

NON-PUBLIC?: N
ACCESSION #: 8908310147
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Three Mile Island - Unit 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000320

TITLE: Failure of a 4160/480V Transformer
EVENT DATE: 07/26/89 LER #: 89-004-00 REPORT DATE: 08/24/89

OPERATING MODE: N POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(i)

LICENSEE CONTACT FOR THIS LER:
NAME: Edward D. Schrull, TMI-2 Licensing TELEPHONE: (717) 948-8461
Engineer

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: EC COMPONENT: XFMR MANUFACTURER: G080
REPORTABLE NPRDS: NO

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 1658 on Tuesday, July 25, 1989, a failure of the transformer supplying power to Unit Substation (USS) 2-46 resulted in entering the Action Statement of Technical Specification (Tech. Spec.) 3.8.2.1.1. USS-2-46 was re-energized by cross-tying to USS-2-36 at 1720. Electrical maintenance investigated the occurrence and found it to be caused by a ground in the primary side of bus 2-46 transformer. Due to this fault, bus 2-46 transformer could not be re-energized and the 8-hour timeclock of the Tech. Spec. Action Statement was exceeded at 0058 on July 26, 1989. This event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) due to a condition prohibited by the plant's Tech. Specs. The root cause of this event was an internal fault in the primary side of bus 2-46 transformer. The apparent cause was degradation of the insulation on the windings on the primary side resulting in grounding of the transformer rendering it inoperable. The immediate corrective action was to restore power to bus 2-46 by effecting a cross-tie with bus 2-36. In the long-term, GPU Nuclear is seeking relief from the Recovery Operations Plan requirement of Section 4.8.2.1.1 relating to busses 2-35, 2-36, 2-45, and 2-46 to allow tie breakers to remain closed in the event that redundant

bus pairs cannot be re-energized within the 8-hour timeclock of Tech. Spec. 3.8.2.1.1.

This event is similar in nature to LER 83-24.

END OF ABSTRACT

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I. PLANT- OPERATING CONDITIONS BEFORE THE EVENT

The TMI-2 facility was in a long-term cold shutdown state; the defueling evolution was in progress. The reactor decay heat was being removed via loss to ambient. Throughout this event there was no affect on the Reactor Coolant System (RCS) or the core.

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

N/A

III. EVENT DESCRIPTION

This event occurred on July 25, 1989, at 1658 when a 4160/480V transformer (IEEE 805-1984 System Code-EC) that was supplying power to Unit Substation (USS) 2-46 failed. The Action Statement of Technical Specification (Tech. Spec.) 3.8.2.1.1 was entered at this time.

USS-2-46 was re-energized by cross-tying to USS-2-36 at 1720.

Electrical maintenance investigated the occurrence and found it to be caused by a ground in the primary side of bus 2-46 transformer. Due to this fault, bus 2-46 transformer could not be re-energized and the 8-hour timeclock of the Tech. Spec. Action Statement was exceeded at 0058 on July 26, 1989.

Tech. Spec. 3.8.2.1.1 requires that the A.C. busses listed in Recovery Operations Plan (ROP) Section 4.8.2.1.1 be operable and energized with the tie breakers open (unless closed in accordance with site-approved procedures) between redundant busses. With less than the listed complement of A.C. busses operable, the Action Statement requires returning the inoperable bus to service within eight (8) hours. Since the Action Statement requirement could not be met within the 8-hour timeclock, this event is reportable under the provisions of 10 CFR 50.73(a)(2)(i)(B) due to the existence of a condition prohibited by the plant's Tech. Specs.

USS-2-46, along with the redundant USS-2-36, provides electrical power

to the Auxiliary and Fuel Handling Building (AFHB) ventilation supply and exhaust fans, the RCS boronmeter, and various Reactor Building receptacles supplying building cameras and auxiliary lights. Components powered by bus 2-46 transformer were without power from 1658 to 1720, when power was restored by cross-tying to the bus 2-46 transformer. USS-2-36 has the capacity to carry the USS-2-46 loads in addition to its own in the cross-tied configuration. Redundant AFHB ventilation supply and exhaust fans and Reactor Building receptacles were powered continuously from busses 2-35 and 2-45.

This event is similar in nature to LER 83-24 which involved the failure of a 1E power transformer.

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IV. ROOT CAUSE OF THE EVENT

This event was caused by an internal fault in the primary side of USS bus 2-46 transformer. The apparent cause was degradation of the insulation on the windings on the primary side resulting in grounding of the transformer rendering it inoperable. The cause of the insulation degradation has not been determined. Transformer failures similar to this event have occurred on three (3) previous occasions, one of which resulted in Licensee Event Report 83-24.

V. CORRECTIVE ACTIONS

The immediate corrective action was to effect a tie-in between bus 2-36 and bus 2-46. This tie-in restored power to bus 2-46 within approximately 22 minutes from detection of the transformer failure.

In the long-term, the options available to mechanically resolve this condition are either to procure a new transformer or refurbish the failed transformer. The lead time to procure a new transformer is approximately one (1) year; the estimated time to refurbish the failed transformer is 12 to 16 weeks. GPU Nuclear's current plans are for TMI-2 to enter Facility Mode 2 by December 31, 1989, at which time, Tech. Spec. 3.8.2.1.1 would no longer be applicable. Therefore, a proposed revision to ROP 4.8.2.1.1 has been submitted via GPU Nuclear letter 4410-89-L-0087, dated August 22, 1989, which recognizes that schedular considerations reduce the necessity and appropriateness of repair or replacement of the failed transformer.

The proposed ROP revision provides flexibility in operation should one of the remaining redundant bus transformers (i.e., those transformers supplying power to busses 2-35, 2-36, or 2-45) fail. The proposed

revision would allow a cross-tie between redundant busses in the event of another transformer failure. However, the proposed revision does not obviate GPU Nuclear's responsibility to maintain each pair of redundant busses energized and to notify the NRC pursuant to 10 CFR 50.73 should a subsequent transformer fail and cannot be returned to operability within the 8-hour period allowed by Tech. Spec. 3.8.2.1.1.

VI. COMPONENT FAILURE DATA

The equipment involved is a General Electric transformer: 2000 KVA 3PHI 4160/480 volt Delta-Y 60 Hz open air cooled (IEEE 805-1984 System Code-EC). The apparent cause of failure was degradation of the insulation on the windings on the primary side resulting in grounding of the transformer.

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VII. AUTOMATIC OR MANUALLY INITIATED SAFETY SYSTEM RESPONSES

N/A

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

Safety consequences of failure of the bus 2-46 transformer (i.e., inability to power a redundant train of the AFHB ventilation and the RCS boronmeter) were mitigated by the redundant ventilation fans powered by the 2-35/2-45 busses. Additionally, boration of the RCS was ensured through controls established in the Boron Hazards Analysis and the Primary Plant Operations Procedure 4210-OPS-3200.02, which requires boron sampling of the RCS every eight (8) hours in the event of boronmeter inoperability. These features would also mitigate the safety consequences of a potential future failure of the bus 2-36 transformer with subsequent loss of power to busses 2-36 and 2-46. Therefore, this event did not jeopardize the health and safety of the public.

ATTACHMENT 1 TO 8908310147 PAGE 1 OF 1

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August, 1989
4410-89-L-0092/0494P

US Nuclear Regulatory Commission
Washington, DC 20555

Attention: Document Control Desk

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Licensee Event Report 89-04

Dear Sirs:

Attached is Licensee Event Report 89-04 concerning the failure to comply with Technical Specification Action Statement 3.8.2.1.1 on July 26, 1989, due to the inoperability of the transformer supplying power to Unit Substation (USS) 2-46.

This event is considered reportable pursuant to Title 10 of the Code of Federal Regulations, Section 50.73(a)(2)(i)(B).

Sincerely,

M. B. Roche
Director, TMI-2

EDS/emf

Attachment

cc: W. T. Russell - Regional Administrator, Region I
J. F. Stolz - Director, Plant Directorate I-4
L. H. Thonus - Project Manager, TMI Site
F. I. Young - Senior Resident Inspector, TMI

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