UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
GENERAL ELECTRIC COMPANY	)	Docket No. 50-70
	)	(Show Cause)
(Vallecitos Nuclear Center -	)	
General Electric Test Reactor,	)	
Operating License No. TR-1)	)	

TESTIMONY OF JOSEPH A. MARTORE

Q.1. Please state your name, your present position with the Nuclear Regulatory Commission and immediately prior position.

A.1. My name is Joseph A. Martore. I am a Project Manager responsible for the overall safety and environmental project management for power reactor license applications. Prior to holding this position I was a Structural Engineer in the Division of Operating Reactors, Office of Nuclear Reactor Regulations, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, responsible for the engineering analysis and review of safety issues and design criteria related to nuclear facilities licensed for operation; including the review and evaluation of structural, seismic, and mechanical analysis and design of safety related structures and components.

Q.2. Please describe your educational background and previous positions held.

A.2. I received M.S. and B.S. degrees in Civil Engineering from Massachusetts Institute of Technology in 1976 and 1975, respectively. Major

fields of study and research included engineering mechanics, structural dynamics, and structural analysis and design. Currently, I am a member of both Earthquake Engineering Research Institute and American Society of Civil Engineers. I am also a registered Professional Engineer.

From April 1974 to February 1976, I was employed by North East Post-tensioning Consultants, Inc. as a field engineer and civil engineer. My duties included construction field supervision and inspection, and analysis and design of prestressed concrete structures.

From March 1976 to March 1979, I was employed by Stone and Webster Engineering Corporation as a Structural Engineer in the Engineering Mechanics Division. My responsibilities included the seismic, static, and accident analysis and design of nuclear power plant safety related structures. I was also engaged in missile impact and cask drop analyses, and in developing structural design criteria and specifications. Between the years 1977 and 1979, I was in charge of the soil-structure interaction and seismic engineering aspects of a nuclear power plant. In this capacity I had lead responsibility for the seismic analysis of all safety related structures, including the assessment of structural behavior and the determination of seismic induced stresses and displacements for use in design of the structures. In addition, I was involved in expanding the company's state-of-the art soil structure interaction modeling and analysis capabilities.

In March 1979, I joined the Nuclear Regulatory Commission. I have participated in the review and evaluation of operating license amendments involving seismic and structural issues. Assessment of seismic design criteria and analysis methodology, and evaluation of mechanical and structural aspects of

spent fuel pool expansions. I have also participated in the NRC sponsored confirmatory research activities related to seismic analyses and methodologies, and have established and managed technical assistance contracts involving seismic issues; including a recent study in which I co-authored a report entitled, "Equipment Response at the El Centro Steam Plant During the October 15, 1979 Imperial Valley Earthquake," NUREG/CR-1665.

Q.3. Please describe your participation in the NRC Staff review of the General Electric Test Reactor for this proceeding.

A.3. In conjunction with Dr. W. J. Hall, I prepared section C of the Staff's May 23, 1980 portion of the Safety Evaluation Report, entitled "Engineering Seismic Design Parameters" and section C of the Staff's October 27, 1980 portion of the Safety Evaluation Report, entitled "Seismic Design of GETR Structures Systems and Components Important to Safety", with the exception of the first paragraph on p.C-8 and the material relating to "Review of Represntative Time Histories for Seismic Scram Analysis at GETR" on p.C-12.

Q.4. Please summarize the extent of your review and your conclusions.

A.4. Our review of this facility is based upon the following general criteria. In the case of nuclear facilities, safety for seismic excitation implies that certain elements and components of the system must continue to remain functional. Structures, piping, and equipment may deform into the inelastic range, and some elements and components may even be permitted to suffer damage, provided that the entire system can continue to achieve and maintain a safe shutdown condition.

Given the seismic design parameters, only the following structural and mechanical requirements must be satisfied:

1. The structural integrity of the massive concrete structure which supports other systems and components important to safety must be maintained.

2. The structural integrity of the reactor vessel and canal fuel storage tanks must be assured.

3. A source of water, including the associated piping system, must be available after the seismic event to provide water to the spent fuel canal storage tanks and the reactor pressure vessel to replenish that lost through boil off and evaporation in the process of cooling the fuel.

The GETR facility, with proposed modifications, has been reanalyzed by General Electric, and reviewed by the NRC Staff and its consultants, to determine whether adequate assurance is provided that the GETR can safely withstand the effects of the seismic design events. Detailed reviews have been carried out on safety related structures, systems and components required to withstand the loadings representing the hazard defined by our seismic design criteria, including possible effects of shaking and faulting.

The seismic review analyses and design of the GETR essential structures, systems and components are in conformance with accepted codes and criteria. In the case of structures and structural components, based on the information reviewed, we find that the analyses performed are consistent with the state-of-the-art that would be used for existing nuclear facilities. It was demonstrated that allowable strengths are adequate to accommodate the

effects of the seismic design criteria. Results of analyses and qualification testing of equipment and values similar to those in service demonstrate their ability to function during and after the design basis events.

Each of the three seismic design input parameters commonly associated in design or review analysis, namely earthquake magnitude, expected ground motion, and the response spectra, include reasonably high levels of conservatism which in turn are compounded one upon another as loading input in the final form of the response spectra that are to be employed in the seismic design.

Rational seismic design is based on both reasonably conservative loading and reasonably conservative physical resistance. The physical resistance is provided to accommodate the design loadings, seismic as well as those arising from other effects, and normally includes a significant margin of safety in terms of strength and/or ductility to accommodate unexpected over-loading or expected deformation.

On the basis of our evaluation of the seismic design criteria, analyses methods and criteria employed, and the results obtained, we conclude that the GETR structures, systems and components important to safety, modified as proposed, will remain functional considering the seismic design bases determined proper by the Staff.