Exelon Generation®

Order No. EA-12-049

RS-15-016

February 27, 2015

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

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Subject: Fourth Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. 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
2. NRC Interim Staff Guidance JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," Revision 0, dated August 29, 2012
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August 2012
4. Exelon Generation Company, LLC's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated October 25, 2012
5. Exelon Generation Company, LLC Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013 (RS-13-017)
6. Exelon Generation Company, LLC First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 28, 2013 (RS-13-113)
7. Exelon Generation Company, LLC Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2014 (RS-14-007)

8. Exelon Generation Company, LLC Third Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated August 28, 2014 (RS-14-205)
9. NRC letter to Exelon Generation Company, LLC, Braidwood Station, Units 1 and 2 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC Nos. MF0895 and MF0896), dated December 17, 2013

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Exelon Generation Company, LLC (EGC). Reference 1 was immediately effective and directs EGC to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the EGC initial status report regarding mitigation strategies. Reference 5 provided the Braidwood Station, Units 1 and 2 overall integrated plan.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. References 6, 7, and 8 provided the first, second, and third six-month status reports, respectively, pursuant to Section IV, Condition C.2, of Reference 1 for Braidwood Station. The purpose of this letter is to provide the fourth six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The enclosed report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any. Since the report was completed on January 31, 2015, EGC has determined that a request for schedule relaxation may be needed in order to complete resolution of recently identified RCP seal leakage issues. The enclosed report also addresses the NRC Interim Staff Evaluation Open and Confirmatory Items contained in Reference 9.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact David P. Helker at 610-765-5525.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 27th day of February 2015.

Respectfully submitted,

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

Enclosure:

1. Braidwood Station, Units 1 and 2 Fourth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

cc: Director, Office of Nuclear Reactor Regulation
NRC Regional Administrator - Region III
NRC Senior Resident Inspector - Braidwood Station, Units 1 and 2
NRC Project Manager, NRR - Braidwood Station, Units 1 and 2
Ms. Jessica A. Kratchman, NRR/JLD/PMB, NRC
Mr. Jack R. Davis, NRR/DPR/MSD, NRC
Mr. Eric E. Bowman, NRR/DPR/MSD, NRC
Mr. Jeremy S. Bowen, NRR/DPR/MSD/MSPB, NRC
Mr. Robert L. Dennig, NRR/DSS/SCVB, NRC
Mr. John D. Hughey, NRR/JLD/JOMB, NRC
Illinois Emergency Management Agency - Division of Nuclear Safety

Enclosure

Braidwood Station, Units 1 and 2

Fourth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

(33 pages)

Braidwood Station, Units 1 and 2

Fourth Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

1 Introduction

Braidwood Station developed an Overall Integrated Plan (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to NRC Order EA-12-049 (Reference 2). This enclosure provides an update of milestone accomplishments since submittal of the last status report, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

The following milestone(s) have been completed since August 28, 2014 and are current as of January 31, 2015.

- Phase 2 Staffing Analysis
- Phase 1 Modification Development
- Phase 2 Modification Development

3 Milestone Schedule Status

The following provides an update to Attachment 2 of the Overall Integrated Plan. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

Site: Braidwood

Original Target Completion Date	Activity	Status	Revised Target Completion Date
	Submit 60 Day Status Report	Complete	
	Submit Overall Integrated Implementation Plan	Complete	
	Contract with Strategic Alliance for FLEX Emergency Response National SAFER Response Center	Complete	
	Submit Six (6) month Updates		
Aug 2013	Update 1	Complete	
Feb 2014	Update 2	Complete	

Aug 2014		Update 3	Complete		
Feb 2015		Update 4	Complete with this submittal		
Aug 2015		Update 5	Not Started		
Unit 1	Unit 2	Modification Development		Unit 1	Unit 2
Feb 2014	Sept 2014	• Phase 1 modifications	Complete	Dec 2014	Dec 2014
Feb 2014	Sept 2014	• Phase 2 modifications	Complete	Dec 2014	Dec 2014
Feb 2014	Sept 2014	• Phase 3 modifications	Complete – modifications are not required		
Unit 1	Unit 2	Modification Implementation			
Apr 2015	Oct 2015	• Phase 1 modifications	Started		
Apr 2015	Oct 2015	• Phase 2 modifications	Started		
Apr 2015	Oct 2015	• Phase 3 modifications	Complete – modifications are not required		
		Procedure Development			
Apr 2015		• Strategy procedures	Started		
Apr 2015		• Validate Procedures (NEI 12-06, Sect. 11.4.3)	Started		
Apr 2015		• Maintenance procedures	Not Started		
Nov 2014		Staffing analysis	Complete		
Apr 2015		Storage Plan and construction	Started		
Apr 2015		FLEX equipment acquisition	Started		
Apr 2015		Training completion	Started		
Dec 2014		National SAFER Response Center Operational	Started	Feb 2015	
Apr 2015		Unit 1 Implementation date	Not Started		
Oct 2015		Unit 2 Implementation date	Not Started		

4 Changes to Compliance Method

Change 1

Section: Maintain Core Cooling and Heat Removal, – PWR Portable Equipment Phase 2 - Deployment Conceptual Design – Strategy, Maintain RCS Inventory Control – PWR Portable Equipment Phase 2 - Deployment Conceptual Modifications – Strategy, Maintain Spent Fuel Pool Cooling – PWR Portable Equipment Phase 2 - Deployment Conceptual Design – Strategy, and Safety Function Support – PWR Portable Equipment Phase 2 - Deployment Conceptual Design – Strategy.

Reason for Change: Site FLEX equipment storage strategy has changed to align with NEI 12-06 revision 0.

Change: Changed this sentence from,

> The "N" FLEX equipment will be stored in one robust building and the "+1" FLEX equipment will be stored in a commercial building.

To:

> The FLEX storage buildings will consist of one robust building and one commercial building. The site's "N" and "+1" equipment will be stored in the robust FLEX building when the first unit on site implements NRC Order EA-12-049. The commercial building will be utilized for the site's "+1" equipment when the second unit implements NRC Order EA-12-049. At that time, if NEI 12-06 revision 1 has not been endorsed by the NRC, Braidwood Station will submit an alternate approach with a shorter allowed unavailability time consistent with revision 1 of NEI 12-06.

Change 2

Section: Maintain Core Cooling and Heat Removal, – PWR Portable Equipment Phase 2 - Deployment Conceptual Design – Strategy, Maintain RCS Inventory Control – PWR Portable Equipment Phase 2 - Deployment Conceptual Modifications – Strategy, Maintain Spent Fuel Pool Cooling – PWR Portable Equipment Phase 2 - Deployment Conceptual Design – Strategy, and Safety Function Support – PWR Portable Equipment Phase 2 - Deployment Conceptual Design – Strategy.

Reason for Change: Additional FLEX equipment has been purchased to support the site strategy.

Change: Two New Holland T5.115 tractors have been purchased to assist in debris removal and transporting FLEX equipment.

Change 3

Section: Maintain Core Cooling and Heat Removal – PWR Portable Equipment Phase 2 - Deployment Conceptual Design – Notes.

Reason for Change: Site calculations are being refined as parts of the FLEX strategy development.

Change: Replace the following:

Secondary cooling capabilities recommend 300 gpm at 300 psia (Ref. 1)

The RWST inventory is maintained at a minimum of 423,000 gallons during normal operation. With a conservative sustained flow rate of 300 gpm, the total inventory would be depleted in 23 hours. Prior to depletion of the RWST inventory a transition will be made to the UHS.

Reference:

(1) WCAP-17601-P Rev. 0, Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering, & Babcock & Wilcox NSSS Designs, dated August 2012.

With,

The RWST inventory during FLEX scenarios is adequate to provide RCS boration / inventory for 145.6 hours with both units in Mode 1-4. With one unit in mode 1-4 and the other unit in mode 5-6, RWST inventory is adequate to provide RCS boration / inventory and core cooing for 57.7 hours (Ref. 1). 0BwFSG-50, FLEX Support Equipment Operation, provides operators with direction for filling the RWST from the boric acid storage tanks (BAST), portable makeup skid or by cross tying RWST's. In addition, a boration skid is requested from the NSRC to provide a long term borated water make-up source.

Reference:

(1) BYR14-129/BRW-14-0212-M, Rev. 0, RWST Usage During FLEX Scenarios, dated October 1, 2014.

Change 4

Section: Maintain RCS Inventory Control - PWR Installed Equipment Phase 1.

Reason for Change: The criteria for declaring an ELAP has been refined as part of the site FSG procedures development.

Change: Change the following paragraph from,

At the initiation of the event operators will enter Emergency Operating Procedures (EOPs) procedure BwCA 0.0, Loss of All AC. The Extended Loss of AC Power (ELAP), BwCA 0.0 Attachment B, will be entered when the emergency diesel generators are confirmed unavailable and off-site power cannot be restored and it is confirmed by dispatcher or visual verification of physical damage to infrastructure at site.

To,

At the initiation of the event operators will enter Emergency Operating Procedure (EOP) procedure BwCA 0.0, Loss of All AC Power. When it has been confirmed that AC power cannot be restored to a 4KV ESF bus from any source, then BwCA 0.0 Attachment B, Extended Loss of All AC Power Response, will be entered.

Change 5

Section: PWR Portable Equipment Phase 2.

Reason for Change: Additional FLEX equipment has been purchased to support the site strategy.

Change: Added two New Holland tractors to Phase 2 Equipment list.

Change 6

Section: Phase 3 Response Equipment/Commodities.

Reason for the Change: A decision has been made to maintain a minimal quantity of food and water for initial responders.

Change: The site will maintain a minimal quantity of food and water supplies for the beyond design basis event initial responders.

5 Need for Relief/Relaxation and Basis for the Relief/Relaxation

Braidwood Station, Units 1 and 2 expects to comply with the order implementation date and no relief/relaxation is required at this time.

6 Open Items from Overall Integrated Plan and Draft Safety Evaluation

The following tables provide a summary of the open items documented in the Overall Integrated Plan or the Draft Safety Evaluation (SE) and the status of each item.

OIP Section Reference	Overall Integrated Plan Open Item	Status
Key Site assumptions (p.4)	Primary and secondary storage locations have not been selected yet; once locations are finalized implementation strategies and routes will be assessed for hazard impact.	Started - The FLEX storage buildings will consist of one robust building and one commercial building. The site's "N" and "+1" equipment will be stored in the robust FLEX building when the first unit on site implements NRC Order EA-12-049. The commercial building will be utilized for the site's "+1" equipment when the second unit implements NRC Order EA-12-049. At that time, if NEI 12-06 revision 1 has not been endorsed by the NRC, Braidwood Station will submit

		an alternate approach with a shorter allowed unavailability time consistent with revision 1 of NEI 12-06. The robust and commercial buildings will be located adjacent to each other outside the protected area, southeast of the main parking lot. Primary and alternate deployment routes for FLEX equipment have been identified and are being recorded within the site program document Snow removal will be addressed as part of the site snow removal plan. Post event snow removal will be accomplished by a FLEX truck with snow plow or FLEX tractor with bucket. The site maximum flood water level is at elevation 601.91 feet resulting from a probable maximum precipitation (PMP) event. Braidwood plant grade elevation is at 600.0 feet and does not vary significantly across the site. The FLEX storage building floor will be constructed above the flood level to an elevation of 602 feet. A majority of the travel path elevations are between elevation 600 feet and 601 feet (Ref. 11). Some travel path location may be covered by a small amount of water. Since the FLEX pumps and generators are trailer mounted, they should be maintained available when being deployed to different

		locations at the site. Debris removal impacts of the travel routes have been evaluated. Guidance exists for coping with downed power lines. The alternate travel route will be utilized in the event the primary path becomes unavailable due to debris. In addition, the site has purchased an F750 and two T5.115 New Holland tractors to assist in debris removal. Extreme hot and cold temperatures should have little impact on the site travel paths. Liquefaction evaluation of the travel routes is in progress.
Sequence of events (p.5)	The final timeline will be time validated once detailed designs are completed and procedures are developed.	Started
Identify how strategies will be deployed (p.7)	Identification of storage area and creation of the administrative program.	Started - The FLEX storage buildings will consist of one robust building and one commercial building. The site's "N" and "+1" equipment will be stored in the robust FLEX building when the first unit on site implements NRC Order EA-12-049. The commercial building will be utilized for the site's "+1" equipment when the second unit implements NRC order EA-12-049. At that time, if NEI 12-06 revision 1 has not been endorsed by the NRC, Braidwood Station will submit an alternate approach with a shorter allowed unavailability time consistent with revision 1 of NEI 12-06.

		The robust and commercial buildings will be located adjacent to each other outside the protected area, southeast of the main parking lot. Site program document draft has been developed.
Programmatic controls (p.8)	Develop an administrative program for FLEX responsibilities, and testing & maintenance.	Started - Site program document draft has been developed. Testing and maintenance procedures will be developed based on the EPRI FLEX equipment templates.
National SAFER Response Center plan (p.9)	Development of Braidwood Station's playbook.	Started - Site response plan (playbook) has been developed.
Key Reactor Parameters (p. multiple)	Identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage.	Complete – Closure supplied as part of third 6 month update (Ref. 25)
Deployment Conceptual Design (p. multiple)	Develop the storage structure conceptual design.	Complete - The FLEX storage buildings will consist of one robust building and one commercial building. The robust building will be 140 feet x 60 feet. The commercial building will be 60 feet x 60 feet. EC398039 and EC398040 contain the design details for the robust and commercial buildings, respectively.
Maintain RCS Inventory Control, Phase 2 (p.23)	A calculation will be required for the timing of the boration and quantity required.	Complete - Calculation BYR13-239/BRW-13-0221-M (Ref. 10) identifies the timing and quantity of boration required. Specifically, boration will need to start prior to 17 hours into the event and require 15,240 gallons of

		water injected at 40 gallons per minute.
Maintain Containment, Phase 1 (p.31)	Additional calculations will be performed to evaluate containment response.	Complete - Calculation BYR13-235/BRW-13-0217-M (Ref. 12) and BYR14-046/BRW-14-0058-M (Ref. 17) evaluate containment response in all modes. In Mode 1-4, design basis temperature and pressure are not reached until > 30 days. The results show site action during phase 1 and phase 2 are not necessary. 1/2BwFSG-12, Containment Cooling, provides operators with different options for restoring containment cooling to maintain containment temperature and pressure within limits.
Maintain Spent Fuel Pool Cooling, Phase 1 (p.39)	Procedure development for Initial Spent fuel pool make-up with gravity drain from the RWST.	Complete – Closure supplied as part of third 6 month update (Ref. 25)
Maintain Spent Fuel Pool Cooling, Phase 1 (p.39)	Initial calculations were used to determine the fuel pool timelines. Formal calculations will be performed to validate this information during development of the spent fuel pool cooling strategy detailed design.	Complete - Closure supplied as part of third 6 month update (Ref. 25)
Maintain Spent Fuel Pool Cooling, Phase 1, (p.39 and p.42)	Evaluation of the spent fuel pool area for steam and condensation will be performed and used to determine if vent path strategy is needed.	Complete - Closure supplied as part of third 6 month update (Ref. 25)
Safety Functions Support, Phase 2 (p.51)	Habitability conditions will be evaluated and a strategy will be developed to maintain Main Control Room.	Complete - Closure supplied as part of third 6 month update (Ref. 25)
Safety Functions Support, Phase 2 (p.51)	Critical ventilation assets may be required to support DDAF pumps, station battery rooms, miscellaneous electric equipment rooms, and fuel handling building personnel	Complete - Habitability conditions within the Plant will be maintained with a tool box approach limiting the impact of high temperatures with

	habitability and/or component survivability. Specific analyses of these rooms will be performed.	methods such as supplemental cooling, personnel rotation and/or availability of fluids. Component survivability has been evaluated with the following calculations: • Calculation BYR13-234/BRW-13-0216-M, Auxiliary FW Pump Room Temperature Analysis during an ELAP Event (Ref. 13), shows room temperature is maintained within acceptable limits and supplemental room cooling is not required. Procedure guidance for setup of alternate cooling was developed to provide additional options to the operators and is controlled by 0BwFSG-5, Initial Assessment of FLEX Equipment. • Calculation BYR13-237/BRW-13-0219-M, MEER and Battery Room Conditions Following ELAP (Ref. 14), shows battery room can reach 2% hydrogen concentration within 2.52 hours of re-energizing the battery charger. Hydrogen generation begins when the battery chargers are re-energized. When power is re-established to the battery charger, power is also returned to the battery room vent fan. Operation of the battery room vent fan will prevent hydrogen

		generation room becoming a concern. 1/2BwFSG-5, Initial Assessment and FLEX Equipment Staging, provides operators with the necessary guidance to establish forced ventilation within the battery room. Additionally, this calculation shows the MEER room will require forced ventilation to preserve component availability within 8 hours of the event. 1/2BwFSG-5 / 0BwFSG-5, Initial Assessment of FLEX Equipment, provides operators with the necessary guidance to establish alternate ventilation. • Calculation BYR13-236/BRW-13-0218-M, Control Room and Auxiliary Electric Equipment Room heat up and Ventilation during an ELAP (Ref. 15) shows the Unit 2 Auxiliary Electric Equipment Room portion of the MRC boundary reaching temperature limits first within approximately 4.75 hours. 0BwFSG-51, Alternate Control Room Ventilation, provides operators with the necessary guidance to establish alternate ventilation.

Interim Safety Evaluation Open Item Braidwood's ISE Response			Status
Line Number	Item Number	Description	Answer
1	Open Item 3.2.1.8.A	Core Subcriticality- The NRC staff has not endorsed the industry-proposed position paper regarding boron mixing. The licensee has indicated that Braidwood is planning on following this methodology. Thus, further resolution of this issue will be necessary in the next phase of the audit process.	Started- Braidwood will abide by the position expressed by the NRC staff in the letter dated January 8, 2014 regarding the boron mixing issue for PWRs (Ref. 22). The NRC letter states that the NRC staff has reviewed the information submitted to date and concluded that use of the industry approach dated August 15, 2013, entitled "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Boron Mixing in Support of the Pressurized Water Reactor Owners Group (PWROG)," Agency wide Documents Access and Management System (ADAMS) Accession Number ML13235A135, (being withheld from public disclosure for proprietary reasons) is acceptable with clarifications listed in the letter. Ref. 10 demonstrates that the Flexible and Diverse Coping Strategies (FLEX) RCS make-up pump will be deployed and capable of injecting into the RCS prior to the time when injection is required including the appropriate time margin to ensure adequate sub-criticality for both the maximum seal leakage and no seal leakage scenarios. The analyses and evaluations supporting the OIP

			demonstrate that the FLEX RCS make-up pump will be aligned one hour prior to the loop flow rate decreasing below the loop flow rate corresponding to single-phase natural circulation for the assumed highest applicable leakage rate of 84 gpm at normal operating pressure and temperature for the reactor coolant pump seals and unidentified reactor coolant system leakage. Therefore, the boron mixing criteria are met. Overall integrated plan (OIP) for Braidwood Attachment 1A, Action Item 15 shows that the high pressure FLEX pumps are available between 12 and 16 hours following the beyond-design-basis external event (BDBEE) which meets the timing requirements outlined in Ref. 22.
	Confirmatory Items		
2	3.1.1.1.A	Storage & Protection of FLEX equipment - Confirm final design of FLEX storage structure conforms to NEI 12-06, Sections 5.3.1, 7.3.1, and 8.3.1 for storage considerations for the hazards applicable to Braidwood.	Complete - The site FLEX equipment robust storage structure design complies with the requirements of NEI 12-06 revision 0, Sections 5.3.1, 7.3.1, and 8.3.1 storage considerations for the hazards applicable to Braidwood. The FLEX storage buildings will consist of one robust building and one commercial building. The site's "N" and "+1" equipment will be stored in the robust FLEX building when the first unit on site implements NRC Order EA-12-049. The commercial building will be

			utilized for the site's "+1" equipment when the second unit implements NRC Order EA-12-049. At that time, if NEI 12-06 revision 1 has not been endorsed by the NRC, Braidwood Station will submit an alternate approach with a shorter allowed unavailability time consistent with revision 1 of NEI 12-06. EC398039 and EC398040 contain the design details for the robust and commercial buildings respectively.
3	3.1.1.3.A	Procedural Interface Considerations (Seismic) –Confirm procedure for measuring key instruments at containment penetrations using portable instrument.	Complete - 1/2 BwFSG-7, Loss of Vital Instrumentation or Control Power has been developed. It provides guidance for alternate methods to measure key instruments at appropriate locations within the plant.
4	3.1.1.4.A	Off-Site Resources – Confirm National SAFER Response Center local staging area and method of transportation to the site in future 6-month update	Complete - Site primary staging area (Area C) location is the Pontiac Municipal Airport in Pontiac, Illinois. The Alternate staging area (Area D) location is LaSalle Nuclear Station near Marseilles, Illinois. The site has approved memorandum of understanding (MOU) with Pontiac Municipal Airport and LaSalle Nuclear Station. Primary and alternate transportation routes have been identified between these locations and the site. These routes are detailed within the site's response plan (playbook). The main transportation method will be by a heavy haul vehicle. If an accessible transportation route cannot be identified, helicopter

			transportation will be utilized. The EOF will coordinate SAFER communications and the transportation of equipment to the site.
5	3.1.5.1.A	Protection of Equipment (High Temperature) - Confirm FLEX storage structure will maintain FLEX equipment at a temperature range to ensure its likely function when called upon.	Complete - The FLEX storage building's ventilation systems are designed to maintain the FLEX equipment in a ready state. The maximum building temperature will be controlled by forced ventilation. Temperature information from Braidwood's UFSAR indicates the site extreme high temperature is a maximum of 102°F. The FLEX low pressure pump was designed to be able to operate with an outside air temperature of 176°F. The FLEX medium head and high head pump purchase specification requires a maximum operating air temperature of 110°F. The FLEX Generator purchase specification requires a maximum operating air temperature of 122°F.
6	3.1.5.3.A	Deployment of Equipment (High Temperature) - Confirm that the effects of high temperature on FLEX equipment have been evaluated in the locations they are intended to operate.	Complete - FLEX equipment is being purchased with appropriate temperature specifications to ensure it will function in the extreme temperature conditions applicable to the site. Temperature information from Braidwood's UFSAR indicates the site extreme high temperature is a maximum of 102°F. The FLEX low pressure pump

			was designed to be able to operate with an outside air temperature of 176°F. The FLEX medium head and high head pump purchase specification requires a maximum operating air temperature of 110°F. The FLEX Generator purchase specification requires a maximum operating air temperature of 122°F. FLEX equipment primary staging locations are located outside of buildings and therefore require no additional cooling.
7	3.2.1.A	RCS cooling & RCS inventory control - Specify which analysis performed in WCAP-17601 is being applied to Braidwood. Additionally, justify the use of that analysis by identifying and evaluating the important parameters and assumptions demonstrating that they are representative of Braidwood and appropriate for simulating the ELAP transient.	Started – The primary conditions considered are based on the Westinghouse reference coping cases described in section 5.2.1 of WCAP-17601-P (Ref. 18). The extended loss of alternating current (AC) power (ELAP) simulation parameters matrix provided in Westinghouse correspondence LTR-FSE-14-43 (Ref. 23) outlines the comparison of items for Braidwood Station.
8	3.2.1.1.A	NOTRUMP - Confirm that the use of NOTRUMP in the ELAP analysis is limited to the flow conditions before reflux condensation initiates. This includes specifying an acceptable definition for reflux condensation cooling.	Started – Exelon has used generic ELAP analyses performed in WCAP 17601-P (Ref. 18) with the NOTRUMP computer code to support the mitigating strategy in its Overall Integrated Plan (OIP). The use of NOTRUMP was limited to the thermal-hydraulic conditions before reflux condensation initiates. The initiation of reflux condensation cooling is defined when the

			one hour centered moving average (CMA) of the flow quality at the top of the steam generator u-tube bend exceeds 0.1 in any one loop. The analyses and evaluations supporting the OIP demonstrate that the Flexible and Diverse Coping Strategies (FLEX) reactor coolant system (RCS) make-up pump will be aligned prior to the loop flow rate decreasing below the loop flow rate corresponding to the definition of the onset of reflux cooling. Calculation BYR13-239/BRW-13-0221-M (Ref. 10) demonstrates that the RCS FLEX pump will be deployed and capable of injecting into the RCS prior to the time when injection is required including the appropriate time margin to ensure adequate sub-criticality for both the maximum seal leakage and no seal leakage scenarios. Overall integrated plan (OIP) for Braidwood Attachment 1A, Action Item 15 shows that the high pressure FLEX pumps are available between 12 and 16 hours following the beyond-design-basis external event (BDBEE) which meets the timing requirements outlined in Ref. 22.
9	3.2.1.1.B	ELAP Analysis - Confirm calculations to verify no nitrogen injection into RCS during depressurization.	Complete - Calculation BYR99-010/BRW-99-0017-I (Ref. 7) determined the minimum steam generator (SG) pressure to preclude a significant amount of nitrogen from being injected into the RCS from the accumulator is 160 psig. This

			value was increased to 260 psig by adding an additional 100 psi margin, as recommended by the Westinghouse Owners Group Emergent Procedure background document. 1/2BwCA 0.0 provides direction to stop the RCS depressurization at a SG pressure of 260 psig and isolate the safety injection accumulators.
10	3.2.1.1.C	Confirm analysis for secondary side SG fouling due to the use of abnormal water sources (RWST, well water, SX water)	Complete – BRW-14-0255-M, Braidwood Units 1 and 2 FLEX Steam Generator Degraded Heat Transfer Analysis Through 72 hours, shows the Unit 1 SGs may lose 1.4% and Unit 2 may lose 2.3% of their heat transfer capability after 72 hours (Ref. 26). Procedural guidance has been developed which follows the industry approach of prioritizing the cleanest to dirtiest water sources. The first choice for condensate makeup to the Diesel Driven Aux Feed (DDAF) pump is the Condensate Storage Tank (CST). If the CST is not available, the UHS will be used. Water purification skid has been requested from the NSRC as one of the first pieces of equipment to arrive in 24 hours.
11	3.2.1.1.D	Complete analysis for length of time prior to depletion of the RWST and determine whether additional boration equipment is needed for Phase 3	Complete –The RWST inventory during FLEX scenarios is adequate to provide RCS boration /

		coping strategy.	inventory for 145.6 hours with both units in Mode 1-4. With one unit in mode 1-4 and the other unit in mode 5-6, RWST inventory is adequate to provide RCS boration / inventory and core cooing for 57.7 hours (Ref. 27). 0BwFSG-50, FLEX Support Equipment Operation, provides operators with direction for filling the RWST from the boric acid storage tanks (BAST), portable makeup skid or by cross tying RWSTs. In addition, a boration skid is requested from the NSRC to provide a long term borated water make-up source.
12	3.2.1.2.B	Reactor Coolant Pump (RCP) Seal Leakage - In some plant designs, the cold legs could experience temperatures as high as 580 °F before cooldown commences. This is beyond the qualification temperature (550°F) of the 0-rings used in the RCP seals. For those Westinghouse designs, a discussion should be provided to justify that (1) the integrity of the associated 0-rings will be maintained at the temperature conditions experienced during the ELAP event, and (2) the seal leakage rate of 21 gpm/seal used in the ELAP is adequate and acceptable.	Complete - Westinghouse LTR-RES-13-153, Documentation of 7228C Compound O-Rings at ELAP Conditions, concludes, with a high level of confidence, that the integrity of the RCS O-rings will be maintained at the temperature conditions experienced during the ELAP event. In June 2014, Westinghouse issued PWROG-14015-P, No.1 Seal Flow Rate for Westinghouse Reactor Coolant Pumps Following Loss of All AC Power. The purpose of this report was to calculate a new number 1 seal leakage rate based on the actual leak-off line layout at Braidwood Station versus the representative leak-off line layout assumed in WCAP-10541. In October, Westinghouse issued

			PWROG-14027-P, No.1 seal Flow Rate for Westinghouse Reactor Coolant Pumps Following Loss of All AC Power. The purpose of this report was to evaluate the revised seal flow rate on time to enter reflux cooling and time at which the core uncovers. The new, lower leakage rates are being utilized in calculation revisions for containment pressure, containment temperature, and boration.
13	3.2.1.2.E	RCP Seal Leakage Rates - The licensee is requested to provide the manufacturer and model number of the RCP seals and discuss whether or not the RCP and seal combination complies with a seal leakage model described in WCAP-17601.	Complete - Closure supplied as part of third 6 month update (Ref. 25)
14	3.2.1.3.A	Decay Heat- Verify that the Integrated Plan update provides the details of the WCAP 17601-P methodology to include the values of certain key parameters used to determine the decay heat levels. Address the adequacy of the values used.	Started - The Westinghouse nuclear steam supply system (NSSS) calculations documented in WCAP- 17601P (Ref. 18) using the NOTRUMP code were performed with the ANS 5.1 1979 + 2 sigma decay heat model and assumed the reactor is initially operating at 100% power (NOTRUMP reference case core power is 3723 MWt). Implementation of this model includes fission product decay heat resulting from the fission of U-235, U-238, and Pu-239 and actinide decay heat from U-239 and Np-239. The power fractions are typical values expected for each of the three fissile isotopes through a three region burn-up with an enrichment based on typical fuel cycle feeds that approach 5%. With

			that, a conversion ratio of 0.65 was used to derive the decay power of the two actinides U-239 and Np-239. Fission product neutron capture is treated per the ANS standard. The decay heat calculation utilizes a power history of three 540-day cycles separated by two 20-day outages that bounds initial condition 3.2.1.2 (1) of the Nuclear Energy Institute (NEI) document NEI 12-06, Section 3.2.1.2 (with a minimum assumption from NEI 12-06 that the reactor has been operated at 100% power for at least 100 days prior to event initiation). Therefore, the decay heat curve assumed in the Westinghouse calculations in WCAP 17601-P is representative of Braidwood Units 1 and 2. The primary-side transient profile assumed in the reactor coolant system (RCS) inventory control and long-term sub-criticality calculations for Modes 1 through 4 with steam generators available is based on the Westinghouse reference coping case of WCAP-17601-P and plant specific parameters such as reactor coolant system nominal temperature(s), pressures(s), and volumes, and accumulator cover gas pressures. These calculations do not, however, include any decay heat model and rely on the case runs cited from WCAP-17601-P regarding decay heat related phenomenon.
15	3.2.1.4.A	Initial Values for Key Plant Parameters	Started - The primary system

		and Assumptions- Confirm WCAP-17601-P analyses are bounding for Braidwood for strategy response or verify plant-specific analyses if more restrictive limits are used due to more restrictive plant specific limits.	conditions considered are based on the Westinghouse reference coping cases described in Section 5.2.1 of WCAP-17601-P (Ref. 18). The extended loss of alternating current (AC) power (ELAP) simulation parameters matrix provided in Westinghouse Correspondence LTR-FSE-14-43 (Ref. 23) outlines the comparison of items for Braidwood Station.
16	3.2.1.4.B	Initial Values for Key Plant Parameters and Assumptions- Confirm calculations to validate 8 hours run time limit on DDAF pump batteries and DDAF room temp for pump operation and human occupancy. Also, confirm site phase 2 staffing study confirms the required time can be met for refilling diesel day tank.	Complete – Calculation BRW-97-0340-E (Ref. 19) confirms the pump batteries can operate for > 8 hour following ELAP event. Calculation BYR13-234/BRW-13-0216-M (Ref. 13) shows room temperature limit for equipment survivability is not challenged. Habitability conditions will be maintained with a tool box approach limiting the impact of high temperatures with methods such as supplemental cooling, personnel rotation and/or availability of fluids. 0BwFSG-5, Initial Assessment and FLEX Equipment Staging, provides the necessary actions to install temporary fans to provide cooling to the DDAF pump room. The Phase 2 staffing study was completed in November 2014. Results were submitted to the NRC by letter RS-14-320 dated November, 2014.
17	3.2.1.5.A	Monitoring Instruments and Control- Confirm additional parameters evaluated for use in plant procedures/guidance or to indicate	Complete - Closure supplied as part of third 6 month update (Ref. 25)

		imminent or actual core damage.	
18	3.2.1.6.A	Sequence of Events - Confirm that the final timeline has been time validated after detailed designs are completed and procedures are developed. The results may be provided in a future 6-month update.	Started - The final time line will be validated as the time sensitive actions, listed in Attachment 1A, go through the validation process. Results will be provided in a future update.
19	3.2.1.6.B	Sequence of Events - Confirm analysis to validate Phase 2 pump capacities.	Complete - Hydraulic calculation BYR13-144/BRW-13-0160-M (Ref. 20), FLEX Pump Sizing and Hydraulic Analysis, evaluates the FLEX high pressure, medium pressure and low pressure pump capacities. BRW-14-0030-M, Godwin Pump Suction Line Hydraulic Analysis to Support FLEX (Ref. 21), evaluates the FLEX low pressure pump suction capability. The calculations validate the capability of the Phase 2 pumps for their intended FLEX purpose.
20	3.2.1.9.A	Use of portable pumps - Confirm final design of strategies meets "use of portable pumps" guideline in NEI 12-06 Section 3.2.2 Guideline 13.	Complete – The site FLEX strategies utilize 1/2BwCA 0.0, loss of all AC, as the controlling document to identify and implement the supporting BwFSG Series procedures. The low pressure FLEX pump connection and line-up is controlled by 0BwFSG-5, Initial Plant Assessment and FLEX Equipment Staging. The medium pressure pump connection and line-up is controlled by 1/2BwFSG-3, Alternate Low Pressure Feedwater. The high pressure pump connection and line-up is controlled by 1/2BwFSG-1,

			Long Term RCS Inventory Control, and 1/2BwFSG-8, Alternate RCS Boration.
21	3.2.2.A	SFP cooling -Verify procedure for SFP makeup via gravity drain; confirm verification of timeline for performing the strategy; and confirm evaluation of SFP area for steam and condensation affects.	Complete - The Spent Fuel Pool make-up via gravity drain from the RWST procedure guidance is not being developed due to its limited make-up flow. The primary means for SFP make-up utilizes the installed 0A Refueling Water Purification Pump with FLEX AC power. 0BwFSG-11, Alternate SFP Make-up and Cooling, provides operators with the necessary guidance to execute the task. The SFP environment has the potential to communicate with the Aux Building via the FHB supply ducting, because the FHB Supply dampers fail open on a loss of AC. It is reasonable to assume this flow path will be isolated by fire damper 0VA413Y. The fire damper will close when its fusible link melts shortly after reaching a set point of 165°F. Due to this damper arrangement and lack of motive force, minimal FHB atmosphere should be dispersed into the AB. 0BwFSG-5, Initial Assessment and FLEX Equipment Staging, or 0BwFSG-11, Alternate SFP make-up and Cooling, establish a Spent Fuel Pool Vent path by opening the SFP track way roll-up door. The site does have manual actions within the spent fuel pool building to setup

			temporary hoses for pool make-up. The site plans to perform these manual actions prior to the onset of SFP boiling. 0BwFSG-5, Initial Assessment and FLEX Equipment Staging and 0BwFSG-11, Alternate SFP make-up and Cooling, provide the necessary guidance to execute the task. The only equipment relied upon post event are the new SFP level instrumentation, which is designed to operate within this environment.
22	3.2.3.A	Containment - Confirm containment reanalysis supports no Phase 1, 2, and 3 mitigation strategies are required because containment pressure and temperature are maintained within acceptable limits.	Complete – BYR13-235/BRW-13-0217-M, Containment Pressure and Temperature Response during an ELAP Event (Ref. 12), confirms that no actions are required to mitigate containment temperature and pressure in Phases 1 and 2. These parameters will be monitored as part of the site strategy. Containment pressure and temperature will reach the FSG setpoint limits in > 30 days and 13.7 days, respectively. In addition, containment pressure and temperature will not reach design basis pressure and temperature limits until >30 days. 1/2BwFSG-12, Containment Cooling, provides operators with different options for restoring containment cooling to maintain containment temperature and pressure within limits.
23	3.2.3.B	Containment - Confirm evaluation	Complete – BYR13-235/BRW-

		performed for the need to monitor containment temperature.	13-0217-M (Ref. 12) shows containment temperature will reach the FSG setpoint limits in 13.7 days and reach design basis temperature limit in > 30 days. Even with these long timeframes, containment temperature has been added to the key parameter list to provide operators with additional tools. Monitoring of containment temperature can be performed on intermittent bases and will be controlled by emergency procedures and 1/2BwFSG-7, Loss of Vital Instrument or Control Power.
24	3.2.4.1.A	Equipment cooling - Confirm modification has been performed to prevent DDAF pump from overheating due to cooling water recirculation flow paths within the SX system cycling and overheating the pump within 1 hour.	Complete – EC 394153, Alternate SX Supply to 1/2SX04P Pump Suction FLEX Mod 3, resolves DDAF pump over heating due to SX water recirculation within the SX system by providing an alternate SX supply. 1/2BwFSG-2, Alternate AFW/EFW Suction Source, provides operators with the necessary guidance to align the alternate SX supply.
25	3.2.4.2.A	Ventilation - Equipment Cooling - Review licensee's evaluation of loss of ventilation effects on equipment in various rooms (DDAF pump room, battery rooms, control room, miscellaneous electrical equipment rooms)	Complete - Calculation BYR13-234/BRW-13-0216-M, Auxiliary FW Pump Room Temperature Analysis during an ELAP Event (Ref. 13), shows room temperature is maintained within acceptable limits and supplemental room cooling is not required. Procedure guidance for the setup of alternate cooling was developed to provide additional options to the operators and is controlled by 0BwFSG-5, Initial Assessment of FLEX

			Equipment. Calculation BYR13-237/BRW-13-0219-M, MEER and Battery Room Conditions Following ELAP (Ref. 14), shows battery room can reach 2% hydrogen concentration within 2.52 hours of re-energizing the battery charger. Hydrogen generation begins when the battery chargers are re-energized. When power is re-established to the battery charger, power is also returned to the battery room vent fan. Operation of the battery room vent fan will prevent hydrogen generation from becoming a concern. 1/2BwFSG-5, Initial Assessment and FLEX Equipment Staging, provides operators with the necessary guidance to establish forced ventilation within the battery room. Additionally, this calculation shows the MEER room will require forced ventilation to preserve component availability within 8 hours of the event. 1/2BwFSG-5 / 0BwFSG-5, Initial Assessment of FLEX Equipment, provides operators with the necessary guidance to establish alternate ventilation. Calculation BYR13-236/BRW-13-0218-M, Control Room and Auxiliary Electric Equipment Room heat up and Ventilation during an ELAP (Ref. 15) shows the Unit 2 Auxiliary Electric Equipment Room portion of the MCR boundary reaching temperature limits first within approximately 4.75

			hours. 0BwFSG-51, Alternate Control Room Ventilation, provides operators with the necessary guidance to establish alternate ventilation.
26	3.2.4.2.B	A discussion is needed on the extreme high/low temperatures effects of the battery's capability to perform its function for the duration of the ELAP event and hydrogen gas ventilation during recharging batteries during Phase 2 and 3.	Complete - Calculation BYR13-237/BRW-13-0219-M, MEER and Battery Room Conditions Following ELAP (Ref. 14), shows battery room can reach 2% hydrogen concentration within 2.52 hours of re-energizing the battery charger. Hydrogen generation begins when the battery chargers are re-energized. When power is re-established to the battery charger, power is also returned to the battery room vent fan. Operation of the battery room vent fan will prevent hydrogen generation from becoming a concern. 1/2BwFSG-5, Initial Assessment and FLEX Equipment Staging, provides operators with the necessary guidance to establish forced ventilation within the battery room. Calculation BYR13-237/BRW-13-0219-M (Ref. 14) assumes a battery room maximum temperature of 138°F and a minimum temperature of 60°F during an ELAP event. The temperature effects on the battery capacity were incorporated into this calculation.
27	3.2.4.3.A	Heat Tracing - Confirm that potential adverse impacts from a loss of heat tracing and normal heating on any equipment credited for ELAP mitigation are adequately addressed. In particular, ensure an RCS inventory	Complete - The site FLEX strategy has been evaluated for potential freezing due to loss of heat trace or other heat sources. Susceptible equipment includes the RWST,

		and source of borated water is available for a BDBEE associated with extreme cold, ice, and snow.	temporary hoses and pumps deployed outside. BRW-14-0211-M, Evaluation of Tank and Hose Freezing during an ELAP, has been completed (Ref. 28). It shows the RWST could potentially reach 32°F in 82.3 hours. Precipitation of boron in solution should not occur before this time. The RWST vent header is heat traced and contains a vacuum relief device. 0BwFSG-5, Initial Assessment and FLEX Equipment Staging, provides the necessary direction to open the RWST hatch, thereby ensuring the vent path is maintained. The FLEX temporary hoses, routed outside, will be protected from freezing by maintaining positive flow or by draining when not in use. Operator guidance has been added to various FSGs to alert the operators to the potential freezing concern. Additional sections of FLEX hose are also available as a replacement in the event a section of the hose freezes.
28	3.2.4.4.A	Communications - Confirm that upgrades to the site's communications systems have been completed.	Started - Communications upgrade detailed design is complete. For the 1st - 2nd refuel outage (A1R18), the site will have 3 iridium satellite phones available for emergency response in the MCR area. Emergency responders will use handheld radios in the talk around mode, sound powered phones, face-to-face, and bull

			horns. For the 2nd – 2nd refuel outage (A2R18), the site will complete the NARS system upgrade and satellite communications system installation. EC 399332 and EC399598 provide the design details, respectively.
29	3.2.4.6.A	Personnel Habitability - Review licensee's evaluation of loss of ventilation effects on personnel habitability and accessibility.	Complete - Closure supplied as part of third 6 month update (Ref. 25).
30	3.2.4.7.A	Water Sources - Justify the time at which SG dryout will occur.	Complete - Closure supplied as part of third 6 month update (Ref. 25).
31	3.2.4.8.A	Electrical Power Sources / Isolation and interactions- confirm class 1E equipment is protected from faults in portable/FLEX equipment and multiple sources do not attempt to power electrical buses.	Complete – 1/2BwFSG-5, Initial Assessment and FLEX Equipment Staging, provides electrical bus isolation and ensures multiple sources are not simultaneously connected to buses. The portable FLEX DG circuit breakers are sized to provide over-current protection downstream of the circuit breakers.
32	3.2.4.9.A	Portable Equipment Fuel - Confirm that complete analysis of fuel usage requirements has been developed after the specific FLEX equipment is identified and the fuel usage is determined. A discussion is needed on maintaining the quality of fuel stored in the tanks for extended periods of time	Started - The Units 1 and 2 "B" diesel fuel oil storage tanks contain 191,400 gallons of fuel. EC394149 and EC394156 provide Unit 1 and Unit 2 FLEX connections to these fuel sources. 0BwFSG-5 provides operators the necessary direction to utilize these sources for refueling FLEX equipment. A fuel usage white paper has been developed to show this source will last for >31 days. The site has an additional 191,400 gallons contained in

			the "A" train tanks. 0BWFSG-50 provides the operators with the necessary direction to transfer the "A" train tanks to the "B" train tanks. The site also has 125,000 gallon and 50,000 gallon storage tanks that are not robust and must be assumed unavailable, but would be used if available. Fuel oil change-out will be addressed in the FLEX preventive maintenance (PM) program.
33	3.2.4.10.A	Load reduction to conserve DC power- Confirm sizing calculations for FLEX generators and details of load shedding.	Complete –EC394207, Electrical FLEC Connections FLEX MOD 11,12, contains FLEX DG sizing calculations. DC load shedding will be performed in accordance with BwFSG-4, ELAP DC Load Shed/Management. Load shedding should start at approximately 35 minutes after the start of an ELAP event and complete within 65 minutes. BYR14-060/BRW-14-0080-E (Ref. 8) demonstrates the Division 2 DC batteries will last at least 8 hours with the performance of appropriate load shedding.

7 Potential Draft Safety Evaluation Impacts

There are no potential impacts to the Draft Safety Evaluation identified at this time.

8 References

The following references support the updates to the Overall Integrated Plan described in this enclosure.

1. Braidwood Station, Units 1 and 2, "Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for

Beyond-Design-Basis External Events (Order Number EA-12-049)," dated February 28, 2013 (RS-13-017).

2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012.
3. NEI 12-06 Rev. 0, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, dated August 2012.
4. Braidwood Station's First Six Month Status Report for the Implementation of FLEX, dated August 28, 2013.
5. Braidwood Station's Second Six Month Status Report for the Implementation of FLEX, dated February 28, 2014.
6. Braidwood Station, Units 1 and 2 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigating Strategies) (TAC NOS. MF0895 AND MF0896), dated December 17, 2013.
7. BYR99-010/BRW-99-0017-I Rev. 2, Documentation of the Basis of the Emergency Operating Procedures (EOP) Setpoints, dated September 2014.
8. BYR14-060/BRW-14-0080-E Rev. 0, Unit 1(2) 125 VDC Battery FLEX Coping Calculation – Common Calculation – Beyond Design Basis, dated September 2014.
9. BYR13-240/BRW-13-0222-M Rev. 0, Spent Fuel Pool Boil Off Analysis during an ELAP Event, dated April 2014.
10. BYR13-239/BRW-13-0221-M Rev. 0, RCS Boration Analysis during an ELAP Event, dated August 2014.
11. Exelon Structural Drawing S-183 Rev. AF, Roadway Plan Plant and Construction Laydown Area, dated May 2014.
12. BYR13-235/BRW-13-0217-M Rev. 0, Containment Pressure and Temperature Response during an ELAP Event, dated September 2014.
13. BYR13-234/BRW-13-0216-M Rev. 0, Auxiliary FW Pump Room Temperature Analysis during an ELAP Event, dated April 2014.
14. BYR13-237/BRW-13-0219-M Rev. 0, MEER and Battery Room Conditions Following ELAP, dated July 2014.
15. BYR13-236/BRW-13-0218-M Rev. 0, Control Room and Auxiliary Electric Equipment Room heat up and Ventilation during an ELAP, dated June 2014.
16. BYR13-026/BRW-13-0031-M Rev. 0, Transient Analysis of SX System Following Loss of A-C Power, dated August 2013.
17. BYR14-046/BRW-14-0058-M Rev. 0, Containment Environment Following an Extended Loss of AC Power During Shutdown, dated September 2014.

18. WCAP 17601-P Rev. 1, Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs, dated January 2013.

19. BRW-97-0340-E Rev. 3, Battery Duty Cycle and Sizing for the Braidwood Diesel Driven Auxiliary Feedwater Pumps, dated August 2014.

20. BYR13-144/BRW-13-0160-M Rev. 2, FLEX Pump Sizing and Hydraulic Analysis, dated December 2014.

21. BRW-14-0030-M Rev. 0, Godwin Pump Suction Line Hydraulic Analysis to Support FLEX, dated August 2014.

22. Letter to Mr. Jack Stringfellow titled "Boron Mixing Endorsement Letter in Regards to Mitigation Strategies Order EA-12-049," January 8, 2014 (Agency-wide Documents Access and Management System (ADAMS) Accession Number ML13276A183).

23. Westinghouse Correspondence LTR-FSE-14-43, Revision 0-A, "Exelon Generation Company, LLC Mitigation Strategies Order (EA-12-049) Design ELAP Simulation Parameters," July 16, 2014. DRAFT.

24. Letter to David Flahive titled "Exelon Generation Company, LLC Mitigation Strategies Order (EA-12-049) Open and Confirmatory Item Responses," Letter LTR-FSE-14-61 Rev.0-A dated July 17, 2014. DRAFT.

25. Braidwood Station's Third Six Month Status Report for the Implementation of FLEX, dated August 28, 2014.

26. BRW-14-0255-M Rev.1, Braidwood Units 1 and 2 FLEX Steam Generator Degraded Heat Transfer Analysis through 72 hours, dated December 2014.

27. BYR14-129/BRW-14-0212-M Rev. 0, RWST Usage during FLEX Scenarios, dated October 2014.

28. BRW-14-0211-M Rev.0, Evaluation of Tank and Hose Freezing during an ELAP, dated September 2014.