Exelon Generation®

Order No. EA-12-049

RS-15-019

February 27, 2015

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

Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

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-13-020)
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-13-119)
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-14-010)

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-14-208)
9. NRC letter to Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC Nos. MF1046 and MF1047), dated November 22, 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 Dresden Nuclear Power Station, Units 2 and 3 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 Dresden 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. 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. Dresden Nuclear Power Station, Units 2 and 3 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 – Dresden Nuclear Power Station, Units 2 and 3
NRC Project Manager, NRR – Dresden Nuclear Power Station, Units 2 and 3
Ms. Jessica A. Kratchman, NRR/JLD/PMB, NRC
Mr. Jack R. Davis, NRR/DPR/MSD, NRC
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Mr. Jeremy S. Bowen, NRR/DPR/MSD/MSPB, NRC
Mr. Robert L. Dennig, NRR/DSS/SCVB, NRC
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Illinois Emergency Management Agency - Division of Nuclear Safety

Enclosure

Dresden Nuclear Power Station, Units 2 and 3

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

(12 pages)

Enclosure

Dresden Nuclear Power station, Units 2 and 3

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

Dresden Nuclear Power Station, Units 2 and 3 (Dresden) developed an Overall Integrated Plan (Reference 1 in Section 8), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This enclosure provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

2 Milestone Accomplishments

Modification development completed.

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.

Original Target Completion Date	Activity	Status {Include date changes in this column}	Revised Target Completion Date
	Submit 60 Day Status Report	Complete	
	Submit Overall Integrated Implementation Plan	Complete	
	Contract with RRC	Complete	
	Submit 6 month updates		
August 2013	Update 1	Complete	
February 2014	Update 2	Complete	
August 2014	Update 3	Complete	
February 2015	Update 4	Complete with this submittal	

Original Target Completion Date		Activity	Status {Include date changes in this column}	Revised Target Completion Date
August 2015		Update 5	Not started	
February 2016		Update 6	Not started	
August 2016		Update 7	Not started	
		Submit Completion Report		
Unit 2	Unit 3	Modification Development		
Oct 2014	Sept 2015	• Phase 1 modifications	Complete	
Oct 2014	Sept 2015	• Phase 2 modifications	Complete	
Oct 2014	Sept 2015	• Phase 3 modifications	Complete	
Unit 2	Unit 3	Modification Implementation		
Nov 2015	Nov 2016	• Phase 1 modifications	None required	
Nov 2015	Nov 2016	• Phase 2 modifications	Started	
Nov 2015	Nov 2016	• Phase 3 modifications	Started	
		Procedure development		
Nov 2015		• Strategy procedures	Started	
Nov 2015		• Validate Strategy Procedures (NEI 12-06, Sect. 11.4.3)	Note 1	
Nov 2015		• Maintenance procedures	Note 1	
Jul 2015		Staffing analysis	Note 1	
Nov 2015		Storage Plan and construction	Note 1	
Nov 2015		FLEX equipment acquisition	Started	
Nov 2015		Training completion	Started	
Jul 2015		National SAFER Response Center Operational	(will be a standard date from National SAFER Response Center)	
Nov 2015		Unit 2 Implementation date	Note 1	
Nov 2016		Unit 3 Implementation date	Note 1	

Note(s):

1. Exelon will update the status of ongoing and future milestones in the Integrated Plan for Dresden Nuclear Power Station during a scheduled six (6) month update. This update will include any changes to the milestone schedule as submitted in the February 28, 2014 Integrated Plan.

4 Changes to Compliance Method

There are no changes to compliance methods since the last update.

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

Dresden Nuclear Power Station 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.

Section Reference	Overall Integrated Plan Open Item	Status
Sequence of Events (page 5-6)	The times to complete actions in the Events Timeline are based on operating judgment, conceptual designs, and current supporting analyses. The final timeline will be time validated once detailed designs are completed and procedures developed.	Not Started
Sequence of Events (page 5)	Analysis of deviations between Exelon's engineering analyses and the analyses contained in BWROG Document NEDC-33771P, "GEH Evaluation of FLEX Implementation Guidelines and documentation of results on Att. 1B, "NSSS Significant Reference Analysis Deviation Table." Planned to be completed and submitted with August 2013 Six Month Update.	Completed. See August 2013 Update
Sequence of Events (page 8)	Initial evaluations 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.	Completed. See August 2014 Update
Deployment Strategy (pages 8-9)	Transportation routes will be developed from the equipment storage area to the FLEX staging areas. An administrative program will be developed to ensure pathways remain clear or compensatory actions will be implemented to ensure all strategies can be deployed during all modes of operation. Identification of storage areas and creation of the administrative program are open items.	See Interim Staff Evaluation Confirmatory Item 3.1.2.2.A response.
Programmatic Controls (pages 9-10)	An administrative program for FLEX to establish responsibilities, and testing & maintenance requirements will be implemented.	Started
Spent Fuel Pool Cooling Phase 2 Discussion (page 46)	Complete an evaluation of the spent fuel pool area for steam and condensation.	See Interim Staff Evaluation Confirmatory Item 3.2.2.A response.

Section Reference	Overall Integrated Plan Open Item	Status
Safety Functions Support Phase 2 Discussion (page 57)	Evaluate the habitability conditions for the Main Control Room and develop a strategy to maintain habitability.	See Interim Staff Evaluation Confirmatory Item 3.2.4.6.C response.
Safety Functions Support Phase 2 Discussion (page 57)	Evaluate the habitability conditions for the Auxiliary Electric Equipment Room (AEER) and develop a strategy to maintain habitability.	See Interim Staff Evaluation Confirmatory Item 3.2.4.2.C response.

Item number	Interim Staff Evaluation OPEN Item	Status
3.1.1.1.A	Each section of the Integrated Plan describing storage protection from hazards makes reference to Section 11 rather than to the specific protection requirements described in NEI 12-06 for the applicable hazard; that is Section 6.2.3.1 for floods, Section 7.3.1 for wind, etc. As a result, the specific guidelines for each hazard are not addressed.	Completed. See February 2014 Update
3.1.2.2. B	The Plan is silent regarding loss of normal access to the Ultimate Heat Sink (UHS) due to flood hazard conditions, the need to provide electrical power for sump pumps, and whether or not flood barriers will be utilized.	Completed. See February 2014 Update
3.2.4.8.A	Updated information provided by the licensee as part of the 6-month update states that they are proposing to install a prestaged generator to supply all FLEX related loads for both units simultaneously for Phase 2 mitigating strategies. This appears to be an alternative approach for satisfying the Mitigating Strategies order. Insufficient information has been provided by the licensee in order to determine whether this provides an equivalent level of protection as would be provided through conformance with NEI 12-06.	Completed. See August 2014 Update

Item number	Interim Staff Evaluation CONFIRMATORY Item	Status
3.1.1.2.A	A postulated downstream dam failure from a seismic event is still being evaluated.	Completed. See February 2014 Update
3.1.1.2.B	Plans for strategies did not address whether electrical power would be required to move or deploy FLEX equipment (e.g. to open a door from a storage location.)	Started
3.1.1.3.A	Development of a reference source for obtaining necessary instrument readings in the event of seismic damage to electrical equipment as described in NEI 12-06, Section 5.3.3, consideration 1.	Started
3.1.1.3.B	Use of, or need for ac power to mitigate ground water intrusion was not addressed.	Completed. See February 2014 Update
3.1.1.4.A	Regarding off site resources, detailed plans for local staging areas and transport of FLEX equipment to overcome hazards are to be provided in 6-month update.	Proposed Complete All licensees, including Exelon Generation Company, relying on SAFER and the National SAFER Response Centers (NSRC), have executed contractual agreements with Pooled Equipment Inventory Company (PEICo) which allows for the capabilities (considerations) in Section 12.2 of NEI 12-06. The NRC staff evaluated the NSRCs and the SAFER program, plans, and procedures against these 10 capabilities (considerations) from NEI 12-06, Section 12.2. The NRC audit results concluded that the NSRCs and the SAFER plans and procedures conform to the guidance described by the 10 capabilities (considerations) of NEI 12-06, Section 12.2. The NRC findings are documented in a letter from the NRC (Jack R. Davis) to the Nuclear Energy Institute (Joseph E. Pollock), Staff Assessment of National Safer Response Centers Established in Response to Order EA-12-049, dated September 26, 2014 (ML14265A107).
3.1.2.A	Impact of persistence of flooding to staging of FLEX equipment not fully addressed.	Started
3.1.2.2.A	Administrative program and procedures for on-site FLEX equipment storage locations and transport routes not yet established.	Started

Item number	Interim Staff Evaluation CONFIRMATORY Item	Status
3.1.2.3.A	Administrative program and procedures related to implementation of mitigation strategies not yet developed.	Started
3.1.4.2.A	Equipment to clear ice and snow from haul pathways is not identified in plan.	Completed. See February 2014 Update
3.1.5.2.A	Procedures to assure equipment can be deployed in a high temperature context have not been developed. Specifically, address high temperature effects on storage locations (e.g. expansion of sheet metal, swollen seals, etc.)	Not started
3.1.5.3.A	Procedures to address high temperature impacts on FLEX equipment not yet developed.	Started
3.2.1.1.A	Need benchmarks to demonstrate Modular Accident Analysis Program (MAAP) 4 is the appropriate code for simulation of ELAP.	Completed. See August 2014 Update
3.2.1.1.B	For MAAP4, collapsed level must remain above Top of Active Fuel and cool down rate must meet technical specifications.	Completed. See August 2014 Update
3.2.1.1.C	MAAP4 use must be consistent with June 2013 position paper.	Completed. See August 2014 Update
3.2.1.1.D	In using MAAP4, the licensee must identify and justify the subset of key modeling parameters cited from Tables 4-1 through 4-6 of the "MAAP4 Application Guidance, Desktop Reference for Using MAAP4 Software, Revision 2" (Electric Power Research Institute Report 1 020236).	Completed. See August 2014 Update
3.2.1.1.E	The specific MAAP4 analysis case that was used to validate the timing of mitigating strategies in the integrated plan must be identified and should be available on the ePortal for NRC staff to view. Alternately, a comparable level of information may be included in the supplemental response.	Completed. See August 2014 Update

Item number	Interim Staff Evaluation CONFIRMATORY Item	Status
3.2.1.3.A	Outstanding Confirmatory Items regarding the use of the MAAP4 analysis may impact the sequence of events timeline. Any changes to the MAAP4 analysis results will need to be reviewed for impact on the sequence of events timeline. The licensee stated that the final timeline will be time validated once detailed designs are completed, procedures are developed, and the results will be provided in a future six (6) month update.	Not started
3.2.1.3.B	Sequence of Events timing for compensatory actions to control temperature rise in the Main Control Room not resolved.	Started
3.2.1.4.A	Detailed engineering analyses to confirm the ability of FLEX pumps to provide required flow and head capacities are not complete.	Started
3.2.1.4.B	Analysis needs to be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. To be provided in a future six (6) month update.	Started
3.2.1.6.A	Whether or not backup compressed air for valve actuation is required, is contingent on the MAAP4 analyses conclusions. The MAAP4 conclusions will determine if containment venting is necessary.	Completed. See August 2014 Update
3.2.2.A	Final analysis of fuel pool area for steam and condensation impacts regarding access is not complete.	Started
3.2.3.A	There are outstanding issues regarding the acceptability of the MAAP4 analysis. The potential for impact of MAAP4 results on the containment heat removal strategy needs to be reviewed.	Completed. See Aug 2014 Update

Item number	Interim Staff Evaluation CONFIRMATORY Item	Status
3.2.4.2.A	A discussion is needed on the effects of extreme low temperatures (i.e., temperatures below those assumed in the sizing calculation for each battery) on each battery's capability to perform its function for the duration of the ELAP event.	Not started
3.2.4.2.B	Procedure will be developed to address controlling battery room hydrogen concentration.	Started
3.2.4.2.C	Evaluations to address loss of ventilation in the auxiliary equipment electric room and Battery Rooms are not complete.	Not started
3.2.4.2.D	Insufficient information to address impact on elevated temperatures in areas critical to mitigation strategies. For example, initial temperatures assumed in the analyses is not clear, critical components in pump rooms are not identified, etc. Detailed design information is needed.	Not started
3.2.4.4.A	Provisions for portable lighting for area access not clear. More information required.	Not started
3.2.4.4.B	Confirm upgrades to communication system that resulted from the licensee communications assessment. ADAMS Accession Nos. ML 12306A 199 and ML 13056A 135.	Started
3.2.4.6.A	Surface pyrometer temperature readings are required in the torus area. The licensee needs to address habitability and access to the torus area.	Started
3.2.4.6.B	Final GOTHIC analysis for the HPCI room temperature rise is not complete.	Started
3.2.4.6.C	Habitability of the control room should consider temperature limits of NUMARC 87-00 and MIL-STD-1472C.	Started
3.2.4.8.B	Detailed designs will identify comprehensive load lists to confirm conceptual load assumptions.	Not started

Item number	Interim Staff Evaluation CONFIRMATORY Item	Status
3.2.4.8.C	Insufficient information provided regarding FLEX diesel generators and the plant Class 1 E diesel generators isolation to prevent simultaneously supplying power to the same Class 1 E bus and regarding minimum bus voltages during the use of FLEX generators.	Proposed complete. The FLEX diesel generator will not be connected to plant electrical systems during normal operation. During a FLEX event all power to the plant electrical system will be lost per FLEX assumptions. Connection of the FLEX diesel generator requires installation of a special device to allow connection of temporary cables to the associated plant electrical bus. Direction for installation of this device will be controlled by procedures initiated by entry into a FLEX event. Based on this the FLEX diesel generator will not be simultaneously providing power to the busses with the Class 1 E diesel generators.
3.2.4.9.A	The licensee stated in its 6-month update that a modification has been proposed to allow transfer of fuel oil from the 2/3 Emergency Diesel Generator main fuel oil storage tank to the area of the proposed FLEX diesel generators. Need to confirm that the modification is installed and supplies sufficient fuel.	Proposed complete. A strategy to obtain fuel oil from Emergency Diesel Generator main fuel oil storage tanks without a modification was developed. A submersible pump capable of being lowered directly into a main fuel oil storage tank was identified. A procedure is being developed to provide direction for use of the pump and methods to refuel FLEX equipment. Use of the submersible pump allows greater flexibility in that fuel oil can be obtained from more than just the 2/3 Emergency Diesel Generator main fuel oil storage tank. Off-site testing of the submersible pump confirms a minimum pumping capacity of 1.3 gpm (78 gph) for each submersible pump. At the present time the largest fueling need is the FLEX Diesel Generator which has a fuel burn rate of approximately 57 gph at full load. One submersible pump will meet this requirement with margin. The fuel oil use evaluation for equipment requiring refueling in the current strategy identifies approximately 68 gallons per hour (56.7 gph – FLEX generator, 7.6 gph – pump in Ultimate Heat Sink, 4.5 gph – all 6 small portable generators operating). This is within the capacity of 1 submersible fuel oil pump with margin. Multiple pumps have been obtained for use. More than one pump can be in operation at a time which further increases available refueling rates for FLEX equipment. There are 3 Emergency Diesel Generator main fuel oil storage tanks. Each has a Technical Specification minimum volume of 10,000 gallons. With an overall fuel consumption rate of 69 gph each storage tank would

Item number	Interim Staff Evaluation CONFIRMATORY Item	Status
		provide a minimum of 6 days fuel requirements. Within this time off-site support would be available to obtain additional fuel. The above discussion describes the strategy during non-flood conditions. Because the Dresden flood event is precipitation based there is time to prepare for the flood. During those preparations station personnel will install a standpipe on the 2/3 EDG Main Fuel Oil Tank vent line. The standpipe is designed such that additional sections can be added/removed as the flood waters rise and recede. The submersible pump described above will be lowered into the standpipe. A floating platform will provide a working location for personnel and equipment to support pumping fuel oil out of the 2/3 EDG fuel oil tank.
3.2.4.9.B	Assessing and maintaining fuel oil quality for FLEX equipment use was not addressed.	Proposed complete. As identified in the response to 3.2.4.9.A (above) the fuel oil for FLEX equipment will be obtained from the safety related Emergency Diesel Main Fuel Oil Storage tanks. The fuel quality of the tanks is maintained through existing station processes for purchasing safety related fuel oil.
3.2.4.10.A	Final analysis for battery operation with load shed not complete. Need detailed load profile for all mitigating strategies and a detailed discussion of loads that will be shed, how they will be shed, and what are the effects of the shed.	Proposed Complete EC 391973 Rev 0 was developed to evaluate proposed battery load shed to support FLEX events. The evaluation addressed both 125V and 250V battery systems. The evaluation identified that with the load shed the 125V and 250V batteries will maintain acceptable capacity for a minimum of 6 hours. This time supports the FLEX Strategy time line actions.
3.4.A	Details not provided to demonstrate the minimum capabilities for offsite resources will be met per NEI 12-06 Section 12.2.	Started

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. Dresden Nuclear Power Station's 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 (subsequently revised Aug 28, 2013).
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. Dresden Nuclear Power Station Updated Final Safety Analysis Report, Revision 9
4. Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", NEI 12-06, Revision 0, August 2012
5. Dresden's First 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 (August 2013)
6. Dresden's Second 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 (February 2014)
7. Dresden's Third 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 (August 2014)
8. Engineering Change 391973 Rev 000, Extend 125VDC and 250VDC Battery Coping Time with Load Shedding.