Docket No. 50-336 June 12, 1986

Mr. John F. Opeka, Senior Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
P. O. Box 270
Hartford, Connecticut 06141-0270

Dear Mr. Opeka:

We have completed our review of your November 8, 1983, March 16, 1984 and January 10, 1986 responses to Item 1.2, "Data Information Capability" of Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events," for Millstone Unit 2. As indicated in the enclosed Safety Evaluation, based on our review of your submittals, we conclude that the post-trip review data and information capabilities for Millstone Unit 2 are acceptable.

Sincerely,

/S/

David H. Jaffe, Project Manager
PWR Project Directorate #8
Division of PWR Licensing-B

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Mr. John F. Opeka
Northeast Nuclear Energy Company

Millstone Nuclear Power Station
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

GENERIC LETTER 83-28, ITEM 1.2 - POST-TRIP REVIEW

(DATA AND INFORMATION CAPABILITY)

I. INTRODUCTION

On February 25, 1983, both of the scram circuit breakers at Unit 1 of the Salem Nuclear Power Plant (SNPP) failed to open upon an automatic reactor trip signal from the reactor protection system. This incident occurred during the plant start-up and the reactor was tripped manually by the operator about 30 seconds after the initiation of the automatic trip signal. The failure of the circuit breakers has been determined to be related to the sticking of the undervoltage trip attachment. On February 22, 1983, during start-up of SNPP, Unit 1, an automatic trip signal occurred as the result of steam generator low-low level. In this case, the reactor was tripped manually by the operator almost coincidentally with the automatic trip. Following these incidents, on February 28, 1983, the NRC Executive Director for Operations (EDO) directed the staff to investigate and report on the generic implications of these occurrences. The results of the staff's inquiry into these incidents are reported in NUREG-1000, "Generic Implications of ATWS Events at the Salem Nuclear Power Plant." As a result of this investigation, the Commission requested (by Generic Letter 83-28 dated July 8, 1983) all licensees of operating reactors, applicants for an operating license, and holders of construction permits to respond to certain generic concerns. These concerns are categorized into four areas: (1) Post-Trip Review, (2) Equipment Classification and Vendor Interface, (3) Post-Maintenance Testing, and (4) Reactor Trip System Reliability Improvements.

The first action item, Post-Trip Review, consists of Action Item 1.1, "Program Description and Procedure" and Action Item 1.2, "Data and Information Capability." This safety evaluation (SE) addresses Action Item 1.2 only.

II. REVIEW GUIDELINES

The following review guidelines were developed after initial evaluation of the various utility responses to Item 1.2 of Generic Letter 83-28 and incorporate the best features of these submittals. As such, these review guidelines in effect represent a "good practices" approach to post-trip review. We have reviewed the licensee's response to Item 1.2 against these guidelines:

A. The equipment that provides the digital sequence of events (SOE) record and the analog time history records of an unscheduled shutdown should provide a reliable source of the necessary information to be used in the post-trip review. Each plant variable which is necessary to determine the cause and progression of the events following a plant trip should be monitored by at least one recorder (such as a sequence-of-events recorder or a plant process computer) for digital parameters; and strip charts, a plant process computer or analog recorder for analog (time history) variables. Performance characteristics guidelines for SOE and time history recorders are as follows:

- o Each sequence of events recorder should be capable of detecting and recording the sequence of events with a sufficient time discrimination capability to ensure that the time responses associated with each monitored safety-related system can be ascertained, and that a determination can be made as to whether the time response is within acceptable limits based on FSAR Chapter 15 Accident Analyses. The recommended guidelines for the SOE time discrimination is approximately 100 milliseconds. If current SOE recorders do not have this time discrimination capability the licensee should show that the current time discrimination capability is sufficient for an adequate reconstruction of the course of the reactor trip and post-trip events. As a minimum this should include the ability to adequately reconstruct the transient and accident scenarios presented in Chapter 15 of the plant FSAR.

- o Each analog time history data recorder should have a sample interval small enough so that the incident can be accurately reconstructed following a reactor trip. As a minimum, the licensee should be able to reconstruct the course of the transient and accident sequences evaluated in the accident analysis of Chapter 15 of the plant FSAR. The recommended guideline for the sample interval is 10 seconds. If the time history equipment does not meet this guideline, the licensee should show that the time history capability is sufficient to accurately reconstruct the transient and accident sequences presented in Chapter 15 of the FSAR. To support the post-trip analysis of the cause of the trip and the proper functioning of involved safety related equipment, each analog time history data recorder should be capable of updating and retaining information from approximately 5 minutes prior to the trip until at least 10 minutes after the trip.

- o All equipment used to record sequence of events and time history information should be powered from a reliable and non-interruptible power source. The power source used need not be Class 1E.

B. The sequence of events and time history recording equipment should monitor sufficient digital and analog parameters, respectively, to assure that the course of the reactor trip and post-trip events can be reconstructed. The parameters monitored should provide sufficient information to determine the root cause of the unscheduled shutdown, the progression of the reactor trip, and the response of the plant parameters and protection and safety systems to the unscheduled shutdowns. Specifically, all input parameters associated with reactor trips, safety injections and other safety-related systems as well as output parameters sufficient to record the proper functioning of these systems should be recorded for use in the post-trip review. The parameters deemed necessary, as a minimum, to perform a post-trip review that would determine if the plant remained within its safety limit design envelope are presented in Table 1. They were selected on the basis of staff engineering judgment following a complete evaluation of utility submittals. If the licensee's SOE recorders and time history recorders do not monitor all of the parameters suggested in these tables the licensee should show that the existing set of monitored parameters are sufficient to establish that the plant remained within the design envelope for the accident conditions analyzed in Chapter 15 of the plant FSAR.

C. The information gathered by the sequence of events and time history recorders should be stored in a manner that will allow for data retrieval and analysis. The data may be retained in either hardcopy (e.g., computer printout, strip chart record), or in an accessible memory (e.g., magnetic disc or tape). This information should be presented in a readable and meaningful format, taking into consideration good human factors practices such as those outlined in NUREG-0700.

D. Retention of data from all unscheduled shutdowns provides a valuable reference source for the determination of the acceptability of the plant vital parameter and equipment response to subsequent unscheduled shutdowns. Information gathered during the post-trip review is to be retained for the life of the plant for post-trip review comparisons of subsequent events.

III. EVALUATION AND CONCLUSION

By letters dated November 8, 1983, March 16, 1984, and January 10, 1986, Northeast Nuclear Energy Company provided information regarding its post-trip review program data and information capabilities for Millstone Nuclear Power Station, Unit 2. We have evaluated the licensee's submittals against the review guidelines described in Section II. Deviations from the Guidelines of Section II were discussed with representatives of the licensee by telephone on December 16, 1985. A brief description of the licensee's responses and the staff's evaluation of the response against each of the review guidelines follows:

A. The licensee has described the performance characteristics of the equipment used to record the sequence of events and time history data needed for post-trip review. Based on our review of the licensee's submittals, we find that the sequence of events recorder and time history characteristics conform to the guidelines described in Section II A, and are acceptable.

B. The licensee has established and identified the parameters to be monitored and recorded for post-trip review. Based on our review, we find that the parameters selected by the licensee include all but one of those identified in Table 1. PORV Position, while not available on the Sequence of Events Recorder, can be inferred from the quench tank high level, pressure or temperature alarms, tailpipe high temperature alarm or acoustic monitoring alarm, all of which are recorded on the Sequence of Events Recorder. The staff finds this acceptable. Consequently, we find that the licensee's selection of parameters meets the intent of the guidelines described in Section II.B and is, therefore, acceptable.

C. The licensee's submittals described the means for storage and retrieval of the information gathered by the sequence of events and time history recorders, and for the presentation of this information for post-trip review and analysis. We find that this information is being presented in a readable and meaningful format, and that the storage, retrieval and presentation conform to the guidelines of Section II C.

D. The licensee's January 10, 1986 submittal stated that the data and information used during post-trip reviews are being retained in an accessible manner for the life of the plant. Based on this information, we find that the licensee's program for data retention conforms to the guidelines of Section II D, and is acceptable.

Based on our review of the licensee's submittals and our telephone conversations with the licensee, we conclude that the licensee's post-trip review data and information capabilities for Millstone Nuclear Power Station, Unit 2, are acceptable.

Dated: June 12, 1986

Principal Contributor:
J. Kramer

TABLE 1 PWR PARAMETER LIST

SOE Recorder	Time History Recorder	Parameter/Signal
(1) x		Reactor Trip
(1) x		Safety Injection
x		Containment Isolation
(1) x		Turbine Trip
x		Control Rod Position
(1) x	x	Neutron Flux, Power
x	x	Containment Pressure
(2)		Containment Radiation
	x	Containment Sump Level
(1) x	x	Primary System Pressure
(1) x	x	Primary System Temperature
(1) x		Pressurizer Level
(1) x		Reactor Coolant Pump Status
(1) x	x	Primary System Flow
(3)		Safety Inj.; Flow, Pump/Valve Status
x		MSIV Position
x	x	Steam Generator Pressure
(1) x	x	Steam Generator Level
(1) x	x	Feedwater Flow
(1) x	x	Steam Flow

SOE Recorder	Time History Recorder	Parameter/Signal
(3)		Auxiliary Feedwater System: Flow, Pump/Valve Status
x		AC and DC System Status (Bus Voltage)
x		Diesel Generator Status (Start/Stop, On/Off)
x		PORV Position

(1) Trip parameters

(2) Parameter may be monitored by either an SOE or time history recorder.

(3) Acceptable recorder options are; (a) system flow recorded on an SOE recorder, (b) system flow recorded on a time history recorder, or (c) equipment status recorded on an SOE recorder.