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Waterford 3

W3F1-2000-0148
A4.05
PR

October 25, 2000

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) 00-010-00 for Waterford Steam Electric Station Unit 3. This report provides details of a non-conservative Technical Specification that caused a surveillance limit to have been exceeded in the past. This condition is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B).

There are no commitments contained in this submittal.

Very truly yours,

A handwritten signature in black ink that reads "Everett P. Perkins, Jr." with a stylized flourish at the end.

E.P. Perkins, Jr.
Director,
Nuclear Safety Assurance

EPP/GCP/tmm
Attachment

IE22

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cc: E.W. Merschoff, (NRC Region IV)
N. Kalyanam, (NRC-NRR)
A.L. Garibaldi
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N.S. Reynolds
NRC Resident Inspectors Office
Louisiana DEQ/Surveillance Division

FACILITY NAME (1) Waterford Steam Electric Station, Unit 3	DOCKET NUMBER (2) 05000-382	PAGE (3) 1 of 8
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TITLE (4)
Non-conservative Essential Chiller Technical Specification Surveillance

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	25	00	00	010	00	10	25	00	N/A	N/A
									N/A	N/A

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)								
		20.2201(b)		20.2203(a)(2)(v)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)		
POWER LEVEL (10)	100	20.2203(a)(2)(i)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)		
		20.405(a)(1)(ii)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71		
		20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER		
		20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A		
		20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)				

LICENSEE CONTACT FOR THIS LER (12)

NAME G. Chris Pickering / Licensing Engineer	TELEPHONE NUMBER (Include Area Code) (504) 739-6256
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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

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		
<input type="checkbox"/> YES <small>(If yes, complete EXPECTED SUBMISSION DATE).</small>	<input checked="" type="checkbox"/> X	<input type="checkbox"/> NO				

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

On 9/25/00, while re-evaluating the setpoints of the essential chiller, Design Engineering discovered that the 42 °F chiller outlet water temperature value in Technical Specification (TS) Surveillance Requirement (SR) 4.7.12.1b was not protecting an assumption in a design basis calculation. A design calculation, 5T, "Essential Chilled Water", assumed a chiller outlet water temperature of 41.5 °F, so the SR value of 42 °F causes the SR to be non-conservative. When the past SR data was reviewed, it was discovered that there were occasions when the chiller outlet water temperature was higher than the design calculation assumed. The intent of the SR was not met for these instances and is reportable as a condition prohibited by plant TS per 10 CFR 50.73(a)(2)(i)(B). The root cause was not adequately communicating changes to the design calculation. The chiller outlet water temperature was verified to be within the new limit to protect the design calculation assumption, including instrument uncertainty. This event did not compromise the health and safety of the public.

This event is not considered a Safety System Functional Failure (SSFF).

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

REPORTABLE OCCURRENCE

It was discovered that the 42 °F chiller outlet water temperature value in Technical Specification (TS) Surveillance Requirement (SR) 4.7.12.1b was not protecting an assumption in a design basis calculation. A design calculation, 5T, assumed a chiller outlet water temperature of 41.5 °F, so the SR value of 42 °F causes the SR to be non-conservative. When the past SR data was reviewed, it was discovered that there were occasions when the chiller outlet water temperature was higher than the design calculation assumed. The intent of the SR was not met for these instances and is reportable as a condition prohibited by plant TS per 10 CFR 50.73(a)(2)(i)(B).

INITIAL CONDITIONS

On 9/25/00, when this event was determined to be reportable, the plant was operating in Mode 1 at approximately 100% power. There was no major equipment out of service specific to this event.

EVENT DESCRIPTION

Event Background

Technical Specification Surveillance Requirement 4.7.12.1b states:

“Each of the above required essential services chilled water loop shall be demonstrated OPERABLE: ...

- b. At least once per 31 days by verifying that the water outlet temperature is ≤ 42 °F at a flow rate of ≥ 500 gpm.”

The Technical Specification Basis states:

“The 31-day Surveillance Requirement (SR) to verify the chilled water outlet temperature is ≤ 42 °F at a flow rate of ≥ 500 gpm ensures the assumptions of the DBA are preserved. This SR will be performed with sufficient heat load to ensure the Hot Gas Bypass Valve is closed and the chiller is not auto recycling on low load. This may require shifting loads from one chilled train to one being tested. This requirement is reflective of an actual post DBA condition, and ensures the chiller will control the chilled water outlet temperature within limits when sufficient heat load is applied.”

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While re-evaluating the essential chiller [CHU] setpoints in response to ER-W3-99-0374 and ER-W3-00-0541, it was discovered that the 42 °F chiller chilled water outlet temperature value in SR 4.7.12.1b does not protect the design basis assumption of calculation 5T which requires that the chilled water outlet temperature be 41.5 °F. The 41.5 °F chiller chilled water outlet temperature supports the 42 °F air handling units' cooling coils inlet temperature.

Repetitive task (R/T) #021438 verifies the TS 4.7.12.1b SR limit of 42 °F is not exceeded. Based on the discovery identified above, the actual design basis value that must be protected by the SR and R/T #021438 is 41.5 °F.

Event Timeline

1976:

Calculation 5T was originally prepared during the original plant design. This calculation reflected a chiller chilled water outlet temperature of 42 °F.

1982:

Calculation 5T was revised to state that the chiller chilled water outlet temperature had to be 41.5 °F to assure 42 °F temperatures at the air handling units' cooling coils inlets. This was a result of considering the addition of heat from the room areas into the chilled water piping and chilled water en route from the chiller to air handling unit cooling coils.

December, 1984:

Plant TS issued as NUREG-0973. TS 3/4.7.12 chiller chilled water outlet temperature SR was 42 °F.

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March, 1985:

Plant TS issued as NUREG-1117. TS 3/4.7.12 chiller chilled water outlet temperature SR was 42 °F.

October 8, 1996:

A TS Audit identified the discrepancy between the 42 °F in the TS and 41.5 °F in the design basis documentation. CR-96-1578 was initiated to document this condition which is the same condition identified later in the CR-00-1117. CR-96-1578 also questioned whether the requirement of this SR to monitor flow and temperature is adequate verification of chiller heat removal capacity. The CR concluded that no action is required as a result of CR-96-1578. The response to this CR was based on the premise that the 41.5 °F design value was generally consistent with licensing documentation. The conclusion was also based on the premise that chiller outlet temperature and flow do not provide an adequate measure of heat capacity removal. However, the evaluation of this CR failed to address the need to reconcile the SR and the design basis assumption regarding the air handling unit cooling coil chilled water maximum temperature. This is considered ineffective corrective action.

February 5, 1998:

Waterford 3 discovered that there was no margin provided between the TS value of 42 °F and what was thought to be the design basis value of 42 °F for the essential chiller outlet temperature. This was discovered while reviewing the essential chilled water system TS SR criteria as part of the Performance Improvement Plan (PIP). Instrument uncertainty did not appear to be considered in this measured parameter, and there was a possibility the actual chiller outlet temperature exceeded 42 °F. This condition was identified in CR-98-0170, and the focus of that CR was on instrument uncertainty and not on the analysis limit (TS limit that protects plant initial conditions assumed in the DBA safety analysis). Calculation 5T identified the chiller chilled water outlet temperature as 41.5 °F at that time, but the reviewers did not properly interpret the design value. The 41.5 °F value was interpreted as a chilled water outlet controller setpoint, and not an analytical limit to be protected by TS. One of the immediate corrective actions resulting from this CR was to decrease the SR limit in

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Repetitive Task (R/T) #021438 from 42 °F to 41.4 °F to account for instrument uncertainty, but no corrective actions addressed the 41.5 °F value as an analytical limit. This was considered a missed opportunity.

Between May 1998 and June 1999:

Design Basis Review (DBR) item OI-CHW-118 identified the essential chillers chilled water outlet temperature as not having an identified design basis. DBR item OI-CHW-118 is currently open and unresolved. This open item used the CR-98-0170 safety significance discussion as the basis for assessing the requirement for timely action commensurate with the significance to safety. This is considered a missed opportunity.

June 1999

ER-W3-99-0491 was issued to address flow rate reductions in flow to room coolers. Calculation 5T was subsequently adjusted to accommodate reductions in chilled water flow to room coolers. The reduction in flow margin resulted in a reduction of temperature margin. This was considered a missed opportunity.

September 25, 2000:

Waterford 3 discovered that the actual chiller chilled water outlet temperature limit is 41.5 °F, based on Mechanical Calculation 5T. CR-00-1117 was initiated to identify this condition. The SR as reflected in R/T #021438 was revised from 41.4 °F to 40.9 °F to protect the 41.5 °F limit, accounting for measurement uncertainty.

CAUSAL FACTORS

The casual factor for this event was inadequate communication of changes to a design calculation. Contributing causes to this condition are inattention to detail, consequences associated with changes not adequately reviewed, and ineffective corrective actions. The

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discrepancy between the TS and Calculation 5T existed before receipt of the Waterford 3 Operating License. The impact of the calculation change on the draft TS was not identified during the original submittal.

CORRECTIVE ACTIONS

Immediate Actions:

- The SR as reflected in R/T #021438 was revised from 41.4 °F to 40.9 °F to protect the 41.5 °F limit, accounting for measurement uncertainty.
- Essential Chiller outlet temperature was verified to be \leq 40.9 °F so the intent of the SR is met.

Long Term Actions:

- The current site procedures for evaluating the impact of document changes should prevent the condition identified as the root cause from recurring in the future.
- Additional corrective actions are being addressed within our Corrective Action process. In summary, some of these actions are:
 - Assess the need to revise Calculation 5T to re-distribute margins as required to support the TS 3/4.7.12.1b Surveillance requirement.
 - Evaluate the twelve DBR open items to assure conservative analytical limits associated with the TS values.

SAFETY SIGNIFICANCE

This condition could have resulted in CHW temperature to cooling coils being as high as 42.5 °F. An evaluation (ER-W3-99-0491-00-00) was performed to evaluate the impact of essential chilled water outlet temperature of 75 °F and degraded flow, the worst case maximum room temperatures resulting from simultaneous degraded conditions, and the effects of those

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maximum temperatures on safety related equipment. This evaluation demonstrated that there is sufficient margin in the Essential Chilled Water (CHW) flows to ensure safety related equipment cooled by CHW receives adequate cooling to perform its safety function.

The impact of the chiller outlet temperature of 42.5 °F on safe shutdown in response to the bounding event is substantially within the evaluation (ER-W3-99-0491-00-00) documented by CR 98-0170, which concluded the condition was not significant to safety. Therefore, this condition is not significant to safety.

This event is not considered a Safety System Functional Failure (SSFF).

SIMILAR EVENTS

CR-96-1578 identified the same condition identified in CR-00-1117, a discrepancy between the chiller outlet temperature values in the TS and design basis documentation. This condition report was not identified as being reportable and did not create any corrective actions to prevent recurrence.

CR-98-0170 was reported under LER-98-007 when it was discovered that the task being performed for the TS SR for chiller outlet temperature did not include instrument uncertainty. The root cause of this event was not appropriately considering instrument uncertainty when preparing the TS SR task.

LER-98-008 reported a potential for a concurrent degraded condition in both trains of CHW. The root cause of the condition was indeterminate but was evidenced by abnormalities in the local ammeter readings during an approximate two month period. CR-98-0476 was the initiating CR and the following CRs were addressed in the RCD and LER: CR-97-2244, 97-2300, 97-2698, 97-2778, 98-0445, 98-0476, 98-0484 and 98-0492.

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These CRs identified additional occasions of the chiller outlet temperature being greater than 42 degrees: 98-0359, 98-0531, 00-0054, 00-0167 and 00-1042.

ADDITIONAL INFORMATION

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