Exelon Generation®

Order No. EA-12-049

RS-15-099

July 2, 2015

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

Calvert Cliffs Nuclear Power Plant, Unit 2
Renewed Facility Operating License No. DPR-69
NRC Docket No. 50-318

Subject: Report of Full Compliance with 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. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), 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 26, 2012
5. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), 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
6. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Supplement to 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 March 8, 2013
7. Letter from E. D. Dean (CENG) to Document Control Desk (NRC), Calvert Cliffs Nuclear Power Plant, Units 1 and 2 - 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 27, 2013

8. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC) – February 2014 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 27, 2014
9. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC) – August 2014 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 26, 2014
10. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC) – February 2015 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 20, 2015 (RS-15-054)
11. Letter from J. S. Bowen (NRC) to J. A. Spina (CENG), Calvert Cliffs Nuclear Power Plant, Units 1 and 2 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049, (Mitigation Strategies) (TAC Nos. MF1142 and MF1143), dated December 17, 2013
12. 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
13. Letter from M. G. Korsnick (CENG) to Document Control Desk (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 2 Staffing Assessment, dated October 13, 2014
14. Letter from J. Paige (NRC) to M. G. Korsnick (CENG), Calvert Cliffs Nuclear Power Plant, Units 1 and 2 – Report for the Audit Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (TAC Nos. MF1142, MF1143, MF1140, and MF1141), dated February 20, 2015
15. Letter from M. G. Korsnick (CENG) to Document Control Desk (NRC), Request for Schedule Relaxation from NRC Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated February 20, 2015 (RS-15-078)
16. Letter from W. M. Dean (NRC) to G. H. Gellrich (EGC), Calvert Cliffs Nuclear Power Plant, Unit 2 – Relaxation of the Schedule Requirements for Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 4, 2015

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements For Mitigation Strategies For Beyond-Design-Basis External Events," (Reference1) to Exelon Generation Company, LLC (EGC), previously Constellation Energy Nuclear Group, LLC (Exelon, the licensee) for Calvert Cliffs Nuclear Power Plant, LLC (CCNPP), Units 1 and 2. Reference 1 was immediately effective and directed Constellation Energy Nuclear Group, LLC (CENG) 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 (OIP) pursuant to Section IV, Condition C. Reference 2 endorsed industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the CENG initial status report regarding mitigation strategies. References 5 and 6 provided the Calvert Cliffs Nuclear Power Plant, Units 1 and 2 OIP and its supplement, respectively.

Reference 1 required submission of a status report at six-month intervals following submittal of the OIP. References 7, 8, 9, and 10 provided the first, second, third, and fourth six-month status reports, respectively, pursuant to Section IV, Condition C.2, of Reference 1 for Calvert Cliffs Nuclear Power Plant, Units 1 and 2.

In Reference 16, the NRC granted a relaxation of the schedule requirement of the Order for full implementation for Calvert Cliffs Nuclear Power Plant, Unit 2 until no later than 60 days following the restart from the Spring 2015 refueling outage to allow sufficient time to complete construction of the FLEX Storage Robust Building, as requested in Reference 15.

The purpose of this letter is to provide the report of full compliance with the 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) (Reference 1) pursuant to Section IV, Condition C.3 of the Order for Calvert Cliffs Nuclear Power Plant, Unit 2.

Calvert Cliffs Nuclear Power Plant, Unit 2 has developed, implemented, and will maintain the 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 in response to Order EA-12-049. The information provided herein documents full compliance for Calvert Cliffs Nuclear Power Plant, Unit 2 with Reference 1.

OIP open items have been addressed and closed as documented in References 7, 8, 9, and 10, and below, and are considered complete pending NRC closure. EGC's response to the NRC Interim Staff Evaluation (ISE) open items identified in Reference 11 have been addressed and closed as documented in References 7, 8, 9, and 10, and are considered complete pending NRC closure. EGC's response to the NRC ISE confirmatory items identified in Reference 11 have been addressed and closed as documented in Reference 14. EGC's response to the NRC ISE confirmatory items identified as open in Reference 14 are addressed below, and are considered complete pending NRC closure. EGC's response to the NRC audit questions and additional audit open items have been addressed and closed as documented in Reference 14, and below, and are considered complete pending NRC closure. The following table provides completion references for each OIP open item, NRC ISE open or confirmatory item, and NRC Audit Report open item.

Overall Integrated Plan Open Items

OIP Open Item	Completion Response Reference
OIP Open Item No. 1	Reference 10
OIP Open Item No. 2	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 3	Reference 10
OIP Open Item No. 4	Reference 10
OIP Open Item No. 5	Reference 7 and updated with this submittal as provided below
OIP Open Item No. 6	Reference 10
OIP Open Item No. 7	Reference 7 and updated with this submittal as provided below
OIP Open Item No. 8	Reference 10
OIP Open Item No. 9	Reference 10
OIP Open Item No. 10	Reference 8
OIP Open Item No. 11	Reference 7
OIP Open Item No. 12	Reference 8
OIP Open Item No. 13	Reference 10
OIP Open Item No. 14	Reference 10
OIP Open Item No. 15	References 8 and 10
OIP Open Item No. 16	Deleted – Addressed in Reference 7
OIP Open Item No. 17	Reference 10
OIP Open Item No. 18	Reference 8
OIP Open Item No. 19	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 20	Deleted – Addressed in Reference 7
OIP Open Item No. 21	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 22	Deleted – Addressed in Reference 8
OIP Open Item No. 23	Reference 10
OIP Open Item No. 24	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 25	Reference 10 and updated with this submittal as provided below
OIP Open Item No. 26	Reference 10
OIP Open Item No. 27	Reference 10
OIP Open Item No. 28	Reference 10

OIP Open Item	Completion Response Reference
OIP Open Item No. 29	Reference 8
OIP Open Item No. 30	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 31	Reference 7 and updated with this submittal as provided below
OIP Open Item No. 32	Deleted- Addressed in Reference 8
OIP Open Item No. 33	Deleted – Addressed in Reference 7
OIP Open Item No. 34	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 35	Deleted – Addressed in Reference 8
OIP Open Item No. 36	Reference 10
OIP Open Item No. 37	Reference 10
OIP Open Item No. 38	Updated with this submittal as provided below
OIP Open Item No. 39	Reference 10
OIP Open Item No. 40	Reference 10
OIP Open Item No. 41	Reference 9
OIP Open Item No. 42	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 43	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 44	Deleted – Addressed in Reference 7
OIP Open Item No. 45	Reference 10
OIP Open Item No. 46	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 47	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 48	Deleted – Addressed in Reference 8
OIP Open Item No. 49	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 50	Reference 7
OIP Open Item No. 51	Deleted – Addressed in Reference 7
OIP Open Item No. 52	Deleted - Addressed in Reference 9
OIP Open Item No. 53	Reference 10
OIP Open Item No. 54	Deleted – Addressed in Reference 8
OIP Open Item No. 55	Reference 10
OIP Open Item No. 56	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 57	Reference 8 and updated with this submittal as provided below

OIP Open Item	Completion Response Reference
OIP Open Item No. 58	Reference 7 and updated with this submittal as provided below
OIP Open Item No. 59	Reference 7 and updated with this submittal as provided below
OIP Open Item No. 60	Duplicate to OIP Open Item No. 55
OIP Open Item No. 61	Reference 9
OIP Open Item No. 62	Reference 9
OIP Open Item No. 63	Reference 7
OIP Open Item No. 64	Reference 7
OIP Open Item No. 65	Reference 9
OIP Open Item No. 66	Reference 9
OIP Open Item No. 67	Reference 9
OIP Open Item No. 68	Reference 9
OIP Open Item No. 69	Deleted – Addressed in Reference 8
OIP Open Item No. 70	Reference 10
OIP Open Item No. 71	Reference 10
OIP Open Item No. 72	Reference 8
OIP Open Item No. 73	Deleted – Addressed in Reference 8
OIP Open Item No. 74	Deleted – Addressed in Reference 10
OIP Open Item No. 75	Reference 10
OIP Open Item No. 76	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 77	Reference 8
OIP Open Item No. 78	Deleted – addressed in Reference 7
OIP Open Item No. 79	Reference 10
OIP Open Item No. 80	Deleted – Addressed in Reference 9
OIP Open Item No. 81	Reference 9
OIP Open Item No. 82	Reference 9
OIP Open Item No. 83	Reference 9
OIP Open Item No. 84	Deleted – Addressed in Reference 10
OIP Open Item No. 85	Deleted – Addressed in Reference 10
OIP Open Item No. 86	Deleted – Addressed in Reference 9
OIP Open Item No. 87	Reference 10
OIP Open Item No. 88	Reference 10

OIP Open Item	Completion Response Reference
OIP Open Item No. 89	Reference 10
OIP Open Item No. 90	Updated with this submittal as provided below
OIP Open Item No. 91	Updated with this submittal as provided below
OIP Open Item No. 92	Reference 8 and updated with this submittal as provided below
OIP Open Item No. 93	Deleted – Addressed in Reference 8
OIP Open Item No. 94	Reference 10

Interim Staff Evaluation Open Items

ISE Open Item	Completion Response Reference
Item No. 3.2.1.1.A	Reference 10
Item No. 3.2.1.1.B	Reference 9
Item No. 3.2.1.8.A	Reference 10

Interim Staff Evaluation Confirmatory Items

ISE Confirmatory Item	Completion Response Reference
Item No. 3.1.1.1.A	Reference 10
Item No. 3.1.1.1.B	Reference 10
Item No. 3.1.1.4.A	Reference 10
Item No. 3.1.2.2.A	Reference 10
Item No. 3.1.2.2.B	Reference 10
Item No. 3.1.2.2.C	Reference 10
Item No. 3.1.3.2.A	Reference 9
Item No. 3.1.4.2.A	Reference 9
Item No. 3.1.4.2.B	Reference 9
Item No. 3.2.1.2.A	Reference 9
Item No. 3.2.1.5.A	Reference 9
Item No. 3.2.1.6.A	Reference 9
Item No. 3.2.1.6.B	Updated with this submittal as provided below
Item No. 3.2.1.7.A	Reference 9
Item No. 3.2.1.9.C	Reference 9
Item No. 3.2.1.9.D	Reference 8

ISE Confirmatory Item	Completion Response Reference
Item No. 3.2.2.A	Reference 9
Item No. 3.2.2.B	Reference 10
Item No. 3.2.3.A	References 7 and 10
Item No. 3.2.4.1.A	Reference 9
Item No. 3.2.4.2.A	Reference 9
Item No. 3.2.4.2.B	Reference 9
Item No. 3.2.4.2.C	Reference 9
Item No. 3.2.4.2.D	Reference 9
Item No. 3.2.4.2.E	Reference 9
Item No. 3.2.4.4.A	Reference 9
Item No. 3.2.4.4.B	Reference 9
Item No. 3.2.4.5.A	Reference 10
Item No. 3.2.4.6.A	Reference 9
Item No. 3.2.4.6.B	Reference 9
Item No. 3.2.4.6.C	Reference 9
Item No. 3.2.4.8.A	Reference 10
Item No. 3.2.4.8.B	Reference 10
Item No. 3.2.4.9.A	Reference 10
Item No. 3.2.4.10.A	Updated with this submittal as provided below
Item No. 3.2.4.10.B	Reference 9
Item No. 3.4.A	Reference 10

NRC Audit Report Open Items

Audit Open Item	Completion Response Reference
AQ 3 (AQ 4)	Reference 14
AQ 16 (AQ 18)	Reference 14
AQ 37 (AQ 47)	Reference 14
SE Review Item 1	Reference 14
ISE CIs 3.1.1.4.A, 3.1.2.2.A, 3.1.2.2.B, and 3.2.4.5.A, Staging Areas	Updated with this submittal as provided below
ISE CI 3.1.3.2.A, Debris Removal	Updated with this submittal as provided below
ISE CI 3.1.4.2.A, Impact of Extreme Temperature	Updated with this submittal as provided below

Audit Open Item	Completion Response Reference
Environments	
ISE CIs 3.2.1.6.A, 3.2.1.6.B, and AQ 23 (AQ27), Sequence of Events	Updated with this submittal as provided below
ISE CI 3.2.1.7.A and AQ 38 (AQ 48), Shutdown and Refueling Modes	Updated with this submittal as provided below
ISE CI 3.2.1.9.C, Engineering Evaluations of Phase 3 Equipment	Updated with this submittal as provided below
ISE CI 3.2.4.9.A and AQ 43 (AQ54), Fuel Oil Consumption	Reference 10
ISE CI 3.2.4.10.A and AQ 34 (AQ 39), DC Load Shedding	Updated with this submittal as provided below
ISE CI 3.4.A, Off-Site Resources	Reference 10
AQ 1 (AQ2), Power Supply	Updated with this submittal as provided below
AQ 21 (AQ 25), DG Sizing Calculations	Reference 14
AQ 32 (AQ 37), Electrical Isolation	Updated with this submittal as provided below
SE Review Item 4, Safety Injection Tanks (SITs)	Updated with this submittal as provided below
SE Review Items 5 and 6, RCS Pump Hydraulic Analysis	Updated with this submittal as provided below

The following table documents the completion of the final remaining open items. As previously stated, EGC provides the response for the following items and considers them to be complete for Calvert Cliffs Nuclear Power Plant, Unit 2.

Item	Description	Status
OIP Open Item No. 2 Implement a design change to install permanent protected FLEX equipment connection points	Various Engineering Change Packages (ECP) have been prepared to install permanent protected FLEX equipment connection points. They are summarized below: 1. ECP-14-000024 was prepared to establish contingency actions to provide back-up power to the Mansell RLMS to ensure that the RCS level can be adequately monitored during an ELAP event with the plant in refueling mode and the reactor head removed.	Complete

Item	Description	Status
	• Loops for the following instruments have been reconfigured to receive safety-related 120VAC vital power from safety-related instrument buses 2Y01 and 2Y02: - Reactor cavity temperature - Safety injection tank level - Safety injection tank pressure - Containment temperature 2. ECP-14-000052 provides the necessary electrical modifications to connect:	
	• FLEX 480VAC 500kW/625kVA portable diesel generators to Unit 2 480 VAC Load Centers 21 B and 24A. This provides the means to restore 480 VAC distribution power essential to the CCNPP Unit 2 FLEX transitional phase (Phase 2) coping strategies to provide power to the battery chargers and other critical AC equipment. • FLEX 100 kW portable diesel generator to Reactor Motor Control Centers 204 (cross-connected with MCC 214). This provides the means to restore 480 VAC distribution power essential to the CCNPP Unit 2 FLEX transitional phase (Phase 2) coping strategies by providing power to the inverter backup bus (which can power the 120VAC vital instrument bus), the SIT Outlet Motor Operated Valves (MOVs), the AFW Pump Room Vent Fans, and other critical AC equipment. 3. ECP-14-000089 was prepared to install a new, permanent branch tee with a hose connection and an isolation valve in the safety related portion of 6" Auxiliary Feedwater motor-driven pump, cross-connect pipe. This new connection provides an additional means of supplying makeup water to the steam generators. 4. ECP-14-000102 was prepared to allow a portable FLEX pump to take suction from	

Item	Description	Status
	Refueling Water Tank (RWT) 2TKRWT21 to supply water to the Reactor Coolant System (RCS) using a portable FLEX pump and temporary hose that enters via newly-installed HPSI header connection valves. 5. ECP-14-000375 was prepared to add instrument air connections for connecting a portable air compressor to the instrument air system for each unit. 6. ECP-14-000376 was prepared to accomplish the following:	
	• The installation of a new missile-protected enclosure around the No. 11 Well Water house power connection. • A new hose connection to route well water to the 12 Condensate Storage Tank.	
OIP Open Item No. 5 Define implementation routes upon finalizing a location or locations for FLEX equipment storage location(s).	<u>On-site</u> Four deployment routes from the FLEX Storage Robust Building have been selected for Phase 2 portable FLEX equipment. One has been defined as the preferred route and three as alternate routes. They are: • Path 1: (Preferred) Calvert Cliffs Parkway to Camp Canoy Road to road along switchyard to the restored sally port • Path 2: (Alternate) Calvert Cliffs Parkway to Camp Canoy Road to ISFSI Haul Route • Path 3: (Alternate) Calvert Cliffs Parkway by the ISFSI to ISFSI Haul Route • Path 4: (Alternate) Old North Road <u>Off-site</u> Primary and alternate deployment routes for Phase 3 portable FLEX equipment are described in the SAFER Response Plan for	<u>Complete</u>

Item	Description	Status
	Calvert Cliffs (CC-CA-118-1001)	
OIP Open Item No. 7 Design and build a protected storage location or locations for the FLEX equipment. Ensure the design meets the requirements of NEI 12-06.	Requirements and options to provide reasonably protected onsite storage of FLEX portable equipment have been evaluated, resulting in the selection of FLEX equipment storage building type and location that meet the specific protection requirements described in NEI 12-06. Onsite FLEX storage consists of one building. A robust structure, the FLEX Storage Robust Building (FSRB) designed to meet the requirements of NEI 12-06 houses the N equipment and N+1 equipment for CCNPP Unit 2. The FSRB is constructed of reinforced concrete approximately 60' wide x 140' long x 21' high and located outside of the Protected Area to the west. The FSRB is designed for seismic, wind, tornado and tornado missiles and flooding conditions. The building is equipped with heating and ventilation units for internal environmental control. The stored equipment is secured to prevent seismic interaction.	Complete
OIP Open Item No. 19 Implement a design change to re-power the [Safety Injection Tank] SIT level and pressure indicators from a vital 120 VAC instrument bus.	Engineering Change Package, ECP-14-000024, was prepared to re-power the Safety Injection Tank (SIT) level and pressure indicators from vital 120 VAC instrument buses 2Y01 and 2Y02 to ensure the SIT wide range level and pressure indication loops are operational during extended loss of AC power (ELAP) events. Work Order C92672259, which implements ECP-14-000024 for Unit 2, has been completed.	Complete
OIP Open Item No. 21 <u>Original open item text:</u> Implement design changes to install "plug and play" protected hose connections for the portable alternate [Auxiliary Feedwater] AFW pump to	Engineering Change Package, ECP-14-000089, was prepared to install a new, permanent branch tee with a hose connection and an isolation valve in the safety-related portion of a 6" Auxiliary Feedwater motor-driven	Complete

Item	Description	Status
AFW on the exterior of the Auxiliary Building west wall with piping run to the 27 ft. East penetration Rooms to connect to the AFW to S/G headers. Modified open item text: Utilize flexible hose to connect a FLEX pump to a newly installed, dedicated hose connections (one per unit) located on the motor driven AFW pump cross-connect lines on the 5 ft. elevation of the Auxiliary Building.	pump, cross-connect pipe. This new connection provides an additional means of supplying makeup water to the steam generators. Work Order C92672325, which implements ECP-14-000089 for Unit 2, has been completed.	
OIP Open Item No. 24 Original open item text: Implement a design change to clearly identify the set of DC load breakers that will either be left energized or load shed by identifying the selected breakers by their unique numbers and load title. Modified open item text: Clearly identify (label) the DC load breakers that will be opened to extend battery life.	Attachments 1 and 2 of FSG-4 list the 125 VDC breakers and 120 VAC breakers which are opened during the performance of load shedding. These breakers have been marked with a sticker with black FLEX lettering over a reflective blue background.	Complete
OIP Open Item No. 25 Implement a procedure or FSG to perform the DC load shedding.	FSG-4, ELAP DC Bus Load Shed and Management, provides actions to remove loads from the 125 VDC batteries to extend battery life during an ELAP and repowering load centers and motor control centers with FLEX equipment.	Complete
OIP Open Item No. 30 Implement a design change to provide dedicated hose connections and piping to the Safety Injection System.	Engineering Change Package, ECP-14-000102, was prepared to provide dedicated hose connections via HPSI header connection by installing 2 new valves and a hose connection to the Safety Injection System.	Complete

Item	Description	Status
	Work Order C92672289, which implements this portion of ECP-14-000102 for Unit 2, has been completed.	
OIP Open Item No. 31 Develop a procedure or FSG to mimic the AFW makeup strategy described in ERPIP-611, Attachment 1.	FSG-3, Alternate Low Pressure Feedwater, provides the necessary actions to utilize the FLEX equipment at CCNPP to provide a feedwater source to the steam generators when the steam driven auxiliary feedwater pumps are no longer available. This FSG includes a description of the alternate strategy for AFW makeup, as described in ERPIP-611, Attachment 1.	Complete
OIP Open Item No. 34 Install a design change to add hose connections at 11 and 21 Refueling Water Storage Tanks (RWT) for makeup and suction for the FLEX pumps.	Engineering Change Package, ECP-14-000102, was prepared to provide a hose connection to the RWT 2TKRWT21. Work Order C92672307, which implements ECP-14-000102 for Unit 2, has been completed.	Complete
OIP Open Item No. 38 Perform an analysis to determine station battery coping time with DC load shedding. Analysis should consider battery age, battery performance without battery room ventilation, load, and load duration prior to completion of DC load shedding.	The following calculations determined the station battery coping time with the implementation of DC load shedding associated with the station response to an ELAP. In calculation CA08256, Battery 11 was shown to have a maximum coping time of 7.07 hours during an ELAP event. For Battery 12, calculation CA08257 showed the minimum voltage was reached beyond 12 hours, thus the maximum credited time was 12 hours. In calculation CA08258, Battery 21 was shown to last 7.33 hours until a limiting voltage was reached using an ELAP Model. For Battery 22, calculation CA08259 showed the minimum voltage was reached beyond 12 hours, thus the maximum credited time was 12 hours. The analyses considered battery age, battery performance without battery room ventilation,	Complete

Item	Description	Status
	load, and load duration prior to completion of DC load shedding.	
OIP Open Item No. 42 Implement a design change to connect a FLEX 480 VAC Diesel generator to either of the A or B train 480 VAC load centers on each unit to provide power to the battery chargers and other critical AC equipment.	Engineering Change Package, ECP-14-000052, provides the necessary electrical modifications to connect the FLEX 480VAC 500kW/625kVA portable diesel generators to Unit 2 480 VAC Load Centers 21 B and 24A. This ECP provides the means to restore 480 VAC distribution power essential to the CCNPP Unit 2 FLEX transitional phase (Phase 2) coping strategies to provide power to the battery chargers and other critical AC equipment. Work Order C92681886, which implements ECP-14-000052 for Unit 2, has been completed.	Complete
OIP Open Item No. 43 Implement a design change to provide direct connection of a portable 100 kW diesel generator to reactor [Motor Control Centers] MCCs 104 or 114 and 204 or 214 to provide power to the inverter backup bus (which can power the 120VAC vital bus), the SIT Outlet [Motor Operated Valves] MOVs, and the AFW Pump Room Vent Fans.	Engineering Change Package, ECP-14-000052, provides the necessary electrical modifications to connect a portable 100 kW diesel generator to Reactor Motor Control Centers 204 (cross-connected to MCC 214) to provide power to the inverter backup bus (which can power the 120VAC vital instrument bus), the SIT Outlet Motor Operated Valves (MOVs), the AFW Pump Room Vent Fans, and other critical AC equipment. Work Order C92681886, which implements ECP-14-000052 for Unit 2, has been completed.	Complete
OIP Open Item No. 46 Implement a procedure to connect a 4160 VAC RRC DG to either of the A or B Train 1E 4160 VAC Buses on each unit to provide power for Phase 3.	FSG-4, ELAP DC BUS LOAD SHED AND MANAGEMENT, has been prepared and approved for use to connect two 4,160 VAC NSRC Gas Turbine Generators (GTG) to either the 14 or 21 4KV buses to provide power for Phase 3, via the 1B or 2A DG disconnects, respectively.	Complete

Item	Description	Status
OIP Open Item No. 47 Develop procedures or FSGs for repowering vital 4160 VAC Class 1E buses from RRC FLEX 4KV DGs.	FSG-4, ELAP DC BUS LOAD SHED AND MANAGEMENT, has been prepared and approved for use to connect two 4,160 VAC NSRC Gas Turbine Generators (GTG) to either the 14 or 21 4KV buses to provide power for Phase 3, via the 1B or 2A DG disconnects, respectively.	Complete
OIP Open Item No. 49 Implement a design change to power containment dome and reactor cavity temperatures instrumentation from a vital 120 VAC instrument bus.	Engineering Change Package, ECP-14-000024, was prepared to repower the Containment Dome and Reactor Cavity temperature instrumentation loops from a vital 120 VAC instrument bus to maintain their functionality during ELAP events. Work Orders C92672267 and C92672269, which implement ECP-14-000024 for Unit 2, have been completed.	Complete
OIP Open Item No. 56 Implement a design change to provide a 6" hose connection to each RWT.	Engineering Change Package, ECP-14-000102, was prepared to provide a 6" hose connection to the 21 RWT. Work Order C92672307, which implements ECP-14-000102 for Unit 2, has been completed.	Complete
OIP Open Item No. 57 Original open item text: Implement a design change to provide dedicated hose connections to the SFP Cooling system. Modifed open item text: Provide the necessary means (i.e., temporary equipment, tools and procedures) to supply makeup water to the SFP via the SFP cooling system.	Engineering Change Package, ECP-14-000105, Fukushima – Related Design Changes to Implement FLEX Phase 3 Long Term Coping Strategies, was prepared to provide a tool to allow the use of a hose connection for makeup to the Spent Fuel Pool (SFP) to support FLEX activities. The tool consists of an 18-inch long flanged spool piece with a 3-inch hose connection. In the event of a BDBEE, the removal spool piece in either line, 8"-HC4-1038 or 8"-HC4-2038 will be removed and replaced with the tool to provide a hose connection that can be used for makeup to the SFP.	Complete

Item	Description	Status
	Portable FLEX pumps and hoses would be used to provide makeup to the SFP via the SFP Cooling System from the Chesapeake Bay. As part of this design change, a hydraulic analysis was performed in CA09973, Rev. 0, "Hydraulic Analyses for FLEX Portable Pump for SFP Makeup", to size the portable pumps and hoses to ensure adequate flow can be delivered to the SFP based on the requirements provided in NEI 12-06.	
OIP Open Item No. 58 Develop and implement procedures or FSGs that include the SFP Cooling FLEX makeup flow path.	The FSGs that execute the CCNPP FLEX Strategy for Spent Fuel Pool (SFP) cooling are described below. During Phase 1, FSG-15, Alignment for Area Cooling, sets up for ventilation of the SFP area within two hours of the event. FSG-5, Initial Assessment and FLEX Equipment Staging, stages the hoses and pump required for surface cooling of the SFP within eight hours of the event. During Phase 2, FSG-11, Alternate SFP Makeup and Cooling, provides actions to restore Spent Fuel Pool (SFP) level using the FLEX SFP Makeup Pump (Godwin HL5MS Dri-Prime Pump) and installation of required hoses. It also installs the FLEX SFP Makeup spool piece in the SFP Heat Exchanger Room. The Shift Manager will determine whether to set up the FLEX SFP Makeup pump and hose trailer at either the Circulating Water Discharge Structure or the Intake Structure opening behind the Traveling Screens. During Phase 3, FSG-11 is utilized to monitor and maintain SFP level between 50 and 67 feet by using the FLEX SFP Makeup Pump by injecting Chesapeake Bay water into the SFP system. An alternate method would utilize an NSRC portable pump as the motive force for SFP make-up.	Complete

Item	Description	Status
	FSG-ATT, Attachments, provides the operating instructions for the major pieces of FLEX equipment, which are used to provide temporary power, water, air, etc., during an ELAP. Attachment 105, FLEX SFP Makeup Pump, provides the operating instructions for the SFP Makeup Pump.	
OIP Open Item No. 59 Develop procedures or FSGs that mimic the ERPIP-612 sections for SFP makeup and SFP spray.	Actions described in the referenced FSGs are similar to those presented in ERPIP-612. These FSGs, which implement the CCNPP FLEX Strategy for Spent Fuel Pool (SFP) cooling, are described below. During Phase 1, FSG-15, Alignment for Area Cooling, sets up for ventilation of the SFP area within two hours of the event. FSG-5, Initial Assessment and FLEX Equipment Staging, stages the hoses and pump required for surface cooling of the SFP within eight hours of the event. During Phase 2, FSG-11, Alternate SFP Makeup and Cooling, provides actions to restore Spent Fuel Pool (SFP) level using the FLEX SFP Makeup Pump (Godwin HL5MS Dri-Prime Pump) and installation of required hoses. It also installs the FLEX SFP Makeup spool piece in the SFP Heat Exchanger Room. The Shift Manager will determine whether to set up the FLEX SFP Makeup pump and hose trailer at either the Circulating Water Discharge Structure or the Intake Structure opening behind the Traveling Screens. During Phase 3, FSG-11, Alternate SFP Makeup and Cooling, is utilized to monitor and maintain SFP level between 50 and 67 feet by using the FLEX SFP Makeup Pump by injecting Chesapeake Bay water into the SFP system. An alternate method would utilize an NSRC portable pump as the motive force for SFP make-up.	Complete

Item	Description	Status
	FSG-ATT, Attachments, provides the operating instructions for the major pieces of FLEX equipment which are used to provide temporary power, water, air, etc., during an Extended Loss of AC Power (ELAP). Attachment 105, FLEX SFP Makeup Pump, provides the operating instructions for the SFP Makeup Pump.	
OIP Open Item No. 76 Implement a design change to modify the Fixed Dedicated Satellite Phone System to provide protection from external hazards, and transmitter and antennas protected from seismic, wind, and wind-driven missiles, including back-up power supply capable of 24 hours operation for the system.	To be fully compliant with Recommendation 9.3, Exelon Generation Company (EGC) purchased and distributed portable, Iridium satellite phones with 24-hr batteries.	Complete
OIP Open Item No. 90 Provide a procedure governing the maintenance and distribution of the consumables that will be stocked to support at least 24 hours of site operation independent of offsite support.	Consumables (as identified in Response to Open Item 89 in the February 2015 Status Report) are stored in a designated area within the Technical Support Center (TSC). The TSC is an environmentally controlled location. An inventory listing of the consumables will be maintained within the designated FLEX Consumables area. The storage area is administratively controlled. CCNPP does not have a specific procedure developed for FLEX consumables. Maintenance of the supplies being held in the TSC will be per existing CCNPP normal stock process of maintaining "min/max" quantities on hand. ERPIP-B.1, EQUIPMENT CHECKLIST, provides Emergency Response Organization (ERO) Facility Inventory Checklists for use during periodic inventory verifications, drills and exercises, and actual events. This existing process will confirm the designated consumables are in their designated area and food consumables are within their shelf life. Reordering and replacement of items	Complete

Item	Description	Status
	approaching end of shelf life will be done as appropriate.	
OIP Open Item No. 91 Develop a strategy to protect onsite consumables for use after a BDBEE.	The following represents the CCNPP strategy for protecting onsite consumables for use after a BDBEE: • Consumables (as identified in Response to Open Item 89) are stored in a designated area within the TSC. The TSC is an environmentally controlled location. An inventory listing of the consumables will be maintained within the designated FLEX Consumables area. The storage area is administratively controlled. • Food consumables include bottled water and protein/Power Bars. Bottled water has a shelf life of 2+ years; protein/Power Bars typically have a shelf life of 1-2 years. • Maintenance of supplies being held in the TSC will be per the existing normal stock process of maintaining "min/max" quantities on hand. ERPIP-B.1, EQUIPMENT CHECKLIST, provides Emergency Response Organization (ERO) Facility Inventory Checklists for use during auditing, drills and exercises, and actual events. This existing process will confirm the designated consumables are in their designated area and food consumables are within their shelf life; reordering and replacement of items approaching end of shelf life will be done as appropriate.	Complete
OIP Open Item No. 92 Develop equipment operating procedures or FSGs, considering vendor technical manual operating procedures, for each of the pieces of portable FLEX equipment that will be procured.	FLEX Operating Guides are prepared for all portable FLEX and support equipment (e.g., 100 kW DGs, 500 kW DGs, Air Compressors, Alternate Feedwater Pump, SFP Makeup Pump, Wheeled Bobcat, Front Loader, Tow Truck, etc.). A typical Operating Guide includes sections for Precautions, Pre-Start Checks,	Complete

Item	Description	Status
	Startup, Monitoring, Manual Shutdown, and Emergency Shutdown. They include annotated photos of equipment and are based on vendor technical manual operating procedures. They are laminated and attached to the respective equipment. The FLEX Operating Guides are also attachments to FSG-ATT, FSG Attachments.	
ISE CI No. 3.2.1.6.B The licensee has not completed final analysis regarding validation of the action times reported in the Sequence of Events, including any SOE changes that may result from ongoing evaluations for: RCP seal leakage, plant specific CENTS analysis, and any revised battery load shed analysis.	The validation of FLEX strategies and procedures has been performed using a series of simulator scenarios, plant walk-downs, and table-top discussions. The validations were performed following a formal Validation Test Plan, which provided reasonable assurance that the required tasks, manual actions and decisions for FLEX strategies are feasible and may be executed within the constraints of the Overall Integrated Plan (OIP) Sequence of Events. Each validation plan performed a qualitative assessment of the margin between the time taken for a time-sensitive action (TSA) under normal conditions versus the time required to implement the strategy under a simulated BDBEE. A final analysis was performed to show that FLEX strategies including TSAs could be performed within the time and resource constraints of the OIP and Phase 2 Staffing Assessment. This independent analysis assured that the testing methods and results were valid and that all assumptions made were reasonable. A time-motion study (CC-VP-001, Rev. 0) was conducted to validate that DC load shedding can be accomplished on each unit in one hour using the FLEX Support Guideline. The time-motion study for both units demonstrated that the deep load shed can be accomplished in 50 minutes using one operator; much less than the one hour required for one unit.	Complete

Item	Description	Status
	Attachment 8 of the CCNPP Program Document (CC-CA-118) shows the Sequence of Events Timeline and validation tests associated with time-constrained activities.	
ISE CI No. 3.2.4.10.A On page 19 of the Integrated Plan, the licensee identified Open Items: to implement a design change to clearly identify the set of [DC] load breakers that will either be left energized or load shed by identifying the selected breakers by their unique numbers and load title; to implement a procedure or FSG to perform the [DC] load shedding; and to complete a time-motion study to validate that DC load shedding can be accomplished on each unit in one hour.	FSG-4, ELAP DC Bus Load Shed and Management, provides actions to remove loads from the 125 VDC batteries to extend battery life during an ELAP and repowering load centers and motor control centers with FLEX equipment. Attachments 1 and 2 of FSG-4 list the 125 VDC breakers and 120 VAC breakers which are opened during the performance of load shedding. These breakers have been marked with a sticker with black FLEX lettering over reflective blue background. A time-motion study (CC-VP-001, Rev. 0) was conducted to validate that DC load shedding can be accomplished on each unit in one hour using the FLEX Support Guideline. The time-motion study for both units demonstrated that the deep load shed can be accomplished in 50 minutes using one operator; much less than the one hour required for one unit. The following calculations determined the station battery coping time with the implementation of DC load shedding associated with the station response to an ELAP. In calculation CA08256, Battery 11 was shown to have a maximum coping time of 7.07 hours during an ELAP event. For Battery 12, calculation CA08257 showed the minimum voltage was reached beyond 12 hours, thus the maximum credited time was 12 hours. In calculation CA08258, Battery 21 was shown to last 7.33 hours until a limiting voltage was reached using an ELAP Model. For Battery 22, calculation CA08259 showed the minimum voltage was reached beyond 12 hours, thus the maximum credited time was 12 hours.	Complete

Item	Description	Status
ISE CI No. 3.1.1.4.A ISE CI No. 3.1.2.2.A ISE CI No. 3.1.2.2.B ISE CI No. 3.2.4.5.A Staging Areas, Deployment Routes, and Offsite Resources	The CCNPP SAFER Response Plan (Playbook) has been finalized and is now CCNPP procedure CC-CA-118-1001, Revision 0. The CCNPP SAFER Response Plan (CC-CA-118-1001, Revision 0) has been posted to the CCNPP ePortal[1] for NRC review.	Complete
ISE CI No. 3.1.3.2.A Debris Removal	Credited debris removal equipment is stored in the FLEX Storage Robust Building (FSRB). The FSRB is a reinforced concrete structure approximately 60' wide x 140' long x 21' high, located outside of the Protected Area to the west. The FSRB has been designed for seismic, wind, tornado and tornado missiles and flooding conditions. The building is equipped with heating and ventilation units for internal environmental control. The stored equipment will be secured to prevent seismic interaction. The list of the credited debris removal equipment has been posted to the CCNPP ePortal[1] for NRC review.	Complete
ISE CI No. 3.1.4.2.A Impact of Extreme Temperature Environments	In accordance with AREVA NP Inc., "Regional Response Center Equipment Technical Requirements," Document No. 51-9199717-008, equipment that will be deployed in outdoor locations following a BDBEE shall be procured to the following environmental requirements: • Equipment (e.g., diesel engines, generators, pumps) shall be capable of continuous duty rated output at an ambient temperature of 130°F. If equipment is not available with this capability, applicable de-rating factors may be applied as long as the performance requirements (power, voltage, flow, pressure, etc.) are met. • Equipment shall be capable of continuous operation at an ambient temperature of	Complete

Item	Description	Status
	– 40°F. If equipment is not available with this capability, the equipment may be procured on the basis of the historical low temperature recorded at Lusby, MD in February 1996 of – 9°F. • Equipment shall be rated for operation up to a minimum of 100 feet above mean sea level. The above criteria were applied in the procurement of both Phase 2 and Phase 3 equipment for CCNPP. A combination of the following has been applied to ensure compatibility with the above requirements: • Review of Vendor Material/information • Specification prior to purchase • Test Data from the factory or local site acceptance test (SAT) • Engineering assessment where applicable • Strategy adjustment or plant modification to ensure that environmental conditions are properly considered (e.g., instructions within procedures to drain hoses to prevent freezing when pumps are secured)	
ISE CI No. 3.2.1.6.A ISE CI No. 3.2.1.6.B AO 23 (AQ 27) Sequence of Events	Attachment 8 of the CCNPP Program Document (CC-CA-118) shows the Sequence of Events Timeline and validation tests associated with time-constrained activities. It is cross-referenced to the Validation Plan. It has been posted to the CCNPP ePortal[1] for NRC review.	Complete
ISE CI 3.2.1.7.A AQ 38 (AQ 48) Shutdown and Refueling Modes	On Page 3 of the CCNPP Overall Integrated Plan (OIP), in the paragraph titled "Implementation Capability Requirements Overview," it is stated that permanent plant equipment, cooling and makeup water inventories, and fuel for FLEX equipment	Complete

Item	Description	Status
	contained in systems or structures with designs that are robust with respect to seismic events, floods, high winds and associated missiles are available, and that installed equipment that is not robust is assumed to be unavailable. On Page 21 in the paragraph titled "Hot Standby, Hot Shutdown, Cold Shutdown, and Refueling (Modes 3 – 6)", it is stated that if the reactor vessel head is removed and the refueling pool (RFP) is or can be filled, then decay heat is removed by the RFP via a gravity fill line-up to the RFP from the refueling water tank (RWT). The RWT does not have the requisite wind-driven missile protection. The following provides the technical justification for assuming that the RWT (which is installed equipment that is not robust) is available for use. The referenced paragraph on Page 21 of the OIP describes the strategy for maintaining core cooling in Mode 6 when the reactor vessel head is removed and decay heat is removed via heat up and boil off of the water in the Refueling Pool (RFP). The strategy credits the Refueling Water Tanks (RWTs) if one is available. However, if the RWTs are not available, the RFP can be refilled to compensate for boil off from any available water storage tank or the Ultimate Heat Sink (Chesapeake Bay). The strategy description has been updated as follows: If the reactor vessel head is removed and the refueling pool (RFP) is or can be filled, then decay heat is removed via heat up and boil off of the water in the RFP. Per AOP-3B, if RFP level is < 57 ft., then a gravity fill line-up is established to gravity fill the RFP from the same unit's RWT (primary connection point). The RWTs are 420,000 gallon stainless steel seismic Category 1 water storage tanks. However, as stated earlier, the RWTs are not protected from wind-driven missiles. If the RWT of the opposite unit remains available, it may be used to refill the RFP by	

Item	Description	Status
	connecting a FLEX portable pump to the RWT FLEX connection of the opposite unit, or by gravity transfer of the water from the opposite unit's RWT to the RWT FLEX connection for the unit in Mode 6 via the spent fuel pool system as described in ERPIP-0611, "Severe Accident Management Restorative Actions," Attachment 1, "Alternate Water Sources". For both of these options the RCS Injection FLEX connection for the unit in Mode 6 would be used to deliver the water into the RFP. If neither RWT is available, the RFP may be refilled from any available water storage tank (11CST, 12CST, 21CST, 11DWST, 11PWST, 12 PWST), well water, or the Ultimate Heat Sink (Chesapeake Bay) using a FLEX portable pump and the RCS injection FLEX connection for the unit in Mode 6.	
ISE CI No. 3.2.1.9.C Engineering Evaluations of Phase 3 Equipment	Engineering Change Package ECP-14-000105, Fukushima – Related Design Changes to Implement FLEX Phase 3 Long Term Coping Strategies for Core and Containment cooling and Spent Fuel Pool Level Control, provides the engineering to implement the CCNPP FLEX Phase 3 strategies to connect NSRC equipment for Saltwater System makeup and Boric Acid addition. As part of these design changes, hydraulic analyses were performed in 1) CA09991, Rev. 0, "Hydraulic Evaluation of the FLEX Pump Connection to the Salt Water System", to verify the adequacy of the National SAFER Response Center (NSRC) high flow/low pressure pump to provide adequate makeup to the SW system, and 2) in CA09973, Rev. 0, "Hydraulic Analyses for FLEX Portable Pump for SFP Makeup", to size the portable pumps and hoses to ensure adequate flow can be delivered to the SFP based on the requirements provided in NEI 12-06. ECP-14-000153, Fukushima 4kV bus	Complete

Item	Description	Status
	connections of FLEX NSRC Diesel Generators, provides the engineering to implement the CCNPP FLEX Phase 3 strategy to connect two 1 MW, 4160 VAC NSRC gas turbine generators FSG-4, ELAP DC BUS LOAD SHED AND MANAGEMENT, has been prepared and approved for use to connect two 4,160 VAC NSRC Gas Turbine Generators (GTG) to either the 14 or 21 4KV buses to provide power for Phase 3, via the 1B or 2A DG disconnects, respectively. CA09991, CA09973, ECP-14-000105, ECP-14-000153 and FSG-4 have been posted to the CCNPP ePortal for NRC review. The paths to these documents in the ePortal are given in the notes to this table.	
ISE CI No. 3.2.4.10.A AQ 34 (AQ 39) DC Load Shedding	Exelon Generation Company understands that the NRC requests ERPIP-0653 in support of ISE CI 3.2.4.10.A. The title of this ERPIP is "Alternate Low Pressure Feedwater", and is not the procedure related to DC Load Shedding. The CCNPP procedure applicable to DC Load Shedding is FSG-4, "ELAP DC Bus Load Shed and Management". FSG-4 provides actions to remove loads from the 125 VDC batteries to extend battery life during an ELAP and repowering load centers and motor control centers with FLEX equipment. FSG-4 has been posted to the CCNPP ePortal[1] for NRC review. A time-motion study (CC-VP-001, Rev. 0) was conducted to validate that DC load shedding can be accomplished on each unit in one hour using the FSG. The time-motion study for both units demonstrated that the deep load shed can be accomplished in 50 minutes using one operator; much less than the one hour required for one unit.	Complete

Item	Description	Status
	CCN0012-17-STUDY-001, Rev. 0, Analysis of Calvert Cliffs DC Systems in Support of INPO Event Report 11-4 has been superseded by detailed DC system analyses. To confirm the safety-related station batteries will support the vital instrumentation required for the Phase 1 FLEX mitigation strategy at Calvert Cliffs until the Phase 2 diesel generators are deployed, the following calculations have been prepared corresponding to safety-related station batteries: • CA08256 - Battery 11 Load Shed Coping Time for ELAP Event • CA08257 - Battery 12 Load Shed Coping Time for ELAP Event • CA08258 - Battery 21 Load Shed Coping Time for ELAP Event • CA08259 - Battery 22 Load Shed Coping Time for ELAP Event In addition, these calculations determined the station battery coping time with the implementation of DC load shedding associated with the station response to an ELAP: • In calculation CA08256, Battery 11 was shown to have a maximum coping time of 7.07 hours during an ELAP event. • For Battery 12, calculation CA08257 showed the minimum voltage was reached beyond 12 hours, thus the maximum credited time was 12 hours. • In calculation CA08258, Battery 21 was shown to last 7.33 hours until a limiting voltage was reached using an ELAP Model. • For Battery 22, calculation CA08259 showed the minimum voltage was reached beyond 12 hours, thus the	

Item	Description	Status
	maximum credited time was 12 hours.	
AQ 1 (AQ2) Power Supply	The three FLEX Storage Robust Building (FSRB) equipment openings, specifically the outside Barrier 1 Missile Doors and the interior roll-up doors intended for equipment deployment do not require electrical power to be opened in order to access or be closed to isolate the stored FLEX equipment. They can be manually opened with a less than or equal to 50-lb force. There are also two personnel access doors that do not require electrical power to open or close. The requested final design drawings and pictures of the FSRB doors have been posted to the CCNPP ePortal[1] for NRC review.	Complete
AQ 32 (AQ 37) Electrical Isolation	Single line diagrams showing the connection points for the Phase 2 and Phase 3 FLEX diesel generators and gas turbine generators have been posted to the CCNPP ePortal[1] for NRC review.	Complete
SE Review Item 4 Safety Injection Tanks (SIT)	For maximum Safety Injection Tank (SIT) injection, assuming the Technical Specification minimum level, SIT isolation is expected to occur at approximately 21 hours into the event when a height of 10 inches is reached. Power supplies to the SIT wide range level and N_2 pressure indicators are being modified (completed for Unit 2 FLEX implementation) to provide continuous power from safety-related 120 VAC instrument power to the level and pressure indicators. Control Room operators will be able to closely monitor SIT level and N_2 pressure as the SITs discharge into the RCS. Emergency Operating Procedure EOP-7-2, directs recording initial SIT levels and pressures prior to the start of the RCS cooldown. Based on a CCNPP reference simulator validation of the CCNPP EOP-7-2, Appendix 1 ELAP cooldown, conducted November 12, 2014, SIT discharge into the RCS began at	Complete

Item	Description	Status
	approximately the five hour mark (293 minutes) of the event just as the RCS cooldown was terminated and RCS temperature stabilized at 340°F (120 PSIA S/G pressure). Level in all four SITs continued to slowly lower over the next 15.5 hours. SIT level lowered by a total of 168 inches over this period of time. Given a normal SIT level of approximately 194 inches, final SIT level reached approximately 26 inches. Conservatively assuming starting SIT level at Technical Specification minimum level of 187 inches, final SIT level would equal 19 inches. These levels are above the ELAP cooldown minimum SIT level of 10 inches to prevent N_2 injection into the RCS. The motor control centers that supply power to the SIT outlet MOVs will be re-energized at approximately 7 hours into the event. Also, at approximately 7 hours power will be restored to a vital 480 VAC load center which will allow a Charging Pump to be started for RCS makeup and boration. FLEX Support Guidelines will direct SIT isolation after pumped RCS makeup begins. Plant reference simulator validation of the CCNPP EOP-7-2, Appendix 1 ELAP RCS Cooldown was used. The SIT volume is a fixed value of 2025 cubic feet. The SIT height is a fixed value of 33.75 feet. The CCNPP Simulator THOR thermal-hydraulic model performs complex calculations to determine the level in the tank as well as pressure. EOP-7-2, Station Blackout, Appendix 1, Initial ELAP RCS Cooldown, Block step B, RCS Cooldown provides guidance to operators to stop the RCS cooldown and raise RCS pressure to prevent N_2 gas intrusion into the RCS.	
SE Review Items 5 and 6 RCS Pump Hydraulic Analysis	Calculation No. CA08576 was performed to determine the hydraulic requirements for a portable FLEX pump and hoses to provide required make-up from the following make-up	Complete

Item	Description	Status
	sources of water to the Reactor Coolant System (RCS) during Beyond-Design-Basis External Events (BDBEE) at Calvert Cliffs Nuclear Power Plant Units 1 and 2: 1) The Refueling Water Tank (RWT) 2) A tank in the tank yard 3) Well water 4) The Ultimate Heat Sink (Chesapeake Bay) The hydraulic calculation was performed such that it can be applicable to either a centrifugal pump or a positive displacement pump. It provides a basis for sizing either a centrifugal pump or positive displacement pump for the application. The calculation data were provided to the pump vendor as a sizing basis for the positive displacement pump used for RCS makeup. In response to the staff's request that EGC provide justification for using lower rated hoses than the hydraulic analysis recommends, the following explanation is provided. CCNPP uses hoses with a design pressure that is below the shutoff head for the RCS makeup pump for FLEX. For FLEX, the positive displacement pumps are provided with pressure relief valves. These valves are provided by the pump vendor and are sized for the rated flow of the pump. Thus, a pressure relief valve provides overpressure protection for the downstream hoses that are connected to the pump to ensure that the pump does not over pressurize the hose. The relief valve is to be set at a maximum allowable pressure equal to the design pressure of the hose. Thus, the presence of a relief valve allows the use of a hose pressure rating that is below the shutoff pressure rating of the pump. Calculation No. CA08576 has been posted to the CCNPP ePortal[2] for NRC review.	

Notes:

1. Path to document in CCNPP ePortal:

- 2014 NRC CCNPP Onsite FLEX Audit
- Documents Provided in Support of Unit 2 FLEX Compliance Letter

2. Path to document in CCNPP ePortal:
   - 2014 NRC CCNPP Onsite FLEX Audit
   - Calculations

MILESTONE SCHEDULE – ITEMS COMPLETE

Milestone	Completion Date
Submit 60 Day Status Report	October 26, 2012
Submit Overall Integrated Plan	February 28, 2013
Submit Supplement to Overall Integrated Plan	March 8, 2013
Contract with National SAFER Response Center	January 17, 2013
Submit 6 Month Updates:	
Update 1	August 27, 2013
Update 2	February 27, 2014
Update 3	August 26, 2014
Update 4	February 20, 2015
Modification Development:	
Phase 2 modifications	October 6, 2014
National SAFER Response Center Operational	February 26, 2015
Procedure Development:	
Strategy procedures	April 10, 2015
Validate Procedures (NEI 12-06, Sect. 11.4.3)	March 27, 2015
Staffing analysis	October 13, 2014
Modification Implementation	
Phase 2 modifications	March 6, 2015
Storage plan and construction	April 8, 2015
FLEX equipment acquisition	March 6, 2015
Training completion	April 10, 2015
Unit 2 implementation date	May 10, 2015

ORDER EA-12-049 COMPLIANCE ELEMENTS SUMMARY

The elements identified below for Calvert Cliffs Nuclear Power Plant, Unit 2 as well as the site OIP response submittal (References 5 and 6), the 6-Month Status Reports (References 7, 8, 9, and 10), and any additional docketed correspondence, demonstrate compliance with Order EA-12-049.

Strategies - Complete

Calvert Cliffs Nuclear Power Plant, Unit 2 strategies are in compliance with Order EA-12-049. There are no strategy related Open Items, Confirmatory Items, or Audit Questions/Audit Report

Open Items. The Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Final Integrated Plan for mitigating strategies will be provided upon full compliance for Calvert Cliffs Nuclear Power Plant, Unit 1 (Spring 2016).

Modifications - Complete

The modifications required to support the FLEX strategies for Calvert Cliffs Nuclear Power Plant, Unit 2 have been fully implemented in accordance with the station design control process.

Equipment – Procured and Maintenance & Testing – Complete

The equipment required to implement the FLEX strategies for Calvert Cliffs Nuclear Power Plant, Unit 2 has been procured in accordance with NEI 12-06, Section 11.1 and 11.2, received at Calvert Cliffs Nuclear Power Plant, Unit 2, initially tested/performance verified as identified in NEI 12-06, Section 11.5, and is available for use.

Maintenance and testing will be conducted through the use of the Calvert Cliffs Nuclear Power Plant, Unit 2 Preventative Maintenance program such that equipment reliability is achieved.

Protected Storage – Complete

The storage facility required to implement the FLEX strategies for Calvert Cliffs Nuclear Power Plant, Unit 2 has been completed and provides protection from the applicable site hazards. The equipment required to implement the FLEX strategies for Calvert Cliffs Nuclear Power Plant, Unit 2 is stored in its protected configuration.

Procedures – Complete

FLEX Support Guidelines (FSG), for Calvert Cliffs Nuclear Power Plant, Unit 2 have been developed, and integrated with existing procedures. The FSGs and affected existing procedures have been verified and are available for use in accordance with the site procedure control program.

Training – Complete

Training for Calvert Cliffs Nuclear Power Plant, Unit 2 has been completed in accordance with an accepted training process as recommended in NEI 12-06, Section 11.6.

Staffing – Complete

The Phase 2 Staffing Assessment (Reference 13) for Calvert Cliffs Nuclear Power Plant has been completed as required by 10CFR50.54(f), "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," Recommendation 9.3, dated March 12, 2012 (Reference 12). 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.

National SAFER Response Center – Complete

EGC has established a contract with Pooled Equipment Inventory Company (PEICo) and has joined the Strategic Alliance for FLEX Emergency Response (SAFER) Team Equipment Committee for off-site facility coordination. It has been confirmed that PEICo is ready to support Calvert Cliffs Nuclear Power Plant, Unit 2 with Phase 3 equipment stored in the National SAFER Response Centers in accordance with the site-specific SAFER Response Plan.

Validation – Complete

EGC validated FLEX strategies in accordance with the NEI FLEX Validation Process. This consisted of validating the feasibility of individual strategies identified in the Overall Integrated Plan (OIP) for Order EA-12-049 using the graded approach described in the NEI guidance document and an integrated review to ensure that adequate resources (personnel, equipment, materials) are available to implement the individual strategies to achieve the intended results.

FLEX Program Document - Established

The Calvert Cliffs Nuclear Power Plant, Unit 2 FLEX Program Document (CC-CA-118) has been developed in accordance with the requirements of NEI 12-06.

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 2nd day of July 2015.

Respectfully submitted,

D. P. Helker

David P. Helker
Manager - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

cc: Director, Office of Nuclear Reactor Regulation
NRC Regional Administrator - Region I
NRC Senior Resident Inspector – Calvert Cliffs Nuclear Power Plant
NRC Project Manager, NRR – Calvert Cliffs Nuclear Power Plant
Mr. Jeremy S. Bowen, NRR/JLD/JOMB, NRC
Ms. Mandy K. Halter, NRR/JLD/PPSD/JOMB, NRC
Mr. Jason C. Paige, NRR/JLD/JOMB, NRC
S. Gray, MD-DNR