Commonwealth Edison
LaSalle County Nuclear Station
2601 N. 21st. Rd.
Marseilles, Illinois 61341
Telephone 815/357-6761

May 27, 1992

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Dear Sir:

Licensee Event Report #92-005-00, Docket #050-373 is being submitted to your office in accordance with 10CFR50.73(a)(2)(v).

G. J. Diederich
for Station Manager
LaSalle County Station

GJD/HTV/mkl

Enclosure

cc: Nuclear Licensing Administrator
NRC Resident Inspector
NRC Region III Administrator
INPO - Records Center
IDNS Resident Inspector

IE22

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
Quad Cities Unit Two	0 5 0 0 0 2 6 5	1 of 0 7

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

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)			
1		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
0 0 0		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)	X 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)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
	AREA CODE
David D. Luebbe, Technical Staff Engineer Ext. 2146	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 NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
Yes (If yes, complete EXPECTED SUBMISSION DATE)	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. On April 23, 1992 at 1715 hours, Unit One was in the RUN mode at 100 percent of rated core thermal power. At that time, it was determined that the present Unit One degraded voltage relay setpoints were non-conservative based on preliminary calculations performed by NED. The apparent cause of the event was a reconciliation between the current method of performing load analysis and the original load analysis methodology. Immediate corrective action for Unit Two 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. Compensatory actions were implemented for Unit One to ensure operability of Unit One safety related loads during a degraded voltage condition. This report is being submitted for Unit One and Unit Two in accordance with 10CFR50.73(a)(2)(ii).

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
LaSalle County Station Unit 1/2	0 5 0 0 0 3 7 3	1 of 0 4

Title (4)

Degraded Voltage Design Deficiencies

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)
									LaSalle Unit 2	0 5 0 0 0 3 7 4
0 4	2 7	9 2	9 2	0 0 6	0 0	0 5	2 7	9 2		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)									
	1/1	___	20.402(b)	___	20.405(c)	___	50.73(a)(2)(iv)	___	73.71(b)		
POWER LEVEL (10)	1 0 0	___	20.405(a)(1)(i)	___	50.36(c)(1)	X	50.73(a)(2)(v)	___	73.71(c)		
	0 8 4	___	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)(x)				

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
	AREA CODE
Harold T. Vinyard, Technical Staff Engineer, Extension 2499	8 1 5 3 5 7 - 6 7 6 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	E I K			N						

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
___ Yes (If yes, complete EXPECTED SUBMISSION DATE)	___ X NO				

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

During the October, 1991 Nuclear Regulatory Commission Electrical Distribution System Functional Inspection (EDSFI) at LaSalle County Station, an issue was raised as to whether the design setpoint of the 4KV degraded voltage relays was sufficient to assure proper operation and protection of safety related equipment at all distribution levels. Calculations indicated the LaSalle degraded voltage setpoint of 3814 ± 76 volts was nonconservative.

Compensatory measures were immediately initiated on both units to restore operability.

On April 27, 1992 at 0906 hours it was determined by Commonwealth Edison that prior to Octob. 1 that the original design calculations were below intended design levels.

On April 29, 1992 at 1337 hours, in the process of completing detailed voltage calculations it was discovered that the Unit 2 Division 3 High Pressure Core Spray (HPCS) Pump Room Cooler Fan starting contactor voltage was lower than required at the compensatory voltage level of 4040 volts. The HPCS system was declared inoperable and placed on a 14-day timeclock.

The cause of this event was design error. There is some safety significance to ' is event since this issue addresses a failure mode that could potentially affect redundant equipment. With the compensatory measures currently in place, the LaSalle electrical system has been restored to its intended level of design and is fully operable.

Long term corrective actions to replace the compensatory measures is being tracked by EDSFI unresolved item 373/374-91019-06. Currently, LaSalle voltage calculations and evaluations are still in progress. Should plant modifications become necessary following completion of these evaluations, the safety significance of the changes will be evaluated and used to determine the implementation schedule.

(Continued On Next Page)

ABSTRACT CONTINUED

This event is reportable pursuant to the requirements of 10CFR50.73(a)(2)(v) due to any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

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

A. CONDITION PRIOR TO EVENT

Unit(s): 1/2 Event Date: 4/27/92 Event Time: 0906 Hours

Reactor Mode(s): 1/1 Mode(s) Name: Run/Run Power Level(s): 100%/84%

B. DESCRIPTION OF EVENT

During the October, 1991 Nuclear Regulatory Commission Electrical Distribution System Functional Inspection (EDSFI) at LaSalle County Station, an issue was raised as to whether the design setpoint of the 4KV degraded voltage relays (AP) [EB] was sufficient to assure proper operation and protection of safety related equipment at all distribution levels. Since this issue had already been raised at other Commonwealth Edison (CECo) Stations, the CECo Nuclear Engineering Department (NED) had already been performing preliminary engineering calculations for LaSalle on this issue prior to the October 1991 inspection.

The results of these calculations indicated the LaSalle degraded voltage setpoint of 3814 ± 76 volts was nonconservative for some Engineered Safety Feature (ESF) loads. Calculations indicated that a voltage greater than 4040 volts was required at the 4KV ESF busses to ensure that all motor and motor control circuits would operate properly at the 480V and 120V distribution levels. These calculations were based on a minimum acceptance criteria of 85% of motor rated starting voltage and 80% of motor rated running voltage at the minimum degraded voltage setpoint.

As a result of these calculations, 19 motors (per unit) were identified as having less than the conservative design requirement of 85% rated voltage for starting at the degraded voltage setpoint of 3814 volts. However, all of the aforementioned motors had at least 80% of rated voltage for starting. Calculations also identified nine contactors (motor starters) per unit having less than the recommended voltage needed for them to function.

Compensatory measures were immediately initiated on both units, which included procedural guidance for declaring any ESF 4KV bus inoperable whenever bus voltage degrades below 4040V. This action assured that all equipment supplied by these busses would remain fully operable with 4KV voltage above this value. Should voltage fall below 4040V on one or more ESF busses, Technical Specifications would be followed as required with the busses declared inoperable.

Following the installation of the compensatory measures, NED committed to perform a detailed evaluations of the LaSalle electrical system. The purpose for these evaluations were to 1) determine a new acceptance degraded voltage setpoint, 2) complete detailed voltage drop calculations on LaSalle safety-related motors for both starting and running conditions, and 3) complete voltage calculations for motor starting contactors.

B. DESCRIPTION OF EVENT (CONTINUED)

On April 29, 1992 at 1337 hours, in the process of completing the detailed voltage calculations above, NED discovered that the Unit 2 Division 3 High Pressure Core Spray (HPCS, HP) [BG] Pump Room Cooler Fan (2VY02C) starting contactor voltage was lower than the required 85% of rated voltage (83.6%) at the compensatory voltage level of 4040 volts. The HPCS system was declared inoperable and placed on a 14-day timeclock.

C. APPARENT CAUSE OF EVENT

The cause of this event was design error. During initial construction, no industry standards existed which required the preparation of voltage drop calculations for every device connected to the electrical system. The Architect Engineer (Sargent & Lundy) used engineering judgement for determining which voltage drop calculations would be performed. These judgements were based on the size of the cable, its length, and the electrical characteristics of the device in the circuit.

As a result, several circuits were found to be unsatisfactory with respect to starting/running voltage when conductor length and size was taken into account. Preliminary calculations indicated several motors and contactors per unit having a motor starting voltage less than 85% of rated and/or running voltage less than 80% of rated during a degraded voltage condition.

D. SAFETY ANALYSIS OF EVENT

There is some safety significance to this event since this issue addresses a failure mode that could potentially affect redundant equipment. However this scenario requires an event of extremely low probability, notably a Loss of Cooling Accident (LOCA) coincident with a degraded voltage condition. LaSalle switchyard (SY) [FK] operating history indicates that rarely has switchyard voltage been lower than the compensatory voltage setpoint now in effect. With the compensatory measures currently in place, the LaSalle electrical system has been restored to its intended level of design and is fully operable.

The safety consequences of the April 29, 1992 event were minimal. The HPCS System, although administratively inoperable, was fully functional and capable of injecting water into the reactor vessel if required. The Reactor Core Isolation Cooling (RCIC, RI) [BN], the alternate high pressure injection system, was fully operable at the time of this event.

E. CORRECTIVE ACTIONS

In response to the October, 1991 preliminary calculation results, LaSalle took the following compensatory measures:

1) The degraded voltage relay setpoints were increased to 3885 volts, near the maximum value allowed by the Technical Specification Limiting Condition for Operation (LCO).

2) The control room undervoltage alarm setpoint for the System Auxiliary Transformer (SAT) 4.16KV winding was raised to 4040 volts.

E. CORRECTIVE ACTIONS (CONTINUED)

3) Procedural guidance was implemented for declaring any ESF 4KV bus inoperable whenever bus voltage degrades below 4040KV.

4) Procedures also require notification of the CECo load dispatcher to raise LaSalle switchyard voltage should bus voltage fall to 4040 volts.

To correct the HPCS Room Cooler Fan problem, the conductor between the local control panel and the motor contactor at the switchgear was placed in parallel with a spare conductor. This effectively decreased the conductor resistance by a factor of 2, resulting in a satisfactory starting voltage increase to 91.0% of rated. The HPCS System was then declared fully operable on April 30, 1992.

Long term corrective actions to replace the compensatory measures is being tracked by EDSFI unresolved item 373/374-91019-06. Currently, LaSalle voltage calculations and evaluations are still in progress. Should plant modifications become necessary following completion of these evaluations, the safety significance of the changes will be evaluated and used to determine the implementation schedule.

F. PREVIOUS EVENTS

No previous events of this type have been reported.

G. COMPONENT FAILURE DATA

No component failed during this event.