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 30, 1982

Director, Office of Nuclear Reactor Regulation
Attention: D. M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket No. 50-206
System Response and Structural Concerns
San Onofre Nuclear Generating Station
Unit 1

By letter dated April 2, 1982, the NRC identified concerns regarding the main steam line break analysis, the nonlinear analysis of masonry walls and the schedule for seismic upgrading of San Onofre Unit 1. That letter further requested that we respond to four specific items related to these concerns. SCE's response to each of these items is provided in the following paragraphs.

1. In order to resolve the steam line break concerns expressed by the NRC, we have undertaken an effort to perform analyses and revise affected station emergency procedures. It has been determined that the best approach for the revision of the emergency procedures is to use the generic guidance provided in the Westinghouse Owners Group Emergency Response Guidelines (ERG), which were developed in response to NUREG-0737 requirements. These generic guidelines are being revised where applicable to provide plant specific guidelines for San Onofre Unit 1.

   The development of plant specific guidelines for San Onofre Unit 1 requires that a large number of transients be re-analyzed where the existing San Onofre Unit 1 analysis is insufficient and where the San Onofre Unit 1 system configuration differs from the reference plant used for the ERG. The transients involved in this re-analysis included steamline break, feedline break, steam generator tube rupture, and a feed and bleed analysis required for loss of secondary heat sink.

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The schedule for completion of the emergency procedures upgrade is May 21, 1982, which is the target date to complete operator training. As a result of recent discussions with members of the NRC staff, it has been indicated that the information requested could be provided as it becomes available starting the week of May 17, 1982. In this manner, the NRC's review of our effort would be accomplished on a schedule which supports our planned startup date of June 4, 1982.

2. SCE's analyses of masonry walls at San Onofre Unit 1 were provided in Volumes 1, 2 and 3 of the report "Seismic Evaluation of Reinforced Concrete Masonry Walls," which were submitted by letters dated January 11 and January 15, 1982. A fourth volume decribing the results for the fuel storage building was submitted April 30, 1982. In addition, detailed responses to all of the specific questions raised by the NRC regarding the methodology used in the evaluation of the masonry walls were submitted to the NRC by letter dated April 30, 1982.

   The analyses performed and submitted to the NRC in the above reports demonstrate that gross failure of the masonry walls will not occur. In addition, as described in detail in the responses to the NRC questions, the calculated strain levels and the stress distributions in the masonry walls also preclude spalling of the face shells. The capability of masonry walls similar to those at San Onofre Unit 1 to deflect in excess of 8 to 10 inches without the occurrence of gross failures or spalling was demonstrated by an independent test program conducted by the Structural Engineering Association of Southern California. Experience in actual earthquakes also indicates that the failure of masonry structures occurs when the connection of the walls to the floor diaphragms fail and not due to mid-span deflections. It is clear that the real behavior of masonry walls during strong ground shaking will be satisfactory provided adequate anchorage is provided. For this reason our evaluation of masonry walls requires that connection stresses be limited to working stress allowables with a factor of 1.33 increase. All of the masonry walls located in the turbine building, reactor auxiliary building, ventilation equipment building and control building have been evaluated. Only connection modifications were required for the turbine building, ventilation equipment building and reactor auxiliary building masonry walls. The upgrading of the connections of these walls will be completed prior to the end of the current outage.

   Subsequent to the submittal of our report on masonry walls, the construction of the turbine building necessitated the removal of block at some locations in the masonry walls. This removal of block permitted further inspection of the walls. These inspections concluded that the reinforcement in the walls was properly spaced,

the cells were fully grouted, the condition of the walls was very good and the construction reflected excellent workmanship. This further verified the results of detailed inspections previously performed by Bechtel and their consultants, Computech Engineering Services.

In summary, we conclude that adequate data exists to support our determination that gross failure of masonry walls (including spalling) will not occur during a seismic event corresponding to a 2/3g Housner response spectrum. This determination is based upon

(a) The results of independent testing by the Structural Engineering Association of Southern California.

(b) Detailed inspections of the condition of the walls, including the verification of rebar, grouting and mortar integrity.

(c) Detailed analyses performed and submitted to the NRC including the responses to all of the specific issues raised by the NRC staff.

(d) The observed response of masonry walls in real earthquakes and the design margin provided in our evaluation to preclude actual observed failure modes.

The effect of displacements of the walls on attached equipment will be evaluated as part of the piping and equipment evaluations. For the most part attached equipment is limited to electrical conduits cable trays and junction boxes. Consideration of wall displacements is included in the evaluation of conduits and cable trays and will be described in our report scheduled to be submitted by May 15, 1982.

In addition to the analyses described above, in order to resolve the masonry wall issue, a limited test program will be developed to provide further verification of our conclusions regarding the structural integrity of the masonry walls. It is our intention to discuss such a program in detail with members of the NRC staff in a meeting scheduled for the week of May 10, 1982. Prior to committing to a scope and schedule for such a program, it is our desire to discuss and obtain NRC concurrence in the selection of the test specimens, the testing facility, the testing procedures and the objectives of the test program. We anticipate these matters being resolved shortly after the meetings the week of May 10, such that this program can be developed before our planned startup date of June 4, 1982.

3. Our current schedules for the seismic reevaluation of components and systems are as follows: (1) the evaluation of conduits and cable trays will be submitted by May 15, 1982, and (2) the evaluation of mechanical equipment and piping required for accident mitigating systems will be submitted by November 1, 1982. The first of these reports is currently in the initial stages of preparation. In order to ensure that the report will be submitted on schedule, additional manpower has been assigned to this project by our contractor. In addition, weekly progress reports are generated to maintain visibility of the program's progress. With respect to the evaluation of accident mitigating systems, personnel involved in the evaluation of safe shutdown systems are being reassigned to this task. The generation of weekly progress reports will enable us to maintain visibility of the program status and will enable us to take the necessary actions in sufficient time to ensure that the above schedules are maintained.

   It is important to recognize that, contrary to what might be inferred from your letter, requests from the NRC staff have been a significant contributor to the schedule slippages you note. As an example, the need to accelerate the upgrading of the north and west turbine deck extensions, together with the numerous analyses and meetings that were required as a part of that decision represented a tremendous expenditure of resources that would have otherwise been devoted to completion of other program elements. Similar diversion of resources for efforts outside of the planned program elements in the future can and likely will lead to delays in the dates noted above.

   Further, the dates specified above are predicated, in most cases, upon analysis work that is well along and is based upon a 2/3g Housner response spectrum. The effort and time required to reconfirm the years of analysis work that has been performed, based upon a modified Housner response spectrum (transmitted to us in your letter of April 5, 1982), has <u>not</u> been included in the above information. We will have revised schedular information for you in the near future. However, it is unrealistic to expect that at this late date in the program, a change in spectra can be accommodated without any schedule impact.

4. In our letter dated November 3, 1981, we indicated our intention to evaluate modifications which are shown to be necessary as a result of the seismic analyses on a case by case basis. Modifications which are not likely to be impacted by other SEP topic evaluations will be implemented during the first plant outage of sufficient duration following completion of the analysis, design and procurement and modifications which are likely to be impacted by other SEP topic evaluations will be implemented or resolved during the SEP integrated assessment. For those modifications which are not implemented by January 1, 1983, SCE will provide justification for continued operation and a schedule for implementation.

In view of the above considerations, the schedule for implementation of any modifications required as a result of the seismic analyses completed to date is discussed in the following paragraphs:

a. Results of the reevaluation of the control and administration building were provided by our letter dated February 9, 1982. No modifications are required to this structure.

b. Results of the reevaluation of the seawall were provided by our letter dated December 8, 1981. No modifications are required to the seawall.

c. Results of the reevaluation of the reactor auxiliary building and ventilation equipment building were provided by our letter dated December 8, 1981. Modifications are required to several connections in both of these structures. These modifications will be completed prior to the end of the current outage.

d. Results of the reevaluation of the circulating water system intake structure were provided by our letter dated December 8, 1981. Modifications are required to the north, south and east pumpwell walls of this structure. Since there is a high potential that these modifications will be impacted by the results of several SEP topics, these modifications will be considered during the SEP integrated assessment. Furthermore, as discussed in our December 8, 1981 letter, the modifications required to this structure are required to meet the reevaluation criteria and therefore restore design margins. However, they are not required to ensure the structural integrity of the structure. Based on conservatisms in the analysis methods and acceptance criteria and experience of structures in past earthquakes, it is concluded that this structure will not collapse in the event of a 0.67g Housner earthquake.

e. Results of the reevaluation of the turbine building were provided by letter dated April 30, 1982. Modifications are required to the north and south turbine building extensions and the west and east heater platforms as described in that letter. All modifications which are required for the north turbine building extension and west heater platform will be completed prior to the end of the current outage.

   Modifications to the south turbine building extension and the east heater platform will be considered during the SEP integrated assessment, since there is a high potential that these modifications will be impacted by the results of several SEP topics. Based on satisfactory resolution of item 1 of this

letter, failure of either of these structures as a result of an earthquake will not prevent the safe shutdown of the plant.

f. Results of the reevaluation of the fuel storage building were provided by letter dated April 30, 1982. Modifications to one wall and to various connections are required to this structure. These modifications are required to meet the reevaluation criteria and therefore restore design margins. They are not required to ensure the structural integrity of the fuel storage building. Nevertheless, implementation of these modifications will be initiated during the current outage and, if necessary, will be completed during plant operation following the outage.

g. Results of the reevaluation of mechanical equipment and piping were provided by letter dated April 30, 1982. Modifications are required to a number of supports as described in that letter. Although the majority of the modifications are required to meet the reevaluation criteria and therefore, restore design margins, some of the items have been identified as required to ensure structural integrity. A schedule for implementation of these modifications, especially the structural integrity items, will be developed and discussed with the NRC staff. We will obtain concurrence from the NRC staff regarding our approach to resolution of these items prior to the end of the current outage.

In addition to the above seismic analyses, SCE is also evaluating cable trays and conduits and mechanical equipment and piping required for accident mitigation as discussed in item 3 above and schedules for implementation of any modifications required as a result of these analyses will be addressed at the time of submittal of these results.

Subscribed on this 30 day of April, 1982.

Very truly yours,
SOUTHERN CALIFORNIA EDISON COMPANY

By K. P. Baskin
K. P. Baskin
Manager of Nuclear Engineering, Safety, and Licensing

OFFICIAL SEAL
D STEWART FARQUHAR
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
My comm. expires JUN 14, 1985

Subscribed and sworn to before me this 30 day of April, 1982

D. Stewart Farquhar
Notary Public in and for the County of Los Angeles, State of California

Enclosure