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SUBJECT: Forwards addl info supporting util response to Generic Ltr 86-06 re implementing reactor coolant pump trip criteria.

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July 1, 1988

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

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
Additional Information Supporting SCE's Response
to Generic Letter 86-06 (TAC Nos. 49691 and 49692)
San Onofre Nuclear Generating Station
Units 2 and 3

The NRC's letter dated April 12, 1988, requested that SCE provide additional information pertaining to a response for implementing reactor coolant pump trip criteria in compliance with the Generic Letter 86-06 requirements. This response was submitted to the NRC on July 7, 1987.

Enclosure 1 provides additional information as requested. Should you have any questions regarding the enclosed information, please call me.

Very truly yours,

M. O. Medford
Manager of Nuclear Engineering
and Licensing

Enclosure

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

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Enclosure 1

ADDITIONAL INFORMATION SUPPORTING SCE'S RESPONSE TO GENERIC LETTER 86-06

Question 1:

Southern California Edison (SCE) did not provide sufficient information in its July 7, 1987 response to GL 86-06 Item 3 to determine how the uncertainties in the generic analysis presented in CEN-268 affect the results as they apply to San Onofre 2 and 3. Therefore, identify the San Onofre 2 and 3 plant specific features not representative of reference plant used in the analysis presented in CEN-268 to determine the setpoint for tripping the first set of pumps. At a minimum, SCE should discuss core power; decay heat; HPIS capacity; makeup flows; setpoints for steam generator safety valves; steam generator tube areas; and setpoints for reactor trip, safety injection, and accumulator injection. Show that the values used in the generic analysis are either representative of those at San Onofre 2 and 3 or conservative. If a reference plant parameter is not representative of San Onofre 2 and 3, discuss how this was considered in determining the plant specific setpoint.

Response:

In CEN-268, the 2700 Megawatt thermal (MWt) class plants were selected as the reference plant based on small break core cooling considerations. The 2700 MWt class plants have the most restrictive combination of safety injection tank pressure (which affects the worst break size) and HPSI pump flow (which affects core coolability). A comparative analysis was also conducted for the 3410 MWt class plants to demonstrate that the results from the reference plant bound the core cooling performance of the 3410 MWt.

Tables 1 and 2 identify the SONGS 2 and 3 plant specific data along with the reference plant assumptions used in the CEN-268 analysis to determine the setpoint for tripping the first set of pumps. The design features assumed in the analysis for the reference plant include a lower combined HPSI and LPSI flow, a lower safety injection tank pressure, a lower minimum letdown flow, and the same charging flow. Setpoint for reactor trip is 1750 psia, HPSI injection is 1225 psia, safety injection is 1600 psia, steam generator safety valve is 1000 psia, and SIT injection is 215 psia. Therefore, the values used at SONGS 2 and 3 are at least representative or conservative with respect to those used for the reference plant.

Table 1

COMPARISON OF ANALYSIS ASSUMPTIONS AND PLANT SPECIFIC DATA

Parameter	Reference Plant	SONGS 2 and 3
Core Power (MWt)	2700	3410
Decay Heat (BTU/sec)	1.0 x ANS Values	Same
HPSI Capacity	Table 2	Table 2
Makeup/Letdown Flow		
A. SBLOCA	1 charging pump at 44 gpm	Same
	No letdown	Same
B. SGTR	2 to 3 charging pumps at 44 gpm each	Same
	Letdown flow at 34 to 132 gpm	40 to 128 gpm
S/G Transfer Area (ft^2)	97,232	104,130
Setpoint (psia)		
A. S/G Safety Valve	1000	1100
B. Safety Injection	1600	1806
C. Accumulator Injection	215	615
D. PZR Pressure Low	1750	1806
E. HPSI Injection	1225	1241 (Rated) 1488 (Shutoff)
HPSI Flow Rate (gpm)	4535*	415 (Design) 1000 (Max)
LPSI Flow Rate (gpm)		4150 (Design) 5500 (Max)

*Combined HPSI and LPSI flow rate.

Table 2

COMPARISON OF 100% HIGH PRESSURE SAFETY INJECTION FLOW

RCS Pressure (psia)	Flow Rate (gpm) Reference Plant	SONGS 2 and 3
1393		0
1300		216.0
1225	0	288.0
1200	59.4	307.2
1100	148.4	376.4
1000	204.0	438.8
900	244.8	492.8
800	278.2	542.4
700	304.2	589.6
600	326.4	635.2
500	356.1	679.2
400	378.4	723.2
300	400.6	765.2
200	422.0	807.2
150		827.2
100		847.6
50		867.2
0		885.6

Question 2:

SCE did not identify which emergency operating instructions (EOIs) provide guidance to the operators on the use of single steam generators with and without operating reactor coolant pumps in its response to GL 86-06, Item 4. Identify the EOIs (EOI title and number). Also, discuss operator training in the use of these instructions to complete the review of this item.

Response:

As discussed in the July 7, 1987 response, the following Emergency Operating Instructions (EOIs) have incorporated the CEOG "trip two, leave two" strategy and provide specific guidance to the operators on the use of single steam generators with and without operating reactor coolant pumps:

SO23-12-1, Standard Post Trip Actions (Step 8)
SO23-12-3, Loss of Coolant Accident (Steps 11-12)
SO23-12-4, Steam Generator Tube Rupture (Steps 8-9 and 14)
SO23-12-5, Steam Line Break (Steps 8-14)
SO23-12-8, Functional Recovery

EOI SO23-12-1, "Standard Post Trip Actions," provides entry into the Emergency Operating Instruction System for any transient that actuates or requires a reactor trip. It assesses various safety function criteria to determine whether a given transient is a LOCA or a non-LOCA in nature and applies pertinent reactor coolant pump trip criteria to such a transient accordingly. Once the characteristics of a particular transient is determined, the applicable EOIs shown above will be implemented to initiate plant cooldown. If a degraded steam generator is involved, then direction is provided to cooldown using a single steam generator with and without operating reactor coolant pumps. A generalized guidance to the operators for plant cooldown as incorporated in these EOIs is summarized as follows:

1. Evaluate the steam generator conditions.
2. Isolate the most affected steam generator.
3. Operate atmospheric steam dump valve on the least affected steam generator for cooldown.
4. Provide feedwater to the least affected steam generator and maintain its level between 40% and 80% on the narrow range monitor.
5. Reset low steam generator pressure setpoint during cooldown.
6. Establish natural circulation with one loop in operation.
7. Prepare restart of two reactor coolant pumps with at least one steam generator in stable conditions.

All appropriate steps incorporating this generalized guidance, apart from some minor variations for different transients, are also identified in each corresponding EOI shown above. Finally, EOI SO23-12-8, "Functional Recovery," will also reference to EOI SO23-12-12, "Heat Removal -- Priority 5," which provides the detailed manipulations of individual steam generators to recover the heat removal safety function during the transients.

With respect to operator training, SCE provides EOI classroom and simulator training to license-path operators and licensed Reactor and Senior Reactor Operators. License-path operators are introduced to the EOI's during their Pre-License Review phase of training. This training begins with formal classroom instruction which introduces the operators to the philosophy, steps, and step bases of each EOI. Classroom training is followed by hands-on experience in the use of each EOI in the SONGS plant specific simulator. The operator's performance during event diagnosis and EOI step implementation on the simulator is critiqued by certified training instructors who provide feedback to the operators to ensure proper operator response. For the previously listed EOI's which have incorporated the CEOG "trip two, leave two" strategy and provide specific guidance to the operators on the use of single steam generators with and without operating reactor coolant pumps, the following lesson plans have been developed for introductory operator training:

2EO702	Standard Post Trip Actions (Classroom)
2EO712	Standard Post Trip Actions (Simulator)
2EO703	Loss of Coolant Accident (Classroom)
2EO713	Loss of Coolant Accident (Simulator)
2EO704	Steam Generator Tube Rupture (Classroom)
2EO714	Steam Generator Tube Rupture (Simulator)
2EO705	Steam Line Break (Classroom)
2EO715	Steam Line Break (Simulator)
2EO708	Functional Recovery (Classroom)
2EO718	Functional Recovery (Simulator)

Licensed Reactor and Senior Reactor Operators are provided a periodic review of all EOI's in the Licensed Operator Requalification Program in accordance with the requirements of 10CFR55. Lessons which have been developed and presented in the classroom and simulator for licensed operators in 1986, 1987 and 1988 to date, and which address the specific EOI's of concern are:

2RP013	Functional Recovery and Shutdown From Outside the Control Room
2RS704	Steam Generator Tube Rupture
2RS706	Steam Line Break and Instrument Failures
2RS707	Small Break LOCA Inside Containment
2RS710	Small Break LOCA Outside Containment
2RS711	Large Break LOCA During an Earthquake
2RS728	Small Break LOCA
2RS730	Main Steam Line Break
2RS733	Large Break LOCA
2RS734	Steam Generator Tube Rupture
2RS739	Steam Generator Tube Leak

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