



Entergy Nuclear South
Entergy Operations, Inc.
17265 River Road
Killona, LA 70057-3093
Tel 504-739-6715
Fax 504-739-6698
rmurill@entergy.com

Robert J. Murillo
Licensing Manager, Acting
Waterford 3

10CFR50.73 (a)(2)(i)(B)

W3F1-2005-0061

August 08, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Licensee Event Report 2005-002-00
Waterford 3 SES
Docket No. 50-382
License No. NPF-38

Gentlemen:

Attached is Licensee Event Report (LER) 2005-002-00 for Waterford Steam Electric Station Unit 3. This report documents a reportable condition due to containment fan cooler condensate flow switches not performing their specified safety function of detecting a leakage rate of one gpm as required by the Technical Specification. This condition is being reported pursuant to 10CFR50.73 (a)(2)(i)(B) as a condition prohibited by the Technical Specification.

There are no commitments contained in this submittal. If you have any questions, please contact Michael E. Mason at (504) 739-6673.

Very truly yours,

A handwritten signature in black ink, appearing to read "R. J. Murillo".

Robert J. Murillo
Licensing Manager, Acting

RJM/MEM/cbh

Attachment

JE22

cc: Mr. Bruce S. Mallett
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Waterford Steam Electric Station Unit 3
P.O. Box 822
Killona, LA 70066-0751

U. S. Nuclear Regulatory Commission
Attn: Mr. N. Kalyanam
Mail Stop O-07 D1
Washington, DC 20555-0001

Wise, Carter, Child & Caraway
ATTN: J. Smith
P.O. Box 651
Jackson, MS 39205

Winston & Strawn
ATTN: N.S. Reynolds
1700 K Street, NW
Washington, DC 20006-3817

Louisiana Department of Environmental Quality
Office of Environmental Compliance (REP&R) Unit
Emergency and Radiological Services Division
P.O. Box 4312
Baton Rouge, LA 70821-4312

American Nuclear Insurers
95 Glastonbury Blvd – Suite 300
Glastonbury, CT 06033-4443

Morgan, Lewis & Bockius LLP
ATTN: T.C. Poindexter
1111 Pennsylvania Avenue, NW
Washington, DC 20004

R.K. West, lerevents@inpo.org - INPO Records Center

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 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 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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.

1. FACILITY NAME Waterford Steam Electric Station, Unit 3	2. DOCKET NUMBER 05000 -382	3. PAGE 1 OF 5
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4. TITLE Failure of One System of RCS Leakage Detection Instrumentation due to Latent Human Error
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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
06	09	2005	2005	- 2 -	00	08	08	2005	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

9. OPERATING MODE 3	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)									
	<input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A						
10. POWER LEVEL N/A										

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Michael E. Mason	TELEPHONE NUMBER (Include Area Code) 504-739-6673
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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

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 June 9, 2005, with Waterford 3 in Mode 3 during Refueling Outage 13, it was determined that over the last three years during certain periods Waterford 3 was operated in a condition prohibited by Technical Specification (TS). TS 3.4.5.1 specifies that one containment fan cooler condensate flow switch (CFCCFS) shall be operable in Modes 1-4. All CFCCFS were determined to have been inoperable during certain periods prior to Refueling Outage 13 due to their inability to detect a leakage rate of one gallon per minute (gpm). Since the CFCCFS were not identified as being inoperable, the TS 3.4.5.1 action c allowed outage time requirement was not met.

The cause of this event is that the TS surveillance requirement implementing procedure did not contain the design basis detector sensitivity requirement of detecting one gpm prior to Refueling Outage 13 due to unawareness of the design basis requirement. The implementing procedure was revised to include the one gpm requirement and the CFCCFS were satisfactorily tested utilizing the revised implementing procedure during Refuel Outage 13 prior to entering Mode 4. Alternate means of detecting reactor coolant pressure boundary leakage were available. This condition did not compromise the health and safety of the public or plant personnel. This condition is not considered a Safety System Functional Failure (SSFF).

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1. FACILITY NAME Waterford Steam Electric Station, Unit 3	2. DOCKET 05000-382	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3. PAGE 2 OF 5
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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

REPORTABLE OCCURRENCE

On June 9, 2005, it was determined that all six containment fan cooler condensate flow switches (CFCCFS) were unable to perform their specified safety function of detecting a leakage rate of one gallon per minute (gpm) prior to Refueling Outage 13, as required by Regulatory Guide 1.45 detector sensitivity requirements and were thus inoperable. This condition existed under Technical Specification Amendment 197, implemented on August 2, 2004 and the original Technical Specification (TS) Limiting Condition for Operations (LCO).

Amendment 197 changed the Reactor Coolant System Leakage Detection (RCSLD) Technical Specification (TS) 3.4.5.1 to specify that one CFCCFS shall be operable in Modes 1-4. TS LCO 3.4.5.1 action statement c. specified that with the required CFCCFS inoperable, a channel check will be performed on the containment atmosphere particulate radioactivity monitor once per 8 hours or a reactor coolant system inventory balance will be performed once per 24 hours or if unable to comply with the action, a plant shutdown is required. Since the CFCCFS were not identified as being inoperable, the requirements of Action c. were not met during certain periods from August 2, 2004 through April 17, 2005.

Prior to August 2, 2004, the RCSLD TS LCO specified that the following leakage detection systems shall be operable:

- a. a containment atmosphere particulate radioactivity monitoring system,
- b. the containment sump level and flow monitoring system, and
- c. either the CFCCFS on at least three coolers or a containment atmosphere gaseous radioactivity monitoring system.

TS LCO 3.4.5.1 action statement specified that with only two of the required leakage detection systems operable, operation may continue for up to thirty days – otherwise, be in at least Hot Standby within the next six hours and in Cold Shutdown within the following thirty hours. Since the CFCCFS were not identified as being inoperable, the requirements of the RCSLD TS LCO action regarding having two required leakage detection systems operable were not met during certain periods.

This condition is being reported in accordance with the 60-day written reporting requirements of 10CFR50.73 (a)(2)(i)(B) as a condition prohibited by the Technical Specification.

INITIAL CONDITIONS

At the time of discovery of this condition, the plant was coming up out of Refueling Outage 13 and operating in Mode 3. There were no procedures being implemented specific to this condition. There were no Technical Specification Limiting Conditions of Operation specific to this condition in effect. There was no equipment out of service specific to this condition.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

EVENT DESCRIPTION

On May 25, 2005, during performance of the channel functional test of the CFCCFS [IJ] to comply with the 18 month RCSLD TS surveillance requirement (SR) 4.4.5.1.c, five of the six flow switches did not respond when flowing one gallon per minute (gpm) of water into the flow switch drain lines. All of the flow switches were adjusted to actuate at one gpm. On June 9, 2005, Engineering completed a past operability evaluation and determined that none of the six flow switches would have performed their specified safety function of detecting a leakage rate of one gpm as required in the detector sensitivity section of Regulatory Guide 1.45, Reactor Coolant Pressure Boundary Leakage Detection Systems, based on the as-found flow switch settings. Prior to Refueling Outage 13, the flow switches had never been tested with a specified flow rate. Historically, the flow switch test had been conducted by directing an unspecified amount of water into the flow switch drain line to verify that the flow switch would trip resulting in a plant computer point changing state, indicating flow in the drain line. The condition was previously unrecognized, and the time of discovery was based on the completion of the engineering evaluation which confirmed the inoperability of the flow switches.

BACKGROUND

The original Technical Specification Surveillance Requirement (TSSR) implementing procedure did not incorporate the Regulatory Guide 1.45 detector sensitivity requirement in the functional testing of the CFCCFS, even though this requirement was part of the original licensing basis. The original RCSLD TS LCO specified that the CFCCFS was one part of one of the three required systems with the other part being the Containment Atmosphere Gaseous Radioactivity Monitoring System (CAGRMS) [IJ]. The other two required systems were the containment sump level and flow monitoring system [IJ] and the containment atmosphere particulate radioactivity monitoring system [IJ].

On August 2, 2004, the implementation of Amendment 197 revised the RCSLDS TS LCO by removing the CAGRMS from the group of required systems, crediting either the containment sump level instrumentation or the containment sump flow monitor instrumentation as the "one containment sump monitor", and allowing one CFCCFS as the third leakage detection system. Additionally, the RCSLD TS Bases was revised and specified that the CFCCFS were instrumented to alarm for increases of 0.5 to 1.0 gpm in the normal flow rates.

An engineering determination was made on June 9, 2005 that none of the six flow switches would have performed their specified leakage detection safety function to the detector sensitivity requirements of Regulatory Guide 1.45 and were thus inoperable. A review of the plant's station log was conducted for the period from June 9, 2002 to August 2, 2004 to identify any instances where any other leakage detection system was inoperable and credit was being taken for the CFCCFS leakage detection system to meet the original RCSLDS TS LCO Action requirement. During this period, multiple occasions were identified wherein Technical Specification Action was not met.

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

For the period from August 2, 2004, corresponding to Amendment 197 implementation, to April 17, 2005, corresponding to when the plant left the applicability mode for the RCSLD TS Action requirements during Refueling Outage 13, action statement c. required the following actions with the required CFCCFS inoperable: perform a channel check on the containment atmosphere particulate radioactivity monitor once per 8 hours or perform a reactor coolant system inventory balance once per 24 hours or perform plant shutdown. A review of the plant's station log established that the requirements of Action c. were not met during certain periods from August 2, 2004 through April 17, 2005.

CAUSAL FACTORS

The condition resulted due to the original TSSR implementing procedure not containing the appropriate testing requirement to ensure the CFCCFS detector sensitivity requirement of Regulatory Guide 1.45 CFCCFS was effectively implemented.

Also, personnel missed opportunities to identify that the RCSLD detector sensitivity requirement of Regulatory Guide 1.45 was not being appropriately tested in the CFCCFS TSSR implementing procedure.

CORRECTIVE ACTIONS

The CFCCFS TSSR implementing procedure was revised to include the Regulatory Guide 1.45 detector sensitivity requirement of one gpm and all of the CFCCFS were satisfactorily tested utilizing the revised implementing procedure during Refuel Outage 13. A corrective action was entered into the corrective action program to confirm that Regulatory Guide 1.45 requirements are clearly specified in the RCSLD TSSR implementing procedures.

SAFETY SIGNIFICANCE

Redundant indications of RCS leakage are required to promptly and quantifiably identify RCPB leakage. The CFCCFS are one of three RCS leak detection systems credited by TS 3.4.5.1. The other credited leak detection systems are containment sump level and containment atmosphere particulate radioactivity. The CFCCFS were able to detect leakage but not necessarily at the 1 gpm limit. The CFCCFS leakage detection capability through the as found flow detector settings was between a value of greater than 1 gpm and equal to 4.4 gpm. In addition to these three TS leakage detection systems, TS 3.4.5.2 requires a Reactor Coolant System water inventory balance at least once per 72 hours which can detect leakage much less than 1 gpm.

In addition to General Design Criteria (GDC) 30 requirements, the requirement for leakage detection is contained in the "leak-before-break" analysis. This analysis, contained in CEN-367-A, "Leak-Before-Break Evaluation of Primary Coolant Loop Piping in Combustion Engineering Designed Nuclear Steam Supply Systems," bounds the identified condition of leakage detection at 4.4 gpm on the CFCCFS since this analysis assumes a RCPB leakage detection capability of 10 gpm, based on a NUREG 1061, Vol 3, recommended leakage detection system safety factor of 10. The CFCCFS leakage detection system was able to detect a leakage rate within the results of the analysis, but not with the safety margin applied in the analysis.

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During the time interval when the CFCCFS was inoperable due to not meeting the Regulatory Guide 1.45 detector sensitivity requirement, there was always one RCSLDS TS LCO detection system operable. In addition, TSSR 4.4.5.2.1, Reactor Coolant System inventory balance, was being performed at least once every 72 hours and provided RCPB leakage detection capability at much less than 1 gpm leakage rate. These detection capabilities coupled with the low LOCA probabilities make the safety significance of this condition negligible.

The containment leakage detection system is not modeled in the PRA. The PRA LOCA initiator frequencies are from NUREG/CR-5750, "Rates of Initiating Events at U.S. Nuclear Power Plants: 1987 - 1995." These PRA LOCA initiator frequencies would remain valid while in this condition. Qualitatively, the low LOCA initiator frequencies and alternative leak detection methods indicate a negligible impact in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF).

This condition is not a Safety System Functional Failure. Per NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, there are four safety system functions: ability to shut down the reactor and maintain it in a safe shutdown condition, ability to remove residual heat, ability to control the release of radioactive material, and ability to mitigate the consequences of an accident. The RCSLD TS LCO meets none of these safety system functions. The system serves as one of the diverse leakage monitoring systems capable of detecting extremely small RCS boundary leakage to allow timely actions to place the plant in a safe condition.

SIMILAR EVENTS

There were no previous similar reportable events identified that involved CFCCFS or Regulatory Guide 1.45 design basis requirements.

ADDITIONAL INFORMATION

Energy Industry Identification System (EIS) codes are identified in the text within brackets [].