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W3F1-2001-0036  
A4.05  
PR

April 23, 2001

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

Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
Reporting of Licensee Event Report

Gentlemen:

Attached is Licensee Event Report (LER) 01-004-00 for Waterford Steam Electric Station Unit 3. This report involves a failure to complete the actions required by TS 3.3.1 Limiting Condition for Operation, Table 3.3-1, when one of the four Core Protection Calculator channels response time values for Reactor Coolant System Cold Leg Temperature was outside the allowable limits specified in the Technical Requirements Manual, Table 3.3-2. The response time surveillance requirement is required by Technical Specifications 4.3.1.3. This condition existed since May 25, 2000 when surveillance test requirements associated with this channel were completed. This condition is being reported pursuant to 10CFR50.73(a)(2)(i)(B), as a condition prohibited by the Technical Specifications.

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There are no commitments contained in this submittal. Actions described herein are controlled and tracked in the Waterford 3 Corrective Action Program.

Very truly yours,



Alan J. Harris  
Director,  
Nuclear Safety Assurance

AJH/RLW/cbh  
Attachment

cc: E.W. Merschoff, (NRC Region IV), N. Kalyanam, (NRC-NRR),  
A.L. Garibaldi, lerevents@inpo.org - INPO Records Center,  
J. Smith, N.S. Reynolds, NRC Resident Inspectors Office,  
Louisiana DEQ/Surveillance Division

Estimated burden per response to comply with this mandatory information 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 Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [bj1@nrc.gov](mailto:bj1@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 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)

<b>FACILITY NAME (1)</b> Waterford Steam Electric Station, Unit 3	<b>DOCKET NUMBER (2)</b> 05000-382	<b>PAGE (3)</b> 1 OF 8
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**TITLE (4)**  
Failure to Enter TS ACTION Statement Due to Inadequate Surveillance Test Procedure

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	21	01	01	004	00	04	23	01	N/A	05000
									N/A	05000

<b>OPERATING MODE (9)</b>	1	<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)</b>			
<b>POWER LEVEL (10)</b>	100	20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
		20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
		20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
		20.2203(a)(2)(v)	X 50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)			
		20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

**LICENSEE CONTACT FOR THIS LER (12)**

<b>NAME</b> Ronald L. Williams / Licensing Engineer	<b>TELEPHONE NUMBER (Include Area Code)</b> (504) 739-6255
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**COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

<b>SUPPLEMENTAL REPORT EXPECTED (14)</b>	<b>EXPECTED SUBMISSION DATE (15)</b>	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).      X    NO				

**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**

On February 21, 2001 at 1138, with the plant operating in Mode 1 at 100% power, it was discovered that Waterford 3 was in a condition involving a failure to complete the actions required by TS 3.3.1, Table 3.3-1, item 10. This condition existed since May 25, 2000 following performance of TS 4.3.1.3 required surveillance test. The total RPS Core Protection Calculator (CPC) Channel D response time of 0.259 sec. for Reactor Coolant System Cold Leg Temperature (T-Cold) exceeded the Technical Requirements Manual (TRM) Table 3.3-2 (item 10c) response time allowable limit of  $\leq$  0.258 sec. This condition is being reported pursuant to 10CFR50.73(a)(2)(i)(B), as a condition prohibited by the TS. CPC Channel D was declared inoperable in accordance with TS 3.3.1, Table 3.3-1 on February 21, 2001 at 1500. The root cause was determined to be a human performance error resulting in a non-conservative (inadequate) surveillance procedure. Two immediate actions were taken: (1) the RPS response time test of the CD matrix was re-performed. The plant was presently in compliance with the TS 3.3.1 LCO; and (2) an analysis was performed and determined the response time allowable limit specified in the TRM was overly conservative. Based on TS LCO compliance, CPC Channel D was returned to operable status on February 22, 2001 at 1730. In addition, the TRM was amended to reflect a total RPS CPC response time allowable limit of  $\leq$  0.300 sec. for the RCS T-Cold parameter. The condition did not compromise the health and safety of the general public. This is not considered a safety-system functional failure.

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**REPORTABLE OCCURRENCE**

On February 21, 2001 at 1138, it was discovered that Waterford 3 was in a condition that involved a failure to complete the actions required by TS Limiting Condition for Operation (LCO) 3.3.1, Table 3.3-1, item 10 following performance of TS 4.3.1.3 required surveillance test on May 25, 2000. The total Reactor Protection System (RPS) [JC ] Core Protection Calculator (CPC) [JP-CPU] Channel D response time of 0.259 seconds for Reactor Coolant System (RCS) Cold Leg Temperature (T-Cold) exceeded the Technical Requirements Manual (TRM) Table 3.3-2 (item 10c) response time allowable limit of  $\leq$  0.258 seconds. This condition is reportable pursuant to 10CFR50.73(a)(2)(i)(B), as a condition prohibited by the plant's TS.

**INITIAL CONDITIONS**

At the time this condition was identified, Waterford 3 was operating in Mode 1 at approximately 100% power. No structures, systems, or components were inoperable at the time of the occurrence that contributed to this condition.

**EVENT DESCRIPTION**

The Plant Protection System (PPS) [JC] is comprised of an Engineered Safety Feature Actuation System (ESFAS) [JE] and a RPS. The CPC system is designed to initiate automatic protective action functions within the RPS. A CPC is installed in each of the four independent RPS channels. The CPC system consists of digital computers that utilize inputs from pressurizer pressure, reactor coolant pump speed, hot leg and cold leg temperatures, selected control element assembly (CEA) positions, CEA deviation penalty factors, and excore neutron flux signals to calculate Departure From Nucleate Boiling Ratio (DNBR) and Local Power Density (LPD). The calculated DNBR and LPD are compared to predetermined setpoints for initiation of a reactor trip signal.

On February 21, 2001 at 1138, it was discovered that Waterford 3 was in a condition that involved a failure to complete the actions required by TS LCO 3.3.1, Table 3.3-1, item 10 following

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performance of TS 4.3.1.3 required surveillance test per procedure MI-003-222 on May 25, 2000. The resultant 0.259 seconds total RPS CPC Channel D response time value for RCS T-Cold exceeded the TRM Table 3.3-2 (item 10c) response time allowable limit of  $\leq 0.258$  seconds. TS 4.3.1.3, Table 3.3-1 surveillance requires at least one of four CPC channels to be tested every 18 months to demonstrate the reactor trip response time is within its allowable limit, as specified in TRM Table 3.3-2, item 10c, such that all channels are tested every 6 years. The response time surveillance procedures MI-003-222, RPS Matrix Response Time Verification, performed on May 25, 2000 and MI-003-223, CPC Response Time Verification, performed on September 24, 1995, contained acceptance criteria of  $< 0.120$  seconds for the reactor trip switchgear undervoltage trip circuit CD matrix, and  $< 0.170$  seconds for the CPC input parameter RCS T-Cold, respectively. The sum of the response time values specified in the surveillance test procedures equal the total RPS CPC Channel D response time for RCS T-Cold of  $< 0.290$  seconds. This acceptance criteria exceeds the TRM Table 3.3-2 allowable limit of  $\leq 0.258$  seconds.

A formalized root cause determination was conducted per Condition Report CR-2001-0241. The investigation was concentrated in two areas, (1) surveillance test procedure development and (2) Technical Specification changes.

From December 15, 1982 through April 2, 1993, surveillance test procedure MI-003-207, Plant Protection System Bi-Stable Matrix Response Time Verification, satisfied the surveillance requirements of TS 4.3.1.3 by measuring the response times for the reactor trip switchgear matrix and the CPC channels for the RCS T-Cold input parameter. In particular, the acceptance criteria for the RPS matrix response time remained at  $< 0.120$  seconds for the duration of this procedure. However, the CPC response times for the RCS T-Cold input parameter was changed, via MI-003-207 revision 2 on October 9, 1984, from  $< 0.103$  to  $< 0.170$  seconds. The procedure change approval for revision 2 did not describe a reason for the change in acceptance criteria. In 1993 surveillance test procedure MI-003-207 was superseded by two procedures, MI-003-222 and

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MI-003-223, that retained the same acceptance criteria for each response time measurement.

In contrast, prior to January 16, 1987, the TS 3.3.1, Table 3.3-2 specified a CPC channel response time acceptance criteria for the RCS T-Cold input parameter of  $\leq 0.634$  seconds. This response time was an assumed time for the Cycle 1 safety analysis and deemed adequate to satisfy the acceptance criteria for the CPC DNBR-Low reactor trip during the limiting transients analyzed for Cycle 1, since plant specific measurements were not available. On January 16, 1987, the NRC approved TS Amendment 12 that revised TS 3.3.1, Table 3.3-2 RPS response times. These changes were requested and approved to ensure the response times would be consistent with the values used in the Cycle-2 safety analysis. Specifically, the CPC channel response time acceptance criteria for RCS T-Cold was revised from  $\leq 0.634$  to  $\leq 0.258$  seconds.

Historical plant records indicate that Amendment 12 was reviewed to ensure all requirements were met prior to TS implementation. However, MI-003-207 was not changed to reflect the new TS CPC channel response time acceptance criteria for RCS T-Cold.

**CAUSAL FACTORS**

The root cause of the procedural inadequacy was not conclusively determined because of the age factor (1987), but the basic root cause was determined to be human performance/human error. The causal factors involved in the failure to change the surveillance test procedure to reflect the TS Amendment 12 acceptance criteria are as follows.

1. Even though historical plant records indicate that Amendment 12 was reviewed by the appropriate department to ensure all requirements were met prior to TS implementation, ineffective change management resulted in existing surveillance test procedures not being revised, as required.

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2. Resource management was inadequate in tracking procedures and other licensing basis documents affected by the TS change to ensure all requirements were met prior to TS implementation or scheduled prior to entry into the applicable mode.
3. Personnel work practices appeared to be inadequate during the development, review, and approval of surveillance test procedures MI-003-222 and MI-003-223. There was no evidence available to verify the acceptance criteria contained in the procedures were validated against the TRM Table 3.3-2 maximum response time limits.

**CORRECTIVE ACTIONS**

Immediate Actions

Immediate Actions were taken to declare CPC Channel D (1) high LPD Trip, (2) low DNBR Trip, and (3) CPC Channel D inoperable in accordance with TS 3.3.1, Table 3.3-1 on February 21, 2001 at 1500. CPC Channel D was placed in the bypassed condition within 1 hour in accordance with TS 3.3.1 ACTION statement 2.

The response time test of the reactor trip switchgear undervoltage trip circuit CD matrix, trip path #2 was re-performed to determine the as-found value, in accordance with surveillance test procedure MI-003-222. The test results yielded a value of 0.095 seconds, which is less than the 0.100 seconds value obtained in the May 25, 2000 test performance, as well as being less than the acceptance criteria specified in the procedure. This as-found value of 0.095 seconds, when added to the CPC response time value of 0.159 seconds for CPC response time Channel D, obtained on September 24, 1995, totaled a CPC response time of 0.254 seconds. The as-found 0.254 seconds CPC response time was less than the  $\leq 0.258$  seconds allowable limit specified in TRM Table 3.3-2. Based on TS LCO compliance, CPC Channel D was returned to operable status on February 22, 2001 at 1730.

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Concurrently with the re-performance of the surveillance test, an independent analysis was performed by Westinghouse Electric Company to evaluate an increase in CPC reactor trip response time for RCS T-Cold input from 0.258 to 0.36 seconds. Based on this analysis, TRM Amendment 43 was approved on February 22, 2001 to change the CPC response time for the RCS T-Cold input parameter from  $\leq 0.258$  to  $\leq 0.300$  seconds.

Long Term Actions

Based on ineffective change management that resulted in existing surveillance test procedures not being revised to reflect the TS Amendment 12 changes, Entergy will review relevant surveillance procedures to ensure they appropriately implement the values in TRM Table 3.3-2. Corrective actions will be initiated in the corrective action program to track any required procedural revisions or changes.

Based on inadequate resource management in tracking procedures and other licensing basis documents affected by the TS change, the Site Procedure W4.503, Control of Changes to the Operating License and Selected Licensing Basis Documents, was reviewed to determine if existing guidance was adequate in tracking required document changes prior to TS implementation. The procedure was verified to contain sufficient guidance to ensure procedures, programs, and processes affected by the TS or TRM change are approved prior to implementation or are tracked in the Commitment Management System for completion prior to entry into an applicable mode.

Since 1987, the procedure review and approval cycle has undergone significant improvement. The improved guidance is contained in Site Procedure W2.109, Procedure Development, Review, & Approval. The current guidance is sufficient to ensure this type incident is minimized in the future. No additional action is required.



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These corrective actions have been entered, and are being tracked, in the plant's corrective action program.

**SAFETY SIGNIFICANCE**

The potential impact of the CPC Channel D response time of 0.259 seconds for RCS T- Cold exceeding the Technical Requirements Manual (TRM) Table 3.3-2 (item 10c) response time allowable limit of  $\leq 0.258$  seconds was reviewed and assessed. The CPC Channel D as-found response time verified the plant was in compliance with the LCO for TS 3.3.1, Table 3.3-1, item 10 by being  $\leq 0.258$  seconds, as specified in TRM Table 3.3-2.

However, an assessment was performed for the time period since May 25, 2000 to determine the impact on plant safety. An independent analysis was performed by Westinghouse Electric Company to evaluate an increase in CPC reactor trip response time to RCS T-Cold input from 0.258 to 0.36 seconds. The analysis determined that the only limiting Chapter 15 event affected by an increase in the CPC response time up to 0.1 seconds was the Asymmetric Steam Generator Transient (ASGT). This event is a DNBR/thermal margin type event where the increase in CPC response time can result in greater thermal margin degradation due to the delayed CPC trip. The evaluation concluded that the impact of an increase in response time of up to 0.1 seconds is negligible and bounded by the existing margin penalties in place for Cycle 11. This evaluation conservatively bounds the actual increase in response time to  $\leq 0.300$  seconds made to the TRM.

Based on the as found surveillance test value, the plant was in compliance with the LCO for TS 3.3.1, Table 3.3-1 and TRM Table 3.3-2. During the time since May 25, 2000, the considerations described in the Westinghouse analysis above indicated the current licensing and design bases would have remained bounding. Therefore, this condition is not considered safety significant.

This event is not considered a safety system functional failure.

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#### SIMILAR EVENTS

Since February, 1998, there were no similar reportable events identified that involved a failure to complete actions required by TS LCO because of non-conservative surveillance test acceptance criteria to the TS/TRM maximum acceptable limits.

#### ADDITIONAL INFORMATION

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