NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Waterford Steam Electric Station Unit 3	05000 382	1 OF 13

TITLE (4)

Controller for ACCW Valve ACC-126A Left in Manual

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
									N/A	05000
11	10	97	97	-- 027 --	00	12	10	97	N/A	05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

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)
	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)		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	TELEPHONE NUMBER (Include Area Code)
T.J. Gaudet, Licensing Manager	(504) 739-6666

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X	YES (If yes, complete EXPECTED SUBMISSION DATE).	NO		03	31	98

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

On November 10, 1997, at approximately 1025, personnel discovered that both trains of the Auxiliary Component Cooling Water (ACCW) were inoperable. Both trains were inoperable for about seven and one half hours at which time operations personnel took immediate actions to make ACCW Train A operable. This condition resulted because, contrary to procedural requirements, the controller for valve ACC-126A was inadvertently left in the manual position, which made ACCW Train A inoperable. Subsequently ACCW Train B was made inoperable for a system maintenance outage. A thorough evaluation of this condition is being performed, and corrective actions have been implemented or are planned. The evaluation to date has established that in the event of an accident, the safety systems would have performed their design functions, design values in the analysis of record would not have been exceeded, and the condition had a very low risk significance. The condition was judged to have low safety significance. The public health and safety was not compromised.

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

REPORTABLE OCCURRENCE

On November 9, 1997, at approximately 1847, the Auxiliary Component Cooling Water (ACCW) Pump A was started for chemical mixing of the Wet Cooling Tower (WCT) basin in accordance with procedure OP-002-001. After about 30 minutes, the ACCW Pump A was secured. On November 10, 1997, at approximately 0300, the ACCW train B was declared inoperable for a system maintenance outage. On November 10, 1997, at approximately 1025, operations personnel discovered the controller for valve ACC-126A was in manual. The controller for valve ACC-126A in the manual mode prevented the ACCW train A from performing its safety function, and thus the system was inoperable. Operations personnel entered Technical Specification 3.0.3 upon discovery that both trains of ACCW were inoperable. Operations personnel determined there was no apparent reason for the controller for valve ACC-126A to be in the manual mode. The controller was placed in the automatic mode about one minute later. The shift exited Technical Specification 3.0.3.

This sequence of events resulted in both trains of ACCW being inoperable for seven hours and twenty six minutes. Technical Specification 3.7.3 requires at least two independent Component Cooling Water (CCW) [EIIS identifier CC] and associated ACCW trains to be operable. Therefore having both trains of ACCW inoperable is a condition prohibited by the Technical Specifications, and the condition is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B).

INITIAL CONDITIONS

At the time this condition was identified, Waterford 3 was operating at approximately 100% power in Operational Mode 1. There were no other test or maintenance being performed that contributed to this event.

EVENT DESCRIPTION

On November 9, 1997, at approximately 1847, ACCW Pump A was started for chemical mixing of the WCT basin in accordance with procedure OP-002-001. During the operation of Pump A, there were numerous vibration alarms received in the Control Room. After thirty minutes, the secondary Nuclear Plant Operator (NPO) made preparations to secure Pump A. The controller for valve ACC-126A was taken to the manual position, valve ACC-126A was closed, Pump A was secured, and the controller setpoint for valve ACC-126A was set to 94 °F. This evolution was performed by the secondary NPO using Procedure OP-002-001. The primary NPO observed and checked these evolutions. Procedure OP-002-001 was exited, and both the primary and secondary NPOs prepared for the shift meeting. Neither the primary nor the secondary NPO recall placing the controller in the automatic position as required by Procedure OP-002-001.

As part of the shift turnover on November 10, 1997, at approximately 0630, the oncoming and offgoing NPOs performed a board walkdown. During the walkdown, operations personnel, discussed the status of safety related equipment, operating equipment and system alignments, reasons for control panel alarms, and other

similar operational information in accordance with procedural requirements. However, these personnel failed to identify the reportable condition during the turnover and board walkdown. Procedural requirements for turnover are not prescriptive, and do not require operations personnel to look at every control switch as part of the shift turnover and board walkdown. The procedures allow operations personnel to apply experience and judgment and to take into account actual operating information in determining the control switches and control panels which require individual and direct observation and evaluation. The control panel indications of the controllers for valve ACC-126A(B) are a set of red lights, with different red lights in the same module indicating whether the controllers are set in the manual or automatic mode. The similarity of the indications for the manual and automatic mode increase the difficulty of recognizing this configuration during turnover and when the other train is tagged out. There are no annunciators or plant monitoring computer alarms associated with having the controllers for ACC-126A(B) in manual.

The running of the ACCW pumps for chemical mixing of the WCT basins is a routine evolution that is performed weekly. This evolution does not require direct supervisory oversight. A post job review of the chemical mixing evolution is not required by procedure; however, the practice of operations personnel is to perform a post job review whenever possible. The Control Room Supervisor (CRS) recalls making a mental note to check the evolution. However, the CRS became distracted, and a post job review was not performed.

On November 10, 1997, at approximately 0300, ACCW Train B was declared inoperable for a system maintenance outage. During shift turnover on November 10, 1997, at approximately 0630, the secondary NPO discussed starting and stopping ACCW Pump A and adjusting the setpoint for the controller. However, neither the secondary NPO nor the relief NPO noticed the controller for valve ACC-126A was in the manual position.

On November 10, 1997, at approximately 1025, the on-shift secondary NPO was in the process of turning over to an interim watch relief, and the mispositioned controller was discovered. The shift entered Technical Specification 3.0.3. The shift determined there was no apparent reason for the controller for valve ACC-126A to be in the manual position, placed the controller in the automatic position, and exited Technical Specification 3.0.3 about a minute later at approximately 1026.

On November 10, 1997, about 1025, plant maintenance personnel determined there was a degraded ground in CP-49. The degraded ground in CP-49 concurrent with work being performed on the Control Panel resulted in the ACC-126B controller switching to the manual position several times. Plant personnel have determined the condition is unrelated to and was not a root or contributing cause for this reportable condition. The evaluation of the degraded ground condition and trouble shooting for other Control Panels is not complete.

On November 10, 1997, at approximately 1730, the Operations Manager conducted an event debriefing with the control room staff in accordance with Site Directive W1.106 and Operations Policy No. 13.

CAUSAL FACTORS

The root cause evaluation is currently in progress and was not finalized on the date this Licensee Event Report (LER) was required to be submitted. A supplement to this LER will be submitted to the NRC after the root cause evaluation is complete. In addition to the evaluation of the mispositioned controller for valve ACC-126A, the root cause evaluation is evaluating the broader aspects of this event which include management expectations and the effectiveness of work practices and procedural requirements regarding supervisory oversight, shift turnover, board walkdowns, and taking equipment out of service.

The preliminary root cause specific to the event of leaving the controller for valve ACC-126A in manual was determined to be personnel error resulting from poor work practice error detection and inadequate self checking. To date, two factors have been identified important to the root cause, first a poorly human factored procedure and secondly, self imposed time pressure.

Procedure OP-002-001, section 7.0, step 6, contained two actions in one step. The procedure directed the operator to adjust the setpoint for the controller for valve ACC-126A as directed by the Shift Supervisor (SS) or the CRS and to also place the controller in automatic.

The secondary NPO indicated there was self-imposed pressure to complete the task prior to the shift meeting at which his attendance was required. The ACCW Pump A was started for chemical mixing of the WCT basin on November 9, 1997 at approximately 1847, and the shift meeting was on November 9, 1997 at about 1930.

A walkdown was performed on November 10, 1997, of Control Panels containing indications or switches for CCW or ACCW equipment to ensure the proper configuration of CCW or ACCW equipment.

The Shift Technical Advisor (STA) checklist for board walkdowns was finalized, and the requirement to use the checklist was incorporated in Procedure UNT-007-011.

The Operations Superintendent met with operations shift superintendents to discuss the event and to convey management expectations about shift turnover and board walkdowns.

Procedure OP-002-001 has been revised so that the adjustment of the setpoint for the controllers for valves ACC-126A(B) and the placement of the controllers in the automatic positions are denoted as two separate steps.

Procedures OP-100-007 and UNT-007-011 have been revised to incorporate explicit guidance to achieve consistency and effectiveness in the board walkdown process.

The previous peer checking guidance only provided guidance for when peer checking should be performed. The operations standard has been clarified to include specific criteria for performing consistent and effective peer checking.

The auxiliary operator was in the area of ACCW Pump A, and the secondary NPO felt compelled to proceed expeditiously with the chemical mixing procedure so the auxiliary operator could confirm the proper operation of ACCW Pump A, a requisite procedural step in starting ACCW Pump A.

The primary NPO only verified the secondary NPO was manipulating the proper controls. The primary NPO did not verify the secondary NPO had in fact performed the actions documented in Procedure OP-002-001.

IMMEDIATE CORRECTIVE MEASURES

On November 10, 1997, at approximately 1730, the Operations Manager conducted an event debriefing with the control room staff which was on shift when the chemical mixing task was performed in accordance with Site Directive W1.106 and Operations Policy No. 13. The event debriefing provided a basis for the determination of the preliminary root cause and the corrective actions.

Management and staff personnel immediately commenced a thorough technical evaluation to evaluate the safety significance of this reportable condition.

The Operations Superintendent met with shift personnel over a period of about one week to brief the personnel in each shift about management expectations regarding verifying the operability of opposite trains when taking equipment out of service for maintenance.

ACTIONS TO PREVENT RECURRENCE

In addition to the immediate corrective measures taken, there are additional corrective actions that are expected to result from the root cause evaluation in order to prevent recurrence.

SAFETY SIGNIFICANCE

The safety related functions of CCW and ACCW are to remove heat from the containment and safety related equipment and to reject the heat to the atmosphere via the dry and wet cooling towers following a Design Basis Accident (DBE). The CCW and ACC supply cooling water to the following components and systems in the event of a DBE.

- One Emergency Diesel Generator [EIIS Identifier EK]
- One Essential Service Water Chiller
- Two Containment Fan Coolers [EIIS Identifier BK-FAN]
- One High Pressure Safety Injection (HPSI) pump [EIIS Identifier BQ-P]
- One Low Pressure Safety Injection (LPSI) pump [EIIS Identifier BP-P]
- One Containment Spray pump [EIIS Identifier BE-P]
- One Shutdown Cooling Heat Exchanger
- Post-Accident Sampling System (PASS)

The CCW is a closed cooling water system. The CCW dissipates heat from the system via the dry cooling towers. ACCW is a separate and supplementary system that cools CCW to maintain CCW temperature less than 11[illegible]°F during accident and

worst case ambient temperature conditions. The amount of heat that can be rejected by the wet and dry cooling towers depends on the ambient temperature conditions. The ACC dissipates the heat from CCW through a heat exchanger and rejects the heat to the atmosphere via the wet cooling towers. Valves ACC-126A(B) open automatically to allow ACCW flow to the CCW heat exchanger to keep CCW temperature below 115°F.

In the event a LOCA had occurred during the time both trains of ACCW were inoperable, the supplemental cooling from ACCW would not have been available since valve ACC-126A was closed and in the manual mode. Without cooling from ACCW, the CCW temperature would have exceeded the maximum CCW temperature assumed in the analysis of record, 115°F under the worst case ambient temperature conditions. Any increase in CCW temperature could have impacted the heat removal capacity of the Containment Fan Coolers (CFCs) and thus the maximum containment pressure resulting from the LOCA. Also, an increase in CCW temperature could have affected the CCW heat removal or cooling capacity provided to components and systems required during a LOCA, such as an Emergency Diesel Generator or the safety injection pumps.

An evaluation was performed to determine the actual increase in CCW temperature in the event a LOCA had occurred during the time, approximately seven and one half hours, both trains of ACCW were inoperable. The evaluation employed the methodology and assumptions used in the analyses of record for the Ultimate Heat Sink (UHS) [EIIS Identifier BS], except that the evaluation used a different ambient dry bulb temperature. The dry bulb temperature during the time both ACCW trains

were inoperable ranged from 46 °F to 56 °F. The dry cooling tower is able to reject more heat if the ambient dry bulb temperature is lower. The evaluation used a dry bulb temperature of 66 °F which conservatively bounds the actual ambient temperatures. The results of the evaluation established the CCW temperature at the inlet to safety related equipment would not have exceeded the analysis of record value of 115 °F. Therefore, this reportable condition did not affect the ability of CCW to provide adequate heat removal or cooling capacity to the CFCs or other components or systems required during a LOCA.

The evaluation also considered the impact of the reportable condition on the design basis tornado analysis of record. In this analysis, a loss of offsite power is postulated, one EDG is assumed to fail so that only one train of the UHS is available, and the tornado is assumed to damage 40% of the DCT cooling coils. The damaged DCT is isolated and bypassed for the first two hours to prevent water loss through the damaged DCT cooling coils. Thus, since the operable DCT is bypassed for the first two hours, and the ACCW Train A was inoperable, there was no heat sink available for CCW heat rejection, and CCW would have absorbed the entire heat load in the event a tornado missile damaged the DCT cooling coils. The evaluation used the methodology and assumptions in the analysis of record. The evaluation established that with operator action to open valve ACC-126A from the Control Room at one hour after the tornado, the CCW temperature would not have exceeded 115 °F. The maximum temperature of record for the design basis tornado event is 120 °F.

The mispositioned controller for valve ACC-126A would have been promptly noticed and corrected in the event of a LOCA. In the event of high CCW temperature, the operators would be directed by the Annunciator Response Procedure to go to Procedure OP-901-510 for a CCW system malfunction. OP-901-510 directs the operators to verify that both ACCW trains are operating. The CCW Train A has a high temperature alarm of 105 °F. Therefore, at a temperature of 105 °F, operations personnel would have had visual and audible indication that CCW temperature was high. The judgment of the operations management and staff is that such indication would have been promptly investigated, and the mispositioning of the controller for valve ACC-126A in the manual position would have been promptly noticed and corrected. There is at least 20 minutes between the CCW high temperature alarm and the time at which CCW temperature reaches 115 °F for the operator to correct the position of valve ACC-126A.

Also, a Probabilistic Safety Evaluation (PSA) was performed for the reportable condition. The PSA evaluation established the change in the probability of core damage from a LOCA as a result of valve ACC-126A being in the manual mode for about seven and one half hours was about 1.1 E-7. This probability is less than the probability of 1 E-6 which is used as the industry standard for judging temporary risk as not significant, reference Electric Power and Research Institute (EPRI) EPRI PR-105396, "PSA Applications Guide."

In summary, this reportable condition did not affect the ability of CCW to perform its design function, design values in the analysis of record were not exceeded, the reportable condition had a very low risk, and there is reasonable information to conclude the reportable condition would have been promptly identified and

corrected during any accident. Therefore, this reportable condition has low safety significance. The public health and safety was not compromised.

SIMILAR EVENTS

There have been no similar events reported as LERs at Waterford 3.