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October 29, 1990

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

Gentlemen:

Subject: Docket No. 50-206
Inservice Testing of Safety Injection Pumps and
Refueling Water Pumps
San Onofre Nuclear Generating Station
Unit 1

This letter addresses inservice testing (IST) of the safety injection (SI) pumps and the refueling water (RW) pumps at San Onofre Unit 1. As requested by your safety evaluation dated May 18, 1990, we have evaluated the possibility of performing improved flow testing of these pumps. The results of our evaluation were discussed with the NRC project manager, Mr. J. E. Tatum, in a telephone conversation on September 28, 1990. These results are presented below along with a new relief request for the SI pumps.

Background

On November 30, 1989, we submitted Revision 3 to Pump Relief Request (PRR) No. 6 for NRC approval. This PRR explained why it is not practical to conduct quarterly full flow testing of the safety injection pumps G50A and G50B and the refueling water pumps G27N and G27S to satisfy the ASME Code, Section XI, requirements. The reason is the absence of a suitably instrumented test path during plant operating Modes 1 and 2. The PRR proposed the addition of flow instrumentation on the pump minimum flow recirculation lines. After this modification, the minimum flow can be measured once every quarter and evaluated with the measured pump differential pressure to monitor for any hydraulic degradation of the pump.

During a telephone discussion last April, the NRC staff emphasized that pump testing at minimum flow conditions should be avoided if at all possible. The staff pointed out that if a full or a substantial flow test can be carried out only at cold shutdown or refueling intervals (instead of quarterly), this is accepted by Generic Letter 89-04. Based on this position, your safety evaluation of May 18, 1990, withheld approval of PRR No. 6, as it applies to the SI pumps and the RW pumps. Your forwarding letter requested SCE to evaluate alternative test paths other than the minimum flow lines and to contact the NRC should relief still be needed. We have completed the requested evaluation and the results are described on the following page.

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Safety Injection Pumps

For the SI pumps G50A and G50B we have not been able to identify a test path that would permit full flow or substantial flow testing at this time, whether at quarterly intervals or otherwise. We, therefore, plan to implement modifications so that improved flow testing of the SI pumps can be performed in accordance with technical position 9 of Generic Letter 89-04. These modifications will be implemented during the Cycle 12 refueling outage, along with other safety injection system modifications that will take place at that time. This schedule is consistent with the NRC's order dated January 2, 1990, concerning full-term operating license open items for San Onofre Unit 1.

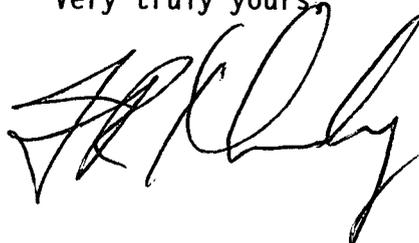
Since the schedule provided above is different from that required by the generic letter, we are enclosing a relief request (PRR No. 10) for your approval. PRR No. 10 provides additional details of our evaluation of IST for the SI pumps. Since relief is required prior to plant restart, we request your approval of this PRR by mid-December 1990.

Refueling Water Pumps

For the RW pumps G27N and G27S we have identified a flow path that will permit testing of these pumps at close to full flow conditions. However, this testing will only be possible in Mode 5. It will not require any plant modifications and it will be initiated prior to plant restart from the present refueling outage. This method of testing meets the guidance of Generic Letter 89-04. Therefore, no relief request is required for the RW pumps. The IST program will be revised to reflect this proposed method of testing.

If you have any questions, please 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
C. D. Townsend, NRC Resident Inspector, San Onofre Unit 1

PUMP RELIEF REQUEST NO. 10

10/90

SYSTEM: Safety Injection (SI) System
COMPONENT: SI Pumps G50A and G50B
CLASS: 2

FUNCTION:

To provide low pressure borated water from the refueling water storage tank to the suction of the Feedwater Pumps, when operating in the SI mode.

TEST REQUIREMENT:

Article IWP-3000 of ASME Code Section XI, requires pump flow rate to be measured once every three months as part of periodic Inservice Testing during normal plant operation.

BASIS FOR RELIEF:

The only available flow paths for periodic testing of the SI pumps during normal power operation (Modes 1 and 2) are the recirculation or mini-flow lines designed to provide the required minimum flow for pump cooling. Presently, the design does not provide instrumentation to measure this flow. IST data is obtained while the pump operates in a fixed resistance flow path. Generic Letter 89-04 (Reference A) permits use of minimum flow recirculation lines for inservice testing only if an alternative path does not exist.

In cases where only the mini-flow recirculation line is available for pump testing, regardless of the test interval, the generic letter requires flow instrumentation which meets the requirements of IWP-4110 and IWP-4120 to be installed in the mini-flow line. Installation of this instrumentation is necessary to provide flow rate measurements during pump testing so this data can be evaluated with the measured pump differential pressure to monitor for pump hydraulic degradation.

In Reference B, the NRC requested that an evaluation of the possibility of performing full flow testing of the SI pumps be undertaken by SCE.

As the result of our evaluation, we determined that three potential test paths exist. These can be seen on P&ID 5178115 (copy attached). Each of these paths was further examined and found to be unacceptable as explained below.

Paths 1 and 2:

The SI pumps take a suction from the refueling water storage tank (RWST) using the normal suction line and discharge via the 2" Feedwater Pump bypass line (line: SIS-5012-2"-CL) to either the reactor coolant system (RCS) directly, or back to the RWST via the Safety Injection Pipe Purge Line (SIS-5009-2"-CL).

The lack of appropriate flow instrumentation in both paths offers no advantage over the current test method. In addition, their large length and small diameter may result in less flow than is currently obtained through the mini-flow recirculation line.

Path 3:

The SI pumps take a suction from the RWST from the normal suction line and discharge via the Feedwater Pumps directly to the RCS using the safety injection flow path (Safety Injection Discharge Valves HV-853A and HV-853B).

1. System flow using the path through the Feedwater Pumps would be approximately 10,000 to 11,000 gpm. The ASME Code requires a minimum pump run time of 5 minutes under stable conditions prior to taking data. This means that 50,000 gallons of water could be injected into the RCS prior to taking any data. The total RCS water volume is approximately 50,500 gallons. There is no practical way of dealing with this excessive volume as there is no return path from the RCS to the RWST that could handle a 10,000 to 11,000 gpm flow.

Testing during Mode 6 (Refueling) with the Reactor Vessel Head removed and filling the refueling cavity during the inservice test has been evaluated. This test path would result in significant airborne and particulate contamination in the containment and could result in costly delay in the refueling operation to allow for decontamination. It would also increase the risk of personnel exposure and contamination.

2. The Feedwater Pump shaft seals are labyrinth seals. Water passes through very narrow clearances between the labyrinth strips and the shaft. As the water passes from one strip to the other, its pressure and velocity are reduced. During normal operation (feeding the steam generators), the shaft seal water is provided by the condensate pumps and flow is directed along the seal length from the outside to the inside of the pump casing. During Safety Injection, normal seal water supply is unavailable and shaft seal water (pressurized RWST water) is provided from inside the Feedwater Pump casing. Since seal flow is reversed, external leakage is expected. This will spread contaminated RWST water in the immediate area of the Feedwater Pumps.

If a design change were installed to inject clean seal water, this water would flow into the RCS via the Feedwater Pump seals and present a risk of diluting the RCS boron concentration.

To prevent contamination problems and dilution of RCS boron concentration, an external source of borated seal water would be required during this test. Providing this external source would entail significant plant modification.

Based on these results, it is concluded that the SI pumps can only be tested using the minimum flow recirculation lines. These lines are shown on P&ID 5178115 (copy attached).

ALTERNATE TESTING:

Interim:

Test the SI pumps once every quarter* on mini-flow in accordance with ASME Code Section XI, except for the measurement of flow rate.

Long Term:

By the end of the Cycle 12 refueling outage:

- a) implement modifications to enable improved flow testing of the SI pumps in accordance with technical position 9 of Reference A
- b) begin improved flow testing.

APPROVAL STATUS:

This Pump Relief Request (PRR) complies with the technical positions of Reference A. The schedule for modifications complies with the schedule given in the NRC's order of January 2, 1990, concerning full-term operating license open items for San Onofre Unit 1.

NRC approval of this revised PRR is requested by mid-December 1990.

REFERENCES:

- A. NRC Generic Letter 89-04, Guidance on Developing Acceptable Inservice Testing Programs, April 3, 1989
- B. Letter, James E. Tatum (NRC) to Harold B. Ray (SCE), Inservice Testing Pump Relief Request No. 6, May 18, 1990 and its enclosed Safety Evaluation Report (SER)

*One quarter will be equal to 92 days.

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