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10 CFR 50.73

W3F1-2014-0027

April 29, 2014

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

Subject: Licensee Event Report (LER) 2014-002-00
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) 2014-002-00 for Waterford Steam Electric Station, Unit 3 (Waterford 3). This report provides details associated with Operation Prohibited by Technical Specifications in that action statements for a Limiting Condition for Operation were not completed as required for an inoperable Emergency Diesel Generator A.

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,

JPJ/RJP

Attachment: Licensee Event Report 2014-002-00

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

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Attachment to

W3F1-2014-0027

Licensee Event Report 2014-002-00

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

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.

LICENSEE EVENT REPORT (LER)

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

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4. TITLE

Inadequate Tightening of Starting Air Filter Housing results in Inoperable Train A Emergency Diesel Generator

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
03	01	2014	2014	- 002	- 00	04	29	2014		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	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
100	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
John Jarrell	5047396685

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

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

During an operator tour of the train A Emergency Diesel Generator (EDG) room on March 1, 2014 at approximately 12:39, it was discovered that the filter housing cover on the EDG A Starting Air Filter had unfastened from its base and was lying on the floor. The last successful start of the EDG A that demonstrated its capability to meet its safety function was on February 27, 2014 at 11:33 and it is postulated that the cover became unfastened during that run. Therefore, EDG was potentially inoperable for 2 days as a result of this condition. Since the condition was unknown at the time, the Technical Specifications required test of EDG B was not performed within 8 hours and the requirement to demonstrate the operability of the remaining A.C. circuits at least once per 8 hours or to be in Hot Shutdown within the next 6 hours was not performed.

The cause was insufficient tightening of the filter housing cover during maintenance on April 8, 2013. The insufficient tightening had not been preventing the EDG A's ability to start within the required times prior to its becoming unfastened. EDG A was returned to OPERABLE condition by refastening the filter housing cover to its base. The other filter housings on EDG A and EDG B were verified to be properly fastened. An evaluation is being conducted to determine if a torque requirement is necessary for the filter housing covers.

NARRATIVE

INITIAL CONDITIONS

At the time of discovery on March 1, 2014 at 12:39, Waterford Steam Electric Station Unit 3 (Waterford 3) was in Mode 1 at approximately 100% power. Emergency Diesel Generator A (EDG) [EK] was in an undiscovered inoperable status. There were no other Structures, Systems, or Components inoperable at the time that contributed to the event.

EVENT DESCRIPTION

During an operator tour of the A train Emergency Diesel Generator room on March 1, 2014 at approximately 12:39, it was discovered that the filter housing cover on EGAMFLT006A Emergency Diesel Gen A Starting Air [LC] Filter [FLT] had unfastened from its base and was lying on the floor.

The engine is started by means of compressed air, which is admitted to the cylinders in sequence. Each side of the engine has an air filter, distributor and pilot valves to port air into the diesel cylinders. This air moves the diesel to provide the momentum to start the EDG. The air distributors are synchronized to port air in a specific pattern for the EDG start. With an air leak at the filter (housing loose or not installed), air would likely not be delivered to the corresponding air distributor, and thus one bank of the EDG would not receive starting air to assist in rolling the EDG. In addition to filtration, a function of this airline particulate filter is to maintain the Emergency Diesel Generator Starting Air System pressure boundary.

If the housing were to unfasten during an EDG run, there would be no effect on the EDG since the starting air function has been completed. In addition, air will not continue to be emitted from the filter housing/area since the starting air valves will be closed, and air flow terminated to that location. The EDG will continue to run and carry the required load. EDG A is started every month for surveillance, and the start time is recorded during these tests. EDG A starts have been within 10 seconds (the required start time) for the last 3 years, demonstrating that the air start system was functioning and that the filter housing was adequately installed until found unattached.

On a start demand with an air leak at the filter (housing loose or not installed), air would likely not be delivered to the corresponding air distributor, and thus one bank of the EDG would not receive starting air to assist in rolling the EDG. Although air would be leaking from the air filter with the housing loose or not installed, the flow is restricted by the internal design of the components and smaller orifices of the inlet of the filter. This restriction is such that not all of the air header would depressurize, and rob air from the opposite bank of the EDG. A single bank of starting air emitting to the EDG is sufficient to roll and start the EDG. However, it cannot be reasonably assured that the generator voltage and frequency would be able to achieve at least 3920 volts and 58.8 Hz in 10 seconds after the start signal as required by technical specifications.

Technical Specification (TS) Surveillance Requirement (SR) 4.8.1.1.2 requires each diesel generator shall be demonstrated OPERABLE at least once per 31 days on a STAGGERED TEST BASIS by verifying the diesel starts and that the generator voltage and frequency shall be at least 3920 volts and

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58.8 Hz in 10 seconds after the start signal. The inability to meet this TS SR caused EDG A to be inoperable, and the action statements in Limiting Conditions for Operation in TS 3.8.1.1 were required to be implemented. Relevant requirements for the Limiting Condition for Operation in TS 3.8.1.1 indicate:

As a minimum, the following A.C. electrical power sources shall be OPERABLE:
a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and
b. Two separate and independent diesel generators, ...

Applicability: Modes 1, 2, 3, and 4.

Action:
b. With one diesel generator of 3.8.1.1b inoperable:
(1) Demonstrate the OPERABILITY of the remaining A.C. circuits by performing Surveillance Requirements 4.8.1.1.1a (separately for each offsite A.C. circuit) within 1 hour and at least once per 8 hours thereafter. If the diesel generator became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generator (unless it has been successfully tested in the last 24 hours) by performing Surveillance Requirement 4.8.1.1.2a.4 within 8 hours unless the absence of any potential common mode failure for the remaining diesel generator is demonstrated.

TS SR 4.8.1.1.1a indicates that each of the required independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be determined OPERABLE by verifying correct breaker alignments and there is indicated power available.

The last successful start of the EDG A that demonstrated its capability to meet its safety function was on February 27, 2014 at 11:33. An EDG Start Evaluation performed for that start recorded the starting time as 5.7 seconds. Subsequent to that start, it is postulated that the cover became unfastened during the run but remained loosely attached until March 1, 2014 when it was discovered lying on the floor.

With the unfastened filter housing cover, EDG A was potentially inoperable for 2 days. Since the condition was unknown at the time, the Technical Specifications required test of EDG B was not performed within 8 hours and the absence of any potential common mode failure for the remaining diesel generator was not demonstrated.

Additionally, the action to demonstrate the OPERABILITY of the remaining A.C. circuits was not performed for a short period. The below timeline reflects that surveillance procedure OP-903-066, Electrical Breaker Alignment Check was being performed in compliance with TS SR 4.8.1.1.1a and was last performed on February 28, 2014 at 22:23. To continue to meet the SR, procedure OP-903-066 should have been completed prior to 06:23 on March 1, 2014, but was not. TS SR 4.8.1.1.1 was no longer required to be completed upon restoring EDG A to an operable status by refastening the filter housing at 12:39 on March 1, 2014. The TS SR was not performed for a period of 14 hours, 16 minutes. This exceeded the 8 hour demonstration frequency by 6 hours, 16 minutes.

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Timeline

February 27, 2014
10:45 EDG A inoperable due to cascading from inoperable train A Ultimate Heat Sink (UHS) [BS] (a support system)
10:53 OP-903-066, Electrical Breaker Alignment Check performed, periodicity met
11:33 Started EDG A; start evaluation demonstrated met < 10 second start criteria of TS surveillance
15:16 OP-903-066 performed, periodicity met
21:06 OP-903-066 performed, periodicity met
21:19 Secured EDG A (EDG A considered additionally inoperable at this point due to uncertainty of meeting TS SR with loose filter housing; there was no test of EDG B within 8 hours)

February 28, 2014
00:01 Restored UHS A and declared EDG A operable (however, inoperable due to loose filter housing)
03:30 Declared UHS A and EDG A inoperable
03:39 OP-903-066 performed, periodicity met
09:00 OP-903-066 performed, periodicity met
15:00 OP-903-066 performed, periodicity met
16:50 Declared UHS A and EDG A operable (remains inoperable due to loose filter housing)
22:18 Declared Essential Chiller A [KM] and EDG A inoperable
22:23 OP-903-066 performed, periodicity met
23:15 Declared Essential Chiller A operable; EDG A remained inoperable (cascading) to fill the Spent Fuel Pool [DA] from the Condensate Storage Pool [KA]

March 1, 2014
00:01 Completed filling the Spent Fuel Pool and declared EDG A operable (remains inoperable due to loose filter housing)
06:23 Non-compliance with the action statement occurs. OP-903-066 should have been performed at or prior to this time to satisfy action statement, but was not.
12:39 Starting Air Filter Housing restored; (EDG A now operable).

March 3, 2014
10:22 Started EDG A to perform monthly surveillance test with satisfactory results

March 17, 2014
10:48 Started EDG B to perform monthly surveillance test with satisfactory results

As shown in the timeline above, action statements to demonstrate the OPERABILITY of the remaining A.C. circuits by performing Surveillance Requirements 4.8.1.1.1a within 1 hour and at least once per 8 hours thereafter were performed subsequent to the last run due to unrelated, coincidental declarations of inoperability.

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Non-compliance with the action statement to test EDG B and to demonstrate the operability of the remaining A.C. circuits for 6 hours, 16 minutes is operation prohibited by the Waterford 3 Technical Specifications and is a reportable condition.

The allowed outage time of 72 hours was not exceeded.

CAUSAL FACTORS

Investigation determined that the last identified maintenance performed on the Starting Air Filter was on April 8, 2013 under WO 52361045 which replaced the filter assembly per the 24 month Preventative Maintenance (PM) requirements. The filter was replaced per procedure MI-005-490 (revision 10), Calibration Procedure Emergency Diesel Generator Control System Calibration and Maintenance, section 9.5, Control Air. The procedure does not provide guidance on how to replace and tighten the filter housing cover and relies on technician knowledge to ensure that the connection is tight. Workers used skill of the craft to install the filter housing and hand tightened the housing in place.

The cause for the disengaged filter housing was insufficient tightening following the previous filter change out. This insufficient tightening had the potential to cause the EDG to be inoperable since that time, but it was confirmed to not have affected operability during subsequent monthly surveillance tests. The intermediate starts demonstrated that the loose housing had not affected the ability of the EDG to meet its safety function up to its start on February 27, 2014 at 11:33.

EXTENT OF CONDITION

The other 3 filters on EDG A and B starting air systems were verified hand tight.

CORRECTIVE ACTIONS

The filter housing was promptly replaced by the operator who discovered the condition. With the replacement, the starting air system was restored to its normal configuration on March 1, 2014 at approximately 12:39. This returned EDG A to an OPERABLE status.

Action was completed to verify that the other 3 filters on EDG A and B starting air systems were properly fastened.

This event was entered into the Waterford 3 corrective action program in Condition Report CR-WF3-2014-00935.

Corrective action is planned to conduct a review of the associated technical manual and consult with engineering to determine if a torque requirement is necessary for the filter housing. If determined necessary, Maintenance procedure MI-005-490, Calibration Procedure Emergency Diesel Generator Control System Calibration and Maintenance will be appropriately revised.

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SAFETY SIGNIFICANCE

An assessment of the safety consequences and implication of the event determined that the safety significance is low for the following reasons.

- Though inoperable, EDG A was available to provide power upon demand. On a start signal, a single bank of starting air remained capable of emitting air to the EDG, which is sufficient to roll and start the EDG. EDG A would have been capable of providing power with a potentially longer starting time than required by the Technical Specifications for the duration of this event (6 hours, 16 minutes).

- During this period, EDG B remained operable and all required systems, subsystems, trains, components, and devices that depend on EDG B remained OPERABLE. In addition, the steam-driven emergency feed pump remained OPERABLE. EDG B successfully passed its monthly start test on March 17, 2014 at 10:48 which confirmed it was OPERABLE while the filter housing was unfastened.

- The overall allowed outage time of 72 hours for EDG A was not exceeded from the time it was declared inoperable on February 27, 2014 at 10:45 until the filter housing cover was replaced on March 1, 2012 at approximately 12:39.

- The duration that the breaker alignment verification was missed was very short (< 7 hours). There is no indication that the breaker alignment was changed from the previously verified position.

SIMILAR EVENTS

Corrective action program data and Licensee Event Reports for the past ten 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 [ ].