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AUTH.NAME AUTHOR AFFILIATION
BASKIN,K.P. Southern California Edison Co.
RECIP.NAME RECIPIENT AFFILIATION
KNIGHTON,G.W. Licensing Branch 3

SUBJECT: Forwards response NRC Question 222.43 re qualification of contrbl sys,per License Conditions 2.C(12) & 2.C.(10). Response will be included in Amend 33 to FSAR.Revised response to Question 222.44 to be submitted by 830501.

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Southern California Edison Company

P. O. BOX 800
2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770

K. P. BASKIN
MANAGER OF NUCLEAR ENGINEERING,
SAFETY, AND LICENSING

TELEPHONE
(213) 572-1401

April 1, 1983

Director, Office of Nuclear Reactor Regulation
Attention: Mr. George W. Knighton, Branch Chief
Licensing Branch No. 3
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

License Conditions 2.C(12) and 2.C(10) of the San Onofre Nuclear Generating Station Units 2 and 3 Operating Licenses respectively require that Southern California Edison Company (SCE) provide, by April 1, 1983, an evaluation of control system failures caused by high energy line break, and by failure of any power sources, sensors, or sensor impulse lines which provide power or signals to two or more control systems.

Provided as Enclosure 1 is the response to NRC Question 222.43 "Qualification of Control Systems." This response satisfies the first portion of License Conditions 2.C(12) (Unit 2) and 2.C(10) (Unit 3) requiring SCE to "provide an evaluation of control system failures caused by high energy line break." This response will be included as part of Amendment 33 to the San Onofre Units 2 and 3 FSAR.

The second portion of the License Conditions requires "an evaluation of control system failures... of any power sources, sensors, or sensor impulse lines which provide power or signals to two or more control systems." In April, 1982, the response to NRC Question 222.44 "Control System Failures" was submitted to the NRC as part of Amendment No. 29 to the San Onofre Units 2 and 3 FSAR and addressed the second portion of the License Condition for Unit 2 (the Unit 3 License had not yet been issued). The response was based on Unit 2, although it was intended to apply to both Unit 2 and Unit 3. In order

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to also satisfy the Unit 3 License Condition, the response to 222.44 was reviewed for applicability to Unit 3. During this review an omission in a portion of the April, 1982 response was discovered. SCE is currently reviewing and revising the response to NRC Question 222.44 for applicability to both Units 2 and 3 and a revised response will be submitted by May 1, 1983.

Consistent with License Condition 2.G of the Operating Licenses for both Units 2 and 3, the NRC Regional Administrator, Region V, is being notified of the inability to satisfy License Conditions 2.C(12) and 2.C(10) for Units 2 and 3 respectively.

If you have any questions regarding this information, please call me.

Very truly yours,

K. P. Baskin / D. Fisher

Enclosures

cc: Harry Rood, NRC (To be opened by addressee only)
John B. Martin, NRC Region V

ENCLOSURE I

Responses to NRC Questions

San Onofre 2 & 3

Question 222.43 Qualification of Control Systems (IE Information Notice 79-22)

Operating reactor licensees were informed by IE Information Notice 79-22, issued September 19, 1979, that certain non-safety grade or control equipment, if subjected to the adverse environment of a high energy line break, could impact the safety analyses and the adequacy of the protection functions performed by the safety grade equipment. Enclosed is a copy of IE Information Notice 79-22, and reprinted copies of an August 20, 1979 Westinghouse letter and a September 10, 1979 Public Service Electric and Gas Company letter which address this matter. Operating reactor licensees conducted reviews to determine whether such problems could exist at operating facilities.

We are concerned that similar potential may exist at light water facilities now under construction. You are, therefore, requested to perform a review to determine what, if any, design changes or operating actions would be necessary to assure that high energy line breaks will not cause control system failures to complicate the event beyond your FSAR analysis. Provide the resuts of your reviews including all identified problems and the manner in which you have resolved them to NRR.

The specific "scenarios" discussed in the above referenced Westinghouse letter are to be considered as examples of the kinds of interactions which might occur. Your review should include these scenarios, where applicable, but should not necessarily be limited to them. Applicants with other LWR designs should consider analogous interactions as relevant to their designs.

Response

The high energy line break (HELB)/control system interaction analysis process employed in the review of the SONGS Units 2 and 3 design is illustrated by the logic diagram of Figure 1. The events considered are those defined in Chapter 15 of the FSAR. The process consists of the following steps.

(1) Identification of all non-safety grade systems or control systems of significance to the FSAR Chapter 15 analyses.

(2) Identification of potential adverse control system malfunctions induced by HELB events.

(3) Detailed system design reviews of control systems with a potentially significant impact on the course of FSAR Chapter 15 to determine which, if any, failure modes can be postulated to cause the adverse malfunctions.

(4) Resolution of unresolved HELB/control system interaction issues through the use of backup systems and/or quantitative analyses to determine if the malfunction effects are acceptable, and through detailed evaluations of the qualification status of control system components.

(5) Identification of the physical locations of control system components whole malfunction effects could not be resolved via the above mentioned approaches to determine whether or not they are impacted. If they are determined to be impacted, then either the impactees need to be protected via design modifications to prevent interactions, or revisions to the operating procedures need to be made to account for the effects of HELB interactions.

The HELBs considered in this analysis are: loss of coolant accident (LOCA), steam line break (SLB), feedwater line break (FWLB), and RCS breaks which occur outside of the containment. A qualitative review of the control systems disclosed eight potential HELB/control system interactons which could exacerbate event consequences. These are:

1) Failure of the Pressurizer Level Control System (PLCS) such that the letdown flow is not set to its minimum value. This malfunction is of concern during a LOCA because the peak clad temperature may be impacted.

2) Failure of the Pressurizer Pressure Control System (PPCS) to deenergize pressurizer heaters when the low level cutout signal is given. This malfunction is of concern during a LOCA because of the energy addition to the RCS above that considered in the FSAR, and in a LOCA, or SLB due to the potential for the heater failure mode to impact the RCS pressure boundary.

3) Failure of the PPCS such that the spray valves do not isolate during a spray line break LOCA. This malfunction could yield a communication path between the two cold legs diverting greater quantities of safety injection fluid to the break than assumed in the FSAR Chapter 15 analyses.

4) Failure of the Reactor Regulating System (RRS) such that CEA's are withdrawn prior to reactor trip. The resultant core power increase is of concern during LOCA, SLB, and FWLB events.

5) Failure of Main Feedwater Control System (MFWCS) such that feedwater flow is increased above the flow considered in the FSAR Chapter 15 analyses. This malfunction is of concern during LOCA's because of the delay in reaching shutdown cooling entry conditions, and in SLB because of the potential for a post-trip return to power.

6) Failure of the Steam Bypass Control System (SBCS) such that the steaming rate is increased. This malfunction is of concern during SLB's because of the potential for a post-trip return to power.

7) Failure of the Turbine Generator Control System (TGCS) such that the steaming rate is increased. This malfunction is a concern for a SLB because of the potential impact on pre-trip fuel performance.

8) Failure of the PLCS such that the RCS inventory is increased. This malfunction is of concern during FWLB events where a potential to fill the pressurizer could exist.

The designs of the control systems of concern were reviewed to determine if there exists a mechanism by which the malfunctions identified above could occur.

The impacts of the assumed malfunctions were determined through quantitative analyses. The results of these analyses demonstrate that the HELB/control system malfunction event consequences are bounded by the event consequences presented in the FSAR. Therefore, no design modifications or operator procedure revisions are needed to mitigate the consequences of HELB/control system interactions.

FIGURE 1
HELBA PROCESS