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Waterford 3

10 CFR 50.73

W3F1-2014-0002

February 14, 2014

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
11555 Rockville Pike  
Rockville, MD 20852

Subject: Licensee Event Report (LER) 2014-001-00  
Waterford Steam Electric Station, Unit 3 (Waterford 3)  
Docket No. 50-382  
License No. NPF-38

Dear Sir or Madam:

Entergy is hereby submitting Licensee Event Report (LER) 2014-001-00 for Waterford Steam Electric Station, Unit 3 (Waterford 3). This report provides details associated with past inoperability of one train of the safety-related Containment Spray system.

Based on plant evaluation, it was determined that this condition is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B).

This report contains no new commitments. Please contact John P. Jarrell, Regulatory Assurance Manager, at (504) 739-6685 if you have questions regarding this information.

Sincerely,

A handwritten signature in black ink, appearing to read "JPJ", written over a large, stylized circular scribble.

JPJ/LEM

Attachment: Licensee Event Report 2014-001-00

cc: Mr. Marc L. Dapas, Regional Administrator  
U.S. NRC, Region IV  
RidsRgn4MailCenter@nrc.gov

U.S. NRC Project Manager for Waterford 3  
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U.S. NRC Senior Resident Inspector for Waterford 3  
Marlone.Davis@nrc.gov  
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**Attachment to**

**W3F1-2014-0002**

**Licensee Event Report 2014-001-00**



**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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 an 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.

**1. FACILITY NAME**

Waterford 3 Steam Electric Station

**2. DOCKET NUMBER**

05000 382

**3. PAGE**

1 OF 4

**4. TITLE**

Room Cooler Breaker Inoperability Causes Past Inoperability of Containment Spray System Train

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	08	2013	2014	001	00	02	14	2014	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

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

**12. LICENSEE CONTACT FOR THIS LER**

LICENSEE CONTACT Waterford 3 Steam Electric Station John Jarrell	TELEPHONE NUMBER (Include Area Code) (504) 739-6685
---------------------------------------------------------------------	--------------------------------------------------------

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
D	BE	BKR	W120	N					

**14. SUPPLEMENTAL REPORT EXPECTED**

YES (If yes, complete 15. EXPECTED SUBMISSION DATE)  NO

**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

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

On May 8, 2013 at 19:53, a safety-related circuit breaker failed when Operations personnel attempted to start Shutdown Cooling Heat Exchanger Room B air handling unit. In accordance with Operations administrative procedure for Technical Specification and Technical Requirements Compliance, Operations personnel entered the applicable Technical Specification Limiting Condition for Operation for Containment Spray (CS) train B. A replacement breaker was installed and a successful start of the air handling unit was performed. CS Train B was declared operable at 17:30 on May 9, 2013.

An evaluation of the failure determined that the air handling unit had been effectively rendered inoperable since installation of the circuit breaker on April 18, 2013. Containment Spray train B was inoperable from 03:09 on April 17, 2013, when the train was declared inoperable to perform preventative maintenance until 17:30 on May 9, 2013, a total of 22.6 days. This time period exceeds the Technical Specification allowed outage time of 7 days. Technical Specification 3.6.2.1 was not complied with, which requires that with one CS system [train] inoperable, restore the system [train] to operable status within 7 days or be in at least Hot Standby within the next six hours.

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**NARRATIVE**

**INITIAL CONDITIONS**

Waterford Steam Electric Station Unit 3 (Waterford 3) was in Mode 1 at approximately 100% power at the time of discovery.

**EVENT DESCRIPTION**

Containment Spray (CS) [BE] Train B was declared inoperable and Technical Specification (T.S.) 3.6.2.1 entered at 03:09 on April 17, 2013 for planned maintenance. T.S. 3.6.2.1 requires that with one CS system [train] inoperable, restore the system [train] to operable status within 7 days or be in at least Hot Standby within the next six hours. During performance of the maintenance, the installed safety-related circuit breaker for the Shutdown Cooling (SDC) [BP] Heat Exchanger (HX) Room B Air Handling Unit (AHU) failed. The installed 10 amp breaker was obsolete, so an Engineering Change Request (ECR) was completed to provide Electrical Maintenance with an acceptable replacement. Based on the drawing information, the ECR identified a suitable replacement 7 amp breaker. Following installation and successful completion of post maintenance testing, CS Train B was declared operable at 23:30 on April 18, 2013.

On May 8, 2013, the 7 amp breaker installed during the April preventative maintenance failed when Operations personnel attempted to start SDC HX Room B AHU. This resulted in the SDC HX Room B AHU being inoperable, which rendered Containment Spray Train B inoperable. Operations personnel entered Technical Specification (T.S.) 3.6.2.1 at 19:53 for the affected Containment Spray train. An Engineering Change Request was generated to install a 15 amp breaker. Following successful start of the AHU, CS Train B was declared operable and T.S. 3.6.2.1 was exited on May 9, 2013, at 17:30.

A subsequent evaluation determined that the SDC HX Room B AHU was rendered inoperable following installation of the replacement 7 amp circuit breaker installed during the preventative maintenance task on April 18, 2013. This resulted in CS Train B being inoperable from 03:09 on April 17, 2013, when the train was declared inoperable to perform the preventative maintenance task until 17:30 on May 9, 2013, a total of 22.6 days. This time period exceeds the Technical Specification allowed outage time of 7 days. Technical Specification 3.6.2.1 was not complied with, which requires that with one CS system [train] inoperable, restore the system [train] to operable status within 7 days or be in at least Hot Standby within the next six hours.

Subsequent evaluation also determined that CS Train A was inoperable two times during the time period from April 17, 2013, until May 9, 2013. T.S. 3.6.2.1 requires that with two containment spray systems [trains] inoperable, restore at least one spray system [train] to operable status within one hour or be in at least Hot Standby within the next six hours and be in Cold Shutdown within the following 30 hours. The first instance was from 09:52 to 16:31 on May 2, 2013, a total duration of 6.65 hours, and the second was from 10:28 to 10:58 on May 8, 2013, a total duration of 0.5 hours. Neither of these times exceeded the total Technical Specification allowed outage and action time of 7 hours.

Failure of the installed breaker in the SDC HX Room B AHU was documented in the corrective action process under Condition Report CR-WF3-2013-02316. This condition report was determined to be not reportable based on information available at that time. Following completion of the subsequent evaluation, it was determined that this condition was reportable and actions to address reportability requirements are documented under CR-WF3-2013-06113.

**REPORTABLE OCCURRENCE**

The past inoperability of Containment Spray Train B is reportable as a Licensee Event Report (LER) pursuant to 10CFR50.73(a)(2)(i)(B), Operation or Condition Prohibited by Technical Specifications.

**BACKGROUND – SYSTEM DESIGN**

The safety related functions of the Containment Spray System are:

- To remove heat and fission products from the containment atmosphere during and following either a loss of coolant accident (LOCA) or a main steam line break accident (MSLB) inside the containment.
- To limit off-site radiation by reducing the pressure differential between containment and the external environment and scrubbing the containment atmosphere following a LOCA so that the offsite dose and the dose to the Operators in the Control Room are within the guidelines of 10CFR50.67 and GDC-19.

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Following automatic initiation, the CS system operates in the following two distinct modes:

- **Injection Mode:**  
In this initial mode of operation, the CS is lined up so that the CS pumps take suction from the Refueling Water Storage Pool (RWSP) and by pumping this water through the nozzles, sprays the containment with borated water. This spray action cools and condenses the steam released from either the Reactor Coolant System (RCS)[AB] or the Main Steam System (MS)[SB]. This in turn maintains the containment temperature and pressure within the design limit.
- **Recirculation Mode**  
When the water level in the RWSP falls to a predetermined level, a recirculation actuation signal (RAS) is generated which shifts suction of the CS pumps to the Safety Injection (SI)[BP] sump by opening the sump outlet isolation valves. Upon indication in the control room of a pump suction shift to the SI sump, the RWSP outlet isolation valves can be closed by operator action.

During both the injection and recirculation modes of operation, the borated water passes through the tube side of the shutdown cooling heat exchangers. In the injection phase, this water is taken from the refueling water storage pool and does not need to be cooled. In the recirculation mode the containment spray pumps take suction from the safety injection system sump. Since the sump water is at an elevated temperature the heat exchangers are required for cooling. Component Cooling Water (CCW)[CC] passes through the shell side of the shutdown cooling heat exchanger to cool the borated spray water.

The Shutdown Cooling Heat Exchanger A and B Area Fan Coolers (AHU) are required to remove heat from the shutdown heat exchanger A and B areas following any Design Basis Accident (DBA).

**CAUSAL FACTORS**

An apparent cause evaluation was performed. The apparent cause was determined to be design documentation/prints inadequate. The locked rotor amperage (LRA) of the SDC HX B AHU motor was not known when the ECR was prepared in April, 2013, to replace the obsolete breaker. When LRA is unknown, the drawing provided guidance to size the breaker according to the horsepower of the motor. The drawing failed to account for motors with higher current draw such as this one whose current draw was 20% higher than the average. The LRA was later found in purchasing documents and used to select the 15 amp breaker installed in May, 2013.

The contributing cause was determined to be testing not performed as required. The work order instructions allowed a documented factory acceptance test to be accepted as an alternative to performing pre-installation testing. The 7 amp replacement breaker was installed without pre-installation testing. The work package directed the electricians to obtain the breaker data sheet if available and to use that as the breaker pre-installation functional test data. The breaker instantaneous test data from the factory was available from the vender as part of the Certificate of Compliance (C of C). The C of C data was from 1992. This installation, without pre-installation testing, is not in line with industry best practices, or practices used for other electrical devices (i.e. relays, motor, etc.) at Waterford. Had pre-installation testing been performed, the breaker might have been recognized as operating on the very low edge of the tolerance band and been rejected.

**EXTENT OF CONDITION**

A query of all Engineering Change Requests (ECR) was performed using the keywords "Breaker" or "Bucket" in the ECR title. No deficiencies were noted.

As part of the extent of condition review, it was determined that the circuit breaker for SDC HX Room A AHU currently has the same configuration as the 10 amp breaker that was previously in SDC HX Room B AHU prior to the preventative maintenance performed April 18, 2013. Based on motor test data, the current trip setting on the circuit breaker is adequately sized to start the SDC HX Room A AHU.

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**CORRECTIVE ACTIONS**

To address the apparent cause:

- The ECR that replaced the 7 amp breaker with a 15 amp breaker was installed in accordance with the work order process.
- Revised drawing notes to account for motors with high full load current.

To address the contributing cause:

- The work instruction template was revised to eliminate the practice of substituting factory acceptance testing for pre-installation testing.

To address the extent of condition:

- Planned action to adjust the setting for the breaker of the SDC HX Room A AHU.

**SAFETY SIGNIFICANCE**

The calculation that evaluates the Shutdown Cooling Heat Exchanger Rooms heat-up based on postulated LOCA concurrent with loss of offsite power heat loads and complete loss of HVAC cooling was reviewed. The calculation showed that the SDC HX room temperature rises to a maximum value of less than 130 °F in 24 hours. The SDC heat exchanger room coolers are not considered in the PSA model. Therefore, the loss of room cooling to the SDC heat exchanger rooms does not impact the core damage frequency or large, early release frequency for the PSA. Additionally, inspection of the Environmental Zone Map indicates that there is no instrumentation in the SDC HX room that controls the post-accident SCD HX operation.

During the timeframe in which CS Train B was inoperable, CS Train A was operable and capable of performing the CS function with the exception of 6.65 hours on May 2, 2013, and 0.5 hours on May 8, 2013. However, based on the above discussion, CS Train B could have met the CS function for a minimum of 24 hours during the entirety of the period in which it was considered inoperable. Therefore, the failure of the SDC HX Room B AHU is not considered risk significant.

**SIMILAR EVENTS**

Corrective action program data and Licensee Event Reports for the past five years were reviewed for similar events. None were identified.

**ADDITIONAL INFORMATION**

Energy industry identification system (EIIS) codes and component function identifiers are identified in the text with brackets [ ].