

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of)
PUBLIC SERVICE COMPANY OF)
NEW HAMPSHIRE, et al.)
(Seabrook Station, Units 1 and 2))

Docket Nos. 50-443
50-444



RESPONSE OF THE NRC STAFF IN OPPOSITION TO NEW
ENGLAND COALITION FOR NUCLEAR POLLUTION'S
PETITION FOR COMMISSION REVIEW OF ALAB-667

Roy P. Lessy
Deputy Assistant Chief
Hearing Counsel

April 7, 1982.

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I. INTRODUCTION

On March 3, 1982, the Atomic Safety and Licensing Appeal Board issued ALAB-667, a "Decision On Remand" with respect to the two seismic issues remanded by the Commission to the Appeal Board in the construction permit phase of this proceeding.^{1/} CLI-80-33, 12 NRC 295 (September 25, 1980) (hereafter "remand order.") In its remand order, the Commission directed the Appeal Board to reopen the record, and reconsider its previous views^{2/} with respect to two discrete seismic issues, viz.: (1) the "factual validity" of the methodology of Dr. Michael Chinnery,^{3/} that there is an empirical relationship between earthquake intensity and earthquake recurrence time; and (2), whether the Staff's methodology for correlating vibratory ground motion (acceleration) is consistent with Appendix A to 10 C.F.R. Part 100.

1/ The operating license phase of this proceeding is now underway with petitions for intervention and requests for a hearing pending before a board designated to rule on such petitions.

2/ See ALAB-422, 6 NRC 33, 54-65 (1977) and ALAB-561, 10 NRC 410, 436 et seq. (1979).

3/ Dr. Chinnery was an expert witness testifying on behalf of the petitioner, New England Coalition on Nuclear Pollution ("NECP").

Subsequent to an evidentiary hearing held before the Appeal Board during the week of April 6th, 1981, the Appeal Board concluded "that Dr. Chinnery's methodology has not been shown to be a credible means of predicting the intensity of seismic motion at a particular [nuclear power plant] site" (ALAB-667, Slip Op. at 39). Thus, the Appeal Board concluded that the present seismic design of Seabrook of Modified Mercalli Intensity VIII, with an associated maximum vibratory ground motion of 0.25g, Regulatory Guide 1.60, is acceptable. Finally, the Appeal Board concluded that the Staff's methodology for correlating vibratory ground motion, which included using the appropriate mean peak acceleration of Trifunac and Brady as the anchor point for a Regulatory Guide 1.60 response spectrum, was consistent with (i.e., "did not offend") Appendix A to 10 C.F.R. Part 100 (Slip Op. at 55).

On March 22, 1982, NECNP filed the instant petition for Commission review under the authority of 10 C.F.R. § 2.786(b). Under the provisions of 10 C.F.R. § 2.786, a party to a proceeding may file a petition for review of an Atomic Safety and Licensing Appeal Board decision with the Commission on the ground that the decision is erroneous with respect to an important question of fact, law or policy, involves an important procedural issue, or otherwise raises important questions of public policy. It is the view of the NRC Staff that none of these requisite elements are raised by the instant petition for review of ALAB-667. Accordingly, and for the reasons discussed below, the petition for review should be denied.

II. DISCUSSION

A. Standards Utilized By The Appeal Board

NECNP contends that "[t]he most serious issue . . . is the lack of any standards by which the Board reached its judgments" (Petition, p. 7).

Thus, NECNP argues that this constitutes "an arbitrary and capricious" approach, ". . . without a rational foundation" (Petition, p. 4).

Initially it must be noted that NECNP has failed to address the requirements of the governing regulation, as to why this assignment of error constitutes an important matter of law or policy that could significantly affect the environment, the public health and safety, or otherwise raise important questions of public policy. See 10 C.F.R. § 2.786(b)(4)(i). Moreover, NECNP has failed to recognize the standards by which Dr. Chinnery's methodology was, in fact, evaluated by the Appeal Board. Four discrete steps were utilized by the Appeal Board in reaching a judgment, as directed by the Commission in its remand order, of "the factual validity" of Dr. Chinnery's methodology.

The first step was to describe the methodology as consisting of four basic assumptions, each of which must be correct assumptions in order for the results of the methodology to be accurate^{4/} (See Chinnery Tr. 90-91). The second step employed by the Appeal Board was to assess the validity of the four assumptions as tested by other expert testimony, the cross-examination of Dr. Chinnery by the other parties, as well as the examination of Dr. Chinnery by the Appeal Board. This step, in essence, probed Dr. Chinnery's justifications for making the assumptions, the reasonableness of the assumptions, and the utilization of the assumptions within the overall methodology. See Slip. Op. at pp. 12-20 (linearity assumption);

4/ The four assumptions are: (1) in any seismic region during a given period of time, there is a linear relationship between epicentral intensity of earthquakes and their frequency of occurrence; (2) this will yield a universal slope consistent with 0.57; (3) there exists no upper bound to earthquake size in any area; and (4) frequency intensity data may be extrapolated linearly to predict the probability of occurrence of larger than historical earthquakes.

pp. 20-22 (uniform slope); pp. 22-26 (upper bounds to maximum earthquake intensity); pp. 26-28 (linear extrapolation beyond historical data).

The third step employed by the Appeal Board was to summarize and delineate in detail the results of its analysis of Dr. Chinnery's assumptions. See Slip Op. pp. 28-34. As a fourth step, the Appeal Board examined the use of scientific data by Dr. Chinnery, i.e., his scientific method (See Slip. Op. pp. 34-39). Only after evaluating Dr. Chinnery's methodology utilizing these four steps, did the Appeal Board render its conclusions with regard to the factual validity of Dr. Chinnery's methodology. The Staff submits that the four-step standards employed by the Appeal Board in responding to the Commission's remand were thorough, well-articulated in ALAB-667, and totally appropriate. Thus, Commission review is not warranted.

E. The Scope of the Hearing

NECNP next contends, as a ground for Commission review, that the Appeal Board erred in ruling that questions concerning alleged uncertainties in the Staff and Applicant methods for determining the SSE were beyond the scope of the hearing (Petition, p. 4). Again, NECNP has failed to address the requirements of the controlling regulation, 10 C.F.R. § 2.786(b).

In responding to this claim, it is important to note that when the Commission ordered the record reopened in this proceeding in September of 1979, it did so with respect to two discrete seismic issues as discussed above. These two issues were but a subset of at least four seismic issues that had been litigated by NECNP before the Appeal Board in 1976-77. See ALAB-422, 6 NRC 33 at 54-65 (1977). Certain other seismic issues, based on arguments advanced by NECNP concerning the "tectonic provinces" approach used by the Staff under Appendix A, and the intensity

of the 1755 Cape Anne earthquake were not reopened by the Commission. However, well after most prehearing matters in the remanded proceeding had been ruled upon, and after the parties had identified the scope of their proffered testimony, NECNP claimed that the hearing should be expanded to examine not only the validity of Dr. Chinnery's methodology, but also should include an adjudication and examination of the relative validity of each party's methods for ascertaining the appropriate intensity earthquake. Since the Staff was a party, such an inquiry would have necessitated a detailed examination of the tectonic province approach and the selection of the Safe Shutdown Earthquake under Appendix A to 10 C.F.R. Part 100. Such issues were beyond the scope of the Commission's remand. Faced with this request by NECNP to expand the issues for hearing -- a request which certainly would have resulted in delay -- the Appeal Board determined that the scope of the hearing should be limited to the remanded issues. See "Memorandum and Order" (February 12, 1981) (unpublished). The Appeal Board did not rule that the "weighing" of all such competing methodologies was inconceivable. Rather, it stated that "It is neither necessary nor appropriate to decide at this juncture whether the Coalition has correctly forecast our next step should the Chinnery approach be found, after the further evidence is received, to be acceptable." Id., p. 7, n.10. The Staff submits that such a ruling was correct, was well within the discretion of the Appeal Board, and clearly forms no basis for Commission review.

C. Conservatism in Licensing

NECNP seeks Commission review on the ground that Dr. Chinnery's methodology is more conservative than the approaches of the Staff and Applicant and that conservatism requires the adoption of the Chinnery approach

(Petition, pp. 5, 9). It is important for the Commission to note that neither NECP witness, Dr. Chinnery, nor Board witness, (formerly NECP witness, now an ACRS consultant) Dr. Mihailo Trifunac criticized the adequacy or safety of the present seismic design of Seabrook of Modified Mercalli Intensity VIII, 0.25g, Reg. Guide 1.60. To this should be added the fact that the seismic design of Seabrook is as high as that of any nuclear power plant east of the Rocky Mountains. Yet Dr. Chinnery's methodology, taken literally, would have most, if not all, nuclear power plants designed to withstand an earthquake of Modified Mercalli X-XII (See Tr. 77-78 (Chinnery)). This assertion is based, in part, on Dr. Chinnery's assumption that there should be a universal slope in the frequency-intensity relationship for all regions of the U.S.A. of 0.57, in spite of the fact that a wide range of slopes for the U.S., from 0.24 to 0.76 had been reported (Slip. Op. pp. 20-21). Moreover, the Appeal Board noted that Dr. Chinnery's assertion of a uniform slope was based only on one study that he had performed, (Slip. Op. p. 20), whereas evidence indicated that a modest variation in slope could produce significant differences. Thus, given these facts, the Appeal Board did not accept NECP's proffered conclusion that Dr. Chinnery's analysis must be accepted simply because it may yield a more conservative result. Rather, the Appeal Board based its conclusions upon the four-step analysis previously described. Accordingly, Commission review of this matter is not warranted.

D. Geologic Testimony

NECP contends that Commission review is required because the Appeal Board cited expert geologic testimony by Staff and Applicant witnesses. In evaluating this claim, it should be initially noted that Dr. Chinnery's methodology is primarily probabilistic (i.e., mathematical) in nature and

does not consider geologic or local characteristics of surface and subsurface material.

The purpose of Dr. Chinnery's methodology is to determine the Safe Shutdown Earthquake ("SSE"). The SSE is defined in 10 C.F.R. Part 100, Appendix A, III(C) as

. . . that earthquake which is based upon an evaluation of the maximum earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material . .

Thus, not only is use of geologic data permissible in evaluating a methodology to determine the SSE, the use of such data, where available, is required by Appendix A. See also, 10 C.F.R. Part 100, Appendix A, § IV. Therefore, it was not erroneous for the Appeal Board to consider geologic testimony in evaluating Dr. Chinnery's methodology, and Commission review is not warranted.

E. Miscellaneous Procedural Matters

As discussed previously, 10 C.F.R. § 2.786 provides for Commission review of procedural issues that are characterized as "important" or serious. The procedural issues delineated by NECNP fall well-short of such a threshold.

For example, NECNP requests Commission review of ALAB-667 because the Appeal Board, in footnote 19 (p. 14), made a single reference to a basic, if not the basic textbook in seismology, "Elementary Seismology" (1958) by C.F. Richter (Petition, p. 6). As explained by the Appeal Board in footnote 19, Dr. Chinnery in Exhibit 1 to his pre-filed direct testimony quoted a portion of a 1956 paper by C.F. Richter (and B. Gutenberg) on the relationship between Modified Mercalli Intensity grades to other numerical quantities. The Appeal Board, after setting

forth Dr. Chinnery's reliance on the 1956 Richter paper, then quoted a basic textbook by Richter, published two years later in 1958. The later quote modified Richter's position which Dr. Chinnery had relied on. As the substance of the matter was treated at length later in the opinion (Slip Op. pp. 29-33), it was not prejudicial for the Appeal Board to update in a footnote a secondary source relied upon by Dr. Chinnery.

NECNP also contends that Commission review is warranted because the Appeal Board failed to grant NECNP's motion to strike portions of Applicant and Staff testimony (Petition, pp. 6-7). In fact, the Appeal Board denied all motions to strike testimony made at the hearing by the Applicant, the Staff and Applicant jointly, and by NECNP. The Appeal Board reasoned that since that proceeding was not before a lay jury but before a Board versed in the technical area, objections to testimony should go to weight, not admissibility. See Tr. 175. The Staff submits that this approach to such motions, as utilized by the Appeal Board, did not harm NECNP.^{5/} NECNP's further argument that it had "no opportunity" to respond to such testimony is not supported by the record. NECNP was afforded opportunities to identify and counter such testimony in the discovery phase of the proceeding, during cross-examination, and by the filing of rebuttal testimony. Therefore, it is clear that Commission review of these procedural matters is not warranted.

F. Specific Applicability of the Chinnery Methodology

The Appeal Board quoted Dr. Chinnery as testifying that his methodology did not reach the question of earthquake intensity at a particular site, but only in broad regions (Slip. Op. pp. 38-39). Indeed, Dr. Chinnery, at the

^{5/} It also appears from a reading of the "Decision on Remand" that very little, if any, weight was given by the Appeal Board to testimony subject to such motions.

hearing was not clear how, or to what extent his regional predictions of earthquake probability could be made site specific. See Tr. 285-89 (Chinnery). The Appeal Board, in evaluating Dr. Chinnery's methodology, referenced this testimony.

NECP, however, claims that this was error because it believes the answer to Dr. Chinnery's uncertainty as to the computation of site specific probabilities is to use that portion of Appendix A which requires, while utilizing the tectonic province approach (not used by Dr. Chinnery), placing the largest historical earthquake in the province, at the site. NECP's proposal would involve mixing methodologies,^{6/} and appears to go beyond Dr. Chinnery's own testimony on Tr. 285-86, 289. In fact, Dr. Chinnery testified generally that deriving precise numbers of risk from his methodology is "clearly nonsense" (Chinnery, Tr. 92). Thus, the Appeal Board did not err in quoting the limitations of his methodology which Dr. Chinnery acknowledged.

G. Staff Use of Reg. Guide 1.60 and Dr. Trifunac's Probability Estimate

NECP has requested Commission review (Petition, p. 6) on two matters relating to the second-remanded issue, the Staff's methodology for correlating vibratory ground motion. First, NECP merely disagrees with the finding of the Appeal Board that the Staff's use of Reg. Guide 1.60 is consistent with Appendix A. This assignment of error by NECP is somewhat surprising in light of the express testimony of Board witness (formerly NECP witness) Dr. Trifunac that the Staff's methodology "would be one acceptable way of rationally interpreting Appendix A" (Trifunac, Tr. 762). Moreover, Dr. Trifunac also agreed with

6/ See "Proposed Findings of Fact, Conclusions of Law, And Supporting Argument The NRC Staff On Remanded Seismic Issues," p. 22 et seq. (June 16, 1981).

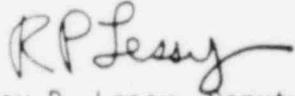
the Staff that the very highest frequency peaks on an accelerogram are not of concern for purposes of seismic design of nuclear power plants because the amount of energy that would be delivered to the structures from such peaks, regardless of the peak value, is not sufficient to cause damage (Knight, Tr. 719; Reiter Tr. 669, Jackson 15; see Trifunac Tr. 762).

Finally, NECNP objects to the Appeal Board's citation of the fact that Dr. Trifunac had no objection to the present seismic design of Seabrook based upon certain uniform risk spectra probability estimates included in Dr. Trifunac's testimony (Petition, p. 7). In assessing the Staff's methodology, the Board examined the question of whether the Staff's methodology in fact produced a response spectrum at Seabrook which properly reflects the maximum vibratory acceleration for the selected SSE. The Board therefore compared the present seismic design of Seabrook with the results of other response spectra developed by the Staff and Applicant witnesses and Board witness Trifunac. The results of these analyses uniformly indicated that the present seismic design of Seabrook is safe and conservative. However, the Appeal Board did not endorse or adopt any design basis probabilities (including Dr. Trifunac's 5% exceedance probability) in that analysis, as NECNP has indicated. Thus, Commission review of this matter is not warranted.

III. CONCLUSION

For the reasons stated above, the Staff believes that NECNP's petition for Commission review of ALAB-667 should be denied.

Respectfully submitted,


Roy P. Lessy, Deputy
Assistant Chief Hearing Counsel

Dated at Bethesda, Maryland
this 7th day of April, 1982.

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CERTIFICATE OF SERVICE

I hereby certify that copies of RESPONSE OF THE NRC STAFF IN OPPOSITION TO NEW ENGLAND COALITION FOR NUCLEAR POLLUTION'S PETITION FOR COMMISSION REVIEW OF ALAB-667 in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 7th day of April, 1982.

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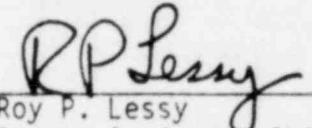
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