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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

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

DATA AND INFORMATION CAPABILITY

GPU NUCLEAR CORPORATION

JERSEY CENTRAL POWER AND LIGHT COMPANY

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

1.0 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 startup 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. Prior to this incident, on February 22, 1983, during startup of SNPP Unit 1, an automatic trip signal was generated based on 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 at SNPP Unit 1. The results of the staff's inquiry into the generic implications of the SNPP units 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 (NRC) 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 addresses Action Item 1.2 only.

Action Item 1.1 was evaluated by the staff in its letter dated May 14, 1985, in which the staff concluded the licensee's response to Item 1.1 was acceptable.

2.0 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, data and information capability. The NRC staff has 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 monitored by at least strip charts, a plant process computer or an analog recorder for analog (time history) variables. Performance characteristics guidelines for SOE and time history recorders are as follows:

- 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 Final Safety Analysis Report (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.

- 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.

- 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.

3.0 EVALUATION

By letter dated November 14, 1983, GPU Nuclear Corporation (the licensee) provided information regarding its post-trip review program data and information capabilities for Oyster Creek Nuclear Generating Station. The staff has evaluated the licensee's submittal against the review guidelines described in Section 2.0. Deviations from the Guidelines were discussed with representatives of the licensee by telephone on December 20, 1985. A brief description of the licensee's responses and the staff's evaluation of the responses against each of the review guidelines is as 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 submittal, the staff finds that the sequence of events recorder and time history characteristics conform to the guidelines described in Section 2.A, and, therefore, are acceptable.

B. The licensee has established and identified the parameters to be monitored and recorded for post-trip review. Based on its review, the staff finds that the parameters selected by the licensee include all of those identified in Table 1 and conform to the guidelines described in Section 2.B and, therefore, are acceptable.

C. The licensee 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. Based on its review, the staff finds that this information will be presented in a readable and meaningful format, and that the storage, retrieval and presentation conform to the guidelines of Section 2.C and, therefore, are acceptable.

D. During the phone conversation of December 20, 1985, the licensee indicated that the data and information used during post-trip reviews is being retained in an accessible manner for the life of the plant. Based on this information, the staff finds that the licensee's program for data retention conforms to the guidelines of Section 2.D, and is, therefore, acceptable.

4.0 CONCLUSION

Based on its evaluation presented above, the staff concludes that the licensee's post-trip review, data and information capability, for Oyster Creek is acceptable.

5.0 REFERENCES

1. Letter from P. B. Fiedler, GPU Nuclear, to Director, Division of Licensing, USNRC, dated November 14, 1983.

2. Telephone conversation between J. Donohew and J. Kramer, USNRC, and M. Laggart, GPU Nuclear, dated December 20, 1985.

Principal Contributor: J. Kramer

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TABLE 1 BWR PARAMETER LIST

SOE Recorder	Time History Recorder	Parameter/Signal
x		Reactor Trip
x		Safety Injection
x		Containment Isolation
x		Turbine Trip
x		Control Rod Position
x (1)	x	Neutron Flux, Power
x (1)		Main Steam Radiation
(2)		Containment (Dry Well) Radiation
x (1)	x	Drywell Pressure (Containment Pressure)
(2)		Suppression Pool Temperature
x (1)	x	Primary System Pressure
x (1)	x	Primary System Level
x		MSIV Position
x (1)		Turbine Stop Valve/Control Valve Position
x		Turbine Bypass Valve Position
	x	Feedwater Flow
	x	Steam Flow
(3)		Recirculation; Flow, Pump Status
x (1)		Scram Discharge Level
x (1)		Condenser Vacuum

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.