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July 06, 2012
TMI-12-105

10 CFR 50.73

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

THREE MILE ISLAND NUCLEAR STATION, UNIT 1 (TMI-1)
RENEWED OPERATING LICENSE NO. DPR-50
DOCKET NO. 50-289

SUBJECT: LICENSEE EVENT REPORT (LER) NO. 2012-001-00
"Single Condition Making Independent Trains Inoperable"

This report is submitted in accordance with 10 CFR 50.73 (a)(2)(vii)(A) and 10 CFR 50.73 (a)(2)(vii)(B).
For additional information regarding this LER contact Mike Fitzwater, Sr. Regulatory Engineer, TMI Unit 1
Regulatory Assurance at (717) 948-8228.

There are no regulatory commitments contained in this LER.

Sincerely,


THOMAS HARRIS FOR MARK NEWCOMER

Mark Newcomer
Plant Manager, Three Mile Island Unit 1
Exelon Generation Co., LLC

MN/mdf

cc: TMI Senior Resident Inspector
Administrator, Region I
TMI-1 Senior Project Manager

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MLR*

LICENSEE EVENT REPORT (LER)

(See reverse 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 Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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.

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4. TITLE: Single Condition Making Independent Trains Inoperable

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	09	2012	2012	- 001 -	00	07	06	2012	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

9. OPERATING MODE N	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)									
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input checked="" 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)						
	<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 type="checkbox"/> 50.73(a)(2)(ii)(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

FACILITY NAME Michael Fitzwater, TMI Unit 1 Regulatory Assurance Engineer	TELEPHONE NUMBER (Include Area Code) (717) 948-8228
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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

☐ 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 05/09/12 a TMI-1 station review of Operating Experience (OE) event # OE30225 was provided to the NRC. The station recognized at that time that this response would need to be revised and entered an issue report (IR# 1364596) into the corrective action database. Subsequent review determined that in a condition in which one main feedwater pump had been reset but was not aligned and providing main feedwater flow to the steam generators, a trip of the other main feedwater pump while providing main feedwater flow to the steam generators, would not have resulted in an actuation to start the emergency feedwater system. It was concluded that the described condition occurred on six different occasions at TMI-1 in the past three years. This condition was not recognized as an entry condition into the TMI-1 Technical Specifications. Corrective actions include revising the OE30225 response, revising applicable procedures, evaluating modifications, operator/technical training and improvements to the Technical Specifications. This event is considered to have no significance with respect to the health and safety of the public.

The submittal of this LER constitutes reporting to the NRC in accordance with 10 CFR 50.73 (a)(2)(vii)(A) and 10 CFR 50.73 (a)(2)(vii)(B).

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A. EVENT DESCRIPTION

Plant Conditions before the event:

Babcock & Wilcox – Pressurized Water Reactor – 2568 MWth Core Power

Date/Time: May 9, 2012 / 11:59 hours

Power Level: 100% steady state power

Mode: Power Operations

There were no structures, systems, or components out of service that contributed to this event.

Event:

In response to the Nuclear Regulatory Commission's request to see Three Mile Island Nuclear Power Station's (TMI-1) original response to Oconee OE30225, TMI-1 discovered that the original review would need to be revised and generated issue report IR# 1364596. TMI-1 provided the original response to the NRC on May 9, 2012.

TMI-1's original review of OE30225 in 2009 assumed that operators would recognize and take action relative to the loss of main feedwater (FW). The original review recognized the applicability and similar vulnerability as described in OE30225, however, there were no prescribed corrective actions.

TMI-1 main feedwater pump (MFWP) operating status is monitored by pressure switches that sense hydraulic oil pressure at the main feedwater pump turbine. The hydraulic oil pressure is an indication of main feedwater pump turbine operating status and inputs are provided to the Reactor Protection System (RPS) and Heat Sink Protection System (HSPS). With one main feedwater pump turbine operating (providing feedwater flow to the steam generators) and one main feedwater pump turbine in a 'reset' condition (satisfactory hydraulic oil pressure is indicated but is not providing feedwater flow to the steam generators), the Reactor Protection System (RPS) trip and a Heat Sink Protection System (HSPS) actuation associated with a loss of both main feedwater pumps is operationally bypassed.

In the past three years TMI has experienced the above operational condition six times as follows:

01/24/10, amount of time from second MFWP reset until FW flow established: 2 hours, 42 min.

05/06/10, amount of time from second MFWP reset until FW flow established: 14 min.

05/31/10, amount of time from second MFWP reset until FW flow established: 39 min.

09/21/10, amount of time from second MFWP reset until FW flow established: 27 min.

11/26/11, amount of time from second MFWP reset until FW flow established: 3 hours, 29 min.

05/26/12, amount of time from second MFWP reset until FW flow established: 25 min.

For all six of the above identified conditions the capability to remove residual heat was maintained although automatic actuation of emergency feedwater (EFW) on a trip of the operating main feedwater pump was lost. In all plant conditions, HSPS system would automatically initiate EFW based upon a low water level sensed in either steam generator and, manual actuation capability was maintained.

The six identified operational conditions were not recognized by the operating staff as an entry condition into a one hour technical specification action statement. On May 26, 2012, a planned down-power occurred which required one main feedwater pump to be secured. The Operating crew briefed the Oconee operating experience and discussed actions required to minimize time in this condition.

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This condition is reportable under 10 CFR 50.73(a)(2)(vii)(B) since a single condition caused two independent trains to become inoperable in a system designed to remove residual heat because a single main feedwater pump in 'reset' bypassed the Emergency Feedwater pump auto start instrumentation for the Heat Sink Protection System.

The condition is also being reported under 10 CFR 50.73(a)(2)(vii)(A) because a single condition caused two independent trains or channels to become inoperable in a single system designed to shut down the reactor and maintain it in a safe shutdown condition. The single condition being when a single main feedwater pump is 'reset' with the other MFWP providing main feedwater flow while reactor power is greater than 7% power, a loss of the running MFWP would not result in an anticipatory reactor trip (ART).

B. CAUSE OF EVENT

The cause of the event was due to an inadequate review of pertinent and applicable operating experience that resulted in continuing station vulnerability to technical specification noncompliance. The reviewer recognized the vulnerability but did not involve Operations licensed personnel to ensure Technical Specifications were complied with.

C. ANALYSIS / SAFETY SIGNIFICANCE

At no time was the allowed out of service time exceeded during the six identified operating conditions when the Technical Specification was entered but not recognized.

The anticipatory reactor trip (ART) in the Reactor Protection System (RPS) for the event of loss of main feedwater when greater than 7% reactor power have been added to reduce the number of challenges to the safety valves and power operated relief valve. The ART feature is not credited in the plant safety analysis; it exists to reduce the probability of an overpressure event and challenge to the pressurizer code safety valves.

The Heat Sink Protection System (HSPS) detects low steam generator level and automatically initiates emergency feedwater. In the event that the reported condition in which one MFWP was running and providing main feedwater flow with the second MFWP in a reset condition (bypassing HSPS EFW actuation on loss of main feedwater), a low steam generator level in either steam generator would still actuate the start of emergency feedwater.

Therefore, in the main feedwater pump turbine 'reset' condition, with the RPS trip and a HSPS actuation associated with a loss of both main feedwater pumps operationally bypassed:

- The identified condition (bypass) does not initiate or result in a plant transient such that it could be viewed as a precursor to a significant event.
- There are alternate diverse parameters that sense the loss of feedwater and provide either a reactor trip or EFW actuation such that the identified condition would not lead to a more significant safety concern.
- TMI-1 has not had plant transients or complications to plant operations due to the identified condition such that the performance indicators were impacted let alone exceeded a threshold.

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- The identified condition is associated with the NRC Reactor Safety cornerstone – mitigation systems by the attribute of configuration control as measured by the operating equipment lineup. The associated cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage) is not adversely impacted as a result of the diverse parameters that sense loss of main feedwater and initiate emergency feedwater.

D. CORRECTIVE ACTIONS

1. Revise response to OE30225
2. Revise operating procedures to recognize entry into TS condition (including declaring/logging LCO)
3. Evaluate possible modifications/design changes to preclude identified condition
4. Evaluate operator and technical training needs to correct deficiencies
5. Evaluate improvements to Technical Specifications and Bases 3.5.1.9 and Table 3.5-1 section D.

E. PREVIOUS OCCURENCES

TMI-1 recently performed a common cause analysis (CCA 1324039) due to several instances of either not properly identifying Technical Specification Limiting Conditions for Operation times or impacts on station risk during work preparation. From the CCA "Previous Events/OE Review section":

Institute of Nuclear Power Operation (INPO) Operating Experience (OE) database and Exelon's Corrective Action Program (CAP) Passport database were reviewed to find similar events associated with either inadequate LCO identification or understanding impacts of system availability. Several INPO OE items were identified relative to missed LCO and availability requirements due to failed equipment or untimely entry in LCO statements.

Two events associated with not properly identifying LCO action statements at TMI were identified. Review of these analysis products was used to formulate corrective actions for this analysis.

Previous Events	Previous Event Review
Apparent Cause Evaluation (ACE) 1123004 (Late Containment Technical Specification Entry during Reactor River Maintenance)	<p><u>Background:</u></p> <p>In October 2010, TMI licensed personnel failed to identify the applicability of entry into containment isolation Technical Specifications (TS) during performance of work on the Engineered Safeguards (ES) system Reactor Building Emergency Cooling (RBEC). NRC residents challenged the station approximately 30 hours into a 72 hour shutdown LCO statement on the missed entry.</p> <p>Gap with senior reactor operators misapplying understanding of operability and design bases requirements relative to remotely controlled containment isolation valves associated with</p>

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	<p>safety systems was identified.</p> <p><u>Review:</u></p> <p>Training solution and procedure revision actions were implemented to strengthen understanding and implementation of containment Tech. Specs. Actions to implement training have been developed.</p>
<p>Apparent Cause Evaluation (ACE) 742762 (Untimely Identification of Reactor Building Emergency Cooling System Technical Specification (TS) Condition – TMI)</p>	<p><u>Background:</u></p> <p>On 2/21/08, Operations configured the plant such that only one train of Reactor Building Emergency Cooling (RBEC) was available. TMI-1 TS allows this lineup for a seven day period, however, licensed operators failed to identify the nonconforming condition. During this event, electrical train separation did not exist between the two Reactor Building Air Handling Unit (AH-E-1) fans that were in service. This condition was identified approximately six and half days into a seven day shutdown LCO action statement.</p> <p>ACE 742762 identified gaps with licensed operators improper interpretation of TS 3.3.3.c relative to three train systems and lack of TS procedural guidance when removing AH-E-1 fans from service.</p> <p><u>Review:</u></p> <p>Training solution actions and procedure revisions were implemented to ensure compliance with TS 3.3.3.c from ACE 742762. Specifically, Licensed Operator Requalification Training (LORT) / Initial Licensed Operator Training (ILT) lesson plans were modified and procedure steps addressing RBEC TS requirements were added to procedures that remove AH-E-1 fans from service. Similar training and procedure change actions have been adopted for this analysis.</p>

* Energy Industry Identification System (EIIS), System Identification (SI) and Component Function Identification (CFI) Codes are included in brackets, [SI/CFI] where applicable, as required by 10 CFR 50.73 (b)(2)(ii)(F).