



**Entergy
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D. F. Packer
General Manager
Plant Operations
Waterford 3

W3F1-93-0141
A4.05
PR

April 16, 1993

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 Number LER-92-019-00 for Waterford Steam Electric Station Unit 3. This Licensee Event Report is submitted in accordance with the requirements of 10CFR50.73(a)(2)(i)(B).

Very truly yours,

D.F. Packer
General Manager
Plant Operations

DFP/TSB/ssf
Attachment

cc: J.L. Milhoan, NRC Region IV
G.L. Florreich
J.T. Wheelock - INPO Records Center
R.B. McGehee
N.S. Reynolds
NRC Resident Inspectors Office
Administrator - LRPD

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PDR ADDCK 05000382
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LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (INRB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545-0001, 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 08

TITLE (4)

Xenon Decay Results in Loss of Shutdown Margin Because of Inadequate Procedure Guidance

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	26	92	92	019	00	04	16	93	N/A	05000
									N/A	05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)				
3	000	20.402(b)		20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)		50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)		50.36(c)(2)	50.73(a)(2)(vii)	OTHER
		20.405(a)(1)(iii)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iv)		50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)		50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

P.M. Melancon, Reactor Engineering & Performance Supervisor

TELEPHONE NUMBER (Include Area Code)

(504) 739-6614

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X					

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

At 0045 on March 27, 1992, Waterford 3 was in Hot Standby when a shutdown margin (SDM) calculation indicated that the actual Reactor Coolant System (RCS) boron concentration was below the required concentration. A new sample was requested immediately. Emergency boration began at 0109. At 0110, the results of the RCS sample indicated that actual RCS boron concentration was greater than the required concentration.

The root cause of this event was inadequate procedural guidance in that the SDM calculation procedure did not address projecting shutdown margin changes due to Xenon decay. A contributing cause was that shift crews did not anticipate changes in Xenon concentration and its effect on SDM.

Corrective action included procedure changes to better account for the effects of Xenon decay and training for operations personnel. A review of actual conditions at the time of the event show that Waterford's reactor was sufficiently subcritical to satisfy the safety analysis. Therefore, the health and safety of the public was not jeopardized.

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

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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Waterford Steam Electric Station Unit 3	05000 382	92	019	00	02 OF 08

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

REPORTABLE OCCURRENCE

On March 27, 1992 at 0045, Waterford 3 was in Mode 3 (Hot Standby) when Control Room Staff performing a Shutdown Margin (SDM) calculation discovered that, based on the results of a sample taken earlier, Reactor Coolant System (RCS; EIIIS Identifier AB) boron concentration was below the RCS boron concentration required by Technical Specification (TS) 3.1.1.2, "Shutdown Margin-All Full-length CEAs Fully Inserted."

A review of the event determined that the RCS boron concentration was below the concentration required by TS 3.1.1.2 at approximately 1730 on March 26, 1992 and remained below the required concentration until no later than 0100 on March 27. The associated action statement, which requires immediate corrective action, was entered shortly after the condition was recognized at 0045. This event was documented as Potential Reportable Event (PRE) 92-009 on March 27, 1992.

The preliminary reportability determination, made by the Shift Supervisor in accordance with UNT-006-010, "Event Notification and Reporting," indicated that the event was reportable to the NRC as operation prohibited by TS in accordance with 10CFR50.73(a)(2)(i)(B). However, the final reportability determination, made by plant staff, indicated that the event was not reportable because the action required by the Technical Specifications was immediately carried out as soon as it was discovered that the Limiting Condition for Operation was not satisfied.

The reportability determination made by plant staff was based on the belief that the surveillance interval was intended to identify this condition and allow action to be taken. In addition, the estimated time for exceeding the

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Shutdown Margin requirements was not tied to a specific inappropriate action that determined the exact time of the "event" and there were no immediate indications in the Control Room that informed the operators that they had inadequate SDM. This coupled with the fact that the appropriate action was taken after the condition was discovered lead to the decision to use the discovery date as the event date in the reportability determination thus making the event not reportable. This position was discussed with the Senior Resident Inspector at the time and the event was reflected in Inspection Report 92-08.

Recently, the NRC inquired about the final disposition of this event. Subsequent internal reviews determined that a LER should have been written. Waterford 3 had previously identified the root cause of- and corrective action for- this event in the disposition of PRE 92-009 and communicated the event to the industry for lessons-learned. This LER will complete the action required by 10CFR50.73(a)(2)(i)(B).

For this event, calculations performed after the event provide firm evidence which indicates that the event date and the discovery date were different. As defined by the LER rule, Waterford 3 operated in a condition prohibited by Technical Specifications because the plant entered a degraded condition at 1730 on March 26th (the event date) and the TS required action was not taken at that time. As such, an LER is required in accordance with 10CFR50.73(a)(2)(i)(B).

Condition Report (CR) 93-024 was written to document the initial failure to submit this LER and enter the deficiency into the Waterford 3 Corrective Action Program.

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INITIAL CONDITIONS

Plant Power	0 %
Plant Operating Mode	Mode 3; Hot Standby
Procedures Being Performed Specific to this Event	None
Technical Specification LCO's in Effect Specific to this Event	None
Major Equipment Out of Service Specific to This Event	None

EVENT SEQUENCE

On March 25, 1992, Waterford 3 SES was shutdown to Mode 3 (Hot Standby) because of RCS leakage from Reactor Coolant Hot Leg Sample Valve (EIIS Identifier AB-SMV) RC-104 in excess of Technical Specification limits (this event is described in Waterford 3 LER 92-002). While in Mode 3 with all Control Element Assemblies (CEAs; EIIS Identifier AA-ROD) inserted, a calculation to determine the RCS boron concentration required to ensure that sufficient shutdown margin existed was being performed every 24 hours as required by TS Surveillance 4.1.1.2.

Shutdown Margin is the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming no change in part-length CEA position and that all full-length CEAs (shutdown and regulating) are fully inserted except for the single assembly of highest reactivity worth, which is assumed to be fully withdrawn. The SDM calculation is performed using information from the Plant Data Book including "Xenon Worth versus Time," "Hot Zero Power (HZP) Inverse Differential Boron Worth versus Burnup," and "Normalized Boron Worth versus Moderator

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Temperature." After the calculation is performed to determine the required SDM boron concentration it is then compared to the RCS sample concentration obtained from the Chemistry department. The SDM calculation is done every 24 hours while in Modes 3, 4, and 5 with all full-length CEAs fully inserted in accordance with TS 4.1.1.2.

As discussed in Waterford 3 LER-92-002, Entergy Operations Inc. opted to make temporary repairs to RC-104. In anticipation of the completion of this work, the Control Room staff began preparations for a Reactor startup. As part of those preparations, the staff initiated regular boration at approximately 2200 on March 26, 1992 to reach the Estimated Critical Concentration (ECC) of 800 ppm. Two hours later, the valve repair was complete and RCS heatup was initiated.

At 0045 on March 27, the Control Room staff performed the 24 hour SDM calculation which showed that, based on a RCS sample drawn before normal boration began, boron concentration was less than the required SDM concentration. A new RCS sample was requested immediately while the operators discussed whether or not emergency boration was appropriate considering that normal boration was in progress and had been for nearly three hours since the sample had been isolated. At 0109 the determination was made to initiate emergency boration. The results of the RCS sample requested at 0045 were received at 0110 and indicated that RCS boron concentration was 646 ppm which was above the Xenon-free concentration of 640 ppm and the required concentration of 558.2 ppm. The operators then exited TS 3.1.1.2 and procedure OP-901-013.

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Calculations using the "Poison" computer code later showed that the required boron concentration had exceeded the actual concentration at approximately 1730 on March 26. This condition existed between approximately 1730 and not later than 0100 of the next day.

EVENT CHRONOLOGY

March 25, 1992:

- 0545 Reactor shutdown to Hot Standby.
- 0600 Initial 24 hour SDM calculation performed. RCS boron concentration is 507 ppm; required SDM boron concentration is 360 ppm.
- 1020 RCS boron concentration is 505 ppm; required SDM boron concentration is 190 ppm.
- 2358 SDM calculation performed. RCS boron concentration is 501 ppm; required SDM boron concentration is 293 ppm.

March 26, 1992:

- 2023 RCS sample isolated; boron concentration is 506 ppm.
- 2200 Began boration to ECC of 800 ppm.

March 27, 1992:

- 0007 Temporary repairs to RC-104 completed; RCS heatup initiated.

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March 27, 1992 (continued):

0045 SDM calculation performed. Last known RCS boron concentration is 506 ppm based on the sample drawn at 2023 the previous day; required boron concentration is 556 ppm. New RCS sample requested.

0100 Requested RCS sample collected.

0109 Initiated Emergency Boration.

0110 Sample results: RCS boron concentration is 646 ppm; required boron concentration is 558.2.

CAUSAL FACTORS

The root cause of this event was inadequate procedural guidance. OP-903-090, "Shutdown Margin," provided the shutdown margin at the time that the calculation was performed. It did not require a projection of the shutdown margin changes expected as a result of Xenon decay.

A contributing cause was an undetected situation. The shift crews did not anticipate changes in Xenon concentration and its effects on SDM following the Reactor shutdown.

ACTIONS TO PREVENT RECURRENCE

Procedure OP-903-090 was changed to include steps to ensure that the effects of expected Xenon changes are accounted for in the SDM calculation. These steps involve performing a calculation to predict the SDM for the next 24 hours using the same information as is used in the present calculation. This is done whenever the reactor is shutdown less than 72 hours.

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Second, this event was discussed with all Operations department members by their respective supervisors to stress the importance of maintaining perspective when performing routine tasks.

In addition, this event was discussed in the Industry Events course as part of continuing training for plant staff technical personnel.

Finally, a discussion of this event was added to the training curriculum for discussion with the Operations staff during requalification training.

SAFETY SIGNIFICANCE

A review of actual conditions at the time of the event show that Waterford's reactor was sufficiently subcritical to satisfy the safety analysis. Therefore, the health and safety of the public was not jeopardized.

SIMILAR OCCURRENCES

None.