, the NRC would give consideration to whether there are potential failures or challenges associated with the implementation of the mitigating strategies per the Commission direction in the August 2012 SRM (Ref. 15). Making the EA-12-049 requirements generically applicable, in addition to improving the regulatory framework, might allow future relaxation of the Order requirements imposed on current licensees.

- Establish a regulatory framework linking the SBO strategies in 10 CFR 50.63, the loss of large area strategies in 10 CFR 50.54(hh)(2), and the beyond-design-basis external event strategies of the new rule. The guidance and strategies originally implemented in response to the SBO rule in 10 CFR 50.63 and Order EA-02-026, *Order for Interim Safeguards and Security Compensatory Measures*, Section B.5.b, made generically applicable as 10 CFR 50.54(hh)(2), are similar or closely related to the strategies being implemented for EA-12-049. It therefore makes sense to evaluate a regulatory framework with these relationships in mind. With regard to station blackout mitigation, the mitigating strategies required by EA-12-049 fit into the plant station blackout emergency operating procedures (EOPs) and are implemented when ac power cannot be recovered from either offsite or onsite sources. As such, the station blackout requirements and the mitigating strategies requirements are directly related at the implementation level.

Based on the information presented in this regulatory basis document, the NRC staff concludes that rulemaking is warranted to potentially amend 10 CFR Parts 50 and 52 by adding defense-

in-depth requirements to account for the uncertainties associated with beyond-design-basis external events, similar to those put forth in Order EA-12-049. Implementation of EA-12-049 (for the extended loss of all ac and loss of normal access to the ultimate heat sink from a beyond-design-basis external event) requirements may adequately address SBO sequences stemming from grid-centered, switchyard centered, and severe weather events. This would enhance the plant capabilities for addressing such events.

Appendix A provides a discussion of rule language concepts that the NRC staff is considering for the potential rulemaking. In addition, Appendix A contains a set of questions soliciting stakeholder feedback in areas that would support the NRC staff in developing a proposed rule.

3.2 NRC Guidance, Policy, and Implementation Issues

This section describes the NRC guidance that would need to be revised, as well as the relevant policy, implementation, and legal issues associated with a proposed rulemaking.

NRC Guidance

The following NRC guidance documents would need revision based on the content of a proposed rule.

- RG 1.155 (Ref. 22): This RG provides one acceptable method for complying with 10 CFR 50.63. The NRC staff expects that this RG might need to be revised to add statements linking RG 1.155 with the new mitigating strategies requirements and supporting guidance. The NRC expects that these changes would note that licensees are required to deploy mitigating strategies as required by the new rule in part 50 when the time required to recover from an SBO event exceeds the existing specified duration.

- JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigating Strategies for Beyond-Design-Basis External Events*, which endorses NEI 12-06 Rev. 0, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide* (Ref. 13): These guidance documents provide one acceptable approach to complying with Order EA-12-049. The NRC staff expects that a new regulatory guide might be developed to specify the criteria for defining an acceptable mitigation strategy or strategies. A new RG would reflect much of the detail in the ISG and would maintain the endorsement of NEI 12-06. If there are any substantive differences between the Order and the rule, then the new RG may need to include additional guidance by including regulatory positions on these differences.

Policy Issues

The NRC's approach for applicability to new reactor applicants and licensees, including COLs, design certifications (DCs), standard design approvals (SDAs), and manufacturing licenses (MLs), might be handled in a manner similar to that of the aircraft impact assessment rule, published June 12, 2009 (Ref. 26). Under this approach, issued DCs and SDAs would not be required to comply until renewal; issued COLs would be treated like an issued operating license (OL) or CP; DCs and COLs currently under NRC review would need to comply prior to issuing the certification or license; and any future DC, SDA, COL, or ML applicant would need to comply in its application. Further, the NRC would ensure that the permanent equipment and connection

requirements are included in the scope of a DC, SDA, or ML application, whereas the portable equipment requirements and mitigating strategies (operational requirements) are included in the scope of a COL application. This separation of permanent and portable equipment and mitigating strategies would implement the Commission's direction but place the requirements under the appropriate licensing application where those requirements would be best addressed.

Implementation Issues

Implementation challenges associated with the initial schedule set for this rulemaking have been significantly reduced as a result of the Commission approval of the revised schedule in SRM-COMSECY-13-0002 (Ref. 3).

- The mitigating strategies Order required each licensee to submit an overall integrated plan to the Commission by February 28, 2013. This licensee plan describes how compliance with the Order requirements will be achieved. Initial review of these plans indicates a number of open items. Under the revised rulemaking schedule approved in SRM-COMSECY-13-0002, the revised proposed rule schedule (due June 2014) is currently viewed as being sufficient to enable lessons learned from the NRC review of these plans to be considered.

- The NRC staff plans to inspect and audit licensee implementation of the SBO mitigating strategies Order during outages that occur in late 2014 and spring 2015. Under the revised rulemaking schedule approved in SRM-COMSECY-13-0002, the proposed rule will be able to partially account for lessons learned from the NRC reviews of the plans and any other interactions with licensees to support their implementation plans.

- The industry and the NRC currently are considering an augmented approach for the treatment of seismic issues to address NTTF Recommendation 2.1. Feedback from NTTF 2.1 regulatory activities could result in changes to the facility regarding protection of SSCs from the effects of external events; this could impact both the installed mitigating strategies equipment and the protection of the portable equipment. The approach to enhance seismic capacity in the short term would be applied to the installed mitigating strategies equipment, and therefore there is some potential that such an activity could impact this rulemaking.

- There is ongoing consideration regarding the use of the mitigating strategies equipment after core damage (under severe accident conditions). If such an approach is used, it could result in changes to the facility and the portable equipment (to allow this to be accomplished), and as such directly impact this rulemaking.

- With the revised final rule schedule approved in SRM-COMSECY-13-0002, the NRC staff anticipates that potential issues arising from implementation of EA-12-049 may largely be eliminated as challenges for a rulemaking.

- The NRC staff will follow its cumulative effects of regulations procedures throughout this rulemaking and, during the final rulemaking phase, expects to explore with external stakeholders whether there remain any implementation challenges that can be accommodated in the final rule's implementation requirements.

4. Impacts of the Rulemaking

The impacts of this rulemaking, for both current reactor licensees and new reactors, are not known at this time. The NRC staff considers it to be reasonable to assume as a starting point that the impacts of a potential rule would largely be the same as those currently being incurred as a result of the implementation of Order EA-12-049. In the appendix of this document, the NRC staff is asking for stakeholder feedback concerning the rulemaking impacts.

Impact on Operating Reactor Licensees

Based on stakeholder feedback, the impact on operating reactor licensees are would be site specific and would include:

- development, implementation, and maintenance of the mitigation strategies (referred to by industry as the "Flex Support Guidelines," see reference 12);
- modification of safety and non-safety related structures, systems, and components to enable ready connection of mitigating strategies equipment;
- engineering evaluations to support the key assumptions in the mitigating strategies that include time sensitive actions and key actions associated with maintaining or restoring core cooling, containment, and spent fuel pool cooling;
- procedural changes that support the mitigation strategies and use of the portable equipment, including the associated training on the changes;
- additional testing, drills, maintenance, or surveillance requirements; and
- other types of impacts to resources, such as coordinating with offsite response organizations (e.g., for the final phase of the mitigation strategy).

Some stakeholders have provided the NRC staff with compliance cost estimates associated with Order EA-12-049. One dual-unit site estimated that the Order may cost approximately $25 million, while a second dual-unit site estimated the cost at $43 million.

The NRC staff expects that a rulemaking would not impose additional adverse impacts on safety, security, or emergency preparedness, relative to the requirements of the Order. However, currently the NRC staff considers that a change control process may be required to control the long term configuration of the mitigation strategies and the equipment relied upon. This provision may have some additional impact; however, as a practical matter, licensees would be required to continue to meet the new provisions, including changes to equipment and strategies (as recognized in the industry guideline, NEI 12-06), so a change control provision should not represent significant additional impact.

If a proposed rule is an adequate protection regulatory action, the NRC staff nevertheless would need to ensure that the requirements achieve their objectives in an efficient and cost-effective manner. The NRC staff believes that a performance-based approach would provide sufficient flexibility for licensees to implement the most efficient and cost-effective approach given site-specific conditions. In addition, the NRC staff believes that there could be ancillary benefits of a proposed rulemaking. For example, the NRC staff expects that the strategies adopted by licensees could improve their ability to effectively carry out the strategies used to comply with Sections 50.63 and 50.54(hh)(2).

The NRC staff expects that a rulemaking would impose additional information collection requirements. Because Order EA-12-049 requires licensees to report on mitigating strategies, a rulemaking would likely allow licensees to rely on previous submissions to comply with certain information collection rule requirements so long as licensees have received NRC staff approval of mitigation strategies prepared for the Order.

Impact on Licensees with Plants under Construction

There are currently 5 reactors under construction – Watts Bar Unit 2, V.C. Summer Units 2 and 3, and Vogtle Units 3 and 4. Watts Bar Unit 2 received the same Order as all other operating reactors, and thus the impact on Watts Bar Unit 2 would be the same as for operating reactors.

The Vogtle and Summer units reference the Westinghouse AP1000 design, which has passive design features that provide core cooling, containment, and spent fuel cooling capabilities for 72 hours without reliance on ac power. Further, the AP1000 design does not rely on external water sources because the containment vessel and the passive containment cooling system serve as the ultimate heat sink. It also includes equipment to maintain required safety functions beyond 72 hours to 7 days and connections for offsite equipment to back up installed equipment. The requirements to address mitigating strategies for the Vogtle plants were similarly provided in Order EA-12-049. Because the licenses for the Summer plants were issued after the Order was issued, the mitigating strategies requirements were instead issued as license conditions. Regardless, there is an equal impact on the Vogtle and Summer plants. However, because of the passive plant design and the previously-planned equipment connections, the impact of the order on the Vogtle and Summer plants will be less than that of the operating reactors.

Impact on Issued Design Certifications and Standard Design Approvals

The NRC has issued 4 design certifications through the rulemaking process, and those certifications were promulgated as Appendices A through D to 10 CFR Part 52 (Ref. 19). As described in SECY-12-0025 (Ref. 9), the NRC staff plans to ensure that Commission-approved Fukushima actions are addressed prior to certification or licensing. SECY-12-0025 also describes how the AP1000 design, referenced in the Vogtle and Summer COLs, includes many of the design capabilities being considered under a potential rulemaking. However, the SECY paper did not recommend whether the Commission should apply the order to any or all of the issued design certifications. The NRC believes that there is no immediate need to amend the issued design certifications to address the order for two reasons. First, the relevant requirements can be implemented by a future COL applicant or licensee through orders or license conditions as was done for the Vogtle and Summer COLs. Second, the necessary changes to the certified design can be made when the design certification is renewed. Therefore, there is no near-term impact on issued design certifications. Instead, the burden associated with implementing requirements from a potential rulemaking could be deferred until the design certification is renewed, should that occur. Whether accomplished through order or rulemaking, the magnitude of the impact would vary among the certified designs, with passive plant designs (AP600 and AP1000) incurring less burden than that of active plant designs (U.S. ABWR and System 80+), though in each of these 4 cases the burden would be less than the burden to an operating reactor licensee. As with issued design certifications, the NRC would not seek to amend any issued standard design approval until an applicant sought to renew the design certification (note: a design approval cannot be renewed, but a vendor could seek a new standard design approval in connection with an application to renew a design certification).

Impact on New Reactor Combined License and Design Certification Applications under NRC Review

There are several applications for combined licenses and design certifications currently under NRC review. As described in SECY-12-0025, the NRC staff plans to ensure that Commission-approved Fukushima actions are addressed prior to certification or licensing. As a result, all applicants for design certifications would need to address the potential rulemaking requirements as applicable to the scope of the design (i.e., as applicable to the SSCs within the scope of the certified design), and all applicants for combined licenses referencing a certified design would need to address the complement of the potential requirements. The NRC also notes here that, because of the difference in the designs, passive plants would have fewer requirements to address than active plants. Thus, the impact on AP1000 and ESBWR (passive) plants would be less than U.S. EPR and U.S. APWR (active) plants.

Impact on Future Applications for Combined Licenses, Design Certifications, Standard Design Approvals, and Manufacturing Licenses

As described in SECY-12-0025, the NRC staff plans to ensure that Commission-approved Fukushima actions are addressed prior to certification or licensing. To achieve this, the NRC currently intends to make the requirements under a potential rulemaking applicable to all future applications for COLs, DCs, standard design approvals, and manufacturing licenses. However, because the effect on such an application depends on the nature of the design, which is not now known, an assessment of impact is not necessary.

Impact on the NRC

Because an SBO mitigating strategies rulemaking likely would only refine the requirements under Order EA-12-049, there would be no significant increase or reduction in impacts on the NRC as a result of a rulemaking. The NRC already would have addressed all operating reactor licensees as part of the EA-12-049 implementation, and any NRC impacts for this rulemaking would be limited to future reactors.

Impact on Public Health and Safety

Because the SBO mitigating strategies rulemaking would only refine the requirements under Order EA-12-049, there would be no substantial increase or reduction in public health, safety, and security.

Impact on State, Local, or Tribal Governments

This rulemaking would have no incremental impact on State, local, or Tribal governments.

5. Stakeholder Involvement

The NRC staff held meetings with industry and other stakeholders related to enhancing mitigation strategies intended to maintain or restore core cooling, containment, and SFP cooling capabilities following beyond-design-basis external events.[8] At these meetings, the NRC staff

[8] Although many other meetings have taken place between NRC staff and site personnel, the NRC staff conducted public meetings related to SBO mitigating strategies at NRC headquarters on the following days: December 1,

discussed implementation of NTTF recommendations, Order EA-12-049 requirements, and the ISG. These meetings also provided current and prospective licensees, as well as other stakeholders, the opportunity to describe proposals for complying with Order EA-12-049. The stakeholder input has been important throughout this regulatory effort; and, in fact, stakeholder input in December 2011 and January 2012 influenced the NRC to issue a much more expansive regulatory action (in the form of EA-12-049) than envisioned in NTTF Recommendation 4.2, SECY-11-0124, and SECY-11-0137.

In addition to these public meetings, the NRC staff published an ANPR in the *Federal Register* on March 20, 2012, to gather public comment to inform the NRC effort to draft a proposed rule addressing SBO mitigatiion strategies for beyond-design-basis external events (Ref. 14). The NRC staff also held a public meeting on April 25, 2012, to (1) provide external stakeholders with the NRC staff's preliminary thoughts on station blackout mitigation as described in the ANPR, (2) afford external stakeholders an opportunity to ask the NRC staff clarifying questions about the ANPR, and (3) provide an opportunity for external stakeholders and NRC staff to exchange information on ANPR subject matter, thereby facilitating more accurate and complete understanding of the subject matter. The results of this public meeting are detailed in the meeting summary and transcript (Refs. 27 and 28, respectively). The public comment period for the ANPR closed on May 4, 2012, and the NRC received 45 comment submissions. The NRC staff considered the stakeholder feedback from the ANPR submissions in developing this regulatory basis.

6. Backfitting and Issue Finality, Regulatory Flexibility Analysis, Compliance with NEPA, Safety Goal Evaluation, and Peer Review of Regulatory Basis

Backfitting and Issue Finality

The NRC's backfit provisions for holders of operating licenses and CPs are found in the regulations at 10 CFR 50.109 (Ref. 4). Issue finality provisions, analogous to the provisions in 10 CFR 50.109, are in 10 CFR 52.63 and the Appendices to part 52 for design certification rules. Issue finality provisions are in 10 CFR 52.83 and 52.98 for combined licenses. At this time, the NRC staff expects that a proposed rulemaking would make the requirements in Order EA-12-049 generically applicable and would not impose mitigating strategies beyond those already imposed through Order EA-12-049. Currently, the NRC staff anticipates that feedback on a proposed rule would allow the staff to better define acceptable and unique approaches (which inform the meaning and underlying purpose of the rule language) and possibly to offer more engineering flexibility (i.e., less reliance on human action and more reliance on engineered features) to current and future licensees. To the extent that the requirements in a proposed rule are the same as those imposed by Order EA-12-049, the requirements would not represent a backfit because they would not impose new or changed requirements on existing 10 CFR part 50 or part 52 licensees. Further, the NRC would not be imposing these requirements on issued design certifications, and therefore there would be no backfitting considerations for those design

2011; December 8, 2011; January 13, 2012; January 18, 2012; March 28, 2012; April 24, 2012; May 9, 2012; May 15, 2012; May 30, 2012; July 26, 2012; September 27, 2012; November 16, 2012.

certifications. There are no backfit considerations in applying the requirements in this rulemaking to future applications for COLs, DCs, MLs, and SDAs.

If a proposed rule includes any requirements in addition to those of Order EA-12-049, then the NRC staff will address the applicable backfitting and issue finality provisions with respect to the added requirements.

Regulatory Flexibility Analysis

The Regulatory Flexibility Act, enacted in September 1980, requires agencies to consider the impact of their regulatory proposals on small entities, analyze alternatives that minimize small entity impacts, and make their analyses available for public comment (Ref. 29).

None of the licensees and CP holders fall within the definition of "small entities" set forth in the size standards established by the NRC in 10 CFR 2.810 (Ref. 30). Therefore, a proposed rulemaking would not have a significant economic impact on a substantial number of small entities.

Environmental Analysis

A rulemaking to incorporate the requirements imposed by EA-12-049 would not be a major Federal action significantly affecting the quality of the human environment, and therefore, an environmental impact statement would not be required. An environmental assessment likely would conclude that there would not be a significant offsite impact to the public from this action because the station blackout mitigating strategies should reduce releases from beyond-design-basis events, and that in turn should reduce environmental impacts from such events.

Safety Goal Evaluation

Safety goal evaluations are applicable to regulatory initiatives considered to be generic safety enhancement backfits subject to the substantial additional protection standard in 10 CFR 50.109(a)(3). This regulatory basis describes potential regulatory changes that would not qualify as generic safety enhancements because the new requirements are expected to meet 10 CFR 50.109(a)(4)(ii), one of the exceptions in 10 CFR 50.109(a)(4)(i)–(iii), which states:

(ii) That regulatory action is necessary to ensure that the facility provides adequate protection to the health and safety of the public and is in accord with the common defense and security.

Because the NRC staff expects that an SBO mitigating strategies rulemaking would qualify as an adequate protection action, a safety goal evaluation would not be required.

Peer Review

The Office of Management and Budget's (OMB's) *Final Information Quality Bulletin for Peer Review* (Ref. 33) requires each Federal agency to subject "influential scientific information" to peer review prior to dissemination. The OMB defines "influential scientific information" as "scientific information the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or private sector decisions." The regulatory basis

document does not contain “influential scientific information.” Therefore, there is no need for a peer review of the regulatory basis.

7. Conclusion

The staff finds that there is a sufficient regulatory basis to proceed with rulemaking. Specifically, the current regulations do not incorporate sufficient defense-in-depth requirements to account for the uncertainties associated with beyond-design-basis external events and the adverse effects that such events could have on the safety-related SSCs at nuclear power reactors. For example, during the development of the current SBO rule, it was concluded that there was a sufficiently low likelihood of a loss of offsite power event generated by a fire, flood, or seismic activity and that preexisting licensing requirements specified sufficient protective measures such that loss of offsite power events from such causes need not be considered under the SBO rule. Additionally, the SBO rule addresses maintaining or restoring SFP cooling. Section 50.63 also does not fully cover events that impact more than one unit at a site (i.e., sites with two or more units). A rulemaking would address the mitigation of beyond-design-basis external events involving SBO such as those for which Order EA-12-049 was issued to address. In addition, a rulemaking would implement requirements similar to those imposed by Order EA-12-049 on future designs and applications.

A rulemaking also would fulfill the Commission’s explicit direction to address station blackout mitigation in a rulemaking, as documented in SRM-SECY-11-0124 and SRM-COMSECY-13-0002.

8. References

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Appendix A
Station Blackout Mitigation Strategies Regulatory Basis
Draft Rule Concepts

The draft regulatory basis provides the justification to conclude that rulemaking is warranted. Central to this conclusion is the recognition that EA-12-049[9] requirements, imposed on current licensees and determined by the Commission to be necessary to ensure continued adequate protection of public health and safety, are not in the *Code of Federal Regulations*, and so rulemaking is needed to make requirements in EA-12-049 generically-applicable to current and future licensees.

This appendix is intended to solicit external feedback to support the NRC staff's efforts to complete the regulatory basis and draft the proposed rule. Accordingly, it provides the NRC staff's current thoughts regarding what requirements would be needed and asks additional questions, with the intent of using the feedback obtained to support development of the proposed rule or its supporting statement of considerations.

Stakeholders should recognize that these are draft rule concepts and expect further development of these concepts into proposed rule text as work progresses to develop the proposed rule. The NRC staff has focused its effort to the development of a performance-based framework that is similar to the requirements in EA-12-049 and 10 CFR 50.54(hh)(2). The questions and information provided in this appendix are intended to solicit additional feedback and information from external stakeholders to support further development of that framework.

Title

The NRC staff intends to title this new regulation such that it conveys the central focus of the requirements. Accordingly, the title should reflect that the new requirements are fundamentally addressing two situations:

1. Extended loss of all ac power conditions resulting from beyond-design-basis external events where it is unlikely ac power will be recovered in the short term.

2. Station blackout conditions that stem from loss of offsite power events with multiple onsite failures of emergency power sources that extend longer than the specified durations of 50.63.

The NRC staff could entitle this effort: Extended Loss of All Alternating Current Power Conditions from Station Blackout and Beyond-Design-Basis External Events.

Applicability

The NRC staff anticipates that the new provisions should apply to all power reactors, both from a design and operation perspective. The new regulation may reflect some of the following requirements:

[9] U.S. Nuclear Regulatory Commission, *Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, Order EA-12-049, March 12, 2012, ADAMS Accession No. ML12054A736.

1. The requirements to develop, implement, and maintain mitigation strategies would apply to all operating power reactor license and combined license holders (part 50 and part 52) because these requirements would need to reflect aspects of the detailed plant design, which might not be known until the later stages of construction.
2. Design requirements, including requirements that relate to the need to have connections for portable equipment, protection of portable equipment, and maintenance and testing of equipment would be directed to operating license applicants and licensees (Part 50).
3. Design requirements, including requirements that relate to protection of the equipment, could be addressed by design certification holders and applicants, or combined license holders or applicants, depending on the nature of the requirement and the equipment relied upon for mitigation. Requirements that relate to the need to have connections for portable equipment could be addressed by design certification holders and applicants. Requirements that involve the protection of portable equipment could be addressed by either the design certification holders or applicants or combined license holders or applicants. Lastly, requirements for maintenance and testing of equipment would be directed to the combined license holders or applicants.
4. Requirements for design certification holders and applicants in item 3 of this section would equally apply to standard design approval and manufacturing license holders and applicants.
5. Cessation of the requirements would be keyed to when a licensee decides to terminate operations (under 10 CFR 50.82 and 10 CFR 52.110) and provides the NRC with the applicable certifications. When a licensee certifies that it has permanently removed the fuel from the reactor vessel, the mitigation strategies requirements, with the exceptions of those applicable to maintaining or restoring spent fuel pool cooling, would end. The remainder of the requirements could be terminated when the fuel is removed from the spent fuel pool and is stored in dry conditions in accordance with Commission requirements under 10 CFR part 72 or when all nuclear fuel for the reactor unit is permanently removed from the site (10 CFR part 73).

Definitions

The NRC staff intends to define a new term that would apply to the new requirements: extended loss of all ac power (ELAP). The intent is for the defined term to support the establishment of clear requirements and also more clearly delineate the differences between the new requirements and those that currently reside in 10 CFR 50.63. The definition of ELAP as currently envisioned would include:

1. A complete loss of ac power to the essential and non-essential switchgear buses
2. Loss of offsite electric power system concurrent with turbine trip
3. Unavailability of the onsite emergency ac power sources and offsite ac power sources for a duration that is longer than the specified duration determined in accordance with 10 CFR 50.63
4. Unavailability and potential non-recoverability of the offsite power source and onsite emergency and alternate ac power sources (with the exception of supplemental ac power sources per number 7 of this “Definitions” section) for beyond-design-basis external events

5. Exception: Initially ac power from inverters fed by safety-related batteries could be assumed available to support development of the strategies, provided this equipment is reasonably protected including the portions of the distribution system that are used.
6. Exception: Supplemental ac power sources that meet the new requirements (which would be specified in the new section) would be allowed to restore ac power.
7. Exception: Portable equipment that meets the new requirements would be allowed to maintain or restore functions.

There is a significant challenge to establishing requirements for what are fundamentally unbounded events (i.e., beyond-design-basis external events). This definition would provide a sufficient description of a damage state that enables, from a practical standpoint, the development of strategies and guidance that in turn are intended to mitigate that condition through the use of an approach that uses both installed and portable equipment to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities. An ELAP differs from a station blackout as envisioned under 10 CFR 50.63 in several fundamental ways. For beyond-design-basis external events, ac power may not be restored for a long period of time from either onsite or offsite. Additionally, such events are expected to impact the entire reactor site and the severe conditions associated with such events can adversely impact structures, systems, and components on the site. Accordingly, the definition is intended to support development of mitigation strategies that provide additional means to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities, simultaneously, for an indefinite period of time, for the entire reactor site.

An additional consideration on the use of an ELAP definition is not to unduly constrain the proposed provisions. A key attribute of sound strategies is the incorporation of contingency measures that provide alternate means for successfully maintaining or restoring functions should the event result in failures or potential challenges to the mitigation strategies. For example, the primary means for hooking up a portable pump may not be available due to failures or event conditions, and so the mitigation strategies should employ backup approaches for equipment connections. Another example is if the event results initially in a more severe condition such that dc power is also lost. In this circumstance, the alternate measure might involve local manual actions to operate a turbine-driven pump.

The ELAP condition, as a direct consequence, causes all ac-powered pumps to fail due to a loss of ac power to the essential and nonessential buses, which typically leads to a loss of capability to remove heat to the ultimate heat sink due to reliance on ac-powered pumps to move water. So while EA-12-049 identified the loss of normal access to the ultimate heat sink as a separate condition, it is viewed as a direct consequence of an ELAP for active plants having piping considered to be robust for external events[10]. However, for passive plants, loss of normal access to the normal heat sink resulting from non-safety related pipe failures may challenge the long term core cooling, containment, and SFP cooling capabilities as identified in the Order.

Finally, the NRC staff believes there is merit to offering additional design flexibility not allowed by EA-12-049. As discussed below, these provisions would allow for use of robust supplemental ac sources to restore power following beyond-design-basis events.

[10] With regard to what constitutes "robust," refer to NEI 12-06 Revision 0 (Ref. 12) that was endorsed by the NRC in JLD-ISG-12-01(Ref.13).

Mitigating Strategies Requirements

The NRC staff currently intends that the new section would contain requirements for licensees to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel cooling capabilities for an ELAP condition. The NRC staff anticipates that these provisions would contain elements such as:

1. Requirements to develop, implement, and maintain guidance and strategies to maintain core cooling, containment, and spent fuel cooling capabilities for ELAP at all of the licensee's units on a site, and to restore such capabilities if one or more is lost.
2. The mitigating strategies would be adapted for implementation in each mode (as defined in the technical specifications for each unit).
3. The mitigating strategies would use or rely upon equipment of sufficient design and capacity, given consideration to the nominal conditions that could be expected, so that core cooling, containment, and spent fuel pool cooling functional capabilities can be maintained or restored for ELAP conditions.
4. The mitigating strategies would consider contingencies for when the primary means of accomplishing a function is lost or challenged.
5. The mitigating strategies would be integrated into the existing plant procedures and guidance for station blackout conditions, so that if a loss of all ac power event exceed the specified duration determined pursuant to 10 CFR 50.63 (or for licensees that use an alternate ac power source, if that source also fails), the mitigation strategies would be implemented to maintain or restore core cooling, containment, and spent fuel pool cooling.
6. The mitigating strategies would accommodate and use offsite assistance and resources to enable the functional capabilities to be indefinitely sustained.
7. The strategies would consider, and plan for, damage to the transportation infrastructure resulting from a beyond-design-basis external event that could adversely impact transportation to the site of offsite resources necessary to maintain the functional capabilities (i.e., core cooling, containment, and spent fuel pool cooling).
8. The strategies and supporting procedures would be in accordance with the requirements of the Recommendation 8 rulemaking "Onsite Emergency Response Capabilities," which is intended to integrate emergency operating procedures, severe accident mitigation guidelines, extensive damage mitigation guidelines, and the new mitigating strategies that would be required by this rulemaking.

Currently, the NRC intends to maintain an approach, consistent with EA-12-049, that is fundamentally performance-based and does not prescriptively establish minimum time periods for the different phases associated with implementation of the mitigation strategies. Instead, licensees would be required to develop their strategies such that the phases overlap and, as a result, the key functions are maintained or can be restored. However, the NRC staff also recognizes that there may be merit to having a baseline minimum capacity for withstanding ELAP conditions during the first portion of the response, which relies on installed equipment and recognizes a need for event assessment and reduces reliance on human action in the event. The staff NRC expects that EA-12-049 implementation feedback will further inform this issue.

The NRC is currently intending to continue to use the terminology "guidance and strategies" in the new rule provisions recognizing that this language has been used extensively since 2002 (Section B.5.b of the Interim Compensatory Measures Order, EA-02-026, issued on February 25, 2002, and in follow-on regulatory actions and guidance including 10 CFR 50.54(hh)(2)). However, the NRC also notes that it has historically used the term "guidance" to refer to NRC-approved or endorsed approaches (i.e., regulatory guidance) for complying with regulations, rather than as a requirement itself (such as is done under 50.54(hh)(2), in which licensees are required to formulate "guidance"). Stakeholders are welcome to provide feedback on the benefit of defining "guidance and strategies" or using different terminology in order to avoid any confusion that might stem from this usage, or whether stakeholders feel this terminology is well understood and does not require definition.

The NRC currently intends to require that mitigation strategies be developed such that they can be implemented "in all modes," and the NRC would simply refer the licensee's existing technical specifications to define what "mode" means. Stakeholders are welcome to provide feedback on whether there is a benefit to defining this terminology for this specific set of requirements, which the NRC recognizes is fundamentally a beyond-design-basis event situation and therefore creates potential confusion when references are made to technical specifications.

Design Requirements

The NRC staff currently intends for the new regulation to contain design requirements applicable to the equipment used to mitigate ELAP conditions. Though in some cases the elements described below may reside in supporting guidance (to avoid unnecessarily prescriptive requirements), these requirements may include:

1. Equipment used for the mitigation of ELAP conditions would be designed to perform its functions as relied upon in the mitigation strategies.
2. Portable equipment relied upon in the mitigating strategies for the mitigation of ELAP conditions would be independent from installed structures, systems, and components credited in the safety analysis to accomplish the same functions.
3. Portable equipment relied upon in the mitigating strategies would be designed, stored, and protected to minimize common cause and common mode failure with installed structures, systems, and components credited in the safety analysis for the same function. This would include the need to provide protection of portable equipment from the effects of beyond-design-basis external events.
4. Portable equipment relied upon in the mitigating strategies would be designed, staged, and deployed to minimize the potential for damage or impairment to safety-related structures, systems, and components.
5. There would be a requirement to have sufficient sets of portable equipment to enable the equipment to be removed from service for maintenance.
6. Equipment relied upon in the mitigating strategies for the mitigation of ELAP conditions would be designed to permit periodic inspection and testing to enable its functional performance to be tested periodically.
7. A test program would be established to assure that equipment relied upon in the mitigating strategies for the mitigation of ELAP conditions will perform satisfactorily in service, and this test program would be performed in accordance with written test procedures that incorporate the acceptance limits.

The objective of the design requirements would be to have an appropriate level of assurance that SSCs relied upon in the mitigating strategies to mitigate ELAPs are designed to have a capability and capacity to function for the expected conditions, to be protected from the effects of beyond-design-basis external events, and to have an appropriate level of maintenance and testing to conclude that there is assurance that the equipment remains functional and available. A key element of these requirements would involve protection of this equipment from the effects of beyond-design-basis external events. The principal focus is towards portable equipment because installed equipment that would be initially relied upon (not powered from the onsite emergency ac power system and therefore potentially available such as turbine-driven pumps) would typically be designed to safety-related standards and as such would be protected by design from external events (per GDC-2) and therefore considered to have reasonable protection. This could be satisfied in part by having multiple sets of equipment stored in different locations to increase the likelihood that sufficient portable equipment remains available for event mitigation. However, the NRC staff recognizes that new reactors, through design and siting, can significantly reduce the risk associated with external events (e.g., location of a new reactor on a dry site can remove external flooding as a significant risk consideration), and as such the staff believes there is merit to having framework flexibility to allow for approaches that rely to a greater extent on engineered features, including flexibility for a supplemental ac power source as discussed below.

With regard to testing, the staff notes that mitigation of ELAP events places heavy reliance on batteries, and as such, testing would need to provide assurance that batteries will function for the conditions and time periods required. Additionally, the NRC staff is considering whether there needs to be (in guidance or requirements) specific limits on a minimum condition for batteries (such as a minimum voltage or some other more applicable parameter) such that when, and if, ac power is recovered, there is sufficient battery capacity to support the actions needed to provide ac power to the emergency buses and/or the associated motor control centers, including reenergizing emergency diesel generator exciter fields to allow starting the generators.

Design Flexibility to Use a Supplemental AC Power Source

Currently, the NRC staff envisions that the new requirements could provide more engineering flexibility than EA-12-049 requirements and allow for the supplemental ac power source(s) to be used to restore power following a beyond-design-basis external event. Supplemental ac power source(s) would be subject to requirements that contain the following:

1. The supplemental ac power source would be required to be electrically independent from the emergency ac power sources.
2. The supplemental ac power source may be required to be diverse in design from the normal emergency ac power sources.
3. The supplemental ac power source would be required to be physically located to minimize the potential for common cause failure stemming from external events, where warranted, based on the nature and magnitude of the external events applicable to that site.
4. The supplemental ac power source(s) would be required to have sufficient combined capacity and capability to operate the equipment necessary to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities following a beyond-design-basis external event for each reactor unit at a site.
5. The supplemental ac power source would be required to have the capability to supply power through physically and electrically separate pathways to multiple

electrical distribution systems or motor control centers that provide power to the equipment important to maintaining or restoring core cooling, containment, and spent fuel pool cooling capabilities.

6. The supplemental ac power source would be required to be designed for, and protected from, the effects of external events with margin at least equivalent to that of all SSCs to which the supplemental ac source supplies power.
7. The supplemental ac power source would be required to be designed to interact with connected SSCs to minimize the potential for damage to both the connected SSCs and itself.

The NRC staff recognizes the advantages of having an installed capability to restore power following events that lead to ELAP conditions. Such a design capability would reduce the reliance on human action. At a high level, the design requirements the NRC staff would place on this power source would be intended to provide assurance that it would be available following beyond-design-basis external events. Accordingly, the design requirements are intended to ensure a level of protection for the supplemental ac power source from event effects that meets or exceeds the level of protection of the equipment that this power source would supply. A key objective for the supplemental ac power source is that it be able to withstand extreme events, while recognizing that at some point these extreme events would destroy the powered equipment. Accordingly, there is a practical limit to protection for the supplemental ac power source beyond which there is little or no safety benefit. The supplemental power source would need to be electrically independent from the class 1E emergency ac power sources to minimize the likelihood of adverse interactions and consequential failures between the power sources. Also, locating the supplemental power sources physically away (within practical limits) from the unit's class 1E emergency ac power sources would reduce the likelihood that adverse effects from a beyond-design-basis external event could cause the complete failure of all the ac power sources. Whether physical separation is needed and beneficial would depend on the nature and magnitude of the external events that impact the site.

Use of a supplemental ac power source would reduce, but not eliminate, reliance on mitigation strategies. Beyond-design-basis external events can have catastrophic impacts on the offsite ac power system, and as a result, the final phase of the mitigation strategies associated with the use of offsite assistance and resources to replenish consumables on site would appear to be needed in all cases. Additionally, the severity of these events may mean that manual actions to align the supplemental ac power source may not be taken for some period of time, so that an initial reliance on installed equipment and portable equipment may still be required until the supplemental ac power source can be used to restore ac power.

Control of Changes

The NRC believes that there is a need to include a change control requirement in the draft rule in recognition that the guidance and strategies apply to beyond-design-basis situations and the current change control requirements of 10 CFR 50.59 may not be effective under such circumstances. The NRC staff believes that change control would involve elements such as:

1. Licensees could make changes to the strategies and equipment required by the new provisions without obtaining a license amendment pursuant to 10 CFR 50.90, provided no existing requirements are triggered that result in the need for prior NRC approval, and only if the licensee performs and retains an evaluation that shows that

the guidance, strategies and supporting equipment, as changed, continue to meet the new mitigation strategy requirements.
2. Licensees would be required to retain an auditable record of each change to the guidance, strategies, and supporting equipment.

The intent of the change control is to ensure that the mitigating strategies continue to be able to achieve their objectives (i.e., maintaining or restoring core cooling, spent fuel pool cooling, and containment capabilities) following beyond-design-basis external events). Of course changes to the facility would continue to be addressed under existing requirements, but the issue is whether the NRC should be involved with the approval of a change to the mitigation strategies or the equipment relied upon in the mitigation strategies. This is in recognition that these requirements were issued in EA-12-049 as being necessary for ensuring continued adequate protection of public health and safety. Currently the NRC staff has concluded that controlling the configuration of the strategies and supporting equipment is appropriate. Changes that enhance mitigation or that enhance the protection of structures, systems, and components, for example, would not need prior NRC review and approval.

External stakeholders are encouraged to provide feedback and suggest better ways of achieving this objective.

Link with the Current 10 CFR 50.63 Requirements

The NRC staff currently intends that the new requirements would be linked with the current station blackout requirements in 10 CFR 50.63. The requirements would be amended to indicate that in the event of a station blackout that exceeds the specified duration determined in accordance with 10 CFR 50.63, or failure or unavailability of an alternate ac source used to comply with 10 CFR 50.63 during a station blackout, the requirements of 10 CFR 50.xxx (i.e., the mitigation strategy requirements that are the subject of this rulemaking) will be implemented.

A central objective for this new regulation would be to ensure continuity with current requirements in 10 CFR 50.63. For station blackout events, the mitigation strategies would be implemented when those events extend beyond a licensee's capability to withstand and recover from a station blackout as required by 10 CFR 50.63 (or for licensees that use an alternate ac power source, if that source also fails or is unavailable). At the implementation level, the mitigation strategies would connect into the emergency operating procedure for station blackout conditions. Specifically, when operators are not able to restore ac power from either offsite or onsite power sources, operators would presumably take actions to implement the mitigation strategies. Accordingly, linking the current station blackout requirements residing in 10 CFR 50.63 with the new requirements is viewed by the NRC as aligning the regulations with the implementation of these requirements at the plant level.

As this rulemaking proceeds, the NRC may conclude that for new reactors the station blackout mitigating strategies requirements make the 10 CFR 50.63 coping determination irrelevant (i.e., always result in more bounding requirements to be able to cope with station blackout conditions). If this occurs, then additional changes to 10 CFR 50.63 may be required so that new reactor designs are not unnecessarily performing 10 CFR 50.63 specified duration determinations.

Implementation

The NRC staff envisions several different implementation scenarios depending on the status of the license or application, and dependent on the licensing process being used:

1. Current licensees subject to the requirements of EA-12-049 or the equivalent license conditions are not expected to have significant implementation challenges, and would not be required to re-submit information that was already provided for review in response to EA-12-049 or the equivalent license condition.
2. Combined license holders in the pre-10 CFR 52.103(g) finding stage, would need to complete full implementation of the requirements (e.g., complete installation of equipment and development and implementation of guidance and strategies) prior to initial fuel load.
3. Combined license applicants who reference a design certification that has not been updated to meet the new rule would need to address the equipment requirements in their applications.
4. Operating license and combined license applicants whose applications are under NRC review would need to supplement their applications within 6-12 months with the required information.
5. Design certification, standard design approval, and manufacturing license applicants would need to address the equipment requirements in their applications.
6. Current design certification holders would not need to amend their design certifications but would need to address equipment requirements in renewal applications.
7. All other future license, design certification, and design approval applicants would need to address the applicable requirements in their applications.

The NRC staff intends to follow its cumulative effects of regulations procedures throughout this rulemaking, and during the final rulemaking phase expects to explore with external stakeholders whether there remain any implementation challenges that can and should be accommodated in the final rule's implementation requirements.

Additional Questions for Stakeholder Consideration

The following are additional questions that are intended to solicit additional feedback from external stakeholders to support the NRC staff's effort to assemble a proposed rule, supporting statement of considerations, and regulatory analysis containing the elements described in this appendix.

1. Should the agency consider a broader rule that combines the current 10 CFR 50.54(hh)(2) and 10 CFR 50.63 with the proposed rule into a single regulatory framework, potentially enhancing efficiency and effectiveness and reducing the cumulative effects of regulation?"
2. New reactors and their siting will be evaluated with up-to-date knowledge of external events (per GDC-2). Further, they may have better and more robust designs reflecting the operating experience of the current generation of reactors with respect to station blackout mitigation. Therefore, the NRC requests comment on the application of station blackout mitigating strategies requirements to new reactors:
    a. Should new reactor designs be required to have station blackout ac power sources that are designed for external events (e.g., safe shutdown earthquake, flooding, and wind) and have sufficient capacity to shutdown the reactor? Should

new reactor designs be required to include additional margin for flooding or other external events?

b. If so, should the NRC allow credit (i.e., allowing these ac sources to re-energize safety buses) under ELAP conditions, or should there be requirements for portable equipment as a diverse means to maintaining or restoring the key functions regardless of whether there are ac sources capable of re-energizing safety buses?
c. What station blackout mitigation strategy requirements should be applied to small modular reactors?
d. The NRC is considering requiring a design certification applicant to address the first portion of the mitigative response with installed equipment and connections to allow for maintenance of functions, and then have the remaining scope (i.e., the portion of the response that is more reliant on portable equipment) be the responsibility of a combined license applicant. What are stakeholder views on the appropriate division of requirements between a design certification and a combined license?
e. What information about mitigation strategies and the equipment to be used should be included in the final safety analysis report? Where should other supporting information be located?
f. For the combined license process, how should implementation be phased with application for a combined license, combined license issuance, and fuel load?

3. How should human reliability be considered for beyond-design-basis external events for which there is an undefined damage state and potentially severe conditions under which human actions would be required?

4. The NRC understands that licensees may incur impacts as a result of station blackout mitigation strategies requirements already imposed under Order EA-12-049 or as a result of the proposed rule contemplated in this regulatory basis document. The NRC requests feedback on the costs associated with the specific station blackout mitigation strategies and related activities, regardless of whether they arise as a result of the Order or the rule. The NRC specifically requests information addressing the following questions. In your response, please indicate whether the information applies to (a) operating reactor licensees, (b) applicants, (c) design certification licensees/applicants, or (d) other (specify).

    a. What specific equipment (and quantity of specific equipment) will licensees or applicants need to procure in order to comply with station blackout mitigation strategies requirements? If applicable, please specify whether the specific equipment will be shared by multiple units at a site or by multiple sites in a region. What are the capital and maintenance costs associated with the equipment?

    b. What plant modifications (i.e., beyond the equipment described above) will licensees or applicants need to make in order to comply with station blackout mitigating strategies requirements? What are the estimated costs associated with these plant modifications? Will these plant modifications extend the duration of plant outages when they are installed? If so, by how much calendar time?

c. What changes to procedures will licensees or applicants likely need to make in order to comply with station blackout mitigation strategies requirements? What are the estimated costs associated with developing these procedure changes? Would operational costs be affected, and if so, at what estimated cost?

d. What training are licensees or applicants likely to purchase or develop to comply with station blackout mitigation strategies requirements? In what format will this training be given and to what types and numbers of workers at what duration and frequency? What is the estimated cost to purchase or develop the training?

e. What other types of activities are anticipated, and what are the estimated costs associated with the activities?

f. What benefits will be gained as a result of station blackout mitigation strategies requirements?

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments on Initial Ballot — Nuclear Plant Interface Coordination for Order 716 (Project 2009-08)

Summary Consideration:
As demonstrated by the strong approval (94%) most balloters support the revised standard. Amongst the comments received with initial ballots, the major concern expressed dealt with the "intent" of Requirement R9.3.5 and the proposed wording. The SDT explained that Requirement R9.3.5 is intended to cover the unique situation of losing both off-site and on-site AC power. The SDT further explained that "provisions for considering" could include restoration steps taken by the Nuclear Plant Generator Operator and/or applicable Transmission Entities. The SDT also explained that the term "requirements" used in this context referred to situationally specific terms between the plant and transmission entities to be negotiated within the agreements.

One entity felt that the Requirement R9.3.5 was not needed since restoration of off-site power was covered in standard EOP-005. The SDT explained that the scope and application of Requirement R9.3.5 is different than the scope and application of EOP-005. The SDT further explained that NUC-001 Requirement R9.3.5 is intended to address the specific case of loss of not only the off-site (preferred) AC power source to the plant's safe shutdown equipment, but coincident loss of all on-site (emergency or backup) AC power sources. In this situation the loss of off-site power may or may not be a result of a BES blackout or isolation situation as referenced in EOP-005.

Another concern expressed dealt with the removal of the term "coping time". The SDT explained that Requirement R9.3.5 was being modified to provide clarity as directed in FERC Order 716. The SDT further explained that it removed the term "coping time" due to an overwhelming objection to include the term raised by the industry. The majority of the industry felt that the term was confusing and ambiguous. The SDT also explained that the present wording allowed for situational determination of restoration priorities and that removal of this term did not relieve or prevent a Nuclear Plant from meeting NPLRs.

Some balloters indicated that the standard addresses a safety issue rather than a reliability issue. The determination of whether this standard should exist as a reliability standard has already been determined by stakeholders.

If you feel that the drafting team overlooked your comments, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, you can contact the Vice President and Director of Standards, Gerry Adamski, at 609-452-8060 or at gerry.adamski@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

[1] The appeals process is in the Reliability Standards Development Procedure: http://www.nerc.com/files/RSDP_V6_1_12Mar07.pdf.

Voter	Entity	Segment	Vote	Comment
Dan R Schoenecker	Midwest Reliability Organization	10	Negative	1. Requirement 9.3.5 considers coping time, instead a nuclear plant should communicate their needs and time frames to us and we should prioritized our restoration process. A nuclear plant may not be the first unit to be restored; a coal plant may have a higher restoration priority then a nuclear plant. Section 215 of the Energy Policy Act of 2005, gave NERC the authority to develop regulations to assure the reliability of the Bulk Electric System (BES). Although Nuclear safety is of paramount concern, it is not within the scope of NERC's responsibilities. The Atomic Energy Act of 1954 as amended provides the Nuclear Regulatory Commission the statutory responsibility for assuring the safety of commercial nuclear power plants. The nuclear industry's excellent safety record, demonstrates the NRC ability to meet its charter. Therefore, we suggest NERC concentrate on assuring the reliability of BES and the systems and structures that support it regardless of the fuel type. 2. Also in requirement 9.3.5, the text “requirement” needs to be clarified. It should not include safety requirements such as NPRI standards. (Paragraph 107, FERC Order 716)
Response: The SDT modified the standard (before this ballot was conducted) and removed the term “coping time”. The SDT believes that the present wording allows for situational determination of restoration priorities. The term “requirements” in this context refers to situationally specific negotiated terms between the plant and transmission entities.				
Jason Shaver	American Transmission Company, LLC	1	Negative	ATC appreciates the work of the Standards Drafting Team but is unable to support the proposed changes to NUC-001-2 for the following reasons. Requirement 9.3.5 is a duplicate of Requirement 11.4 in EOP-005-1 for Transmission Operators: We believe that Requirement 9.3.5 is duplicative of Requirement 11.4 in EOP-005-1 and should simply be deleted from NUC-001-2. EOP-005-1 Requirement 11: Following a disturbance in which one or more areas of the Bulk Electric System become isolated or blacked out, the affected Transmission Operators and Balancing Authorities shall begin immediately to return the Bulk Electric System to Normal. EOP-005-1 Requirement

Voter	Entity	Segment	Vote	Comment
				11.4: The affected Transmission Operators shall give high priority to restoration of off-site power to nuclear stations. NUC-001-2 Requirement 9.3.5: Requirement 9.3.5 simply states that the applicable transmission entity has to consider the "urgency of a nuclear plant that has lost all off-site and on-site AC power". Both Requirement 11.4 and Requirement 9.3.5 state that a transmission operator has to give priority to nuclear generators following the loss of off-site AC power. Because of the similarity in both requirements it's our belief that the best course of action is to simple delete Requirement 9.3.5. If the SDT does not agree with our assessment of Requirement 9.3.5 then we ask that the following changes be incorporated for clarity and to reduce potential conflicts between EOP-005 R11.4 and NUC-001 R9.3.5 for TOP's: Provision for including, within the applicable Transmission Entity system restoration plan, the physical and electrical needs and urgency of a nuclear plant that has lost all off-site and on-site AC power. a) The phrase "restoration process" in the standard being balloted is not clear on whose restoration process has to be considered. Does this mean that the Transmission Entities has to consider the Nuclear Plant's restoration process, or their restoration process? Our proposal to replace the existing phrase with "applicable Transmission Entity's system restoration plan" makes it absolutely clear as to whose restoration process is being identified. Note that entities other than BA's and TOP's (who are already required in EOP-005 to have a restoration plan) identified as a Transmission Entity under NUC-001 will now be required to have a restoration plan with the sole requirement to address R9.3.5. b) The term "requirements" is unclear and inappropriate without more specific qualifications. Use of the term here could easily be confused with NPLRs, NPIRs, Plant Licensing Requirement or the NUC-001-1 requirements themselves. ATC believes that the use of the term "electrical and physical needs" would be a more appropriate because it specifies

Voter	Entity	Segment	Vote	Comment
				what needs to be included. c) ATC believes that it will be very difficult for entities to demonstrate compliance on how they "consider" the nuclear plant's needs and urgency. We believe that the better word to use is "include" which lends itself to easier demonstration of compliance and implies more specifically that some coordination of this subject need be "included" not only in the restoration plan, but also in the interface agreement to satisfy R2 of this standard. Planning Authority versus Planning Coordinator: ATC does not agree with the proposed change from Planning Authority to Planning Coordinator. The term Planning Coordinator does exist in the latest version of the Functional Model Guideline but does not exist in NERC's Rule of Procedure's. In addition, NERC has not registered a single entity as a Planning Coordinator, so it is unclear who will be responsible for this Standard.

Response: The SDT believes that the requirement referenced in EOP-005 is slightly different than Requirement R9.3.5. Requirement R9.3.5 addresses situations that may not be covered in EOP-005. For example, the loss of on-site or off-site power does not necessarily constitute a blackout or isolation situation as described in EOP-005. In addition, Requirement R9.3.5 does not require "high priority" to be given as directed by EOP-005. Requirement R9.3.5 specifies that provision for considering the needs of a Nuclear Plant must be given within a restoration plan.

The SDT disagrees with your suggested wording for the following reasons:

- **a) The provisions for considering within the restoration process could include restoration steps taken by the Plant Operator and/or other Transmission Entities. Requirement R9.3.5 is one required element of negotiated agreements.**
- **b) The term "requirements" in this context refers to situationally specific negotiated terms between the plant and transmission entities.**
- **c) Requirement R9.3.5 requires the agreement(s) to include a provision for addressing the situation.**

The change from Planning Authority to Planning Coordinator is being made to provide uniformity within this standard and other standards under development. The Standards Committee has directed drafting teams to adopt the terms in Version 3 of the Functional Model – and Version 3 replaced the term, "Planning Authority" with "Planning Coordinator." Note that FERC has been notified of this change, and has indicated that it accepts the replacement of "Planning Authority" with "Planning Coordinator."

Voter	Entity	Segment	Vote	Comment
Mike Laney	Luminant Generation Company LLC	5	Negative	Luminant agrees with the wording change of “in effect” verses “executed” applicable to section B.R2. of the requirements. However, Luminant is not in support of the proposed modifications of R9.3.5. Nuclear Power Plants are required by the Nuclear Regulatory Commission (NRC) to comply with 10CFR 50.63, “Loss of all alternating current power.” Per 10CFR50.63, “The reactor core and associated coolant, control, and protection systems, including station batteries and any other necessary support systems, must provide sufficient capacity and capability to ensure that the core is cooled and appropriate containment integrity is maintained in the event of a station blackout for the specified duration. The capability for coping with a station blackout of specified duration shall be determined by an appropriate coping analysis. Licensees are expected to have the baseline assumptions, analyses, and related information used in their coping evaluations available for NRC review.” Luminant's nuclear facility was evaluated against the NRC’s Station Black Out Rule requirements using NRC Regulatory Guide (RG) 1.155, “Station Blackout.” Luminant is obligated and committed to RG 1.155 with NRC for a specific coping time. Nuclear Final Safety Analysis Reports (FSAR) describe the design, construction and operation of nuclear power plants. The NRC uses this design information provided within the FSAR to evaluate as to whether a nuclear plant can operate without undue risk to the health and safety of the public. Since “coping time” is part of a nuclear units licensing basis, Luminant feels the current proposed language change is not sufficient.
Response: The SDT was directed to provide clarity to Requirement R9.3.5 in FERC Order 716. The SDT removed the term “coping time” due to an overwhelming objection to include the term by the industry. The industry felt that the term was confusing and ambiguous. This requirement does not relieve nor prevent a Nuclear Plant from meeting NPLRs (such as coping time).				

Voter	Entity	Segment	Vote	Comment
William L. Thompson Jalal (John) Babik Mike Garton Louis S Slade	Dominion Virginia Power Dominion Resources, Inc. Dominion Resources, Inc. Dominion Resources, Inc.	1 3 5 6	Negative	Requirement R9.3.5 does not provide enough clarity for the Nuclear Plant Generator Operator and Transmission Entities to develop appropriate language for the agreements required by this standard. As an example, a likely scenario for a nuclear power plant, the loss of off-site power without the loss of on-site power, is not addressed within the scope of Requirement R9.3.5 or any of the other sub-requirements of Requirement 9.3.
Response: Requirement R9.3.5 is intended to cover the unique situation of losing both off-site and on-site power. The example you have provided would be covered in Requirements R4.2 and R9.2.2.				
Charles H Yeung	Southwest Power Pool	2	Affirmative	SPP, Inc. supports this version of NUC-001. We are concerned however that this standard is not directly relevant to bulk power system reliability - NERC's mission. Although it is important for obvious reasons for a nuclear plant to have agreements in place with transmission providers, these requirements are meant to be safeguards for the nuclear plant and not for the reliability of the bulk power system. Further, NIPRs are already in existence that require the nuclear plants to have agreements in place and can be enforced through other regulatory bodies.
Response: The SDT acknowledges your affirmative response and thanks you for your clarifying comment. The need for the standard has already been established through the Standards Development Process. The scope of the current project is to provide modification to Requirement R9.3.5 as directed in FERC Order 716.				
Richard J. Padilla	Pacific Gas and Electric Company	5	Affirmative	Proposed to change from R9.3.5. Provision for considering, within the restoration process, the requirements and urgency of a nuclear plant that has lost all off-site and on-site AC power. Change to: R9.3.5. Provision for considering, within the restoration process, the requirements and urgency of nuclear plants that have lost all off-site AC power.
Response: The SDT acknowledges your affirmative response and thanks you for your clarifying comment. Requirement R9.3.5 is intended to cover the unique situation of losing both off-site and on-site power. The example you have provided would be covered in Requirements R4.2 and R9.2.2.				

Voter	Entity	Segment	Vote	Comment
Terry Bilke	Midwest ISO, Inc.	2	Abstain	We have mixed feelings for this standard. We understand that NERC was directed to develop such a standard, but this standard clearly tries to address a nuclear safety rather than a reliability issue. The EPAct legislation specifically excluded authority for the development of safety standards. If there is a problem with auxiliary supply that jeopardizes reliability, other existing standards will apply. This encroachment on the purview of the NRC will continue to muddy the waters. When everyone is in charge, nobody is responsible. It will also lead to misallocation of resources.
Response: The need for the standard has already been established through the Standards Development Process. The scope of the current project is to provide modification to Requirement R9.3.5 as directed in FERC Order 716.				