

# AmerGen

A PECO Energy/British Energy Company

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February 09, 2000  
5928-00-20003

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

Dear Ladies and Gentlemen:

Subject: THREE MILE ISLAND NUCLEAR STATION, UNIT 1 (TMI-1)  
OPERATING LICENSE NO. DPR-50  
DOCKET NO. 50-289  
LER 00-001-00, "AUTOMATIC START OF EMERGENCY DIESEL GENERATOR 1B  
DUE TO FAILURE OF FAULT PRESSURE RELAY CIRCUIT CARD ON AUXILIARY  
TRANSFORMER 1A"

This letter transmits Licensee Event Report (LER) 00-001-00. It provides the complete description, extent of the condition, and actions taken with regard to the January 10, 2000 event involving a partial loss of offsite power and subsequent automatic start of Emergency Diesel Generator 1B.

The event was evaluated and determined to be reportable pursuant to 10 CFR 50.72(b)(2)(ii) and notification was made via the ENS telephone on January 10, 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 V. Lewis Killpack, Jr. of TMI Regulatory Engineering at (717) 948-8196.

Sincerely,



John B. Cotton  
Vice President, TMI Unit 1

VLK

cc: Administrator, Region I - Hubert J. Miller  
TMI Senior Resident Inspector - Wayne L. Schmidt  
TMI-1 Senior Project Manager - Timothy G. Colburn  
File 00043

IE22

**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.

FACILITY NAME (1)

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DOCKET NUMBER (2)

05000289

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TITLE (4)

Automatic Start of Emergency Diesel Generator 1B Due to Failure of a Fault Pressure Relay on Auxiliary Transformer 1A

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
01	10	2000	2000	- 001	- 00	02	09	2000		05000
<p>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)</p>										
OPERATING MODE (9)		N		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(vii)
POWER LEVEL (10)		100		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)		X 50.73(a)(2)(iv)		OTHER-Voluntary
				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)(vi)		

**LICENSEE CONTACT FOR THIS LER (12)**

NAME

William Heysek, TMI Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

(717) 948-8196

**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
B	EA	RLY	013602	N					

**SUPPLEMENTAL REPORT EXPECTED (14)**

YES (If yes, complete EXPECTED SUBMISSION DATE).

X No

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

On January 10, 2000 at approximately 11:45 a.m., the 1A Auxiliary Transformer (230 kV to 6900 V & 4160 V) tripped while supplying in-plant loads. The plant was operating at 100% power at the time of this spurious trip and remained at near full power during and following the event transient. Following the loss of the 1A auxiliary transformer, non-Class 1E loads transferred to the 1B Auxiliary Transformer and Class 1E loads transferred to the 1B emergency diesel generator which had automatically started in response to the event.

The "A" Auxiliary Transformer tripped after water leaked into the transformer control cabinet enclosure and tracked onto the fault pressure seal-in electronic circuit board. The direct cause of the trip was a water induced short between two solder points. The water intrusion occurred as a result of a failure to weatherproof the screw penetrations on terminal strips directly above the circuit board after their installation in October 1999 during the 13R refueling outage.

The failed fault pressure relay seal-in electronics board was replaced, the new board was mounted on standoffs, and the screw holes were sealed.

The event was reported pursuant to 10 CFR 50.72(b)(2)(ii) at 2:02 p.m. on January 10, 2000.

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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 of the event.

**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 that contributed to the event addressed by this Licensee Event Report were out-of-service at the time the transient was initiated.

**III. EVENT DESCRIPTION**

At approximately 11:45 a.m. on January 10, 2000 the 1A Auxiliary Transformer (230 kV to 6900 V & 4160 V)[EA/XFMR], which supplies offsite power to in-plant loads, tripped while the plant was operating at 100% power. Following the loss of the 1A auxiliary transformer, non-Class 1E loads transferred to the 1B Auxiliary Transformer and Class 1E loads transferred to the 1B emergency diesel generator (EG-Y-1B) [EK/DG], which had automatically started in response to the event.

The 1A Auxiliary Transformer tripped on fault pressure without a concurrent transformer phase over current or ground fault relay actuation. The substation digital fault recorder (DFR)[XR], which also monitors transformer currents, did not indicate any change in current prior to the trip. Receipt of the alarm titled "230kV Bus 8 Differential Trip" was received, as expected, for a fault pressure trip in that the differential trip lockouts are used to achieve transformer isolation. Transformer oil samples were collected for dissolved combustible gas analysis to determine if internal arcing in the transformer had occurred. The laboratory oil sample analysis did not indicate significant presence of either acetylene or hydrogen, which would have been indicative of internal arcing. After the fault pressure trip was placed in defeat and the above information was reviewed by station management, it was determined that the fault pressure actuation was a false trip and the 1A auxiliary transformer was returned to service at approximately 10:49 p.m. on January 10, 2000.

The class 1E bus operated on the emergency diesel generator until 11:22 p.m. on January 10, 2000 when EG-Y-1B was shutdown and returned to an engineered safeguards (ES) standby status: thereby returning the plant electrical distribution system to its normal configuration.

**IV. AUTOMATIC OR MANUAL INITIATED SAFETY SYSTEM RESPONSES**

The response of safety related systems and components were normal. As a result of the 1A Auxiliary Transformer trip, the following automatic safety system responses were initiated:

- The 1E Station Inverter alarmed on high frequency. The 1E inverter receives its frequency reference from the 1B Diesel Generator. This allows a smooth transition of connected loads should an inverter failure occur, as the alternate power supply is connected to the 1B diesel generator. The high frequency alarm cleared when diesel frequency was reduced to 60 Hz.
- The 1B Emergency Diesel Generator started. The 1B Emergency Diesel Generator frequency was slightly high (within specification) based on its light loading and the governor setpoint.

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- Non-Class 1E loads transferred to the 1B Auxiliary Transformer and Class 1E loads transferred to the 1B emergency diesel generator (EG-Y-1B) [EK/DG]
- The 1A and 1E Inverters started sharing their DC supplies from their internal rectifiers to the 1A DC Distribution System. The 1A and 1C Battery Chargers provided the inverters DC power requirements. The inverters continued to draw some of their power from the chargers until plant voltage sufficiently recovered to provide internal DC voltage above 1A DC Distribution System voltage.

Manually initiated actions included securing a circulating water pump (CW-P-1D) [KE/P] in accordance with Operating Procedure 1107-1, "Normal Electrical System", to assure the presence of adequate voltage levels to support loss of coolant accident block loading while plant loads were on one auxiliary transformer.

**V. FAILURES AND ERRORS**

Based on initial examination of the failed component and vendor comments, this seal-in electronic device was actuated by water shorting across exposed solder joints. Evidence to date suggests this component failure is not a generic industry concern. The ingress of water appears to be from new screw holes made during installation of new sliding link terminal strips and the seal-in module. The screws extended through the back of the panel, and were not sealed.

The extent of condition was reviewed. This same seal-in board (Qualitrol model # 900-200-01) exists on the 1B Auxiliary Transformer. The seal-in board was installed during the 13R outage. This board was used exclusively on the plant's two auxiliary transformers.

In addition to the unsealed screw holes on both the A and B Auxiliary Transformers, a section of weather-stripping was also found missing from the top of the A Auxiliary Transformer right side cabinet door. Although undesirable, this condition was not likely to have been the entry point of water that caused the trip since the circuit board is located along the back wall of the left side of the cabinet. Corrective actions will address sealing the screws on both transformers and replacing this weather-stripping. Other than some slight drift noted on the pressure switch setpoints, no other deficiencies were identified with the transformer instrumentation or wiring.

Corrective measures to prevent recurrence of the failures will be completed as described in Section VIII.B.

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

The plant's automatic response to the event was as designed. There were no safety consequences associated with the momentary failure of the fault pressure seal-in circuit board and the subsequent startup of 1B Emergency Diesel Generator and the transfer of loads that took place.

These events did not result in any actual or potential adverse impacts on personnel or plant equipment.

**VII. PREVIOUS EVENTS OF A SIMILAR NATURE**

Maintenance records and the TMI Corrective Action Process (CAP) database were searched to identify any prior instances of failure of the fault pressure seal-in electronic circuit board. None were found. A previous

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similar trip due to the failure of the fault pressure sensor circuit was encountered on 1B Transformer on June 26, 1999. Although this was a similar event, it did not share the same causes. The previous trip occurred as a result of a gradual degradation of the fault sensing circuit after twenty years of service, while the current trip was a water induced short of a circuit that had only been installed three months ago. The new fault pressure seal-in circuits were installed during 13R to replace the older fault sensing components. No other problems have been identified.

**VIII. CORRECTIVE ACTIONS**

**A. Short Term Corrective Action**

1. The pressure trip on 1A/B Auxiliary Transformer was placed in defeat (It will alarm but not trip) shortly after the event during initial analysis.
2. The seal-in module was replaced on January 13, 2000 in the 1A Auxiliary Transformer with the same part and was installed with washers and standoffs to keep module away from the back wall of the enclosure. All screw holes were sealed from the back with RTV. The module and fault pressure relays were calibrated.
3. Oil samples were taken by TMI January 10, 2000 and analyzed to assure there was no internal transformer fault. The analysis results were normal.
4. The Digital Fault Recorder output was examined for fault current and the protective relay panel flags. was checked for protective relay flags and no indications of a fault with the transformer were found.
5. The 1B Auxiliary Transformer panel was inspected during inclement weather and no leaks were found; however, the panel will be sealed by 3/15/00.

**B. Long Term Corrective Action**

1. Craft, planners, engineering, and other key personnel will be trained on topics of weather tight enclosures, the importance of insuring weather stripping is good, and that all penetrations are sealed with a completion date of 7/31/00.
2. An evaluation of leaving the cutout switch in the off position - so that the alarm function, but not the trip function, is activated - will be conducted by 3/30/00.
3. The 1B Auxiliary Transformer panel sealing surfaces will be inspected and sealed by 3/15/00.
4. Defective weather stripping in the 1A Auxiliary Transformer panel will be replaced by 3/15/00.

\* The Energy Industry Identification System (EIS), System Identification (SI) and Component Function

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Identification (CFI) Codes are included in brackets, "[SI/CFI]" where applicable, as required by 10 CFR 50.73 (b)(2)(ii)(F).