

LICENSEE EVENT REPORT (LER)

Form Rev. 2.0

Facility Name (1) Quad Cities Unit 2	Docket Number (2) 0 5 0 0 0 2 6 5	Page (3) 1 of 4
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Title (4) An unplanned Engineered Safeguards Feature (ESF) actuated on Unit 2 when the "A" channel of the Reactor Protection System (RPS) bus de-energized, due to an aging related failure of a voltage regulator transformer that was not included in the Preventive Maintenance program.

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	2	1	7	1999	1999	0	0	1	0	0	0	3	1	5	1999		0	5	0	0	0				

OPERATING MODE (9) 1

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

POWER LEVEL (10)	1	0	0	20.402(b)	20.405(c)	X	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)	Other (Specify in
				20.405(a)(1)(iii)	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)	Abstract below and
				20.405(a)(1)(iv)	50.73(a)(2)(ii)		50.73(a)(viii)(B)	in Text
				20.405(a)(1)(v)	50.73(a)(2)(iii)		50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name Charles Peterson, Regulatory Affairs Manager, ext. 3609	TELEPHONE NUMBER AREA CODE 3 0 9 6 5 4 - 2 2 4 1
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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					
E	J	C	R	G	2	7	S	2	4	0	Y																			

SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)		Month	Day	Year
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO														

ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines) (16)

ABSTRACT:

At approximately 0020 on 02171999, with the reactor at 100% power, the 2A Reactor Protection System (RPS) bus Electrical Protection Assembly (EPA) 2AB-1 breaker tripped open on undervoltage. The 2A RPS bus was being supplied by the reserve electrical feed. An RPS channel 2A 1/2 scram, 1/2 group 1 and 1/2 group 2 isolations and a Reactor Water Cleanup system isolation occurred. As part of the Engineering Safeguards Feature (ESF) actuation and partial group 2 isolation, the expected Primary Containment Isolation (PCI) valves closed. The RPS bus was re-energized at 0036 on 02171999.

The cause of the EPA 2AB-1 breaker tripping was attributed to an undervoltage condition when the RPS bus reserve electrical feed Voltage Regulating Transformer (VRT) failed. The failure mode was aging of discreet components, i.e., a control transformer and circuit board contained within the transformer. The root cause was the fact that the VRT was not included in the preventive maintenance program. This original equipment was installed in 1982.

The control transformer and circuit board on Unit 2 were replaced on 02191999 and the VRT was returned to service. The control transformer in the VRT for Unit 1 is scheduled for replacement by 06301999. Engineering will determine what type and frequency of preventive maintenance that should be performed on the VRT's. There was no safety significance to this event. The failure of the RPS EPA breaker did not increase risk to the health and welfare of the public or to onsite personnel. The partial PCI group 1, 2 and 3 initiations occurred as expected and valves isolated, as required. All required ESF and emergency systems were fully capable of performing their design functions.

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TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]																	

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power.

EVENT IDENTIFICATION: An unplanned Engineered Safeguards Feature (ESF) actuated on Unit 2 when the "A" channel of the Reactor Protection System (RPS) bus de-energized, due to an aging related failure of a voltage regulator transformer that was not included in the Preventive Maintenance program.

A. CONDITIONS PRIOR TO EVENT:

Unit:	2	Event Date:	02171999	Event Time:	0020
Reactor Mode:	One	Mode Name:	Power Operation	Power Level:	100%

This report was initiated by Licensee Event Report 265/99-001.

Power Operation (1) - Mode switch in the RUN position with average reactor coolant temperature at any temperature.

B. DESCRIPTION OF EVENT:

On 02121999 at 0230, Operations transferred the 2A Reactor Protection System (RPS) [JC] bus on Unit 2 to its reserve electrical feed, per procedure QOP 7000-01, "Reactor Protection System MG Sets." This was done to support an Operational Analysis Department (OAD) calibration/functional-testing request of the Electrical Protection Assemblies (EPA) associated with the 2A RPS Motor Generator (MG) set. The OAD checks were satisfactory, and their work did not cause this system perturbation. The 2A RPS bus remained on its reserve electrical feed to support testing during the Unit 2 planned maintenance outage (Q2P02).

At approximately 0020 on 02171999, with the reactor at 100% power, the 2A RPS EPA 2AB-1 breaker tripped on undervoltage. An RPS channel 2A 1/2 scram, 1/2 group 1 and group 2 isolations and a Reactor Water Cleanup (RWCU) system group 3 isolation occurred. As part of the Engineering Safeguards Feature (ESF) actuation and partial group 2 isolation, the expected Primary Containment Isolation (PCI) valves closed. The RPS bus was re-energized at 0036 on 02171999. At 0105, Operations completed the actions of QOA 7000-1, "120 VAC Reactor Protection Bus Failure (one or both Buses)." The RWCU system, Control Room vents, and Reactor Building vents were left isolated and the Standby Gas Treatment remained in an operating mode. Following restoration of 2A RPS bus from its normal power supply, the 2-1705-2A Main Steam Line (MSL) Radiation Monitor failed downscale. Operations subsequently identified the Unit 2 RPS reserve Feed Voltage Regulating Transformer (VRT) [RG] [27] had failed.

Operations initiated Action Request (AR) # 990010511 for repair of the 2A MSL Radiation Monitor and AR #990010512 for repair of the U2 RPS reserve feed VRT.

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C. CAUSE OF THE EVENT:

The root cause of this event was the fact that the VRT's were not included in the site preventive maintenance program.

Troubleshooting per Work Request (WR) #990017559 by Electrical Maintenance, System Engineering, and the Vendor Representative found that discreet components of the VRT had failed. A short in the primary windings of the control power transformer caused an overvoltage surge to the circuit board, which led to the circuit board failure. Troubleshooting indicated the control power transformer windings were burned (open). No voltage was apparent at the output when voltage was applied to the input of the transformer.

The control transformer and the circuit board were sent to Commonwealth Edison's failure analysis group (C-Team) for analysis. Per the C-Team analysis, the failure mode of the control transformer is age and service time. As provided by the Vendor representative, the service life for this type of control transformer is approximately 18 years. This equipment has been in service since 1982 and has been energized approximately 95% of that time. Subsequent to this event, a review of the EPRI Guidelines for PM was completed on 03041999. No information for periodicity or type of PM that should be performed on this type of component was found.

D. SAFETY ANALYSIS:

There was no safety significance to this event. The failure of the RPS EPA breaker did not increase risk to the health and welfare of the public or to onsite personnel. The partial PCI group 1, 2 and 3 initiations occurred as expected and valves isolated, as required. All required ESF and emergency systems were fully capable of performing their design functions.

The 2A RPS bus was de-energized for approximately 0.25 hours (16 minutes).

E. CORRECTIVE ACTIONS:

Corrective Actions Completed:

1. The control transformer and the circuit board on Unit 2 were replaced under WR #990017559 on 02191999 and the VRT was subsequently returned to service.

Corrective Actions to be Completed:

1. The control transformer, in the Voltage Regulating Transformer for Unit 1, will be replaced by 06301999. (NTS 26518099SCAQ00001.01; Electrical Maintenance)
2. By 06301999, Engineering will determine what type and frequency of preventive maintenance that should be performed on the Voltage Regulating Transformers. (NTS 26518099SCAQ00001.02; Engineering)

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F. PREVIOUS OCCURRENCES:

LER 254/97-015, "The Electrical Protection Assembly failed due to aging and deterioration of the undervoltage release coil causing a loss of power to the Reactor Protection Bus 1B."

The cause of the failure was determined to be age-related. These breakers were installed at approximately the same time the VRT's were installed. All of the remaining original breakers were replaced (reference NTS 254-180-97-015.01). This is not related to the current failure of the VRT.

LER 254/97-012, "Loss of Shutdown Cooling Due To The Loss Of Power To The Reactor Protection Bus 2B."

This was due to the VRT output voltage drifting low and causing the EPA to trip on undervoltage. The VRT was cleaned and adjusted per WR #70123496. This is not related to the current failure of the VRT.

Problem Identification Form (PIF) 96-1856, from May 1996, describes the 1B RPS bus de-energizing due to a spurious trip of the 1B-2 EPA. The PIF investigation could find no cause for the trip.

A search of the internet INPO database found no similar industry events.

G. COMPONENT FAILURE DATA:

Solatron Line Voltage Regulator
 Part No. 33-16-325
 Model No. A4S25