NEI 13-06 [Revision 0]

Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events

April 2014

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Nuclear Energy Institute

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April 2014

ACKNOWLEDGMENTS

This document was developed by the Nuclear Energy Institute (NEI) Emergency Preparedness (EP) Working Group with assistance from the Beyond Design Basis (BDB) Event Response Drill Task Force.

NEI BDB Event Response Drill Task Force

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NOTICE

EXECUTIVE SUMMARY

This technical report provides guidance for the completion of actions necessary to address the Tier 2 Emergency Preparedness (EP) enhancements identified in US Nuclear Regulatory Commission (NRC) Report, *Recommendations for Enhancing Reactor Safety in the 21st Century* [*The Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident*].[1&2] These actions reflect the approach discussed in COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*, and related NRC staff and Nuclear Energy Institute (NEI) documents. Specifically, the NRC staff determined that certain Tier 2 EP items are being addressed adequately through implementation of NRC Order EA-12-049, *Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*.

Order EA-12-049 addresses NRC NTTF Report Recommendation 4 and stemmed directly from Recommendation 4.2. The activities undertaken by the industry to comply with the Order will resolve two of the three Tier 2 items contained in NRC NTTF Report Recommendation 9.3; these items are periodic training and drills, and EP equipment and facilities, both associated with responses to a multi-unit and/or extended loss of AC power event.[3] The remaining Tier 2 item from Recommendation 9.3 deals with multi-unit dose assessment capability and is not within scope of Order EA-12-049 activities.

NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, provides guidance on the format and content of licensee responses to Order EA-12-049. The guidance also covers information related to FLEX deployment, including training and drills, and equipment and facility topics captured in Recommendation 9.3. For example, NEI 12-06, states, "[w]here appropriate, the integrated FLEX drills should be organized on a team or crew basis and conducted periodically; with all time-sensitive actions to be evaluated over a period of not more than eight years." It further states, "Periodic training should be provided to site emergency response leaders on beyond design-basis emergency response strategies and implementing guidelines," and "procedures/guidance should identify the protective clothing or other equipment or actions necessary…."

In addition, NEI 12-06 recommends utilization of the staffing and communication resources identified in NEI 12-01, *Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities*. The latter document was developed to address the two Tier 1 topics from Recommendation 9.3 - staffing and communications. NEI 12-01 states, "[a] licensee should identify additional work areas necessary for the performance of expanded response functions. The use of alternate emergency response facilities should be considered." This statement addresses the facilities needed to house the response staff.

[1] This report is commonly referred to as the NRC NTTF Report.
[2] The tier assignments made to the EP enhancements are discussed in SECY-11-0137, *Prioritization of Recommended Actions to be taken in Response to Fukushima Lessons Learned*, dated October 3, 2011
[3] Staff documents may refer to an "extended loss of AC power" as a "prolonged Station Blackout (SBO)."

With the preceding in mind, NEI and the industry have created this technical report to promote consistent implementation of the actions which address the Tier 2 EP enhancements discussed above.

Three of the topics addressed by COMSECY-13-0010 are also relevant to NRC NTTF Recommendation 8. These topics are training, drills and exercises, and they are discussed in an NRC document entitled, *Onsite Emergency Response Capabilities, Regulatory Basis to Address Nuclear Regulatory Commission Near-Term Task Force Recommendation 8*, dated October 1, 2013.[4] In recognition of the interrelationship between of the discussions presented in the COMSECY and the regulatory basis, and the desirability of having well-integrated guidance, this document also addresses training, qualifications, drills and exercises for beyond design basis events and severe accidents.

Finally, fleet and site leadership teams should carefully consider which department(s) will be assigned a responsibility for addressing one or more of the EP and emergency response-related enhancements discussed in this document. It is important that leadership teams have a full understanding of the requirements related to EP and Beyond Design Basis (BDB) emergency response capabilities in order to identify potential gaps in organizational knowledge, "skill sets," and alignment/coordination that could impact sustainability. In particular, opportunities to leverage organizational resources and synergies in order to improve performance should be pursued.

[4] Available on regulations.gov; see Docket ID: NRC-2012-0031.

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ENHANCEMENTS TO EMERGENCY RESPONSE CAPABILITIES FOR BEYOND DESIGN BASIS ACCIDENTS AND EVENTS

1 INTRODUCTION

1.1 SCOPE AND PURPOSE OF NEI 13-06

This technical report provides guidance for the performance of licensee actions that will address certain aspects ofrecommendations contained in US Nuclear Regulatory Commission (NRC) Report, *Recommendations for Enhancing Reactor Safety in the 21st Century* [*The Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident*]. The specific recommendations are:

- Recommendation 4.2 – "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."

- Recommendation 8.1 – "Order licensees to modify the EOP technical guidelines (required by Supplement 1, 'Requirements for Emergency Response Capability,' to NUREG-0737, issued January 1983 (GL 82-33), to (1) include EOPs, SAMGs, and EDMGs in an integrated manner, (2) specify clear command and control strategies for their implementation, and (3) stipulate appropriate qualification and training for those who make decisions during emergencies."

- Recommendation 8.4 – "Initiate rulemaking to require more realistic, hands-on training and exercises on SAMGs and EDMGs for all staff expected to implement the strategies and those licensee staff expected to make decisions during emergencies, including emergency coordinators and emergency directors."

- Recommendation 9.3 [*relevant wording excerpted*] – "Order licensees to do the following until rulemaking is complete:

    - Add guidance to the emergency plan that documents how to perform a multiunit dose assessment (including releases from spent fuel pools) using the licensee's site-specific dose assessment software and approach.

    - Conduct periodic training and exercises for multiunit and prolonged SBO [*Station Blackout*] scenarios. Practice (simulate) the identification and acquisition of offsite resources, to the extent possible.

    - Ensure that EP equipment and facilities are sufficient for dealing with multiunit and prolonged SBO scenarios."

These recommendations were subsequently evaluated by the NRC staff and refined into various regulatory positions and actions. NEI 13-06 addresses the positions and actions discussed in COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*. The topics in the COMSECY include multi-unit dose assessment, training, EP facilities and equipment, and drills and exercises.

Additionally, the COMSECY makes reference to certain topics that are also within the scope of Recommendation 8; these topics are training, drills and exercises. With respect to Recommendation 8, these topics apply to the implementation of FLEX Support Guidelines (FSGs), Severe Accident Management Guidelines (SAMGs) and Extensive Damage Mitigation Guidelines (EDMGs). In recognition of the need for well-integrated guidance, NEI 13-06 addresses the training, qualification, drill and exercise aspects of the COMSECY and *Onsite Emergency Response Capabilities, Regulatory Basis to Address Nuclear Regulatory Commission Near-Term Task Force Recommendation 8*, dated October 1, 2013.

Finally, this document uses the term "FLEX Support Guidelines" or "FSGs" to connote the document(s) developed or enhanced in response to NRC Order EA-12-049, *Order Modifying Licenses with regard to Requirements for Mitigating Strategies for Beyond Design Basis External Events*, and which describe/direct the operator and field actions necessary to implement mitigating strategies in response to a beyond design basis external event. Depending upon Owners Group guidance, and fleet and site standards, these actions may be contained in a document(s) with a different name. Each licensee should ensure that their appropriate site-specific documents are utilized when addressing the FLEX-related guidance contained in this document.

2 MULTI-UNIT DOSE ASSESSMENT

2.1 APPLICABLE ASPECTS OF NRC NTTF REPORT RECOMMENDATIONS

2.1.1 Recommendation 9

"The Task Force recommends that the Commission direct the staff to do the following:

. . .

9.3 Order licensees to do the following until rulemaking is complete:

. . .

Add guidance to the emergency plan that documents how to perform a multiunit dose assessment (including releases from spent fuel pools) using the licensee's site-specific dose assessment software and approach."

2.2 RELATED REFERENCE DOCUMENTS

SECY-11-0137, *Prioritization of Recommended Actions to be taken in Response to Fukushima Lessons Learned*, dated October 3, 2011

NEI Letter, *Industry Implementation of Multi-unit Dose Assessment Capability*, Pollock to Wiggins, dated January 28, 2013

NRC Letter, Wiggins to Pollock, dated February 27, 2013

NEI Letter, *Commitment for Implementation of Multi-Unit Dose Assessment Capability*, Pollock to Wiggins, dated March 14, 2013

NEI Letter, *Commitment for Implementation of Multi-Unit Dose Assessment Capability*, Pietrangelo to Nuclear Strategic Issues Advisory Committee Steering Group, dated March 22, 2013

COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*, dated March 27, 2013

Site-specific letter to NRC staff concerning the intent to implement multi-unit (source) dose assessment capability, dated on or around June 30, 2013

2.3 RECOMMENDED ACTIONS

2.3.1 Industry Performance Standard for Multi-Unit Dose Assessment

All single and multi-unit sites should establish the capability to perform offsite dose assessments during an event involving concurrent radiological releases from all on-site

units and/or multiple release points (i.e., whether from one or multiple units[5]), consistent with the description contained in the site-specific licensee letter to the NRC staff dated on or around June 30, 2013.

The multi-unit dose assessment capability should be computerized (i.e., offsite dose projections are generated using a computer-based model), and reflect the normally expected use of radiological and meteorological indications, e.g., incorporated into the site's emergency dose projection software as an assessment option. It should be available to support responses during events both within and beyond the plant design basis. In particular, the capability should exist to project offsite doses during an event involving an extended loss of AC power affecting all onsite units.

In addition to the normally used calculation methods and input indications, the capability should also accommodate the use of alternate methods and indications to address instances when normal data sources may be unavailable. For example, in cases where a plant vent radiation monitor is non-functional, a dose projection model might have the capability to project offsite doses based on a source term derived from a dose rate measurement in the plant or field. Or if onsite meteorological data is not available, then dose assessments are performed using parameter values obtained from a pre-identified near-site source or the National Weather Service.

A licensee may elect to also include a backup method (e.g., a manual method) to supplement the computerized method discussed above; if this option is pursued, the backup method should be capable of producing results within a reasonable time period (e.g., within about 30 minutes). In addition, consideration should be given to establishing a procedurally-driven peer/second person check of manually derived output, where warranted.

Implementation of this enhancement may necessitate the addition of a backup power source (e.g., an uninterruptable power supply) to onsite dose assessment computing platforms or ensuring the availability of computing platforms at locations away from the site (e.g., at an ERO alternate facility or an Emergency Operations Facility). It does not require the installation of new, or modification of existing, plant equipment such as radiation monitors, flow detectors and meteorological instrumentation (including associated data processors and power sources).

Each licensee should discuss their capability to perform multi-unit dose assessment with the appropriate Offsite Reponses Organization (ORO) agency officials, and determine if any changes are necessary to ORO plans and procedures.

2.3.2 Emergency Classification and Protective Action Recommendations

Multi-unit dose assessment results should be assessed in accordance with the licensee's existing emergency classification scheme and Protective Action Recommendation (PAR) decision-making process.

[5] This topic is referred to as "multi-unit dose assessment" for ease of reading; however, it should be understood to mean the capability to assess concurrent releases from multiple release sources/points such as reactor cores and spent fuel pools. It is therefore applicable to single-unit sites as well.

Each licensee should verify that the capability exists to issue a PAR for appropriate areas beyond the Emergency Planning Zone (EPZ) boundary, in accordance with existing regulatory requirements and guidance.

Consideration should be given to addressing the following points in the site-specific procedure or guideline that implements the multi-unit dose assessment capability.

- Projected offsite doses should be compared against the Emergency Action Levels (EALs) to determine if a change in the emergency classification is warranted.
- Projected offsite doses should be compared against appropriate decision-making criteria to determine if a change in PARs is warranted.

2.3.3 Training

Each licensee should provide training to the personnel responsible for performing a multi-unit dose assessment. Training materials, delivery methods and frequencies, and evaluation techniques should be developed using established Systematic Approach to Training (SAT) processes.

2.3.4 Performance Enhancing Experience

Periodic opportunities for a performance enhancing experience should be provided to personnel responsible for performing multi-unit dose assessment and assessing the results. Such opportunities may include performance during a drill or exercise (as an in sequence or out-of-sequence activity) or a separate/stand-alone mini-drill. These opportunities should be provided consistent with the extent-of-play and methods normally used to implement mini-drills, drills or exercises involving a demonstration of dose assessment capabilities.

2.3.5 Quality and Maintenance-Related Requirements

Equipment and software used to implement a multi-unit dose assessment capability should be procured and installed under the commercial and site requirements normally applicable to the EP Program.

Programmatic controls should be applied to appropriate equipment and software to ensure availability and reliability, including the performance of periodic inventory checks and functionality testing.

2.3.6 Considerations for Program Documents

A capability for performing multi-unit dose assessment need not be described in the site emergency plan; however, this capability should be described in a document maintained through a fleet or site document control process. The document should be retained for the life of the plant.

3 TRAINING

3.1 APPLICABLE ASPECTS OF NRC NTTF REPORT RECOMMENDATIONS

3.1.1 Recommendation 4

"The Task Force recommends that the Commission direct the staff to begin the actions given below to further enhance the ability of nuclear power plants to deal with the effects of prolonged SBO conditions at single and multiunit sites without damage to the nuclear fuel in the reactor or spent fuel pool and without the loss of reactor coolant system or primary containment integrity.

. . .

4.2 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.

- This existing equipment currently provides some of the coping capability that is recommended for the long term, but current storage requirements do not ensure that it will be available after a design-basis external event. This requirement would increase the likelihood that the equipment will be available if called upon.

- The staff should also consider conforming changes to the requirements in 10 CFR 50.54(hh)(2) to address multiunit response capacity."

3.1.2 Recommendation 8

"The Task Force recommends that the Commission direct the staff to further enhance the current capabilities for onsite emergency actions in the following ways:

. . .

8.1 Order licensees to modify the EOP technical guidelines (required by Supplement 1, 'Requirements for Emergency Response Capability,' to NUREG-0737, issued January 1983 (GL 82-33), to (1) include EOPs, SAMGs, and EDMGs in an integrated manner, (2) specify clear command and control strategies for their implementation, and (3) stipulate appropriate qualification and training for those who make decisions during emergencies.

. . .

8.4 Initiate rulemaking to require more realistic, hands-on training and exercises on SAMGs and EDMGs for all staff expected to implement the strategies and those licensee staff expected to make decisions during emergencies, including emergency coordinators and emergency directors."

3.1.3 Recommendation 9

"The Task Force recommends that the Commission direct the staff to do the following:

. . .

9.3 Order licensees to do the following until rulemaking is complete:

. . .

Conduct periodic training and exercises for multiunit and prolonged SBO scenarios. Practice (simulate) the identification and acquisition of offsite resources, to the extent possible."

3.2 RELATED REFERENCE DOCUMENTS

SECY-11-0137, *Prioritization of Recommended Actions to be taken in Response to Fukushima Lessons Learned*, dated October 3, 2011

NRC letter, *Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident*, dated March 12, 2012

NRC Order EA-12-049, *Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*, dated March 12, 2012

NEI 12-01, *Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities*, dated May 2012

NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, dated August 2012

NRC JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*, dated August 29, 2012

Site-specific letter to NRC staff transmitting results of a communications assessment performed in response to NRC 50.54(f) letter; initial letter dated on or around October 31, 2012 and a possible follow-up letter dated on or around February 28, 2013

COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*, dated March 27, 2013

Site-specific letter to NRC staff transmitting results of a first-phase staffing assessment performed in response to NRC 50.54(f) letter, dated on or around April 30, 2013; a second-phase staffing assessment is due to the NRC staff no later than 4 months prior to the beginning of the second refueling outage (as described in the site response to NRC Order EA-12-049

Site-specific Integrated Plan for implementing NRC Order EA-12-049

Onsite Emergency Response Capabilities, Regulatory Basis to Address Nuclear Regulatory Commission Near-Term Task Force Recommendation 8, dated October 1, 2013

3.3 RECOMMENDED ACTIONS

3.3.1 BDB Event Response Training

Each licensee should provide training to the key personnel relied upon to implement the procedures and guidelines for responding to a beyond design basis event or severe accident, including the site-specific integrated use of FLEX Support Guidelines (FSGs), Extensive Damage Mitigation Guidelines (EDMGs) and Severe Accident Management Guidelines (SAMGs).[6] Training materials, delivery methods and frequencies, and evaluation techniques should be developed using ~~established Systematic Approach to Training (SAT) processes~~the Systems Approach to Training (SAT) process as defined in 10 CFR 55.4. Position-specific qualification requirements should also be identified, as appropriate.

Training and qualification elements may be incorporated into a new training program, into an existing training program(s), or a combination of both.

The development of training and qualification requirements and materials should consider the degree to which the knowledge and skills normally expected of a given position can be readily applied to an assigned task. Development should also recognize the availability of job/user aids and built-in equipment/hardware features that can improve human performance during stressful or adverse conditions (e.g., color coding, standardized connections, etc.).

Training program developers should assess and implement reasonable methods that may be used to facilitate practice at performing tasks under expected adverse conditions. The use of these methods should maintain an appropriate focus on the safety of plant personnel or equipment.

The primary focus of licensed operator initial and requalification training programs should continue to be on developing and maintaining the knowledge and skills of operators to implement the Emergency Operating Procedures (EOPs). This goal should be balanced with the need to provide the additional training necessary to ensure that operators have the capability to respond to a beyond design basis event or severe accident. Reflecting this balance, the following approach is recommended.

- Identify the knowledge and skills uniquely necessary to execute the FSG, EDMG and SAMG strategies that are not implemented directly through performance of an AOP or EOP.[7] This listing should be maintained separate from the licensed operator knowledge and abilities (K/A) catalog.

Comment [S1]: Please re-confirm what you mean, K/A catalogs currently have SAMGs included. What is the intent? A SAT process as defined in 55.4 includes: 1) systematic analysis of the jobs to be performed, 2) learning objectives derived from the analysis which describe desired performance after training, 3) training design and implementation based on the learning objectives, 4) evaluation of trainee mastery of the objectives during training, and 5) evaluation and revision of the training based on the performance of trained personnel in the job setting. The first 2 bullets of this section suggest that operator training will not be done consistent with all elements of a SAT process. Clarification should be provided to reconcile these bullets with the preceding statement in 3.3.1 regarding use of a SAT process.

[6] This training may be accomplished in different settings since implementation of some emergency response procedures and guidelines are dependent upon the nature of the postulated initiating event, the plant response/accident sequence, and the ability of responders to select and implement mitigation/management strategies.
[7] In other words, knowledge or skills that are not necessary for the performance of AOPs or EOPs.

- Evaluation techniques should be developed to assess trainee learning. Dynamic exams may be used, consistent with simulator capabilities.

- Site administrative controls should be established to ensure that an individual has successfully completed all required training prior to assuming a licensed operator position on-shift (e.g., training could be performed after receipt of an initial operator license but before being assigned on-shift duties in the Control Room).

In addition to licensed operators, initial training and periodic retraining should be established for other licensee personnel with supporting responsibilities, including:

- Non-licensed operators, health physics staff, maintenance personnel, and other positions that would be called upon to perform implementing tasks.

- Support staff that would be evaluating plant conditions and recommending appropriate accident mitigating and management strategies for implementation.

- Personnel who would be requesting and coordinating the delivery of Final Phase (Phase 3) mitigating strategy equipment from an offsite location (e.g., from a Regional Response Center).

3.3.2 Plant-Referenced Simulator

The fidelity of the plant-referenced simulator should be maintained in accordance with 10 CFR 55.46 as additional equipment is installed in the facility and utilized to support operation. The simulator should also be updated as additional accident monitoring instrumentation is installed in the Control Room. Modelling of instrumentation responses should use current model capabilities, and consider the anticipated effects of the environmental conditions associated with a beyond design basis event or severe accident on the reliability of the instrumentation readings. Such consideration may be on a "best estimate" basis. Increasing the capability of the plant-referenced simulator to specifically model the conditions of the reactor core or stored spent fuel during a beyond design basis event or severe accident is not required.

3.3.3 Ultimate Decision-Maker Qualifications

As part of the required planning for responses to emergency conditions, each licensee has established a command and control structure for their Emergency Response Organization (ERO). Within this structure, there should be a position(s) with the assigned authority and responsibility for providing overall direction on the implementation of EOPs, FSGs, EDMGs and SAMGs for a unit or set of units; this authority and responsibility is referred to as the Ultimate Decision-Maker (UDM) function.[8] Qualification requirements should be developed for the position(s) performing this function. These requirements should ensure that each UDM-qualified individual has sufficient technical understanding and leadership ability to make timely and informed decisions during a beyond design basis event or severe accident.

[8] The UDM function is described in NEI 14-01, *Emergency Response Procedures and Guidelines for Beyond Design Basis Events and Severe Accidents*.

Provisions for periodic requalification should also be assessed in order to ensure that the individuals have maintained the necessary knowledge and skills.

Comment [TJ2]: What does it mean here?

3.3.4 Training Development Guidance from Regulatory Responses

In addition to the topics discussed above, training programs should also address the training-related actions described in:

- FLEX program implementing documents developed in accordance with NRC Order EA-12-049.
- The communications and staffing assessment responses provided to the NRC staff in accordance with the 50.54(f) letter dated March 12, 2012.

3.3.5 Considerations for Program Documents

The training and qualifications for responding to a beyond design basis event or severe accident need not be described in the site emergency plan; however, this material should be described in a document maintained through a fleet or site document control process. The document should be retained for the life of the plant.

4 EP FACILITIES AND EQUIPMENT[9]

4.1 APPLICABLE ASPECTS OF NRC NTTF REPORT RECOMMENDATIONS

4.1.1 Recommendation 4

"The Task Force recommends that the Commission direct the staff to begin the actions given below to further enhance the ability of nuclear power plants to deal with the effects of prolonged SBO conditions at single and multiunit sites without damage to the nuclear fuel in the reactor or spent fuel pool and without the loss of reactor coolant system or primary containment integrity."

. . .

4.2 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.

- This existing equipment currently provides some of the coping capability that is recommended for the long term, but current storage requirements do not ensure that it will be available after a design-basis external event. This requirement would increase the likelihood that the equipment will be available if called upon.

- The staff should also consider conforming changes to the requirements in 10 CFR 50.54(hh)(2) to address multiunit response capacity."

4.1.2 Recommendation 9

"The Task Force recommends that the Commission direct the staff to do the following:

. . .

9.3 Order licensees to do the following until rulemaking is complete:

. . .

Ensure that EP equipment and facilities are sufficient for dealing with multiunit and prolonged SBO scenarios."

4.2 RELATED REFERENCE DOCUMENTS

SECY-11-0137, *Prioritization of Recommended Actions to be taken in Response to Fukushima Lessons Learned*, dated October 3, 2011

[9] As used here, EP facilities and equipment refers to those facilities in which ERO members would perform their assigned functions during a Beyond Design Basis event response, and the necessary equipment located therein. It does not include the systems, structures, components or portable equipment used to implement accident mitigating or management strategies described in Abnormal/Emergency Operating Procedures, or FLEX Support, Severe Accident Management or Extensive Damage Mitigation Guidelines.

NRC letter, *Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident*, dated March 12, 2012

NRC Order EA-12-049, *Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*, dated March 12, 2012

NEI 12-01, *Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities*, dated May 2012

NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, dated August 2012

NRC JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*, dated August 29, 2012

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Site-specific Integrated Plan for implementing NRC Order EA-12-049

4.3 RECOMMENDED ACTIONS

4.3.1 Industry Performance Standard for EP Facilities and Equipment

Each licensee should implement the Emergency Preparedness (EP) facility and equipment enhancements identified in their communications and staffing assessments provided to the NRC staff in accordance with the 50.54(f) letter.

For EP facility and equipment enhancements not addressed by the requirements or guidance discussed above, the following approaches are recommended.

- Determine applicable design and configuration control measures.
- Items may be procured and installed under the commercial and site requirements normally applied to EP facilities and equipment.
- For multi-unit sites, ensure that sufficient quantities of radiation protection equipment

and supplies are, or can be made, available to support protracted operation of an expanded Emergency Response Organization (ERO).

- Programmatic controls should be developed to ensure the availability and reliability of EP facilities and equipment, including the performance of periodic inventory checks, functionality testing and maintenance.

- Supporting contracts with vendors should be periodically verified.

4.3.2 Considerations for Program Documents

The facilities and equipment used exclusively for responding to a beyond design basis event or severe accident need not be described in the site emergency plan; however, these items should be described in a document maintained through a fleet or site document control process. The document should be retained for the life of the plant.

5 DRILLS AND EXERCISES

5.1 APPLICABLE ASPECTS OF NRC NTTF REPORT RECOMMENDATIONS

5.1.1 Recommendation 4

"The Task Force recommends that the Commission direct the staff to begin the actions given below to further enhance the ability of nuclear power plants to deal with the effects of prolonged SBO conditions at single and multiunit sites without damage to the nuclear fuel in the reactor or spent fuel pool and without the loss of reactor coolant system or primary containment integrity.

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- This existing equipment currently provides some of the coping capability that is recommended for the long term, but current storage requirements do not ensure that it will be available after a design-basis external event. This requirement would increase the likelihood that the equipment will be available if called upon.

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"The Task Force recommends that the Commission direct the staff to further enhance the current capabilities for onsite emergency actions in the following ways:

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8.4 Initiate rulemaking to require more realistic, hands-on training and exercises on SAMGs and EDMGs for all staff expected to implement the strategies and those licensee staff expected to make decisions during emergencies, including emergency coordinators and emergency directors."

5.1.3 Recommendation 9

"The Task Force recommends that the Commission direct the staff to do the following:

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NRC JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*, dated August 29, 2012

COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*, dated March 27, 2013

Site-specific letter to NRC staff transmitting results of a first-phase staffing assessment performed in response to NRC 50.54(f) letter, dated on or around April 30, 2013; a second-phase staffing assessment is due to the NRC staff no later than 4 months prior to the beginning of the second refueling outage (as described in the site response to NRC Order EA-12-049

Onsite Emergency Response Capabilities, Regulatory Basis to Address Nuclear Regulatory Commission Near-Term Task Force Recommendation 8, dated October 1, 2013

5.3 RECOMMENDED ACTIONS

5.3.1 Industry Performance Standards for BDB Event Response Drills

Each licensee should demonstrate the capability for effective integrated use of their accident mitigation and management procedure and guideline sets. In particular, the ability to transition between procedure and guideline sets, and select the best strategy for preventing or mitigating fuel damage and limiting radiological releases, is demonstrated. Complementary methods will be necessary to accomplish this demonstration since the procedures and guidelines implemented for a given scenario are dependent upon the nature of the postulated initiating event, the plant response/accident sequence, and the ability of responders to select and implement mitigation/management strategies. The use of complementary methods will also promote more effective use of resources (e.g.,

facilitates targeted drill objectives, avoids excessive drill "down time" and durations, etc.), and minimize potential safety challenges to personnel and equipment. These methods are discussed below and involve conducting:

- A drill that demonstrates the integrated use of FLEX strategies under the control of an Abnormal Operating Procedure (AOP) or Emergency Operating Procedure (EOP), as appropriate to the postulated scenario. Specific considerations for this drill are discussed in section 5.3.4. This drill should be conducted by December 31, 2017.

- A drill that demonstrates the transition from a controlling AOP, EOP or Extensive Damage Mitigation Guidelines (EDMG) into Severe Accident Management Guidelines (SAMGs), and the selection of appropriate severe accident management strategies. The integrated use of FLEX strategies may occur if directed by the controlling SAMG and as appropriate to the postulated scenario. Specific considerations for this drill are discussed in section 5.3.5. This drill should be conducted by December 31, 2018.

- A drill that demonstrates the use of EDMG strategies.[10] The integrated use of AOPs and EOPs, and FLEX strategies, may occur if directed by the controlling EDMG as appropriate to the postulated scenario. Specific considerations for this drill are discussed in section 5.3.6. This drill should be conducted by December 31, 2019.

- A drill or drills to demonstrate the capability to utilize equipment necessary to implement strategies for responding to a beyond design basis event or severe accident. Specific considerations for this drill are discussed in section 5.3.7. All demonstrations should be completed by December 31, 2024.

Subsequent drills, of each type, should be conducted within 8 years of the preceding occurrence of a drill of that type for the life of the plant.

~~A unit that has not entered commercial operation by December 31, 2016, should determine the initial drill implementation dates through discussions with the NRC staff. As noted above, subsequent drills, of each type, should be conducted within 8 years of the preceding occurrence for the life of the plant.~~

Comment [TJ3]: The types need to be reconciled with 5.3.7.1 and 5.3.7.2.

Comment [TJ4]: The dates may need to be adjusted based on the dates of implementation of the rule language. Is there a prescriptive need for these dates?

5.3.2 Common BDB Event Response Drill Attributes

5.3.2.1 The following attributes apply to any BDB event response drill requiring implementation of FSGs, SAMGs or EDMGs, and the Drill Manager should consider them when developing the drill scenario and implementation methods.

- If not leading the effort, it is recommended that a fleet or site Emergency Preparedness (EP) Department be involved with the development and

[10] As used here, EDMG should be understood to mean the site document(s) developed to address 10 CFR 50.54(hh)(2), and the related guidance in NEI 06-12, B.5.b Phase 2 & 3 Submittal Guideline.

implementation of the drill[11].

- Two or more of the drills described above may be combined and conducted as one activity. A drill(s) may also be included within the scope of another drill (e.g., a scheduled ERO drill) or an evaluated exercise conducted to meet the requirements of 10 CFR 50, Appendix E.

- Conducting a BDB event response drill may require a set of site resources different from those normally used to conduct EP drills. The Drill Manager should identify the site resources (e.g., staffing and equipment) necessary to conduct the drill and ensure that they are scheduled/reserved. In particular, consider items that should be available to support the selected demonstrations of in-field/plant actions (e.g., movement of a portable pump).

- All normal site security, radiation protection and personnel safety requirements should be followed during the drill. These requirements should be carefully considered when developing the drill scope, extent-of-play and scenario.

- Scenario time jumps/compression may be used during the drill; however, the Drill Manager should be aware that operating experience has indicated such techniques may cause confusion among drill participants unless carefully scripted and controlled.

- Emergency response functions described in the site emergency plan should be implemented as appropriate to the drill scope, extent-of-play and scenario, and consistent with normal EP drill program practices.

- The licensee should consider whether drill performance will count towards the DEP and ERO performance indicators, consistent with the guidance in NEI 99-02.

Comment [TJ5]: What does consider mean in this context?

- Drill controller and evaluator duty assignments and responsibilities should be consistent with normal fleet or site drill program practices. In particular, assignments should be made to observe and assess player performance in a manner similar to that done for other drills.

- Use of radiation protection equipment by personnel responsible for deploying portable equipment in the field/plant should be performed.

- Following a drill, the licensee should conduct a drill critique and develop a drill report. The report should include a timeline of the decisions and actions taken to implement the selected BDB event response strategies.

[11] This recommendation is limited to drill development and implementation. No position is taken with respect to which fleet or site department(s) should be assigned ownership of BDB event response programs or program elements.

- Identified drill weaknesses and deficiencies should be placed into the appropriate fleet or site corrective action program.

5.3.3 Use of a Plant-Referenced Simulator during BDB Event Response Drills

Drills should utilize the capabilities of the plant-referenced simulator(s) to the degree practicable by current simulator modeling.

In cases where the postulated drill scenario events exceed the limits of the simulator model, or such limits would be exceeded soon after the drill is commenced, the simulator should not be used. Key parameter values supporting the drill should be generated and supplied to participants through other means (e.g., "best estimate" values are developed and provided using paper data sheets).

For a multiple-unit site with one plant-referenced simulator, the simulator may be used during a drill and the resulting data taken as representative of all onsite units if consistent with the postulated scenario conditions (i.e., the postulated events affect all onsite units in a similar manner).

5.3.4 Drill Demonstrating Integrated Use of FLEX Strategies Under the Control of an AOP or EOP

5.3.4.1 The following organizations and facilities should participate in the drill.

- A simulated Control Room for all on-site units. The Control Room(s) may be simulated in any location, consistent with the guidance in step 5.3.3 (e.g., simulator, conference room or classroom, TSC, etc.). Control Room players may be limited to those necessary for the planned demonstration.

- The primary Emergency Operations Facility (EOF) or alternate EOF, if the use of the facility is anticipated during the response to the postulated event.

- An offsite facility to which the onsite Emergency Response Organization (ERO) would report during the period when the site is inaccessible (e.g., an ERO alternative facility[12]), if the use of the facility is anticipated during the response to the postulated event.

- Offsite Response Organizations (OROs)[13] should be invited to participate; however, their participation is not required.

- The appropriate Regional Response Center (RRC) should be invited to participate; however, actual delivery of equipment is not required.

[12] An ERO alternative facility is the staging area for augmented ERO personnel used during a response to a hostile action, as described in the site emergency plan.
[13] OROs are those state, local and tribal agencies with primary responsibility for coordinating and implementing offsite emergency measures.

5.3.4.2 The Drill Manager[14] should consider the following items when developing the drill scope and extent-of-play.

- As used in this section, "drill" means a performance enhancing experience during which participant performance is assessed against a certain standard (e.g., a drill objective). Such experiences typically exclude classroom training and facilitated meetings where on-the-spot instruction and coaching is expected.

- Control Room players should process through the operating procedures and guidelines that would be used to respond to the postulated event.

- The drill duration need not exceed the assumed elapsed time necessary for augmented ERO personnel to access the site following the initiating event, as specified in the licensee's staffing assessments performed pursuant to the NRC's 50.54(f) letter dated March 12, 2012. This elapsed time is typically 6 hours.[15] Since the arrival times of ERO personnel reporting to the site from offsite locations during the drill should be consistent with the times specified in the staffing assessments, it is unlikely that the onsite TSC and OSC will be activated during the drill (unless the drill duration exceeds the assumed time necessary for ERO personnel to access the site).

- The arrival times of response personnel reporting to the EOF and/or an ERO alternate facility should reasonably reflect the postulated scenario conditions and the facility's distance from the plant site.

- Sufficient drill time should be allowed for the appropriate augmented ERO position to demonstrate the ability to assume command and control of the event response from the Shift Manager.

- Drill players should use the communications systems and equipment that would be employed during an actual response to the postulated event. This equipment may be simulated if changes or modifications would be required to support drill use (e.g., the simulated Control Room could not use a system without the installation of a new antenna and cabling). The decision to use or simulate this equipment should also include resource and equipment safety considerations.

- A control cell should be established to simulate non-participating organizations.

- Appropriate personnel at ERO facilities should demonstrate the ability to request the acquisition, and coordinate the delivery, of equipment from the supporting RRC consistent with site procedures and guidelines; however, activation of the RRC is not required. If the RRC is not participating, then

[14] As used in this document, "Drill Manager" refers to the individual with the overall responsibility for coordinating preparation and implementation of a BDB event response drill.
[15] Refer to NEI 12-01, assumption 2.2.4, and site-specific staffing assessments.

a control cell should be established to simulate the appropriate contact point. Actual delivery of equipment from an RRC will be simulated or occur as an out-of-sequence activity as coordinated with, and agreed to in advance, by the RRC.

5.3.4.3 The Drill Manager should consider the following items when developing the drill scenario and implementation methods.

- Determine the strategies, procedures and guidelines to be demonstrated during the drill, and specify the necessary operating mode(s) for each onsite unit in the scenario initial conditions.
- The assumed drill start time for the initiating event should occur during a period of minimum on-shift staffing, i.e., during a backshift, weekend or holiday.[16]
- The drill should be initiated by a beyond design basis event that results in an extended loss of AC power (ELAP) simultaneously affecting all onsite units.
- The postulated drill scenario conditions should be generally consistent with the event assumptions listed in NEI 12-01 and NEI 12-06.
- Controllers should track the assignment/deployment of on-shift personnel, and promptly identify any instances where such assignments/deployments exceed to the number of available individuals[17]. Such instances should be reported to the players, documented in a controller log and discussed in the drill critique. The players are responsible for determining what changes to assignments/deployments are necessary during the drill to account for staffing constraints identified by a controller.
- The scenario need not include the postulated failure of portable equipment.
- The drill scenario need not include a postulated radiological release.
- The scenario may assume that requested response assistance provided by OROs and other offsite resource providers (e.g., corporate support) is available within reasonably expected timeframes.

5.3.5 Drill Demonstrating the Transition from a Controlling AOP, EOP or EDMG into SAMGs

5.3.5.1 The following organizations and facilities should participate in the drill.

[16] To allow for drill conduct during a normal work day, the scenario may use an assumed day and/or start time (e.g., a drill conducted during normal work hours on a Tuesday may assume that the scenario takes place on a Saturday).
[17] The number of available individuals should be determined from, and consistent with, the staffing assessments performed in response to the NRC 50.54(f) letter of March 12, 2012.

- A simulated Control Room for all on-site units. The Control Room(s) may be simulated in any location, consistent with the guidance in step 5.3.3 (e.g., simulator, conference room or classroom, TSC, etc.). Control Room players may be limited to those necessary for the planned demonstration.

- The primary or alternate emergency response facilities which house personnel with responsibility for evaluation of SAMG strategies and related decision-making for implementation. Players may be limited to these individuals.

- Offsite Response Organizations (OROs) should be invited to participate; however, their participation is not required.

- Participation by an RRC is not required.

5.3.5.2 The Drill Manager should consider the following items when developing the drill scope and extent-of-play.

- As used in this section, "drill" means a performance enhancing experience during which participant performance is assessed against a certain standard (e.g., a drill objective). Such experiences typically exclude classroom training and facilitated meetings where on-the-spot instruction and coaching is expected.

- Control Room players should process through the operating procedures and guidelines that would be used to respond to the postulated event.

- The drill should facilitate demonstration of the ability of the appropriate ERO decision-maker to assume command and control of the event response from the Shift Manager.

- Drill players should use the communications systems and equipment that would be employed during an actual response to the postulated event. This equipment may be simulated if changes or modifications would be required to support drill use (e.g., the simulated Control Room could not use a system without the installation of a new antenna and cabling). The decision to use or simulate this equipment should also include resource and equipment safety considerations.

- A control cell should be established to simulate non-participating organizations. For example, if portions of the Technical Support Center staff are participating, the Drill Manager should consider establishing a control cell to simulate needed contacts with the Operational Support Center and EOF staffs.

- The drill should facilitate demonstration of the evaluation and decision-making for at least two SAMG strategies.

5.3.5.3 The Drill Manager should consider the following items when developing the drill scenario and implementation methods.

- The drill initial conditions should reflect the occurrence of an accident or event that resulted in the onset of conditions leading to fuel damage, and driving entry into SAMGs for at least one unit.[18] The initial conditions should also specify the operating mode(s) of each onsite unit that existed prior to the accident or event, based on the strategies, procedures and guidelines to be demonstrated during the drill. The transition from the procedure(s) in effect, and into SAMGs, should be demonstrated.

- All ERO facilities may be assumed to be activated.

- The scenario may assume that requested response assistance provided by OROs and other offsite resource providers (e.g., corporate support) is available within reasonably expected timeframes.

Comment [TJ6]: The text should be modified to reflect that some use of the SAMGs is necessary.

5.3.6 Drill Demonstrating the Use of EDMG Strategies

5.3.6.1 The following organizations and facilities should participate in the drill.

- Appropriate on-shift personnel should be selected based on whether or not the drill scenario assumes that the control room command and control structure remains available.

  - If available, establish a simulated Control Room for all on-site units. The Control Room(s) may be simulated in any location, consistent with the guidance in step 5.3.3 (e.g., simulator, conference room or classroom, TSC, etc.). Control Room players may be limited to those necessary for the planned demonstration.

  - If not available, personnel should be those that can be expected to respond to an event involving a loss of large areas of the plant due to explosions or fire, and causing a loss of the normal on-shift command and control structure.

- On-site emergency response facilities or other locations that would be expected to be available following an event involving a loss of large areas of the plant due to explosions or fire, as described in the drill scenario.

- Offsite Response Organizations (OROs) should be invited to participate; however, their participation is not required.

- Participation by an RRC is not required.

[18] For example, a BDB seismic event occurred several hours ago that resulted in implementation of FLEX strategies. A second BDB seismic event occurred that impacted the ability to sustain one or more FLEX strategies, and more hours have elapsed. The drill would begin with conditions that are then degrading into those requiring a transition into SAMGs.

5.3.6.2 The Drill Manager should consider the following items when developing the drill scope and extent-of-play.

- As used in this section, "drill" means a performance enhancing experience during which participant performance is assessed against a certain standard (e.g., a drill objective). Such experiences typically exclude classroom training and facilitated meetings where on-the-spot instruction and coaching is expected.
- Operators and other appropriate players should process through the operating procedures and guidelines that would be used to respond to the postulated event.
- The arrival times of response personnel reporting to the site from offsite locations should be consistent with those described in the site emergency plan.
- Sufficient drill time should be allowed for the appropriate augmented ERO position to demonstrate the ability to assume command and control of the event response.
- Drill players should use the communications systems and equipment that would be employed during an actual response to the postulated event. This equipment may be simulated if changes or modifications would be required to support drill use. The decision to use or simulate this equipment should also include resource and equipment safety considerations.
- A control cell should be established to simulate non-participating organizations.
- The drill should facilitate demonstration of the evaluation and decision-making for at least two extensive damage mitigating strategies.

5.3.6.3 The Drill Manager should consider the following items when developing the drill scenario and implementation methods.

- The assumed drill start time for the initiating event should occur during a period of minimum on-shift staffing, i.e., during a backshift, weekend or holiday.[19]
- The drill should be initiated by an event involving a loss of large areas of the plant due to explosions or fire. The scenario should specify whether or not the concurrent loss of the normal on-shift command and control structure is assumed to have occurred. These conditions should result in operators or other available on-shift personnel implementing EDMGs.

[19] To allow for drill conduct during a normal work day, the scenario may use an assumed day and/or start time (e.g., a drill conducted during normal work hours on a Tuesday may assume that the scenario takes place on a Saturday).

- Controllers should track the assignment/deployment of on-shift personnel, and promptly identify any instances where such assignments/deployments exceed to the number of available individuals[20]. Such instances should be reported to the players, documented in a controller log and discussed in the drill critique. The players are responsible for determining what changes to assignments/deployments are necessary during the drill to account for staffing constraints identified by a controller.

- The scenario need not include the postulated failure of portable equipment.

- The drill scenario need not include a postulated radiological release.

- The scenario may assume that requested response assistance provided by OROs and other offsite resource providers (e.g., corporate support) is available within reasonably expected timeframes.

5.3.7 Drills Demonstrating the Use of Strategy-Related Equipment

5.3.7.1 Each licensee should create a list of the mitigating strategies described in site-specific FSGs, SAMGs and EDMGs. An example list of strategies is presented in Attachment B.[21] The capability to mobilize equipment used for debris removal should also be included in the list. For each listed strategy, the capability to utilize the key equipment necessary for performing an implementing method should be periodically demonstrated as discussed in step 5.3.1.

5.3.7.2 If the same (or essentially the same) strategy is described in two or more guideline sets, then the capability for implementation need be demonstrated only once over a given 8-year period. For example, feeding a steam generator is a PWR strategy that appears in FSGs, SAMGs and EDMGs; therefore, demonstration of an implementing method for this strategy, such as using a portable pump, need occur only once during a given 8-year period.

Comment [j7]: This is not clear as to how often each strategy needs demonstration.

5.3.7.3 The capability to implement a strategy using installed plant equipment may be demonstrated during a drill or as an out-of-sequence activity. The licensee may include an out-of-sequence demonstration within the scope of another scheduled activity. Such opportunities may include, but are not limited to, a mini-drill or Dynamic Learning Activity, a Job Performance Measure/Task Performance Evaluation or a demonstration associated with another program activity (e.g., a fire protection program inspection). Demonstration credit may also be given for performance during an actual event. All such demonstrations must be consistent with plant configuration control

[20] The number of available individuals should be consistent with the site emergency plan plus any additional personnel filling positions for which administrative controls exist to ensure 24/7 staffing.
[21] The example list reflects currently operating plant designs that employ "active" safety features, and is for illustrative purposes only. As noted, each facility will need to create a site-specific listing based on site-specific mitigating strategies. This includes plant designs based on "passive" safety features such as the Westinghouse AP1000 or GE-Hitachi ESBWR.

requirements and sound operational decision-making. Actual manipulation or operation of equipment is not required.

5.3.7.4 The capability to implement a strategy using portable equipment may be demonstrated during a drill or as an out-of-sequence activity. The licensee may include an out-of-sequence demonstration within the scope of another scheduled activity. Such opportunities may include, but are not limited to, a mini-drill or Dynamic Learning Activity, a Job Performance Measure/Task Performance Evaluation or a demonstration associated with another program activity (e.g., a fire protection program inspection). Demonstration credit may also be given for performance during an actual event.

The demonstration of portable equipment should entail the movement of the equipment from its storage location to the location where it would be placed and operated, consistent with plant configuration control requirements and sound operational decision-making. Actual connection/hookup or operation of equipment is not required.

5.3.7.5 The capability to mobilize equipment used for debris removal may be demonstrated during a drill or as an out-of-sequence activity. The licensee may include an out-of-sequence demonstration within the scope of another scheduled activity. Such opportunities may include, but are not limited to, a mini-drill or Dynamic Learning Activity, a Job Performance Measure/Task Performance Evaluation or a surveillance. Demonstration credit may also be given for performance during an actual event (e.g., the same equipment is used to clear site roads following a heavy snowfall).

5.3.7.6 For a mitigating strategy expected to be implemented within the assumed elapsed time necessary for ERO personnel to access the site (as specified in the licensee's staffing assessments performed pursuant to the NRC's 50.54[f] letter dated March 12, 2012), the following drill guideline should be considered.

- The number of individuals performing the demonstration should be consistent with the number expected to be available during a real event; this number may be determined from a staffing assessment. Deviations from a staffing assessment should be documented in a controller log and discussed in the drill critique.

5.3.8 BDB Event Response Drill Objectives

Appendix A, BDB Event Response Drill Objectives, presents generic drill objectives that a licensee should use to develop a site-specific set of objectives for each BDB event response drill. Each objective has an associated listing of Performance Attributes; these attributes define successful objective performance and should be used to develop the site-specific evaluation criteria for each objective. The development of objectives and evaluation criteria should be informed by the content of site-specific procedures and guidelines, and the established drill scope and extent-of-play. While a licensee is not expected to use the generic objectives verbatim, the function(s) described by each

objective, and the associated performance attributes, should be considered during the development of the drill objectives and evaluation material.

Objectives described in the fleet/site EP drill and exercise program may also be considered for demonstration during a BDB event response drill. These objectives, and their associated evaluation criteria, should be reviewed and revised as necessary to reflect differences between expected performance during a design basis event and a beyond design basis event. For example, additional time may be necessary to complete certain activities such as ORO notifications, the personnel accountability process and activation of ERO emergency response facilities during a beyond design basis event response. The licensee should determine reasonable performance standards based on site-specific capabilities, and reflect these in the objectives and evaluation criteria.

As noted above, each BDB event response drill should be critiqued to identify weaknesses and deficiencies. Licensees should modify their critique processes as necessary to ensure a thorough review and evaluation of BDB-related drill objectives.

5.3.9 Considerations for Program Documents

The drills conducted to demonstrate responses to a beyond design basis event or severe accident need not be described in the site emergency plan; however, these activities should be described in a document maintained through a fleet or site document control process. The document should be retained for the life of the plant.

Each licensee should review the condition screening and evaluation requirements described in their corrective action program(s), and determine if changes are necessary. The purpose of this review is to ensure that program criteria will properly prioritize conditions associated with beyond design basis event response capabilities and appropriately allocate resources for their correction. In particular, the prioritization and allocation of resources should be balanced with other needs, and commensurate with the anticipated benefits to overall accident or event response capabilities (e.g., changes offering lower relative or absolute benefits should be assigned lower priorities).

6 REFERENCES

- NRC Report, *Recommendations for Enhancing Reactor Safety in the 21st Century [The Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident]*, dated July 12, 2011
- SECY-11-0137, *Prioritization of Recommended Actions to be taken in Response to Fukushima Lessons Learned*, dated October 3, 2011
- NRC Order EA-12-049, *Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*, dated March 12, 2012
- NRC letter, *Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident*, dated March 12, 2012
- NRC JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events*, dated August 29, 2012
- NRC Letter, Wiggins to Pollock, dated February 27, 2013
- COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*, dated March 27, 2013
- *Onsite Emergency Response Capabilities, Regulatory Basis to Address Nuclear Regulatory Commission Near-Term Task Force Recommendation 8*, dated October 1, 2013
- NEI 06-12, *B.5.b Phase 2 & 3 Submittal Guideline*, dated July 2009
- NEI 12-01, *Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities*, dated May 2012
- NEI 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, dated August 2012
- NEI Letter, *Industry Implementation of Multi-unit Dose Assessment Capability*, Pollock to Wiggins, dated January 28, 2013
- NEI Letter, *Commitment for Implementation of Multi-Unit Dose Assessment Capability*, Pollock to Wiggins, dated March 14, 2013
- NEI Letter, *Commitment for Implementation of Multi-Unit Dose Assessment Capability*, Pietrangelo to Nuclear Strategic Issues Advisory Committee Steering Group, dated March 22, 2013

- NEI 14-01, *Emergency Response Procedures and Guidelines for Beyond Design Basis Events and Severe Accidents*, dated April 2014

APPENDIX A – BDB EVENT RESPONSE DRILL OBJECTIVES

Recommended Objective	Performance Attributes
1. Demonstrate the ability of on-shift operations personnel to perform integrated implementation of operating procedures and guidelines for responding to a beyond design basis event or severe accident.	• The Shift Manager provides effective command and control of the accident or event response until relieved • Perform processing of, and transitions between, applicable procedures and guidelines. • Perform evaluation and decision-making related to the selection of mitigation or management strategies and actions. • Communicate selected mitigation or management strategies and actions to the appropriate personnel.
2. Demonstrate the ability of the [*ERO position assuming UDM function from Shift Manager*] to assume command and control for the selection and implementation of mitigation and management strategies.	• Perform turnover of command and control consistent with the applicable procedures or guidelines. • Perform decision-making related to the selection of mitigation and management strategies and actions, including those associated with a multi-unit response if applicable. • Direct the communication of selected mitigation and management strategies and actions to the Control Room and other appropriate personnel.
3. Demonstrate the ability of the augmented ERO staff to evaluate and recommend mitigation and management strategies.	• Perform evaluation and recommendations related to the selection of mitigation and management strategies and actions, including those associated with a multi-unit response if applicable. • Communicate selected mitigation and management strategies and actions to the Control Room and other appropriate personnel.

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Recommended Objective	Performance Attributes
4. Demonstrate the ability of the on-shift and augmented ERO staff to communicate during a beyond design basis event or severe accident.	Establish and maintain required communications in accordance with applicable procedures and guidelines. [*Wording should reflect which organizations will be represented by a controller/control cell.*] • Offsite Response Organizations • NRC ENS • Between ERO facilities • On-site and in-plant response teams • Offsite monitoring teams
5. Demonstrate the ability to operate the installed plant equipment necessary for implementing a mitigating or management strategy.	• [*Specify the mitigating or management strategy(ies) to be demonstrated during the drill; select these from the list of strategies developed per the guidance in section 5.3.7.*] • [*Specify which key implementing actions will be performed, simulated or discussed during the drill.*] • Verify that the necessary actions for implementing a mitigating or management strategy can be performed by the available staff. • Verify that personnel assigned actions do not have concurrent collateral duties which would preclude timely performance.
6. Demonstrate the ability to deploy the portable equipment necessary for implementing a mitigating or management strategy.	• [*Specify the mitigating or management strategy(ies) to be demonstrated during the drill; select these from the list of strategies developed per the guidance in section 5.3.7.*] • [*Specify which key implementing actions will be performed, simulated or discussed during the drill.*] • Verify that the necessary actions for implementing a mitigating or management strategy can be performed by the available staff. • Verify that personnel assigned actions do not have concurrent collateral duties which would preclude timely performance.

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Recommended Objective	Performance Attributes
7. Demonstrate the ability to deploy equipment necessary for debris removal in order to allow/improve access to the unit(s).	• [*Specify which key implementing actions will be performed, simulated or discussed during the drill.*] • [*Specify the location(s) where demonstration will occur.*] • Verify that the necessary actions for performing debris removal can be implemented by the available staff. • Verify that personnel assigned actions do not have concurrent collateral duties which would preclude timely performance.
8. Demonstrate the adequacy of EP facilities and equipment to support the augmented ERO during a beyond design basis event.	• EP facilities can adequately accommodate expected personnel during the response to a beyond design basis event affecting all onsite units. • Augmented ERO personnel have the equipment necessary to perform assigned duties during a beyond design basis event affecting all onsite units.
9. Demonstrate the ability to perform multi-unit/source dose assessment.	Perform an offsite dose assessment following a beyond design basis event or severe accident resulting in concurrent radiological releases from all on-site units (*multi-unit site*) or multiple release points (*single-unit site*). **Note** This drill objective may demonstrated during a drill or exercise (as an in sequence or out-of-sequence activity) or a separate/stand-alone mini-drill. Refer to section 2.3.4 for additional information.
10. Demonstrate the ability to notify the Regional Response Center (RRC) and coordinate the delivery of requested equipment.	The RRC is notified of the event and equipment needs in accordance with appropriate procedures or guidelines. [*Site protocol may have this notification being made to INPO instead of directly to the RRC; revise wording as needed. Wording should also reflect which organizations will be represented by a controller/control cell.*]

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APPENDIX B – EXAMPLE MITIGATION STRATEGY LIST

Example Boiling Water Reactor (BWR) Mitigating Strategies	
Flex Support Guidelines	1. DC load shedding/stripping 2. Use of RCIC/HPCI/IC during an ELAP 3. Repower instrumentation needed to maintain safety functions with portable power supplies 4. Use of alternate water supply to support core and spent fuel pool heat removal 5. Depressurize RPV for injection with portable injection source 6. Containment venting 7. Repower hydrogen igniters with a portable power supply (BWR Mark III containments only) 8. Spent fuel pool cooling via makeup with a portable injection source
Severe Accident Management Guidelines	1. Inject into (makeup to) reactor pressure vessel/reactor coolant system (RPV/RCS) 2. Depressurize the RPV/RCS 3. Spray within the RPV 4. Operate isolation condenser 5. Spray into containment 6. Inject into containment 7. Operate recombiners 8. Operate igniters 9. Inert the containment with noncondensable gases 10. Vent the primary containment 11. Inject into the spent fuel pool 12. Spray the spent fuel pool 13. Vent/ventilate the reactor building or auxiliary building 14. Scrub releases by external spraying of buildings
Extensive Damage Mitigation Guidelines (or other related guidelines describing mitigating actions for an event involving a loss of large areas of the plant due to explosions or fire)	1. Manual operation of RCIC/IC 2. DC power supplies to allow depressurization of RPV and injection with portable pump 3. Utilize feedwater and condensate 4. Makeup to hotwell. 5. Makeup to CST 6. Maximize CRD flow 7. Procedure to isolate RWCU 8. Manually open containment vent lines 9. Inject water into the drywell 10. Portable sprays

Example Pressurized Water Reactor (PWR) Mitigating Strategies	
Flex Support Guidelines	1. DC load shedding/stripping 2. Use of AFW/EFW during an ELAP 3. Repower instrumentation needed to maintain safety functions with portable power supplies 4. Use of alternate water supply to support core and spent fuel pool heat removal (including all portable/staged pumps) 5. Depressurize steam generator for makeup with portable injection source 6. Means to provide borated RCS makeup 7. Containment spray (if applicable) 8. Operate hydrogen igniters (ice condenser containments) 9. Spent fuel pool cooling via makeup with a portable injection source 10. Mode 5 & 6 RCS makeup using portable injection source
Severe Accident Management Guidelines	1. Inject into (makeup to) reactor vessel/reactor coolant system 2. Depressurize the RCS 3. Restart reactor coolant pump (RCP) 4. Depressurize steam generators 5. Inject into (feed) the steam generators 6. Spray into containment 7. Inject into containment 8. Operate fan coolers 9. Operate hydrogen igniters (ice condenser containments) 10. Vent the containment 11. Inject into the spent fuel pool 12. Spray the spent fuel pool 13. Vent/ventilate the auxiliary building 14. Scrub releases by external spraying of buildings
Extensive Damage Mitigation Guidelines (or other related guidelines describing mitigating actions for an event involving a loss of large areas of the plant due to explosions or fire)	1. Makeup to RWST 2. Manually depressurize steam generators to reduce RCS inventory loss 3. Manual operation of turbine (or diesel)-driven AFW/EFW pump 4. Manually depressurize steam generators and use portable pump 5. Makeup to CST 6. Containment flooding with portable pump 7. Portable sprays (if available) 8. Internal Spent Fuel Pool Makeup 9. External Spent Fuel Pool Makeup

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