



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION I  
2100 RENAISSANCE BOULEVARD, SUITE 100  
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

August 29, 2019

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: JAMES A. FITZPATRICK NUCLEAR POWER PLANT – DESIGN BASIS  
ASSURANCE INSPECTION (TEAMS) INSPECTION REPORT  
05000333/2019011

Dear Mr. Hanson:

On August 1, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at James A. FitzPatrick Nuclear Power Plant and discussed the results of this inspection with Mr. Timothy Peter, Plant Manager, 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.a of the Enforcement Policy.

If you contest the violation or 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 FitzPatrick.

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/**

Mel Gray, Chief  
Engineering Branch 1  
Division of Reactor Safety

Docket No. 05000333  
License No. DPR-59

Enclosure:  
As stated

cc w/ encl: Distribution via LISTSERV®

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT – DESIGN BASIS  
 ASSURANCE INSPECTION (TEAMS) INSPECTION REPORT  
 05000333/2019011 DATED AUGUST 29, 2019

DISTRIBUTION:

DLew, RA (R1ORAMAIL RESOURCE)  
 RLorson, DRA (R1ORAMAIL RESOURCE)  
 DCollins, DRP (R1DRPMAIL RESOURCE)  
 BWellington, DRP (R1DRPMAIL RESOURCE)  
 JYerokun, DRS (R1DRSMAIL RESOURCE)  
 PKrohn, DRS (R1DRSMAIL RESOURCE)  
 ECarfang, DRP  
 LCline, DRP  
 SHaney, DRP  
 EMiller, DRP, SRI  
 ATrudell, DRP, AA  
 DDodson, RI OEDO  
 RidsNrrPMFitzPatrick Resource  
 RidsNrrDorlLpl1 Resource  
 ROPReports Resource

DOCUMENT NAME: G:\DRS\Engineering Branch 1\-- Schoppy\Fitz DBAI IR 2019011.docx  
 ADAMS ACCESSION NUMBER: ML19241A380

<input checked="" type="checkbox"/> SUNSI Review		<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive		<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	
OFFICE	RI/DRS	RI/DRS	RI/DRP	RI/DRS	
NAME	JSchoppy	FArner	ECarfang	MGray	
DATE	8/26/19	8/26/19	8/26/19	8/29/19	

OFFICIAL RECORD COPY

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

Docket Number: 05000333

License Number: DPR-59

Report Number: 05000333/2019011

Enterprise Identifier: I-2019-011-0022

Licensee: Exelon Generation Company, LLC

Facility: James A. FitzPatrick Nuclear Power Plant

Location: Scriba, NY

Inspection Dates: July 14, 2019 to August 3, 2019

Inspectors: J. Schoppy, Senior Reactor Inspector (Team Lead)  
F. Arner, Senior Reactor Analyst  
C. Baron, NRC Mechanical Contractor  
N. Floyd, Senior Reactor Inspector  
J. Kulp, Senior Reactor Inspector  
H. Leake, NRC Electrical Contractor

Approved By: Mel Gray, Chief  
Engineering Branch 1  
Division of 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) at James A. FitzPatrick Nuclear Power Plant 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 Include Appropriate Correction Factors for Lake Level in Emergency Service Water Test Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000333/2019011-01 Open/Closed	None (NPP)	71111.21M
The team identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, Exelon failed to include appropriate correction factors for lake level in procedure ST-8Q, "Emergency Service Water (ESW) Comprehensive Pump Test (IST)," Revision 51. This failure resulted in non-conservative acceptance criteria for ESW flowrates to safety-related components.			

### 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.

## 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) (5 Samples)

#### (1) **4.16KV Bus 10600 (71H06)**

- 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
- Control logic
- Design calculations
- Surveillance testing and recent test results
- Environmental conditions
- Contactor and fuse ratings; Component adequacy for minimum voltage
- Equipment protection from fire, flood, and water intrusion or spray

The team used Appendix B guidance for *Instrumentation, Circuit Breakers and Fuses, Cables, Electric Loads, and Motor Control Centers (MCCs)*.

#### (2) **B Emergency Diesel Generator (Electrical)**

- 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
- Control logic
- Design calculations

- Surveillance testing and recent test results
- Environmental conditions
- Contactor and fuse ratings; Component adequacy for minimum voltage
- Protection coordination; Load in-rush and full load current
- Range, accuracy, and setpoint of installed instrumentation
- Equipment protection from fire, flood, and water intrusion or spray

The team used Appendix B guidance for *Instrumentation, Circuit Breakers and Fuses, Cables, Electric Loads, and As-Built System*.

(3) **A Emergency Service Water Pump (46P-2A)**

- 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
- Design calculations
- Surveillance testing and recent test results
- System and component level performance monitoring
- Equipment protection from fire, flood, and water intrusion or spray
- Heat removal cooling water and ventilation

The team used Appendix B guidance for *Valves, Pumps, Instrumentation, and As-Built System*.

(4) **Fire Protection Piping Integrity to Preclude and/or Mitigate Internal Flooding in the Relay Room, Battery Corridor, or North Tunnel**

- 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
- 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
- Verify that component degradation is monitored

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

(5) **High Pressure Coolant Injection Pump and Turbine**

- 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
- Design calculations
- Surveillance testing and recent test results
- System and component level performance monitoring
- Equipment protection from fire, flood, and water intrusion or spray
- Heat removal cooling water and ventilation

The team used Appendix B guidance for *Valves, Pumps, Instrumentation, and As-Built System*.

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

(1) **B RHR Torus Cooling Valve (10MOV-34B)**

- 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, Cables, Electric Loads, and As-Built System*.

Modification Review - Permanent Mods (IP Section 02.03) (4 Samples)

- (1) Replacement of Valve Stem and Wedge Pin for Anchor-Darling Double Disc Gate Valves (EC 0000624991)
- (2) Evaluation of Code Reconciliation of Later Code Years for Use of Revised Allowable Stresses (EC 0000625045)
- (3) 10MOV-89A/B Replacement (EC 9000067365)
- (4) Installation, Testing, and Return to Service of EC 17239 for 71INV-3B (EC 9000017249)



## Review of Operating Experience Issues (IP Section 02.06) (2 Samples)

- (1) NRC Information Notice 2018-07: Pump/Turbine Bearing Oil Sight Glass Problems
- (2) Electroswitch Corporation 10 CFR Part 21 (EN 51915)

### **INSPECTION RESULTS**

Failure to Include Appropriate Correction Factors for Lake Level in Emergency Service Water Test Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000333/2019011-01 Open/Closed	None (NPP)	71111.21M
<p>The team identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." Specifically, Exelon failed to include appropriate correction factors for lake level in procedure ST-8Q, "Emergency Service Water (ESW) Comprehensive Pump Test (IST)," Revision 51. This failure resulted in non-conservative acceptance criteria for ESW flowrates to safety-related components.</p>			
<p><u>Description:</u> The team reviewed test procedure ST-8Q, "Emergency Service Water (ESW) Comprehensive Pump Test (IST)," Revision 51. In addition to evaluating the test results for in-service test acceptance criteria, Exelon staff used the test procedure to evaluate if flow was adequate to supplied ESW components. The team noted that ST-8Q, Attachment 4 included correction factors to account for the differences between test conditions and ESW system design conditions. These correction factors were applied to the design flows for each component to establish "target flows" to be used as acceptance criteria for the ESW system comprehensive test. The team noted that the correction factor for lake level for the emergency diesel generator jacket water heat exchangers was listed as "0" and questioned this factor as, based on the system design and engineering principles, the ESW flow through the emergency diesel generator jacket water heat exchangers should vary directly with lake level (the ESW pump suction source). Subsequently, upon further review, engineering determined that the correction factor was incorrect. The incorrect coefficient was the result of an error in calculation 01-107, "Emergency Service Water Flow Response to Variations in Lake Level, Strainer Differential Pressure and Pump Speed," Revision A. The results of this calculation were used in calculation JAF-CALC-SWS-00621, "Flow Equations for ST-8Q Acceptance Criteria," Revision 3, to develop correction factors for the subject test procedure. The incorrect factors were also included in Attachment 3 of test procedures ST-8QA, "Testing of ESW Loop A (IST)," Revision 4, and ST-8QB, "Testing of ESW Loop B (IST)," Revision 4. On July 30, 2019, Exelon staff initiated a corrective action issue report (AR 04268131) to address this issue.</p>			
<p>During the inspection, Exelon engineering personnel reviewed recent comprehensive ESW test results and determined that in several cases ESW flows to some safety-related components would have had negative margin if appropriate correction factors for lake level had been applied. In accordance with test procedure ST-8Q, failure to meet target component flows would have required additional engineering evaluation or testing to verify operability. Exelon engineering personnel reviewed lake level data from August 2014 through July 2019 and determined that the minimum lake level was approximately 243 feet, similar to the actual lake level during the most recent ESW system comprehensive test. Engineering</p>			

staff determined that based on this historical data that there was no loss of operability or functionality due to this finding during this time period. The team found these conclusions to be reasonable. The team noted that the licensee accepted vendor calculation 01-107 on January 21, 2002, and did not identify the calculation errors that led to non-conservative correction factors at that time.

Corrective Actions: Exelon personnel entered the issue into their corrective action program and performed an evaluation to determine the impact of these errors. Exelon's evaluation provided reasonable assurance that the ESW system was operable.

Corrective Action Reference: Action Request 04268131

Performance Assessment:

Performance Deficiency: The team determined that the failure to include appropriate correction factors for lake level in ESW test procedures was a performance deficiency that was reasonably within the licensee's ability to foresee and prevent.

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, failure to include appropriate correction factors for lake level in ESW test procedures resulted in non-conservative acceptance criteria for ESW flowrates to safety-related components. Additionally, the performance deficiency was similar to IMC 0612, Appendix E, "Example of Minor Issues," Question 3.J in that there was reasonable doubt of operability of the ESW system because non-conservative acceptance criteria could have resulted in inadequate ESW flow to safety-related equipment under design basis lake level conditions.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding was evaluated using the significance determination process in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings." Because the finding impacted the Mitigating Systems cornerstone, the team screened the finding through IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," using Exhibit 2, "Mitigating Systems Screening Questions." The finding was determined to be of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability.

Cross-Cutting Aspect: Not Present Performance. No cross cutting aspect was assigned to this finding because the inspectors determined the finding involved a historical design issue not indicative of current performance. Specifically, the associated ESW hydraulic model (including calculation 01-107) was not changed within the last three years and there was no recent operating experience that was directly applicable to the performance deficiency.

Enforcement:

Violation: The team identified a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that

deviations from such standards are controlled. Contrary to the above, between January 21, 2002, and July 30, 2019, Exelon did not establish measures to assure that regulatory requirements and the design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, Exelon failed to include appropriate correction factors for lake level in procedure ST-8Q "Emergency Service Water (ESW) Comprehensive Pump Test (IST)," Revision 51.

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 August 1, 2019, the inspectors presented the design basis assurance inspection (teams) results to Mr. Timothy Peter, Plant Manager, and other members of the licensee staff.

## DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21M	Calculations	99-123	Assessment of the Emergency Service Water System to Provide Minimum Required Safety Related Flows with the Valves 15MOV-102 and 15MOV-103 Open	A
		JAF-CALC-09-00016	JAF Auxiliary Power System Analysis	3
		JAF-CALC-11-00002	James A. Fitzpatrick Fast Bus Transfer Analysis	0
		JAF-CALC-EDG-03358	JAF Single Emergency Diesel Generator Loading	0
	Corrective Action Documents	AR 03997323		
		AR 04073961		
		AR 04104530		
		AR 04156632		
		AR 04160339		
		AR 04160340		
		AR 04220548		
		AR 04224342		
		AR 04249656		
		AR 04252625		
		AR 04261707		
		AR 04263528		
		AR 04264656		
		AR 04264855		
		AR 04264864		
		AR 04266746		
		AR 04267824		
		CR-JAF-2010-03689		
		CR-JAF-2016-00244		
	Corrective Action	04261707		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Documents Resulting from Inspection	04264295		
		04264535		
		04264577		
		04264651		
		04264656		
		04264855		
		04264864		
		04264891		
		04264926		
		04264929		
		04265097		
		04265126		
		04265259		
		04265514		
		04267249		
		04267262		
		04267278		
		04267291		
		04268131		
		04268271		
		04268900		
	Drawings	MSK-1999	Service Water Piping – Screen Well & Tunnels	2
	Engineering Changes	622093	EC for Replacement of EQ Electros witch Branded Isolation Switches Currently Installed in Reliance Electric Safe Shutdown Panels	0
		67365	R22: 10MOV-89A/B Replacement	0
	Engineering Evaluations	JAF-RPT-12-00001	JAF 115 kV Bus Voltage Evaluation with Replacement 115/4.16kV Transformers (71T-2 and 71T-1)	0
		JF-PRA-012	Internal Flood Evaluation Summary Notebook	0
	Miscellaneous	PES-S-006	Code Reconciliation	6
	Procedures	MA-AA-716-012, Attachment 2	MOV Post Maintenance Test Matrix	23

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		MA-AA-734-400	Constant Level Oiler and Sight Glass Maintenance	2
		OP-15	High Pressure Coolant Injection	64
		ST-4N	HPCI Quick-Start, Inservice, and Transient Monitor Test (IST)	1/21/14 and 7/24/19
		ST-8Q	Testing of the Emergency Service Water System (IST)	performed 4/13/19