AmerGen
A PECO Energy/British Energy Company

AmerGen Energy Company, LLC
Three Mile Island Unit 1
Route 441 South, P.O. Box 480
Middletown, PA 17057
Phone: 717-944-7621

1920-99-20650

December 28, 1999

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

Dear Sir:
Subject: Three Mile Island, Unit 1 (TMI Unit 1)
Operating License No. DPR-50
Docket No. 50-289
LER 99-013-00, "Improperly Made-up Electrical Connection on a Control Rod Drive Breaker Test Switch"

This letter transmits Licensee Event Report (LER) number 99-013-00. It provides the complete description, extent of the condition and actions taken in association with the identification of an improperly made-up connection on a Control Rod Drive Breaker Test Switch at TMI-1 on December 1, 1999.

The condition was evaluated and determined to be reportable. The condition is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B) and is provided on 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 long term corrective actions in Section VIII of the attached report constitute commitments made to prevent recurrence of the personnel errors associated with the deficient condition described herein..

As described in the attached report, this condition did not adversely affect the health and safety of the public. For additional information regarding this LER contact William Heysek of the TMI Regulatory Engineering Section at (717) 948-8191.

Sincerely,

John B. Cotton
Vice President, TMI Unit 1

WGH
cc: Administrator, Region I - Hubert J. Miller
TMI Senior Resident Inspector - Wayne L. Schmidt
TMI Unit 1 Senior Project Manager - Timothy G. Colburn
File 99173

IE22

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Three Mile Island, Unit 1	05000289	1 OF 4

TITLE (4)

Improperly Made-up Electrical Connection on a Control Rod Drive Breaker Test Switch

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
										05000
12	01	99	99	- 013	-- 00	12	28	99	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)	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)
William Heysek, TMI Regulatory Engineer	(717) 948-8191

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 December 1, 1999 a deficient condition regarding an improperly made-up electrical connection was identified. A technician troubleshooting anomalies experienced during the performance of Surveillance Procedure 1303-4.2B "RPS Chan B CRD Breaker Logic Test" found an incorrectly attached lug on control rod drive breaker, CB-11 test switch C2. A panel indication light for "SHUNT TRIP PWR" did not return to the "ON" state and an annunciator light for "CRDM Breaker Test Trouble" that was expected to clear did not. Upon identification, the improperly made-up jumper connection was remade and the surveillance was satisfactorily completed. The deficient condition was documented by an entry into the Corrective Action Process: form number T1999-1202.

An evaluation by GPU Nuclear identified that the specific cause of this event was the failure of the I&C technician assigned the task to correctly make-up the connection as part of a plant modification. Individuals assigned independent verification tasks also failed to identify the incorrectly connected lug.

The long term corrective actions to reduce the probability of similar occurrences in the future involve a review of the lessons learned from this and similar events with Electrical and I&C maintenance and Quality Verification personnel during cyclic and position specific training.

The deficient condition is being reported per 10 CFR 50.73(a)(2)(i)(B).

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Three Mile Island, Unit 1	05000289	99	--013--	00	2 OF 4

TEXT *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

The plant was operating at 100% power at the time the improperly made-up connection was identified and determined to be reportable. Plant operation was not changed as a result of that determination.

II. STATUS OF STRUCTURES, COMPONENTS OR SYSTEMS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT.

No systems, structures or components were out-of-service that contributed to the condition addressed by this LER.

III. EVENT DESCRIPTION

During the performance of Surveillance Procedure 1303-4.2B "RPS Channel B Control Rod Drive (CRD) Breaker Logic Test", the technician performing the surveillance experienced anomalies at step number 8.2.5, which follows testing of the undervoltage trip. When the test switch is returned to normal, the white "SHUNT TRIP PWR" light should return to the "ON" state and the Control room Panel Right Front-1-1, "CRDM Bkr Test Trouble" annunciator should clear. Subsequent troubleshooting revealed an improperly connected lug on CRD-CB-11 Breaker [AA/BKR] Test Switch -C2 affecting the jumper between test switch terminals 9 and 7.

The improper jumper connection was made-up during the modification to install the CRD-CB-10 and 11 Breaker test switches during the 13R outage. The jumper wire's ring lug was not properly landed through the terminal screw at terminal 9. Instead, it was attached between another lug's ring and the terminal base. Although the installation of the lug was checked by the I&C technician performing the task and two additional independent verifiers, the error went undetected until the indication light anomalies were observed during the performance of the surveillance test on December 1, 1999. The modification had passed both post modification testing and a subsequent surveillance test, performed on November 5, 1999.

Upon discovery on December 1, 1999, a Surveillance Deficiency Report was written to document the failure of the component indication light to change state as required. It was during troubleshooting of that problem, that close visual examination of the test switch terminals identified the incorrectly made-up connection. The jumper lug connection was subsequently correctly landed at terminal 9 by the I&C technician performing the surveillance. The technician repeated the test and successfully completed the remaining steps. Corrective Action Process (CAP) form number T1999-1202 was initiated on December 1, 1999 to document the incorrectly attached lug.

IV. AUTOMATIC OR MANUAL INITIATED SAFETY SYSTEM RESPONSES

No automatic or manual safety system responses were involved with the deficient condition reported herein since there was no physical plant event.

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Three Mile Island, Unit 1	05000289	99	--013--	00	3 OF 4

TEXT *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

V. FAILURES AND ERRORS

An evaluation was performed to determine the root cause of the incorrectly attached lug. The I&C department technician performing the test switch installation modification failed to properly make-up the connection at terminal 9. He and two independent personnel (an I&C Supervisor and a contracted Quality Verification Inspector) assigned verification functions failed to detect the improper ring lug termination. The successful performance of these tasks was hampered by the component design which inhibited access to the jumper connection at the terminal and a direct line of sight was only available to the back side of the terminal block. The technician and the verifiers should have recognized that due to the limited access there was a significantly greater opportunity for error. Although each of these individuals checked that the right wire was landed at the correct terminal and they tugged on the wire to assure it was tight, they failed to complete an adequate check that this wire's ring lug was correctly landed through the terminal screw. The root cause was concluded to be "deficient work practices by the technician in failing to adequately perform / self-check to assure intended action was correct", and a contributing cause of "Required verification was not adequately performed".

VI. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

GPU Nuclear Engineering reviewed the subject deficient condition and determined that the improperly landed jumper ring lug and subsequent as-left configuration of the RPS/CRD breaker circuitry following completion of the modification would result in a failure of the shunt trip function of the breaker to function during a seismic event. Technical Specification 3.5.1.7 requires the shunt trip function of breaker CRD-CB-11 to be operable. Since it was verified that no work was performed on the CRD-CB-11 TEST SWITCH-C2, the deficient condition is considered to have existed since the restart of the plant from the 13R outage (from October 19, 1999 until December 2, 1999).

The condition being reported, as specified by Technical Specification section 3.5.1.7, is the exceeding of a specified forty-eight hour allowable outage time for a diverse trip feature of a trip breaker found inoperable,

VII. PREVIOUS EVENTS OF A SIMILAR NATURE AND EXTENT OF CONDITION

A previous event search of the CAP and Quality Verification databases from January 1, 1997 to present identified nine events related to improper termination and wiring issues. The majority of those events were associated with landing wires at the wrong terminals. One event, however, documented by CAP T1999-1073, dated October 17, 1999 addressed a loose wire on terminal strip in Transfer Cabinet No. 6. The loose connection resulted in Control Rod 4-8 dropping into the core when its rod group was transferred onto the DC Hold Bus. This error was also attributed to I&C department personnel. Both CAP events identified deficient work practices that occurred during the period of the 13R outage. The individuals involved in these events were properly trained and qualified persons with years of experience. During interviews, the individuals involved did not feel fatigued, distracted, or rushed to complete this task. The challenges presented to the I&C technicians performing the termination tasks associated with these events were different due to the actual hardware design, although the event causes of inadequate self-checking and weak verification are similar. When evaluated in the context of the total number of successful terminations completed by I&C department personnel during the course of the past thirty-five months, the two problematic terminations are not considered to indicate a programmatic deficiency or an adverse trend.

To determine the extent of condition, Modification Document MD-H257-001 which prescribed the installation of the test switches on both CRD-CB-10 and CRD-CB-11 was used to identify the terminals in the breaker cubicles affected by the modification. The connections on those terminals were visually inspected to assure that they were correctly made-up. No additional deficient connections were found as a result of this effort.

VIII. CORRECTIVE ACTIONS

A. Immediate Corrective Action

1. Upon discovery on December 1,1999, the deficiency was documented and action taken to correctly land the lug on the terminal. Operability of the component was verified by retest using the surveillance procedure. The surveillance was completed satisfactorily.

2. Both the technician and Foreman involved in the original test switch termination installation/ verification activities were coached in regards to diligent performance of assigned tasks.

3. The extent of the condition was determined to involve only the initially identified connection.

B. Long Term Corrective Action

1. The events involving the improperly landed lugs will be a discussion topic for cyclic training to be provided to both the Electrical and I&C department personnel by the end of March 2000. Expectations for both work practice and performance verification will be incorporated in the discussion.

2. The events involving the improperly landed lugs will be a discussion topic for Quality Verification department personnel during position specific training by the end of March 2000. Expectations for actions associated with performance verification of electrical connections will be incorporated in the discussion.

* The 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).