
Timothy C. Peter
Site Vice President- JAF

JAFP-22-0002
January 14, 2022

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: 2021-003, Air Solenoid Valve Condition Results in Main Steam Isolation Valve (MSIV) Fast Closure Test Failure

Dear Sir or Madam:

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

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,



Timothy C. Peter
Site Vice President

TCP/RS/mh

Enclosure: LER: 2021-003, Air Solenoid Valve Condition Results in Main Steam Isolation Valve (MSIV) Fast Closure Test Failure

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



LICENSEE EVENT REPORT (LER)
(See Page 3 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/)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollections.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: oira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name James A. FitzPatrick Nuclear Power Plant	2. Docket Number 05000333	3. Page 1 OF 3
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4. Title
LER: 2021-003, Air Solenoid Valve Condition Results in Main Steam Isolation Valve (MSIV) Fast Closure Test Failure

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
11	18	2021	2021	003	00	01	14	2022	N/A	N/A

9. Operating Mode 1 **10. Power Level** 100

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

<input type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input checked="" type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	

OTHER (Specify in Abstract below or in NRC Form 366A).

12. Licensee Contact for this LER

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

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

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
B	JM	FCV	H198	Y					

14. Supplemental Report Expected

No Yes (If yes, complete 15. Expected Submission date)

15. Expected Submission Date

Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On September 14, 2020, at the beginning of James A. FitzPatrick (JAF) refueling outage (RO24), stroke time tests for Main Steam Isolation Valves (MSIV) 29AOV-86C and 29AOV-86D were outside the required time limit of 3 to 5 seconds per Surveillance Requirement (SR) 3.6.1.3.6. All other MSIVs were tested satisfactorily.

A failure analysis was completed on November 18, 2021, the most probable failure mechanism is a sticking solenoid combined with vendor overhaul practices. This condition is common between two independent channels of a system used to control the release of radioactive material to become inoperable. Therefore, this LER is reportable per 10 CFR 50.73(a)(2)(vii).

Corrective actions to replace the air solenoid valves were completed and both were tested satisfactorily on September 26, 2020. In the next refuel outage six MSIV air solenoid valves are planned to be replaced and sent for additional investigation.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
James A. FitzPatrick Nuclear Power Plant	05000 – 333	YEAR 2021	SEQUENTIAL NUMBER – 003	REV NO. – 00

NARRATIVE

Background

James A. FitzPatrick Nuclear Power Plant (JAF) has four main steam lines [EIS identifier: SB] between the reactor and the main turbine [TA]. These lines are designed to isolate in the event of design basis accidents. In the event of a main steam line break, the isolation prevents further radiological release. In the event of a loss of coolant (LOCA) accident, they isolate to maintain coolant inside of containment.

Two isolation valves are provided in series in a horizontal run of each main steam line, as close as practical to the primary containment. One inside (inboard) and the other outside (outboard) together form part of the primary containment barrier for Reactor Coolant System breaks inside the containment and part of the Reactor Coolant Pressure Boundary for main steam line breaks outside the primary containment.

Event Description

On September 14, 2020, during the performance of ST-1B, Main Steam Isolation Valve (MSIV) Fast Closure Test, the isolation times for 29AOV-86C and 29AOV-86D were not in compliance with the Technical Specification Surveillance Requirement 3.6.1.3.6. The acceptable isolation time is 3 to 5 seconds. Observed times from control switch manipulation to indication of full closure for 29AOV-86C and 29AOV-86D were 10.69 seconds and 24.97 seconds respectively.

Event Analysis

The MSIV components did not have any internal issues that would cause it to stick or bind while closing. From the MSIV position indicator data, the valves closed within the expected 3-5 seconds once the valves started to move. The delay in valve closure was caused by a delay in the venting of air from the valve’s solenoid air valves associated with MSIV operators 29AOV-86C(OP) and 29AOV-86D(OP). The excessive stroke of the main valve was due to response time of the solenoid to a control signal indicating an internal issue with the air solenoid valve.

The air operator solenoid manifold assemblies were in fair physical condition when inspected, with proper alignment and assembly of the subcomponents. As found testing and inspection revealed unexpected leakage around the solenoids, areas of wear and corrosion, and foreign material. At no time during the inspection and testing of this assembly did the air control valves and solenoid valves fail to shift completely or exhibit any significant delay. While the wear/corrosion has been identified as the potential source of leakage noted during test, it does not provide an adequate source for the extended stroke time.

The inspection and testing did not provide any conclusive example or replication of delayed stroke time, however the testing revealed abnormal solenoid leakage. It should be noted that while the leaking solenoid is abnormal, it still shifted fully during the as-found functional test and continued to function within specification under a continued air supply.

During disassembly, the 4-way solenoid valve air manifold and air valves were inspected and found to have traces of contamination. The lead piston had an undetermined contamination on the surfaces. The contamination could result in a delay in the solenoid valve and therefore a delay in the MSIV stroke time.

This is a condition which caused two independent channels of a system used to control the release of radioactive material to become inoperable reportable per 10 CFR 50.73(a)(2)(vii).



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
James A. FitzPatrick Nuclear Power Plant	05000 – 333	2021	– 003	– 00

Cause

Slow MSIV closure time during testing is caused by a delay in air venting from the valve air solenoid valves associated with 29AOV-86C(OP) and 29AOV-86D(OP). The most probable failure mechanism is a sticking solenoid combined with vendor overhaul practices.

Similar Events

FitzPatrick, LER 2016-002, Sticking DC Pilot in Solenoid Valve Cluster Assembly Results in Slow MSIV Closures, dated April 25, 2016.

FAILED COMPONENT IDENTIFICATION:

Manufacturer:	Ralph A. Hiller Co.
Manufacturer Model Number:	SA-A094
Manufacturer Code:	H198
Component Code:	FCV
FitzPatrick Component ID:	29AOV-86C(OP) and 29AOV-86D(OP)

Corrective Actions

Completed: Air solenoid valves associated with 29AOV-86C(OP) and 29AOV-86D(OP) were replaced. The MSIV fast closure test was successfully completed after replacement of the solenoids.

Planned: Six MSIV air solenoid valves are planned to be replaced in the upcoming refuel outage in the Fall of 2022. Following replacement, solenoids will be sent for additional failure analysis.

Safety Significance

There were no actual radiological or nuclear safety consequences due to this condition.

Two MSIV close automatically to prevent fuel damage by limiting the loss of reactor coolant in the case of a major steam system leak, and to limit the release of radioactive materials by isolating the primary containment. Valve stroke time is required to be short enough to limit the release of radioactive material in accordance with accident analyses. JAF UFSAR section 14.6.1.5 states a maximum MSIV closure time of 10.5 seconds would limit the total amount of liquid and steam lost from the primary system to prevent core damage, and this closure time will ensure that any radiological doses are well below the guidelines set forth in 10 CFR 100.

This deficiency only affected two outboard MSIVs. In both cases, the inboard MSIVs performed satisfactorily. Therefore, all main steam lines were able to perform their intended safety function to isolate.

References

- Issue Report – IR 04369253, ‘C’ Outboard MSIV, 29AOV-86C Failed Stroke Time
- Issue Report – IR 04369255, ‘D’ Outboard MSIV, 29AOV-86D Failed Stroke Time
- FSAR-JAF-4.6, Main Steam Line Isolation Valves