



ADJUDICATORY ISSUE

June 29, 1983

(Notation Vote)

SECY-83-262

For: The Commissioners

From: James A. Fitzgerald
Assistant General Counsel

Subject: REVIEW OF ALAB-720 (IN THE MATTER OF
GENERAL ELECTRIC COMPANY)

Facility: Vallecitos Nuclear Center -
General Electric Test Reactor,
Operating License No. TR-1

Purpose: To inform the Commission of the above
decision [and to recommend that

EX.5

Summary: In ALAB-720, the Appeal Board affirmed:
(1) the Licensing Board's determination
of the seismic and geologic design bases
for the General Electric Test Reactor
(GETR);¹ and (2) the structural
modifications which have been or are
being performed to accommodate those
design bases. Although the Licensing
Board was unanimous on most of its

¹The General Electric Test Reactor (GETR) is a 50MW
(thermal) reactor located at the Vallecitos Nuclear Center,
near Pleasanton, California. GETR, which was licensed to
operate in January 1959, is used for the production of
radioisotopes and for the testing of reactor fuels and
materials.

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findings, it was sharply divided on the issue of the maximum possible displacement of the ground under the GETR should an earthquake occur on the nearby capable fault: the majority found that a one-meter displacement should be assumed while the Board Chairman believed that the record supported a two-meter displacement. In spite of this controversy, no party appealed the Licensing Board's decision. Therefore, the Appeal Board conducted its usual sua sponte review. The Appeal Board found that the record supported a maximum ground displacement of one meter because any earthquake-induced ground displacement would probably be deflected away from the base of the reactor building. |

therefore believe that

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Discussion:

I. Background

This case arose during a review of the geology and seismology of the GETR site in connection with GE's application for a license renewal. In August 1977, the NRC staff learned that investigations conducted by the United States Geological Survey (USGS) indicated that a trace of the nearby Verona fault comes within 200 feet of the reactor, rather than one-half mile, as previously believed. Subsequent field work, including trenching at the site, led the staff to conclude that the trace appeared to be associated with a fault, probably "capable," as defined in Appendix A to 10 CFR Part 100, and that, as a result, earthquakes on the

Calaveras or Verona faults, or on both, could produce surface and ground motions in excess of those assumed as the bases for the GETR design. Thereupon, the NRC issued an Order to Show Cause that required the facility to be placed in a cold shutdown condition and GE to show cause why the shutdown should not be continued.

In February 1978, the Commission established a Licensing Board to hold hearings on: (1) the proper seismic and geologic design bases for GETR; (2) what structural modifications should and could be made to assure the safety of GETR in light of these design bases; and (3) whether the suspension of licensed activities should continue.

Following issuance of the Show Cause Order, many geologic and seismic studies -- including extensive field work -- of the GETR site were conducted to establish the proper seismic design bases. Concurrently, the capability of the GETR to withstand the more severe seismic conditions was investigated and a series of modifications to safety-related structures, systems and components was proposed. Public hearings began before the Licensing Board on May 27, 1981 and were concluded on June 10, 1981.

On August 16, 1982, the Licensing Board established geologic and seismic design bases, and found that the structural modifications required to satisfy these bases could be implemented. LBP-82-64. The Board majority found that, among the design bases, an earthquake on the nearby faults could result in a maximum ground displacement of one meter under the reactor. The Board Chairman

strenuously disagreed and believed that the maximum surface displacement resulting from an earthquake associated with the Verona fault should be considered to be 2 meters. Nonetheless, the Chairman agreed with the majority that any soil displacement would likely be deflected around the reactor and, thus, his disagreement with the majority would not affect the Board's conclusion that the GETR could be modified so as to safely withstand the revised geologic and seismic design basis events.

None of the parties appealed the Licensing Board's decision. Therefore, in accordance with its usual practice, the Appeal Board reviewed the decision and the underlying record on its own initiative. In its decision (ALAB-720, March 23, 1983), the Appeal Board accepted the majority's view as to the proper geologic design bases and affirmed the Licensing Board's decision. OPE has reviewed the technical issues in ALAB-720 and finds that they do not raise questions warranting Commission review.

In addition, this case raises the legal issue of whether the General Design Criteria (GDC) for nuclear power plants apply to testing reactors. For the reasons discussed below, we believe that

The Licensing Board Chairman stated that if Appendix A to 10 CFR Part 50, which establishes the General Design Criteria for nuclear power plants, did apply, GETR's design would not meet General

Design Criterion 2. Criterion 2 requires that structures, systems, and components important to safety shall be able to perform their safety functions despite "appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena." According to the Chairman, the staff indicated that a design basis seismic event "in conjunction with" a non-seismic design basis accident is an "appropriate combination" of events for the purposes of Criterion 2. Slip op. at 185. At GETR, a combination of accidents such as a design basis seismic event that breached the containment followed by a non-seismic design basis accident that involved a core melt might release excessive radiation to the environs.² Slip op. at 86, 186. Neither the majority nor the Chairman analyzed this possibility of excessive releases, apparently because neither felt that this combination of events had to be considered.

In our view,

²The Licensing Board indicated that the failure of the containment structure in the case of a design basis seismic event alone would not result in excessive releases. Slip op. at 86-88.

The inability of the containment to withstand a design basis seismic event also appears to mean that GETR does not meet General Design Criterion 16.

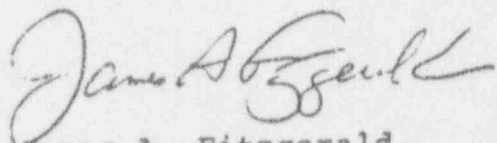
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Conclusion

For the reasons discussed above, we believe that

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D.S



James A. Fitzgerald
Assistant General Counsel

Attachment:
ALAB-720

Commissioners' comments or consent should be provided directly to the Office of the Secretary by c.o.b. Friday, July 15, 1983.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, July 8, 1983, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Alan S. Rosenthal, Chairman
Stephen F. Eilperin
Howard A. Wilber

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

DECISION

March 23, 1983

(ALAB-720)

We have before us the Licensing Board's initial decision in this show cause proceeding instituted to consider certain issues pertaining to the appropriate seismic and geological design bases for the General Electric Test Reactor (GETR). LBP-82-64, 16 NRC ____ (August 16, 1982). Located at the General Electric Company's Vallecitos Nuclear Center near Pleasanton, California, this 50 megawatt (thermal) reactor received an operating license in January 1959 for the purposes of (1) the production of radioisotopes for medical and industrial uses and (2) the testing of reactor fuels and materials.

The events leading up to the show cause proceeding (and the suspension of the operating license pendente lite) are

adequately described in the introductory section of the Licensing Board's opinion and need not be rehearsed in detail. It suffices here to note that the proceeding was triggered by an NRC staff review of the geology and seismology of the Vallecitos site that had been undertaken in connection with GE's application for a license renewal. During the course of that review, the staff received a United States Geological Survey (USGS) report that disclosed that a geological anomaly, denominated the Verona fault, comes within approximately 200 feet of the GETR. (It previously had been believed that the fault was about one-half mile from the reactor.) Given this disclosure, the Licensing Board was called upon to reassess the seismic and geologic design bases for the GETR and to determine, in light of that reassessment, whether facility modifications would be required to meet any revisions in those design bases.

On the basis of the record developed at the evidentiary hearing on these questions, the Licensing Board made numerous findings of fact, from which it reached several conclusions of law. As to many of those findings and conclusions, the Board was unanimous. There was sharp disagreement, however, between the Board Chairman and his colleagues on one matter. This disagreement prompted a lengthy separate opinion by the Chairman, followed by a

rejoinder on the part of the Board majority. 1/

Nevertheless, no party has appealed any portion of the initial decision. Thus, as is customary in such circumstances, we have reviewed the decision and the underlying evidentiary record on our own initiative. On those issues respecting which there was no difference in result below, we find no cause to disturb the outcome announced in the majority opinion. 2/ With regard to the matter on which the Licensing Board was divided, for the reasons summarized below we accept the majority view. Accordingly, the initial decision is affirmed.

1/ The Licensing Board's ultimate determination was that (1) the design of safety-related GETR structures, systems and components required modification in light of the geological and seismic design bases prescribed by the Board; and (2) the necessary modifications could be accomplished.

The proceeding involving the GETR license renewal application itself is still pending below. Also remaining before the Licensing Board is GE's application for a renewal of its special nuclear material license for the Vallecitos Nuclear Center.

2/ To be sure, in his separate opinion the Board Chairman noted that, on several such issues, he had come to the same conclusion as his colleagues without subscribing to all that was said on the particular point in the majority opinion. We believe those issues were correctly resolved by the Board and see no reason to pursue here the differences between the Chairman's analysis and that of the other Board members.

1. Were an earthquake to occur on the Verona fault, there could be some permanent soil displacement (i.e., surface offset). Because of the particular characteristics of this fault, the displacement would be in both horizontal and vertical directions. Accordingly, in the event that the displacement took place under the reactor building, there would be stresses upon both its foundation and walls -- which would carry over, at least in part, to the safety-related structures and equipment within the building.

Obviously, the facility must be designed to provide reasonable assurance that any such stresses would not threaten the integrity of those components. Because of the relationship between the extent of soil displacement and the particular stresses associated with it, the Board necessarily had to address the question of how much displacement under the reactor is to be assumed for design basis purposes. It was on this question that the Board was not unanimous. In the view of the majority, a one meter displacement should be assumed; in the opinion of the dissenting member, the appropriate figure is two meters.

It should be noted preliminarily that there is considerable uncontroverted evidence in the record suggesting that it is highly unlikely that a seismic event on the Verona fault would produce any soil displacement under the reactor building itself. This evidence took the form of analyses -- performed independently by the licensee

and the staff -- which indicated that the soil displacement would be deflected away from the base of the building (Pichumani, fol. Tr. 996, at pp. 5-7; Lic. Exh. 1, at pp. 84-94; Tr. 236-39, 401-02, 467-69, 491-93, 2264-96). In such circumstances, the displacement might nonetheless occasion damage to the outer walls (containment) of the building (Tr. 1965-66). ^{3/} But there would not be a like threat to the safety-related components contained therein; i.e., the stresses associated with a displacement adjacent

^{3/} As all three members of the Licensing Board agreed, the record reflects that a loss of containment attributable to an earthquake would not result in radioactive releases beyond those permitted by Commission regulation. 16 NRC at _____, _____ (slip opinion, pp. 87-88, 184-85). This is so, according to a staff witness, because (1) the reactor would automatically shutdown prior to any possibility of fuel damage stemming from continued operation; (2) the core would not become uncovered; and (3) the fuel would not be adversely affected by the seismic motions (Tr. 2219).

The full Board below also agreed that it was not necessary to consider the consequences of the simultaneous occurrence of an earthquake and a non-seismic design basis accident. Although recognizing that such consideration would have been required by Appendix A to 10 CFR Part 50 had the facility at bar been a power reactor, the Board concluded that Appendix A has no applicability to test reactors such as the GETR. 16 NRC at _____, _____ (slip opinion, pp. 87, 101, 186-87). This conclusion seems adequately supported by the introduction to the Appendix, which indicates that its requirements extend solely to "nuclear power plants." A "nuclear power unit" is then defined in terms of "a nuclear power reactor and associated equipment necessary for electric power generation." In the absence of any challenge to the conclusion, we therefore accept it for the purposes of this case. See fn. 7, infra.

to (rather than under) the reactor slab would not have an impact upon those components (Lic. Exh. 22, at p. 55).

No party attempted to demonstrate that the fault deflection analyses were flawed in some material respect. That being so, it would appear that the difference of opinion between the Board Chairman and his colleagues is of very limited significance. The short of the matter is that, whether one or two meters in extent, a deflected soil displacement is not a major safety concern.

2. In coming to grips with the question of the appropriate design basis respecting soil displacement, the Licensing Board majority assessed several lines of evidence bearing upon the location, dip, and extent of any displacement that might result from an earthquake on the Verona fault. In addition to the fault deflection analyses, the record included (1) data derived from trenches that had been dug at the site in the course of GE's geological investigation; (2) a comparison of the characteristics of the Verona fault with those of other faults in California (e.g., the San Fernando fault); (3) worldwide data for maximum soil displacements during seismic activity; and (4) two independent probabilistic analyses that focused on the likelihood (fault deflection considerations to one side) that a seismic event on the Verona fault would produce soil displacement under the reactor of over one meter. See 16 NRC at ____ (slip opinion, p. 37). The majority's detailed

appraisal of this evidence led to its ultimate adoption of a design value of one meter.

Our independent examination of the record has brought us to the same result. In this connection, we have scrutinized the reasons assigned by the Chairman of the Licensing Board in support of his contrary conclusion that the seismic design of the facility should make allowance for a two meter soil displacement under the reactor. When evaluated in the light of the full record, however, those reasons do not carry the day.

More specifically, as we see it, there are several crucial difficulties with the dissenting opinion below. Inasmuch as no party to the proceeding has urged the correctness of any portion of the dissent, we need not undertake to expound upon each such difficulty here. By way of illustration, we briefly note two of them.

a. GE performed one of the two probabilistic analyses to which we have earlier referred. ^{4/} A part of the staff review of that analysis was conducted in a consultant capacity by Dr. David B. Slemmons, a Professor of Geology and Geophysics at the University of Nevada at Reno.

^{4/} The other analysis was performed by the TERA Corporation for the NRC. Both analyses yielded results indicating that a one meter design basis value would be conservative. See 16 NRC at ____ (slip opinion, pp. 54-55).

Testifying as a staff witness, Dr. Slemmons stated that, in his opinion, the GE analysis rested on an adequate data base (Tr. 1549).

In questioning the validity of the GE analysis, the dissent did not even allude to this testimony. Rather, the dissent confined its consideration of the "sufficiency of [the] geological information" underlying the analysis to what it characterized as the "reservations" of "USGS experts." 16 NRC at ___ (slip opinion, p. 119). It appears from the record that only one USGS employee testified on the point -- Dr. Earl E. Brabb, who likewise was called as a staff witness. ^{5/} And, while Dr. Brabb did express the reservations attributed to him by the dissent, at a later point in his testimony he expressly conceded that he had not made "a thorough review of the geological data that went into the probability analyses" (Tr. 1675). In that circumstance, we see no reason why the Board below should have taken Dr. Brabb's view as more persuasive than that of Dr. Slemmons -- who, unlike the USGS experts, had been asked by the staff to focus directly upon the probabilistic analyses (Tr. 1533, 1547).

^{5/} Thus, all of the transcript citations in the dissent bearing upon the point (Tr. 1468, 1538-39, 1543, 1552-53, 1555) are to Dr. Brabb's testimony.

b. The dissent relied upon the opinion of the USGS witnesses (Drs. Brabb and Darrell G. Herd) that the soil displacement in one of the trenches dug as part of the GE geological investigation (T-1) was between five and seven feet (i.e., in excess of one meter). 16 NRC at ____ (slip opinion, pp. 125-26). But this opinion did not rest upon the witnesses' observations of that trench -- which had been cursory and for an entirely different purpose (Tr. 1469-70, 1496, 1498). ^{6/} To the contrary, the witnesses' conclusions regarding the extent of the displacement in trench T-1 were derived from the trench log supplied by the licensee (Tr. 1470). According to Dr. Brabb, however, the log did not "accurately show some of the soil conditions in T-1, and possibly some of the faulting" (Tr. 1112). Given that doubt, it is difficult to understand how the log could be taken as a reliable indicator of displacement size.

It is noteworthy on this score that, although putting substantial emphasis on the USGS judgment respecting the dimensions of the unmeasured soil displacement in trench T-1, at the same time the dissent disparaged GE's reliance upon the actual measurements of displacement in other trenches on the site. 16 NRC at ____ (slip opinion, pp.

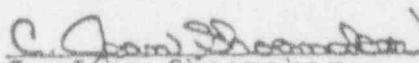
^{6/} Indeed, the trench had been dug with a backhoe and its geological features were difficult to discern at the time of their inspection (Tr. 1496, 1513).

127-28). Those measurements disclosed no displacement in excess of three feet (Tr. 1485). It may not perforce follow that there could not be greater soil displacement under the reactor as a result of a seismic event on the Verona fault. But, surely, the Board majority was justified in attaching larger significance to the measured displacements than to inferences drawn from trench log data of questionable accuracy.

The Licensing Board's August 16, 1982 initial decision is affirmed. 7/

It is so ORDERED.

FOR THE APPEAL BOARD


C. Jean Shoemaker
Secretary to the
Appeal Board

7/ Insofar as concerns the questions of law addressed in the initial decision (e.g., the applicability to the GETR of certain Commission regulations), its affirmance does not have stare decisis effect. See Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Units 1, 2 and 3), ALAB-713, 17 NRC ____, ____ (slip opinion, p. 3) (February 15, 1983).