Entergy

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JAFP-10-0151
November 16, 2010

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

SUBJECT: LER: 2010-004-00, Main Steam Isolation Valve Leak Rate Exceeds Authorized Limit
James A. FitzPatrick Nuclear Power Plant, Unit No. 1
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), 10 CFR 50.73(a)(2)(ii)(A) and 10 CFR 50.73(a)(2)(v)(C).

There are no new commitments contained in this report.

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

Sincerely,

Kevin Bronson
Site Vice President

KB/JP/ed

Enclosure: JAF LER: 2010-004-00, Main Steam Isolation Valve Leak Rate Exceeds Authorized Limit

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

Document Components:
001 Transmittal Letter with Enclosure (LER 2010-004-00)

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

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

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 Records and FOIA/Privacy Service Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

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

4. TITLE

Main Steam Isolation Valve Leak Rate Exceeds Authorized Limit

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	05000
09	17	2010	2010	– 004 –	00	11	16	2010	FACILITY NAME N/A	DOCKET NUMBER 05000

9. OPERATING MODE

Mode 05

10. POWER LEVEL

0

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
X	SB	ISV	E095	Y					

14. SUPPLEMENTAL REPORT EXPECTED		15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ Yes (If yes, complete 15. *EXPECTED SUBMISSION DATE*)	☒ NO		n/a	n/a	n/a

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

On September 17, 2010, following Local Leak Rate Testing (LLRT) of valves 29AOV-80C (Inboard) and 29AOV-86C (Outboard) Main Steam Isolation Valves (MSIVs), it was determined that the allowable leak rate was exceeded for 29AOV-86C. Due to the initial test being performed between the valves (reverse flow for 29AOV-80C), follow-up testing from above the valve plug was conducted on September 21, 2010, at which time 29AOV-80C was also determined to have failed the leak rate test. At the time of testing, the Mode Switch was in Refuel and the plant was conducting Refueling Outage 19.

The excessive leakage on 29AOV-80C, was attributed to corrosion products found on the valve seat during inspection of the valve internals. Leakage on 29AOV-86C was attributed to flow erosion in the stellite seat between the 3 o'clock and 5 o'clock position, causing the disc to be off center and slightly off the seat.

The valves were repaired and tested satisfactorily prior to plant startup, and an Apparent Cause Evaluation was completed.

NARRATIVE

EVENT DESCRIPTION:

The plant entered Refueling Outage 19 on September 13, 2010. Type C Local Leak Rate Testing (LLRT) activities on the Primary Containment [NH] penetrations and isolation valves commenced shortly after plant cooldown in accordance with Technical Specification (TS) 5.5.6, Primary Containment Leakage Rate Testing Program. On September 17, 2010, the initial LLRT of the Main Steam System [SB] Main Steam Isolation Valves (MSIVs) 29AOV-80C (Inboard) and 29AOV-86C (Outboard) failed to meet acceptance criteria. The initial test was performed between the MSIVs and provided indeterminate results due to testing the inboard valve from below the seat. The test was re-performed following Main Steam Line (MSL) Plug installation, with pressure being applied from above the plug. The test results showed that both 29AOV-80C and 29AOV-86C failed to meet acceptance criteria.

BACKGROUND:

The normal sequence of testing for the MSIVs is:
1) Test between the valves at 25 psig per the TS requirement. Check MSL vents to determine which valve is leaking.
2) After Main Steam Line Plugs are installed, test the valves individually from the refuel floor through the test connection on the Main Steam Line Plug at 45 psig.
3) After leakage rates are measured, determine As-Found (AF) minimum pathway to verify whether or not the TS limit of 46 scfh is met.
4) After repairs, if required, leakage rates are measured to determine the As-Left (AL) maximum pathway to verify that the TS limit of 46 scfh is met.

As-Found Leak Rate Test Results:

Minimum Pathway Analysis of "C" Main Steam Line at 45 psig

Inboard	Would not hold pressure
Outboard	Would not hold pressure
Penetration	Would not hold pressure

EVENT ANALYSIS:

This report is being 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," 10 CFR 50.73(a)(2)(ii)(A), "Any event or condition that resulted in the nuclear power plant, including its principal safety barriers, being seriously degraded," and in accordance with 10 CFR 50.73(a)(2)(v), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to (C) Control the release of radioactive material."

The primary Containment System has the capability to limit leakage, during any of the postulated design basis accidents for which it is assumed to be functional, such that offsite doses do not exceed the guideline values set forth in 10 CFR 100. Compliance with 10 CFR 50, Appendix J provides assurance that the Primary Containment including those systems which penetrate the Primary Containment do not exceed the allowable leakage rate specified in the TS.

EVENT ANALYSIS (continued):

Based on the LLRT failures, 29AOV-80C and 29AOV-86C were disassembled and inspected. The inspection of 29AOV-80C did not identify any indications of seat wear or damage. The presence of corrosion products on the seat was noted. Inspection of 29AOV-86C revealed a small wear mark described as erosion between the three o'clock and five o'clock position in the stellite seat and wear in the bore which would cause the valve disc to be off center and slightly off the seat. These material conditions were the result of normal wear on these components.

CAUSE OF EVENT:

The LLRT failure of 29AOV-80C was caused by corrosion products fouling the valve seat and the LLRT failure of 29AOV-86C was the result of flow erosion on the valve body and seating surface.

EXTENT OF CONDITION;

All MSIVs are leak rate tested, as described above, during each refueling outage. No other MSIVs were determined to exceed the Technical Specification Leak Rate Limits and all Maximum Path As-Left leak rates were within the Technical Specification limits.

As-Left Maximum Pathway Leak Rate Analysis of "C" MSL

Inboard	0.215
Outboard	0.215
Penetration	0.215

FAILED COMPONENT IDENTIFICATION:

Component ID:	29AOV-80C, 29AOV-86C
Noun Name:	Main Steam Line Isolation Valves
Manufacturer:	Edward Valves, Inc.
Model:	1612 JMMNY
Type:	1250 psi, 24 inch, Globe Valve

CORRECTIVE ACTIONS:

Completed Actions:

1) Inspected 29AOV-80C and 29AOV-86C
2) Cleaned valve internals and repaired identified wear on 29AOV-86C
3) Retested 29AOV-80C and 29AOV-86C satisfactorily.

CORRECTIVE ACTIONS (continued):

Open Actions:

Develop a Failure Modes Analysis document to be used by Operations to evaluate LLRT test related failure influences and by Maintenance and Central Planning to evaluate valve anomalies that can influence LLRT test related failures.

ASSESSMENT OF SAFETY CONSEQUENCES:

An upper bound on the leak rate through 29AOV-80C and 29AOV-86C could not be determined; therefore the potential dose consequences of this event could not be precisely quantified. A Level 2 Probabilistic Risk Assessment to estimate the incremental large early release frequency (LERF) increase was conducted to quantify / evaluate the safety significance of this event. The average maintenance model was modified by setting basic events associated with MSIVs 29AOV-80C and 29AOV-86C to TRUE. Specifically, basic events MSV-AOV-OO-80C and MSV-AOV-OO-86C (fails-to-close NO-FO) are changed. These basic events only appear in the primary containment isolation fault tree model as part of the LERF model. Hence, these events have no impact on the core damage frequency.

In addition to changing basic events MSV-AOV-OO-80C and MSV-AOV-OO-86C failure rate; the primary containment isolation system fault tree was modified to reflect that MSIVs failure to close on demand are applicable to plant events that result in core damage at high Reactor Pressure Vessel pressure.

Using the analysis described above results the estimated frequency of a large early release was 2.85×10^{-7} / yr. This frequency is less than the LERF safety goal of 1×10^{-6} /yr. This value represents a 9.2 percent increase from the 'base case' value of 2.61×10^{-7} /yr.

The impact on the LERF as described in Reg. Guide 1.174 defines very small changes in risk as resulting in increases of core damage frequency (CDF) below 10^{-6} /yr and increases in LERF below 10^{-7} /yr. Since the MSIVs leakage does not impact CDF, the relevant metric is LERF. Calculating the increase in LERF is simply the increase in risk from the above LERF base case to the MSIV leakage case or

$$\Delta LERF = LERF\ MSIV\ CASE - LERF\ BASE\ CASE$$
$$= 2.85 \times 10^{-7}/yr - 2.61 \times 10^{-7}\ /yr$$
$$\Delta LERF = 2.40 \times 10^{-8}\ /yr$$

Since guidance in Reg. Guide 1.174 defines very small changes in LERF as below 10^{-7} /yr, excessive MSIVs leakage from 29AOV-80C and 29AOV-86C is non-risk significant.

SIMILAR EVENTS:

There have been other failures of MSIVs due to internal wear. The last failure of both an Inboard and Outboard MSIV in the same penetration occurred in 2000 and was reported under LER 2000-015.

REFERENCES:

CR-JAF-2010-05544, MSIV Leak Rate Test Failure

Reg Guide 1.174, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis