Commonwealth Edison
LaSalle County Nuclear Station
Rural Route #1, Box 220
Marseilles, Illinois 61341
Telephone 815/357-6761

February 15, 1990

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

Dear Sir:

Licensee Event Report #89-010-01, Docket #050-374 is being submitted to your office to supercede previously submitted Licensee Event Report 89-010-00.

WRo Arnett

for G. J. Diederich
Station Manager
LaSalle County Station

GJD/HTV/kg

Enclosure

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

IE22

LICENSEE EVENT REPORT (LER) Form Rev 2.0

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

Title (4)

High Pressure Core Spay Inoperable Due to Division III Battery Charger Oscillations

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 1	0 5 0 0 0 3 7 3
0 7	1 5	8 9	8 9	0 1 1 0	0 1	0 2	1 5	9 0		0 5 0 0 0

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 9 5	___ 20.402(b)	___ 20.405(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)		
		___ 20.405(a)(1)(i)	___ 50.36(c)(1)	X 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)(x)			

LICENSEE CONTACT FOR THIS LER (12)

Name	TELEPHONE NUMBER
	AREA CODE
Herold 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
X	E J	R L Y	F 2 3 4	Y					

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)

On July 15, 1989 with Unit 2 in Operational Condition 1 (Run) at 95% power, the Nuclear Station Operator (NSO) noticed voltage oscillations (120-131VDC) on the Unit 2 Division III battery charger. These oscillations were not constant, but would occur for 5-10 seconds at indeterminate intervals. The battery charger was declared inoperable at 2119 hours on July 15, 1989. This also rendered the Unit 2 High Pressure Core Spray (HPCS) system inoperable and a 14-day timeclock was initiated in accordance with Technical Specifications. Similar occurrences of these oscillations have been observed since this event. Because of the intermittent nature of the problem, the root cause could not be determined.

The cause of these events appears to be related to the charger High Voltage Shutdown Relay (HVSR). The exact failure mode of this relay was not determined.

The consequences of this event(s) was minimal. Division I and II Emergency Core Cooling Systems (ECCS) were fully operable during this period. In addition, the Reactor Core Isolation Cooling system was fully operable as an alternate high pressure injection system. The HPCS system was fully functional, although inoperable, during this event(s). The Unit 2 Division III DC emergency power supply (battery) was fully charged throughout the event.

A chart recorder was connected to the HVSR to monitor coil voltage and contact position. Had the charger voltage oscillations re-occurred, the recorder would have indicated the HVSR failure mode.

This event is reportable pursuant to 10CFR50.73(a)(2)(v) due to a safety system being declared inoperable.

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: 7/15/89 Event Time: 2119 Hours

Reactor Mode(s): 1/1 Mode(s) Name: Run/Run Power Level(s): 91%/95%

B. DESCRIPTION OF EVENT

On July 15, 1989 with Unit 2 in Operational Condition 1 (Run) at 95% power, the Nuclear Station Operator (NSO, licensed Reactor Operator) noticed voltage oscillations (120-131VDC) on the Unit 2 Division III battery charger (DC) [EJ]. These oscillations were not constant, but would occur for 5-10 seconds at indeterminate intervals. The battery charger was declared inoperable at 2119 hours on July 15, 1989. Per Technical Specification 3.8.2.3 action b, the Unit 2 High Pressure Core Spray system (HPCS) (HP) [BG] was declared inoperable and a 14-day timeclock was initiated in accordance with Technical Specification 3.5.1. Work Request L91276 was immediately initiated to resolve the problem. The Unit 2 Division III battery and bus (213) were crosstied to the Unit 1 Division III charger so the Unit 2 charger could be isolated. Crosstying DC buses with both units in Condition 1 (Run) required that the Unit 1 HPCS system was also declared inoperable.

Inspection of the battery charger control circuit cards under Work Request L91276 revealed a heat damaged area on the "A" phase firing board. This board was removed and replaced with a new board. The charger was then energized and observed for normal operation. No charger abnormalities were observed at that time. The crosstie between Division III DC buses from Units 1 and 2 was removed and the Unit 1 HPCS system declared operable. The Unit 2 battery charger and HPCS system were declared operable at 1735 hours on July 16, 1989.

On July 17, 1989 at approximately 1600 hours, the Unit 2 NSO again noticed voltage oscillations on the Unit 2 Division III battery charger. The magnitude and duration of these oscillations were similar to the ones seen on July 15, 1989. Technical Staff and Electrical Maintenance personnel were immediately contacted to observe the oscillations. The Unit 2 Division III battery charger and the HPCS system were declared inoperable at 1745 hours on July 17, 1989. Work Request L91305 was initiated to troubleshoot the charger. The Division III DC buses were crosstied and the Unit 1 HPCS system declared inoperable.

The battery charger was subsequently inspected by the vendor. As a result of this investigation and of the problems described, the vendor recommended changing out the "A" phase Silicon-Controlled-Rectifier (SCR) assembly. This was performed on July 21, 1989. LaSalle Electrical Surveillance, LES-DC-103, "Battery Charger Capacity Test," was then performed to verify Technical Specification capacity requirements were met following replacement of the "A" phase SCR assembly. The battery charger was declared operable at 0900 hours on July 24, 1989.

B. DESCRIPTION OF EVENT (Continued)

On July 27, 1989 at 1645 hours, voltage oscillations were again observed on the Unit 2 Division III charger. Charger voltage decreased to 120VDC and returned to normal (131VDC) in approximately 1 minutes. At 1700 hours, charger voltage again decreased to 120VDC and did not return to normal voltage until approximately 4 minutes later. The charger was declared inoperable at 1700 hours on July 27, 1989. The Technical Staff Engineer was notified and troubleshooting activities began under Work Request L91558. At this time it was discovered that contacts on the High Voltage Shutdown Relay (HVSR) were not making sufficient contact. This relay is normally energized (with contacts closed) during normal charger operation. Should a high voltage condition exist on the charger output, this relay will drop out and remove power to the charger control boards, effectively shutting off the charger. Oscillations of the charger could be reproduced by physically separating the contacts of this relay. The HVSR was replaced under Work Request L91558. A vendor representative verified proper operation following replacement. The charger was then declared operable on July 28, 1989.

On August 3, 1989 at 1100 hours, charger voltage dropped to 120VDC. The Technical Staff Engineer was immediately notified and proceeded to investigate the charger. Contacts of the HVSR were found to be slightly offset and were adjusted to the proper position. Following this action, the charger returned to normal operating voltage. The problem re-occurred at 2115 hours on August 3, 1989. Charger voltage dropped to 120VDC for 1 minute and then returned to normal. The HVSR contacts were again cleaned and contacts verified in their proper position. A chart recorder was connected to the HVSR to aid in the failure analysis should the problem have re-occurred. No further charger abnormalities were experienced and the chart recorder was removed on September 15, 1989.

C. APPARENT CAUSE OF EVENT

The cause of this event appears to have been related to the HVSR, although the exact failure mode could not be determined since no further abnormalities occurred with the chart recorder connected.

D. SAFETY ANALYSIS OF EVENT

Division I and II Emergency Core Cooling Systems (ECCS) were fully operable during this period. In addition, the Reactor Core Isolation Cooling (RCIC) (RI) [BN] system was fully operable as an alternate high pressure injection system. The HPCS system was functional, although inoperable, during this event(s). The Unit 2 Division III DC emergency power supply (battery) was fully charged throughout the event.

E. CORRECTIVE ACTIONS

The following is a chronology of the troubleshooting activities since the July 15, 1989 event:

E. CORRECTIVE ACTIONS (Continued)

7/16/89: An inspection was performed of the battery charger control cards under Work Request L91276 revealed a heat damaged area on the "A" phase firing board. This board was removed and replaced with a new board. The charger was then energized and observed for normal operation. No charger abnormalities were observed at that time and the charger declared operable.

7/17/89: With the charger energized, input/output current through the Silicon-Controlled-Rectifiers (SCR's) was measured on all three phases. (Each phase has its own SCR assembly.) "B" phase current appears to oscillate more than the other two phases, implying an unbalanced condition. The battery charger was shutdown and all balancing potentiometers were cleaned and centered. In addition, all control circuit cards were removed, their connections cleaned, and boards replaced (same boards). The charger was energized and phase currents balanced using the balancing potentiometers. Operating personnel were then instructed to observe the charger for oscillations. Voltage/current oscillations began approximately one hour following the phase balancing.

7/18/89: The battery charger vendor (C & D Power Systems, Inc.) was contacted and arrived onsite at approximately 1700 hours. Technical Staff and Electrical Maintenance personnel assisted the vendor in troubleshooting the charger. Voltage checkpoints were established at the power transformer secondary (AC input to the SCR bridge) and at the charger output terminals (DC output). At that time, the charger appeared to be operating properly. Approximately one hour later, the charger voltage began to oscillate. Power transformer secondary voltage remained constant during the oscillation but output voltage dropped to 120VDC. The problem, therefore was isolated to the output side of the SCR's. Since voltage regulation is controlled by the voltage/current sensing board, the vendor recommended changing out this board. This was accomplished under Work Request L91305. The charger was energized and Operating personnel instructed to monitor the charger.

7/19/89: LES-DC-103, "Battery Charger Capacity Test," was successfully performed to ensure the battery charger would satisfy Technical Specification Requirements.

7/20/89: In discussions with the vendor, it was decided to replace the "A" phase SCR assembly. This corrective action was recommended by the vendor based on problem description and the location of the burnt spot on the "A" phase firing board.

7/21/89: The "A" phase SCR assembly was replaced under Work Request L91305. LES-DC-103 was repeated to ensure this replacement did not affect the ability of the charger to meet Technical Specifications.

7/23/89: A chart recorder was placed on the charger to continuously monitor phase currents and output voltage.

7/25/89: Chart recorder was removed. No abnormalities were observed.

E. CORRECTIVE ACTIONS (Continued)

7/27/89: Charger voltage oscillations were reported and Work Request L91558 initiated to investigate. During this investigation, it was discovered that contacts on the High Voltage Shutdown Relay (HVSR) were intermittently breaking contact. This relay is normally energized, with contacts closed. In the event of a high voltage condition at the charger output terminals, this relay drops out and the battery charger is shutdown. Further investigation revealed that the charger oscillations could be recreated by physically opening one set of contacts of the HVSR relay. (The relay has 3 sets of contacts, 1 for each phase.) A call was made to C & D Power Systems to verify that failure of this relay could cause the erratic behavior exhibited by the charger. This was confirmed by the vendor.

7/28/89: The HVSR was replaced with assistance from the vendor. The vendor representative then verified proper operation of the relay and charger following replacement.

8/03/89: Charger voltage dropped to 120VDC at 1100 hours. The Technical Staff Engineer discovered the "B" phase contacts of the HVSR were slightly offset and adjusted them to the proper position. The charger then returned to its normal operating voltage. Problem re-occurred at 2215 hours, where charger voltage dropped to 120VDC for one minute and then returned to normal.

A chart recorder was connected to the HVSR to monitor coil voltage and contact position. Had the charger voltage oscillation re-occurred, the recorder would have indicated its exact failure mode. Unless this event, re-occurs, no further corrective action is necessary.

F. PREVIOUS EVENTS

None.

G. COMPONENT FAILUPE DATA

Manufacturer	Nomenclature	Model Number	MFG Part Number
Furnas Elect.	Relay/Contactor	MN4	41NB30AF147P