NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
THREE MILE ISLAND, UNIT 1	0 5 0 0 0 2 8 9	1 OF 0 4

TITLE (4)
DEGRADED GRID UNDERVOLTAGE RELAYS

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 NAMES	DOCKET NUMBER(S)
0 7	1 8	8 4	8 4	- 0 0 6	- 0 0	0 8	2 1	8 4		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE 7 1 7 — 9 4 8 - 1 8 8 5 1 5

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	E A	2 7	B 4 5 5	Y							

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 fifteen single-space typewritten lines) (16)

This report is being submitted on a voluntary basis as information of potential interest to other licensees.

On July 18 and 19, 1984, during the performance of a TMI-1 Surveillance Procedure, the setpoints for three ITE 27H relays (27) in the 4160V Bus 1E (EA) were found out of calibration.

The three relays were installed and calibrated on 07/24/81. Over time, the relays continued to drift out of tolerance even with the surveillance frequency being increased from refueling interval to 6 months to quarterly. The supplier (Brown Boveri) indicates that these relays are used in an improper application and cannot certify that the ITE 27H relays are capable of meeting the specified tolerances, and field experience has shown that these relays over the long term cannot meet the setpoint tolerances required by Technical Specification 3.5.3.1. Because of the conservative assumptions used in selecting the setpoints (degraded grid, single auxilary transformer and full station service load) the safety impact of this drift is minimal.

The short term corrective action is to replace the relays that have a tendency to drift with spare relays that have been checked for stability. The long term corrective action is to replace the relays with relays that are certified to meet the tolerance requirements specified in Technical Specification 3.5.3.1. If unable to replace the relays prior to criticality, the surveillance frequency will be increased to provide additional assurance that the relays do not drift out of Tech Spec requirements.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

TMI-1 was in long term cold shutdown at the time of the occurrence with the Reactor Coolant System at atmospheric pressure.

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

Not Applicable

III. EVENT DESCRIPTION

This report is being submitted on a voluntary basis as information of potential interest to other licensees.

On July 18 and 19, 1984, during the performance of TMI-1 Surveillance Procedure 1302-5.31A "4160V D and E Bus Degraded Grid Undervoltage Relay System Calibration", the setpoints for 27-1, 27-2 and 27-3 relays in the 4160V Bus 1E were found out of tolerance. Technical Specification 3.5.3.1 requires the setpoint for degraded voltage relays to be 3595 volts. The minimum allowed setting is 3560 volts and the maximum allowed setting is 3650 volts. The three voltage relays model ITE 27H are on the secondary side of the potential transformers. Based on the transformer primary to secondary ratio, the relay setpoints are 59.3 volts with a tolerance of 58.7 to 60.2 volts. Relay 27-1 dropout value was 58.35 volts (3537 volts). Relay 27-2 dropout value was 58.24 volts (3531 volts). Relay 27-3 dropout valve was 58.53 volts (3548 volts).

The three relays were installed and calibrated on 07/24/81 with the as-left setpoints at 59.3 volts (3595 volts). On 08/04/83, in accordance with Surveillance Procedure 1302-5.31A , Relays 27-1, 27-2, and 27-3 were first found to be drifting out of tolerance. The surveillance frequency was increased from refueling interval to 6 months. On 01/11/84 Relays 27-1 and 27-2 were again found to have drifted out of tolerance. The surveillance frequency was increased to quarterly. Table 1 attached lists the as-left and as-found history for these three relays. The same type of relay used on the 4160V 1D Bus for the degraded grid undervoltage relay have not drifted out of tolerance.

The supplier (Brown Boveri) indicates that these relays are used in an improper application and cannot certify that the ITE 27H relays are capable of meeting the specified tolerances and field experience has shown that these relays, over the long term, cannot meet the setpoint tolerances required by Technical Specification 3.5.3.1.

IV. COMPONENT FAILURE DATA:

The relays are ITE Solid State Relays Model 27H, Cat. No. 211B0175, Serial Nos. 5235, 5236, and 5237. This event is considered a Cause Code "X", Improper Application.

V. AUTOMATIC OR MANUALLY INITIATED SAFETY SYSTEM RESPONSES:

None.

VI. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATION OF THE EVENT:

During a degraded grid condition, the undervoltage relays would transfer the 4160V E.S. Buses from off-site power to the Emergency Diesel Generators (DG). The setpoint and tolerances assure adequate voltage to Engineered Safeguard equipment without unnecessarily transfering to the Emergency Diesel Generators.

Based on the as-found relay settings, the 1E Safeguards bus would transfer to the diesel generator at 3537 volts instead of the required 3560 volts. The relays are connected in a 2 of 3 logic so the first 2 relays to operate would cause the transfer.

Because of the conservative assumptions used in selecting the setpoints (degraded grid, single auxilary transformer and full station service load), the safety impact of this drift is minimal.

VII. PREVIOUS EVENTS OF A SIMILAR NATURE:

None.

VIII. CORRECTIVE ACTIONS PLANNED:

The short term corrective action is to replace the relays that have a tendency to drift with spare relays that have been checked for stability.

The long term corrective action is to replace the relays with relays that are certified to meet the tolerance requirements specified in Technical Specification 3.5.3.1. If unable to replace the relays prior to criticality, the surveillance frequency will be increased to provide additional assurance that the relays do not drift out of Tech Spec requirements.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

TABLE 1
4160V 1E E.S. BUS DEGRADED GRID UNDERVOLTAGE
RELAY HISTORY

Date	As-Found Secondary	As-Found Primary	(±0.0.S*)	As Left Secondary	As Left Primary
			27-1 S.N. 5235		
07/24/81	-	-	-	59.3v	3595v
08/04/83	60.6v	3674v	(+ 24v)	59.4v	3601v
01/11/84	60.3v	3655v	(+ 5v)	59.3v	3595v
04/13/84	59.51v	3608v	-	59.51v	3608v
07/18/84	58.35v	3537v	(- 23v)	59.31v	3595v
			27-2 S.N. 5236		
07/24/81	-	-	-	59.3v	3595v
08/04/83	60.7v	3680v	(+ 30v)	59.3v	3595v
01/11/84	60.5v	3668v	(+ 18v)	59.36v	3599v
04/13/84	59.41v	3602v	-	59.42v	3602v
07/19/84	58.24v	3531v	(- 29v)	59.30v	3595v
			27-3 S.N. 5237		
07/24/81	-	-	-	59.3v	3595v
08/04/83	60.4v	3662v	(+ 12v)	59.3v	3595v
01/12/84	60.0v	3637v	-	59.38v	3600v
04/13/84	59.47v	3605v	-	59.47v	3605v
07/19/84	58.53v	3548v	(- 12v)	59.32v	3596v

*(± 0.0.S.) The amount (Volts) of out of Specification tolerance.

GPU Nuclear

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TELEX 84-2386
Writer's Direct Dial Number:

August 21, 1984
5211-84-2212

U. S. Nuclear Regulatory Commission
Document Control Room
Mail Stop 058
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
LER 84-006-00

This letter transmits Licensee Event Report (LER) No. 84-006-00 which deals with degraded grid undervoltage relays. Public health and safety were unaffected.

This LER is being submitted pursuant to 10 CFR 50.73, using the required NRC forms (attached). NRC Form 366 contains an abstract which provides a brief description of the event. For a complete understanding of the event, refer to the text of the report which appears on Form 366A.

Sincerely,

H. D. Hukill
Director, TMI-1

HDH:SMO:vjf

Enclosures

cc: Dr. T. E. Murley
R. Conte
J. Van Vliet

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