June 22, 1981

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of	)	
	)	
SOUTHERN CALIFORNIA EDISON COMPANY, ET AL.	)	Docket Nos. 50-361 OL 50-362 OL
	)	
(San Onofre Nuclear Generating Station, Units 2 and 3)	)	

NRC STAFF VIEWS WITH RESPECT TO QUESTIONS POSED BY THE ATOMIC SAFETY AND LICENSING BOARD IN THE AREA OF EMERGENCY PLANNING

INTRODUCTION

During the course of discovery of this proceeding, certain questions have come before the Atomic Safety and Licensing Board involving the nature and extent of emergency planning required under the Nuclear Regulatory Commission's regulations, specifically 10 CFR § 50.47 and 10 CFR Part 50, Appendix E. The particular areas of concern identified by the Licensing Board were (1) proper determination of Emergency Planning Zones (EPZs), and (2) the proper consideration to be given to earthquakes in the emergency planning required under the Commission's regulations. At a prehearing conference held in San Diego, California on April 29, 1981, the Licensing Board indicated that it would solicit the views of the parties with respect to these concerns. In its Prehearing Conference

Order of May 8, 1981, the Board identified the legal issues of concern to it and solicited the views of the parties.[1/]

DISCUSSION

The Staff sets forth below each concern raised by the Licensing Board and presents the Staff's views thereon.

I. What is the extent of an applicant's obligation to take into account possible off-site effects of an earthquake on its emergency plans? Must he consider possible on-site and off-site effects of an earthquake more severe than the plant's safe shutdown earthquake under the Vermont Yankee case, 8 AEC 809, 812. See Memorandum and Order of April 17, 1981, at pp. 4-7.

A fundamental premise in the approach to emergency planning utilized by the Federal Emergency Management Agency (FEMA) and the Commission is that the emergency planning basis must be capable of responding to a wide spectrum of accidents. This was the conclusion reached by the Task Force which authored NUREG-0396.[2/] That Task Force report was subsequently endorsed by the Commission in its Policy Statement with respect to the Planning Basis for Emergency Responses to Nuclear Power Reactor Accidents (Policy Statement). 44 Fed. Reg. 61123 (October 23, 1979). The concept

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1/ The Prehearing Conference Order of May 8, 1981, was subsequently revised and issued as a Revised Prehearing Conference Order of May 28, 1981. The substantive portion of the original order dealing with the emergency planning area was not changed. However, the due date for views on the legal issues of concern to the Board was extended to June 22, 1981.

2/ NUREG-0396, EPA 520/1-78-016, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," December 1978, pp. 4-6.

is reiterated in NUREG-0654.[3/] Consequently, as a single specific accident sequence for a light water reactor nuclear power plant could not be identified as a planning basis, both NUREG-0396 and NUREG-0654 emphasized that the most important element of any planning basis is the distance from the nuclear facility which defines the area over which planning for predetermined action should be carried out.[4/] Not only is this area, termed the Emergency Planning Zone or EPZ, crucial but the characteristics of the EPZ are significant.

> The need for specification of areas for major exposure pathways is evident. The location of the population for whom protective measures may be needed, responsible authorities who would carry out protective actions and the means of communication to these authorities and to the population are all dependent on the characteristics of the planning areas. (Emphasis supplied). NUREG-0654, p. 8.

It is, therefore, inherent in the planning approach utilized by FEMA and the Commission, i.e., the Emergency Planning Zone concept, that the characteristics of the Emergency Planning Zones themselves must be factored into emergency planning considerations. For example, if an EPZ is an area with singular adverse weather attributes, those attributes must be considered in emergency planning. This reasoning would extend to all attributes that might adversely affect an Emergency Planning Zone. Although neither 10 CFR 50.47 nor Appendix E explicitly state that the emergency plans must account for adverse weather conditions or adverse site characteristics, such conditions are covered by NUREG-0654, which the Commission has adopted to provide guidance in developing plans for coping

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3/ NUREG-0654, FEMA-Rep-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980, pp. 5-7.

4/ NUREG-0396, p. 8; NUREG-0654, p. 7.

with emergencies.[5/] NUREG-0654 calls for required evacuation time estimates to consider adverse conditions which might reasonably be expected to occur during the plant lifetime at a particular site and be severe enough to affect the time estimates for a particular event. Affidavit of Brian Grimes, attached.

> Two conditions--normal and adverse--are considered in the analyses. Adverse conditions would depend on the characteristics of a specific site and could include flooding, snow, ice, fog or rain. (Emphasis supplied) NUREG-0654, pp. 4-6.

Thus, adverse site characteristics of a particular Emergency Planning Zone must be taken into account to satisfactorily implement the Commission's emergency planning regulations.

In the case of San Onofre Units 2 & 3, the site is in California which has a substantial earthquake potential, a fact that is recognized in the seismic design of these units. Consequently, high seismicity is a characteristic which affects the EPZ's around the San Onofre site and is to be considered in emergency planning.

The more difficult question is the extent to which earthquake effects are to be taken into account in emergency planning, for which there is no explicit guidance in 10 CFR 50.47 or in Appendix E to Part 50 nor in NUREG-0654. The Staff, however, believes the answer to this question is dependent upon the nature of the risk and the nature of the remedy to deal with the risk. In areas of low seismicity, the nature of risk is such that the NRC Staff does not require any explicit consideration of earthquake effects in emergency planning. In areas of high seismicity, specifically California, the nature of the risk warrants specific consideration of earthquake effects. To this end, the

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5/ 10 CFR part 50, Appendix F, footnote 1.

NRC Staff has made requests to the Applicants on December 17, 1980 and May 13, 1981 to consider earthquake effects in its emergency planning, and the NRC Staff has also requested FEMA to consider earthquake effects in its evaluation of off-site plans. On the other hand, the Staff has concluded that additional requirements such as the design of additional facilities, structures and systems to specifically withstand earthquakes is not necessary. In particular, no special seismic design of public notification systems, environmental monitoring capability or communications equipment is contemplated. Also, consideration need not be given to a seismic event coincident with a significant accident at the plant due to the very low likelihood of such a coincidence. Grimes Affidavit.

With respect to on-site effects, the NRC Staff believes consideration should be given to the ability to transport necessary personnel to the plant to cope with degraded modes of plant operation possibly resulting from the earthquake. In addition, there should be assurance of continued communication between the plant and off-site agencies. Grimes Affidavit.

With respect to off-site effects, the FEMA Radiological Emergency Preparedness Staff believes there should be assurance of continued communication between the plant and outside agencies. In addition, the Emergency Operation Centers (EOCs) of each of the jurisdictions involved in the emergency planning effort for a specific nuclear facility should have suitably distant backup facilities to permit continued functioning of a jurisdiction's emergency response given the possible failure of its primary EOC. Affidavit of Robert Jaske, attached.

In addition, the capability should exist to obtain damage estimates both to the plant and to transportation and communication facilities

off-site to provide a data base to factor into the decisionmaking process. Finally, the Applicants should have available a range of recommendations to off-site authorities, taking into account the degree of damage to the plant caused by the earthquake and to transportation and communication facilities off-site. Grimes Affidavit.

The specific size or magnitude of earthquake to be considered for emergency planning purposes is not a critical element as long as the magnitude postulated is less than or equal to the Safe Shutdown Earthquake (SSE), because such earthquakes are accounted for in the plant design. A moderate size earthquake, something less than the SSE, will produce impacts on transportation and communication facilities which, if considered in emergency planning, would also provide an emergency response capability useful in coping with any less likely larger earthquakes. As noted above, the planning basis for emergency preparedness does not include explicit planning for any specific event or events, but rather is a base capability which can be expanded or contracted to address an actual emergency. The measures which cope with consequences of moderate earthquakes (e.g., backup communications and EOCs, and feedback of damage estimates regarding transportation routes to decisionmakers) would be equally applicable in the event of a large earthquake. Explicit consideration of less than worst-case effects suffices to give confidence that the occurrence of any of a spectrum of events, including very low likelihood events, give decisionmakers a planning base from which specific actions could be chosen from among available alternatives. Grimes Affidavit.

However, the magnitude of the earthquake does become critical when one considers the SSE with its potential for a sudden radiological

release from the plant itself. Presumably, if one postulates an earthquake of magnitude less than or equal to the SSE, while one could have impacts upon communications and transportation as a consequence of the earthquake, nonetheless the plant would not pose an immediate radiological hazard. If however, one postulates an earthquake in excess the SSE, then one has the potential for a very real radiological hazard complicated by the nonradiological impacts posed a major earthquake. In the view of NRC Staff, such a contingency does not warrant specific emergency planning efforts due to remote likelihood of its occurence. See infra, pp. 9-10. In addition, the characteristics of an accident which could theoretically be created by an earthquake larger than the SSE would not be outside the spectrum of accidents considered in NUREG-0396 upon which the judgment on planning zone sizes and other planning elements were based. Also to provide an adequate emergency response in these circumstances would require a commitment of societal resources of great magnitude. Such a commitment is not warranted given the low likelihood of occurrence of earthquakes in excess of tne SSE. Grimes Affidavit.

Consequently, due to the remote likelihood of its occurrence and due to the great commitment of resources required for the extremely low risk involved, the NRC Staff is of the view that earthquakes more severe than the SSE need not be explicitly considered for emergency planning purposes. As noted above, however, as a consequence of planning for moderate earthquakes, a planning base is available in the event of the less likely larger earthquake.

With respect to the Board's question regarding the application of the principles of the Vermont Yankee case to this situation,[6/] it would be the Staff's view that the principle of the Vermont Yankee case would not bar, as a matter of law, inquiry into the appropriateness of earthquake considerations in the emergency planning area given an earthquake in excess of the SSE. As the Licensing Board noted at p.6 of its April 17, 1981, Memorandum and Order, the Atomic Energy Commission stated in the Vermont Yankee case:

> Thus, the accident postulated in the ECCS criteria need not necessarily be regarded as the accident to be postulated for containment design purposes. Rather, as shown in our discussion in of defense-in-depth...the use of successively increasing conservatism in postulated accidents contributes an added measure of protection to the public health and safety.

Consequently, as a matter of law, under the Vermont Yankee principal, one could extend earthquake considerations with respect to emergency planning to earthquakes greater than the SSE. Whether such an extension would be appropriate would be a question to be determined based on the particular circumstances of the case involved. In the Vermont Yankee decision, the Commission interpreted Criterion 50 of 10 CFR Part 50, Appendix A, as establishing as a containment design basis that the containment structure and its internal compartments should accommodate the effects of potential energy sources that may result from the degradation but not total failure of emergency core cooling functioning. The Commission interpreted "degraded emergency core cooling functioning" as used in Criterion 50 to mean emergency core cooling functioning degraded beyond

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6/ Vermont Yankee Nuclear Power Corporation (Vermont Yankee Nuclear Power Station), CLI-74-40, 8 AEC 809 (1974).

the requirements of the acceptance criteria, i.e. 10 CFR § 50.46 and 10 CFR Part 50, Appendix K, though not to the point of ECCS failure. Consequently, for purposes of determining containment adequacy, one would not be bound by the hydrogen concentration limits of the ECCS acceptance criteria. However, should one choose limits different from those set forth in the acceptance criteria, there must be a showing that those different limits are appropriate in the circumstances of a specific case and that they have a factual basis. On this point the Commission said:

> Thus, we specifically hold that the phrase "degraded emergency core cooling functioning" as used in criterion 50, means emergency core cooling functioning degraded beyond the requirements of the acceptance criteria, though not to the point ECCS failure. Reliance upon this concept in a licensing case must, of course, be accompanied by a showing that the party's position has a factual basis. (Emphasis supplied). P. 812.

Consequently, by analogy to Vermont Yankee, to extend emergency planning to earthquakes in excess of the SSE, there must be a showing that such an extension is warranted, i.e., that it has a factual basis. No such showing has been made in this proceeding. Indeed, under the Commission's regulations which established the SSE, it is clear that the SSE is regarded as a highly conservative design basis with little likelihood of an earthquake in excess of the SSE affecting the site. The SSE is defined as follows:

> The "Safe Shutdown Earthquake" is that earthquake which is based upon the evaluation of the maximum earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material. It is that earthquake which produces the maximum vibratory ground motion for which certain structures, systems, and components are designed to remain functional. 10 CFR Part 100, Appendix A III(c). (Emphasis supplied)

Again, in 10 CFR Part 100, Appendix A V(a):

> The earthquake which could cause the maximum vibratory ground motion at the site should be designated the Safe Shutdown Earthquake. (Emphasis supplied)

Thus, the Commission's regulations make clear that the SSE is to be set in a highly conservative fashion as the maximum earthquake based on assessment of historic tectonic characteristics which could affect the site. With this high degree of conservatism in establishing the SSE, the NRC Staff do not believe that there can be any reasonable showing warranting consideration of more severe events for emergency planning purposes.

In summary, in response to Board's first question, it is the NRC Staff's view that earthquake effects should be taken into account in both the on-site and off-site emergency plans given the seismic situation in California. The Staff believes that consideration should be given to a moderate earthquake which has a reasonable likelihood of occurance and which would seriously challenge transportation and communications both on-site and off-site. Measures which are effective for mcderate earthquakes will form a response base also for larger earthquakes. There is no reasonable basis for giving consideration to an earthquake in excess of the SSE. Such earthquakes are extremely unlikely. Inquiry beyond the SSE is not barred as a matter of law. However, there must be at the outset a reasonable factual basis for asserting that consideration of such larger event is warranted.

II. How are the sizes of the plume exposure and ingestion pathways EPZ's to be determined under 10 CFR 50.57(2)? Are site specific studies of local demography, topography and the like required? If not, exactly how are EPZ sizes to be determined, assuming that a mechanical application of the 50 and 10 figures can not be made?

The size of the EPZs are substantially set by regulation.[7/] The Commission's regulations on this point read:

> Generally, the plume exposure pathway EPZ for nuclear power plants shall consist of an area of about 10 miles (16 km.) in radius. And the ingestion pathway EPZ shall consist of an area of about 50 miles (80 km.) in radius. The exact size and configuration of the EPZ surrounding a peticular nuclear power reactor shall be determined in relation to local emergency response needs and the capabilities as they are affected by such conditions as demography, topography, land characteristics, access roads and jurisdicational boundaries. The size of EPZs may also be determined on a case-by-case basis for gas-cooled nulcear reactors and for reactors with an authorized power level less than 250 MW thermal. 10 CFR 50.47(c)(2).

Thus, the determination of EPZs is not considered ab initio on a case-by-case basis.[8/] Rather, the Commission's regulations provide a standard of about 10 miles or about 50 miles with the exact dimensions to be left to the responsible planning officials taking in account local characteristics which bear on such planning.

The Statement of Considerations accompanying the promulgation of the rule further supports the proposition that the EPZs are substantially set by regulation. There the Commission stated:

7/ To the extent that the Board in Cinncinati Gas and Electric Co. et al (William H. Zimmer Nuclear Station), LBP-80-19, 12 NRC 67, 73 (1980) took a different view, that Board's ruling considered EPZs in the context of a Commission policy statement and not in the context of final Commission regulations which is the situation this Licensing Board presently has before it.

8/ Ab initio, case-by-case assessment is limited to gas cooled reactors or reactors with limited power levels.

> The EPZ for airborne exposure has a radius of about 10 miles; the EPZ for contaminated food and water has a radius of about 50 miles. Predetermined protective action plans are needed for the EPZs. The exact size and shape of each EPZ will be decided by emergency planning officials after they consider the specific conditions at each site. These distances are considered large enough to provide a response base that would support activity outside the planning zone should this ever be needed. (Emphasis supplied.) 45 Fed. Reg. 55406 (August 19, 1980).

Thus the Commission explicitly stated that the 10 mile and 50 mile EPZs "are considered large enough to provide a response base...". This is clear language that the Commission did not contemplate the size of EPZs to be established ab initio in each specific licensing proceeding.

Further support for this interpretation can be gleaned from the Commission Policy Statement outlining the planning basis for emergency responses to nulcear power plant accidents, supra. The Policy Statement makes reference to NUREG-0396 and the statement goes to indicated that "the NRC concurs in and endorses for use the guidance contained in the task force report". In that report, the EPZ concept is discussed. It is clear from that discussion at pp. 15-17 that the 10 mile and 50 mile radii selected were firm distances to be subjected to only local variation to take into account local conditions such as demography, topography, land characteristics, access routes and local jurisdictional boundaries. The report specifically states:

> Although the radius for the EPZ implies a circular area, the actual shape would depend upon the characteristics of the particular site. p. 16.

Thus, the only variation of the 10 mile and 50 mile limits was intended to suit the peculiarities of a local site. The regulations would not permit mandating EPZs substantially different from the 10 and 50 mile EPZs which have been set by regulation.

Under the scheme of the regulations, it is then the task of emergency planning officials to consider the specific conditions at each site and to delimit the EPZs to be used for emergency planning within the above constraints, and the function of the FEMA Radiological Emergency Preparedness Staff to assess the adequacy of such plans. Grimes Affidavit; Jaske Affidavit.

Information relative to these factors is considered during the FEMA evaluation of the off-site plans. No special site-specific studies are required for this determination. In general, appropriate bounds to the EPZs are set by local officials based on their knowledge of local characteristics. The only points of significance for the determination of the actual boundaries are whether the boundary is clearly defined, can be readily communicated to the public and accounts for local conditions near the nominal 10-mile or 50-mile boundary. Grimes Affidavit; Jaske Affidavit.

In summary, in response to the Board's second question, site specific studies to determine EPZs are not required. The EPZ size is substantially set by regulation with the actual boundaries set by emergency planning officials based on their knowledge of local conditions.

CONCLUSION

With respect to the Board's first question, the Staff is of the view that the effects of a moderate earthquake should be considered in both on- and off-site planning with respect to the San Onofre Nuclear

Generating Station. With respect to the Board's second question, EPZ sizes are substanially set by regulation. No site specific studies are required by regulation for emergency planning officials to determine specific EPZ sizes. Rather, emergency planning officials may simply inspect local demography, topography, land characteristics, access routes and local jurisdictional boundaries to clearly delimit EPZ size.

Respectfully submitted,

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Dated at Bethesda, Maryland
this 22nd day of June, 1981