



**Constellation
Energy Group**

Nine Mile Point
Nuclear Station

January 31, 2003
NMP1L 1712

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Nine Mile Point Unit 1
Docket No. 50-220
License No. DPR-63

Licensee Event Report 02-003, "Loss of Power to Reactor Protection System (RPS) Bus 12 while RPS Bus 11 Emergency Power Source was Inoperable"

Gentlemen:

In accordance with 10 CFR 50.73(a)(2)(v)(B), we are submitting Licensee Event Report (LER) 02-003, "Loss of Power to Reactor Protection System (RPS) Bus 12 while RPS Bus 11 Emergency Power Source was Inoperable."

Very truly yours,

Lawrence A. Hopkins
Plant General Manager

LAH/KLE/mlg
Attachment

cc: Mr. H. J. Miller, NRC Regional Administrator, Region I
Mr. G. K. Hunegs, NRC Senior Resident Inspector

IB22

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory information collection request 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)
Nine Mile Point, Unit 1

DOCKET NUMBER (2)
05000220

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TITLE (4)
Loss of Power to Reactor Protection System (RPS) Bus 12 while RPS Bus 11 Emergency Power Source was Inoperable

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
12	02	2002	2002	003	00	01	31	2003		05000
										05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)			
1	100	20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
		20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
		20.2203(a)(2)(ii)	50.36(c)(2)	X 50.73(a)(2)(v)(B)	OTHER
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
		20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)
 NAME: Michael O. Pearce, Manager Maintenance
 TELEPHONE NUMBER (Include Area Code): 315-349-4848

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
B	EF	JX	L045	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	X					

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On 12/2/02, at 1647 hours with power level at approximately 100 percent and Emergency Diesel Generator (EDG) 102 out of service for maintenance, Nine Mile Point Unit 1 (NMP1) experienced a loss of Uninterruptible Power Supply (UPS) 172, which resulted in the loss of Reactor Protection System (RPS) Bus 12. With the loss of UPS 172, emergency power was not available to RPS Bus 12. RPS Bus 11 remained energized but its emergency power source, EDG 102 was out of service. With EDG 102 out of service and RPS Bus 12 de-energized, Technical Specifications (TS) required that the emergency power source be restored to either RPS Bus 11 or RPS Bus 12 within an hour or commence a shutdown and be shutdown within ten hours. RPS Bus 12 was re-energized from non-safety related Bus 130A at 1709 hours on 12/2/02. At 1746 hours on 12/2/02, operators began a normal reactor shutdown. At 1900 hours on 12/2/02, EDG 102 was returned to service and the Action statement requiring a shutdown within ten hours was exited. On 12/03/02, at 1248 hours, RPS Bus 12 was returned to UPS 172.

Troubleshooting determined that the UPS 172 trip was the result of an actuation of overvoltage protective relay RLY-(PRC172)59-1. The overvoltage signal was determined to have been invalid and caused by set point drift. The set point drift was the result of degraded electrolytic capacitors in power supply PWRS-(PRC172)PS-1.

The apparent cause of this event is design inadequacy, in that a single degraded power supply would trip UPS Bus 172. Contributing to this event were degraded electrolytic capacitors associated with the power supply. A loss of electrolyte had degraded the capacitors.

Corrective actions include replacing the failed power supply, conducting a failure analysis on the failed power supply, and developing a modification to preclude loss of a RPS Bus due to a single degraded power supply.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(v)(B) in that neither RPS Bus had its emergency power supply operable.

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

I. Description of Event

On 12/2/02 at 1647 hours with power level at approximately 100 percent and Emergency Diesel Generator (EDG) 102 out of service for maintenance, Nine Mile Point Unit 1 (NMP1) experienced a loss of Uninterruptible Power Supply (UPS) 172, which resulted in the loss of Reactor Protection System (RPS) Bus 12. The loss of UPS 172 precluded supplying RPS Bus 12 from its safety related power source, EDG 103. RPS Bus 11 remained energized but its emergency power source, EDG 102 was out of service. With EDG 102 out of service, Technical Specification (TS) 3.6.3.g requires all the emergency equipment aligned to EDG 103 to be operable. Since the loss of UPS 172 precluded RPS Bus 12 from being aligned to EDG 103, its emergency power source requirement per TS 3.6.3.g was not met. The Action Statement required that the emergency power source be restored to either RPS Bus 11 or RPS Bus 12 within an hour or commence a shutdown and be shutdown within ten hours. RPS Bus 12 was re-energized from non-safety related maintenance Bus 130A at 1709 hours on 12/2/02. At 1746 hours on 12/2/02 operators began a normal reactor shutdown. At 1900 hours on 12/2/02, EDG 102 was returned to service and the Action statement requiring a shutdown within ten hours was exited. On 12/03/02, at 1248 hours, RPS Bus 12 was returned to UPS 172.

Each RPS Bus is normally supplied from a UPS. UPS 162 supplies RPS Bus 11 and UPS 172 supplies RPS Bus 12. Each UPS has a primary and alternate load protection power supply. Troubleshooting determined that the UPS 172 trip was the result of an invalid actuation of overvoltage protective relay RLY-(PRC172)59-1. Further troubleshooting determined that the output of power supply PWRS-(PRC172)PS-1 had drifted low causing the protective relay setpoint to drift low and eventually actuating the overvoltage protective relay and tripping UPS 172 offline. The loss of UPS 172 deenergized RPS Bus 12.

Protective relay RLY-(PRC172)59-1 is an ABB Model No. 410C1175 overvoltage relay. The relay was installed, as part of modification N1-98-034, in March 2001 to replace the existing overvoltage relay that had been experiencing repeat setpoint drift problems. The modification used an existing 48 VDC power supply, PWRS-(PRC172)PS-1.

Power supply PWRS-(PRC172)PS-1 is a Lambda Model #LCS-A-48 power supply. A failure analysis concluded that the power supply failure was caused by degraded electrolytic capacitors. The degraded capacitors caused the power supply's internal reference voltage to drift down in value. The lower reference voltage drove down the power supply's output voltage, which was supplying the overvoltage relay, RLY-(PRC172)59-1. The lower voltage supplied to the relay caused the relay's internal reference voltage to drift down, which in turn caused the relay's setpoint to drift down. The lowering setpoint eventually caused the relay to incorrectly sense an overvoltage condition and trip UPS 172 offline.

II. Cause of Event

The apparent cause of this event is design inadequacy. The protective relay scheme, per modification N1-98-034, was designed such that a total loss of control power (from 48 volts to 0 volts) to the protective relay would not result in the loss of the UPS Bus. However, the Failure Mode and Effects Analysis for the modification did not consider the effects of a partial loss of a power supply on the protective relay. Prior to the modification, a partial loss of a power supply would not have resulted in the loss of the UPS Bus.

A contributing cause was the degraded electrolytic capacitors of power supply PWRS-(PRC172)PS-1. The capacitors were found to have degraded from the loss of electrolytes. The degraded capacitors drove down the power supplies' output, which drove down the protective relay's setpoint. The relay's setpoint shifted down enough to trip the relay with normal UPS Bus present. The loss of electrolyte is attributed to aging.

An additional contributing cause was lack of thoroughness in the design development. This issue had been recognized previously and a new engineering design process was established.

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III. Analysis of Event

This event is reportable in accordance with 10CFR50.73(a)(2)(v)(B), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (B) Remove residual heat;..." because both RPS Bus 11 and RPS Bus 12 were considered inoperable. The Channel 11 Automatic Depressurization System (ADS) is powered from RPS Bus 11. With EDG 102 out of service, the Channel 11 ADS emergency power source is inoperable. At the time EDG 102 was taken out of service, Channel 12 ADS was operable, but when RPS Bus 12 was lost, due to the power supply failure, Channel 12 ADS became inoperable resulting in both ADS Channels being inoperable.

The loss of RPS Bus 12 with the emergency power source for RPS Bus 11 out of service did not pose a threat to the health and safety of plant personnel or the public, based on the following:

A battery was available to supply backup power to RPS Bus 11 through UPS 162.

EDG 102 was returned to service approximately 2 hours and 15 minutes after the loss of UPS 172.

The single failure proof design feature of the RPS was maintained in that the failure of the power supply for UPS 172, the normal power source for RPS Bus 12, could not cause a loss of RPS Bus 11.

A Probabilistic Risk Assessment (PRA) evaluation was performed for this event. This evaluation concluded that based on the Incremental Core Damage Probability resulting from this event, the event was of low risk significance.

IV. Corrective Actions

1. Replaced power supply PWRS-(PRC172)PS-1.
2. Performed a failure analysis on power supply PWRS-(PRC172)PS-1.
3. As a result of the extent of condition review, two additional power supplies were replaced.
4. Unit 1 Lambda power supplies will be added to the preventive maintenance database to have the electrolytic capacitors replaced every 10 years.
5. A modification will be implemented so that a single protective relay power supply failure will not result in the loss of a UPS Bus.
6. A new engineering design change process is now in place.

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

V. Additional Information

1. Failed Components:
Lambda Model #LCS-A-48 power supply, Manufactured by Lambda Electronics
2. Previous similar events:
A failure of UPS 172 occurred in July 2001. The cause of this failure, as documented in the corrective action program, was a degraded diode internal to the power supply.
3. Identification of components referred to in this Licensee Event Report:

<u>Components</u>	<u>IEEE 805 System ID</u>	<u>IEEE 803A Function</u>
Emergency Onsite Power	EK	N/A
Reactor Protection System Bus	EF	N/A
Automatic Depressurization System	SB	N/A
Diesel Generator	EK	DG
Relay	EK	59
Power Supply	EK	RJX
Uninterruptible Power Supply	EK	UJX
Capacitor	EK	CAP