



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

July 28, 2021

Mr. David P. Rhoades
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, UNITS 1 AND 2 – DESIGN
BASIS ASSURANCE INSPECTION (TEAMS) INSPECTION REPORT
05000317/2021010 AND 05000318/2021010**

Dear Mr. Rhoades:

On June 25, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 and discussed the results of this inspection with Mr. Thomas P. Haaf, Site Vice President and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at Calvert Cliffs Nuclear Power Plant, Units 1 and 2.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; and the NRC Resident Inspector at Calvert Cliffs Nuclear Power Plant, Units 1 and 2.

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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Mel Gray, Chief
Engineering Branch 1
Division of Operating Reactor Safety

Docket Nos. 05000317 and 05000318
License Nos. DPR-53 and DPR-69

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV®

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2 – DESIGN BASIS ASSURANCE INSPECTION (TEAMS) INSPECTION REPORT 05000317/2021010 AND 05000318/2021010 DATED JULY 27, 2021

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Numbers: 05000317 and 05000318

License Numbers: DPR-53 and DPR-69

Report Numbers: 05000317/2021010 and 05000318/2021010

Enterprise Identifier: I-2021-010-0026

Licensee: Exelon Generation Company, LLC

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

Location: Lusby, MD

Inspection Dates: June 7, 2021 to June 25, 2021

Inspectors: J. Brand, Reactor Inspector
P. Cataldo, Senior Reactor Inspector
G. Eatmon, Senior Resident Inspector
M. Patel, Senior Reactor Inspector
B. Pinson, Reactor Inspector
J. Schoppy, Senior Reactor Inspector

Approved By: Mel Gray, Chief
Engineering Branch 1
Division of Operating Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a design basis assurance inspection (teams) inspection at Calvert Cliffs Nuclear Power Plant, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

Failure to Follow Scaffold Construction Requirements in Close Proximity to Safety-Related Equipment			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000317/2021010-01 Open/Closed	[H.8] - Procedure Adherence	71111.21M
The team identified a Green finding and associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because Exelon personnel did not adequately accomplish scaffold construction in the safety-related Unit 1 switchgear room in accordance with approved scaffold control procedures.			

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards. Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), inspectors were directed to begin telework. In addition, regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.21M - Design Bases Assurance Inspection (Teams)

The inspectors evaluated the following components and listed applicable attributes, permanent modifications, and operating experience:

Design Review - Risk-Significant/Low Design Margin Components (IP Section 02.02) (4 Samples)

- (1) Unit 1 No. 11 Refueling Water Tank
 - Material condition and installed configuration (e.g., visual inspection/walkdown)
 - Normal, abnormal, and emergency operating procedures
 - Consistency among design and licensing bases and other documents/procedures
 - Maintenance effectiveness and records, and corrective action history reflects current system conditions
 - Calculations
 - Operator Actions
 - Surveillance testing and recent test results consistent with design basis calculations and test procedure acceptance criteria
 - Equipment protection from fire, flood, and water intrusion or spray

The team used Appendix B guidance during the inspection.

- (2) Unit 1 No. 1A Emergency Diesel Generator
- Energy source verified for accident conditions
 - Normal, abnormal, and emergency operating procedures available for decision-making
 - Consistency among design and licensing bases and other documents/procedures
 - System health report, maintenance effectiveness and records, and corrective action history
 - Component controls functional during accident conditions
 - Equipment/environmental controls and qualification
 - Operation and alignment of component consistent with licensing and design bases
 - Operator actions that rely on instrumentation and alarms are available for decision-making
 - Design calculations, assumptions and performance capability
 - Surveillance testing and validation of recent test results
 - Equipment protection (sealing of cable and conduits)
 - Installed configuration of component will support design basis functions
 - Inputs and outputs of the component acceptable during accident conditions

The team used Appendix B guidance during the inspection.

- (3) Unit 1 No. 12 Steam-Driven Auxiliary Feedwater Pump
- Material condition and installed configuration (e.g., visual inspection/walkdown)
 - Normal, abnormal, and emergency operating procedures
 - Consistency among design and licensing bases and other documents/procedures
 - System health report, maintenance effectiveness and records, and corrective action history
 - Design calculations
 - Operator Actions
 - Surveillance testing and recent test results
 - Equipment protection from fire, flood, and water intrusion or spray

The team used Appendix B guidance for Valves, Pumps, Instrumentation, and As-Built System, during the inspection

- (4) Unit 2 No. 23 High Pressure Safety Injection Pump
- Material condition and installed configuration (e.g., visual inspection/walkdown)
 - Normal, abnormal, and emergency operating procedures
 - Consistency among design and licensing bases and other documents/procedures
 - System health report, maintenance effectiveness and records, and corrective action history
 - Equipment/environmental controls and qualification
 - Operator Actions
 - Design calculations

- Surveillance testing and recent test results
- Equipment protection (sealing of cable and conduits)
- Equipment protection from fire, flood, and water intrusion or spray

The team used Appendix B guidance for Valves, Instrumentation, and Electrical Loads, during the inspection.

Design Review - Large Early Release Frequency (LERFs) (IP Section 02.02) (1 Sample)

- (1) Unit 2 Power-Operated Relief Valve (PORV), 2-ERV-402
 - Energy source verified for accident conditions
 - Normal, abnormal, and emergency operating procedures available for decision-making
 - Consistency among design and licensing bases and other documents/procedures
 - System health report, maintenance effectiveness and records, and corrective action history
 - Control Logic; Component Inputs and outputs
 - Equipment/environmental controls and qualification
 - Operation and alignment of component consistent with licensing and design bases
 - Design calculations, assumptions and performance capability
 - Surveillance testing and validation of recent test results
 - Equipment protection (sealing of cable and conduits)

The team used Appendix B guidance for Valves, Instrumentation, and As-Built System, during the inspection.

Modification Review - Permanent Mods (IP Section 02.03) (5 Samples)

- (1) ECP-18-285, Update 120V/480V Breaker Coordination Calculations
- (2) ECP-19-391, 2-MOV-4516 Magnesium Motor Replacement
- (3) ECP-19-485, Pump/Motor Assembly Replacements for 1B, 2B, 2A Emergency Diesel Generators
- (4) ECP-19-658, Update Documents for Flooding in Emergency Core Cooling System Rooms
- (5) ECP-20-248, Generic Equipment Qualification Solution for Replacement of Rosemont Transmitter Model 3514N

Review of Operating Experience Issues (IP Section 02.06) (3 Samples)

- (1) IN 88-23, Potential for Gas Binding of High Pressure Safety Injection Pumps During Loss of Coolant Accidents
- (2) IN 2019-01, Inadequate Evaluation of Temporary Alterations
- (3) IN 2019-08, Flow-Accelerated Corrosion Events

INSPECTION RESULTS

Failure to Follow Scaffold Construction Requirements in Close Proximity to Safety-Related Equipment			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000317/2021010-01 Open/Closed	[H.8] - Procedure Adherence	71111.21M
<p>The team identified a Green finding and associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because Exelon personnel did not adequately accomplish scaffold construction in the safety-related Unit 1 switchgear room in accordance with approved scaffold control procedures.</p> <p><u>Description:</u> On June 7, 2021, during a plant barrier impairment walkdown in the Unit 1 45' switchgear room, the team noted that a scaffold (OL-021-033) erected on March 29, 2021, appeared to be in direct contact with conduit B1A4341 in at least two separate locations. Engineering staff identified that the conduit in question was non-safety-related (NSR); however, since Exelon's scaffold procedure clearly states that "Scaffolding may NEVER directly contact any plant components," contact with the NSR conduit would still be contrary to the scaffold procedure guidance. During a follow-up scaffold walkdown on June 9, 2021, with the NRC inspector, Exelon engineering staff performed a close-up inspection of the conduit in question and identified that the adjacent scaffold pole was in direct contact in one of the two previously questioned locations. During this follow-up walkdown, the NRC inspector identified an additional location where the scaffold was in direct contact with safety-related equipment. Specifically, the 2" scaffold pole was in direct contact with the smaller ½" instrument air tubing associated with 1HVMS- 3938A (11 atmospheric dump valve auxiliary shutdown control transfer hand valve) and 1HVMS-3938B (11 atmospheric dump valve quick open solenoid override hand valve). The team discussed the contact of the scaffold with safety-related equipment with the on-duty shift manager. The shift manager promptly directed scaffold builders to inspect and evaluate the scaffold. On June 10, 2021, the scaffold builders repositioned and adjusted the scaffold to establish at least a 1-inch clearance to all plant equipment. Engineering staff initiated corrective action issue report (IR) 4428640, "Scaffold in Contact with Safety Related Equipment," for the condition adverse to quality.</p> <p>Based on additional inspection, Exelon engineering staff determined that there was no observable damage to the instrument tubing. In addition, engineering staff concluded that, although in contact with the tubing, the installed scaffold restraints would have prevented the scaffolding from moving in the direction of the tubing and that the tubing would not have been damaged to the point of leakage during a seismic event. To bound this past operability assessment, engineering staff also evaluated the impact to plant operations given a tubing break at the contact location. Given a seismic event and plant trip, a tubing break at that location would likely result in diversion of air away from the positioner for air-operated valve 1CV3938, the 11 steam generator atmospheric dump valve (ADV), and failure of the ADV to open as designed during the plant transient. Although this would complicate the operators' response to the event, the turbine bypass valves would remain available and the operators would still be able to operate the ADV manually. Additionally, a tubing break without a plant trip would result in a control room alarm for lowering air pressure and most likely addressed by operators through procedure AOP-7D, "Loss of Instrument Air." The team acknowledged engineering's assessment; however, the inspectors concluded that the placement of the larger scaffold pole in direct contact with the smaller instrument tubing represented an</p>			

increased probability of tubing failure during a seismic event.

The team identified that Exelon staff constructed and approved the scaffold contrary to the scaffold control procedure guidance. Specifically, MA-CA-796-024-1001, "Calvert Rigging and Scaffold Control," Revision 7, Section 5.1 states "Scaffold Builders shall maintain station-specific clearances from any plant equipment. See station-specific clearance attachments." Attachment 9, "Station-Specific Clearance and Bracing Requirements," states that "Scaffolding may NEVER directly contact any plant components." Contrary to this requirement, the scaffold builders erected the scaffold, and subsequently, engineering staff approved the scaffold, with direct contact between the scaffold and safety-related instrument tubing in the Unit 1 switchgear room.

Corrective Actions: Exelon personnel relocated the scaffold to ensure no direct contact with plant equipment and to ensure that the scaffold was adequately braced. Exelon personnel performed extent-of-condition walkdowns of accessible scaffolding throughout both units. On June 23, 2021, engineering issued "White Paper Response to the Scaffold Discrepancies Noted by the NRC during 2021 DBAI," in response to the team's question regarding apparent performance gaps in the scaffold building process.

Corrective Action References: IR 04428640

Performance Assessment:

Performance Deficiency: A scaffold was built and approved contrary to the scaffold control procedure guidance. Specifically, the scaffold was in direct contact with safety-related and NSR equipment in the Unit 1 45' switchgear room.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, direct contact between the larger scaffold poles and the smaller safety-related tubing increased the probability of tubing failure following a seismic event.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The team used IMC 0612, Appendix E, "Examples of Minor Issues," to inform the screening. The team noted that the performance deficiency was similar to Example 4.a, in that the performance deficiency was associated with the design control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the subsequent engineering evaluation confirmed that the affected safety-related tubing would be subject to seismic induced pipe loads that had not been considered in the original analysis and increased the probability of pipe failure during accident mitigation.

Cross-Cutting Aspect: H.8 - Procedure Adherence: Individuals follow processes, procedures, and work instructions. The team identified that Exelon personnel did not adequately accomplish scaffold construction in the safety-related Unit 1 switchgear room in accordance with approved scaffold control procedures.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.

Exelon procedure MA-CA-796-024-1001, "Calvert Rigging and Scaffold Control," Revision 7, Section 5.1 states "Scaffold Builders shall maintain station-specific clearances from any plant equipment. See station-specific clearance attachments." Attachment 9, "Station-Specific Clearance and Bracing Requirements," states that "Scaffolding may NEVER directly contact any plant components."

Contrary to the above, from March 29, 2021, to June 10, 2021, Exelon personnel constructed and maintained a scaffold with direct contact between the scaffold and safety-related instrument tubing in the Unit 1 switchgear room.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On June 25, 2021, the inspectors presented the design basis assurance inspection (teams) inspection results to Mr. Thomas P. Haaf, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date	
71111.21M	Calculations	CA04581	Evaluation of Maximum HPSI and LPSI Flow for Containment Response Evaluation	Revision 3	
		CA05689	Documentation of HPSI Pump Curve Use as an Input to Design Bases Analysis	Revision 0	
		CA10120	Gas Accumulation Calculation on the High Points of SI and CS Suction Piping for CCNPP Units 1 and 2	Revision 0	
		CA10121	Gas Accumulation Calculation on the High Points of SI and CS Discharge Piping for CCNPP Units 1 and 2	Revision 0	
		E-88-015	Diesel Generator Loading Calculation	Revision 6	
		E-90-088	Protective Relay Setpoint Calculation for 480V Breakers	Revision 0	
		E-92-046	Diesel Generator LOCI and Shutdown Sequence Voltage Profile	Revision 4	
		IC-88-15	Refueling Water Storage Tank Levels and Capacities	Revision 0	
		M-90-196	Time Response Calculation for Isolation of a Flooding Event in the Aux Building and Intake Structure where the Room Specific Indication for the Control Room	Revision 0	
	Corrective Action Documents	02663759			
		02670533			
		02713145			
		03950294			
		04054643			
		04054778			
	04104640				
	04113592				
	04115510				
	04125536				
	04152920				
	04156632				
	04186249				
	04192991				
	04230952				

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		04241742 04242026 04284726 04314005 04319825 04321068 04321267 04321510 04321540 04322504 04327390 04429419 04334605 04377208 04383082 04397735 04415554 04427334 04425600		
	Corrective Action Documents Resulting from Inspection	04428088 04428181 04428393 04428429 04428436 04428444 04428455 04428609 04428610 04428615 04428632 04428640 04428775 04428795 04428797		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		04428798 04428881 04429394 04429396 04429397 04429398 04429482 04429620 04429723 04429925 04430117 04430166 04430775 04430793 04430847 04430849 04430850 04430874 04431022 04431098 04431361 04431408 04431496 04431527 04432138		
	Drawings	18002-0083SH0043	Elementary Diagram Emergency Fast Start Signal	Revision 3
		18002-0083SH0053	Elementary Diagram EDG Breaker Tripping Signal and Cool Down Cycle	Revision 2
		18002-0083SH0067	Elementary Diagram Normal and Emergency Shutdown Signal	Revision 2
		18002-0083SH0071	Elementary Diagram Emergency Shutdown and Due to Electrical Faults	Revision 3
		61601SH0002	Turbine Building Barriers for SW Piping Plans, Sections, &	Revision 0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Details	
	Engineering Changes	ECP-15-000727-MU-02	Refueling Water Tank Level(s) and Capacity	Revision 1
		ECP-16-000026	Replace Unit 1 and Unit 2 RWT Level Instrumentation	Revision 3
	Miscellaneous	CC1R25	Calvert Cliffs Nuclear Power Plant, Flow Accelerated Corrosion and Erosion Programs, 2020 Post Outage Summary Report, Unit 1	05/08/2020
		CC2R24	Calvert Cliffs Nuclear Power Plant, Flow Accelerated Corrosion and Erosion Programs, 2021 Post Outage Summary Report, Unit 2	04/14/2021
		STP M-502-1	Calibration Check of #11 4kV Bus LOCI and Shutdown Sequencer	2/22/21
		STP M-651C-1A	SIAS and UV Trip Bypass Test for 1A Diesel Generator	5/28/21
		STP O-4A-1	"A" Train Integrated Engineered Safety Features Test	3/7/20
		STP O-5A12-1	12 Auxiliary Feedwater Pump Quarterly Surveillance Test	3/11/20
		STP O-5A12-1	12 Auxiliary Feedwater Pump Quarterly Surveillance Test	6/25/20
		STP O-5A12-1	12 Auxiliary Feedwater Pump Quarterly Surveillance Test	10/16/20
		STP O-5A12-1	12 Auxiliary Feedwater Pump Quarterly Surveillance Test	4/20/21
		STP O-73H-1	AFW Pump Large Flow Test	2/13/20
		STP O-73H-1	AFW Pump Large Flow Test	3/11/20
		NDE Reports	IHI Project 17-01-443	Automated Ultrasonic Examination of the Reactor Water Storage Tank at Calvert Cliffs Unit 1 Nuclear Power Plant
	Procedures	CC-AA-201	Plant Barrier Control Program,	Revision 13
		OI-32A	Auxiliary Feedwater System	Revision 43
	Work Orders	C93612835 C93614275 C93651457 C93686595 C93746932 C93746941 C93307532 C93660721 C93307532 C93201391		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		C93635797 C93602788 C91953304 C92348186 C92758110 C92814953 C93102316 C93449616 C93642803 C93646926 C93646932 C93659256 C93666007 C93700574 C93702793 C93702794 C93708238 C93722103 C93728052 C93728809 C93729482 C93742367 C93771781		