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)	)	

AFFIDAVIT OF BRIAN K. GRIMES

My name is Brian K. Grimes. I am Director, Division of Emergency Preparedness, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D. C. My professional qualifications are attached as part of this affidavit. This affidavit is submitted to address the areas of emergency planning earthquake considerations and selection of Emergency Planning Zone (EPZ) size.

I. Emergency Planning Earthquake Considerations

A fundamental premise in the approach to emergency planning utilized by the Federal Emergency Management Agency (FEMA) and the Nuclear Regulatory Commission (NRC) 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.[1/]

1/ 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.

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 is reiterated in NUREG-0654.[2/] 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.[3/] 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

2/ 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.

3/ NUREG-0396, p. 8, NUREG-0654, p. 7.

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. Appendix 4 of NUREG-0654 speaks to this point directly. Evacuation time estimates are required 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.

> 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, Rev. 1, pp. 4-6.

It should be stressed that this reference is to NUREG-0654 which the Commission has adopted to provide guidance in developing plans for coping with emergencies.[4/] It is clear then that the characteristics of a particular Emergency Planning Zone must be taken into account to give meaning to 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 EPZs 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. The answer to this question is dependent upon the nature of the risk and the nature

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4/ 10 C.F.R. Part 50, Appendix E, footnote 1.

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 (high earthquake frequency and magnitude), specifically California, the nature of the risk warrants specific consideration of earthquake effects. To this end, the NRC Staff has made requests to the Applicants on December 17, 1981, 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. The Staff has, however, 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.

With respect to on-site effects, 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.

With respect to off-site effects, it is our understanding that the FEMA Radiological Emergency Preparedness staff believes that 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.

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.

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, provide decisionmakers with a planning base from which specific actions could be chosen from among available alternatives.

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 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 of the SSE, then one has the potential for a very real radiological hazard complicated by the nonradiological impacts posed a major earthquake. In both FEMA's and Staff's view, such a contingency does not warrant specific emergency planning efforts due to the remote likelihood of its occurrence. In addition, the characterisitcs 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 for such an occurrence 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 the SSE. Consequently, due to the remote likelihood of its occurrence and due to the great commitment of resources required both the FEMA

Radiological Emergency Preparedness Staff and the NRC Staff are 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.

II. Selection of Emergency Planning Zone (EPZ) Size

The size of the EPZs are substantially set by regulation. 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 particular 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 jurisdictional boundaries. The size of EPZs may also be determined on a case-by-case basis for gas-cooled nuclear reactors and for reactors with an authorized power level less than 250 MW thermal. 10 C.F.R. 50.47(c)(2).

Consequently, while the size and configuration of EPZs may be affected by the conditions indicated, it is the NRC Staff's position that the Commission's intent was that variability in size would be minimal, i.e., perhaps 11 miles, perhaps 9 miles. However, in no case was the determination of an EPZ to be considered ab initio on a case-by-case basis. Such considerations were reserved for gas-cooled reactors or for reactors with limited power levels.

With respect to large power reactors such as those at San Onofre, only minimal variation of the 10 mile and 50 mile limits was intended to suit the peculiarities of a local site. Consequently, some judgment

must be employed to firmly set the shape of the EPZs but the Commission's regulations place a limit to the degree of judgment needed. The regulations would not mandate EPZs substantially different from the 10- and 50-mile EPZs which have been set by regulation.

Under 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. Should offsite authorities choose to expend resources to extend EPZs to large distances, compliance with the regulations would not be affected as long as such planning did not reduce the level of preparedness called for by the Commission's regulations within the EPZs called for by the Commission regulations.

Information relative to the factors considered in setting EPZ size is evaluated by FEMA during its review of the off-site plans. No site-specific studies are required to determine EPZ size. The points of significance for the determination of the actual boundaries is 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 so that those members of the public within the EPZs who would be affected by protective action recommendations would be planned for.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 22, 1981.

Brian K. Grimes

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BRIAN K. GRIMES

PROFESSIONAL QUALIFICATIONS

OFFICE OF INSPECTION AND ENFORCEMENT

I am employed as Director, Division of Emergency Preparedness, Office of Inspection and Enforcement, U. S. Nuclear Regulatory Commission, Washington, D. C. I am also the NRC Cochairman on the joint NRC/Federal Emergency Management Agency (FEMA) Steering Committee for Emergency Preparedness. Responsibilities under my current assignments include directing the activities of personnel in the review of emergency plans for operating power reactors, operating licenses and construction permits and coordinating NRC and FEMA efforts in the review of emergency preparedness at and around nuclear power plant sites; assuring that the NRC's Operations Center is staffed, trained, and ready to respond promptly and effectively to actual or simulated emergencies, directing the NRC's inspection program to ensure NRC licensees are maintaining in effect emergency plans that there is no degradation in their ability to respond to emergencies.

I attended the University of Washington, Seattle, Washington, and received a BS degree in Chemical Engineering in 1962 and a MS degree in Nuclear Engineering in 1964. While completing my graduate work, I was employed as a research assistant at the University of Washington Engineering Experiment Station; my duties involved performing analytical and experimental work on the University of Washington research reactor.

In 1963, I accepted employment with the Division of Reactor Licensing, USAEC. My first assignment involved attendance at the International Institute for

Nuclear Science and Engineering at Argonne National Laboratory for four months. Upon completion of this course, I was assigned as a Nuclear Engineer in the Division of Reactor Licensing. My initial duties included primary responsibility for the continuing review of the nuclear safety aspects of various research reactors. I subsequently participated in the safety evaluation of a number of construction permit applications for both pressurized and boiling water power reactors.

Later, as a Reactor Project Engineer in the Division of Reactor Licensing, I had primary responsibility for the safety review of the construction permit application for the Commonwealth Edison Company's Quad-Cities Units 1 and 2, for the Duke Power Company's Oconee Nuclear Station Units 1, 2 and 3, for the Metropolitan Edison Company's Three Mile Island Nuclear Station Unit 1, and for the Indiana & Michigan Electric Company's Donald C. Cook Nuclear Plant Units 1 and 2. I was assigned to the position of Technical Coordinator for Reactor Projects in October, 1968. Prior to March, 1970, I served as Technical Coordinator for both pressurized and boiling water reactors. After March, 1970, as Technical Coordinator for Boiling Water Reactors, my responsibilities included coordinating the technical aspects of all safety reviews in the Boiling Water Reactor group, providing liaison with the pressurized water reactor group and serving as administrative assistant to the Assistant Director for Boiling Water Reactors.

I was assigned to the position of Chief of the Radiological Safety Branch, Division of Reactor Licensing in July, 1971, in which position I was responsible for the review of systems necessary for the control and treatment of radioactivity

under normal and accident conditions. In January, 1972, the functions of this branch were divided and I was appointed Chief of the Accident Analysis Branch. My responsibilities as Chief of the Accident Analysis Branch included reviewing calculational models, procedures and methods developed by members of the Branch for both conservative assessment and a realistic assessment of the consequences of a spectrum of accidents for all nuclear power plants and reviewing analyses of all nuclear power reactor sites performed by members of the Branch with regard to site related hazards and compliance with the guidelines of 10 CFR Part 100. In January, 1976, I was assigned to the position of Chief of the Environmental Evaluation Branch in the newly formed Division of Operating Reactors. In this position my responsibilities included supervising the review of radiological and non-radiological impacts of operating nuclear power plants from both a safety and environmental standpoint. Branch review areas included accident analyses, site-related hazards, effluent treatment systems, off-site radiological effects, and thermal and chemical effluents.

On April 1, 1978 I was appointed Assistant Director for Engineering and Projects in the Division of Operating Reactors. In this position my responsibilities included managing the activities of the Engineering Branch, the Environmental Evaluation Branch, Operating Reactors Project Branch No. 3, Operating Reactors Project Branch No. 4 and the Standard Technical Specification Group. On June 25, 1979, I was assigned Acting Assistant Director for Systems Engineering in the Division of Operating Reactors, and managed the Plant Systems Branch and the Reactor Safety Branch. On October 25, 1979, I was designated Director of the Emergency Preparedness Task Group reporting to the Director of the

Office of Nuclear Reactor Regulation. In November, 1980, all reactor emergency preparedness review activities were combined with NRC response activities in the new Division of Emergency Preparedness in the Office of Inspection and Enforcement and I was appointed Director of that Division. In this position, I supervise the Emergency Preparedness Licensing Branch, Emergency Preparedness Development Branch and the Incident Response Branch.