Exelon Generation

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Patrick D. Navin
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JAFP-20-0032
April 14, 2020

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

James A. FitzPatrick Nuclear Power Plant
Renewed Facility Operating License No. DPR-059
NRC Docket No. 50-333

Subject: LER: 2020-002, Unanalyzed Condition Due to Unprotected Control Circuits Running Through Multiple Fire Areas

Dear Sir or Madam:

This report is being submitted pursuant to 10 CFR 50.73(a)(2)(ii)(B).

There are no new regulatory commitments contained in this report.

Questions concerning this report may be addressed to Mr. Richard Sullivan, Regulatory Assurance Manager, at (315) 349-6562.

Sincerely,

Patrick D. Navin
Site Vice President

PDN/RS/hm

Enclosure: LER: 2020-002, Unanalyzed Condition Due to Unprotected Control Circuits Running Through Multiple Fire Areas

cc: USNRC, Region I Administrator
USNRC, Project Manager
USNRC, Resident Inspector
INPO Records Center (IRIS)

NRC FORM 366 (04-2018)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. Facility Name	2. Docket Number	3. Page
James A. FitzPatrick Nuclear Power Plant	05000333	1 OF 3

4. Title

Unanalyzed Condition Due to Unprotected Control Circuits Running Through Multiple Fire Areas

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
									N/A	N/A
2	20	2020	2020	- 002	- 00	04	14	2020	Facility Name N/A	Docket Number N/A

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (*Check all that apply*)			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☑ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
100	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Mr. Richard Sullivan, Regulatory Assurance Manager	315-349-6562

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ **Yes** (If yes, complete 15. Expected Submission date) ☑ **No**				

Abstract (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

During a review of industry Operating Experience, James A. FitzPatrick Nuclear Power Plant (JAF) identified that unprotected control circuits for non-safety related oil pumps routed through different fire areas. The concern is that a postulated fire in one area can cause short circuits potentially resulting in secondary fires or cable failures in other fire areas where the cables are routed.

The control circuits for the Turbine Generator Emergency Bearing Lube Oil Pump (94P-2), Emergency Seal Oil Pump (94P-13), and Reactor Feed Pump Turbine Emergency Oil Pumps (31P-7A and 31P-7B) are unfused and would not be protected. Cables for these control circuits are routed in safety-related trays with safety-related cables thru fire zones in Battery Charger Rooms, Battery Room Corridor, Cable Spreading Room, Relay Room, and Control Room.

The cause of the condition is that the original plant design, prior to 10 CFR 50 Appendix R, did not include overcurrent protection for control circuits in all applicable Safe Shutdown Analysis circumstances. Compensatory actions were established for the affected Fire Zones until the affected circuits were modified.

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NARRATIVE

Background

The James A. FitzPatrick Nuclear Power Plant (JAF) 10 CFR 50 Appendix R Safe Shutdown Analysis is based on the occurrence of a single fire. The only failures that are considered are those directly attributable to the fire, and spurious operations that can be postulated to occur as a result of the fire. No other failures are assumed to occur (i.e., single failure). Fire areas are established to meet the separation requirements of Section III.G of Appendix R for safe shutdown systems.

It is postulated that a fire in one fire area could cause a short-circuit resulting in an overcurrent condition that overheat cables, and then possibly produce secondary fires in other fire areas where the cables are routed. Secondary fires or cable failures are outside the assumptions of the 10 CFR 50 Appendix R Safe Shutdown Analysis. Fuses in electrical circuits prevent this type of fire propagation.

Event Description

On June 24, 2019, during a review of industry operating experience, Electrical Engineering identified similar conditions at JAF where non-safety related direct current (DC) control circuits lack adequate overcurrent protection. Specifically, the control circuits for the Turbine Generator Emergency Bearing Lube Oil (EBOP) Pump (94P-2), the Emergency Seal Oil Pump (ESOP) (94P-13), and the Reactor Feed Pump Turbine (RFPT) DC Emergency Oil Pumps (31P-7A and 31P-7B) are unfused. Circuit breakers associated with these control circuits are insufficient to prevent a postulated overcurrent event from damaging additional cables or propagating secondary fire because the circuit breakers are designed to protect the power supply to each pump and not the control circuit portion. Portions of these non-safety related control cables are routed in safety-related trays with safety-related cables thru some fire zones.

This event was initially reported to the NRC on June 24, 2019 (ENS 54130) and letter JAFP-19-0080 dated August 23, 2019 (LER: 2019-002-00). An engineering analysis determined that no credible hot short scenario will result in damage to adjacent cables in other fire zones and the current configuration would not degrade plant safety. Based on this analysis, ENS 54130 and LER 2019-002-00 were withdrawn by letter JAFP-19-0095 dated September 30, 2019.

The adequacy of the analysis was later challenged, and a conservative decision was made to implement actions per Technical Requirement Manual (TRM) 3.7.M Fire Barrier Penetrations. In February 2020, the site determined that the short circuit current would exceed the values assumed in the initial evaluation resulting in temperatures in excess of the cable insulation rating of 250C. As a result, the event was reported to the NRC on February 20, 2020 (ENS 54533) per 10 CFR 50.72(b)(3)(ii)(B). The required actions of the Technical Requirement Manual (TRM) 3.7.M remained in place.

Event Analysis

The failure mechanism is overheating of a faulted (inadequately protected) cable that causes damage to that cable and to other cables routed in common enclosures (cable trays, conduits, panels, etc.). This creates the potential for a fire in one fire area to damage cables located in a different fire area, which could impact the equipment credited for fire safe shutdown and possibly invalidate credited safe shutdown methods. Based on a review of the cables contained within common enclosures, additional failures resulting

from postulated secondary fires or cable failures were evaluated.

For Fire Area 03, Automatic Depressurization System (ADS) [EIIS identifier: SB], Control Room Ventilation [VI], and High-Pressure Coolant Injection System (HPCI) [BJ] are impacted by the common enclosure concern as a result of the unprotected control cables.

Since the degree of separation for redundant safe shutdown trains was lacking, the event is being submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B).

There were no actual consequences caused by this condition. A detailed risk evaluation (JF-SDP-001) determined that the unfused circuit condition had a very low safety significance.

Cause

The cause of this condition was overcurrent protection was not installed in all applicable control circuits which can impact the 10 CFR 50 Appendix R Safe Shutdown Analysis. This condition has existed since original plant design.

Similar Events

FitzPatrick, LER: 2013-003-00, Unfused DC Ammeter Circuits Result in Unanalyzed Condition, JAFP-13-0158, dated December 26, 2013.

FitzPatrick, LER: 2019-002-00, Unanalyzed Condition due to Unprotected Control Circuits Running through Multiple Fire Areas

Corrective Actions

An operations department standing order was initiated to establish compensatory actions for the affected fire areas in accordance with TRM 3.7.M until the circuit protective devices were installed. The control circuits for the affected circuits were modified to add fuses.

References

JAF Issue Report IR 04319657, Feb. 20, 2020

JAF Issue Report IR 04259118, June 26, 2019

JAF-RPT-FPS-01975, Revision 5, 10CFR50 Appendix R Safe Shutdown Analysis Report (SSAR)