



**Entergy
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W3F1-97-0071

A4.05

PR

April 21, 1997

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) Number 97-011-00 for Waterford Steam Electric Station Unit 3. The LER reports the discovery that the volume of water maintained in the Containment Spray Risers may have been less than required by the Technical Specifications. This condition is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(v).

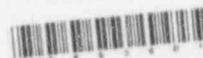
Very truly yours,

T.R. Leonard
General Manager
Plant Operations

TRL/MKG/tjs
Attachment

9704230303 970421
PDR ADDCK 05000382
S PDR

IED21



Reporting of Licensee Event Report

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cc: E.W. Merschoff, NRC Region IV
C.P. Patel, NRC-NRR
A.L. Garibaldi
J.T. Wheelock - INPO Records Center
R.B. McGehee
N.S. Reynolds
NRC Resident Inspectors Office
Administrator - LRPD

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY
INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE
INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY.
FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND
RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION,
WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-
0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

WATERFORD STEAM ELECTRIC STATION UNIT 3

DOCKET NUMBER (2)

05000 382

PAGE (3)

1 OF 7

TITLE (4)

CONTAINMENT SPRAY WATER LESS THAN REQUIRED DUE TO INSTRUMENT UNCERTAINTY

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
03	21	97	97	011	00	04	21	97	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)				
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(2)(v)	<input checked="" type="checkbox"/>	50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	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)	<input checked="" type="checkbox"/>	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

T.J. GAUDET, LICENSING MANAGER

TELEPHONE NUMBER (Include Area Code)

(504) 739-6666

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDs

SUPPLEMENTAL REPORT EXPECTED (14)

YES

(If yes, complete EXPECTED SUBMISSION DATE).

☒ NOEXPECTED
SUBMISSION
DATE (15)

MONTH

DAY

YEAR

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

On March 21, 1997, Engineering personnel discovered that the level of water in the Containment Spray (CS) Risers could have been less than required by Technical Specification (TS) 4.6.2.1.a. The instruments used to verify the TS required water level (e.g., greater than or equal to 149.5 feet Mean Sea Level elevation) are located approximately 31.5 feet below sea level and measure the height of water in the CS Risers. Historically, operators have performed the level verification by ensuring that the instruments indicate a height of water greater than or equal to 181 feet. The indicated verification value was chosen because an actual water height of 181 feet is equal to 149.5 feet MSL elevation. When considering the effects of instrument uncertainties, however, verification that the indicated level is greater than or equal to 181 feet is not sufficient to ensure TS compliance. Preliminary investigations indicate that the root cause of this event was the failure to consider instrument uncertainty when establishing a minimum indicated CS riser level value that ensures compliance with the TS required value. The height of water in CS Risers A and B, as indicated by level instruments, was verified to be 196 feet and 183, respectively. The indicated water level in CS Riser B was raised to 191 feet. In addition, the surveillance procedure was revised to ensure future compliance. This event did not compromise the health and safety of the public.

**REQUIRED NUMBER OF DIGITS/CHARACTERS
FOR EACH BLOCK**

BLOCK NUMBER	NUMBER OF DIGITS/CHARACTERS	TITLE
1	UP TO 46	FACILITY NAME
2	8 TOTAL 3 IN ADDITION TO 05000	DOCKET NUMBER
3	VARIES	PAGE NUMBER
4	UP TO 76	TITLE
5	6 TOTAL 2 PER BLOCK	EVENT DATE
6	7 TOTAL 2 FOR YEAR 3 FOR SEQUENTIAL NUMBER 2 FOR REVISION NUMBER	LER NUMBER
7	6 TOTAL 2 PER BLOCK	REPORT DATE
8	UP TO 18 -- FACILITY NAME 8 TOTAL -- DOCKET NUMBER 3 IN ADDITION TO 05000	OTHER FACILITIES INVOLVED
9	1	OPERATING MODE
10	3	POWER LEVEL
11	1 CHECK BOX THAT APPLIES	REQUIREMENTS OF 10 CFR
12	UP TO 50 FOR NAME 14 FOR TELEPHONE	LICENSEE CONTACT
13	CAUSE VARIES 2 FOR SYSTEM 4 FOR COMPONENT 4 FOR MANUFACTURER NPRDS VARIES	EACH COMPONENT FAILURE
14	1 CHECK BOX THAT APPLIES	SUPPLEMENTAL REPORT EXPECTED
15	6 TOTAL 2 PER BLOCK	EXPECTED SUBMISSION DATE

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TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
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WATERFORD STEAM ELECTRIC STATION UNIT 3	05000 382	97	011	--	2 OF 7

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

REPORTABLE OCCURRENCE

Technical Specification (TS) 4.6.2.1.a requires periodic verification that the water level in the Containment Spray (CS) system (CS; EIS Identifier BE) Riser is >149.5 feet Mean Sea Level (MSL) elevation. Historically, Operators have performed the surveillance by verifying the indicated level on each CS Riser level instrument (EIS Identifier BE-LI) is ≥ 181 feet. The indicated verification value was chosen because an actual water height of 181 feet is equal to 149.5 feet MSL elevation. Engineering discovered, however, that the indicated value does not account for instrument uncertainty. In consequence, actual water levels in the CS Risers may have been less than TS requirements. This condition is reportable pursuant to 10 CFR 73(a)(2)(i)(B) as a condition prohibited by TS and 10 CFR 50.73(a)(2)(v) as a condition that alone could have prevented the fulfillment of a safety function.

INITIAL CONDITIONS

At the time this concern was identified, Waterford 3 was operating in Mode 1 at approximately 100% power. The height of water in CS Risers A and B, as indicated by level instruments, was 196 feet and 183 feet, respectively. There was no major equipment out of service specific to this event and no TS Limiting Conditions for Operation were in effect specific to this event.

EVENT DESCRIPTION

On March 8, 1997, Waterford 3 discovered that the indicated level of the Refueling Water Storage Pool, as measured by differential pressure transmitters, was affected when the Controlled Ventilation Area System (CVAS) was started. Licensee Event Report (LER) 97-007-00 was issued to describe that condition.

On March 21, 1997, while addressing the generic implications of LER 97-007-00, Engineering identified that the low pressure port of each CS Riser level instrument is vented in the CVAS boundary. Operation of the CVAS causes pressure changes that

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affect instrument uncertainty. The CVAS effect can cause the indicated water level to vary as much as five inches from the actual water level. In addition, subsequent research into other potential sources of instrument uncertainty identified that the total uncertainty could result in a variance of nine feet five inches (with CVAS operating) between the indicated water level and the actual water level.

TS 4.6.2.1.a requires periodic verification the water level in the CS riser is > 149.5 feet MSL elevation. In order to satisfy that requirement, Operating Procedure OP-903-001, "Technical Specification Logs," requires Operations personnel to periodically verify that the indicated height of water in the CS Risers is ≥ 181 feet. Since the level instruments are located approximately -31.5 feet MSL, it appears that the OP-903-001 value was derived simply by adding 31.5 to 149.5.

Given actual water levels in the CS discharge piping could be as much as nine feet five inches below the TS required value, Engineering initiated a corrective action document, CR-97-0682, at 1345 hours and immediately notified the Control Room. Engineering recommended that the CS Risers be filled to an indicated level of ≥ 190 feet, maintained at that level and the new indicated level be established with CVAS secured so the pressure changes created by the CVAS would not impact level instrument readings.

The Control Room reviewed the last performance of OP-903-001 and discovered that approximately six hours earlier the indicated water levels in CS Risers A and B were verified to be 196 feet and 183 feet, respectively. At 1400 hours, the Control Room declared CS Train B inoperable and entered the action statement for TS 3.6.2.1. By 1434 hours, CS Riser B had been filled to 191 feet and the action statement exited.

On April 15, 1997, while evaluating this event for past operability, Design Engineering re-ran the design basis containment maximum pressure and temperature analyses. The re-run was conducted conservatively assuming only two Containment Fan Coolers are operable versus four (a condition allowed by TS) and a CS riser water level of 140 feet MSL. The re-run resulted in a peak containment pressure of 44.05 psig which is

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slightly higher than the design pressure of 44.0 psig. Although the input conservatisms could be adjusted using actual data to reduce the peak containment pressure below the design value, a conservative 10 CFR50.72 notification was made at 1700 hours to report this event as a condition that alone could have prevented the fulfillment of a safety function.

CAUSAL FACTORS

The root cause investigation into this event is not yet completed. However, preliminary investigations indicate the root cause of this event is the failure to consider instrument uncertainty when establishing a minimum indicated CS riser level value that ensures compliance with the TS required value.

CORRECTIVE MEASURES

The following corrective measures were implemented:

- A corrective action document, CR-97-0682, was initiated to document this condition.
- The Control Room staff initiated and completed immediate actions to establish and maintain indicated CS Riser level ≥ 190 feet (with CVAS secured).
- OP-903-001, Technical Specification Surveillance Logs, was revised to incorporate the ≥ 190 feet indicated level verification requirement.

Additional corrective actions planned for this event include:

- The CS Riser level gauges will be replaced with new gauges that offer increased accuracy.
- A root cause investigation will be conducted to determine why instrument uncertainty was not considered when establishing an indicated instrument value.
- Enhancements to TS 4.6.2.1.a will be considered during Waterford 3's conversion to Improved Technical Specifications. Although the TS value of > 149.5 MSL contains

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sufficient margin to ensure operability, a human factors improvement to express the water level value as an indicated value will be considered.

- TS LCOs will be reviewed against Combustion Engineering Owner's Group Guidelines for application of instrument uncertainties. Current design basis documentation will be augmented, as necessary, to support the TS LCO values.
- This LER will be revised when the root cause investigation is completed if the investigation identifies additional information that meets the revision criteria of NUREG-1022.

SAFETY SIGNIFICANCE

Safety significance assessments were performed with water levels below the TS identified 149.5 MSL elevation to determine if system performance or safety assumptions would be reduced. Conservative analyses were performed utilizing the CONTEMPT Code and worst case accident conditions. For example, both analyses assumed a Main Steam Line Break (i.e., the most limiting case for containment peak pressure) with single failure of a Main Steam Isolation Valve (i.e., failure to close). Current and historical plant configurations were considered. Current plant procedures require two Containment Fan Coolers per Containment Cooling System (CCS) train to be operable, while past plant configuration procedures required only one Containment Fan Cooler (CFC) per CCS train to be operable.

Analysis with four CFCs operable and a CS Riser level of 139.5 feet MSL resulted in a containment peak pressure of 43.97 psig, which is slightly below the acceptance limit of 44 psig. Both trains of CS will perform their intended safety functions any time the water level in the risers is above 139.5 feet MSL elevation. Therefore, this condition did not prevent the CS or CCS or any other auxiliary equipment that is required to ensure operability of those systems from performing their specified safety functions.

Analysis with two CFCs operable and a CS Riser level of 140 feet MSL resulted in a containment peak pressure of 44.05 psig which is slightly (0.05 psig) above the containment design pressure of 44.0 psig. The CONTEMPT Code calculation results

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have sufficient conservatism to accommodate the conservatively calculated 0.05 psig excess pressure value. Engineering judgment supporting that conclusion is based upon the following:

- The containment spray header isolation valves (CS-125A(B)) actual opening time is lower than the 10 second opening time assumed in the analysis. The lower opening time will result in an earlier CS flow to the containment and will result in a lower peak containment pressure.
- The measured Component Cooling Water (CCW) flow rates to CFCs and Shutdown Cooling Heat Exchangers (SDCHXs) are higher than the CCW flow rates used in the analysis. The higher CCW flow rate to these units will increase the heat removal rate from the containment atmosphere and will result in a lower containment peak pressure.
- The containment peak pressure for the Main Steam Line Break (MSLB) occurs about one minute into the accident. The CCW temperature assumed in the analysis is 115 °F. The actual CCW water temperature is normally below 95 °F and is not expected to increase to 115 °F in the one minute time period. Therefore, the actual CCW temperature is significantly lower than the assumed value of 115 °F during the first minute. The lower CCW temperature also results in an increased heat removal rate from containment.
- The analysis assumes the steel containment vessel outer surface is insulated, (i.e., no heat transfer to the annulus). Since the timing of peak pressure is relatively short, about one minute, crediting the heat transfer to the annulus will result in a slightly lower peak containment pressure.

Based on the above, it is believed this event would not have prevented the CS or CCS or any other auxiliary equipment that is required to ensure operability of those systems from performing their specified safety functions. In consequence, this event did not compromise the health and safety of the general public.

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SIMILAR EVENTS

LER-97-007-00 documents that the Refueling Water Storage Pool level instrument indications are affected by CVAS induced pressure differentials.