



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION I  
2100 RENAISSANCE BLVD.  
KING OF PRUSSIA, PA 19406-2713

May 30, 2017

Mr. Bryan C. Hanson  
Senior Vice President  
Exelon Generation Company, LLC  
President and Chief Nuclear Officer, Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

**SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – TEMPORARY  
INSTRUCTION 2515/191 INSPECTION REPORT 05000317/2017007 AND  
05000318/2017007**

Dear Mr. Hanson:

On April 20, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2. On April 20, 2017, the NRC inspectors discussed the results of this inspection with Mr. Mark Flaherty, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

The inspection examined activities conducted under your licenses as they relate to the implementation of mitigation strategies and spent fuel pool instrumentation orders (EA-12-049 and EA-12-051) and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans, your compliance with the Commission's rules and regulations, and with the conditions of your operating licenses. Within these areas, the inspection involved examination of selected procedures and records, observation of activities, and interviews with plant personnel.

The NRC inspectors did not identify any finding or violation of more than minor significance.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

*/RA/*

Marc S. Ferdas, Chief  
Technical Support and Assessment Branch  
Division of Reactor Projects

Docket Nos. 50-317 and 50-318  
License Nos. DPR-53 and DPR-69

Enclosure:  
Inspection Report 05000317/2017007 and  
05000318/2017007  
w/Attachment: Supplementary Information

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 RidsNrrPMCalvertCliffs Resource  
 RidsNrrDorLPL1 Resource  
 ROPReports Resource

DOCUMENT NAME: G:\DRS\DIRECTOR\Cahill\Calvert IR 2017007FINAL.docx  
 ADAMS Accession No. ML17151A232

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OFFICE	RI/DRS	RI/DRP	RI/DRP		
NAME	CCahill	ADimitriadis	MFerdas		
DATE	5/30/17	5/30/17	5/30/17		

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION I**

Docket Nos. 50-317 and 50-318

License Nos. DPR-53 and DPR-69

Report Nos. 05000317/2017007 and 05000318/2017007

Licensee: Exelon Generation Company, LLC (Exelon)

Facility: Calvert Cliffs Nuclear Power Plant, Units 1 and 2

Location: Lusby, MD

Dates: April 17-20, 2017

Inspectors: C. Cahill, PE, Senior Reactor Analyst, Division of Reactor Safety (DRS)  
S. Anderson, Reactor Engineer, DRS  
C. Roettgen, Resident Inspector (Calvert Cliffs)

Approved by: Marc S. Ferdas, Chief  
Technical Support and Assessment Branch  
Division of Reactor Projects

**SUMMARY**

Inspection Report 05000317/2017007 and 05000318/2017007; 04/17/2017 – 04/20/2017; Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2; Temporary Instruction (TI) 2515/191, Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans.

The inspection covered a one week inspection by one senior reactor analyst, a reactor engineer, and the resident inspector. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

## REPORT DETAILS

### 4. OTHER ACTIVITIES

#### 4OA5 Other Activities

##### TI 2515/191 – Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans

The objective of TI 2515/191, “Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans,” is to verify: (1) that licensees have adequately implemented the mitigation strategies as described in the licensee’s Final Integrated Plan (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16131A638) and the NRC’s plant safety evaluation (ADAMS Accession No. ML16258A446); (2) that the licensees installed reliable water-level measurement instrumentation in their spent fuel pools (SFPs); and (3) that licensees have implemented emergency preparedness enhancements as described in their site-specific submittals and NRC safety assessments, including multi-unit dose assessment capability, enhancements to ensure that staffing is sufficient, and that communications can be maintained during beyond-design-basis external events.

The team verified that plans for complying with NRC Orders EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design Basis External Events,” (ADAMS Accession No. ML12054A735) and EA-12-051, “Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation,” (ADAMS Accession No. ML12056A044) were in place and were being implemented by Exelon. The team also verified that Exelon had implemented staffing and communications plans provided in response to the March 12, 2012, request for information letter and multi-unit dose assessment information provided per COMSECY-13-0010, “Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned,” dated March 27, 2013 (ADAMS Accession No. ML12339A262).

The team discussed the plans and strategies with Exelon personnel, reviewed documentation, completed a tabletop exercise involving a beyond design basis event leading to an extended loss of offsite power and, where appropriate, performed plant walk downs to verify that the strategies could be implemented as stated in Exelon’s submittals and the NRC staff prepared safety evaluation. For most strategies, this included verification that the strategy was feasible, procedures and/or guidance had been developed, training had been provided to plant staff, and required equipment had been identified and staged. Specific details of the team’s inspection activities are described in the following sections. Documents reviewed for each section of this report are listed in the Attachment.

## 1. Mitigation Strategies for Beyond-Design Basis External Events

### a. Inspection Scope

The team examined Exelon's established guidelines and implementing procedures for the beyond-design-basis mitigation strategies. The team assessed how the Exelon staff coordinated and documented the interface/transition between existing off-normal and emergency operating procedures with the newly developed mitigation strategies. The team selected a number of mitigation strategies and conducted plant walk downs with licensed operators and responsible plant staff to assess: the adequacy and completeness of the procedures; familiarity of operators with the procedure objectives and specific guidance; staging and compatibility of equipment; and the practicality of the operator actions prescribed by the procedures, consistent with the postulated scenarios.

The team verified that a preventive maintenance program had been established for the Diverse and Flexible Coping Strategies (FLEX) portable equipment and that periodic equipment inventories were in place and being conducted. Additionally, the team examined the introductory and planned periodic/refresher training provided to the Operations and CCNP staff most likely to be tasked with implementation of the FLEX mitigation strategies. The team also reviewed the introductory and planned periodic training provided to the Emergency Response Organization personnel.

### b. Assessment

Based on samples selected for review, the inspectors verified that Exelon satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant specific submittals and the associated safety evaluation (ADAMS Accession No. ML16258A446) and determined that Exelon was in compliance with NRC Order EA-12-049.

The team verified that Exelon satisfactorily:

- Developed and issued FLEX Support Guidelines (FSGs) to implement the FLEX strategies for postulated external events;
- Integrated their FSGs into their existing emergency operating procedures and off-normal procedures such that entry into and departure from the FSGs are clear when using existing plant procedures;
- Protected FLEX equipment from site-specific hazards;
- Developed and implemented adequate testing and maintenance of FLEX equipment to ensure their availability and capability;
- Trained their staff to assure personnel proficiency in the mitigation of beyond-design-basis events; and
- Developed procedures to ensure that the necessary off-site FLEX equipment will be available from off-site locations.

The team verified that inspector observations identified during the inspection were entered into Exelon's corrective action program, where appropriate.

### c. Findings

No findings were identified.

## 2. Spent Fuel Pool Instrumentation

### a. Inspection Scope

The team examined Exelon's newly installed SFP instrumentation. Specifically, the team verified the sensors were installed as described in the plant specific submittals and the associated safety evaluation, and that the cabling for the power supplies and the indications for each channel are physically and electrically separated. In addition, the team verified that Exelon had evaluated environmental conditions and accessibility of the instrumentation.

The team verified that Exelon had approved procedures for maintenance, testing, calibration, and use of the primary and backup SFP instrumentation channels. The team also verified that the procedures followed the industry guidance contained in Nuclear Energy Institute 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051," "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," and that these procedures were part of an existing Exelon process to be maintained.

### b. Assessment

Based on samples selected for review, the team determined that Exelon satisfactorily installed and established appropriate operating and maintenance controls for the SFP instrumentation as described in the plant specific submittals and the associated safety evaluation. The team determined that Exelon was in compliance with NRC Order EA-12-051.

The team verified that Exelon satisfactorily:

- Installed the SFP instrumentation sensors, cabling, and power supplies to provide physical and electrical separation as described in the plant specific submittals and safety evaluation;
- Installed the SFP instrumentation display in the accessible location, and environmental conditions as described in the plant specific submittals;
- Trained their staff to assure personnel proficiency with the maintenance, testing, and use of the SFP instrumentation; and
- Developed and issued procedures for maintenance, testing, and use of the reliable SFP instrumentation.

The team verified that issues identified during the inspection were entered into Exelon's corrective action program.

### c. Findings

No findings were identified.



### 3. Staffing and Communication Request for Information

#### a. Inspection Scope

Through discussions with plant staff, review of documentation, and plant walk downs, the team verified that Exelon had implemented required changes to staffing, communications equipment, and facilities to support an extended loss of all AC power (ELAP) scenario as described in Exelon's staffing assessment and the NRC safety evaluation. The team also verified that Exelon had implemented dose assessment (including releases from SFPs) capability using site-specific dose assessment software, as described in Exelon's dose assessment submittal.

#### b. Assessment

The team reviewed information provided in Exelon's dose assessment submittal and in response to the NRC's March 12, 2012, request for information letter (ML12053A340), and verified that Exelon satisfactorily implemented enhancements pertaining to Near-Term Task Force (NTTF) Recommendation 9.3, response to a large scale natural emergency event that results in an ELAP to all site units and impedes access to the site.

The team verified the following:

- Exelon satisfactorily implemented required staffing changes to support an ELAP scenario;
- Emergency preparedness communications equipment and facilities were sufficient for dealing with an ELAP scenario; and
- Exelon implemented dose assessment capabilities (including releases from SFPs) using CCNPP site-specific dose assessment software and approach.

The team verified that issues identified during the inspection were entered into Exelon's corrective action program.

#### c. Findings

No findings were identified.

#### 4OA6 Meetings, Including Exit

On April 20, 2017, the team exited the inspection results with Mr. Mark Flaherty, Site Vice President, and other members of the CCNPP staff. The team verified that no proprietary information was retained by team members or documented in this report.

### **ATTACHMENT: SUPPLEMENTARY INFORMATION**

## **SUPPLEMENTARY INFORMATION**

### **KEY POINTS OF CONTACT**

Licensee personnel:

M. Flaherty, Site Vice President  
P. Amos, Site Emergency Planning Manager  
F. Bazyk, Manager, Operations Support  
J. Delgado, Senior Engineer  
M. Fick, Principal Regulatory Engineer  
B. Ficke, Senior Site Emergency Planning Specialist  
D. Geneva, Ops Shift Manager  
K. Greene, Principal Regulatory Engineer  
R. Gretz, Lead Operations Instructor  
J. Huber, Supervisor Facilities  
J. Lyter, Exelon Corporate FLEX Transition Ops/BWR Lead  
R. Pace, Consultant  
S. Pierson, Exelon Corporate FLEX Transition Ops/PWR Lead  
M. Robinson, Senior Emergency Preparedness Specialist  
A. Thorne, Programs Engineer  
J. Wood, Principal Plant Operator

### **LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED**

Opened and Closed:

None

Discussed:

None

### **LIST OF DOCUMENTS REVIEWED**

Procedures:

0-130-04-O-A, FLEX Storage Robust Building (FSRB) Flex Equipment Annual Inventory, Revision 00000  
0-130-05-O-A, FLEX Storage Commercial Building (FSCB) Flex Equipment Annual Inventory, Revision 00000  
0-130-06-O-A, In Plant FLEX Equipment Annual Inventory, Revision 00000  
AOP 3B, Unit One, Abnormal Shutdown Cooling Conditions, Revision 29  
AOP 3B, Unit Two, Abnormal Shutdown Cooling Conditions, Revision 27  
CC-AA-118, Diverse and Flexible Coping Strategies (FLEX) and Spent Fuel Pool Instrumentation Program Document, Revision 2  
CC-CA-118, Calvert Cliffs Implementation of Diverse and Flexible Coping Strategies (FLEX) and Spent Fuel Pool Instrumentation Program, Revision 002  
EOP-7, Unit One, Station Blackout, Revision 020  
EOP-7, Unit Two, Station Blackout, Revision 021  
EP-AA-110-202, CCNPP Dose Assessment, Revision 002  
EP-AA-112-100-F-50, Shift Manager Emergency Director Checklist (CNG), Revision E43  
EP-AA-110-202, CCNPP Dose Assessment, Revision 2  
EP-AA-123, Computer Programs, Revision 10  
ERPIP-825, Meteorological Data Acquisition Methods, Revision 009  
FSG-1, Unit One and Two, Long Term RCS Inventory Control, Revision 004

FSG-2, Unit One and Two, Alternate AFW Suction Source, Revision 002  
 FSG-3, Unit One and Two, Alternate Low Pressure Feedwater, Revision 001  
 FSG-4, Unit One and Two, ELAP DC Bus Load Shed and Management, Revision 003  
 FSG-5, Unit One and Two, Initial Assessment and FLEX Equipment Staging, Revision 001  
 FSG-6, Unit One and Two, Alternate CST Makeup, Revision 003  
 FSG-7-1, Unit One and Two, Loss of Vital Instrumentation and Control Power, Revision 000  
 FSG-7-2, Unit One and Two, Loss of Vital Instrumentation and Control Power, Revision 000  
 FSG-8, Unit One and Two, Alternate RCS Boration, Revision 003  
 FSG-9, Unit One and Two, Low Decay Heat Temperature Control, Revision 001  
 FSG-10, Unit One and Two, Safety Injection Tank Isolation, Revision 001  
 FSG-11, Unit One and Two, Alternate SFP Makeup and Cooling, Revision 001  
 FSG-12, Unit One and Two, Alternate Containment Cooling, Revision 001  
 FSG-13, Unit One and Two, Transition from FLEX Equipment, Revision 00000  
 FSG-14, Unit One and Two, Shutdown RCS Makeup, Revision 003  
 FSG-15, Unit One and Two, Alignment for Area Cooling, Revision 001  
 FSG-16, Unit One and Two, FLEX Communication, Revision 000  
 TQ-AA-113, Northeast Standard ERO Position Attribute and Selection Consideration Matrix,  
 Attachment 4, Revision 30

Work Orders:

C93505486	C93129260	C93217978
C93594475	C93465653	C93471895
C93463198	C93471869	

Other:

Calvert Cliffs Nuclear Power Plants, Units 1 and 2, Capability to perform Offsite Dose  
 Assessment during an Event Involving Multiple Release Sources, June 21, 2013  
 Calvert Cliffs Nuclear Power Plants, Units 1 and 2, Phase 2 Staffing Assessment,  
 October 13, 2014  
 Calvert Cliffs Self-Assessment for TI 191 Pre-Inspection, February 3, 2017  
 JPM FSG-04-3, ELAP BCD Installation, Revision 0.0  
 JPM FSG-04-1, ELAP DC Bus Load Shed, Revision 0.0  
 JPM FSG-04-2, ELAP Extend Use of Installed DC Sources, Revision 0.0  
 N-CC-AA-2016, ERFLEX, 2016 ERO Flex Technical Training, Revision 0  
 N-CC-OPS, SAMG/B.5.b/FLEX Refresher, Revision 00  
 NDurance Fire Hose Specification Sheet  
 NFPA 1961, Standard on Fire Hose, 2007 Edition  
 Open Support Request E37438  
 Shift Orders dated April 20, 2017  
 XX-CIC-AA-FUKULEX, Introduction to CCNPP FLEX, Revision 7

ARs Reviewed:

02651814	02654865	02668068
02668077	03974864	02673993
02683625	02700284	02703141

ARs Generated

03999858  
04000140  
04000142  
04000288  
04000385

**List of Acronyms**

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
AR	Action Request
CCNPP	Calvert Cliffs Nuclear Power Plant
ELAP	Extended Loss of all AC Power
FLEX	Diverse and Flexible Coping Strategies
FSG	FLEX Support Guidelines
NRC	Nuclear Regulatory Commission, U.S.
NTTF	Near Term Task Force
SFP	Spent Fuel Pool
TI	Temporary Instruction