

RS-14-119

May 29, 2014

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Response to March 12, 2012, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Enclosure 5, Recommendation 9.3, Emergency Preparedness – Staffing, Requested Information Items 1, 2, and 6 - Phase 2 Staffing Assessment

References:

1. 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
2. Exelon Generation Company, LLC's 60-Day Response to March 12, 2012 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 May 14, 2012
3. NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, dated May 2012
4. NRC Letter to NEI, dated May 15, 2012, USNRC Review of NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, dated May 2012
5. NRC Order Number EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012

On March 12, 2012, the NRC staff issued a letter entitled Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (Reference 1). Enclosure 5 of Reference 1 contains the specific Requested Actions, Requested Information, and Required Response associated with Recommendation 9.3 for Emergency Preparedness - Staffing. In accordance with 10 CFR 50.54, "Conditions of licenses," paragraph (f), addressees were requested to submit a written response to the information requests within 90 days.

In accordance with Reference 1, Enclosure 5, Exelon Generation Company, LLC (EGC) submitted an alternative course of action for performing the requested actions and providing the requested information (Reference 2). Enclosure 1 of Reference 2 described the alternative course of action and schedule for responding to the Emergency Preparedness – Staffing, Requested Information Items 1, 2, and 6.

Enclosure 1 to this letter provides the Byron Station Phase 2 Staffing Assessment Report. The Byron Station Phase 2 Staffing Assessment Report follows the assessment process methodology described in NEI 12-01 (Reference 3), which was endorsed by the NRC in Reference 4.

In accordance with Reference 2, Enclosure 1, this letter provides the response to the following information requests:

- Reference 1, Enclosure 5, Staffing, Requested Information Item 1
- Reference 1, Enclosure 5, Staffing, Requested Information Item 2
- Reference 1, Enclosure 5, Staffing, Requested Information Item 6

Response to Information Request in Reference 1, Enclosure 5, Staffing, Requested Information Item 1

It is requested that addressees provide an assessment of the onsite and augmented staff needed to respond to a large scale natural event meeting the conditions described in the Discussion section (Reference 1, Enclosure 5). This assessment should include a discussion of the onsite and augmented staff available to implement the strategies as discussed in the emergency plan and/or described in plant operating procedures. The following functions are requested to be assessed:

- ***How onsite staff will move back-up equipment (e.g., pumps, generators) from alternate onsite storage facilities to repair locations at each reactor as described in the Order regarding the NRC Near-Term Task Force (NTTF) Recommendation 4.2. It is requested that consideration be given to the major functional areas of NUREG-0654, Table B-1, such as plant operations and assessment of operational aspects, emergency direction and control, notification/communication, radiological accident assessment, and support of operational accident assessment, as appropriate.***
- ***New staff or functions identified as a result of the assessment.***
- ***Collateral duties (personnel not being prevented from timely performance of their assigned functions).***

Response

Enclosure 1 provides the Byron Station on-shift staffing assessment conducted pursuant to Reference 2. As described in Enclosure 1, Section 4, a detailed timeline and table-top review of the on-shift response to the postulated Beyond-Design-Basis External Event

(BDBEE) Extended Loss of AC Power (ELAP) was performed based upon Operations review of the applicable station procedures. The focus of the timeline was to identify all resources, both operators and support organizations that would be required to execute each task for the Initial and Transition Phases using the FLEX mitigating strategies.

The data from the Operations timeline, as well as the review of Radiation Protection and Chemistry resource requirements, was analyzed by applying the methodology specified in NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," to evaluate the capability of the minimum on-shift staffing complement to execute the actions specified for Operations, Radiation Protection and Chemistry and the required Emergency Plan responsibilities.

The tables describing the required minimum staffing, the Operations timeline, and the NEI 10-05 staffing analysis tables for Byron Station are included in Enclosure 1.

This Phase 2 Staffing Assessment concluded that the current shift staffing is sufficient to execute all required initial and transition phase tasks prior to the arrival of additional site personnel. The assessment identified the need for six (6) additional personnel to support the movement of cable and temporary generators, and the establishment of temporary Control Room ventilation. These personnel will be drawn from the available auxiliary site personnel. An analysis of the use of these auxiliary personnel in support of the Initial and Transition Phase actions is provided under a separate submittal.

The staffing assessment provided in Enclosure 1 determined that no new staff or functions have been identified as a result of the Phase 2 assessment. The analysis did not identify any non-validated tasks or potential overlap tasks that would require a Time Motion Study to be performed.

The staffing assessment provided in Enclosure 1 determined that the existing on-shift staff is sufficient to implement the FLEX mitigating strategies for the postulated BDBEE ELAP multi-unit event, while supporting performance of the required Emergency Planning duties without unacceptable collateral duties.

Response to Information Request in Reference 1, Enclosure 5, Staffing, Requested Information Item 2

Provide an implementation schedule of the time needed to conduct the onsite and augmented staffing assessment. If any modifications are determined to be appropriate, please include in the schedule the time to implement the changes.

Response

The Phase 2 Staffing Assessment results for Byron Station require the establishment of procedural controls to activate the Expanded Response Capability for the BDBEE as defined for the Phase 2 Staffing Assessment. This staffing will be provided by the current site resources, supplemented by fleet resources, as necessary.

The Phase 2 Staffing Assessment concluded that an action is required to establish fleet procedural controls to activate the Expanded Response Capability. These controls will be established by September 30, 2014, consistent with the FLEX implementation milestone schedule.

Response to Information Request in Reference 1, Enclosure 5, Staffing, Requested Information Item 6

Identify changes that have been made or will be made to your emergency plan regarding the on-shift or augmented staffing changes necessary to respond to a loss of all ac power, multi-unit event, including any new or revised agreements with offsite resource providers (e.g., staffing, equipment, transportation, etc.).

Response

As described in Enclosure 1, Section 7, the existing on-shift staff is sufficient to implement the existing mitigating strategies on both units, simultaneously, while supporting performance of the required Emergency Planning duties without unacceptable collateral duties, provided that the staff is augmented with six (6) auxiliary personnel. No staffing changes are required.

Also as described in Enclosure 1, Section 7, the existing augmented ERO, supplemented by site staff, provides sufficient staffing to satisfy the Expanded Capability functions defined in NEI 12-01, Table 3.1. Exelon will address the expanded staffing requirements commencing at 6-hours post-event using available site resources augmented by resources from other Exelon sites and the corporate staff.

Exelon will incorporate instructions into applicable fleet procedures to activate the Expanded Response Capability and to request any necessary logistical support for site access based upon the following conditions, as described in NEI 12-01, Section 3.8:

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

These procedure changes will be implemented concurrent with the implementation of the mitigating strategies at the first affected Exelon site (Byron Station) in the Fall of 2014. This action will be completed by September 30, 2014, consistent with the FLEX implementation milestone schedule.

Exelon will be incorporating requirements for drills and exercises involving a BDBEE scenario in accordance with the guidance in NEI 13-06, Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events, in order to address the Tier 2 Emergency Preparedness (EP) enhancements identified in US Nuclear Regulatory Commission (NRC) Report, Recommendations for Enhancing Reactor Safety in

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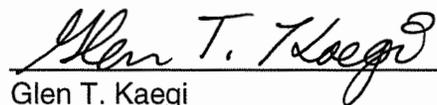
the 21st Century [The Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident]. The BDBEE requirements will be implemented in accordance with the implementation schedule for NEI 13-06.

This letter contains no new regulatory commitments.

If you have any questions regarding this submittal, please contact Ron Gaston at (630) 657-3359.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 29th day of May 2014.

Respectfully,



Glen T. Kaegi
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:

1. Byron Station NEI 12-01 Phase 2 Staffing Assessment

cc: Director, Office of Nuclear Reactor Regulation
Regional Administrator - NRC Region III
NRC Senior Resident Inspector – Byron Station,
NRC Project Manager, NRR - Byron Station
Illinois Emergency Management Agency – Division of Nuclear Safety

Enclosure 1

Byron Station

NEI 12-01 Phase 2 Staffing Assessment Report

(36 Pages)

Enclosure 1

BYRON STATION

NEI 12-01 Phase 2

Staffing Assessment

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1.0 EXECUTIVE SUMMARY

This report provides the Phase 2 Staffing Assessment for Byron Station Units 1 and 2 in response to the March 12, 2012, Nuclear Regulatory 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." Specifically, this report provides Phase 2 information to address Staffing Request Numbers 1, 2, and 6 as committed in Exelon's 60-Day Response for Byron Station.

The Phase 2 Staffing Assessment was conducted using NEI 12-01, Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities; an approach endorsed by the NRC in a Letter from D. L. Skeen (NRR) to Susan Perkins-Grew (NEI) dated May 15, 2012. This report includes the results of the Phase 2 Staffing Assessment as described in NEI 12-01. It also includes a discussion of any changes planned in response to the Phase 2 Staffing Assessment and the associated implementation schedule.

The Phase 2 Staffing Assessment concluded that the current minimum on-shift staffing as defined in EP-AA-1002, Radiological Emergency Plan Annex Byron Station, is sufficient to support the implementation of the current mitigating strategies for a Beyond Design Basis External Event (BDBEE) on both Units 1 and 2, as well as the required Emergency Plan actions, with no unacceptable collateral duties, provided that the minimum staff is augmented with additional auxiliary personnel on-site. The Phase 2 Staffing Assessment also identifies the staffing necessary to support the Expanded Response Capability for the (BDBEE) as defined in NEI 12-01, Section 3.4.

The Phase 2 Staffing Assessment was performed based upon the latest draft FLEX implementing procedures. These procedures will be validated and approved by, October 15, 2014 as part of the FLEX implementation for Byron Unit 2. The results of the procedure validation will be reviewed and compared with the timeline as documented in this report. If the results of the validation alter staffing requirements or the conclusions of this report, an updated report will be submitted within 60 days of startup from B2R18 (Fall 2014), consistent with the Byron FLEX full compliance submittal.

2.0 BACKGROUND

Response to Near-Term Task Force Recommendation 9.3, Staffing

In response to the Fukushima Dai-ichi accident, US Nuclear Regulatory Commission (NRC) issued a 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. The information requests related to Emergency Preparedness (EP) are contained in Enclosure 5, "Recommendation 9.3: Emergency Preparedness" of this §50.54(f) Letter. Within this enclosure are two Requested Actions (Communications and Staffing). Both Requested Actions involve

performance of an assessment. The action for the staffing assessment is summarized below:

It is requested that addressees assess their current staffing levels and determine the appropriate staff to fill all necessary positions for responding to a multi-unit event during a beyond design basis natural event and determine if any enhancements are appropriate given the considerations of Near-Term Task Force (NTTF) Recommendation 9.3.

The industry developed an alternative response based upon a phased approach to Recommendation 9.3. This approach was delineated in NEI 12-01 and was found acceptable by the NRC. In its letter to Susan Perkins-Grew, NEI, dated May 15, 2012, the US NRC stated, in part:

The staff has reviewed NEI-12-01, Revision 0, dated May 2012, and has found this guidance to be an acceptable method for licensees to employ when responding to the 10 CFR 50.54(f) letters regarding NTTF Recommendation 9.3.

The phased approach and associated schedule was submitted to the NRC under Exelon's 60-Day Response to March 12, 2012 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 May 14, 2012. In this letter, Exelon committed to the completion of a Phase 2 staffing assessment for Byron Station by May 29, 2014.

- 1 Provide an assessment of the on-site and augmented staff needed to respond to a large scale natural event meeting the conditions described in the Discussion section. This assessment should include a discussion of the on-site and augmented staff available to implement the strategies as discussed in the emergency plan and/or described in plant operating procedures. The following functions are requested to be assessed:

How on-site staff will move back-up equipment (e.g., pumps, generators) from alternate on-site storage facilities to repair locations at each reactor as described in the order regarding the NRC Near-Term Task Force (NTTF) Recommendation 4.2. It is requested that consideration be given to the major functional areas of NUREG-0654, Table B-1, such as plant operations and assessment of operational aspects, emergency direction and control, notification/communication, radiological accident assessment, and support of operational accident assessment, as appropriate.

New staff or functions identified as a result of the assessment.

Collateral duties (personnel not being prevented from timely performance of their assigned functions).

- 1B Provide on-site and augmented staffing assessment considering all requested functions except those related to NTTF Recommendation 4.2. [Phase 2 staffing assessment]
- 2B Conduct the on-site and augmented staffing assessment:
- The on-site and augmented staffing assessment considering all requested functions except those related to NTTF Recommendation 4.2. [Phase 2 staffing assessment]
- 2D A schedule of the time needed to implement changes will be provided as follows:
- Those associated with the Phase 2 staffing assessment.
- 6 Identify changes that have been made or will be made to your emergency plan regarding the on-shift or augmented staffing changes necessary to respond to a loss of all AC power, multi-unit event, including any new or revised agreements with offsite resource providers (e.g., staffing, equipment, transportation, etc.).
- 6A Changes will be identified as follows:
- Those associated with the Phase 2 Staffing Assessment.

This report for Byron Station provides the NEI 12-01 Phase 2 Staffing Assessment, as requested by the §50.54(f) letter, conducted using the guidance in NEI 12-01 and material from NEI 10-05.

Phase 2 Staffing Assessment

The industry is responding to multiple regulatory actions resulting from the recommendations contained in the Fukushima NTTF Report, as modified in related Commission Papers (SECY's) and Staff Requirements Memoranda (SRM). One of these actions, in particular, has the potential to impact emergency response staffing levels. This action is NRC Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events EA-12-049 [the Order] which addresses Fukushima NTTF Recommendation 4.2.

In accordance with the Order, each licensee must develop new strategies for mitigating the effects of beyond-design-basis external events. To ensure accurate results, the staffing assessment for response functions related to NTTF Recommendation 4.2 must be based on the actions delineated in the procedures and guidelines developed in response to the Order. Once the site-specific actions associated with the new response strategies are defined (e.g., down to the

procedure or guideline step level), the staffing needed to perform these actions can be assessed with the necessary level of accuracy.

As requested, an implementation schedule for any modifications that are determined to be appropriate should be included with the Phase 2 staffing assessment.

This Byron Phase 2 Staffing Assessment Report provides the results of an assessment performed of the staffing necessary to implement actions that address the NRC Order Modifying Licensed with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (EA-12-049). The assessment was performed in conjunction with the development of procedures or guidelines that address the Order using the guidance provided in NEI 12-01.

3.0 EMERGENCY PLAN MINIMUM STAFFING

Revision 31 of EP-AA-1002, Radiological Emergency plan Annex for Byron Station, establishes the licensing basis for the on-shift staffing complement. The following table indicates the on-shift personnel necessary to perform the required emergency planning functions.

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size
1. Plant Operations/Safe Shutdown and Assessment of Operational Aspects	Control Room Staff	Shift Manager	1
		Shift Supervisor	1
		Nuclear Station Operator ^(b)	3
		SSD Non Licensed Operator ^(b)	4
2. Emergency Direction and Control	Command and Control	Shift Emergency Director	1 ^(a)
3. Notification and Communication	Emergency Communications	Plant Shift Personnel	1
4. Radiological Assessment	Offsite Dose Assessment	RP Personnel	1
	In-Plant Surveys	RP Personnel	1
	Chemistry	Chemistry Personnel	1
5. Plant System Engineering Repair and Corrective Action	Technical Support	STA or Incident Assessor	1
	Repair and Corrective Actions	Mech Maintenance I&C/Electrical Maintenance	1 ^(a) 1 ^(a)
6. In Plant Protective Actions	Radiation Protection	RP Personnel	2 ^(a)
7. Fire Fighting	--	Fire Brigade ^(c)	5
8. First Aid and Rescue Operations	--	Plant Personnel	2 ^(a)
9. Site Access Control and Personnel Accountability	Security and Accountability	Security Team Personnel	(d)
Total:			19

(a) May be provided by personnel assigned other functions

- (b) Safe Shutdown per Fire Protection Report or per Tech Specs
- (c) Fire Brigade per FSAR/Technical Specifications, as applicable
- (d) Function performed by on-shift security personnel

4.0 **BEYOND DESIGN BASIS EXTERNAL EVENT (BDBEE)**

4.1 **General Assumptions and Limitations**

4.1.1 **NEI 12-01 Assumptions Common to Both Assessments (Staffing and Communications)**

1. A large-scale external event occurs that results in:
 - a. all on-site units affected
 - b. extended loss of AC power
 - c. 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 the event.
4. The event impedes site access as follows:
 - a. Post event time: 6 hours - No site access. This duration reflects the time necessary to clear road way obstructions, use different travel routes, mobilize alternate transportation capabilities (e.g., private resource providers or public sector support), etc.
 - b. Post event time: 6 to 24 hours - Limited site access. Individuals may access the site by walking, personal vehicle or via alternate transportation capabilities (e.g., private resource providers or public sector support).
 - c. Post event time: 24+ hours - Improved site access. Site access is restored to a near-normal status and/or augmented transportation resources are available to deliver equipment, supplies, and large numbers of personnel.

Each licensee should identify transportation and site access-enhancing methods in accordance with Section 3.9 of NEI 12-01, and include this information in the response to Staffing Information Request #4. The Staffing Information Request #4 response should also include an overview discussion of how the identified methods will be implemented following a beyond design basis external event.

A staffing assessment may utilize a “no site access” end time of less than 6 hours and greater than or equal to 4 hours, if supported by a documented basis. This basis should include a discussion of the site-specific transportation-related resources and capabilities, and related supporting arrangements, which provide assurance that augmented staff would be available on the site starting at the time used in the

assessment. These resources and capabilities could be provided by Company-internal, private or public sources (including vehicles and aircraft, such as helicopters from military and National Guard organizations). All arrangements with the anticipated service providers should be documented (e.g., Letter of Agreement, contract, etc.).

A staffing assessment may not utilize a “no site access” end time of less than 4 hours.

4.1.2 NEI 12-01 Assumptions for Staffing Assessment

1. For multi-unit plants, the Phase 1 staffing assessment performed in response to the Letter will be performed by March 29, 2013, and provided by April 30, 2013. This assessment will consider all requested functions except those related to Fukushima Near-Term Task Force (NTTF) Recommendation 4.2. An assessment considering these functions will be performed in Phase 2.

Each licensee should determine a date for completing the Phase 2 staffing assessment; the assessment will be provided no later than 4 months prior to beginning of second refueling outage (as used within the context of NRC Order EA-12-049). This assessment will consider the requested functions related to Fukushima Near-Term Task Force (NTTF) Recommendation 4.2.

The industry will be responding to multiple regulatory actions resulting from the recommendations contained in the Fukushima NTTF Report, as modified in related Commission Papers (SECY's) and Staff Requirements Memoranda (SRM). One of these actions, in particular, has the potential to impact emergency response staffing levels. This action is NRC Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events EA-12-049 [the Order] which addresses Fukushima NTTF Recommendation 4.2. A summary of the Order is provided below.

This Order requires a three-phase approach for mitigating beyond-design-basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore the functions of core cooling, containment and spent fuel pool cooling. The transition phase requires providing sufficient, portable, on-site equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from off site. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely. Additional details on an acceptable approach for complying with this Order will be contained in final Interim Staff Guidance (ISG) scheduled to be issued by the NRC in August 2012.

In accordance with the Order, each licensee must develop new strategies for mitigating the effects of beyond-design-basis external events. To ensure accurate results, the staffing assessment for response functions

related to NTTF Recommendation 4.2 must be based on the actions delineated in the procedures and guidelines developed in response to the Order. Once the site-specific actions associated with the new response strategies are defined (e.g., down to the procedure or guideline step level), the staffing needed to perform these actions can be assessed with the necessary level of accuracy.

Based on a review of the planned actions necessary to comply with the Order, an assessment of the staffing for the functions related to NTTF Recommendation 4.2 can be provided by 4 months prior to beginning of the second refueling outage (as used within the context of NRC Order EA-12-049). Licensees of single-unit sites should adhere to this submittal milestone. Licensees of multi-unit sites have two options for providing the Phase 2 staffing assessment:

- Provide one phase 2 staffing assessment applicable to all on-site units. This assessment should be provided 4 months prior to the first occurrence of a second refueling outage at the site (i.e., the first “second refueling outage”). This option may be used by sites that will employ essentially identical mitigation strategies for all on-site units.
- Provide two or more phase 2 staffing assessments as applicable to the different on-site units. Each assessment should be provided 4 months prior to the occurrence of the second refueling outage of the unit to which the assessment is applicable. This option may be used by sites that will employ different mitigation strategies for on-site units.

As requested, an implementation schedule for any modifications that are determined to be appropriate should be included with the Phase 2 staffing assessment.

The Phase 2 staffing assessment is one component of an overall licensee work plan necessary to implement the requirements of the Order. As stated in the Order, all holders of operating licenses issued under Part 50 shall complete full implementation no later than two (2) refueling cycles after submittal of the overall integrated plan, as required in Condition C.1.a, or December 31, 2016, whichever comes first. Full compliance shall include procedures, guidance, training, and acquisition, staging, or installing of equipment needed for the strategies.

4.1.3 Additional Assumptions for Minimum Staffing

1. On-shift personnel are limited to the minimum complement allowed by the site regulatory requirements (e.g., Emergency Plan and Security Plan) and commitments. This would typically be the on-shift complement present during a backshift, weekend, or holiday.

4.1.4 Additional Guidance for Staffing Assessment

Per NEI 12-01, Section 3.1, for purposes of assessing augmented staffing, it is assumed that the on-shift staff successfully performs all Initial Phase, and any Transition Phase, coping actions.

Initial Phase – Implementation of strategies that generally rely upon installed plant equipment.

Transition Phase – Implementation of strategies that involve the use of portable equipment and consumables to extend the coping period, and maintain or restore the functions of core cooling, containment, and spent fuel pool cooling.

4.1.5 NEI 10-05 Applicable Assumptions to Support Methodology

1. On-shift personnel can report to their assigned response locations within timeframes sufficient to allow for performance of assigned actions.
2. The on-shift staff possesses the necessary Radiation Worker qualifications to obtain normal dosimetry and to enter Radiologically Controlled Areas (but not high, locked high or very high radiation areas) without the aid of a Radiation Protection Technician.
3. It is assumed that personnel assigned to the major response area of Plant Operations & Safe Shutdown meet the requirements and guidance established by NRC regulations. Staff performance within this area is not evaluated as part of this assessment, unless a role/function/task from another major response area is assigned as a collateral duty.
4. The on-site security organization is able to satisfactorily perform all tasks related to Site and Protected Area Access Controls, under all event or accident conditions. Performance of this function is regularly analyzed through other station programs and will not be evaluated here, unless a role or function from another major response area is assigned as a collateral duty.
5. Individuals holding the position of radiation protection or chemistry technician are qualified to perform the range of tasks expected of their position.

6. The task of making a simple and brief communication has minimal impact on the ability to perform other assigned functions/tasks, and is therefore an acceptable collateral duty for all positions. Examples include making a plant page announcement or placing a call for assistance to an offsite resource such as local law enforcement. This assumption does not apply to emergency notification to an Offsite Response Organization (ORO) or the NRC.
7. The task of performing a peer check has minimal impact on the ability to perform other assigned functions/tasks, and is therefore an acceptable collateral duty for all positions. Examples include performing a peer check on a recommended emergency classification or notification form for transmittal to offsite authorities.
8. The analyzed event occurs during off-normal work hours at a time when augmented ERO responders are not at the site (e.g., during a backshift, weekend or holiday). The ERO augmentation time is based on the time of event declaration until the time of turnover of the function/responsibility. Specifically, any time needed by the augmenting ERO to acquire materials or prepare for turnover is accounted for. Facility activation includes the turnover of functions from the on shift staff. For purposes of this analysis, 360 minutes will be used as the time period for the conduct of on-shift ERO response actions.

Per NEI 10-05, the analysis methodology allows flexibility in the assignment of on-shift response functions and tasks, dependent upon the event or accident. For example, members of a fire brigade may be assigned other response duties if the event or accident does not include a fire. Likewise, a security officer might be assigned to perform offsite notifications during a DBA but not the DBT. For the purposes of this assessment, members of the fire brigade are utilized to perform actions during the initial and transition phases of the response.

4.2 Scope/Sequence of Events

4.2.1 Beyond Design Basis External Event (BDBEE): Station Blackout (SBO)

Per NEI 12-01, Section 2.2, a large-scale external event occurs that results in:

- All on-site units affected
- Extended loss of AC power
- Impeded access to the units

Initially, both on-site reactors are operating at full power and are successfully shut down.

- Both units experience a loss of offsite power and a failure of all emergency AC power sources resulting in a Station Blackout (Loss of all AC power).

- The BDBEE occurs such that restoration of any AC power source is not possible before the arrival of the augmented ERO personnel. (e.g., 360 minutes)
- The event initially results in a Site Area Emergency based on EAL MS1, with a subsequent escalation to a General Emergency based on EAL MG1.

4.2.2 On-shift Response

Byron has a common Control Room for the operation of Units 1 and 2 with one Shift Manager (SRO) providing Operations oversight of both units, and one Control Room Supervisor (SRO) who directs the activities for both units. In addition, minimum staffing includes a Shift Technical Advisor (STA) and three Nuclear Station Operators (ROs).

During a plant transient, manual or automatic shutdown, the Control Room Supervisor directs implementation of response actions per applicable abnormal operating or emergency operating procedures. The STA provides independent oversight and safety function status assessment (for both units during a dual unit event). The SM provides independent oversight and is also the Emergency Director (ED) when plant conditions reach emergency action declaration criteria. The ED provides direction to execute the required Emergency Plan actions in accordance with the applicable Emergency Plan implementing procedures.

Non-licensed plant operators, on shift Radiation Protection and Chemistry technicians will report to the control room for direction or direction will be provided to them via portable radio or other communications, as available.

For the Phase 2 Staffing Assessment, on-shift personnel respond to the initiating events in accordance with plant procedures. (Describe general sequence of response)

The following procedures and documents were referenced during the event review:

- 2BCA-0.0, Loss of All AC Power
- 2BFSG-1 Long Term RCS Inventory Control
- 2BFSG-2, Alternate AFW/EFW Suction Source
- 2BFSG-4, ELAP DC Bus Load Shed/Management
- 0BFSG-5, Initial Assessment and FLEX Equipment Unit 0
- 2BFSG-5, Initial Assessment and FLEX Equipment Staging Unit 2
- 0BFSG-50, FLEX Support Equipment Operation
- 0BFSG-51, Alternate MCR Ventilation
- EP-AA-112-100-F-01, Shift Emergency Director Checklist
- EP-AA-1002, Radiological Emergency Plan Annex for Byron Station
- EP-AA-1000, Standardized Radiological Emergency Plan
- BY-AA-300-1004, RP Response to Plant Transient Conditions
- CY-BY-120-1020, Reactor Trip – Primary Chemistry Excursion
- CY-AP-120-2010 Steam Generator Hideout Return

5.0 ON-SHIFT STAFFING TASK ANALYSIS RESULTS

Byron Operations personnel conducted a table-top review of the on-shift response to the postulated BDBEE and extended loss of AC power for the Initial and Transition Phases using the FLEX mitigating strategies. Resources needed to perform initial event response actions were identified from the Emergency Operating Procedures (EOPs), Abnormal Operating Procedures (AOPs), FLEX Support Guidelines, or other supporting procedures.

Per NEI 12-01, Byron performed an assessment of the ability to execute the required EP functions using the methodology specified in NEI 10-05. Per NEI 10-05, the analysis is performed using five tables to evaluate the on-shift staffing and functions. The on-shift resources were entered in the appropriate tables (Attachment 1, Tables 2 and 3). Applicable RP and Chemistry tasks and the time required to perform expected emergency plan functions were documented in Attachment 1, Table 4. This information was documented on the applicable tables from NEI 10-05 located in Attachment 1 of this report. The Emergency Plan functions for the event were reviewed and assigned to the on-shift resource responsible for performance of the identified function and documented as per NEI 12-01 using the NEI 10-05 documentation (Table 5). Finally, the on-shift resources and their actions were summarized in Table 1 using the NEI 10-05 documentation process.

This Phase 2 Staffing Assessment concluded that the current shift staffing is sufficient to execute all required initial and transition phase tasks prior to the arrival of additional site personnel. The assessment identified the need for 6 additional personnel to support the movement of cable and temporary generators, and the establishment of temporary Control Room ventilation. These personnel will be drawn from the available auxiliary site personnel. An analysis of the use of these auxiliary personnel in support of the Initial and Transition Phase actions is provided under a separate submittal.

The Operating tasks were assigned as shown in Table 5.1 below. None of these operating tasks require the use of the Shift Manager / Shift Emergency Director, STA, or the dedicated shift communicator. As such, no unacceptable collateral duties were identified. Refer to Attachment 1, NEI 10-05 Staffing Tables for Byron Station, for documentation of the on-shift staffing analysis results. The analysis did not identify any non-validated tasks or potential overlap tasks that would require a Time Motion Study to be performed.

Table 5.1: Byron Staffing Timeline

T=17 Declare ELAP
T=19 Declare 50.54(x)

Time (Mins.) Position	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120	
FBL		Direct OBFSG-5					Verify Rotating Equip / Vent Gen H2		
NSO 1		Direct 1BFSG-4 and 5							
NSO 2		Direct 2BFSG-4 and 5							
NSO 3		Coordinate field activities with Control Room – Radios/Sound-powered phones							
EO #1		U1 DDAF pp Start			Monitor DDAF pps				
EO #2		U2 DDAF pp Start			Monitor FW 05 Valves				
EO #3		2A/2B EDG Emerg Stop	2A EDG Local Start	DC Load Shed / SSPS Switches U2 211/212 (2BFSG-4)		RCP Seal Isolation U1/U2			
EO #4		1A/1B EDG Emerg Stop	1A EDG Local Start	DC Load Shed / SSPS Switches U1 111/112 (1BFSG-4)		Briefing / Setup for Cooldown		Local Valve Ops – Cooldown 1MS018A/D	
EO #5		Debris removal							
EO #6		Move Portable Generator from FLEX Building (0BFSG-5)				Briefing / Setup for Cooldown		Local Valve Ops – Cooldown 1MS018B/C	
EO #7		2B Local EDG Start	Att A 2BFSG-5	Pull U2 Cables (2BFSG-5 Att A)		Briefing / Setup for Cooldown		Local Valve Ops – Cooldown 2MS018A/D	
EO #8		1B Local EDG Start	Att A 1BFSG-5	Pull U1 Cables (1BFSG-5 Att A)		Briefing / Setup for Cooldown		Local Valve Ops – Cooldown 2MS018B/C	
RPT #1				Safety Man	Preps/Brief for RCP Seal Isolation		RCP Seal Isolation U1/U2		
RPT #2				Safety Man	MSL Rad Prep	Monitor MSL Rad Levels			
Chemistry		Move Portable Generator from FLEX Building (0BFSG-5)							
Aux #1					Pull U2 Cables (2BFSG-5 Attachment A)				
Aux #2					Pull U1 Cables (1BFSG-5 Attachment A)				
Aux #3						Move Portable Generator from FLEX Building (0BFSG-5)			
Aux #4					Pull U2 Cables (2BFSG-5 Attachment A)				
Aux #5					Pull U1 Cables (1BFSG-5 Attachment A)				
Aux #6									

Time (Mins.) Position	120-135	135-150	150-165	165-180	180-195	195-210	210-225	225-240
FBL	Direct OBFSG-5							
NSO 1	Direct 1BFSG-4 and 5							
NSO 2	Direct 2BFSG-4 and 5							
NSO 3	Coordinate field activities with Control Room – Radios/Sound-powered phones							
EO #1	Monitor DDAF pps							
EO #2	Monitor FW 05 Valves							
EO #3	RCP Seals	Control Room Ventilation						Connect Generator
EO #4	Local Valve Ops - Cooldown							
EO #5	Debris Removal							Connect Generator
EO #6	Local Valve Ops - Cooldown							
EO #7	Local Valve Ops - Cooldown					Connect Temp Cables at Disconnect (2BFSG-5)	Connect Generator	
EO #8	Local Valve Ops - Cooldown					Connect Temp Cables at Disconnect (1BFSG-5)	Connect Generator	
RPT #1	RCP Seals	Control Room Ventilation						
RPT #2	MSL Rad Monitoring							
Chemistry	Move Portable Generator from FLEX Building (0BFSG-5)							
Aux #1	Pull U2 Cables (2BFSG-5 Attachment A)							
Aux #2	Pull U1 Cables (1BFSG-5 Attachment A)							
Aux #3	Move Portable Generator from FLEX Building (0BFSG-5)							
Aux #4	Pull U2 Cables (2BFSG-5 Attachment A)							
Aux #5	Pull U1 Cables (1BFSG-5 Attachment A)							
Aux#6		Open Doors for Control Room Ventilation						

Time (Mins.) Position	240-255	255-270	270-285	285-300	300-315	315-330	330-345	345-360
FBL	Direct OBFSG-5							
NSO 1	Direct 1BFSG-4 and 5							
NSO 2	Direct 2BFSG-4 and 5							
NSO 3	Coordinate field activities with Control Room – Radios/Sound-powered phones							
EO #1	Monitor DDAF pps					DDAF pp day tank fill – Coordinate with EOs 3 and 5		
EO #2	Monitor FW 05 Valves							
EO #3	Connect Generator	Close Gen Brkr	Align Breakers		Close Breakers		Plant Assessment (OBFSG-5 Attachment A)	
EO #4	Local Valve Ops - Cooldown							
EO #5	Connect Generator	Close Gen Brkr	Align Breakers		Close Breakers		Plant Assessment (OBFSG-5 Attachment A)	
EO #6	Local Valve Ops - Cooldown							
EO #7	Connect Generator	Close Gen Brkr	Align Breakers		Close Breakers		Stage FLEX Equipment (OBFSG-5 Steps 13 through 16))	
EO #8	Connect Generator	Close Gen Brkr	Align Breakers		Close Breakers		Stage FLEX Equipment (OBFSG-5 Steps 13 through 16))	
RPT #1							Plant Assessment (OBFSG-5 Attachment A)	
RPT #2	MSL Rad Monitoring							
Chemistry							Stage FLEX Equipment (OBFSG-5 Steps 13 through 16))	
Aux #1								
Aux #2								
Aux #3								
Aux #4								
Aux #5								
Aux #6								

Notes for Table 5.1

- **Gray indicates unassigned time period**
- **Shift Manager/ED, STA, and Shift Communicator have no other assigned functions**
- **EOs, RP and Chemistry report to WEC**
- **Security will proceed to Control Room to contact Ops**
- **Aux personnel represent other personnel available on-site**

6.0 EXPANDED RESPONSE CAPABILITY

A typical augmented ERO for a multi-unit site would be challenged to effectively respond to a beyond design basis external event that resulted in an extended loss of AC power affecting more than one unit. In an event of this magnitude, it would be necessary to “expand” the capability of the augmented ERO in order to facilitate timely and effective performance of critical emergency response functions. The focus of this “expanded response capability” at Byron should be to enable the performance of unit-specific accident assessment and mitigation functions.

In accordance with NEI 12-01, to be effective, the expanded response capability should encompass those functions necessary for preventing damage to irradiated fuel, or if such damage occurs, minimizing radiological releases. Selected functions must directly support the assessment and implementation of a range of mitigation strategies intended to maintain or restore the functions of core cooling, containment, and spent fuel pool cooling.

NEI 12-01, Tables 3.1 and 3.2, list the emergency response functions identified by the NEI Beyond Design Basis Event Response Staffing Study Task Force as meeting these requirements. These tables provide key roles and staffing considerations for each expanded response function and specifies the staffing necessary to support the simultaneous deployment of emergency repair and corrective action teams to each affected unit.

Table 6.1 of this report describes the recommended expanded response capability staffing for Byron, based upon the NEI 12-01 guidance for the phase 2 staffing assessment.

**Table 6.1
Expanded Response Functions for Byron Phase 2 Staffing Assessment**

Expanded Response Function	Typical Location	Key Roles and Staffing Considerations	Required Staffing	Function Fulfilled By
Unit Response Coordination	TSC	<ul style="list-style-type: none"> Overall cognizance of the activities related to implementation of repair and corrective actions, and implementation of Transition Phase coping and Severe Accident Management (SAM) strategies for an assigned unit One individual per unit; individuals should not be assigned other functions 	2	Station ED / Operations Manager - Normal ERO Response (Required staffing* + 1)
Operations Coordination	TSC	<ul style="list-style-type: none"> Provides coordination of Operations staff and support for an assigned unit One individual per unit; individuals should not be assigned other functions 	2	Operations Manager - Normal ERO Response (Required staffing* + 1)
Maintenance Coordination	TSC or OSC	<ul style="list-style-type: none"> Provides coordination of Maintenance staff and support for an assigned unit One individual per unit; individuals should not be assigned other functions 	2	Maintenance Manager - Normal ERO Response (Required staffing* + 1)
Engineering Coordination	TSC or OSC	<ul style="list-style-type: none"> Provides coordination of Engineering staff and support for an assigned unit One individual per unit; individuals should not be assigned other functions 	2	Technical Manager - Normal ERO Response (Required staffing* + 1)
Engineering Assessments	TSC or OSC	<ul style="list-style-type: none"> One team for each unit to perform engineering assessments in support of repair and corrective actions Team composition (i.e., number and represented disciplines) as described in the emergency plan Team may include personnel responsible for performing other functions for the same assigned unit 	6	Core Th/Hyd Eng Mech Eng Elect Eng Normal ERO Response (Required

Expanded Response Function	Typical Location	Key Roles and Staffing Considerations	Required Staffing	Function Fulfilled By staffing* + 1)
Evaluation of Severe Accident Management (SAM) Strategies	TSC or OSC	<ul style="list-style-type: none"> One team for each unit to evaluate selection of SAM strategies; team performs evaluations not done by Control Room personnel Team composition (i.e., number and represented disciplines) as described in governing site programs, procedures and guidelines Team may include personnel responsible for performing other functions for the same assigned unit 	(4) Two SAM Evaluators per Unit - Duty concurrent with Technical Manager / SAMG Qualified Engineer	Technical Manager / SAMG Qualified Engineer
Unit In-Plant Team Coordination	OSC	<ul style="list-style-type: none"> Overall cognizance of on-site and in-plant teams performing or supporting repair and corrective actions for an assigned unit One individual per unit; individuals should not be assigned other functions 	2	OSC Director Asst OSC Director Normal ERO Response (Required staffing* + 1)
Non-Licensed Operators	OSC	<ul style="list-style-type: none"> Two individuals per unit to implement repair and corrective actions Should not include members of the on-shift staff 	4	Site NLOs and/or regional NLO resources
Mechanical Maintenance Repair and Corrective Action	OSC	<ul style="list-style-type: none"> 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) 	4	Site Technicians and/or regional resources
Electrical Maintenance Repair and Corrective Action	OSC	<ul style="list-style-type: none"> 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) 	4	Site Technicians and/or regional resources
I&C Repair and Corrective Action	OSC	<ul style="list-style-type: none"> 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) 	4	Site Technicians and/or regional resources
Implementation of SAM Strategies	OSC	<ul style="list-style-type: none"> Number and composition of personnel capable of simultaneous implementation 	22 NLOs	6 NLOs from on-shift crew, 16

Expanded Response Function	Typical Location	Key Roles and Staffing Considerations	Required Staffing	Function Fulfilled By
		<p>of any 2 SAM strategies at each unit (See Note 1 below)</p> <ul style="list-style-type: none"> Should not include personnel assigned to other functions (e.g., emergency repair and corrective actions); however, may include members of the on-shift staff and personnel responsible for implementation of Transition Phase coping strategies 		NLOs from site staff and/or regional resources
Evaluation of Transition Phase Coping Strategies	TSC or EOF	<ul style="list-style-type: none"> One team for each unit to evaluate selection of Transition Coping strategies; team performs evaluations not done by Control Room personnel Team composition (i.e., number and represented disciplines) as described in governing site programs, procedures and guidelines Team may include personnel responsible for performing other functions for the same assigned unit 	(4) Two SAM Evaluators per Unit - Duty concurrent with Technical Manager / SAMG Qualified Engineer	Operations Manager / Technical Manager Normal ERO Response (Required staffing* + 1)
Implementation of Transition Phase Coping Strategies	OSC	<ul style="list-style-type: none"> Number and composition of personnel capable of simultaneous implementation of any 2 Transition Phase coping strategies at each unit Should not include personnel assigned to other functions (e.g., emergency repair and corrective actions); however, may include members of the on-shift staff and personnel responsible for implementation of SAM strategies 	8 NLOs (Note 2)	6 NLOs from on-shift crew, and 2 NLOs from site staff and/or regional resources (Note 3)

* - The required staffing for each position is specified in EP-AA-1002, Radiological Emergency Plan Annex for (Byron Station. Normal augmentation is the required staffing plus one additional qualified individual.

Notes:

1 – The SAM strategies selected for Byron were SCG-1, Mitigate Fission Product releases with CS and RCFC unavailable, and SAG-1 Inject into SG with Fire Pump, Appendix B with Local Operation of SG PORV Required.

2 - The Phase 2 strategies selected for Byron were the connection of alternate power to the 480 VAC bus per 2BFSG-5, with a maximum number of 3 NLOs per Unit at any time, and Alternate Spent Fuel Pool Makeup and Cooling per 0BFSG-11, with a maximum number of 2 NLOs.

3 - These functions would be collateral duties for personnel assigned to the evaluation and implementation of SAM strategies.

6.1 On-Site Radiation Protection Technicians

Following a beyond design basis external event, on-site Radiation Protection (RP) Technicians should be available in sufficient numbers to support performance of assigned emergency plan functions and the expanded response capability. Per NEI 12-01, the equation is used to determine the required number of on-site RP Technicians (RPTs):

$$\text{RPTT} = \text{RPTCOP} + \text{RPTRCA} + \text{RPTNC}$$

Where:

RPTT = Total required number of on-site RP Technicians

RPTCOP = Number needed to support implementation of any 2 extended loss of AC power coping strategies per unit. Determine this number by reviewing strategies for each unit.

RPTRCA = Number needed for repair and corrective action
= 2 x the number of units

RPTNC = Number of on-site RP Technicians performing other emergency plan functions that would preclude them from performing job coverage for extended loss of AC power coping, repair or corrective action teams.

For Byron Station:

RPTCOP = 0 RP Technicians

RPTRCA = 4 RP Technicians (2 per Unit)

RPTNC = 4 RP Technician (2 - On-site Surveys; 2 – Offsite radiation monitoring)

RPTT = 8 RP Technicians

For Byron, the complement of RP Technicians specified in the augmented ERO per EP-AA-1002 is 10 (2 on-shift, 8 additional RP Technicians for full augmentation). Therefore, sufficient RP Technicians are anticipated to be available from Site resources to support the initial staffing of the Expanded Capability. Additional RP Technician resources are available from the Site staff, as well as other Exelon sites.

6.2 Administrative Support Personnel

Administrative support personnel positions are not required for the Byron On-call ERO Staffing Requirements. Should the need for administrative support arise, this support would be obtained through a combination of site personnel and personnel from the Corporate organization, as well as other regional Exelon nuclear sites. Therefore, no enhancements have been identified in the assessment of administrative support personnel.

6.3 Training

No new ERO tasks or functions are required for implementing the expanded response capability. There are a sufficient number of qualified ERO personnel to implement the expanded response; qualification of additional personnel will not be required.

6.4 Work Areas for Expanded Capability

Due to the unavailability of communications and to expected travel limitations within 25 miles of the site, personnel contacted to perform the expanded capability functions will be staged at either the Cantera offices (Location of the Byron EOF) or the Quad Cities Station TSC, depending on travel conditions. Should conditions warrant transport of personnel to the site, several on-site facilities may be utilized to support the expanded response capabilities if available. These areas include administrative office areas and Maintenance shop facilities. These locations are not robust from the perspective of a BDBEE. As such, other available office space may be utilized, as appropriate, based upon the nature and effects of the external event.

7.0 CHANGES REQUIRED TO SUPPORT PHASE 2 STAFFING ASSESSMENT

7.1 Staffing Changes

This Phase 2 Staffing Assessment concluded that the existing on-shift staff is sufficient to implement the existing mitigating strategies on both units, simultaneously, while supporting performance of the required Emergency Planning duties without unacceptable collateral duties, provided that the staff is augmented with 6 auxiliary personnel. No staffing changes are required.

7.2.1 Expanded Capability Staffing

The existing augmented ERO, supplemented by site staff, provides sufficient staffing to satisfy the Expanded Capability functions as defined in NEI 12-01, Table 3.1. Due to the initiating event, personnel close to the plant (nominally, within a 25 mile radius of the site), may not be able to respond. Exelon has multiple resources available to address the impact of such conditions. These include site personnel residing outside the 25 mile radius, as well as personnel resources from other Exelon sites and the Corporate organization. It is standard practice for Exelon sites to share Operator, Maintenance, RP, and technical staff during outages. This has provided organizational flexibility that would support additional staffing in response to a BDBEE. Similarly, the Corporate organization maintains technical expertise in the Engineering, Maintenance, RP, and Chemistry disciplines that are shared during outages and emergent plant issues. Based upon the available pool of resources outside of the site organization with the requisite skill set, Exelon will address the expanded staffing requirements commencing at 6 hours post-event using available site resources augmented by resources from other Exelon sites and the Corporate staff.

7.3 Emergency Plan and Procedure Changes

Per NEI 12-01, Section 3.10, the capability for responding to a beyond design basis external event does not need to be described in the emergency plan. A licensee may, however, choose to incorporate implementing instructions for expanded response functions into emergency plan implementing procedures, and/or extended loss of AC power, SAM or other program documents.

Exelon will incorporate instructions into applicable fleet procedures to activate the Expanded Response Capability and to request any necessary logistical support for site access based upon the following conditions, as described in NEI 12-01, Section 3.8:

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

These procedure changes will be implemented concurrent with the implementation of the mitigating strategies at the first affected Exelon site in the fall of 2014. This action will be completed by September 30, 2014.

NEI 12-01 further states that a licensee should determine if any changes are necessary to documents describing the emergency response drill and exercise program. In particular, standard objectives and extent-of-play may need to be revised to clarify the expected demonstration of functions that are dependent upon the type of scenario event or accident (i.e., within or beyond design basis, and number of affected units). For example, functions associated with an expanded response capability would not be demonstrated during a drill or exercise that involved a design basis accident affecting only one unit.

Exelon will be incorporating requirements for drills and exercises involving a BDBEE scenario in accordance with the guidance in NEI 13-06, Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events, in order 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]. The BDBEE requirements will be implemented in accordance with the implementation schedule for NEI 13-06.

8.0 CONCLUSION

This Phase 2 Staffing Assessment concluded that the current minimum on-shift staffing as defined in EP-AA-1002, Radiological Emergency Plan Annex for (Byron Station, as augmented by site auxiliary personnel, is sufficient to support the implementation of the current mitigating strategies for a Beyond Design Basis External Event (BDBEE) on Units 1 and 2, as well as the required Emergency Plan actions, with no unacceptable collateral duties.

The Phase 2 Staffing Assessment also identified the staffing necessary to support the Expanded Response Capability for the beyond design basis external event (BDBEE) as defined for the Phase 2 staffing assessment. This staffing will be provided by the current site resources, supplemented by fleet resources, as necessary.

The Phase 2 Staffing Assessment concluded that an action is required to establish fleet procedural controls to activate the Expanded Response Capability. These controls will be established by September 30, 2014.

9.0 ATTACHMENTS

- 9.1 Attachment 1, NEI 10-05 Staffing Tables for Byron Station.

10.0 REFERENCES

- 10.1 NEI 12-01, Rev 0, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities"
- 10.2 NEI 10-05, Rev 0, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities"
- 10.3 NSIR DPR-ISG-01, "Interim Staff Guidance – Emergency Planning for Nuclear Power Plants."
- 10.4 NEI 12-06, Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities
- 10.5 EP-AA-1000, Exelon Nuclear Standardized Radiological Emergency Plan, Rev. 21
- 10.6 EP-AA-1002, Exelon Nuclear Radiological Emergency Plan Annex For Byron Station
- 10.7 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.
- 10.8 Exelon Generation Company, LLC Letter to NRC, "60-Day Response to March 12, 2012 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 May 11, 2012 and May 14, 2012 (corrected).
- 10.9 EA-12-049, NRC Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events
- 10.10 HU-AA-1081-F-15, Emergency Response Organization Fundamentals

- 10.11 EP-AA-1002 Addendum 1, Byron Station On-shift Staffing Technical Basis
- 10.12 Exelon Generation Company, LLC Letter to NRC, "Exelon Generation Company, LLC's (EGC) 90-Day Response to March 12, 2012 Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident; dated March 12, 2012 (Emergency Preparedness)," dated June 11, 2012.
- 10.13 NRC Letter to Susan Perkins-Grew, NEI, "U.S. Nuclear Regulatory Commission Review of NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, dated May 15, 2012.
- 10.14 Exelon Generation Company, LLC Letter to NRC, "Response to March 12, 2012, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations of the Near - Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, Enclosure 5, Recommendation 9.3, Emergency Preparedness - Staffing, Requested Information Items 1, 2, and 6 - Phase 1 Staffing Assessment," dated April 30, 2013.

Attachment 1

NEI 10-05 Staffing Tables

For

Byron Station

NEI 12-01 Phase 2 Staffing Assessment

Attachment 1
NEI 12-01 Phase 2 On-shift Staffing Assessment (OSA)
Station Blackout (SBO)

1. Accident Summary:

- A loss of all offsite AC power occurs coincident with the trip of both units. All station emergency diesel generators fail to start.

2. Procedures Reviewed for Accident Response Include:

- 2BCA-0.0, Loss of All AC Power
- 2BFSG-1 Long Term RCS Inventory Control
- 2BFSG-2, Alternate AFW/EFW Suction Source
- 2BFSG-4, ELAP DC Bus Load Shed/Management
- 0BFSG-5, Initial Assessment and FLEX Equipment Unit 0
- 2BFSG-5, Initial Assessment and FLEX Equipment Staging Unit 2
- 0BFSG-50, FLEX Support Equipment Operation
- 0BFSG-51, Alternate MCR Ventilation
- EP-AA-112-100-F-01, Shift Emergency Director Checklist
- BY-AA-300-1004, RP Response to Plant Transient Conditions
- CY-BY-120-1020, Reactor Trip – Primary Chemistry Excursion

Attachment 1

Byron

TABLE 1 – On-shift Positions

Analysis NEI 12-01 Phase 2.

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min) Note 2	Role in Table#/Line#
1.	Shift Manager / Shift ED	EP-AA-1002, Table 2-1	N/A	T2 L1 T5 L1 T5 L2 T5 L3 T5 L4 T5 L5 T5 L8 T5 L10
2.	U-1 Control Room Supv (SRO)	EP-AA-1002, Table 2-1	N/A	T2 L2
3.	STA (SRO)	EP-AA-1002, Table 2-1	N/A	T2L3
4.	Reactor Operator (RO #1)	EP-AA-1002, Table 2-1	N/A	T2 L4
5.	Reactor Operator (RO #2)	EP-AA-1002, Table 2-1	N/A	T2 L5
6.	Reactor Operator (RO #3)	EP-AA-1002, Table 2-1	N/A	T2L6
7.	Equipment Operator #1 (EO #1)	EP-AA-1002, Table 2-1	N/A	T2 L7
8.	Equipment Operator #2 (EO #2)	EP-AA-1002, Table 2-1	N/A	T2 L8
9.	Equipment Operator #3 (EO #3)	EP-AA-1002, Table 2-1	N/A	T2L9
10.	Equipment Operator #4 (EO #4)	EP-AA-1002, Table 2-1	N/A	T2L10

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min) Note 2	Role in Table#/Line#
11.	Shift Communicator Note 1	EP-AA-1002, Table 2-1	N/A	T5L6 T5L9 T5L13
12.	Rad Pro Tech #1 (RPT #1)	EP-AA-1002, Table 2-1	N/A	T4L1
13.	Rad Pro Tech #2 (RPT #2)	EP-AA-1002, Table 2-1	N/A	T4L4
14.	Chem Tech	EP-AA-1002, Table 2-1	N/A	-
15.	Fire Brigade Leader	EP-AA-1002, Table 2-1	N/A	T2L15
16.	Fire Brigade EO (EO #5)	EP-AA-1002, Table 2-1	N/A	T2L11
17.	Fire Brigade EO (EO #6)	EP-AA-1002, Table 2-1	N/A	T2L12
18.	Fire Brigade EO (EO #7)	EP-AA-1002, Table 2-1	N/A	T2L13
19.	Fire Brigade EO (EO #8)	EP-AA-1002, Table 2-1	N/A	T2L14
20.	Security	EP-AA-1002, Table 2-1	N/A	-

NOTES:

1. The Shift Communicator can be filled by any available qualified individual who is not assigned STA, Fire Brigade, SSD or Shift Emergency Director.
2. Augmentation Elapsed Time - Per the site access assumptions in NEI 12-01, augmentation will begin at T = 6 hours. This assessment is based upon the ability to execute the required functions for the initial 6 hours following the initiating event.

Attachment 1 Byron

TABLE 2 – Plant Operations & Safe ShutdownAnalysis **NEI 12-01 Phase 2**

Two Units - One Control Room

Applicable to site unit(s) # 1 & 2

Minimum Operations Crew Necessary to Implement AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1	Shift Manager	Shift Manager	Ops Training Program
2	Unit Supervisor	Unit 1 Supervisor (SRO)	Ops Training Program
3	Shift Technical Advisor	STA (SRO)	Ops Training Program
4	Reactor Operator #1	RO #1	Ops Training Program
5	Reactor Operator #2	RO #2	Ops Training Program
6	Reactor Operator #3	RO #3	Ops Training Program
7	Auxiliary Operator #1	EO #1	Ops Training Program
8	Auxiliary Operator #2	EO #2	Ops Training Program
9	Auxiliary Operator #3	EO #3	Ops Training Program
10	Auxiliary Operator #4	EO #4	Ops Training Program
11	Auxiliary Operator #5	EO #5/FBM	Ops Training Program
12	Auxiliary Operator #6	EO #6/FBM	Ops Training Program
13	Auxiliary Operator #7	EO #7/FBM	Ops Training Program
14	Auxiliary Operator #8	EO #8/FBM	Ops Training Program
15	Fire Brigade Leader	SRO/FBL	Ops Training Program

Other (non-Operations) Personnel Necessary to Implement AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
16	Mechanic	n/a	n/a
17	Electrician	n/a	n/a
18	I&C Technician	n/a	n/a
19	Other	n/a	n/a

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TABLE 3 – Firefighting

Analysis NEI 12-01 Phase 2

Line	Performed By	Task Performance Validation
1	n/a	n/a
2	n/a	n/a
3	n/a	n/a
4	n/a	n/a
5	n/a	n/a

Notes:
Scenario assumes no concurrent fire

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TABLE 4 – Radiation Protection & Chemistry

Analysis NEI 12-01 Phase 2

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1	In-Plant Survey On-Shift Position: RPT #2 Monitor Main Steam Line Radiation Levels									X	X	X	X	X	X	X	X	X	X
2	On-Site Survey On-Shift Position:																		
3	Job Coverage On-Shift Position: RPT #1 Safety Man – Breaker Rackout							X	X										
4	Job Coverage On-Shift Position: RPT #2 Safety Man – Breaker Rackout							X	X										
5	Job Coverage On-Shift Position: RPT #1 RCP Seal Isolation									X	X	X	X	X	X	X	X	X	X
6	Offsite Radiological Assessment On-Shift Position:																		
7	Chemistry function/task #1 – Describe: Move Portable Generator On-Shift Position: Chem Tech #1				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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TABLE 4 – Radiation Protection & Chemistry (cont'd)

Line	Position Performing Function/Task	90-120	120-150	150-180	180-210	210-240	240-270	270-300	300-330	330-360
		1	In-Plant Survey On-Shift Position: RPT #2 Monitor Main Steam Line Radiation Levels	X	X	X	X	X	X	X
2	On-Site Survey On-Shift Position:									
3	Job Coverage On-Shift Position: RPT #1 Safety Man – Breaker Rackout									
4	Job Coverage On-Shift Position: RPT #2 Safety Man – Breaker Rackout									
5	Job Coverage On-Shift Position: RPT #1 RCP Seal Isolation	X	X							
6	Offsite Radiological Assessment On-Shift Position:									
7	Chemistry function/task #1 – Describe: Move Portable Generator On-Shift Position: Chem Tech #1	X	X	X	X	X				

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TABLE 4 – Radiation Protection & Chemistry (cont'd)**Notes:**

RP and Chemistry personnel will perform assignments at the direction of the Shift Manager.

Rad Protection:

- EP-AA-112-100-F-01, Step 1.10 – An RP tech is assigned to the MCR to support emergency response. This RP Tech will support Operations activities as necessary and as prioritized by the Shift Emergency Director. However, there are no specific actions for RP identified under this procedure step.

- RP-BY-300-1004, includes for RPTs to survey the respective units CV03F, CV01FA, and CV01FB [Reactor Coolant System Filters] within one hour and then once an hour for the first 4 hours, or until stabilization; and to obtain noble gas samples to support containment entries. Under ELAP conditions, the ED considered ELAP response actions to be higher priority than the filter surveys. In addition, due to plant conditions, the noble gas sampling capability would be unavailable.

Chemistry:

Actions at the direction of the Shift Manager

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TABLE 5 – Emergency Plan Implementation Analysis NEI 12-01 Phase 2

Line	Function/Task	On-Shift Position	Task Performance Validation
1	Declare the Emergency Classification Level (ECL)*	Shift Manager	Ops Training Program
2	Approve Offsite Protective Action Recommendations*	Shift Manager	Ops Training Program
3	Approve content of State/local notifications*	Shift Manager	Ops Training Program
4	Approve extension to allowable dose limits*	Shift Manager	Ops Training Program/ EP Drills and Exercises
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)***	Shift Manager	Ops Training Program
6	ERO notification	Shift Communicator	Ops Training Program/ EP Drills and Exercises
7	Abbreviated NRC notification for DBT event	n/a	n/a
8	Complete State/local notification form	Shift Manager	Ops Training Program
9	Perform State/local notifications	Shift Communicator	Ops Training Program/ EP Drills and Exercises
10	Complete NRC event notification form	Shift Manager	Ops Training Program
11	Activate ERDS	n/a	n/a
12	Offsite radiological assessment **	n/a	EP Drills and Exercises
13	Perform NRC notifications	Shift Communicator	Ops Training Program/ EP Drills and Exercises
14	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	n/a	n/a
15	Personnel accountability	Security	EP Drills
16	Other: Specify	n/a	n/a

*Shift Manager non-delegable duty

** Offsite radiological assessment is not required for this scenario. The capability is maintained, in that RPT #2 can be re-assigned to this function if offsite dose assessment is required. Under such circumstances, Operations would change the sequence of breaker manipulations on his unit and direct RPT #1 to perform the 'safety man' function on both units in support of 2(1)BFSG-5, and delay main steam line radiation monitoring, based upon prioritization. At the one hour point, dose assessment capability is provided by the EOF staff.

***In-plant notification of on-shift plant staff will be performed using available communications (e.g., sound-powered phones or talk-around radio channels, or by Security personnel in accordance with existing site Security procedures.