UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 20, 1991

Docket No. 50-410

LICENSEE: Niagara Mohawk Power Corporation

FACILITY: Nine Mile Point Nuclear Station, Unit 2

SUBJECT: MEETING MINUTES REGARDING THE NOVEMBER 1, 1991, MEETING TO DISCUSS THE EXIDE ELECTRONICS 75 KVA UNINTERRUPTIBLE POWER SUPPLY CONTROL LOGIC POWER SUPPLY AT NINE MILE POINT 2

A meeting was held in the Maryland National Bank Building in Bethesda, Maryland with Niagara Mohawk Power Corporation (NMPC), Exide Electronics, and NRC staff representatives. This meeting was requested by the Incident Investigation Team (IIT) to (1) further discuss the purpose of the internal batteries in the Exide 75 KVA uninterruptible power supply (UPS) units at Nine Mile Point 2 and (2) to attempt to resolve technical disagreements between the IIT and NMPC regarding the purpose of the internal batteries. These technical disagreements were identified in the IIT briefing of the Commission on October 18, 1991, and in a letter dated October 23, 1991, to James M. Taylor, NRC, from B. Ralph Sylvia, NMPC. Enclosure 1 is a list of meeting attendees.

The IIT concluded that two factors were the direct causes of the UPS loss at NMP-2. The first factor was a design deficiency internal to each UPS. The second factor was the failure of the NMPC plant staff to perform appropriate preventive maintenance in that the internal batteries were dead and had not been replaced on a timely basis. In its October 23, 1991, letter, NMPC expressed disagreement with these conclusions and suggested that Information Notice 91-63 and NUREG-1455 be revised to reflect NMPC's position that the root cause of the UPS loss was an improper design.

During the meeting, the Exide Electronics representatives stated that the UPSs were standard commercial grade products which were originally designed without the internal batteries. The batteries were added when it was discovered that a UPS would shut down and fail to transfer from the normal AC supply to the maintenance AC supply upon demand if certain single failures existed in the UPS logic. The batteries were intended to supply power to the logic for up to 15 minutes in the event of single failures; however, the batteries were not intended to compensate for multiple failures within the UPS logic.

The Exide representatives also stated that with no failures in UPS logic, with the UPS logic receiving power from the inverter output, and assuming that the maintenance supply is of proper quality (correct frequency, voltage, phase angle, etc.), the UPS would transfer from its normal AC supply to the maintenance supply regardless of the condition of the internal batteries or even without the internal batteries present. It was also determined that the internal batteries may be useful in maintaining logic power in the event of certain logic failures and for startup of the UPS when AC power is not available.

Memo

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Prior to the meeting, the NRC Incident Investigation Team had developed a series of questions regarding the UPS. The questions (Enclosure 2) were provided to NMPC and Exide Electronics prior to the meeting. NMPC and Exide Electronics provided oral responses to these questions during the meeting.

At the conclusion of the meeting, the NRC staff representatives informed the NMPC representatives that the NRC staff would respond in writing to Mr. Sylvia's letter dated October 23, 1991.

Donald S. Brinkman

Donald S. Brinkman, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. List of Attendees
2. UPS Questions

cc w/enclosures:
See next page

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ENCLOSURE 1

ATTENDANCE LIST

November 1, 1991 Meeting to Discuss Exide 75 KVA UPS
Control Logic Power Supply at NMP-2

Name	Title	Organization
Donald S. Brinkman	Senior Project Manager	NRC/NRR/PDI-1
Jack E. Rosenthal	IIT Team Leader	NRC/AEOD
Denny Ross	Dep. Dir. AEOD	NRC/AEOD
D. J. Hess	Dir. Customer Support	Exide Elec
Rudi Machilek	Dir. Sr. Staff Consultant	Exide Elec
Michael Grady	Mgr. Tech Support	Exide Elec
John Hockoday	Sr. Tech Specialist	Exide Elec
B. Ralph Sylvia	Executive Vice President	Niagara Mohawk
Carl Terry	VP-Nuclear Engineering	Niagara Mohawk
Anil K. Julka	Supervisor-Electrical NMP2	Niagara Mohawk
Bob Crandall	NMP2 UPS System Engineer	Niagara Mohawk
W. David Baker	Program Dir.-Licensing NMP2	Niagara Mohawk
Frank Ashe	Electrical Engineer	SELB/NRR
Thomas J. Pohida	IIT Member	SICB/NRR
Roger Woodruff	Sr. Reactor Systems Eng.	OEAB/NRR
Penny Bender	Reporter	States News Service
Kim Mills	Reporter	Associated Press
John Kauffman	IIT Member	NRC/AEOD/ROAB

ENCLOSURE 2

October 29, 1991

Mr. B. Ralph Sylvia
Exec. Vice President-Nuclear
Niagara Mohawk Power Corporation
301 Plainfield Rd.
Syracuse, New York 13212

SUBJECT: UPS QUESTIONS

1. What is the technical basis for the power supply fail (PSF) setpoint being specified as 16.5 volts? How frequently has this setpoint voltage been verified through measurement, and appropriately adjusted, in the past? How frequently will this setpoint be verified and adjusted in the future?

2. What is the K1, K2, K3, and K5 relay transfer time? How is this verified and monitored?

3. What would result if one of the 20 volt power supply outputs was suddenly lost without functional batteries?

4. Are there any fuses associated with the 20 volt power supplies? If yes, what would result if one of the fuses open circuited?

5. What is the designed rise time of the inverter output voltage? What is the time required for the inverter output voltage to rise from 25 VAC to 96 VAC? During this time period the 20 volt power supplies could be receiving power from the inverter output; will the power supply output voltage degrade during the rise time of the inverter?

6. What is the minimum DC voltage required to operate the shunt trip for CB1, CB2, and CB3? What is the current required at this minimum voltage? Will the current be available?

7. What time is required to open CB3 and close CB4 after the circuitry has made this decision? What is the sequence of the static switch and circuit breaker (CB3 and CB4) action? For what time duration must the circuitry be functional to control the static switch?

8. At what DC input voltage (from the power supplies) do the +5 V and +12 V voltage regulators loose the ability to maintain their specified output voltages? Plot the output voltage and current capability of the regulators for an input voltage ranging from 0 to 20 volts. What is the minimum voltage and current required out of these regulators to power the various components?

9. How long does it take to sense a degraded inverter output voltage? This degraded voltage could be due to internal inverter failures, or due to faulty UPS unit loads.

10. What are the postulated inverter failure modes?

11. Provide copies of measurement data and oscilloscope traces for all tests performed on the UPS units after the event.

12. How long will the batteries successfully power the UPS unit given the battery data sheets and the circuit drawings? How is this time modified as a result of a unit trip? Is the battery current load greater during normal operation, after a module trip, or with all four breakers open?

13. How was maintenance and surveillance performed without the proper documentation?

14. Where is the UPS unit original equipment manual?

15. During normal operating conditions, are the UPS units configured in the Auto-restart or Manual-restart mode?

16. What is the power source for the motors which operate CB3 and CB4? What is the minimum voltage and current required from this source? What is the time required for the motor to complete a full range of motion under the minimum voltage and current conditions?

POC: Thomas J. Pohida
U.S. Nuclear Regulatory Commission
301-492-4440

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Original Signed By:

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Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. List of Attendees
2. UPS Questions

cc w/enclosures:
See next page

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OGC	EJordan, MNBB 3701
NRC Participants	ACRS (10)
RACapra	JRosenthal, MNBB 9715

by phone

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