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JAFP-11-0134
November 15, 2011

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

SUBJECT: LER: 2011-001-01, Reactor Core Isolation Cooling System Inoperable Longer Than Allowed By Technical Specifications
James A. FitzPatrick Nuclear Power Plan
Docket No. 50-333
License No. DPR-59

Dear Sir or Madam:

This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications..." and amends the report previously submitted on March 8, 2011.

There are no commitments contained in this report.

Questions concerning this report may be addressed to Mr. Joseph Pechacek, Licensing Manager, at (315) 349-6766.

Sincerely,

Michael J. Colomb
Site Vice President

MJC/JP/jo

Enclosure: JAF LER: 2011-001-01, Reactor Core Isolation Cooling System Inoperable Longer Than Allowed By Technical Specifications

cc:
USNRC, Region 1
USNRC, Resident Inspector
USNRC, Project Directorate
INPO

Document Components:
001 Transmittal Letter with Enclosure

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
James A. FitzPatrick Nuclear Power Plant	05000333	1 OF 5

4. TITLE

Reactor Core Isolation Cooling System Inoperable Longer Than Allowed By Technical Specifications

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
09	23	2010	2011	– 001 –	01	11	15	2011	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

Mode 01

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Mr. Joseph Pechacek, Licensing Manager	(315) 349-6766

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	EJ	42	G080	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ Yes (If yes, complete 15. *EXPECTED SUBMISSION DATE*) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On January 7, 2011, with the plant operating in Mode 1 at 100% power, 13MOV-131, Reactor Core Isolation Cooling (RCIC) Steam Admission Isolation Valve failed to stroke full open during surveillance test ST-24J. Troubleshooting determined the most probable cause to be loose connections in the motor control circuit, 71BMCC-3-OB1(MC). Preventive Maintenance (PM) had been performed on the motor control circuit on September 23, 2010, during Refueling Outage 19. Because the identified condition could have resulted in a failure of the RCIC system to operate properly, if needed, it is considered that the RCIC System was Inoperable from the time that RCIC was required to be Operable on October 16, 2010, until the completion of the Post Maintenance Testing on January 8, 2011. Since Limiting Condition for Operation (LCO) 3.5.3 requires RCIC to be Operable in Mode 1 and in Modes 2 and 3 with steam dome pressure greater that 150 psig, this period of Inoperability exceeded the Technical Specification allowed out of service time.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV N0.	
James A. FitzPatrick Nuclear Power Plant	05000333	2011 –	001	– 01	2 OF 5

NARRATIVE

EVENT DESCRIPTION:

On January 7, 2011, with the plant operating in Mode 1 at 100% power, 13MOV-131, Reactor Core Isolation Cooling (RCIC) System [BN] Steam Admission Isolation Valve failed to stroke full open during surveillance test ST-24J, RCIC Flow Rate and Inservice Test. Although the valve failed to go full open, it opened far enough to allow the RCIC system to achieve rated speed, flow, and pressure within the required system response time.

Troubleshooting determined the most probable cause to be loose connections in the 125 VDC [EJ] motor control circuit. Loose connections were identified going to contactors 42-1O, 42-2O, and 42-2C, in motor control circuit 71BMCC-3-OB1(MC). Based on the strip chart recording, taken during the performance of ST-24J, the observed failure was the result of de-energizing the 42-2O contactor coil. When the 42-2O contactor coil de-energized, the seal-in contact maintaining power to the 42-1O and 42-2O contactors and a main contact in the DC motor series field opened. This fully de-energized the motor operator prior to fully opening the steam admission valve (13MOV-131).

Preventive maintenance (PM) had been performed on the motor control circuit on September 23, 2010, during Refueling Outage (RO) 19. A similar failure occurred on October 29, 2010, during ST-24J. At that time the failure was attributed to a lack of stem lubrication causing the motor torque switch to open on high torque. Motor operated valve 13MOV-131 stroked properly following stem cleaning and lubricating and the system satisfactorily passed the post maintenance test and subsequent surveillance testing. The actual cause of the deficiency was masked by 1) the intermittent nature of the opening of the circuit; and 2) the proper response after the valve stem was lubricated.

When the problem occurred again on January 7, 2011, a new Failure Modes and Effects Analysis (FMEA) and further trouble shooting of the control circuit was performed. The FMEA and troubleshooting identified the loose connections to the motor control contactors.

The loose connections were un-lugged compression type connections. This particular style of terminal connection uses a base with a center tapped inverted u-shaped retention plate tightened by a screw inserted through the center tap. Leads are inserted under the retention plate on either side of the screw and the connection is tightened by torquing the screw such that the leads are secured between the base and the retention plate. At the time of discovery the leads associated with the 42-1O, 42-2O, and 42-2C contactor coils were determined to be loose, and the lead to the 42-2O contactor coil could be removed from the terminal with minimal force.

The PM performed on September 23, 2010, requires checking leads for tightness. This is accomplished by hand-checking the tightness by gently manipulating the wire. The PM does not require a tightness check of the termination using a screw driver or other tool.

The identified condition could have resulted in a failure of the RCIC system to operate properly, if needed. Because RCIC is not required to be Operable during Mode 2 (Start-up) until steam dome pressure is greater than 150 psig, it is considered that the RCIC System was Inoperable from the time that RCIC was required to be Operable on October 16, 2010, until the completion of the Post Maintenance Testing on January 8, 2011. Since LCO 3.5.3 requires RCIC to be Operable in Mode 1 and in Modes 2 and 3 with steam dome pressure greater that 150 psig, this period of Inoperability exceeded the Technical Specification allowed out of service time. On October 23, 2010, during the period of RCIC Inoperability, the HPCI system was also Inoperable for a period of approximately 20 hours and 31 minutes from 0023 to 2054.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV N0.	
James A. FitzPatrick Nuclear Power Plant	05000333	2011 –	001	– 01	3 OF 5

BACKGROUND:

The RCIC System is comprised of various components which include pumps, valves, piping, and instrumentation. The RCIC System is designed to operate either automatically or manually following Reactor Pressure Vessel (RPV) isolation accompanied by a loss of coolant flow from the feedwater system to provide adequate core cooling and control of the RPV water level under these conditions. The High Pressure Coolant Injection (HPCI) [BJ] and RCIC systems perform similar functions. The HPCI and RCIC systems permit the plant to be shutdown while maintaining sufficient reactor vessel water inventory until the reactor vessel pressure is low enough to allow the Low Pressure Coolant Injection (LPCI) System [BO] or Core Spray (CS) System [BM] to maintain core cooling.

13MOV-131 is the RCIC Steam Admission Isolation valve. The motor operator for 13MOV-131 is supplied power from the 125 VDC Electrical Distribution System.

Although the RCIC System is considered to have been Inoperable, during the period between, October 16, 2010, when the system was first required to be Operable, and the satisfactory performance of post maintenance testing on January 8, 2011, the system was available. The determination of availability is based on the satisfactory performance of surveillance testing (ST-24J) after lubricating the valve stem, and the ability to manually open 13MOV-131, if system operation had been required.

EVENT ANALYSIS:

During James A. FitzPatrick's 2010 refueling outage, a PM was performed on 13MOV-131. At the conclusion of the PM activity it appears that the connections to motor control contactors 42-1O, 42-2O, and 42-2C were loose.

The loose connections resulted in an intermittent open circuit to the 42-2O contactor which would cause the motor operator to stop prior to fully opening 13MOV-131. Due to the intermittent nature of the problem it is possible that RCIC might have failed to operate as designed under accident conditions.

Since the Technical Specifications require the RCIC system to be Operable in Mode 1 and in Modes 2 and Mode 3 with steam dome pressure greater that 150 psig, it is was concluded that the system was Inoperable for a period of time greater than allowed by the Technical Specifications. However, since the JAF accident analysis does not credit the operation of the RCIC system to mitigate the consequences of a design basis accident there was no loss of safety function. It is also noted, that on October 23, 2010, during the period of RCIC Inoperability, the HPCI system was also Inoperable for a period of approximately 20 hours and 31 minutes from 0023 to 2054. The HPCI Inoperability was due to a degraded transformer internal to the HPCI inverter.

The safety significance of the concurrent Inoperability of HPCI and RCIC is minimized because although, technically Inoperable, the RCIC system was available for operation as discussed in the Assessment of Safety Consequences below.

CAUSE OF EVENT:

The most probable cause of this event was loose connections in motor control circuit 71BMCC-3-OB1(MC), for motor operator 13MOV-131(OP).

EXTENT OF CONDITION:

An Extent of Condition (EOC) review for possible loose connections inadvertently missed during Motor Control Center (MCC) PMs during RO-19, similar to 71BMCC-3-OB1(MC) for 13MOV-131 was considered. The EOC review considered 1) Motor Control Centers in which PM activities were performed; 2) which PMs included the same check of connections; and 3) valve position indications obtained during surveillance testing subsequent to the PMs.

Five (5) similar PM activities were identified. The PM activities were performed on the MCC's associated with the following Motor Operated Valves (MOVs): 23MOV-19 and 23MOV-16 in the HPCI System and 13MOV-39, 13MOV-14 and 13MOV-132 in the RCIC System.

ST-4N, HPCI Quick Start, Inservice, and Performance Monitoring Test, was performed on October 13, 2010 and on January 18, 2011. During the performance of these tests 23MOV-16 and 23MOV-19 were required to operate and no problems with valve positioning or indication were identified.

ST-24J, RCIC Flow Rate and Inservice Test, was performed on October 29, 2010, and on January 7, 2011. In both cases 13MOV-39, 13MOV-14 and 13MOV-132 operated normally with no positioning or indication problems identified. However, as noted in this LER, 13MOV-131 was identified as having positioning and indication problems during both tests. After tightening the loose connections and retesting on January 8, 2011, all the RCIC valves in the EOC population functioned normally.

Because multiple surveillance tests were performed involving the EOC population and no similar indications of loose connections were observed, the extent of the deficiency was determined to be confined to 13MOV-131.

FAILED COMPONENT IDENTIFICATION:

Manufacturer:	General Electric
Manufacturer Model Number:	IC28001607F3
NPRDS Manufacturer Code:	G080
NPRDS Component Code:	42
FitzPatrick Component ID:	71BMCC-3-OB1(MC)

CORRECTIVE ACTIONS:

Completed Actions:

1. Tightened the connections in 71BMCC-3-OB1(MC).
2. Tested the System.
3. Review the apparent cause evaluation with the Electrical Maintenance Department, focusing on inspection of termination practices.
4. Benchmark industry practice on un-lugged wires in compression type fitting terminations to determine if methodology / procedure changes are required.
5. Include this event and any beneficial practices indentified during benchmarking in continuing training for Electrical and Instrument and Control Maintenance.

ASSESSMENT OF SAFETY CONSEQUENCES:

Actual Consequences

There were no actual industrial, radiological, or nuclear safety consequences during or as a result of the described period of RCIC Inoperability.

Potential Consequences

The identified condition could have resulted in a failure of the RCIC system to operate as designed. However, the JAF accident and transient analysis does not take credit for the operation of the RCIC system. Therefore, this condition could not have prevented the fulfillment of a safety function and is not reportable per 10 CFR 50.73(a)(2)(v)(D).

The accident analysis does, however, assume the operation of the HPCI system and operation of the Automatic Depressurization System (ADS) in conjunction with the LPCI System. It is noted that during the period of RCIC Inoperability, the HPCI system was also Inoperable for a period of approximately 20 hours and 31 minutes on October 23, 2010 from 0023 to 2054. As discussed below, the RCIC system was available during this period of concurrent Inoperability. Therefore, the potential safety consequences are minimized during this time period.

While automatic operation of the RCIC system was affected by the identified deficiency, the system was available Procedures and training address manual opening of 13MOV-131 in the control room; or, if unsuccessful, manual opening 13MOV-131. In addition, although the valve failed to go full open, it opened far enough to allow the RCIC system to achieve rated speed, flow, and pressure within the required system response time. Therefore, the potential nuclear safety consequences of the RCIC system being Inoperable during this period were minimal.

SIMILAR EVENTS:

Licensee Event Reports written since 2000 were reviewed to determine if there were similar events at JAF. LER-2006-002 documented a case of the HPCI System being Inoperable for longer than allowed by the plant Technical Specifications due to hydraulic tubing being incorrectly re-installed after a PM activity. Although the 2006 event was not related to an electrical connection it was related to a PM activity.

No other events since 2000 had any similarities with the event reported in this LER.

REFERENCES:

1. Apparent Cause Evaluation Report: CR-JAF-2011-00123 (RCIC Steam Admission Valve Failed to Open)
2. Technical Specification 3.5.3
3. JAF Updated Final Safety Analysis Report: Section 4.7, Reactor Coolant Isolation Cooling System
4. LER 2010-005-01, HPCI System Declared Inoperable Due to Power Supply Degradation