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Robert J. Murillo
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W3F1-2010-0035

April 22, 2010

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Licensee Event Report 2010-002-00
Waterford Steam Electric Station, Unit 3 (Waterford 3)
Docket No. 50-382
License No. NPF-38

Dear Sir or Madam:

Entergy is hereby submitting Licensee Event Report (LER) 2010-002-00 for Waterford Steam Electric Station Unit 3. This report provides details associated with the Main Feedwater Isolation Valve B accumulator tubing connection failure on 2/23/2010.

Based on this failure, it was determined that Waterford 3 operated in a condition prohibited by the Limiting Condition for Operation (LCO) delineated in Technical Specification 3.7.1.6, which requires that each Main Feedwater Isolation Valve shall be operable in modes 1 through 4. The condition is reported herein as required by 10 CFR 50.73(a)(2)(i)(B).

This report contains no new commitments. Please contact Robert J. Murillo at (504) 739-6715 if you have questions regarding this information.

Sincerely,

RJM/WH

Attachment: Licensee Event Report 2010-002-00

IE22
NRR

cc: Mr. Elmo E. Collins, Jr.
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U. S. Nuclear Regulatory Commission
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R.K. West, lerevents@inpo.org - INPO Records Center

Attachment

W3F1-2010-0035

Licensee Event Report 2010-002-00

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(9-2007)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 8/31/2010

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE

Main Feedwater Isolation Valve B exceeded allowed outage time due to tubing connection failure

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
									NA	05000
02	23	2010	2010	- 002 -	00	04	22	2010	FACILITY NAME NA	DOCKET NUMBER NA

9. OPERATING MODE

1

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 Specify in Abstract below or in NRC Form 366A
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Waterford 3 Steam Electric Station Robert J. Murillo	(504) 739-6715

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	SJ	VOP	A391	NO					

14. SUPPLEMENTAL REPORT EXPECTED

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

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT

On 2/23/2010 maintenance personnel were performing a scheduled calibration of a nitrogen accumulator pressure switch associated with Main Feedwater Isolation Valve (MFIV) B. Shortly after isolating the instrument valve, the associated instrument side tubing blew out of a tubing fitting.

Subsequent examination identified that the compression fitting had not been properly installed and tightened. In addition, loose bracket mounting bolts were identified on the instrument isolation valve just upstream of the compression fitting.

Since the instrument line had been isolated prior to the tubing connection failure, no loss of nitrogen occurred from the associated accumulator. MFIV B remained operable with the pressure switch isolated. An evaluation of past operability determined that the degraded condition of the tubing connection while in service would have caused a past inoperable condition that would exceed the Technical Specification allowed outage time.

Corrective actions include replacement of the compression fitting and tightening of the bracket mounting bolts.

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NARRATIVE

REPORTABLE OCCURRENCE

This condition meets the reporting criteria of 10CFR50.73(a)(2)(i)(B) because Waterford 3 operated in a condition prohibited by the limiting condition for operation (LCO) delineated in Technical Specification 3.7.1.6, which requires that each Main Feedwater Isolation Valve (MFIV) [SJ] shall be OPERABLE in MODES 1, 2, 3, and 4. MFIV B was not recognized as inoperable in cycle 17. The requirement was not met to close and deactivate, or isolate the inoperable valve within 72 hours and verify inoperable valve closed and deactivated or isolated once every 7 days; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

INITIAL CONDITIONS

During the scheduled calibration of an accumulator pressure switch associated with MFIV B, the plant was in power operation (Mode 1) stabilized at approximately 100% rated thermal power. Reactor Coolant System [AB] temperature was approximately 545 degrees F and Reactor Coolant System pressure was at approximately 2250 psia. Both MFIVs are required to be operable in this plant condition. This plant condition did not contribute to this event. There were no other structures, systems, or components inoperable at the start of the event that contributed to the event.

The MFIV's are required to rapidly close in the event of a main steam line break (MSLB) or feed water line break (FWLB). Each of the two MFIV's has two precharged nitrogen accumulators to ensure the MFIV will close in the required time limit. Plant calculation ECM00-006 states that for an MFIV to be operable, both pneumatic/hydraulic trains must be functional. The MFIV is a containment isolation valve and is therefore required to remain closed for up to 30 days after an event. The MFIV's are equipped with devices that prevent the valve from drifting open in the event that the high pressure accumulators lose pressure. The high pressure accumulators have an allowed leak rate of 13.33 psi/hr to ensure the MFIV's can close up to 1.5 hours from accident initiation.

EVENT DESCRIPTION

On 2/23/2010, during a scheduled calibration of the pressure switch the technicians closed the instrument high pressure isolation valve and paused to sign the work step. A short length of tubing that connects pressure gauge FW IPI3040-1B to the high pressure accumulator A for Steam Generator #2 MFIV blew out of the upstream compression fitting. The section of tubing that blew out was less than a foot long and was situated between the isolation manifold block and the pressure switch; therefore, no loss of nitrogen pressure from the accumulator occurred. No injuries occurred as the technicians were clear of the tubing at that moment and only a very small volume of gas was expelled from the isolated tubing. Appropriate Personal Protective Equipment was utilized during this evolution.

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NARRATIVE

EVENT DESCRIPTION (continued)

Operations personnel were notified immediately. Maintenance supervision was contacted by the technicians and supervised the emergent work effort utilizing existing plant processes.

Technical Specification (TS) 3.7.1.6 requires that each MFIV be OPERABLE in Modes 1 through 4. Plant procedure OP-100-014, Technical Specification and Technical Requirements Compliance, requires that (1) each MFIV have two pressurized accumulators with each individual accumulator less than or equal to 5900 psig; and (2) when the pressure of both accumulators are added together the total is not less than 9720 psig.

No equipment movement or actuation occurred due to the condition. Since the instrument line had been isolated prior to the tubing connection failure, no loss of nitrogen occurred from the associated accumulator. MFIV B remained operable with the pressure switch isolated.

An evaluation of past operability determined that the degraded condition of the tubing connection while in service would have caused a past inoperable condition that would exceed the TS allowed outage time.

An evaluation of safety significance determined that there is reasonable assurance that safety functions associated with the MFIV would have been fulfilled and therefore this condition presents a minimal safety significance concern for accident analyses.

CAUSAL FACTORS

Discussion with the technicians indicates that the maintenance activities did not initiate the condition, but were coincidental.

Maintenance identified that the compression fitting was not properly installed and tightened. The tubing was smooth in the area where the ferrule should have deformed the tubing on a properly installed compression fitting. The compression fitting was replaced and existing tubing was able to be reused. If the tubing had been properly deformed it would not have been possible to install a new ferrule over the existing tubing, providing additional evidence that the previous compression fitting was not properly installed.

After the tubing blew out of the fitting, technicians identified loose mounting bolts on the isolation valve just upstream of the failed compression fitting. The bolts were noted to be secure when operating the valve prior to the event. The loose bolts were determined to be caused by the release of tension on the mounting when the tubing connection failed.

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NARRATIVE

CORRECTIVE ACTIONS

The existing tubing was reused after evaluation utilizing a new compression fitting. The fitting was tightened according to existing plant procedures.

The instrument isolation valve mounting bolts were examined and reused. Bolts were tightened according to existing plant procedures.

Fittings and bolts for both accumulators for MFIV B and both accumulators on MFIV A were visually examined. No loose fitting or bolts were identified from visual examination.

Work orders were generated to verify compression fittings on MFIV accumulators. The work is scheduled for next refueling outage.

Shop training was conducted regarding the seismic and operability implications of loose mounting bolts on instrument and controls equipment.

Shop training was conducted to emphasize existing training on compression fittings and the use of the pre-staged operating experience within applicable work orders during pre-job briefs.

SAFETY SIGNIFICANCE

A main steam isolation signal (MSIS) is generated by two-out-of-four low steam generator pressure signals or two-out-of-four high containment pressure signals. MSIS terminates the main feedwater flow to steam generators by isolating main feedwater isolation valves (MFIV) and main feedwater regulating valves.

Closure of MFIVs is credited in several accident analyses that results in main steam isolation signal (MSIS). The two limiting events are the main steam line break (MSLB) and feedwater line break (FWLB). The condition described would result in availability of only one accumulator to close the MFIV. ECM00-006 demonstrates that for all events, except FWLB, the MFIV would be able to close within the TS requirement with only one accumulator available. For the FWLB event the MFIV may not be able to fully close due to stem ejection forces that significantly impact the closing the MFIV. Thus, the FWLB event is the only event that needs to be considered for safety significance.

FWLB event is an RCS heat up and RCS pressurization event, not an RCS cooldown event. FWLB analysis conservatively assumes that the feedwater flow to the intact steam generator is isolated instantaneously at the time of the break. This assumption of instantaneous stoppage of feedwater flow would result in a more severe RCS heat-up and pressurization. Therefore, if MFIV is not completely closed for this event, the postulated condition will have a beneficial effect on the FWLB event results. Note that for breaks downstream of the MFIV, the feedwater regulating valve will close on MSIS and will isolate the feedwater flow. For flow upstream of the check valve, the check valve will prevent blowdown of the steam generator.

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NARRATIVE

SAFETY SIGNIFICANCE (continued)

MSLB is the limiting event with respect to containment pressure and temperature response. MSLB event with failure of one MFIV to close has been analyzed for Waterford 3. For this event the closure of feedwater regulating valve is credited to close to terminate the feedwater flow to the broken steam generator. Note that this condition is not an issue for the MSLB events. Also, note that containment pressure and temperature response to a MSLB event is more severe than the containment response to a FWLB event.

As each MFIV has redundant accumulators and only one accumulator is considered inoperable due to this condition, a Safety System Functional Failure does not exist.

Based on above discussion, there is reasonable assurance that safety functions associated with the MFIV will be fulfilled and therefore this condition presents a minimal safety significance concern for accident analyses.

SIMILAR EVENTS

There have been no previous, similar events associated with failure of the MFIVs due to failure of accumulator tubing.

ADDITIONAL INFORMATION

Energy industry identification system (EIIS) codes are identified in the text within brackets [ ].