

MAR 17 1986

Docket No. 50-206

Mr. Kenneth P. Baskin, Vice President
Nuclear Engineering
Safety and Licensing Department
Southern California Edison Company
2244 Walnut Grove Avenue
P.O. Box 800
Rosemead, CA 91770

Dear Mr. Baskin:

SUBJECT: REQUEST FOR INFORMATION NEEDED FOR NRC REVIEW OF NOVEMBER 21, 1985
EVENT AT SAN ONOFRE, UNIT 1

The November 21, 1985 loss of offsite power at San Onofre 1 resulted in the occurrence of a severe water hammer event. This water hammer caused significant damage to the feedwater line to the "B" steam generator and stretched the bolts on a check valve resulting in a feedwater system leak. Recovery from this event involved complex operator actions and was accomplished without abnormal releases of radioactivity.

The NRC subsequently investigated the circumstances of this event and documented its conclusions in NUREG-1190 (Loss of Power and Water Hammer Event at San Onofre, Unit 1, on November 21, 1985), issued in January 1986. The investigation concluded that the most significant aspect of the event involved the failure of five safety-related check valves in the feedwater system which occurred in less than a year, without detection, and jeopardized the integrity of safety systems.

As you are aware, on November 21, 1985, the NRC Region V office issued a Confirmatory Action Letter which confirms your commitment to maintain San Onofre Unit 1 in a shutdown condition until concurrence is received from the NRC to return to power. Region V has the overall lead responsibility for NRC staff actions related to facility restart. The purpose of this letter is to request information that the staff needs in order to determine the adequacy of the design and operation of San Onofre Unit 1. Schedules for these responses should be developed with your NRC Project Manager.

The reporting and/or recordkeeping requirements contained in this letter

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K. P. Baskin

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affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

Original signed by:
George E. Lear

George E. Lear, Director
PWR Project Directorate #1
Division of PWR Licensing-A

Enclosure:
Request for Additional Information

Office:


PM/PAD#1

PD/PAD#1

Surname:

RDudley*/tg:jm GLear*



Date:

03/11/86

03/17/86

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Mr. Kenneth P. Baskin
Southern California Edison Company

San Onofre Nuclear Generating Station
Unit No. 1

cc
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REQUEST FOR ADDITIONAL INFORMATION

1. Describe steam generator blowdown isolation features and provide an evaluation of the steam generator blowdown system, including the following:
 - a. Any proposed features which preclude automatic reinitiation of steam generator blowdown upon reset of the steam generator blowdown isolation signal or appropriate justification for not doing so.
 - b. Features which allow monitoring status of the steam generator blowdown system including the need for flow monitoring capability or valve position status. Specifically address control room status indication.
2. Describe the current (as modified prior to restart) SONGS-1 main steam and feedwater system design and the basis for the design. Additionally, you should address the following:
 - a. Specific water hammer design considerations and any instrumentation to indicate impending water hammer conditions. Include in your discussion the basis for concluding that the water hammer originally occurred in the feedwater line and not the feedring. Also, compare your design considerations for water hammer with vendor recommendations to prevent water hammer.
 - b. Measures taken or to be taken to verify the integrity of feedwater piping and supporting structures (including concrete) prior to return to service. Also, provide a summary of the results of NDE of pipe weldments and any metallographic examination of feedwater pipe cracks.
 - c. Results of any reevaluation of existing design of main steam and feedwater systems with respect to potential for loss of heat sink in the event of steam or feedwater system rupture. Include in your discussion, as appropriate, consideration of manual and automatic actuation of steam line isolation valves and assurance of steam generator availability to remove decay heat.
3. Provide an evaluation and description of your consideration to provide an uninterruptible power source (UPS) for the Critical Function Monitoring System (CFMS) in order to enhance the plant post-trip review capability. Describe administrative procedures for resetting the CFMS after troubleshooting.
4. Provide a discussion of the neutral grounding of auxiliary transformer "A." Is the neutral grounded through an impedance? If so, what is the value of neutral impedance and of the ground fault current?

5. Provide a description of the relay protection and settings for the auxiliary transformer "A" grounded neutral.
6. Provide an evaluation of the rationale for not loading diesels automatically when power to Class 1E buses is lost from the offsite source.
7. Provide information on Safeguard Load Sequencing System (SLSS) including logic, type, and description of operating modes.
8. Provide information on load sequencing of load groups for loss of station power with discussion of status lamps in the surveillance panels.
9. Provide information on station loss of voltage auto-transfer scheme. Discuss how the automatic transfer of electrical power recovery is accomplished.
10. Provide information on any fault locating and/or maintenance testing procedures of 4.16 Kv cable circuits at San Onofre nuclear generating plant.
11. Provide a description of the power supply to vital 120V Bus #4. Is the supply to vital 120 volt Bus #4 from 7.5 KVA transformer or unregulated 37.5 KVA transformer? Are the transfer switches associated with the supply to vital 120 volt Bus #4 and the 7.5 KVA and 37.5 transformer manual or automatic?
12. What was the phase-relationship between transformer A and transformer C windings when both transformers were momentarily paralleled?
13. For loss of Bus #4, provide an evaluation of the necessity to scram the reactor.
14. Provide the rationale for not restoring Bus 2C from Bus 1B before manual scrambling of the reactor.
15. Discuss any design changes to eliminate spurious SI indication.
16. Discuss interlocks, including basis for interlocks, associated with the diesel generator output breaker; and provide an evaluation of the appropriateness of these interlocks.
17. Discuss the basis for maximum permissible time limits on loading of diesel generators following loss of station power.
18. Describe provisions made for reconstructing event data following loss of station power.

19. Describe any improvements to be made for labeling of selected control room indicators.
20. Provide an evaluation of the need of an uninterruptible power such as inverter power to vital Bus #4.
21. Provide a report and supporting documentation which addresses the root cause of the November 1985 water hammer event and SCE's proposed corrective actions. Include discussion of the root cause of the check valve failures.
22. Provide a determination and supporting documentation of the adequacy of testing programs and procedures, as implemented, to detect degraded and failed safety-related check valves. Describe any QA involvement in the testing programs.
23. Provide a determination and supporting documentation of the adequacy of the design and related testing, maintenance, and inspection programs for the various check valves in the feedwater and other safety-related systems.
24. Describe any additional sensors, such as acoustic monitors, that will be used to account for uncertainties in the effect of turbulence on feedwater system check valve discs.