

LICENSEE EVENT REPORT (LER)

Facility Name (1) <b>QUAD-CITIES NUCLEAR POWER STATION, UNIT TWO</b>										Docket Number (2) <b>0 5 0 0 0 2 6 5</b>					Page (3) <b>1 of 0 4</b>				
Title (4) <b>UNIT TWO SCRAM WHILE IN COLD SHUTDOWN WHEN LOWERING REACTOR LEVEL - INADEQUATE PROCEDURE</b>																			
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 8	1 7	8 7	8 7	0 1 1 0	0 1 0	0 8	1 7	8 7			0 5 0 0 0 1 1								
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																
POWER LEVEL (10) <b>0 0 0</b>			20.402(b)		20.405(c)		<input checked="" type="checkbox"/> 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 Abstract below and in Text)										
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)												
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)												
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(ix)												
LICENSEE CONTACT FOR THIS LER (12)																			
Name <b>K. J. Hill, Technical Staff Engineer, Extension 2150</b>										TELEPHONE NUMBER AREA CODE <b>3 0 9</b> <b>6 5 4</b> - <b>2 2 4 1</b>									
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																			
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPD										
SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)									
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)																			

On August 17, 1987, Unit Two was in the SHUTDOWN mode at zero percent reactor power. At 2110 hours, a low reactor water level scram and Group II and III isolation occurred while lowering reactor vessel water level. The reactor water level was restored above the low level trip point in approximately one minute. NRC notification was completed at 2145 hours to satisfy the requirements of 10 CFR 50.72.

The cause for this event was determined to be procedural inadequacy. At the time of the event, there was no procedure for lowering reactor water level with the reactor water cleanup (RWCU) system not available. Therefore, when it became necessary to lower the reactor water level, adequate precautions and/or instructions were not provided and this resulted in the low reactor water level scram. Contributing to this event was insufficient planning and coordination.

Corrective actions include development of a procedure to describe the method to lower reactor water level during cold shutdown conditions (with RWCU system not available) and operating personnel will be interviewed to determine if any other operations are performed which may not be controlled by procedures. New procedures will be written as necessary. In addition the industry operating experience reports of similar draining events will be reviewed to determine if additional action is needed. This report is submitted to comply with the requirements of 10 CFR 50.73 (a)(2)(iv).

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PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power. Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

EVENT IDENTIFICATION:

Reactor Scram occurred while in cold shutdown condition when lowering reactor water level due to inadequate procedure.

A. CONDITIONS PRIOR TO EVENT:

Unit: Two	Event Date: August 17, 1987	Event Time: 2110
Reactor Mode: One	Mode Name: Shutdown	Power Level: 0%

This report was initiated by Deviation Report D-4-2-87-041

Shutdown Mode (1) - In this position, a reactor scram is initiated, power to the control rod drives is removed, and the reactor protection trip systems have been deenergized for 10 seconds prior to permissive for manual reset.

B. DESCRIPTION OF EVENT:

At 1910 hours, on August 17, 1987, Quad Cities Unit Two was in the SHUTDOWN mode at zero percent reactor thermal power. At this time, the Reactor Water Cleanup System (RWCU)[CE] was taken out of service for maintenance. Since the RWCU system is the normal means of removing water from the reactor and the only known source of water addition to the reactor vessel at that time was the Control Rod Drive System (CRD)[AA], the CRD system was isolated at 1905 hours, prior to removing the RWCU system from service at 1910 hours. Approximately 10 to 15 minutes after isolating the RWCU system, the reactor water level had increased from the normal level of 30 inches to a level of 35 inches. At this time, the feedwater inlet valves [SJ, ISV], 2-3205A and B were closed to eliminate possible leakage through the feedwater regulating valves [LCV]. The isolation of the feedwater inlet valves slowed the rate of reactor water level increase.

The Shift Engineer (SE), Shift Control Room Engineer (SCRE), and Unit Two Nuclear Station Operator (NSO) discussed possible methods for rejecting water from the reactor vessel in order to prevent a reactor water high level trip (+48 inches)[JC] and to keep the vessel level within the scale of the narrow range level instrumentation [LIC] (+60 inches). It was determined that water could be drained from the reactor vessel, through the Shutdown Cooling Suction valves [BO, 20], 2-1001-47, 50, through the Residual Heat Removal system (RHR)[BO] to the suppression pool [NH] using the RHR System Test Return valves [TV], 2-1001-34A, 36A. This method of draining would not require operation of the RHR pumps. The operating shift was aware that this operation could cause rapid decrease of water level if not properly controlled, but this method had been used on prior occasions successfully.

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Approximately two hours later, the reactor water level had reached approximately 41 inches. The SCRE and NSO then decided to lower the level to 30 inches by the previously discussed method.

With the SCRE at panel [PL] 902-5, the NSO went to panel 902-3 and opened valve 2-1001-34A. The shutdown cooling suction valves were already open and the RHR pumps were off. When valve 2-1001-34A was full open, the NSO jogged open valve 2-1001-36A for two or three seconds. Valve 2-1001-36A is a throttle valve and was the intended means of controlling the rate of reactor water removal. The NSO then proceeded to panel 902-5 to check the reactor water level trend. As the NSO reached panel 902-5, the SCRE alerted him that the level was dropping more rapidly than expected and the reactor low water level alarm [ALM] (+18 inches) was received. The NSO returned immediately to panel 902-3 and started valve 2-1001-34A closed (seal-in) and began closing valve 2-1001-36A. Before valve 2-1001-36A was fully closed, the NSO moved to panel 902-6 to open the feedwater supply valves (seal-in), then returned to panel 902-3 to complete closing of valve 2-1001-36A. Valve 2-1001-36A was fully closed approximately two seconds after returning to panel 902-3 and total closure time was estimated to be ten seconds.

At 2110 hours, on August 17, 1987, a low reactor water level scram was received with Group II [JC] and Group III [JC] isolation signals. In addition, the following automatic actions occurred as designed due to low reactor water level:

1. The Control Room Ventilation System [VI] went to the 100 percent recirculation mode.
2. Unit One and Two Reactor Building Ventilation System [VA] isolated.
3. Standby Gas Treatment System (SBGT) [BH] started.

The reactor water level decreased to one inch as observed by the SCRE before reversing. The process computer showed the rate of level decrease from 35 inches to 18 inches in 14 seconds. The reactor water level was restored above the low level trip point in approximately one minute. NRC notification via the Emergency Notification System (ENS) was completed at 2145 hours to satisfy the requirements of 10 CFR 50.72. All systems were promptly restored to normal.

**C. APPARENT CAUSE OF EVENT:**

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(iv), which requires the reporting of "any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

The cause of this event has been attributed to inadequate procedures. At the time of the event, there was no written and approved procedure for lowering reactor vessel water level with the RWCU system unavailable. A procedure would have provided adequate precautions against rapid removal of water from the vessel and would have provided instructions for controlling the rate of water removal. Contributing to the event was the lack of sufficient planning and coordination prior to and during the event\*. Although the Shift Engineer had discussed the operation with the SCRE and NSO, the SCRE and NSO did not notify the SE prior to performing the operation, nor was the SE in the control room at the time of the event. There was no communications arranged to alert the NSO immediately if vessel water level began to decrease rapidly during the operation. Therefore, by the time the SCRE

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noticed the rapid decrease in water level and informed the NSO, it was too late to prevent the low reactor water level.

Personnel error was considered for the cause of this event. However, the investigation conducted as a result of the event came to the conclusion that the primary cause for this event was a lack of sufficient procedural guidance i.e., had a procedure been available, this event could have been prevented.

**D. SAFETY ANALYSIS OF EVENT:**

The reactor was in a cold shutdown condition at the time of the event. The Group III isolation valves were already closed prior to the event. The Group II isolation initiates closure of the shutdown cooling suction valves which would have stopped the draining process if no operator action had been taken. Throughout the event, there were two Core Spray subsystems [BM] and two RHR pumps available to provide an emergency supply of water to the reactor, if necessary.

The Station is aware of industry events involving inadvertent draining of the reactor vessel inventory through the RHR system as provided by NRC I.E. Information Notices 84-81 (Inadvertent Reduction in Primary Coolant Inventory in Boiling Water Reactors During Shutdown and Startup), NRC I.E. Information Notice 86-74 (Reduction of Reactor Coolant Inventory because of Misalignment of RHR Valves), INPO Significant Operating Experience Report (SOER) 87-2 (Inadvertent draining of Reactor Vessel to Suppression Pool at BWRs) and General Electric Service Information Letter No. 388 (RHR Valve Misalignment During Shutdown Cooling Operation for BWRs). As a result of these reports, procedure changes were initiated to include precautions in the applicable procedures. However, as noted in Section C of this report, there was not a procedure addressing the conditions described. Therefore adequate procedural guidance was not available or provided, which led to the low reactor water level scram while the unit was in cold shutdown.

**E. CORRECTIVE ACTIONS:**

A temporary procedure has been written describing the method to be used to remove water from the reactor vessel during cold shutdown when the RWCU system is not available. This procedure will be submitted for a permanent procedure change and will be tracked with Action Item Number 2652008704101. The on-shift licensed operating personnel will be interviewed to determine if any other operations are performed which may not be directly covered by procedures. New procedures will be written as necessary. This will be tracked with Action Item Number 2652008704104.

This event was discussed by the Assistant Superintendent of Operating with the operating staff.

Station responses to NRC I.E. Notices 84-81 and 86-74, SOER 87-2, and SIL 388 will be reviewed in light of this event to determine if additional action is required. This will be tracked with Action Item Number 2652008704103.

**F. PREVIOUS EVENTS:**

There have been no previous reports of a scram being caused by reactor low water level while draining water from the vessel through the RHR system.

**G. COMPONENT FAILURE DATA:**

Not applicable.





Commonwealth Edison

## DEVIATION REPORT

DVR NO. 4 - 2 - 87 - 041  
STA UNIT YEAR NO.

PART 1 TITLE OF DEVIATION

OCCURRED

8/17/87 2110  
DATE TIME

U-2 SCRAM WITH NO CONTROL ROD MOVEMENT WHILE IN S/D

SYSTEM AFFECTED

PLANT STATUS AT TIME OF EVENT

500

MODE S/D, POWER(%) 0

WORK REQUEST NO.

TESTING

☐ YES ☒ NO

DESCRIPTION OF EVENT

U-2 RECEIVED A LOW LEVEL SCRAM WHILE ATTEMPTING TO LOWER WATER LEVEL TO 30". RX WATER LEVEL STARTED OUT AT 40". THE WATER WAS BEING DRAINED THROUGH RHR TO THE TORUS.

POTENTIALLY SIGNIFICANT EVENT PER NSD DIRECTIVE A-07

☒ YES ☐ NO10CFR50.72 NRC RED PHONE  
NOTIFICATION MADE☐ 1 HOUR  
☒ 4 HOUR 2145 ☐ NO  
TIMED.C. Bucknell  
RESPONSIBLE SUPERVISOR8/17/87  
DATE

PART 2 OPERATING ENGINEER'S COMMENTS

OPERATOR OPENED THE 2-1001-34A AND GAVE A TWO SECOND OPEN SIGNAL TO THE 2-1001-36A. THIS ALLOWED THE LEVEL TO DROP 22" IN 50 SECONDS. AFTER OPENING THE 2-1001-36A VALVE THE OPERATOR CHECKED LEVEL, SAW IT DROPPING RAPIDLY, BUT WAS TOO LATE IN CLOSING THE 2-1001-36A/34A.

☐ NON REPORTABLE EVENT☒ 30 DAY REPORTABLE/10CFR 50.73  
(a)(2)(IV)☐ 5 DAY REPORT PER 10CFR21☐ ANNUAL/SPECIAL REPORT REQUIRED

A.I.R. #

L.E.R. # 87-010

NOTIFICATION

REGION III

DATE

TIME

NSD

DATE

TIME

☐ CECO CORPORATE NOTIFICATION MADE  
IF ABOVE NOTIFICATION IS PER 10CFR21

TELECOPY

CECO CORPORATE OFFICER

DATE

TIME

PRELIMINARY REPORT  
COMPLETED AND REVIEWED

H.G. Lihou

8/18/87

OPERATING ENGINEER

DATE

INVESTIGATION REPORT & RESOLUTION  
ACCEPTED BY STATION REVIEWRESOLUTION APPROVED AND  
AUTHORIZED FOR DISTRIBUTION

STATION MANAGER

9-15-87  
DATE



**Commonwealth Edison**

Quad Cities Nuclear Power Station  
22710 206 Avenue North  
Cordova, Illinois 61242  
Telephone 309/654-2241

RLB-87-239

September, 8 1987

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Reference: Quad-Cities Nuclear Power Station  
Docket Number 50-265, DPR-30, Unit Two

Enclosed please find Licensee Event Report (LER) 86-010, 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)(iv), which requires the reporting of any event or condition that resulted in the manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

Respectfully,

COMMONWEALTH EDISON COMPANY  
QUAD-CITIES NUCLEAR POWER STATION

R. L. Bax  
Station Manager

RLB/DWH/eb

Enclosure

cc: I. Johnson  
R. Higgins  
INPO Records Center  
NRC Region III

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