



Leia Milster
Manager
Regulatory Assurance
504-739-6250

W3F1-2023-0031

10 CFR 50.73

May 9, 2023

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

Subject: Licensee Event Report 50-382/2023-002-00, Plant Shutdown Required by
Technical Specifications for Unidentified Reactor Coolant System Leakage in
Containment
Waterford Steam Electric Station, Unit 3
NRC Docket No. 50-382
Renewed Facility Operating License No. NPF-38

Entergy Operations, Inc. (Entergy) submits the enclosed Licensee Event Report (LER) 50-382/2023-002-00 for Waterford Steam Electric Station, Unit 3 (Waterford 3). The event reported herein is reportable in accordance with 10 CFR 50.73(a)(2)(i)(A) - The completion of any nuclear plant shutdown required by the plant's Technical Specifications.

The LER describes the Unidentified Reactor Coolant System Leakage in Containment and subsequent Plant Shutdown.

This letter contains no new commitments.

Should you have any questions concerning this issue, please contact Leia Milster, Manager, Regulatory Assurance, at 504-739-6250.

Respectfully,

A handwritten signature in black ink that reads 'Leia Milster'.

Leia Milster

LEM/mrp

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Enclosure: Licensee Event Report 50-382/2023-002-00

cc: NRC Region IV Regional Administrator
NRC Senior Resident Inspector – Waterford Steam Electric Station, Unit 3
NRC Project Manager – Waterford Steam Electric Station, Unit 3
Louisiana Department of Environmental Quality

Enclosure

W3F1-2023-0031

Licensee Event Report 50-382/2023-002-00



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
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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 email to Infocollcts.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; email: oir_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 Waterford Steam Electric Station, Unit 3	<input checked="" type="checkbox"/> 050 <input type="checkbox"/> 052	2. Docket Number 00382	3. Page 1 OF 3
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4. Title
 Plant Shutdown Required by Technical Specifications for Unidentified Reactor Coolant System Leakage in Containment

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
03	10	2023	2023	002	00	05	09	2023	<input type="checkbox"/> 050	
									Facility Name	<input type="checkbox"/> 052

9. Operating Mode 1	10. Power Level 100
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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"/> 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"/> 73.1200(a)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<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"/> 73.1200(b)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<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)	<input type="checkbox"/> 73.1200(c)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<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"/> 73.1200(d)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 10 CFR Part 21	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 10 CFR Part 73	<input type="checkbox"/> 73.1200(e)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.77(a)(1)	<input type="checkbox"/> 73.1200(f)
<input type="checkbox"/> 20.2203(a)(2)(iii)		<input checked="" type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(2)(i)	<input type="checkbox"/> 73.1200(g)
<input type="checkbox"/> 20.2203(a)(2)(iv)		<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(ii)	<input type="checkbox"/> 73.1200(h)
<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)		

OTHER (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact Leia Milster / Manager, Regulatory Assurance	Phone Number (include area code) (504) 739-6250
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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	AB	PSP	n/a	Y					

14. Supplemental Report Expected

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)
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15. Expected Submission Date

Month	Day	Year

16. Abstract (Limit to 1326 spaces, i.e., approximately 13 single-spaced typewritten lines)
 On March 9, 2023, while operating in Mode 1 at 100% power, Waterford Steam Electric Station, Unit 3 (WF3) operators identified elevated activity and unidentified leakage in containment from the reactor coolant system (RCS). On March 10, 2023, at 0030 CST Operations entered Technical Specification 3.4.5.2 action (c) due to Unidentified Leakage exceeding 1 gpm. Technical Specification (TS) 3.4.5.2 action (c) requires reducing the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
 Operators located the leak source near the Reactor Coolant Pump (RCP) 1B but were unable to access the leak source while the plant was at power. On March 10, 2023, at 0257, WF3 operators commenced a manual reactor shutdown in accordance with TS. The required safety systems and shutdown equipment performed as expected, resulting in an uncomplicated shutdown. The condition was reported on March 10, 2023 (Event Number 56403).
 The source of the through wall leak was near a weld on RCP 1B instrument tubing likely caused by high cycle fatigue in conjunction with vibrational stress from missing tube supports that were previously corrected in 2016. The cracked tubing was replaced, and operability was restored. WF3 returned to Mode 1 and commenced power ascension on March 14, 2023. This event is reportable under 10 CFR 50.73(a)(2)(i)(A) "The completion of any nuclear plant shutdown required by the plant's Technical Specifications."



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

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1. FACILITY NAME Waterford Steam Electric Station, Unit 3	<input checked="" type="checkbox"/> 050	2. DOCKET NUMBER 00382	3. LER NUMBER		
	<input type="checkbox"/> 052		YEAR 2023	SEQUENTIAL NUMBER 002	REV NO. 00

NARRATIVE

PLANT STATUS

On March 9, 2023, Waterford Steam Electric Station, Unit 3 (WF3) was operating at 100% power in Mode 1. There were no other structures, systems, or components that were inoperable at the time that contributed to the event.

EVENT DESCRIPTION

On March 9, 2023, at 2200 CST, WF3 entered OP-901-111, "Reactor Coolant System Leakage," and OP-901-403, "High Activity In Containment," due to elevated Reactor Coolant System (RCS) leakage in Containment. On March 10, 2023, at 0030, unidentified leakage exceeded 1 gpm and WF3 entered Technical Specification (TS) 3.4.5.2 action (c) due to Unidentified Leakage exceeding 1 gpm. Technical Specification 3.4.5.2 action (c) requires reducing the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Operators entered containment to locate the leak source. The leak was identified inside the D-ring, near reactor coolant pump (RCP) 1B [P]. The leak was inaccessible while the plant remained at power. On March 10, 2023, at 0257, WF3 operators commenced a manual reactor shutdown in accordance with TS. The required safety systems and shutdown equipment performed as expected, resulting in an uncomplicated reactor shutdown.

Once the plant was offline, the RCS leak was confirmed to be due to a through wall leak near a weld on the 0.5 inch instrument tubing line [TBG] of RCP 1B. The cause is attributed to high cycle fatigue due to vibrational stress in conjunction with missing tube supports [SPT] previously corrected in 2016. The cracked tubing was replaced, and operability was restored. The removed tubing was sent to a vendor for additional failure analysis. WF3 returned to Mode 1 and commenced power ascension on March 14, 2023.

This event is reportable under 10 CFR 50.73(a)(2)(i)(A) "The completion of any nuclear plant shutdown required by the plant's Technical Specifications."

TIMELINE

- March 9, 2023, 22:00: Entered OP-901-111, Reactor Coolant System Leak, and OP-901-403, High Activity in Containment, due to elevated RCS Unidentified Leakage in containment
- March 10, 2023, 00:30: RCS Unidentified Leakage has exceeded 1 gpm. T.S. 3.4.5.2 was entered
- March 10, 2023, 02:30: Personnel entered Containment to search for the source of RCS Unidentified Leakage. Containment team reported water falling from inside of the RCP 1B D ring cell. Leak source was not accessible while at power
- March 10, 2023, 02:57: Plant down power commenced
- March 10, 2023, 05:21: Operations manually tripped the reactor [RCT] in accordance with OP-10-005 "Plant Shutdown". The main turbine [TRB] tripped and the station entered Mode 3
- March 10, 2023, 14:06: Closed RCP 1B instrument line valve to isolate RCS leak. Field Operators confirmed that the RCS leak stopped
- March 12, 2023, 23:19: During the extent of condition investigation, engineering determined there was a bent and damaged section of tubing downstream of RCP Valve 115B (RC MVAAA115 B). The condition was evaluated and determined to be acceptable for the remainder of the cycle
- March 13, 2023, 04:15: Post Maintenance Testing was completed satisfactory
- March 14, 2023, 13:29: WF3 entered Mode 1 and began power ascension



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	<input type="checkbox"/> 052		YEAR 2023	SEQUENTIAL NUMBER 002	REV NO. 00

NARRATIVE

EXTENT OF CONDITION

Engineering completed a walkdown of RCP 1A, 2A, and 2B to determine if any additional RCS leaks, excessive vibration, missing supports, or deformed tubing were present. During this extent of condition investigation, engineering identified a bent and damaged section of tubing downstream of reactor vessel loop 1B high pressure root valve [RTV] (RC MVAAA115 B) and a potential similar stressed condition on a tubing weld for RCP 2A. The conditions were evaluated in accordance with EN-FAP-OM-030 "Operational Decision Making" process, entered in the corrective action program, and evaluated the conditions as acceptable for the remainder of this cycle

SAFETY ASSESSMENT

The actual consequence to this condition resulted in a forced shutdown, which was a low risk evolution. This event leakage was greater than 1 gpm and was significantly less than the capacity of two charging pumps at approximately 82 gpm. The leakage associated with this RCS instrument tubing line was lower than the threshold to be considered a small break loss of coolant accident due to the capacity of the charging pumps. There were no consequences regarding the safety of the public, nuclear safety, industrial safety or radiological safety for this event.

EVENT CAUSES

The cause of the event on March 10, 2023 is attributed to high cycle fatigue due to vibrational stress in conjunction with missing tube supports that were previously corrected in 2016. WF3 has sent the removed tubing section to a vendor for additional failure analysis. A previous WF3 event in 2016 documents elevated RCS leakage from RCP 1B in a different section, downstream of this event. The 2016 event was caused by fretting from two missing supports on the same 0.05 inch high pressure instrument tubing line. It is unknown how long the supports were missing prior to 2016. This allowed for the tubing to vibrate for an unknown amount of time and is likely a contributor to the failure in 2023.

CORRECTIVE ACTIONS

The cracked tubing line was replaced, and operability was restored on March 13, 2023 at 0415 CST.

PREVIOUS SIMILAR EVENTS

On October 10, 2016 at 2200, RCS leak rate unidentified leakage increased from 0.04 gpm to 0.44 gpm. Additional containment sump inflow increased was observed. A containment walk down identified water at the bottom of the RCP 1B cell. On October 24, 2016, the leakage investigation team identified a probable leak location was from the RCP 1B pump differential pressure instrumentation line. Two tubing supports directly downstream from the leak location were identified missing. On October 25, 2016, after isolating the 0.5 inch tubing leak, the location of the leak was found to be in contact with a structural steel support member. Prior removal of the tubing supports allowed the instrument line to come in contact with a support beam, causing a longitudinal crack in the instrument tubing. The tubing appeared to have been fretting on the structural steel support member for an unknown duration.