



Commonwealth Edison

Quad Cities Nuclear Power Station
22710 206 Avenue North
Cordova, Illinois 61242-9740
Telephone 309/854-2241

RLB-92-108

May 5, 1992

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 is Licensee Event Report (LER) 92-013, 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)(11). Any event or condition that resulted in the condition of the nuclear power plant, including its principal safety barriers, being seriously degraded, or that resulted in the nuclear plant being in a condition that was outside the design basis of the plant.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/TB/plm

Enclosure

cc: J. Schrage
T. Taylor
INPO Records Center
NRC Region III

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Quad Cities Unit Two
 Docket Number (2) 0 | 5 | 0 | 0 | 0 | 2 | 6 | 5
 Page (3) 1 | of | 0 | 5
 Title (4) Second Level Undervoltage Setpoint Nonconservative Due To Faulty Calculation Methodology

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 Quad Cities Unit One	Docket Number(s)
0 4	0 7	9 2	9 2	0 1 3	0 0	0 5	0 7	9 2		0 5 0 0 0 2 5 4 0 5 0 0 0 0 1 1

OPERATING MODE (9) 1

POWER LEVEL (10) 0 | 0 | 0

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

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in Text)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input checked="" type="checkbox"/> 50.73(a)(2)(viii)(A)	
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name David Luebke Ext. 2146
 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	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15) X | NO

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

ABSTRACT:

On April 7, 1992, at 1430 hours, Unit Two was in the SHUTDOWN mode at zero percent of rated core thermal power. At that time, based on calculations performed by the Nuclear Engineering Department (NED), the second level undervoltage setpoint was determined to be non-conservative. The present relay [RLY] setting would not ensure that adequate terminal voltage would be available for continuous duty 480 volt electrical equipment under maximum credible loading conditions. The apparent cause of the event is considered to be management and technical deficiencies at the time of the installation of the second level undervoltage scheme. Immediate corrective action was to design and install modifications which would shed unneeded loads during a LOCA condition in order to assure adequate bus voltage for safety-related loads. In addition, the second level undervoltage relays were replaced with relays having a tighter reset tolerance. After completion of the calculation by NED, the second level undervoltage relays were reset to 3886 volts (up from 3840 V) with a tolerance of +/-7.0 V. A conservative decision was made to complete required modifications prior to startup of Unit Two from refuel outage Q2R11. Safety significance of the event was minimal as the unit was in cold shutdown and the safety related loads were not required. This report is being submitted in accordance with 10CFR50.73(a)(2)(11).

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						Year	Sequential Number	Revision Number														
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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

C. APPARENT CAUSE OF EVENT:

This Licensee Event Report is being submitted in accordance with 10CFR50.73(a)(2)(ii), which requires reporting of any event or condition that resulted in the condition of the nuclear plant, including its principal safety barriers being seriously degraded or that resulted in the nuclear plant being in an unanalyzed condition that significantly compromises plant safety.

The apparent cause of this event is attributed to inadequate design control due to management and technical deficiencies at the time of the installation of the second level undervoltage relay modification. The following deficiencies have been identified as a cause of this event:

1. Past computer modeling of plant electrical loading was not as accurate as today's computer modeling.
2. Load data in the past was taken at the source (Bus) of the load rather than from the motor terminals. Therefore, actual motor required voltage was not the basis for the calculations.
3. Impedance losses in power feed cables were assumed incorrectly. Actual loads (horsepower) were used in the calculations, but with improper cable impedance loss assumptions.
4. Calculations assumed a loading on 480 Volt transformers [XFMR]. Transformer voltage drops were not accurately modeled. In addition, since the original calculations were performed, additional loading has been added which would be running in a LOCA condition.
5. Increased motor currents due to lower motor voltage were not accurately analyzed.
6. Inadequate documentation control and review of setpoint calculations.

D. SAFETY ANALYSIS OF EVENT:

It has been determined by NED that the existing Second Level Undervoltage Relay settings were inadequate to assure proper protection of ALL Safety Related equipment and that in order to insure adequate protection, modifications were needed to be performed on Unit Two. Unit Two was in the Cold Shutdown mode when Quad Cities was notified of the calculations and the decision was made to perform these modifications prior to the startup of Unit Two. Therefore, the safety significance of the event was minimal because the unit was in cold shutdown and the safety related loads were not required. In addition, if this condition had been discovered with the unit in operation, the safety significance would have been minimal due to the extremely low probability of a LOCA concurrent with a degraded voltage condition. History has also shown that the incidence of degraded voltage in the switchyard has been extremely small.

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

Calculations are presently being performed on Unit 1 for the Second Level Undervoltage relay setpoint to determine if any discrepancies exist for Unit One.

E. CORRECTIVE ACTIONS:

Immediate corrective actions were to design and install modifications which would trip unneeded loads on receipt of a LOCA initiation signal in order to ensure adequate bus [BU] voltage to start safety-related loads. Modification M4-2-91-019 tripped the following loads from Unit Two 480 Volt Safety Related Buses on receipt of a LOCA signal:

- a. Drywell Coolers
- b. Reactor Building Closed Cooling Water pumps [P]
- c. Fuel Pool Cooling pumps
- d. Recirc MG Set ventilation [VA] fans [FAN]
- e. Turbine Building Exhaust and Supply fans

Modification M4-2-92-006 was divided into ten partials defined as follows:

- a. Partial A through G are proposed cable pulls to safety related loads, which are scheduled to be installed during Q2R12. These cable pulls will improve terminal voltage at the motors, but are not considered to be essential to safe plant operation at this time (NTS #2652009205001).
- b. Partial H ensures that the 1/2 Diesel Generator DG Auxiliaries (DG room vent fan, DG Cooling Water Pump (DGCWP), and fuel oil transfer pump) will automatically transfer to the unit with a LOCA to ensure adequate power supplies to these loads.
- c. Partial I installs a redundant power feed (from Unit Two) to the 1/2 DGCWP cooler fans. (This issue is documented in Licensee Event Report 04-02-92-014).
- d. Partial J provided parallel control power cabling for the Residual Heat Removal (RHR) Low Pressure Coolant Injection [BO] (LPCI) 2SA, 29B and 50 valves, and also the Recirculation [AD] system 5A and 5B valves. This ensures that proper voltage is available to start these valves in a degraded voltage condition.

In addition, the second level undervoltage relays were replaced with relays which had a tighter reset tolerance (0.5%). With the changes made by the modifications, MED performed another calculation, and the second level undervoltage relays were reset at the new setpoint of 3886 volts +/-7.0V. All of these modifications, with the exception of Modification M4-2-92-006 partials A through G, were completed prior to startup of Unit 2 from refuel outage Q2R11. In order to ensure that our calculations involving the electrical distribution system are updated to current industry standards, NED is presently performing calculations for Unit 1 to determine if a problem exists. Any problems for Unit 1 will be addressed as they are revealed, and appropriate modifications will be installed, if required (NTS 2652009205002).

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F. PREVIOUS EVENTS:

There have been no previous events of Second Level Undervoltage Design Compliance at Quad Cities based on methods of calculations performed in the past.

There has been a similar event at Dresden Station.

LER Number Title

LER 91-021/050237 Improper Setpoint of Second Level Undervoltage Relays Due to Management Deficiency

During an Electrical Distribution System Functional Inspection (EDSFI), the NRC inspection team questioned whether the setting of the Second Level Undervoltage relays would provide adequate protection to Class 1E equipment. An Engineering review was performed. The review resulted in implementation of compensatory measures.

G. COMPONENT FAILURE DATA:

The cause of this event was not attributed to a component failure.