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Quad Cities Nuclear Power Station
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April 1, 2005

SVP-05-023

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

Quad Cities Nuclear Power Station, Units 1 and 2
Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Licensee Event Report 254/05-001, "4160 Volt Relaying and Metering Single Failure Vulnerability"

Enclosed is Licensee Event Report (LER) 254/05-001, "4160 Volt Relaying and Metering Single Failure Vulnerability," for Quad Cities Nuclear Power Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(ii)(B), which requires reporting of any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety, and Part 50.73 (a)(2)(i)(B), which requires the reporting of any operation or condition that was prohibited by the plant's Technical Specifications.

Should you have any questions concerning this report, please contact Mr. W. J. Beck at (309) 227-2800.

Respectfully,



Timothy J. Tulon
Site Vice President
Quad Cities Nuclear Power Station

cc: Regional Administrator – NRC Region III
 NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

JE22

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

1. FACILITY NAME Quad Cities Nuclear Power Station, Unit 1	2. DOCKET NUMBER 05000 254	3. PAGE 1 OF 5
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4. TITLE
4160 Volt Relaying and Metering Single Failure Vulnerability

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	03	2005	2005	- 001 -	00	04	01	2005	Quad Cities Nuclear Power Station, Unit 2	05000265
									FACILITY NAME	DOCKET NUMBER
									N/A	05000 N/A

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)									
10. POWER LEVEL 085%	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER							
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Wally Beck, Regulatory Assurance Manager	TELEPHONE NUMBER (Include Area Code) (309) 227-2800
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

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

On February 3, 2005, at 1819 hours (CST), with Unit 1 at approximately 85 percent power and Unit 2 at approximately 85 percent power, Quad Cities Engineering personnel confirmed that a single failure vulnerability existed on 4160 Volt Relaying and Metering transformers on both units. The single failure vulnerability defeated the independence of the offsite alternating power supplies. If this failure occurred during a Loss of Coolant Accident, the Residual Heat Removal Service Water system pumps may not have been able to be start within the required ten minutes. The single failure vulnerability was removed on February 4, 2005, at 0152 hours, and the affected plant equipment was declared operable.

The root cause of this event was determined to be an existing latent design deficiency. The corrective action to prevent reoccurrence is currently in place in the Configuration Change procedures used to install new designs at Quad Cities Nuclear Power Station.

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor, 2957 Megawatts Rated Core Thermal Power
 Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

EVENT IDENTIFICATION

4160 Volt Relaying and Metering Single Failure Vulnerability

A. CONDITION PRIOR TO EVENT

Unit: 1	Event Date: February 3, 2005	Event Time: 1819 hours
Reactor Mode: 1	Mode Name: Power Operation	Power Level: 085%
Unit: 2	Event Date: February 3, 2005	Event Time: 1819 hours
Reactor Mode: 1	Mode Name: Power Operation	Power Level: 085%

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

B. DESCRIPTION OF EVENT

On January 27, 2005, Crystal River Unit 3 reported to the NRC, in Event Notification Report Number 41362, a design deficiency in a common metering circuit such that a postulated single failure would result in the loss of all offsite and onsite AC power to both divisions of safety related distribution buses. The initial Quad Cities' reviews focused on a spurious ground on the common circuitry. These initial reviews identified that grounds would not have an adverse impact on the circuitry. Similar reviews were conducted at other Exelon sites. On February 1, 2005, LaSalle Station identified that its circuitry was vulnerable to a single failure vulnerability that was due to spurious open circuits (Event Notification Report Number 41366). Quad Cities Nuclear Power Station expanded the review of the design for an open circuit single failure vulnerability.

On February 3, 2005, at 1819 hours (CST), with Unit 1 at approximately 85 percent power and Unit 2 at approximately 85 percent power, Quad Cities Engineering personnel confirmed that a single failure vulnerability existed on 4160 Volt Relaying and Metering transformers associated with the Unit Auxiliary Transformers (UATs) [XFMR] and Reserve Auxiliary Transformers (RATs) on both units. Although the Relaying and Metering transformers were fully functional at that time, failure of the Relaying and Metering transformers circuitry could have caused the neutral overcurrent relay to trip and lock out the main, reserve and cross-tie feed breakers. These combined protective relay trips would have acted to trip and lock out the circuit breakers supplying electrical feeds to Buses 13 (23) and 14 (24) [EA], essentially isolating these buses from their normal and emergency power

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sources. Emergency power from the Emergency Diesel Generators (EDGs) [EK] would have been available to safety related Buses 13-1 (23-1) and 14-1 (24-1) [EB], but the Residual Heat Removal Service Water (RHRSW) system [BI], which is fed from Buses 13 (23) and 14 (24), would have remained without a power source. If this failure occurred during a Loss of Coolant Accident, then the RHRSW pumps may not have been able to start within the required ten minutes. These events were promptly reported to the NRC in accordance with 10CFR50.72(b)(3)(v)(B), "Any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat," and 10CFR50.72(b)(3)(ii)(B), "Any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degrades plant safety." Subsequent investigations have since revealed that there was not a potential loss of safety function as a result of these events.

The single failure vulnerabilities were removed on February 4, 2005, at 0152 hours, and the affected equipment was declared operable.

These events are being reported in accordance with:

10 CFR 50.73(a)(2)(ii)(B), "Any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety," as the single failure vulnerabilities defeated the single failure design of plant systems, and

10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications," as the single failure vulnerability rendered Technical Specification equipment inoperable for a period of time that exceeded Technical Specification Required Action Times.

C. CAUSE OF EVENT

The root cause of these events was determined to be an existing latent design deficiency. Additionally, this design deficiency was not identified in design reviews performed for subsequent modifications, which allowed the systems to continue to be deficient for a common single failure.

The original design met the engineering standard practice of the time (the late 1960's and early 1970's) and was designed prior to the issuance of many of the IEEE standards related to nuclear power stations. This design can also be found in non-nuclear facilities of similar vintage. The initial design contained the above described single failure vulnerability.

The purpose of interconnecting the transformers was to obtain power readings from the UAT / RAT for totalization. These meters were a precursor to the revenue metering of today, and were used for internal utility accounting purposes. The transformers used for the totalizer were not required to be as accurate as those used for revenue metering. The preferred practice was to use separate transformers for metering and relaying; however, it was not uncommon, due to space limitations, cost, or retrofits, to use relaying transformers for metering and to interconnect them in this configuration.

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Quad Cities has performed reviews of and modifications to the plant's electrical distribution system since initial operation. An evaluation of these opportunities that could have previously discovered the above described single failure vulnerabilities concluded that the discovery was unlikely.

D. SAFETY ANALYSIS

The safety significance of the event is minimal. The single failure to which the 4160 Volt Relaying and Metering transformers associated with the UATs and RATs on both units were vulnerable is not a typical or likely failure mode, and has not occurred historically at Quad Cities. Therefore, the consequences of this event had minimal impact on the health and safety of the public and reactor safety.

E. CORRECTIVE ACTIONS

The Corrective Action to Prevent Recurrence is currently in place in the Configuration Change procedures used to install new designs at Exelon facilities. Separation and Station Single Point Vulnerability reviews and failure mode and effect conditions are part of the preparation and review process contained in existing Exelon procedures. The existing Exelon Human Performance Technical Rigor Standards would also mitigate this situation.

Immediate Corrective Actions:

Temporary modifications were installed to eliminate the single failure vulnerability on both units.

Corrective Actions to be completed:

A permanent modification to the circuitry to eliminate the single failure vulnerability will be designed and installed.

The AC, DC, and EDG systems will be reviewed for latent design deficiency conditions similar to this event.

This event will be reviewed as part of a briefing/discussion to raise awareness of common circuits and the potential to affect more than one train of equipment.

A description of this event will be included in continuing engineering training to raise awareness of common circuits and the potential to affect more than one train of equipment.

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F. PREVIOUS OCCURRENCES

A review of Quad Cities Nuclear Power Station LERs identified no similar events.

G. COMPONENT FAILURE DATA

There were no component failures associated with this issue.