

AmerGen

A PECO Energy/British Energy Company

AmerGen Energy Company, LLC
Three Mile Island Unit 1

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July 28, 2000
5928-00-20242

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

Dear Sir or Madam;

Subject: THREE MILE ISLAND NUCLEAR STATION, UNIT 1 (TMI-1)
OPERATING LICENSE NO. DPR-50
DOCKET NO. 50-289
LICENSEE EVENT REPORT (LER) NO. 2000-002-00,
"Discovery of a Condition Outside the Fire Hazards Analysis Design Basis for
the Alternate Shutdown Facility in Achieving Cold Shutdown in the Event of a
Fire which Forces Evacuation of the Control Room."

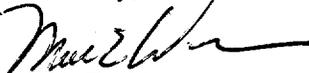
This letter transmits LER No. 2000-002-00. It provides the complete description of the event, the extent of the condition, safety assessment and actions taken with regard to the nonconformance to the Appendix R Fire Protection requirements of 10 CFR 50 involving the procedural implementation of the Subsections III.L (1) and (3).

The event was evaluated and determined to be reportable pursuant to 10 CFR 50.72 subparagraphs (b) (2) (ii) and an immediate notification was made to the NRC via the ENS telephone on June 28, 2000. This LER is being submitted pursuant to 10 CFR 50.73, using the required NRC forms (attached). NRC Form 366 contains an abstract that provides a brief description of the evaluated condition. A complete report is contained on Form 366A.

The corrective actions in Section VIII of the attached report constitute commitments to prevent recurrence.

This event did not adversely affect the health and safety of the public. For additional information regarding this LER contact Mr. Gregory M. Gurican of TMI Regulatory Engineering at (717) 948-8753.

Sincerely,



Mark E. Warner
Vice President, TMI Unit 1

GMG

cc: Administrator, Region I
TMI Senior Resident Inspector
TMI-1 Senior Project Manager
File 00096

JED2

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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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TITLE (4)
Discovery of a Condition Outside the Fire Hazards Analysis Design Basis for the Alternate Shutdown Facility in Achieving COLD SHUTDOWN in the Event of a Fire which Forces Evacuation of the Control Room.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MON TH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
6	28	2000	2000	-- 002	-- 00	7	28	2000		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9) N 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)			50.73(a)(2)(i)		50.73(a)(2)(viii)		
	20.2203(a)(1)			20.2203(a)(3)(ii)			X 50.73(a)(2)(ii)(B)		50.73(a)(2)(x)		
	20.2203(a)(2)(i)			20.2203(a)(3)(iii)			50.73(a)(2)(iii)		73.71		
	20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)		X OTHER: 50.72(b)(1)		
	20.2203(a)(2)(iii)			50.36(c)(1)			X 50.73(a)(2)(vi)		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 Mr. Gregory M. Gurican, Sr. II Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 717-948-8753

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	

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

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

On June 28, 2000, AmerGen Energy LLC (AmerGen) discovered a condition, which was outside the plant design basis required by 10 CFR 50, Appendix R, III. L (1) and (3), as described in the Fire Hazards Analysis Report. Appendix R requires the capability to achieve COLD SHUTDOWN conditions (200°F) within 72 hours following the event of a fire which forces evacuation of the Control Room and control of the plant from Alternate Shutdown Facilities. Specifically, it has been determined that TMI Unit 1 lacks the defined capability, since such capability is not contained in plant procedures nor identified in operator training. The inability to meet the Appendix R requirement of the FHAR design basis description is reportable as an immediate notification to the NRC in accordance with 10 CFR 50.72 (b)(1)(ii)(b). A 30 day LER is required in accordance with 10 CFR 50.73(a)(2)(v) and (vii). Immediate compensatory measures were taken by way of written Operations Night Orders reviewed by all Shift Managers with each crew.

The root cause has been determined to be: "Change Management Resources and Methods: Accuracy/Effectiveness of Change Not Verified or Validated," as applicable to implementation of Fire Protection commitments made in the 1980s. Significant process improvements have been implemented throughout the late 1990s that address the root cause of this event; therefore, no specific corrective actions to address the Root Cause of this event are required. Nonetheless, both short term and long term corrective actions have been initiated to bring the Unit into compliance with the requirements of 10 CFR 50, Appendix R, as described in the body of the report. This event did not involve any equipment failures or damage, nor were there any personal injuries as a result of this event. There were no adverse safety consequences resulting from this event, and the event did not affect the health and safety of the public.

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I. Plant Operating Conditions Before The Event:

TMI-1 was operating at 100% steady state power prior to and during the event described in this LER.

II. Status of Structures, Components, or Systems That Were Inoperable At The Start Of The Event And That Contributed To The Event:

None.

III. Event Description:

In 1998, as part of an ongoing effort to improve design fidelity, TMI began a project to validate the statements, assumptions, and calculations for the design basis accidents (DBAs) described in the Updated Final Safety Analysis Report (UFSAR). This project resulted in a significant improvement in the fidelity of Chapter 14 description of design basis accidents (DBAs) in the UFSAR, and the design basis calculations used to support those documents. The review also identified incorrect assumptions and statements related to the capability of various plant equipment. TMI is in the process of correcting all affected documents.

One area identified in the Chapter 14 review was the potential insufficiency of the Condensate Storage Tank (CST) inventory. The CST inventory sufficiency had not been verified for the increased power level from 2535 MWt to 2568 MWt. A new calculation found that the UFSAR CST inventory values, as well as the Technical Specification basis, were inconsistent, requiring revision.

A safety evaluation was developed to support the changes required to correct the UFSAR and Technical Specification bases. During preparation of these documents, the Fire Hazards Analysis Report (FHAR) was reviewed for related CST inventory discrepancies. During this review, it was discovered that the FHAR assumed that the plant could be cooled to 200°F within 72 hours while on natural circulation, steaming through the Atmospheric Dump Valves (ADVs) until the Decay Heat Removal (DHR) System can be started. This total cooldown time was based upon a nominal cooldown rate of 10°F/hr. Recent calculations show that the assumed linear 10°F/hr cooldown rate cannot be maintained in the latter stages of a cooldown. The results of the calculation identified that the required COLD SHUTDOWN condition would not be achieved within 72 hours using plant equipment credited in the FHAR. Alternative means for increasing the cooldown rate are available; however, they are not described in plant procedures or discussed in operator training.

Cognizant TMI-1 staff reviewed the Appendix R requirements and related commitments made by TMI-1, which might have changed the design basis of the unit. Discovering no docketed correspondence altering the Appendix R shutdown requirements, the discrepancy was identified to plant management via the TMI-1 Corrective Action Program (CAP) reporting process, and CAP T2000-0542 was issued on June 28, 2000. The Plant Review Group met following receipt of the CAP to determine the effects on operability and reportability. The event was determined to be reportable pursuant to 10 CFR 50.72 and a one-hour report notification was given to the NRC.

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IV. Identification of Root Cause:

The defined event was "A Condition Outside the Fire Hazards Analysis Design Basis for the Alternate Shutdown Facility in achieving COLD SHUTDOWN in the event of a Fire, which forces Evacuation of the Control Room." The root cause of the event was that, "During the initial implementation of the Appendix R requirements, the change management process was not sufficiently rigorous to require independent verification that the linear cooldown rate assumption to reach COLD SHUTDOWN conditions within 72 hours was achievable. This root cause was further classified as: " Change Management Resources and Methods: Accuracy/Effectiveness of Change Not Verified or Validated." [Code No. C10Cm] No contributing factors could be determined from the review of historical documents related to the cause of this event.

Additional rigor related to verification of design basis assumptions prior to being translated into procedures has been added to the design change processes over the last several years. The project to validate statements, assumptions and calculations in DBAs, as described in the UFSAR, led to the finding of this problem. Corrective actions have been previously implemented to prevent reoccurrence of the problem. As a result of these process improvements no specific corrective action to address the Root Cause of this event is required.

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V. Investigation of Previous Events & Extent of Condition:

A search was performed of the LER and CAP databases to identify any previous similar instances where questions of a potential failure mechanism were raised that the existing analysis had not addressed. The previous similar events are:

CAP T1999-0185, "The capability for plant cooldown on one CST was incorrectly based in the results of calculation T1-5360-424-004. That calculation concluded that IF it were to take 10 hours to cooldown the RCS to 250°F, THEN the required condensate would be 155,500 gallons. Therefore, the minimum required inventory in one CST (150,000 gallons per tank per T.S. 3.4.1.1) would not be adequate to either remove decay heat for 24 hours OR to cooldown the RCS to 250F."

CAP T1998-1076, "During the FSAR Chapter 14 Accident Analysis review process, for the Loss of Off-Site Power (LOOP) event, a discrepancy was discovered. The accident analysis for this event states that the minimum CST inventory is 150,000 gallons. This inventory provides sufficient water for decay heat cooling (assuming infinite irradiation at 2535 MWt) for a period in excess of 1 day. The discrepancy is that the inventory value is based on 2535 MWt and needs to be revised for 2568 MWt."

LER 99-006-00, "Inability of the Pressurizer Support Bolts to Meet FSAR Requirements," CAP T1999-0264 was initiated on March 19, 1999 to document preliminary analyses results provided by Framatome Technologies that identified an apparent discrepancy between the Pressurizer support lugs and their design basis. Subsequent independent analyses performed by GPU Nuclear (GPUN) determined that while the Pressurizer support lugs were not overstressed, the support lug bolt seismic loads exceeded the FSAR design requirements. An evaluation by GPUN for TMI Unit 1 could not identify the specific cause of this event. Probable causes could be either the inadequate transfer of design information from the Nuclear Steam Supply System supplier to the architect engineer, structural analyses inadequacies for the support or inaccurate design analyses and drawings for the Pressurizer. The long term corrective actions include either an action to obtain approval of a license change request which would permit use of damping values in accordance with the guidance of Regulatory Guide 1.61 or modification of the support hardware such that the resulting bolt stresses are in accordance with the current TMI-1 Updated FSAR requirements.

These events are similar in that they identify cases where the plant was outside of its design basis, or may not have been bounded by the original analysis. These previous instances are not considered to reflect a programmatic failure of the current engineering analysis process. This conclusion was reached on the basis of the small number of similar events identified and the fact that most of these design analyses were performed ten or more years ago. It is recognized that improvements made in the state of the art of accident modeling in conjunction with a larger bank of industry experience, has significantly improved the ability to identify new challenges to design bases. The self-identification of the condition reported in this LER also reflects the plant staff's questioning attitude and desire to adhere to the SAR commitments

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VI. Assessment of Safety Consequences & Implications of the Event:

This event does not involve any personnel injury, equipment damage, or safety system response. The Appendix R – Alternate Shutdown Facilities (a.k.a. the "Remote Shutdown Panels [RSPs]" at TMI Unit 1) remained operable and unaffected by this event. Equipment available from the RSPs would allow the plant to commence a controlled shutdown of the Unit, eventually achieving COLD SHUTDOWN conditions.

In the event of a fire that forces evacuation of the control room, the Emergency Director (ED) would evaluate the plant conditions and severity of the fire. Should the fire event require bringing the plant to COLD SHUTDOWN conditions using the RSPs, the ED would use plant operating procedure OP-1102-11 Enclosure 2, "RCS Natural Circulation Cooling," and determine the rate of cooldown dependent upon the complexity of the casualty. Should it be necessary to achieve COLD SHUTDOWN conditions (200°F) rapidly, the ED could rely upon plant equipment other than the ADVs, credited as the energy removal means by steaming to atmosphere, with or without the loss of all offsite power, e.g. the turbine bypass valves (TBVs) to release energy to the plant condenser. The cooldown rate does not diminish until the secondary plant steam pressure has been reduced (several hours following the event), which would allow emergency response staff in the Technical Support Center to assess the plant conditions and determine what other available equipment could support a more rapid cooldown than would be achieved by relying solely upon the ADVs and Steam Generators, if desired, e.g. use of the Main Steam Safety Valves as an alternate pathway for the steam release (energy discharge).

Furthermore, should this event have occurred in the time period between its discovery and the date years earlier when the 10 CFR 50 Appendix R requirements were implemented, it is believed that the capability to cooldown faster, using means other than the ADVs, was and is available, albeit no specific procedures address the actual steps to be taken which would effectuate same. Appendix R does not require a 72-hour cooldown to COLD SHUTDOWN conditions (200°F), only that the capability to do so exists. This event points to the non-compliance with the procedural implementation requirements of Appendix R Section III (L) (3) rather than the potential inability to cooldown. Therefore, there are no safety consequences as a result of this event.

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VII. Corrective Action Taken:

Immediate & Short Term Actions:

1. On June 30, 2000 Operations Night Orders were issued based on the contingent Fire Event described in the CAP T2000-0542, as follows: "**CONTINGENCY:** On 6/29/00, a design deficiency was identified. The plant alternate shutdown systems are required to be capable of bringing the plant to COLD SHUTDOWN in less than 72 hrs. in order to satisfy 10 CFR 50 Appendix R. Without off-site power, plant cooldown rate is limited by the atmospheric dump valve capacity. If a fire or other plant event occurs where plant cooldown rate is limited and a higher cooldown rate is desired, the ED should consult with the TSC for additional options." [CAP CA T2000-0542-1] **This action is completed.**
2. Revise the Operations procedure OP-1102-11, Enclosure 2, to provide guidance related to the use of alternate means of cooldown by the ED in the event of a Fire that requires evacuation of the Control Room and that does not rely upon the ADVs as the only mechanism to achieving COLD SHUTDOWN conditions (200°F) within 72 hours, if needed. [CAP CA T2000-0542-2] **This action is completed.**
3. The Fire Protection Engineer reviewed the FHAR for additional instances where credit may have been taken for reaching COLD SHUTDOWN using the CSTs, the ADVs, and a cooldown rate of 10°F/hr within 72 hours of a fire requiring evacuation of the Control Room. No additional instances were discovered in which FHAR commitments and requirements were not incorporated into plant procedures. [RCE Report 7/20/2000] **This action is completed.**

Long Term Corrective Actions:

1. Issue a design verified calculation that confirms TMI-1's capability to achieve COLD SHUTDOWN conditions (200°F) within 72 hours, following a Fire which forces evacuation of the Control Room using all available means for cooldown. [CAP CA T2000-0542-3] **This action is targeted for completion on or before December 31, 2000.**
2. Revise and update the FHAR and Appendix R commitments to accurately reflect the plant capability to achieve COLD SHUTDOWN within 72 hours following a fire that requires evacuation of the Control Room and to adequately address the methods used, as well as, the results of Long Term Action 1. [CAP CA T2000-0542-4] **This action is targeted for completion on or before March 31, 2001.**

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VIII. Date of Full Compliance:

Full compliance with the design basis requirements for Alternate Shutdown Facility capability considerations will be achieved following implementation of any remedial or mitigating actions required by confirmation of analyses and calculations to be performed on or before March 31, 2001.

*The Energy Industry Identification System (EIS), 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).