

November 16, 1990

Docket No. 50-245

LICENSEE: Northeast Nuclear Energy Company

FACILITY: Millstone Nuclear Power Station, Unit No. 1

SUBJECT: SUMMARY OF OCTOBER 16, 1990, MEETING WITH NNECO ON
DEGRADED GRID/UNDERVOLTAGE PROTECTION (TAC 60207)

On October 17, 1990, the NRC met with representatives of Northeast Utilities (NU) in Rockville, Maryland, to discuss the Millstone Unit 1 undervoltage protection design. A list of attendees is enclosed (Enclosure 1). An agenda for the meeting was previously made available as an enclosure to the October 11, 1990, memorandum announcing the meeting. Enclosure 2 is a copy of material furnished by NNECO during the meeting.

In summary, the licensee was requested to provide information on the problems operators had responding to undervoltage events on the plant simulator when the "split-logic" scheme was modeled and to discuss why a "split-logic" undervoltage design wasn't implemented. The licensee made a presentation on the history of degraded grid/undervoltage protection at Millstone 1, the "split-logic" design, and the operator's ability to cope with an undervoltage event on the plant simulator. At the end of the presentation, the NRC staff had questions on the applicability of GDC 17 to the Millstone 1 undervoltage protection design and the details of the licensee's undervoltage protection PRA analysis. The licensee stated that they would provide a description of the PRA analysis and a commitment to upgrade the fast transfer relays at the emergency buses to Class 1E in a letter by the end of October 1990. The staff stated that they would resolve the question of applicability of GDC 17 to the undervoltage protection design at Millstone 1 in order to issue a safety evaluation in the near future.

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Enclosures:
As stated

cc w/enclosures:
See next page

DISTRIBUTION	PDMilano	SKMitra	JLazevnick
JKnight	FRosa	GTnomas	BBoger
Docket File	NRC & L PDRs	SVarga	JCaldwell
SNorris	MBoyle	OGC	JPartlow
ACRS (10)	EWenzinger (RI)	JStolz	EMiraglia
			EJordan
			PDI-4 File

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NAME	: SNorris	: MBoyle/BAH	: JStolz	: FRosa	:
DATE	: 11/15/90	: 11-15-90	: 11-15-90	: 11/16/90	:

Document Name: MEETING ON NNECO

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PDR ADDCK 05000245
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Millstone Nuclear Power Station
Unit No. 1

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MEETING ATTENDEES

<u>Name</u>	<u>Representing</u>
Michael L. Boyle	NRC - Millstone 1 PM
P. D. Milano	NRC - Plant Systems Branch
S. K. Mitra	NRC - Electrical Systems Branch
Jim Lazevnick	NRC - Electrical Systems Branch
Jim Knight	NRC - Electrical Systems Branch
Faust Rosa	NRC - Electrical Systems Branch
John Stolz	NRC - Project Directorate I-4
George Thomas	NRC - Reactor Systems Branch
Roy Linthicum	NU - PRA
Chris Tabone	NU - Operator Instructor
James R. Nowell	NU - Shift Supervisor
Joseph A. Summa	NU - Engineering Supervisor
Peter J. Miner	NU - Licensing
Richard J. Halleck	NU - Electrical Engineering
Jeff Regan	NU - Electrical Engineering Supr.

MILLSTONE UNIT NO. 1
DEGRADED GRID UNDERVOLTAGE PROTECTION
MEETING WITH NRC
ROCKVILLE, MD

NORTHEAST NUCLEAR ENERGY COMPANY

OCTOBER 16, 1990

PARTICIPANTS

P. J. MINER	SCIENTIST, NUCLEAR LICENSING
J. R. NOWELL	SHIFT SUPERVISOR, UNIT 1 OPERATIONS
J. B. REGAN	SUPERVISOR, GENERATION ELECTRICAL ENGINEERING
R. J. HALLECK	SR. ENGINEER, GENERATION ELECTRICAL ENGINEERING
J. A. SUMMA	SUPERVISOR, UNIT 1 ENGINEERING
R. R. LINTHICUM	ENGINEER, PRA
C. J. TABONE	SR. INSTRUCTOR, OPERATOR TRAINING

INTRODUCTION

- 0 LONG HISTORY
- 0 BASIC LOGIC DESIGN IN PLACE SINCE INITIAL LICENSING OF PLANT
- 0 GDC 17 NOT LICENSING BASIS REQUIREMENT FOR MILLSTONE UNIT NO. 1
- 0 SEVERAL DESIGN ITERATIONS
- 0 MODIFICATIONS DURING 1989 OUTAGE FULFILLED COMMITMENTS
- 0 NRC LETTER REQUESTED THAT NNECO DEVELOP SPLIT-LOGIC DESIGN
- 0 NNECO ASSESSED OPTIONS TO SATISFY STAFF POSITION AND RESPONDED TO NRC'S LETTER

MILLSTONE UNIT NO. 1 CONFIGURATION

0 UNIQUE DESIGN

- ASYMMETRICAL BUS CONFIGURATION
- GAS TURBINE GENERATOR EMERGENCY LOAD
(APPROX. 10.6 MWE)
- DIESEL GENERATOR EMERGENCY LOAD
(APPROX. 2.6 MWE)

0 BUS DOES NOT AUTOMATICALLY ENERGIZE ON LOSS OF
POWER TO SINGLE DIVISION

OVERVIEW

- 0 NNECO's INITIAL PROPOSED DESIGN CHANGES IMPLEMENTED A SPLIT LOGIC CONFIGURATION

- 0 AS A RESULT OF MODIFICATIONS DURING 1989 OUTAGE, COMMITMENTS TO BTP PSB-1 MET

- 0 NNECO COULD ENGINEER SPLIT-LOGIC DESIGN (AND TRAIN OPERATORS) IF SUFFICIENT SAFETY BENEFIT DEMONSTRATED

- 0 CURRENT CONFIGURATION PROVIDES ADEQUATE PROTECTION

HISTORY

- 0 1976 - MILLSTONE UNIT NO. 2 EXPERIENCES DEGRADED VOLTAGE WHICH CAUSED "COMMON-MODE" FAILURES

- 0 1977 - LEVEL 2 PROTECTION INSTALLED AT 345KV LEVEL

- 0 1980 - NNECO MADE TWO COMMITMENTS:
 - 0 RELOCATE THE LEVEL 2 SENSORS TO THE CLASS 1E BUSES

 - 0 PROVIDE FOR THE AUTO-REINSTATEMENT OF THE LOAD SHED FEATURE

- 0 1980 THRU 1987 - NNECO ATTEMPTED TO MODIFY THE LNP LOGIC TO ACCOMPLISH THE FOLLOWING:
 - 0 RELOCATE LEVEL 1 & 2 SENSING TO THE CLASS 1E BUSES

 - 0 PROVIDE FOR THE REINSTATEMENT OF LOAD SLED FEATURE BY SPLITTING THE LNP LOGIC

- 0 1987 - TESTING OF PROPOSED DESIGN ON PLANT-SPECIFIC SIMULATOR
 - MODIFICATIONS DEFERRED TO 1989 OUTAGE

- 0 1988 - DESIGN MODIFIED TO ACCOMPLISH THE FOLLOWING:
 - 0 RELOCATE THE LEVEL 1 & 2 SENSING TO THE CLASS 1E BUSES
 - 0 PROVIDE FOR A SCRAM ON A LOSS OF POWER TO THE MAIN BUSES
 - 0 PROVIDE FOR AUTO-REINSTATEMENT OF THE LOAD SHED FEATURE
 - 0 DO NOT SPLIT THE LNP LOGIC

- 0 1989 - DESIGN SUCCESSFULLY IMPLEMENTED SATISFYING 1980 COMMITMENTS
 - STAFF ISSUES POSITION THAT LNP LOGIC SHOULD BE SPLIT TO COVER "NON-COMMON" FAILURE MODES
 - ASSESSED OPTIONS TO SATISFY STAFF POSITION

SUMMARY

0 CURRENT CONFIGURATION WITHIN LICENSING BASIS

0 SAFETY BENEFIT OF SPLITTING LOGIC NOT APPARENT

RISK ASSESSMENT

0 FAILURES OF ONE OR BOTH EMERGENCY AC BUSES

- APPROX. 19% OF CMF.
 - 14% FROM LOSS OF OFFSITE POWER
 - 5% FROM ALL OTHER CAUSES INCLUDING FAST TRANSFER FAILURES

0 FAILURE OF 1 BUS TO FAST TRANSFER

- APPROX. 0.5% OF CMF.

7 MAXIMUM BENEFIT THAT COULD BE GAINED FROM SPLITTING LOGIC

CMF REDUCTION: $2.95E-7/YR$

PUBLIC SAFETY BENEFIT: 18 MAN-REM OVER REMAINING PLANT LIFE