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Quad Cities Generating Station
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February 18, 2000

SVP-00-034

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

Enclosed is Licensee Event Report (LER) 265/00-001, Revision 00, 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)(A). The licensee shall report any event or condition that could have prevented a Reactor shutdown and maintenance of safe shutdown.

We are committing to the following actions:

During planned operations of valve 0-2901-7 and 1-2901-8 the lower end of the bushing will be observed to detect any bushing rotation. This action will not be required after completion of inspection of the yoke bushing staking.

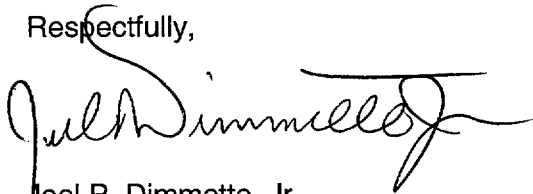
The yoke bushing staking for the 0-2901-7 and 1-2901-8 valves will be inspected and repaired as necessary.

Any other actions described in the submittal represent intended or planned actions by Commonwealth Edison (ComEd) Company. They are described for the NRC's information and are not regulatory commitments.

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Should you have any questions concerning this letter, please contact Mr. C.C. Peterson at (309) 654-2241, extension 3609.

Respectfully,

A handwritten signature in black ink, appearing to read "Joel P. Dimmette, Jr.", with a stylized flourish at the end.

Joel P. Dimmette, Jr.
Site Vice President
Quad Cities Nuclear Power Station

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

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 0 5											
Title (4) Safe Shutdown Makeup Pump Injection Valve Inoperable due to Failure to Use Vendor Manual for Correct Staking of Yoke Bushing																									
Event Date (5)			LER Number (6)					Report Date (7)			Other Facilities Involved (8)														
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Docket Number(s)																
0	1	1	9	2000	2000	0	0	1	0	0	0	2	1	8	2000	0	5	0	0	0	2	5	4		
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)	0	8	5	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(c)	50.36(c)(1)	50.36(c)(2)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vii)	50.73(a)(2)(viii)(A)	50.73(a)(viii)(B)	50.73(a)(2)(x)	73.71(b)	73.71(c)	Other (Specify in Abstract below and in Text)	
																	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										
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		I	N	J				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:

On January 19, 2000, the Safe Shutdown Makeup Pump (SSMP) Unit 2 injection valve was determined to be inoperable due to the failure of the yoke bushing to remain staked to the yoke. The operator was removed from the valve, the bushing was returned flush to the yoke and staked and the operator was re-installed. A motor operated valve diagnostic test was performed on the valve for post maintenance testing and the SSMP system was declared operable.

This failure was determined to be the result of inadequate staking of the bushing in August, 1993, due to failure to utilize vendor documentation.

This event was not safety significant. The SSMP system is a backup to the Reactor Core Isolation Cooling system, which was operable and available throughout this event. Also, the complete failure of the valve to operate occurred only after the system was removed from service for maintenance.

The only other two valves of this design in the plant have been visually examined and are operable. The yoke bushing staking will be inspected and repaired as necessary.

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FACILITY NAME (1)	DOCKET NUMBER (2)								LER NUMBER (6)				PAGE (3)							
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Quad Cities Unit 2	0	5	0	0	0	2	6	5	2000		0	0	1		0	0	2	of	0	5
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:

Safe Shutdown Makeup Pump Injection Valve Inoperable due to Failure to Use Vendor Manual for Correct Staking of Yoke Bushing

A. CONDITIONS PRIOR TO EVENT:

Unit:	2	Event Date:	January 19, 2000	Event Time:	1455 hours
Reactor Mode:	1	Mode Name:	Power Operation	Power Level:	85%

This report was initiated by Licensee Event Report 265/00-001

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

B. DESCRIPTION OF EVENT:

In April of 1993, maintenance was performed on the Safe Shutdown Makeup Pump (SSMP) [P] Unit 2 injection (2-2901-8) valve [INV] to correct seat leakage through the valve. This maintenance involved a complete disassembly of the valve, including removal of the valve yoke and removal of the welded valve bonnet. Also, the need to replace the yoke bushing was identified during this maintenance, and the bushing was replaced. Although additional maintenance has been performed on this valve since April 1993 and prior to August 1999, it did not impact the yoke bushing.

On August 31, 1999, after performing a non-Environmental Qualification Limitorque Motor Operated Valve (MOV) inspection for periodically scheduled preventive maintenance on the operator for the 2-2901-8 valve, Operations Department personnel noted elevated pressure and temperature on the discharge piping of the SSMP system. This piping is normally depressurized and at ambient temperature, but has the potential to reach elevated pressure and temperature due to its connection to the feed water header via the High Pressure Coolant Injection (HPCI) [BJ] discharge piping. It was determined that the system was capable of performing its required function with no concerns, and a subsequent walk down of the system by the System Engineer determined that the back leakage was coming through the Unit 2 injection line. The 2-2901-8 valve was manually torqued closed per procedure and an action item (AR 990048433) was written to adjust the close limit switch.

When the 2-2901-8 valve was first stroked under AR 990048433 on January 19, 2000, it was noted that the close limit switch [33] was not set properly and was stopping the motor operator before the valve was fully closed. The limit was reset, but the setting was not repeatable during subsequent operation of the valve to verify the setting. On further investigation, it was noted that the yoke bushing was rotating during valve motion and that a significant portion had become unthreaded from the bottom of the yoke. In this valve and operator type the yoke bushing is to remain stationary and serves the same function as the stem nut in other operator designs; i.e. converts operator

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Quad Cities Unit 2	0	5	0	0	0	2	6	5	2000	0	0	1	0	0	3	of	0	5
TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]																		

torque into stem thrust. During the troubleshooting, the yoke bushing became unthreaded to the point that the valve could no longer be moved, either electrically or mechanically.

The SSMP was declared inoperable to Unit 2 since the valve could not be fully opened to allow flow to Unit 2. It was subsequently declared inoperable to Unit 1 when it was determined that the valve could not be held in the closed position to prevent diversion of flow from Unit 1. A walk down was performed by the System Engineer on two other valves in the SSMP system of identical design to determine if a similar condition existed; 0-2901-7, SSMP test return valve and 1-2901-8, Unit 1 injection valve. There was no evidence that the yoke bushing of either valve had begun to unthread from the yoke.

When the operator was removed from the valve on January 20, 2000, it was determined that the valve design relied on the staking of the yoke bushing to the yoke to prevent rotation of the bushing. The bushing was returned flush to the yoke, staked and the operator re-installed. A motor operated valve diagnostic test was successfully performed on the valve for post maintenance testing and the SSMP system declared operable.

The inadequate staking of the yoke bushing most likely existed since the overhaul of the valve in 1993. The staking of the yoke bushing cannot be directly observed with the operator installed on the valve. In addition, rotation of the yoke bushing would not be noticed by normal monitoring of the valve during operation. The lower end of the bushing is normally recessed in the yoke and can only be observed with a directed light and the observer positioned to look underneath the valve yoke.

C. CAUSE OF THE EVENT:

The root cause for this event is most likely the failure to use the appropriate vendor documentation during the 1993 overhaul of the 2-2901-8 valve.

The 2-2901-8 valve failed to stroke after the failure of the staking of the yoke bushing to yoke occurred and allowed the bushing to rotate in the yoke. In February 1997, 33 ft-lbs was required to close the valve. In September 1999, after the problem was first noted, there was no obvious change in the condition of the valve and operator, since a comparable value of 35 ft-lbs was required to operate the valve in the close direction. The vendor has indicated that these torque values are in an acceptable range. This information indicates that the yoke bushing had not experienced excessive torque, and the staking failed because it was not performed properly.

The appropriate vendor manual was not referenced in the work package for the valve overhaul although it appears to have existed at the time. Due to the age of the work request, it cannot be determined specifically why the vendor manual was not referenced.

Therefore, the most likely root cause for this event is the failure to use the appropriate vendor documentation during the 1993 overhaul of the 2-2901-8 valve.

The specific nature of the failure is limited to rising, rotating stem valves. As previously noted there are two other SSMP valves of identical design. There are no other known motor operated, rising, rotating stem valves in the plant.

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Quad Cities Unit 2	0	5	0	0	0	2	6	5	2000		0	0	1		0	0	4	of	0	5
TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]																				

D. SAFETY ANALYSIS:

The SSMP is a single train system designed to supply demineralized makeup water from the Contaminated Condensate Storage Tank (CCST) [TK] [KA] to the reactor vessel [RPV]. Although the SSMP is a single train system, it functions as a backup to the Reactor Core Isolation Cooling (RCIC) [BN] system to satisfy the requirements of 10 CFR 50, Appendix R, Section III.G, "Fire Protection of Safe Shutdown Capability." The SSMP system does not provide a heat removal function, as the decay heat removal is provided by the Residual Heat Removal system as described in sections 3.1 and 4.0 of the Safe Shutdown Report. The SSMP is not credited in any accident analysis.

The RCIC system was operable and available throughout this event. Also, the complete failure of the 2-2901-8 valve to operate occurred only after the system was removed from service for maintenance in accordance with Technical Specifications.

Therefore, there were no significant safety consequences from this event.

E. CORRECTIVE ACTIONS:

Corrective Actions Completed:

The operator was removed from the 2-2901-8 valve, the bushing was returned flush to the yoke and staked and the operator was re-installed. A motor operated valve diagnostic test was performed on the valve for post maintenance testing and the SSMP system was declared operable.

Corrective Actions to be Completed:

- (1) During planned operations of valve 0-2901-7 and 1-2901-8 the lower end of the bushing will be observed to detect any bushing rotation. This action will not be required after completion of inspection of the yoke bushing staking.
- (2) The yoke bushing staking for the 0-2901-7 and 1-2901-8 valves will be inspected and repaired as necessary. (AR 990074861 and AR 990074864, respectively)

F. PREVIOUS OCCURRENCES:

The station event database was searched for the past two years. In addition, INPO and NRC documents in the OPEX database were searched for events similar to this one with respect to the rotation of the yoke bushing and the failure to use vendor documentation. Searches were also performed on the EPIX and NPRDS databases for similar component failures. The only failure found of an apparently similar valve was documented in SER 02-80: Stem Bushing Failure in Target Rock Valves. Due to the age of this event and the difference in valve manufacturers, this is not considered industry experience that should have prevented the failure of the 2-2901-8 valve.

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Quad Cities Unit 2	0 5 0 0 0 2 6 5	2000	0 0 1	0 0	5 of 0 5
TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]					

G. COMPONENT FAILURE DATA:

The 2-2901-8 valve is a Rockwell Edward Forged Steel Univalve, model number 4-B36128MT4.