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Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities

March 2012

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Nuclear Energy Institute

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March 2012

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EXECUTIVE SUMMARY

This technical report provides recommended criteria to assist with the preparation of assessments to determine the required staff necessary for responding to a beyond design basis natural event that affects multiple units at a site, and the identification of enhancements that could provide means to power communications equipment necessary for licensee onsite and off-site communications during a prolonged Station Blackout (SBO) event. These assessments will address certain proposed enhancements contained in a US Nuclear Regulatory Commission (NRC) staff report entitled, *Recommendations for Enhancing Reactor Safety in the 21st Century*[1], dated July 12, 2012. The regulatory actions necessary to implement the proposed enhancements are discussed and prioritized SECY-11-0137, *Prioritization of Recommended Actions to be taken in Response to Fukushima Lessons Learned*[2], dated October 3, 2011.

On {date}, the NRC issued . . . 50.54(f) letter discussion . . .

A licensee must be able to provide staffing necessary to respond to a beyond design basis natural event that affects all units on a site. The number and composition of the response staff must be sufficient to implement mitigation strategies and repair actions intended to maintain or restore core cooling, containment integrity, and spent fuel pool cooling capabilities for all affected units. The assessment criteria presented in this technical report will assist with identification of the required staffing and related requirements.

In addition to adequate staffing, a licensee must also maintain the capability to perform critical communications following an event that results in a prolonged station blackout (SBO). This document provides criteria for assessing the post-event viability of communications systems and equipment necessary for implementation of the planning standard requirements described in 10 CFR 50, Appendix E, sections IV.D and E.9. Communications capabilities that support implementation of mitigation strategies and repair actions intended to maintain or restore core cooling, containment integrity, and spent fuel pool cooling capabilities will also be assessed.

[1] Refer to ADAMS ML111861807
[2] Refer to ADAMS ML11272A111

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GUIDELINE FOR ASSESSING BEYOND DESIGN BASIS ACCIDENT RESPONSE STAFFING AND COMMUNICATIONS CAPABILITIES

1 INTRODUCTION

1.1 RESPONSE STAFFING ASSESSMENT

Each licensee currently maintains an on-shift and augmented Emergency Response Organization (ERO) in accordance with existing regulations and guidance. An ERO is capable of responding to any accident within the scope of the plant design basis. The criteria presented in this technical report are intended to assist a licensee with the identification of additional organizational capabilities that will facilitate simultaneous performance of accident mitigation and repair actions at all on-site units following a beyond design basis natural event.

It is recognized that licensees employ many different response organization structures to meet emergency planning standards and requirements. Consequently, there is a wide variation in the number, type, and location of emergency response positions, as well as the assignment of requisite authorities and responsibilities. This variation precluded development of a standard response staffing study template.

In lieu of a standard template, this technical report provides recommended criteria for use in performing an assessment to identify the staff that must be available to respond to a beyond design basis natural event affecting multiple units at a site. These criteria can be readily applied to a variety of assessment methodologies. This approach will allow a licensee the flexibility to perform a response staffing assessment that accommodates their specific needs while, at the same time, ensuring consistency with industry-developed standards and NRC staff expectations.

1.2 COMMUNICATIONS DURING A PROLONGED STATION BLACKOUT ASSESSMENT

Licensees also employ diverse methods to meet emergency communications requirements and, as a result, there are large differences in communications systems, configurations and capabilities from site to site. As with the response staffing assessment, these differences precluded development of a standard communications assessment template.

In lieu of a standard template, this technical report provides recommended criteria for use in identifying enhancements that will ensure the availability of critical communications capabilities during a prolonged station blackout (SBO), including evaluation of power sources to onsite and off-site communications equipment. These criteria can be readily applied to a variety of assessment methodologies. This approach will allow a licensee the flexibility to perform a communications capability assessment that accommodates their specific needs while, at the same time, ensuring consistency with industry-developed standards and NRC staff expectations.

This technical report does not contain assessment criteria associated with the Emergency Response Data System (ERDS). These criteria will be developed at a later date in concert with the NRC staff's initiation of actions to address the associated Tier 3 recommendation as discussed in SECY-11-0137.

Requirements for communications related to security plan-related functions are addressed by security-related regulations, guidance, plans and procedures. Since the adequacy of security-

related communications systems are evaluated by separate processes, these functions are not addressed in this technical report.

1.3 USE OF ASSESSMENT RESULTS

As requested by NRC letter [letter info], each licensee will assess … discuss response . . .

It is expected that the results of each completed assessment will be verified and validated to ensure adequacy and accuracy. Once these actions are completed, a licensee should promptly enter any unsatisfactory results and identified enhancements into their Corrective Action Program for resolution and tracking. After submitting a condition report, it will be necessary to determine what interim correction measures may be necessary to meet the requirements of 10 CFR 50, Appendix E and related regulatory guidance.

2 ASSESSMENT ASSUMPTIONS

2.1 PURPOSE

Assessments pursuant to the information request contained in [NRC letter] should be performed using the assumptions contained in this section. The use of these assumptions will help ensure that question responses, including identification of enhancements, are developed consistent with industry standards and NRC staff expectations. These assumptions will also obviate several potential analysis issues, including:

- the large number of possible accident progression timelines and related variables,
- the indeterminate nature and timing of many events and conditions, including those associated with offsite transportation and communications infrastructure,
- and the different response requirements and timing criteria employed by licensees.

2.2 ASSUMPTIONS COMMON TO BOTH ASSESSMENTS

1. A large-scale natural event occurs that results in:
   - All on-site units affected
   - Extended loss of AC power
   - Impeded access to the units
2. Initially, all on-site reactors are operating at full power and are successfully shut down.
3. A Hostile Action directed at the affected site does not occur during the period that the site is responding to a beyond design basis event.
4. The event restricts site access as follows:
   A. Post event time: 0 to TBD hours – No site access. This duration reflects the time necessary to clear roadway obstructions, use alternate routes, mobilize alternate transportation capabilities, etc.
   B. Post event time: TBD to TBD hours – Limited site access. The site may be accessed by walking, a helicopter, personal vehicle or small boat.
   C. Post event time: TBD+ hours – Unlimited access. Site access is restored to a near-normal status and/or augmented transportation resources are available to deliver heavy or large loads.

   A licensee may modify assumption #4 if supported by a documented basis.

   These time frames were determined based on a review of 7 natural phenomena events that resulted in significant and wide-spread damage. The reviewed events

included earthquakes, hurricanes and tornados. The following observations were made during this review.

- The natural phenomena events that potentially have the most impact on site access are those associated with large severe storm systems (e.g., a hurricane). This impact is militated by the fact that augmented ERO personnel and response equipment can be staged at on or near-site locations prior to storm arrival. In addition, as a result of their storm tracking, preparation and response activities, State agencies are in a position to provide special transportation-related resources to facilitate site access if necessary.

- While earthquakes and tornados did present some challenges to the mobilization or deployment of response personnel (e.g., police and firefighters), these actions were not significantly delayed.

2.3 RESPONSE STAFFING ASSUMPTIONS

1. On-site personnel are limited to the minimum on-shift complement (i.e., the minimum required number for each required position). This would typically be the on-shift complement present during a backshift, weekend or holiday.

2.4 COMMUNICATIONS DURING A PROLONGED STATION BLACKOUT ASSUMPTIONS

1. Installed sources of AC power, including SBO power sources, are not available. These power sources are typically classified as safety-related or governed by augmented quality requirements.

2. Nonessential loads from DC battery buses are stripped in accordance with plant emergency operating procedures or other response guidelines to extend battery life.

3. Installed inverters and battery chargers remain available provided they are protected from internal and external flooding events consistent with current station design.

4. Diesel fuel oil stored in seismic structures and protected from flooding and wind remains available.

5. Portable equipment, such as AC power sources and equipment staged for implementation of accident management strategies (e.g., for SAMG and EDMG), may be used provided it is stored on site; is protected from seismic, wind, and flooding events ; is maintained through programmatic controls; and has connection actions specified in existing procedures or guidelines.

6. Portable backup DC power, such as spare batteries, may be used provided the source is stored on site; is protected from seismic, wind, and flooding events; is maintained through programmatic controls; and has connection actions specified in existing procedures or guidelines.

7. Offsite infrastructure supporting communications systems is inoperable, or operating with degraded capability, in the area surrounding the site. A licensee has two options for use of this assumption.

   - Apply a default distance value, in all directions, of approximately 25 miles from the plant site, OR
   - Develop a site-specific distance assumption and document the basis.

8. The communications capabilities of Offsite Response Organization (ORO) and other offsite response facilities located beyond some distance from the site are not significantly impacted by the event. A licensee has two options with respect to the distance value.

   - Use a default value, in all directions, of approximately 25 miles from the plant site, OR
   - Develop a site-specific distance assumption and document the basis.

9. Communications systems equipment located in ORO and other offsite response facilities, and supplied from a backup AC power source (e.g., a diesel generator), is assumed to be available.

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3 RESPONSE STAFFING STUDY

3.1 CONCEPT OF RESPONSE OPERATIONS FOR A BEYOND DESIGN BASIS EVENT

Following the occurrence of a significant off-normal event, a licensee will declare an emergency and begin responding in accordance with their emergency plan. At an Alert or higher emergency classification level, plan implementation will include notification of some or all of the augmenting ERO. In accordance with existing regulations and guidance, an augmented ERO is capable of responding to any design basis event affecting the site.

A typical augmented ERO would be challenged to effectively respond to a beyond design basis event that resulted in the on-site and offsite conditions described by the assumptions listed in Section 2. In an event of this magnitude, it would be necessary to "expand" the organizational capability of the ERO to effectively respond to significant post-event conditions affecting multiple units. This expanded capability would enable the assignment of staff resources focused on the performance of accident assessment and mitigation functions for each unit.

A simplified overview of the response framework in which an ERO with expanded capabilities would operate is presented in Figure 3.1. From this Figure, the following observations are drawn.

Conditions at All Units	A beyond design basis event results in an extended station blackout; all on-site units are equally affected.
Response Phases	The response to the stipulated unit conditions may be divided into 3 phases. • Initial Coping - Implementation of strategies that generally rely upon installed plant equipment. At some sites, this phase may include use of some Extended Coping strategies that can be readily placed into service by the on-shift staff. • Extended Coping[3] – Implementation of strategies that involve the use of on-site portable equipment to extend the coping period. To prevent core damage, these strategies must be implemented prior to the end of the Initial Coping phase. Depending upon the strategy, implementation could be performed by either the on-shift staff or the augmented ERO. • Fuel Damage – Implementation of strategies intended to arrest incipient or ongoing fuel damage, protect containment integrity and minimize radiological releases.

[3] This phase may include use of FLEX strategies currently under development.

Mitigation Procedures	As appropriate to the 3 Response Phases discussed above, plant operators and ERO members would employ mitigation strategies and equipment in accordance with the following procedure sets. • Emergency Operating Procedures (EOPs) – Procedures developed in accordance with existing regulatory and industry guidance. • [Procedure Type TBD by Owners Groups] – These are procedures that will be developed to implement flexible and diverse extended coping strategies. These strategies will be implemented through use of staged/stored portable equipment and supplies, and will significantly lengthen coping times, i.e., extend coping well beyond the Initial Coping phase. • Severe Accident Management Guidelines (SAMGs) – Guidelines developed in accordance with existing regulatory and industry guidance.
Mitigation Equipment	The mitigation equipment appropriate for responding to the stipulated unit conditions may be divided into 2 categories. • Installed Systems, Structures and Components (SSCs). At some sites, may include use of non-plant equipment. Equipment usage is typically directed in accordance with EOPs. • Other equipment to augment plant SSCs. Equipment of this type would be used in accordance with procedures or guidelines developed to implement Extended Coping or SAM strategies[4]. This category includes stored portable equipment such as pumps, generators, batteries, air bottles, hoses, cables, etc.
Fuel Status (all units)	The status of irradiated fuel during the stipulated unit conditions may be divided into 2 states. • During the Initial Coping and Extended Coping Responses Phases, irradiated fuel will be adequately cooled such that no damage will occur. • If coping strategies cannot be effectively implemented, then decay heat may cause damage to irradiated fuel.
ERO Status	• The on-shift ERO staff must be capable of implementing Initial Coping, and any site-specific Extended Coping, strategies. • Expanded ERO capabilities must be available to implement Extended Coping strategies within a timeframe sufficient to prevent the loss of a function necessary for core cooling, containment integrity, and spent fuel cooling. Expanded ERO capabilities must also be available to implement SAM strategies in the event that coping actions are unsuccessful in preventing fuel damage.

Discuss Fukushima OE
Need to nail down coping terms and conditions

3.2 ON-SHIFT ERO FUNCTIONS FOR A MULTI-UNIT EVENT

Section IV.A.9 of 10 CFR 50, Appendix E, states that nuclear power reactor licensees shall perform "a detailed analysis demonstrating that on-shift personnel assigned emergency plan

[4] May include equipment used to implement EDMG/B.5.b strategies.

implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions as specified in the emergency plan." The methodology described in NEI 10-05, Assessment of On-Shift Emergency Response Organization Staffing and Capabilities, provides a structured approach for meeting this requirement. The use of NEI 10-05 to perform an on-shift staffing analysis is endorsed in NSIR/DPR-ISG-01, Interim Staff Guidance Emergency Planning for Nuclear Power Plants.

While NEI 10-05 addresses the scenario of a SBO affecting one unit on a multi-unit site, it does not assess the adequacy of the on-shift staff to respond to a SBO affecting multiple units on a site. One additional analysis should be performed using the event defined by the assumptions in Section III. The criteria needed to perform this additional analysis are presented below.

<add this criteria>.

3.3 EXPANDED ERO FUNCTIONS FOR A MULTI-UNIT EVENT

A licensee's on-shift ERO is augmented in response to more serious events and accidents; augmenting ERO personnel are capable of performing a wide range of functions necessary for responding to a radiological emergency, including a severe accident. These emergency response functions are specified in regulations and associated guidance, and described in the licensee's emergency plan.

Using the assumptions in Section III, a review of emergency response functions was performed to identify those necessary for preventing damage to irradiated fuel, or if such damage occurs, minimizing radiological releases. Such functions must directly support the assessment and implementation of a range of mitigation strategies and actions intended to maintain or restore core cooling, containment integrity, and spent fuel pool cooling capabilities. Table 4.1 lists the ERO functions identified by this review.

In keeping with the multi-unit nature of the staffing study, a licensee should have expanded capabilities to implement the functions identified in Table 4.1 on a unit-specific basis, i.e., possess the organizational capability to perform these functions specifically for each affected unit. This capability will promote timely unit-specific evaluations of accident conditions and mitigation strategies. It will also facilitate subsequent performance of accident mitigation actions for each affected unit.

As noted in Table 4.1, the staffing required for "Extended Coping and SAMG Implementation" will vary depending upon several factors. The licensee should review the range of strategies applicable to each unit (e.g., depressurizing steam generators or injecting into the RPV using a specific water source), and identify the two strategies for each unit that require the greatest number of staff to implement within time periods compatible with successful performance. The number and composition of the individuals identified by this review comprise the minimum staffing for this function.

Table 4.1 also specifies staffing to support the simultaneous deployment of emergency repair and corrective action teams to each affected unit. The availability of this staffing will promote timelier restoration of installed plant safety systems to service and facilitate implementation of component modifications necessary to utilize equipment brought-in from offsite locations.

3.4 MOBILIZATION OF EXPANDED ERO CAPABILITY STAFFING

As depicted in Figure 3.1 and discussed in Section IV, an On-Shift ERO must be capable implementing all coping actions (initial and possibly some extended) specified in plant-specific Emergency Operating Procedures (EOPs). A licensee will need to verify this capability in accordance with the guidance presented in NEI 10-05 (single-unit site) or this white paper (multi-unit site). For purposes of assessing the adequacy of augmented staffing, it is assumed that the On-Shift ERO successfully performed all coping actions required by EOPs.

Expanded ERO capability must be available prior to the exhaustion of initial coping strategies and within a timeframe sufficient to allow for implementation of extended coping strategies such that core cooling, containment integrity, and spent fuel pool cooling are continuously maintained. Staff mobilization strategies should be developed to support a goal of accomplishing minimum staff augmentation at least 90-minutes prior to the end of the site-specific initial coping period. The 90-minute period is intended to allow adequate time for initial briefings, evaluation and selection of mitigation strategies, briefing and deployment of teams, and performance of mitigation actions.

Licensees should identify appropriate transportation resources that could be used to support timely staff augmentation should the event cause restrictions to normal site access. Resources of this type would vary depending upon the location of the plant, and may include helicopters, all-terrain vehicles or boats. A resource provider listing should be available to appropriate ERO personnel (e.g., in an emergency response telephone directory). Some arrangements may require a written agreement (e.g., Letter of Agreement, Memorandum of Understanding, contract, etc.).

3.5 STAFFING OF EXPANDED ERO FUNCTIONS

A licensee may ensure performance of an expanded ERO function in several ways. Some examples include:

- Assign responsibilities for performing a unit-specific response function to an existing ERO position. To maintain compliance with planning standard (b)(1) and related guidance, the added responsibilities should be described in the emergency plan. Changes to the emergency plan must be evaluated in accordance with the requirements of 10 CFR 50.54(q).
- Establish provisions for calling out an additional qualified individual from the existing augmenting ERO staff to fill a position assigned performance of a unit-specific response function.
- Select and qualify additional personnel for the ERO. Staffing options may include use of corporate, contractor or site security resources.
- Consider the application of remote data access, meeting and other communications technologies to support the availability of required staffing.

Additional personnel identified by the staffing assessment as necessary for ensuring a successful response to a beyond design basis event should be considered members of the ERO.

Individuals and positions added to an ERO are subject to the requirements of 10 CFR 50, Appendix E, and related guidance.

3.6 RECOMMENDED CRITERIA FOR ACTIVATING EXPANDED ERO FUNCTIONS

In accordance with the assumptions in Section 2, expanded ERO functions are needed following a beyond design basis event that results in a simultaneous and prolonged station blackout at multiple units on a site. A licensee should develop an implementing strategy to integrate an expanded ERO capability into the existing augmented ERO (i.e., ability to transition to unit-specific performance of some functions). Such a strategy would include decision-making criteria for initiating the actions necessary to ensure timely performance of expanded ERO functions.

Suggested criteria for requiring performance of expanded ERO functions would include:

- Loss of ALL offsite and ALL onsite power sources to AC emergency busses at more than 1 unit,
  OR
- Plant parameters or conditions require implementation of Extended Coping or SAM strategies for more than 1 unit.

3.7 POSITION-SPECIFIC ASSESSMENT GUIDANCE

3.7.1 On-Site Radiation Protection Technicians

Following a beyond design basis natural event, on-site Radiation Protection (RP) Technicians must be available in sufficient numbers to support assigned emergency plan functions and performance of expanded functions. This number is determined assuming that there is no damage to irradiated fuel, and no actual or imminent challenge to containment integrity; this assumption reflects the fact that timely implementation of coping strategies will prevent damage to irradiated fuel and a loss of containment integrity. Should post-event conditions degrade to the point where fuel damage does occur (i.e., entry into SAMGs), then prevailing dose rates would likely require that the site's RP Technician complement be augmented with technicians from other sites and contracted service providers.

The following equation should be used to determine the required number of on-site RP Technicians:

$$RPT_T = RPT_{COP} + RPT_{RCA} + RPT_{NC}$$

Where:

RPT_T = Total required number of on-site RP Technicians

RPT_{COP} = Number needed to support implementation of coping strategies up to a maximum of 2 per unit. Determine this number by reviewing strategies for each unit.

RPT_{RCA} = Number needed for repair and corrective action

= 2 x the number of on-site units

RPT_{NC} = Number of on-site RP Technicians performing other emergency plan functions that would preclude them from performing job coverage for coping, repair or corrective action teams

3.7.2 Administrative Support Personnel

A licensee should determine if current assignments and locations of administrative support personnel are adequate for implementation expanded ERO functions, and make changes as necessary.

3.8 EMERGENCY PLAN DESCRIPTION OF EXPANDED ERO FUNCTIONS

The site emergency plan should be revised to provide a summary description of expanded ERO functions, including the conditions under which these functions would be performed. Given the consequence uncertainties associated with a beyond design basis natural event, response times associated with performance of Expanded ERO functions should not be specified. Any changes to the Emergency Plan must be evaluated in accordance with the requirements delineated in 10 CFR 50.54(q) and Regulatory Guide 1.219.

An example emergency plan description is presented below.

> [Licensee Name] maintains the capability to provide the augmented organizational resources necessary to respond to a beyond design basis natural event that affects more than one unit on the site. This capability will allow ERO managers to assign staffing resources focused on accident assessment and mitigation for each affected unit. Provisions for mobilizing and deploying these resources, and descriptions of position-specific responsibilities and actions, are contained in [site-specific procedures or guidelines].

A licensee may choose to incorporate implementing instructions for expanded ERO functions into extended coping and SAM documents, and/or within emergency plan implementing procedures.

The procedures or guidelines that implement coping, extended coping or severe accident management strategies should not be considered part of the site emergency plan; however, impacts on the emergency plan resulting from changes to these documents should be identified and evaluated.

3.9 EMERGENCY RESPONSE DRILLS AND EXERCISES

A licensee should determine if any changes are necessary to documents describing the drill and exercise program. In particular, standard objectives and extent-of-play may need to be revised to clarify the expected demonstration of response capabilities that are dependent upon the type of scenario event or accident (i.e., within or beyond design basis). For example, expanded response capabilities would not be demonstrated during a drill or exercise that involved a design basis accident affecting only one unit.

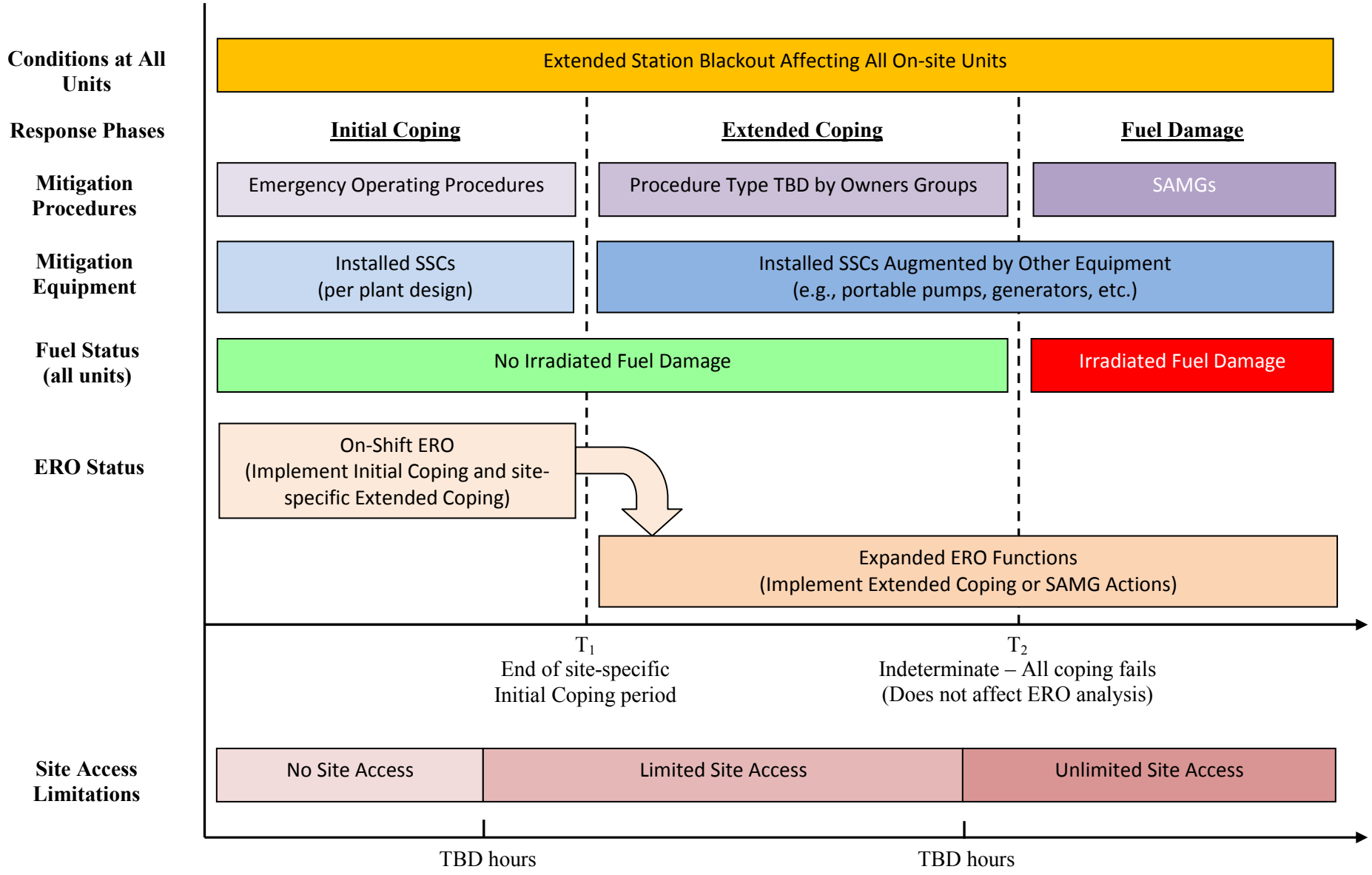
PARKING LOT – Use INPO terms for coping strategies? Primary and secondary?
Logic flowchart for staffing distinction?

Table 4.1
Expanded Response Functions for a Multi-Unit Beyond Design Basis Event

Expanded Response Function	Typical Location	Key Roles and Considerations
Unit Response Coordination	TSC	• Overall cognizance of the activities related to implementation of repair and corrective actions, and implementation of Extended Coping and Severe Accident Management (SAM) strategies for an assigned unit • Assigned individual may fill another function
Operations Coordination	TSC	• Provides coordination of Operations staff and support for an assigned unit • Assigned individual may fill another function
Maintenance Coordination	TSC or OSC	• Provides coordination of Maintenance staff and support for an assigned unit • Assigned individual may fill another function
Engineering Coordination	TSC or EOF	• Provides coordination of Engineering staff and support for an assigned unit • Assigned individual may fill another function
Engineering Assessments	TSC or EOF	• Team composition (i.e., number and represented disciplines) as described in the emergency plan; one team per unit • Provide unit-specific engineering assessments in support repair and corrective actions • Team may include personnel responsible for selection of Extended Coping and SAM strategies
Extended Coping Strategy Evaluation	TSC or EOF	• Team composition (i.e., number and represented disciplines) as described in governing site programs, procedures and guidelines; one team per unit • Provide unit-specific evaluations to support selection of Extended Coping strategies • Team may include personnel responsible for performing engineering assessments and evaluation of SAM strategies for the same assigned unit

Expanded Response Function	Typical Location	Key Roles and Considerations
Severe Accident Management (SAM) Strategy Evaluation	TSC or EOF	• Team composition (i.e., number and represented disciplines) as described in governing site programs, procedures and guidelines; one team per unit • Provide unit-specific evaluations to support selection of SAM strategies • Team may include personnel responsible for performing engineering assessments and evaluation of Extended Coping strategies for the same assigned unit
In-Plant Team Coordination	OSC	• Overall cognizance of on-site and in-plant teams performing or supporting repair and corrective actions for an assigned unit • Assigned individual may fill another function
Extended Coping and SAMG Implementation	OSC	• Number and composition of individuals capable of simultaneously implementing any 2 Extending Coping or SAMG strategies at each unit • Site-specific number and composition of individuals are consistent with the applicable Owners Group approach, and site-specific programs, procedures and guidelines • Cannot contain personnel assigned to other functions • May include members of the on-shift Operations crew
Mechanical Maintenance Repair and Corrective Action	OSC	• Two individuals per unit to implement repair and corrective actions • Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented)
Electrical Maintenance Repair and Corrective Action	OSC	• Two individuals per unit to implement repair and corrective actions • Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented)
I&C Repair and Corrective Action	OSC	• Two individuals per unit to implement repair and corrective actions • Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented)

Figure 3.1
Simplified Response Framework for an Expanded ERO for Beyond Design Basis Events



4 COMMUNICATIONS DURING A PROLONGED STATION BLACKOUT

4.1 REQUIRED POST-EVENT EMERGENCY COMMUNICATIONS CAPABILITIES

Consistent with the planning standard requirements described in 10 CFR 50, Appendix E, sections IV.D and E.9, communications systems and equipment associated with the following emergency response functions must be available following a beyond design basis event. Availability should be determined after a review of existing capabilities and consistent with the assumptions listed in Section 2. In particular, it is important that the primary and backup (if applicable) power source for each communications system or piece of equipment be identified.

When performing this assessment, consideration should be given to the desirability of providing some post-event communications capabilities in alternate facilities at offsite locations instead of their normal locations in on-site facilities.

1. Notifications to, and communications with, Offsite Response Organizations (OROs). [*10 CFR 50 Appendix E.IV.D and E.9.a*]

Emergency Response Facility	Minimum Communications Links
Control Room	1 per Control Room for Shift Communicator
Technical Support Center[5] (TSC)	1 for Key TSC Communicator
Emergency Operations Facility (EOF)	1 for Key EOF Communicator

2. Notifications to, and communications with, the Nuclear Regulatory Commission (NRC) Headquarters Incident Response Center. [*10 CFR 50 Appendix E.IV.D and E.9.d*]

Emergency Response Facility	Minimum Communications Links
Control Room	1 per Control Room for ENS Communicator
Technical Support Center (TSC)	1 for ENS Communicator
Location(s) where HPN communications are performed	1 for HPN Communicator

3. Communications between licensee emergency response facilities. The minimum communications links to support this function are listed below by facility. For example, if the normally used telephone system cannot be restored to service, these links could rely upon some combination of radio, sound-powered and satellite-based communications systems. [*10 CFR 50 Appendix E.9.c. Additional links that support performance of critical response functions are also specified.*]

[5] If applicable per the site Emergency Plan.

Emergency Response Facility	Minimum Communications Links[6]
Control Room	1 per Control Room
Technical Support Center (TSC)	1 each for: • Senior Manager • Key Operations Support • Key Radiological Support • Key Technical Support Additional response coordination links for multi-unit sites: • 1 for each Control Room. Position at licensee's discretion.
Operational Support Center (OSC)	1 each for: • Key OSC Manager • Radiological Support Additional response coordination links for multi-unit sites: • 1 for each Control Room. Position at licensee's discretion.
Emergency Operations Facility (EOF)	1 each for: • Senior Manager • Key Protective Measures • Operations or Technical Support (as needed to support performance of dose projections, formulation of PARs and plant status updates to ORO authorities).
Joint Information Center (JIC)	1 for Senior Manager

4. Communications with field/offsite monitoring teams. [*10 CFR 50 Appendix E.9.c*]

Emergency Response Facility	Minimum Communications Links
Primary location where field/offsite monitoring team coordination is performed	Field/offsite monitoring team coordination
Primary location from which field/ offsite monitoring teams are deployed	1 for each field/offsite monitoring team

4. Communications with other Federal agencies as described in the site emergency plan (e.g., the US Coast Guard). [*10 CFR 50 Appendix E.9.b*]

[6] The specified links are in addition to those specified for ORO and NRC communications.

Emergency Response Facility	Minimum Communications Links
Primary location where communication with Federal agencies is performed	Coordination with Federal agencies

The following communications functions and equipment should also be assessed to determine post-event availability. As above, this determination should be made after a review of, and consistent with, each of the listed assessment assumptions.

1. **Plant-Paging System** [*If described in the Emergency Plan as a method to communicate initial response instructions to the plant staff.*]

   Since this event will result in the declaration of a Site Area Emergency declaration (at a minimum), all plant personnel would be directed to report to their assigned emergency response facilities or an assembly area, or exit the site. Once at an emergency response facility or assembly area, further communications to these individuals may be made over the inter-facility communications links via facility announcements. After the initial directions to plant personnel have been provided, the plant-paging system may be removed from service at any time as a means to extend battery life.

   The following assessment actions should be performed.

   A. Determine if the plant-paging system (e.g., Gai-Tronics) is powered from a battery-backed source and would remain available to provide the initial emergency declaration and direction announcement to the plant staff. If this is the case, then no further action is required.

   B. If portions of the plant-paging system are not powered from a battery-backed source, then reasonable provisions or alternate methods must exist to provide emergency notification to the plant staff in the areas that would not receive an announcement.

      1. These provisions or methods must be capable of notifying essentially 100% of the plant staff within approximately 30 minutes.

   C. If the plant-paging system is not powered from a battery-backed source, then perform some combination of the following actions.

      1. Provide a battery-backed power source for all or critical portions of the plant-paging system.

      2. Establish reasonable provisions or alternate methods to provide emergency notification to the plant staff. These provisions or methods must be capable of notifying essentially 100% of the plant staff within approximately 30 minutes.

2. Coordination and direction of on-site and in-plant response teams including those necessary to affect emergency repairs, firefighting, search and rescue, radiological monitoring and implementation of extended coping and severe accident mitigation strategies.

Emergency Response Facility	Minimum Communications Links
Operational Support Center (OSC) and other site-specific locations as necessary	1 each for: • On-site radiological monitoring 2 each for: • Firefighting (1 for brigade leader and 1 for the brigade) 2 each/unit for: • In-plant radiological monitoring • Search and Rescue • Emergency repairs • Teams to implement extended coping and severe accident mitigation strategies

4.2 COMMUNICATIONS EQUIPMENT AT ORO FACILITIES

Some post-event communications capability must be available at the ORO facilities that normally receive licensee notifications of an emergency declaration or a Protective Action Recommendation (as described in the site emergency plan). Through discussions with ORO and other appropriate personnel, identify the communications equipment that would remain operable during an extended loss-of-grid event. This determination should be made consistent with the assumptions listed in Section 2.

4.3 NOTIFICATION OF THE EMERGENCY RESPONSE ORGANIZATION (ERO)

To promote timely staff augmentation by the ERO, licensees should verify the following:

- ERO members can be notified of the emergency using a method that would be operable under the assumed event conditions (e.g., satellite pagers), AND/OR
- ERO members are trained to automatically respond to their assigned facilities or a designated staging area when made aware of an area wide loss-of-grid (e.g., by direct observation, media reports, word-of-mouth, etc.).

4.4 EQUIPMENT LOCATION REQUIREMENTS

To be assumed operable in the post-event environment, a piece of on-site communications equipment must be in a location, and maintained in a manner, that maximizes survivability following a beyond design basis natural event[7]. In particular, the location or manner shall

[7] Informed by knowledge of the most probable external events for the station's geographical location.

reasonably preclude wetting from flooding or impact damage from a seismic event. The equipment itself does not need to be seismically qualified.

Equipment must be stored, or otherwise available, in locations that can be readily accessed when needed. To the degree practical, consider potential constraints to equipment access or movement when selecting a storage location.

These requirements apply to equipment at the point of use (e.g., a radio) as well as any supporting infrastructure components. Such components may include portable power sources, and radio system repeaters and antennas.

4.5 PERFORMANCE CHARACTERISTICS

As necessary, the assessment should confirm the interoperability of the post-event communications methods that will be in use at different locations. In particular, the systems and equipment identified for post-event usage will support communications among and between:

- Licensee emergency response facilities, including Security
- Field/offsite monitoring teams and the location controlling deployment of the teams (e.g., the EOF)
- The Shift Communicator, Key TSC and EOF Communicators, and the ORO contact points.
- ENS and HPN communicators and the NRC staff.
- On-site and in-plant teams and the location controlling deployment of the teams (e.g., the OSC)

The assessment should also verify that a radio system(s) used by ERO personnel possesses the necessary design and operating characteristics to adequately support emergency communications.

Expected reliance upon "multi-use" equipment should be minimized. This means that communications equipment used to implement emergency response functions should not be relied upon to simultaneously support other functions (e.g., Security). In cases where multiple-usage is unavoidable, the assessment should consider the capability of the equipment to effectively perform under the expected conditions and the need for specific multi-use protocols.

The material in NRC Information Notice (IN) 2007-12, *Tactical Communications Interoperability between Nuclear Power Reactor Licensees and First Responders*, should be reviewed for applicability.

4.6 OTHER ASSESSMENT CONSIDERATIONS

A portable backup AC power source for communications systems and components may be credited as operable provided that it is consistent with the assumptions and requirements discussed above, including location requirements. The assessment should consider the amount of power source fuel available on-site (e.g., available fuel will support expected run time).

For battery-operated equipment, there must be a sufficient number of on-site and charged batteries to support prompt operation of required equipment. This number should be determined with consideration given to the following items.

- At a minimum, charged batteries must be available at the start of event in sufficient number to support performance of the required emergency response functions listed in Section 4.1, Required Post-Event Emergency Communications Capabilities.
- Use the vendor's stated minimum reliable operability period for a fully-charged battery. This information may be modified if supported by a documented basis.
- The availability of on-site battery charging capability. Credit may be given to power source(s) and battery charging equipment consistent with the assumptions and requirements discussed above, including location requirements.
- Delivery of replacement batteries may be assumed to occur any time after T + 24 hours. The assessment must consider whether the batteries are delivered in a charged or uncharged state, and if uncharged, the time required for on-site charging.

Manual actions taken by emergency responders to facilitate the use of a particular means of communication may be credited provided that these actions are described in a response procedure or guideline. For example, radio communication relay zones may be employed if a procedure or guideline specifies or provides guidance on where personnel need to be located and their equipment. The personnel necessary to implement these manuals methods must be considered when determining the staffing required for responding to a prolonged station blackout.

4.7 QUALITY-RELATED REQUIREMENTS

Communications equipment, and related power sources and infrastructure, identified through this assessment may be purchased and installed under the site requirements normally applied to other EP equipment. It is desirable that the equipment to be commonly available (e.g. commercial equipment) such that parts and replacements can be readily obtained.

Programmatic controls shall be applied to the identified communications equipment to ensure availability and reliability, including the performance of periodic inventory checks and operability testing.

Supporting vendor service contracts shall be periodically verified.

The guidance contained in INPO 10-007, *Equipment Important to Emergency Response*, should be reviewed for applicability.

4.8 NATIONAL COMMUNICATIONS SYSTEM (NCS) SERVICES

To enhance overall post-event communications capabilities, each licensee should verify that they have arrangements in place to utilize the services offered by the NCS to the degree possible. These services include access to the Government Emergency Telecommunications Service (GETS), the Telecommunications Service Priority (TSP) program and the Wireless Priority

Service (WPS). Information concerning these services may be obtained from their web site - http://www.ncs.gov/

4.9 COMMUNICATIONS PROVIDER EMERGENCY SERVICES

To enhance overall post-event communications capabilities, each licensee should verify that they have arrangements in place to utilize the emergency services offered by their communications service provider(s) to the degree possible. As one example, see services offered by Verizon - http://www.verizonbusiness.com/Products/communications/emergency/

4.10 PERSONNEL TRAINING

Response personnel shall receive periodic training on the location and use of backup communications equipment.

PARKING LOT ITEMS

- Whether and how regional storage centers are discussed

Survivability criteria from 4.2 Task Force

REFERENCES

4.11 10 CFR § 50.47 Emergency plans – Section (b)

4.12 10 CFR § 50, Appendix E – Emergency Planning and Preparedness for Production and Utilization Facilities

4.13 NSIR/DPR-ISG-01, Interim Staff Guidance – Emergency Planning for Nuclear Power Plants

4.14 NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants