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February 28, 2006

SVP-06-014

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

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

Subject: Licensee Event Report 265/05-002, "Main Steam Relief Valve Actuator Degradation"

Enclosed is Licensee Event Report (LER) 265/05-002, "Main Steam Relief Valve Actuator Degradation," 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)(v)(D), which requires the reporting of any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident; Part 50.73(a)(2)(i)(A), which requires the reporting of completion of a shutdown required by Technical Specifications; Part 50.73(a)(2)(i)(B), which requires the reporting of any operation or condition prohibited by Technical Specifications; and Part 50.73(a)(2)(vii), which requires the reporting of any event where a single cause or condition caused at least two independent trains or channels to become inoperable in a single system.

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

IE22

NRC FORM 366 (7-2001)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004, Estimated burden per response to comply with this mandatory information 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 Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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.					
<b>LICENSEE EVENT REPORT (LER)</b>										
1. FACILITY NAME Quad Cities Nuclear Power Station Unit 2					2. DOCKET NUMBER 05000265			3. PAGE 1 of 5		
4. TITLE Main Steam Relief Valve Actuator Degradation										
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME Quad Cities Nuclear Power Station Unit 1	DOCKET NUMBER 05000254
12	30	2005	05	002	00	02	28	2006	FACILITY NAME N/A	DOCKET NUMBER 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 024		20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)		
		20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)		
		20.2203(a)(1)		50.36(c)(1)(i)(A)		50.73(a)(2)(iv)(A)		73.71(a)(4)		
		20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)		
		20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A		
		20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)				
		20.2203(a)(2)(iv)		X 50.73(a)(2)(i)(A)		X 50.73(a)(2)(v)(D)				
		20.2203(a)(2)(v)		X 50.73(a)(2)(i)(B)		X 50.73(a)(2)(vii)				
		20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)				
		20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)				
12. LICENSEE CONTACT FOR THIS LER										
NAME Wally Beck, Regulatory Assurance Manager					TELEPHONE NUMBER (Include Area Code) (309) 227-2800					
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						15. EXPECTED SUBMISSION DATE		MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)						NO		05	12	2006

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

Between December 30, 2005, and January 19, 2006, each unit at Quad Cities Nuclear Power Station was shut down twice to inspect and/or repair Main Steam Line Electromatic Relief Valve (ERV) actuators. The apparent cause of the actuator damage is excessive main steam line vibration during operation at Extended Power Uprate (EPU) power levels. The investigation into the root cause of the issue is ongoing. A supplemental report will be submitted following completion of the root case investigation.

The safety significance of this issue is minimal. The eight Main Steam Line Safety Valves and the Target Rock Safety/Relief Valve were not affected by this issue, and remained operable throughout these events. Additionally, for the most limiting case two ERVs were available.

The ERV actuators have been rebuilt in accordance with enhanced guidance prepared based on the results of the ERV actuator inspections. Both Unit 1 and Unit 2 are limited to pre-EPU power levels until the ERV root cause evaluation is complete, necessary corrective actions implemented, and a meeting has been held with the NRC to discuss these actions.

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

**PLANT AND SYSTEM IDENTIFICATION**

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

**EVENT IDENTIFICATION**

Main Steam Relief Valve Actuator Degradation

**A. CONDITION PRIOR TO EVENT**

Unit: 1	Event Date: January 6, 2006	Event Time: 1900 hours
Reactor Mode: 1	Mode Name: Power Operation	Power Level: 085%
Unit: 2	Event Date: December 30, 2005	Event Time: 0900 hours
Reactor Mode: 1	Mode Name: Power Operation	Power Level: 024%

**B. DESCRIPTION OF EVENT**

On December 21, 2005, the 2-0203-3D Main Steam Electromatic Relief Valve (ERV) [RV] [SB] was declared inoperable due to the inability to determine whether or not a 125 VDC negative ground was affecting the valve control circuit. Operations personnel entered Technical Specification Limiting Condition of Operation (LCO) 3.4.3 Condition A and 3.5.1 Condition G for an inoperable safety relief valve, which placed Unit 2 in a 14-day allowed outage time (AOT). Station personnel continued troubleshooting efforts to determine the effect and precise circuit location of the negative ground.

On December 30, 2005, a load drop was initiated to allow personnel to enter the Unit 2 drywell to conduct an inspection of the 3D ERV. The inspection team found internal damage in the 3D ERV solenoid [SOL] actuator, and a unit shutdown was initiated at 0900 hours.

Inspections of the other three Unit 2 ERV solenoid actuators were conducted. Significant wear and some loose parts were identified on the 3B, 3C and 3E ERV actuators. These ERV actuators were electrically stroked from the main control room one time prior to the initial inspections and two more times after the initial inspections, with personnel in attendance to verify operation of the actuators; however indications of an open valve via control room annunciation and sequence of event recorder (SER) computer points were not received for the 3C and 3E valves.

All four ERV solenoid actuators were replaced with rebuilt actuators and Unit 2 was synchronized to the grid on January 1, 2006, and returned to pre-Extended Power Uprate (pre-EPU) power (approximately 2511 Mwt) on January 3, 2006.

On December 31, 2006, power was decreased on Unit 1 to pre-EPU power as a conservative measure. On January 6, 2006, based on the results of the Unit 2 ERV actuator inspections, a Unit 1 shutdown was initiated to perform an extent of condition (EOC) review. Unit 1 was taken off line at 0001 on January 7, 2006.

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Three of the four Unit 1 ERVs were declared inoperable based on unsuccessful actuator stroke tests or inspection results. Loose hardware and spring guidepost wear were noted on all four of the ERV solenoid actuators. All four Unit 1 ERV actuators were removed and quarantined for further evaluation. Rebuilt actuators were installed and stroke tested satisfactorily. Unit 1 was synchronized to the grid on January 8, 2006, and returned to pre-EPU power on January 9, 2006.

During inspections of the quarantined Unit 1 ERV actuators, it was noted that the actuator pivot plate bolting was worn. This condition created the potential for failure of the actuator to function as designed. Procedure reviews conducted in light of this information determined that the pivot plate bolts were not normally inspected. This brought into question the continued operability of the refurbished and currently installed Unit 2 ERV actuators. Unit 1 was not immediately called into question because new pivot plate bolts had just been installed during the January 7, 2006, shutdown.

On January 14, 2006, Unit 2 was shut down for inspection of the ERV actuator pivot plate bolts. During the as-found stroke testing, the 3D ERV actuator stroked once and then became bound. The cause of this condition was determined to be over-tightening of the roller plunger and ERV actuator equipment tolerances. Changes were made to the guidance for rebuilding the actuators, and the removed Unit 2 ERV actuators were then rebuilt using the new rebuild criteria and reinstalled.

Also during the Unit 2 shutdown, an inspection was conducted on the support between the ERV main valve and the ERV pilot valve. This support is referred to as the turnbuckle. The inspection identified that both valve and pilot side turnbuckle tack welds had cracked on the 3D ERV. Because cracked turnbuckle tack welds might be a precursor to fretting wear of the turnbuckle threads, the turnbuckle was removed and further analyzed on site, and fretting wear was identified.

As a result of the roller-plunger over-tightening issue identified on Unit 2, the Unit 1 ERVs were declared inoperable. On January 15, 2006, Unit 1 was shut down and the Unit 1 ERV actuators were satisfactorily stroke tested in place. The Unit 1 ERV turnbuckles were inspected with no cracks found on the tack welds. The Unit 1 ERV actuators were replaced with actuators rebuilt in accordance with the new criteria developed in response to the Unit 2 issues. Also, the Unit 1 3D ERV was replaced due to high tailpipe temperatures experienced during the previous start up.

Both Unit 1 and Unit 2 were returned to power operation on January 19, 2006.

**C. CAUSE OF EVENT**

The apparent cause of the ERV actuator damage was high main steam line vibration during operation at EPU power levels. The root cause evaluation is in progress. The root cause will be included in the supplemental LER to be submitted following completion of the root cause evaluation.

**D. SAFETY ANALYSIS**

The risk to overall plant operation was minimal.

In the first Unit 2 outage, one ERV was inoperable. The Target Rock Safety/Relief Valve (S/RV), the 3B, 3C and 3E ERVs and all eight of the safety valves were

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operable and available during this event.

In the first Unit 1 outage, three ERVs were found to be inoperable. The S/RV, the 3E ERV and all eight of the safety valves were operable during this event. The 3B ERV was determined to be available for operation after the first initial stroke. The 3C valve was available for the initial stroke, but not for subsequent strokes. Based on this, the 3C valve was available for the probabilistic risk assessment (PRA) function of manual depressurization of the reactor (ADS). Therefore, although three valves were inoperable, only two valves were unavailable for the PRA manual depressurization function.

In the second Unit 2 outage, one electromatic relief valve was inoperable. The S/RV, the 3B, 3C and 3E ERVs and all eight of the safety valves were operable and available during this event.

In the second Unit 1 outage, all ERVs were operable.

The limiting event was the Unit 1 outage on January 7, 2006, in which two of four ERVs were available. Exelon had a probabilistic risk assessment performed based on 147 days of Unit 1 EPU operation. The conclusion of the Exelon analysis was that the risk for the event was green. This includes internal events Core Damage Frequency (CDF), internal events Large Early Release Frequency (LERF), and external events.

This LER is being submitted in accordance with:

- 10 CFR 50.73(a)(2)(i)(A), Completion of shutdown required by TS, (January 15, 2006, Unit 1 shutdown - ENS call made January 15, 2006, at 1136 hours, in accordance with 10 CFR 50.72(b)(2)(i))
- 10 CFR 50.73(a)(2)(i)(B), Operation or condition prohibited by TS, (December 30, 2005, Unit 2 shutdown, and January 6, 2006, Unit 1 shutdown)
- 10 CFR 50.73(a)(2)(v)(D), Any event or condition that could have prevented the fulfillment of a safety function, (January 6, 2006, Unit 1 shutdown)
- 10 CFR 50.73(a)(2)(vii), Single cause inoperability of independent trains or channels, (January 6, 2006, Unit 1 shutdown)

**E. CORRECTIVE ACTIONS**Corrective Actions Completed:

The ERV actuators on Unit 1 and Unit 2 have been rebuilt in accordance with the guidance incorporating the results of the inspections.

Unit 1 and Unit 2 are being limited to pre-EPU power until the ERV root cause evaluation is complete, necessary corrective actions implemented, and a meeting has been held with the NRC to discuss these actions.

Corrective Actions to be Completed:

The root cause evaluation for this issue is in progress. Corrective actions will be included in the supplemental LER to be submitted following completion of the root cause evaluation.

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**F. PREVIOUS OCCURRENCES**

The root cause evaluation for this issue is in progress. Previous occurrences will be included in the supplemental LER to be submitted following completion of the root cause evaluation.

**G. COMPONENT FAILURE DATA**

The valves are 6 inch, model 1525VX relief valves manufactured by Dresser Industries. The root cause evaluation for this issue is in progress. Block 13 on Page 1 will be completed in the supplemental LER to be submitted following completion of the root cause evaluation.