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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: Docket No. 50-206
Generic Letter 83-28: Required Actions Based on
Generic Implications of Salem ATWS Events
San Onofre Nuclear Generating Station
Unit 1

This letter provides our response to your request for additional information regarding the control room events recorder in accordance with your letter dated May 16, 1990. The additional information is supplied to aid your review of our response to Generic Letter 83-28, Item 1.2, "Post Trip Review - Data and Information Capabilities" and is provided as the enclosure to this letter.

If you have any questions, please do not hesitate to call me.

Very truly yours,

Enclosure

cc: J. B. Martin, Regional Administrator, NRC Region V
C. Caldwell, NRC Senior Resident Inspector, San Onofre Units 1, 2 and 3

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ADDITIONAL INFORMATION FOR GL 83-28

1. "By letter dated September 3, 1985, the NRC staff provided the licensee with the results of a preliminary review of its submittal regarding GL 83-28, Item 1.2. These preliminary results indicated that the licensee failed to satisfy the review criteria in certain areas. With the exception of recorder discrimination capability, what is the resolution of the weaknesses that were identified?"

Response:

The September 3, 1985, NRC letter states that the following desirable parameters are not being recorded on the events recorder for use in the post trip review. The current status of each of these parameters is indicated below:

- Containment Isolation - This signal is recorded on the Technical Support Center data gathering computer which is a Foxboro Model III (FOX III). Reference SCE letters November 28, 1983, and July 15, 1986.
- Control Rod Position - This signal is recorded in the control room on the control room data recorders in the J-console. Reference SCE letter dated April 28, 1987.
- Neutron Flux Power - The Events Recorder records Intermediate Range High Startup Rate Power Range and Over Power trip signals. Nuclear Power is recorded on the control room recorders. The FOX III records Intermediate Range and Source Range. Reference SCE letters dated November 28, 1983, and April 28, 1987.
- Containment Pressure - This signal is recorded on the FOX III. Reference SCE letters dated November 28, 1983, and April 28, 1987.
- Containment Radiation - Control Room Data Recorders record containment radiation. Reference SCE letter dated April 28, 1987.
- Primary System Temperature - Primary System Temperatures are recorded on both the FOX III computer and the control room data recorders. Reference SCE letter November 28, 1983.
- Reactor Coolant Pump Status - The RCP status is not directly recorded. An indirect indication is provided by the RCP bearing temperature recorder. Reference SCE letter dated April 28, 1987.
- MSIV Position - SONGS Unit 1 does not have MSIVs. Therefore, this indication does not apply.

- Steam Generator Pressure - The steam header pressure is recorded on the FOX III. The control room data recorders also record this signal. Reference SCE letter dated November 28, 1983 and SCE letter dated April 28, 1987.
 - Feedwater Flow - Feedwater flow/steam flow mismatch trip signal is recorded on the Events Recorder. The control room data recorders also record this signal. Reference SCE letter dated April 28, 1987.
 - Steam Flow - Steam flow/feedwater flow mismatch trip signal is recorded on the Events Recorder. The control room data recorders also record this signal. Reference SCE letter dated April 28, 1987.
 - AC and DC System Status - AC & DC system voltages or frequencies are not currently recorded on the events recorder however. The 220 kV frequency and the 18 kV bus voltage are recorded on other control room recorders. The status of the vital busses will be included in the Safety Parameter Display System. Reference SCE letter dated April 28, 1987.
 - Diesel Generator Status - Diesel Generator status is not directly recorded; however, indirect indication is available whenever the safety injection system is actuated. The Diesel Generators are automatically started by the safety injection actuation signal. Safety Injection initiation is recorded on the FOX III and on the Events Recorder. Reference SCE letter dated April 28, 1987.
 - PORV Position - The PORV position is recorded on the FOX III. Reference SCE letters dated November 28, 1983 and April 28, 1987.
 - Primary System Flow - The system flow is recorded on the Events Recorder. Reference SCE letter dated April 28, 1987.
2. "The Events Recorder shifts to the high speed mode of operation upon receipt of a trip signal and continues to operate in this mode for 24 seconds. What is the basis for the 24 seconds duration? Why is it adequate"?

Response:

The events recorder strip chart normally advances at a rate of 3/4 inch/hour. Following receipt of a trip signal, the recorder advances the strip chart paper at 3600 times the normal rate or 3/4 inch/sec. High speed operation continues for 24 seconds then the events recorder returns to its normal operation speed. Operation of the

events recorder is explained in detail in an SCE letter dated January 21, 1986.

Since we began our post trip review program, following the issuance of Generic Letter 83-28, there have been several reactor trips. The post trip reviews we have performed have not been hindered by the relatively short period of high speed operation of the events recorder. Although the 24 second duration is a physical constraint of the events recorder and has never been tied to an event analysis to justify its duration, the pieces of data presently recorded by the various equipment in the control room have been sufficient to perform the post trip reviews.

If the high speed printout from the events recorder were the only data available to perform a post trip review, a 24 second duration would not be sufficient. However, the output of the events recorder is just one of several pieces of data used to perform a post trip review. The high speed run of the events recorder is primarily utilized to provide high resolution data sequencing. The remainder of a post trip review is performed using the data stored in the FOX III computer and the other recorders located in the control room.

We are scheduled to install our Safety Parameter Display System (SPDS) during the Cycle 12 refueling outage. A table showing how each parameter desired by the September 3, 1985 NRC letter is to be recorded is provided as Attachment 1 to this letter. The SPDS computer will be capable of functionally replacing the events recorder for recording the sequence of events for many parameters. High resolution data sequencing for longer than 24 seconds following a trip signal will also be possible. All of the parameters that are currently being recorded on the FOX III computer will be recorded by the SPDS computer. Attachment 1 provides the proposed method of addressing each of the desired post trip parameters for a pressurized water reactor. Following installation of SPDS - detailed design scheduled to begin in 1991 - the functions of the event recorder will be replaced by the SPDS computer. The events recorder, however, may be retained in its current capacity as a backup to the SPDS sequence of events recorder function.

3. "By letter dated April 28, 1987, the licensee stated that as a minimum recorder paper would be maintained sufficient for three high speed runs of the Event Recorder. What is the basis for selecting three high speed runs as a criteria?"

Response:

In a telephone conference with the NRC on December 8, 1986, it was noted that there is a possibility of the events recorder receiving multiple trip signals in rapid succession. This theoretically could result in several sequential high speed runs of the events recorder. The paper supply for the events recorder is checked daily by the control room staff as directed by Procedure S01-12.9-11. The events recorder is

equipped with an indicator which alerts personnel when the paper supply is low. When the paper supply is low, the control room staff replenishes the supply. When the indicator shows a low paper supply, at least 10 linear feet of paper remains, which is enough for a minimum of three high speed recording runs. For the majority of the time that the plant is in Modes 1-6, the events recorder has sufficient paper supply for multiple high speed runs. However, operating experience has shown that multiple high speed runs are very unlikely and that the existing paper supply is adequate. In the unlikely event that multiple trip signals were received by the events recorder at a time when the paper supply could be exhausted, the other recorders in the control room (as discussed in the response to Question No. 2 above) would provide sufficient information to perform the post trip review.

4. "By letter dated April 28, 1987, the licensee indicated that parameters that are not part of the FOX III Post Trip Review function are not applicable to Generic Letter 83-28, Item 1.2. Therefore, in addition to the discrepancies referred to by Question No. 1, the licensee does not satisfy the review criteria for recording containment pressure. What is the resolution of this discrepancy?"

Response:

Containment pressure (wide range) is recorded on the FOX III and is scanned at one second intervals. Maximum containment pressure is also recorded on the FOX III but is scanned at 60 second intervals. As indicated in our April 28, 1987 letter, the NRC review criteria for analog data sampling is at least once every 10 seconds. Our April 28, 1987 letter states that the maximum containment pressure is scanned at a frequency greater than once per 10 seconds but that it is not used in performing the post-trip review and therefore is not subject to the data sampling frequency criteria in Generic Letter 83-28. Because containment pressure (wide range) is recorded on the FOX III and the data sampling rate is once per second, the criteria of Generic Letter 83-28 are satisfied for containment pressure. Additionally, as indicated in Table 1 (attached), containment pressure will be included in the Safety Parameter Display System.

TABLE 1
RECORDING METHODS FOR
POST-TRIP REVIEW PARAMETERS⁽¹⁾

<u>Parameter/Signal</u>	<u>Events Recorder</u>	<u>Control Room Data Recorders</u>	<u>FOX III</u>	<u>To Be Included On SPDS</u>
Reactor Trip	X		X	X
Safety Injection	X		X	X
Containment Isolation			X	X
Turbine Trip	X			X ⁽²⁾
Control Rod Position		X		X ⁽³⁾
Neutron Flux, Power	X	X	X	X
Containment Pressure			X	X
Containment Radiation		X		X
Containment Sump Level			X	X
RCS Pressure	X	X	X	X
RCS Temperature		X	X	X
Pressurizer Level	X	X	X	X
Reactor Coolant Pump Status		X ⁽⁴⁾		
RCS Flow ⁽⁵⁾				X
Safety Injection Flow ⁽⁶⁾		X	X	X
MSIV Position ⁽⁷⁾				
Steam Generator Pressure		X	X	X
Steam Generator Level	X	X	X	X
Feedwater Flow	X	X		X
Steam Flow	X	X		X
AFWS Flow			X	X
AC and DC System Status				X ⁽⁸⁾
DG Status ⁽⁹⁾				X
PORV Position			X	X

NOTES:

- 1) This table supercedes the similar table provided in the April 28, 1987 letter from SCE to the NRC.
- 2) This parameter is planned to be included in SPDS but further investigation is required to assure feasibility.
- 3) The Full In indication for the control rods will be recorded in SPDS. The actual position of the individual rods is recorded on other control room recorders in the J-Console but is not planned to be included in the SPDS computer.
- 4) The reactor coolant pump status is not planned to be included in SPDS. This parameter is recorded indirectly by recording the reactor coolant pump bearing temperature in the control room data recorder.
- 5) RCS flow is not currently recorded directly. Loss of RCS flow is indirectly indicated on the events recorder by the RCS reduced power low flow scram and full power low flow scram channels. RCS flow will, however, be recorded on the SPDS system.

- 6) Safety Injection pump bearing temperature is recorded and provides an indirect indication of pump status.
- 7) Parameter not applicable to San Onofre Unit 1.
- 8) Vital bus voltage will be included in SPDS.
- 9) The diesel generator (DG) status is currently not recorded directly. The DGs are automatically started during a safety injection system actuation. Safety injection initiation is recorded on the Fox III and the events recorder. The diesel generator status will be recorded directly on SPDS.