

James A. FitzPatrick  
Nuclear Power Plant  
268 Lake Road  
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Michael J. Colomb  
Site Executive Officer

July 26, 2000  
JAFP-00-0166

United States Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Station P1-137  
Washington, D.C. 20555

Subject: **Docket No. 50-333**  
**LICENSEE EVENT REPORT: LER-00-006 (DER-00-02678)**

**RPS Motor Generator Voltage Regulator Failure Causes Loss of "A" RPS Bus  
and ESF Actuation**

Dear Sir:

This report is submitted in accordance with 10 CFR 50.73(A)(2)(iv).

There are no commitments contained in this report.

Questions concerning this report may be addressed to Mr. Robert Steigerwald at (315) 349-6209.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Michael J. Colomb', written over a horizontal line.

MICHAEL J. COLOMB

MJC:RS:las  
Enclosure

cc: USNRC, Region 1  
USNRC, Project Directorate  
USNRC Resident Inspector  
INPO Records Center

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)

James A. FitzPatrick Nuclear Power Plant

## DOCKET NUMBER (2)

05000333

## PAGE (3)

1 OF 4

## TITLE (4)

RPS Motor Generator Voltage Regulator Failure Causes Loss of "A" RPS Bus and ESF Actuation

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
06	26	00	00	006	00	07	26	00	N/A	05000
									N/A	05000
OPERATING MODE (9)		N		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)						
POWER LEVEL (10)		100		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)(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
				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

Mr. Robert Steigerwald, Sr. Licensing Engineer

## TELEPHONE NUMBER (Include Area Code)

315-349-6209

## 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
X	EF	RG	G080	Y					

## SUPPLEMENTAL REPORT EXPECTED (14)

## EXPECTED

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 06/26/2000 at 23:21 with the reactor at approximately 100 percent power, the "A" Reactor Protection System (RPS) bus was de-energized due to an unplanned loss of power. The Electrical Protection Assembly (EPA) breakers that supply the RPS bus were found in a tripped condition. This condition re-occurred on July 3, 2000, with the same half scram and isolations.

In both events Operations transferred the RPS bus to the alternate transformer supply, and reset the half scram and isolations. Isolations and initiations as a result of the loss of power consisted of reactor building isolation, standby gas treatment initiation, reactor water cleanup isolation, isolation of primary containment drains, and containment vent and purge isolation.

Troubleshooting revealed that RPS motor-generator voltage regulator instability caused the output voltage to dip below the EPA breaker under-voltage trip setting. The safety significance was minimal, a plant transient did not occur and the plant equipment responded as designed.

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## TEXT CONTINUATION

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

EIIIS Codes in [ ]

**Description:**

On 06/26/2000 at 23:21 with the reactor at approximately 100 percent power, the "A" Reactor Protection System (RPS) [JC] bus was de-energized due to an unplanned loss of power. The Electrical Protection Assembly (EPA) breakers that supply the RPS bus were found in a tripped condition. The loss of power to the "A" RPS bus de-energized one-half of the RPS logic and one-half of the Primary Containment Isolation System (PCIS) [JM] logic. De-energizing half of the logic resulted in isolation of the reactor water cleanup [CE], primary containment [NH] drain, reactor water sample, reactor building [NG] ventilation [VA] systems, and initiation of the Standby Gas Treatment System (SBGT). De-energizing only one-half of the RPS logic does not cause a reactor scram or a main steam [SB] isolation due to the logic design. Operations transferred the RPS bus to the alternate transformer supply and reset the half scram and isolations. This condition re-occurred on July 3, 2000, with the same half scram and isolations.

**Cause:**

Initial troubleshooting relating to the 6/26/00 trip of the EPAs, lead to the replacement of an EPA logic card that was not resetting properly. Operator logs revealed that the voltage output of the RPS motor generator set was 2 volts lower than the nominal 122 VAC recommended. The EPA logic card was then replaced. After the card was replaced the voltage setting was found at 122 VAC. On 6/28/00 the RPS MG set was returned to service.

On the 6/28/00 dayshift the RPS voltage was logged at 123 VAC. On the 6/28/00 night shift the voltage was logged at 120 VAC. On 7/1/00 voltage was logged at 119 VAC. On 7/3 the "A" RPS EPA breakers tripped again on under-voltage. The RPS MG was found running with no load voltage at 118.13 VAC.

Troubleshooting and use of Kepner-Tregoe™ problem solving process were used to determine the cause. The troubleshooting and Kepner-Tregoe™ process results were reviewed with the equipment vendor. It was determined that the most probable cause was that RPS motor generator voltage instability caused voltage to dip below the EPA breaker under-voltage trip setting (Cause Code X). However, the voltage fluctuations could not be duplicated when the RPS MG output was connected to a resistive load bank and run for a 2 week period.

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

**Cause: (cont'd.)**

Ohm measurements taken between the anode and cathode of the silicon controlled rectifier (SCR) within the voltage regulator measured 1200 ohms in one direction. A reading of greater than 100K ohms was required. Ohm readings on a new regulator rectifier obtained from stock had similar results. Both regulators had capacitors with manufacturing date codes of 1978. The spare voltage regulator from stock was sent out for refurbishment and will be installed when delivered.

**Extent of Conditions:**

This problem could affect the opposite train of RPS. The "00B" RPS motor generator set voltage regulator is of same make and vintage.

**Analysis:**

The RPS system response and logic circuits functioned as designed. The safety significance of the event was minor, the RPS scram logic and Main Steam Isolation Valve logic did not actuate by design. Isolation of the reactor water cleanup [CE], primary containment [NH] drains, reactor water sample, reactor building ventilation systems, and initiation of the standby gas treatment system occurred, but had minimal impact on plant operations.

**Corrective Actions:**

1. The "A" RPS bus was transferred to the alternate power supply. Isolations and initiations were reset. The "A" RPS Motor Generator was connected to a test load, and run for two weeks with out re-appearance of the anomaly.
2. Troubleshooting and Kepner-Tregoe™ analysis were performed to determine cause.
3. Replace "A" RPS Motor Generator voltage regulator with one refurbished with recently manufactured electrolytic capacitors. **(Scheduled Completion Date: July 28, 2000)**

**LICENSEE EVENT REPORT (LER)**  
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**Corrective Actions: (cont'd.)**

4. Prepare a temporary modification to monitor "A" RPS Motor Generator set. **(Scheduled Completion Date: July 21, 2000)**
5. Replace "B" RPS Motor Generator voltage regulator with a refurbished one with recently manufactured electrolytic capacitors. **(Scheduled Completion Date: November 10, 2000)**

**Similar Events:**

LER-88-003, LER-98-14

**Failed Component:**

Voltage Regulator Manufacturer: General Electric  
Voltage Regulator Model Number: 3300A03B044  
Manufacturer EPIX (NPRDS) Code: G080

**Applicability to NEI 99-02 Rev. 0:**

This event did not result in a safety system functional failure, nor any other hit against the NRC performance indicators for the FitzPatrick plant.