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MEMORANDUM FOR: Commissioner Ahearne

FROM: William J. Dircks
Executive Director for Operations EDO 12103

SUBJECT: DIRECTOR'S DENIAL OF 2.206 RELIEF (IN THE MATTER OF SOUTHERN CALIFORNIA EDISON COMPANY) (SECY-82-63)

By memorandum dated June 18, 1982, the staff was requested to address your comments regarding the subject Director's denial. The enclosure provides our response to your comments.

(Signed) William J. Dircks

William J. Dircks
Executive Director for Operations

Enclosure:
As stated

cc: Chairman Palladino
Commissioner Gilinsky
Commissioner Roberts
Commission Asselstine
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ENCLOSURE

Commissioner Ahearne's Comment (5/3/82):

The letters from FEMA received subsequent to the Director's decision support the description in that decision. Therefore, I agree with not reviewing the Director's Decision.

However, the Director's decision and the SER identified several open issues. Since the decision, difficulties in resolving some of these issues and additional problems have arisen that the staff is addressing. Consequently, I would be interested in the EDO informing the Commission which issues must reach what stage of resolution prior to allowing SONGS 1 to restart.

Staff Response:

In Appendix A, the Director's Decision (DD-81-19) identified FEMA concerns related to the offsite capability for the implementation of State and local goverment emergency response plans. On December 1, 1981, FEMA HQ forwarded to the NRC a status report on the corrective actions being taken to address these concerns. Additional information on the resolution of these concerns was submitted to the NRC by the licensee in letters dated December 30, 1981, and March 22, 1982. The licensee also forwarded to the NRC the FEMA report concerning their evaluation of the offsite portion of the emergency response exercise held on April 14, 1982. In this report FEMA concluded that while some procedural issues related to coordination of information at the Emergency Operations Facility remained, all jurisdictions reflected an adequate or better capability to respond to an offsite emergency at San Onofre.

The staff finds that the documents from FEMA and the licensee on offsite emergency preparedness subsequent to the Director's Decision support the staff position as stated in the Decision. The staff further concludes that the issues raised by the ASLB in the decision concerning the licensing of San Onofre Units 2 and 3 do not adversely impact the continued operation of San Onofre Unit 1.

With regard to the seismic issue, on May 3, 1982, the staff received significant new information related to the adequacy of San Onofre Unit 1 seismic design. On May 20, 1982, the staff met with the licensee to discuss the seriousness of the technical matter and the staff's concern that San Onofre Unit 1 piping, pipe supports and mechanical equipment anchorages may not meet the original seismic design basis under which the plant was licensed. Representatives of the 2.206 petitioners were informed of and attended the meeting.

At the meeting the licensee was unable to demonstrate to the staff's satisfaction that the plant met the original seismic design. By letters dated June 15, 1982 and June 24, 1982, the licensee has informed us that he no longer intends to attempt to show that the plant meets its original design basis but rather has now proposed to complete all analysis and appropriate modifications associated with the SEP seismic reevaluation program (at 0.67g Housner) prior to plant start up which the licensee estimates will be late fall of this year. Enclosure 1 of the June 24, 1982, letter includes an identification and proposed schedule for resolution of outstanding issues related to the SEP seismic reevaluation program. The staff review is continuing and the staff is unable to commit to a schedule for completion of our review at this time since significant information is yet to be provided. Our review however, will be completed and a Safety Evaluation Report issued prior to start up. The seismic upgrading proposed by the licensee, if found acceptable during the staff's review, will provide a basis for restart.

the only other issue that must be resolved before restart is that the licensee must submit a report for NRC review and approval on the results of the steam generator inspections conducted during the current outage.

Commissioner's Ahearne's Second Comment:

One other area does concern me:

Portions of the Turbine Building Complex were originally designed as Category B structures, although they contained systems and components necessary for safe shutdown and accident mitigation and thus should have been Category A. The misclassification of the Turbine Building Complex is troubling. I recognize that it has not been demonstrated there were pervasive errors. I also recognize we often apply different standards to operating reactor licensees (particularly SEP plants) than to new licensees. However, I tend to believe there is a basis for looking further at the possibility there may be other major errors at San Onofre 1.

It is difficult to understand how Bechtel made the mistake and then failed to discover it. The error was at a basic level of conceptual design, not buried in some detailed calculations. The mistake was clear as opposed to arguable. It involved a relatively straightforward application of criteria rather than engineering judgment. It was significant rather than trivial since (in combination with other deficiencies), among other things, it endangered all methods for providing water to remove reactor decay heat.

Given the nature of the error and the fact that there have been difficulties in the past with errors in design and construction of Bechtel plants (e.g., Trojan and Midland), has the staff considered any course of action to assure there are no other significant errors? If so, what was the staff's decision?

Staff Response:

The classification of the turbine building complex as Category B structures was consistent with prevailing industrial and regulatory practices at the time the San Onofre design was conceived. Attention to seismic capability was generally limited to equipment inside containment since containment isolation without exterior accident mitigation features was considered acceptable for plants of that vintage and power level.

The licensee's commitment to complete the SEP seismic reanalysis and implement necessary modifications prior to start up, coupled with the staff completing its review and issuing our Safety Evaluation Report (SER), provides reasonable assurance that any major seismic design deficiencies would be identified. The current schedule for other SEP topics is such that all topic reviews would be complete and SERs issued before start up except for Topics III-5.A and III-5.B, High Energy Line Breaks Inside and Outside Containment. These two topics require completion of the seismic reanalysis effort to determine potential break locations. However, since San Onofre Unit 1 was not originally designed considering High Energy Line Breaks it is unlikely that these reviews would discover potential design errors.

The staff is aware of and is following the resolution of design and construction errors at Bechtel plants. The staff does not view the classification of the Turbine building as comparable to these errors. Further, the staff believes that the audit conducted during the SEP which includes a topic on classification of structures, components, and systems, provide assurance that there are no significant residual errors. Consequently, a specific course of action to assure there are no other significant errors is not needed and has not been developed solely because San Onofre Unit 1 is a Bechtel plant.

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MEMORANDUM FOR: Commissioner Ahearne

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: RESPONSE TO QUESTIONS REGARDING SAN ONOFRE UNIT NO. 1

By memorandum dated September 24, 1982, the staff was requested to address your questions regarding San Onofre Unit No. 1.

Detailed discussion of the responses to both sets of questions is provided in the enclosure. In summary, the staff agrees that because of the large amount of safety related equipment contained therein, portions of the turbine building complex at San Onofre Unit No. 1 should be designated as Category A. Staff practice as promulgated in Regulatory Guide 1.29 has been that where unavoidable, Category I equipment could be located in non-Category I structures. This is acceptable provided that an SSE would not cause failure of the non-Category I structure. An example of this practice is the reactor trip based on a turbine trip. The trip signals from the turbine to the Reactor Protection System are safety related. Sensors and cabling are in the turbine building which is not seismic Category I. This is acceptable to the staff for plants of the San Onofre Unit No. 1 era as well as for currently licensed facilities.

The staff does not feel that the San Onofre Unit No. 1 situation exists for other facilities of that era. The staff has completed seismic reviews for the Systematic Evaluation Program for six other units (Palisades, Ginna, Oyster Creek, Dresden Unit 2, Millstone Unit 1 and Haddam Neck). Based on those reviews, it appears that the situation that exists at San Onofre Unit No. 1 is unique to that plant.

With respect to your second set of questions; 1) there is no revised draft or final SER, 2) the staff will provide its evaluation of the licensee's program in support of its conclusions relative to the restart of San Onofre Unit No. 1, 3) The acceptance criteria the staff intends to use for restart

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are detailed in the enclosure and are generally contained in various Sections of the SRP as well as other specific guidance (such as NUREG-0098) previously made publically available.

The enclosure provides our more detailed responses to your comments.

(Signed) William J. Dircks

William J. Dircks
Executive Director for Operations

Enclosure:
As stated

cc w/enclosure:
Chairman Palladino
Commissioner Gilinsky
Commissioner Roberts
Commissioner Asselstine
SECY
PE
GC

EDO:DIR
WJDircks
10/ /82

*Please see previous concurrence page.

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ENCLOSURE

Commissioner Ahearne's First Set of Questions (09/24/82):

On July 22nd you responded to a June 18th memo requesting a response to my comments on the Director's Denial of 2.206 relief (Secy 82-63). Specifically you addressed the questions I had with respect to the categorization of portions of the turbine building complex as Category B, although they should have been Category A (my judgement). Your answer states:

> "The classification of the turbine building complex as Category B structures was consistent with prevailing industrial and regulatory practices at the time the San Onofre design was conceived."

I would appreciate answers to the following questions:

1. Does the staff agree that these portions of the turbine building complex should be Category A-- that is, does the staff agree that they contain systems and components necessary for safe shutdown and accident mitigation and thus, should be Category A?

   (a) If the answer is no, please explain.

   (b) If the answer is yes, then I have a second question.

2. Does the quoted statement above in your answer mean that prevailing practice both in the industry and in the AEC was not to require equipment that would be necessary for a safe shutdown to have Category A protection? If that is the case and if we now believe it should, then what is the staff program to review other plants designed and approved in this era to assure that they too don't have similar problems?

Staff Response:

1. Yes. The staff agrees that portions of the San Onofre Unit No. 1 turbine building complex should be Category A.

2. In Section 3.2.1 "Seismic Classification" of both the Standard Format (Regulatory Guide 1.70) and Standard Review Plan, it is

stated that Seismic Category I* structures shall be designed to withstand the effects of SSE and remain functional and it refers to Regulatory Guide 1.29 for detailed guidance. Position 1 of R. G. 1.29 states:

> "The following structures, systems, and components of a nuclear power plant, including their foundations and supports, are designated as Seismic Category I and should be designed to withstand the effects of the SSE and remain functional. The pertinent quality assurance requirements of Appendix B to 10 CFR Part 50 should be applied to all activities affecting the safety-related functions of these structures, systems, and components."

Position 2 of Regulatory Guide 1.29 states:

> "Those portions of structures, systems, or components whose continued function is not required but whose failure could reduce the functioning of any plant feature included in items 1.a through 1.q above to an unacceptable safety level or could result in an incapacitating injury to occupants of the control room should be designed and constructed so that the SSE would not cause such failure."

The words "functional" and "failure" are underlined here to emphasize the difference in performance criteria between the two positions - Position 1 for Seismic Category I structures such as containments, and Position 2 for non-Seismic Category I structures whose failure (collapse) may affect the functionality of other Seismic Category I structures, systems, or components. The SSE effects are considered by both Positions 1 and 2 but in different degrees, i.e., Position 1 requires Seismic Category I structures to remain functional whereas Position 2 only requires structures not to fail under SSE effects.

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*The San Onofre Unit No. 1 FSAR section 9.2.3 defines the classification of components, systems and structures as follows:

Category A: Components, systems and structures that are important to nuclear safety of the plant.

Category B: Components, systems and structures that are important to the continuity of power generation or whose contained activity is such that releases would not constitute a hazard.

Category C: All remaining structures were designed to the uniform building code.

Category A is generally equivalent to Seismic Category I.

Since Position 2 addresses three different types of engineering specialties namely, structural, system, and mechanical, the use of a generic word "failure" may be necessary and appropriate. Nonetheless, in terms of civil structures alone, a clearer concept can be gained if one understands that the usual interpretation of the word failure is to mean collapse. In summary, the NRC provisions require (1) that Seismic Category I structures be designed to withstand the SSE effects and remain functional, and their construction be controlled and monitored by rigorous quality assurance requirements of Appendix B to 10 CFR Part 50, and (2) that non-Seismic Category I structures, whose collapse may result in the loss of functions of Category I structures, systems, or components, be designed to withstand the SSE effects without collapse. It is acceptable to provide two different sets of criteria for two different categories of structures, with each commensurate with its own importance to safety.

The distinction between Positions 1 and 2 is the difference between functional and collapse of a structure. Functional requirements are different from one structure to another. Leak tightness may be the most important functional requirement for a water storage tank or a concrete containment, but for a tall office or residential building, limiting its sway motion to an acceptable level under turbulent wind may become the main functional requirement. In order to accomplish these functional requirements, structural systems that provide high lateral rigidities have been used for tall buildings and low allowable stresses or strains for the materials involved have been set for the structure with low leakage requirements in an attempt to indirectly limit excessive cracking in concrete or the potential rupture of a steel liner. Although these stress or strain limitations are below those levels that will cause collapse of a containment or Category I structure, they are meaningful and effective only if specified together with methods of computing stresses and strains. These methods of analysis and design for Seismic Category I structures are defined in the Standard Review Plan and pertinent Regulatory Guides, and are understood and used by engineers.

However, the investigation of the collapse load of a structure as a whole, i.e., limit analysis in concrete or plastic analysis in

steel structures, has not been fully developed and used to any appreciable extent, and general design procedures based on such an analysis are not available for nuclear power plant structures and none is mentioned in the NRC guidance. It is, perhaps, for this reason that, to our recollection, no licensee has ever taken advantage of Position 2 of Regulatory Guide 1.29 which is less stringent than that of Position 1. For example, those portions of the turbine building of Diablo Canyon that house Seismic Category I components (equipment, piping, instrumentation, switchgear, etc.) were designed to the Position 1 criteria instead of Position 2. Another example is that the turbine building of Bellefonte, which houses no Seismic Category I components, but which was also designed to the criteria of Position 1 because its collapse may have an effect on adjacent Seismic Category I structures.

In summary, it is proper to categorize turbine buildings as non-Seismic Category I structures, as they have been, and the NRC provisions in Regulatory Guide 1.29 applicable to turbine buildings are adequate, and the industry practices on the design of turbine buildings taking into account that their collapse may have an affect on other Category I structures, systems, or components, are prudent.

Based upon Systematic Evaluation Program (SEP) seismic reviews of plants of the San Onofre Unit No. 1 era that have been completed to date (Palisades, Ginna, Oyster Creek, Dresden Unit 2, Millstone Unit 1 and Haddam Neck) it appears that the issue of misclassification of the North Turbine Building Extension at San Onofre Unit No. 1 (Staff's SER on the Interim Seismic Adequacy of San Onofre Unit No. 1 dated November 16, 1981, pages 6 and 7) is unique to San Onofre Unit No. 1. There have been other instances of safety related systems (i.e., Seismic Category I or Category A) in non-safety related structures (i.e., non Seismic Category I or Category B). However, during the SEP review of these plants, the turbine buildings were found to have sufficient margin to prevent collapse from an SSE. It was also common practice to have portions of a structure Category I while the overall structure was Category II,

(e.g. the control room at Haddam Neck is part of the turbine building). It was and still is acceptable to have portions of structures or systems Category I within structures as long as failure (i.e., collapse) for an SSE is unlikely and the contained system or portion of structure can function. However, this conclusion is not applicable to San Onofre Unit No. 1 (i.e., North Turbine Building Extension). The November 16, 1971 SER page 7) defines systems, and components witnin the North Turbine Building Extension. These systems and components are Category A and were so classified. The structure itself was classified Category B. Its failure (i.e., collapse) at less than 0.5g Housner, the SSE level, was likely and collapse would adversely affect nuclear safety of the plant. Therefore, it should have been classified as Category A.

Commissioner Ahearne's Second Set of Questions (09/24/82):

The document control system shows a May 10, 1982 draft SER on the seismic design of San Onofre Unit No. 1 and comments from various divisions, but no final SER. I recognize that events since the publication of this draft have changed staff's program of review. However, I would appreciate receiving answers to the following questions:

1. Is there a revised draft SER or a final SER, and if so, is it available?

2. If not, what is your schedule for making such available?

3. What are the acceptance criteria for restart which the staff intends to use? These become particularly important in light of the following statements in the May 10 draft SER:

   (a) "The licensee...refused to perform the additional time history analysis." (p. 8)

   (b) "The staff is unable to conclude that the main reactor coolant system piping and components are adequately supported for design for a 0.67g Housner SSE." (p. 9)

   (c) "Therefore, function of the CVCS (Chemical Volume Control System) would be lost at 0.67g Housner." (p. 9)

   (d) "Safety injection system integrity, therefore, cannot be assured." (p. 11)

   (e) "RHR, CCW and spent fuel pool cooling systems function cannot be assured." (p. 12)

   (f) "We consider the licensee statement that small diameter piping will never fail, regardless of the loads applied, to be unfounded and without basis." (p.19)

   (g) "...It is not possible to reach any conclusion concerning the adequacy of the original seismit design of Emergency Core Cooling Systems at San Onofre Unit 1." (p. 24)

Staff Response:

1. No revisions were issued to the May 10, 1982 draft SER. This draft SER was prepared to identify the status of the SEP seismic review of San Onofre Unit No. 1 and to support a possible staff action to maintain the plant in a shutdown condition until seismic upgrading was completed.

2. As a result of May 20, 1982 meeting between the licensees and the NRC staff, the licensees decided to keep the plant in a shutdown condition until the analyses and the modifications described in their submittals dated June 15, 1982 and June 24, 1982 are completed. On August 11, 1982, the NRC staff issued an order confirming the licensee's decision. Therefore, no updating of the May 10, 1982 draft SER is planned. The staff will issue a SER for restart.

3. The acceptance criteria for restart are as stated in the August 11, 1982 order that requires that the licensees shall:

> Maintain San Onofre Unit No. 1 in the shutdown condition until modifications described in their submittal dated June 15, 1982 as supplemented by letter dated June 24, 1982 are completed and NRC approval is obtained for restart.

Specifically the items to be resolved are:

A. Resolution of the site ground motion issue

The issue has been resolved and the NRC staff evaluation was issued to the licensees by letter dated September 16, 1982.

B. Resolution of in-situ soil conditions

The staff is reviewing the licensees submittals dated November 2, 1981, February 1, 1982, and August 17, 1982. The staff's review criteria are delineated in the Standard Review Plan (NUREG-0800) Section 2.5.4 for evaluating soils. The effect of the changes in soil conditions from those previously evaluated as part of SEP for structures and equipment will be reevaluated as a result of the discovery of loose soils during turbine building modifications.

C. Reevaluation and modification of structures

The NRC staff review is continuing. The review of structures and some buried equipment must consider the changes identified in the in-situ soil conditions and, therefore, cannot be resolved before completion of our soils review.

The review criteria for structures and buried piping are specified in:

(a) NUREG/CR-0098

(b) Soil-Structure Interaction Guidelines
Letter to Licensees dated December 15, 1980

(c) Staff position on the use of NUREG/CR-0098 (ductility reduction methods)
Letter to Licensees dated June 23, 1982

(d) Standard Review Plan Sections 3.7 and 3.8

Criteria different from the guidelines must be addressed by the licensees and will be reviewed on a case-by-case basis. In this regard, the licensees' proposed masonry wall test program to demonstrate the acceptability of the non-linear, inelastic methodology is under review.

D. Reevaluation and modification of mechanical equipment and piping

The licensees' submittal on the final resolution of piping and equipment has not yet been received. The staff's review will require completion of the loose-soils review such that the adequacy of structural input motion for mechanical analyses can be determined.

The review criteria for piping and mechanical equipment are specified in:

(a) NRC Staff Guidelines in a letter to the licensees dated July 26, 1982 and supplemented by letter dated September 20, 1982

(b) Standard Review Plan Section 3.9 and 3.10

Criteria different from the guidelines must be addressed by the licensee and will be reviewed on a case-by-case basis.

E. Reevaluation and modification of electrical raceways and conduits

The staff is reviewing the licensees' submittal on the criteria and methodology being used in the seismic reevaluation of cable tray and conduit supports at San Onofre Unit No. 1. This review requires the resolution

of Structural issues to define input motions.

The review criteria are specified in the Standard Review Plan Sections 3.7.3 and 3.9.2.

Further, the licensee will be asked to assess the results of the ANCO cable tray tests and apply them specifically to San Onofre Unit No. 1.

F. Resolution of anchorage of electrical equipment

The NRC staff is reviewing the licensees' submittal on the reevaluation criteria for anchorage and support of safety related electrical equipment.

The review criteria are specified in:

(a) NRC Staff Guidelines in a letter to the licensees dated July 26, 1982 as supplemented by letter dated September 20, 1982

(b) Standard Review Plan Section 3.10

G. Resolution of issues on Seismic Backfit Project

Questions related to the staff's evaluation of the NSSS main loop components and piping were issued to the licensees in letters dated April 26 and June 30, 1982. The major issues that remain unresolved with regard to the Seismic Backfit project are the use of a single artificial time history as input into a nonlinear analysis and the lack of variation of the soil modulus in defining structural responses.

The review criteria are specified in:

(a) NRC Staff Guidelines in a letter to the licensees dated July 26, 1982 as supplemented by letter dated September 20, 1982

(b) Standard Review Plan Section 3.9 and 3.10

The licensees' implementation plan for completion of the seismic upgrading of San Onofre Unit No. 1 to withstand 0.67g Housner spectra consists of: (1) the completion of the above stated reevaluation including resolution of NRC comments on the criteria and methodology used in the reevaluations and (2) the completion of all structural modifications required as a result of these reevaluations. The staff believes that satisfactory resolution of the items A through G identified above will ensure that concerns typified by the examples in items 3.(a) through 3.(g), of your September 24, 1982 memorandum will be adequately addressed.