

INVESTIGATION OF CHARGES RELATING
TO NUCLEAR REACTOR SAFETY

HEARINGS
BEFORE THE
JOINT COMMITTEE ON ATOMIC ENERGY
CONGRESS OF THE UNITED STATES
NINETY-FOURTH CONGRESS
SECOND SESSION

—
FEBRUARY 18, 23, AND 24, MARCH 2 AND 4, 1976
—

Volume 2: Appendixes 12-19
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APPENDIX 14

NUCLEAR REGULATORY COMMISSION STAFF REPORT ON OTHER
ISSUES RAISED BY MESSRS. POLLARD, BRIDENBAUGH, et al.

NRC STAFF REPORT

ON OTHER ISSUES RAISED BY

R. D. POLLARD, D. G. BRIDENBAUGH

R. B. HUBBARD AND G. C. MINER

FEBRUARY 29, 1976

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"1. Has the Nuclear Regulatory Commission been presented with a review of the findings of Dr. Charles Reed of General Electric concerning the technical adequacy of the BWR? If so, is General Electric's progress being evaluated? What programs have been implemented by the NRC as a result of their evaluation of the Reed study?"

Response

During 1975, a General Electric Company task force made a detailed critical review of their Boiling Water Reactor design to determine what improvements could be made in the way their reactors were designed, constructed, and operated. Although the task force only intended to review how improvements could affect General Electric's commercial position, the possibility that questions of safety might be raised was recognized. Therefore, the findings of the task force were reviewed by the General Electric licensing group. This review identified some twenty-seven safety related items and concluded that the NRC had been aware of all of them. As a result of the February 18 testimony, members of the NRC staff reviewed the findings of the General Electric task force and also came to the conclusion that the NRC staff was previously aware of all of the safety related items contained in the General Electric task group findings, and that no further staff action was required.

The staff report of the NRC review that was performed, dated February 25, 1976, is attached.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20545

February 23, 1976

Ben C. Rusch, Director
Office of Nuclear Reactor Regulation

On February 23-24, 1976, a review was made of the GE Nuclear Reactor Study (Reed Report) at the General Electric Offices (GE) in Washington, D.C. The review of this report was made for two specific purposes: (1) to determine if any information in the report expressing safety concerns by GE had not previously been known to the Nuclear Regulatory Commission (NRC); and (2) to determine if Section 206 of the Energy Reorganization Act of 1974 had been met by the reporting of significant safety items. In our review of the report we did not identify any instances of new areas of safety concern; nor, were any instances identified where significant safety concerns were not previously reported to the NRC. The GE Nuclear Reactor Study consists of the main report plus ten (10) appendices as follows:

- A. Nuclear Systems
- B. Fuel
- C. Electrical Control and Instrumentation
- D. Mechanical Systems and Equipment
- E. Materials, Processes and Chemistry
- F. Production, Procurement and Construction
- G. Quality Control Systems Overview
- H. Management/Information Systems
- I. Regulatory Consideration
- J. Scope and Standardization

In our review of the GE Nuclear Reactor Study it was apparent that the study was mainly directed at marketing rather than safety per se. The report does contain items which had implication on the safe construction and operation of BWRs; however, the examples were used to illustrate the point that identified problems (some of which had safety significance) do have an effect on the availability of BWR plants and hence the cost and marketing potential of the plant. In those instances where problems having safety significance were cited there was no analysis in the GE report of the significance from a safety standpoint of the particular phenomenon.

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In our record NRC, no previous review that is specific where a review problem has been reported did not event,

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In our review of the report, we did not attempt to provide a track record of how the particular issue was reported or made known to the NRC, rather we were interested in determining whether or not the NRC was previously made aware of the particular issue as discussed. From our review of the safety related items cited in the report it was our view that many of the issues were raised by the NRC itself in its review of specific applications as submitted by GE. We did not find any examples wherein the NRC was not cognizant of the particular concern. In our review there were also issues raised as a consequence of operating problems in BWRs and again we did not attempt to trace how a reported problem was communicated to the NRC. In some instances problems could have been reported by the operator of the plant or by GE itself, but since we did not identify any instance where the NRC was not fully aware of the event, we made no attempt to track the means of reporting.

There was one category of information which we did not have sufficient documentation to determine if the events identified in the GE Nuclear Reactor Study were themselves reportable. This was in the area of quality assurance where the report indicated that the GE task force identified instances based on their review of audit reports where detailed procedures related to quality assurance were not followed. The specific examples were not provided in the report. The GE representative stated that the GE licensing group however, had reviewed the specific items reviewed by the task force itself and had determined that the quality assurance breakdown did not have the significance indicated in Section 706 for reportability. We are aware that the audit reports mentioned in the GE Nuclear Reactor Study are also available to the vendors as well as the NRC inspection staff. Since these reports are available and are reviewed on a selected basis by the NRC inspectors, we did not delve into this issue at any greater depth.

Warren Minners
Warren Minners, Section Leader
Section A, Reactor Systems Branch
Division of Systems Safety, NRR

Donald F. Knuth
Donald F. Knuth, Director
Reactor Safety Research, RCS

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...ing requiring these intervenors to make the proceeding as they found it
precludes any disruption of the established discovery and hearing
20 (The hearing is currently scheduled to get underway in September.)
m, we perceive neither serious delay nor expansion of the issues in the
gs flowing from the admission of these intervenors out of time. We
do not think it can fairly be said that the Licensing Board abused its
in ruling that the City and the County's status as "important local
ntal entities" tipped the balance in favor of their intervention.
gly, we defer to the Board's judgment in this matter.

appeals of the City of Louisville and of Jefferson County, Kentucky, are
without prejudice as premature.
applicant's appeal is denied.
so ORDERED.

FOR THE ATOMIC SAFETY AND
LICENSING APPEAL BOARD

Romayne M. Skrutski
Secretary to the Appeal Board

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A tardy petitioner with no good excuse may be required to take the proceeding as it
is. For, as stated by the dissenting member of the Appeal Board, "any disadvantage
it might suffer in terms of the opportunity for trial preparation would be entirely of
making." *West Valley, supra* CLI-75-4, 1 NRC at 276.

Alan S. Rosenthal, Chairman
Michael C. Farrar
Dr. W. Reed Johnson

In the Matter of

Docket Nos. 50-461
50-462

ILLINOIS POWER COMPANY

(Clinton Power Station, Unit
Nos. 1 and 2)

Upon appeal by intervenors from the partial initial decision of the Licensing
Board (LBP-75-59), and upon review *sua sponte* of uncontested portions of that
decision and that Board's initial decision (LBP-76-6), the Appeal Board
concludes that, although several determinations of the Licensing Board are of
doubtful correctness, there was no error which could have changed significantly
the result reached in either decision or which affected substantial rights.

Licensing Board decisions affirmed.

RULES OF PRACTICE: HEARSAY EVIDENCE

An expert may generally rely on scientific treatises and articles, irrespective
of their hearsay character.

RULES OF PRACTICE: REQUESTS DURING HEARING FOR PRODUCTION
OF DOCUMENTS

Requests to obtain background material from a witness, to supply answers
to cross-examination questions which the witness was unable to answer, cannot
be denied solely because the material was not earlier requested through dis-
covery.

RULES OF PRACTICE: REQUESTS DURING HEARING FOR PRODUCTION
OF DOCUMENTS

In considering whether to grant requests for the production of documents
made at the time of cross-examination, a board must balance the costs of delay

National Environmental Policy Act requires that reasonable alternatives be analyzed to a degree sufficient to assure that there will not be a foreclosure of options which might enhance environmental quality or have less detrimental effects than the proposal under consideration.

COST-BENEFIT ANALYSIS

Once a need for power has been demonstrated, a board must inquire into the need, taking into account all relevant environmental, economic and technical factors, to determine if the need can be best met through the proposal under consideration.

SCOPE OF INFORMATION REQUIRED FOR LICENSING

The board must examine the effects of withdrawing land from agricultural production in terms both of society as a whole and of the particular owners or users of such land.

COST-BENEFIT ANALYSIS

The societal cost of removing agricultural land from production should be measured in terms of how much it would cost to regenerate, if necessary, an equivalent amount of production on other land.

COST-BENEFIT ANALYSIS

In performing a benefit-cost analysis, the placing of a monetary value on the benefits of electricity is inappropriate.

COST-BENEFIT ANALYSIS

Regulators may consider strictly economic differences of project alternatives to the extent that the environmental impacts of the alternatives vary.

COST-BENEFIT ANALYSIS

Essential tax revenues are transfer payments resulting in offsetting costs and benefits and therefore may not be included in the cost-benefit analysis of a project.

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at least bring sufficient attention to the issue to stimulate the board's consideration of it.

Messrs. Peter V. Fazio, Jr., and Sheldon A. Zabel, Chicago, Illinois (Mr. Christopher R. Nelson with them on the brief), for the applicant, Illinois Power Company.

Mr. Robert W. Dodd, Champaign, Illinois, for the intervenors, Salt Creek Association, *et al.*

Mr. Milton J. Grossman (Mr. Charles A. Barth on the brief) for the Nuclear Regulatory Commission staff.

DECISION

July 29, 1976

Before us for review are two decisions of the Licensing Board in this construction permit proceeding involving the Clinton Power Station, consisting of two units with a net power output of approximately 933 MWe each. The reactors are to be located in Harp Township, DeWitt County, Illinois, near the confluence of Salt Creek and its North Fork, approximately six miles east of the City of Clinton. In a partial initial decision rendered on September 30, 1975, the Board reviewed the environmental and site suitability aspects of the facility and made the determinations requisite to the issuance of limited work authorizations. LBP-75-59, 2 NRC 579. Thereafter, on February 20, 1976, the Board rendered its second decision, which dealt with the remaining radiological health and safety questions and authorized the issuance of construction permits. LBP-76-6, NRC-76/2 135.¹

Participating jointly as intervenors in the proceeding are the Salt Creek Association and a number of individuals who live, work, or own or rent land in the vicinity of the proposed facility. Before the Board below these intervenors restricted their attention to certain environmental issues, and their appeal is confined to the disposition of those issues in the September 30, 1975, partial initial decision. Nevertheless, as is our custom, we have reviewed both decisions

¹ The construction permits have been issued. 41 FR 9425 (March 4, 1976).

therefore affirm.

I

The Clinton site extends over some 13,535 acres in a rural area. The facility and its construction-related activities will utilize approximately 6135 acres. Of this amount, some 4900 acres are to be inundated for a cooling lake which is to comprise a part of the facility's exhaust steam cooling system. In the recent past, most of this land has been devoted to crop production or employed as pasture (Final Environmental Statement (FES), §2.7.1). There appears to be no dispute that at least a significant portion of it is of high agricultural quality.

The thrust of the intervenors' position before the Board below was that a need for the power which would be generated by the facility had not been established; that sufficient consideration had not been given to "coal as an economically viable alternative fuel"; and that the cost-benefit analysis of the applicant and the staff did not adequately consider the "adverse agricultural and/or economic impacts" which the taking of such a large quantity of land for the nuclear plant would have upon the Salt Creek Association members residing in DeWitt County. In short, the intervenors opposed construction of the facility on exclusively socioeconomic grounds.

On the basis of what it found to be reasonable forecasts of future demand, the Licensing Board concluded, however, that the power would be required by the date of the scheduled completion of the facility. The Board further determined that the alternative of a coal-fired plant was not economically superior and that, balancing all benefits and costs (including those associated with the diversion of the land from agricultural use), the construction of the facility at the Clinton site was justified.

On appeal, the intervenors do not press the need-for-power issue but do renew their claims on the other issues raised below. Additionally, they complain vigorously of two procedural rulings of the Licensing Board. The applicant and the NRC staff urge affirmance.

II

We turn first to the procedural questions presented to us by the intervenors.

A. During the course of the hearing, the Licensing Board struck certain segments of the prepared written testimony of Dr. Michael Rieber, an economist called as a witness by the intervenors. It did so in response to motions of the

selection and utility system planning, fuel cycle costs, capital costs, and cooling system evaluation. For its part, the staff primarily urged that either hearsay or legal conclusions were involved. The hearsay objection encompassed references made by Dr. Rieber to various articles in newspapers, magazines, and other periodicals which he had utilized as source materials for portions of his analysis. It was the staff's argument (particularly as to hearsay) which carried the day (Tr. 1592, 1642, 1664). Subsequently, in the partial initial decision, the Board opined that the material which it had excluded not only was hearsay but, additionally, was "irrelevant, immaterial and unreliable" (2 NRC at 588).

We do not believe that the stricken parts of the Rieber testimony were either irrelevant or immaterial. Nor does any basis appear in the record for regarding the sources cited by Dr. Rieber to be inherently unreliable. Thus, the Licensing Board's action can be justified, if at all, only on hearsay grounds. In the circumstances of this case, however, there is no compelling need to reach the difficult question of the extent to which an expert witness in an administrative proceeding may make reference to articles in newspapers and other periodicals without running afoul of the hearsay rule.² Insofar as we can determine, none of the contents of the source material pointed to by Dr. Rieber has been challenged by the applicant or staff as either incorrect or inconsistent with other disclosures in the record. Rather, the dispute seems to center on the conclusions which Dr. Rieber drew from the facts asserted in those sources and elsewhere. This being so, we see no impediment to our taking into account the entire Rieber testimony in evaluating those conclusions—including the struck portions, all of which are in our possession. We accordingly have done so.

B. The Licensing Board denied the intervenors' request that it require Seymour Jaye, one of the applicant's witnesses,³ to bring to the hearing in Illinois underlying data on computer models which he had used in forecasting lifetime fuel cycle costs for the Clinton station.⁴ The request was made after the witness was unable to answer certain questions on cross-examination because the necessary data was at his home office in New York City. The intervenors sought the source decks, data decks, computer programs and background documentation upon which the models were based. At no previous time had they formally

²An expert may, of course, generally rely on scientific treatises and articles, irrespective of their hearsay character. See Rule 803(18), Rules of Evidence for United States Courts.

³Mr. Jaye was the Vice-President and General Manager of the Utility Division of S. M. Stoller Corp. (SMSC) of New York, a consulting engineering firm which the applicant had engaged to perform the fuel cycle cost analysis of the Clinton units (Tr. 1256-58).

⁴That forecast was relevant to the comparative economic costs of nuclear and coal alternatives. See further discussion of this subject at pp. 49-51, *infra*.

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sufficient time to analyze the data once it had been delivered to them (Tr. 1427-29).

The Licensing Board based the denial upon both the delay factor and the failure of the intervenors to have asked earlier for the material. It referred to the fact that, during the discovery process, the intervenors' expert witness, Dr. Rieber, had been given a copy of a letter from Mr. Jaye to the applicant which had made explicit reference to the model used by him to estimate costs; and that the intervenors had "at least a week's time [before the close of the discovery period] following receipt of that letter" to request additional discovery and did not do so. Further, the Board noted that the intervenors had been given Mr. Jaye's prepared written testimony on June 9, 1975, and had not asked for the underlying data during the intervening 17-day period between that date and the time the request was made. It concluded that

... information revealing the existence and significance of the models was available to the Intervenor during the discovery process and their failure to follow up and request the detailed backup data at that time required us, in fairness to the other parties and to the public's right to a prompt disposition of this proceeding, to deny their request.

2 NRC at 585.⁶

1. It is clear that Mr. Jaye was unable to answer certain questions on cross-examination because of the absence of some underlying data. The intervenors claim that the accuracy of the models employed by Mr. Jaye—and hence of a substantial portion of his testimony—cannot be evaluated without such data and that their questions were of a type that an expert should have been able to answer from memory (App. Tr. 47). Accordingly, they reason, it should not have been necessary to ask Mr. Jaye to bring the information to the hearing, since he should have been familiar with it. Similarly, it is argued, they should not have been required to seek the information through discovery in order to be provided with answers to relevant questions on cross-examination.

Whether or not an expert witness such as Mr. Jaye should have anticipated

⁶The intervenors advised the Licensing Board that they had earlier inquired about such material and been informed that "Stoller materials were secret and not available" (Tr. 1414). The applicant denied this to be so (Tr. 1417).

⁷The staff would have upheld the intervenors' exception on the ground that they had submitted a proposed finding which essentially paralleled the reasons adopted by the Board. But the proposed finding merely described what the Board had previously done and cannot be taken as a waiver of any objections to the ruling. Moreover, the proposed finding also included a statement as to the deficiencies of Mr. Jaye's testimony and the resulting lack of weight which should be given thereto; the Board did not adopt that portion of the finding.

anything else—by way of discovery. Discovery is available to assist a party to "obtain adequate factual data in support of his claim or defense" and also [to learn the substantial basis of the positions asserted by his adversary]." 4 Moore's Federal Practice, 2d ed., par. 26.02[4]. Failure of a party to take advantage of discovery can in no way preclude its exercise of other rights it may possess.

In this connection, we have previously noted the parallel between our discovery rules and those contained in the Federal Rules of Civil Procedure *Commonwealth Edison Co. (Zion Station, Units 1 and 2), ALAB-196, 7 AEC 457, 460-61 (1974)*. The parties have not called our attention to any instance in which a court has declined to allow a subpoena for the production of a document at trial under either Rule 34 or Rule 45(b) for the reason that the requesting party had not earlier sought the same document through discovery.

2. Thus, the correctness of the Licensing Board's action hinges upon the validity of the other reason it assigned—the avoidance of delay.

Licensing boards have extensive authority to control the course of a hearing 10 CFR §2.718. And they are under a mandate to insure that proceedings are conducted "as expeditiously as possible, consistent with the development of an adequate decisional record." 10 CFR Part 2, Appendix A, Section V. Moreover, delay in the hearing is a well recognized basis for limiting or denying requests for the production of documents. 4A Moore's Federal Practice, 2d ed., par. 34.06 *Savannah Theatre Co. v. Lucas & Jenkins*, 8 F.R. Serv. 34.12, Case 2 (S.D. Ga. 1944); cf. *Commonwealth Edison Co. (Zion Station, Units 1 and 2), ALAB-196, supra*, 7 AEC at 467; *Bernstein v. N.V. Nederlandsche-Amerikaansche Stoomvaart-Maatschappij*, 15 F.R.D. 32 (S.D.N.Y. 1953).

In considering whether, in a particular case, delay should be countenanced to allow a party to obtain additional information, a board must balance the effects of such delay against such countervailing factors as the alacrity with which the information was requested when its materiality became apparent, the particular relationship of the requested information to unresolved questions in the proceeding, and the overall importance of the information to a sound decision. In this instance, it is not clear whether the intervenors asked for the material at the earliest practicable time; we will assume that they did so. But we are satisfied both that the additional data sought was far more extensive than necessary to provide answers to the questions to which Mr. Jaye was unable to respond and, further, that the particular information bearing upon such answers would have been of too little potential worth to justify holding up the evidentiary hearing to await its receipt and analysis.

We have earlier noted (p. 32, *supra*), that the hearing delay incident to the document request would have resulted primarily from the time needed by the intervenors to analyze the material once it had been delivered to them. What was

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and documentation upon which the witness based his testimony. Mr. Jaye in developing his fuel cycle cost forecasts. As we shall see, it was far more extensive than was needed to provide answers to those relatively few questions to which the witness had been unable to respond. In this connection, Professor Moore has observed that "[a] blanket request for production of all 'books, documents, papers and records which are relevant and relate to the subject matter of [an] examination . . . is obviously without merit.'" 4A Moore's Federal Practice, 2d ed., par. 34.07. Thus, in all events, the Board need not have required the production of everything that was sought by the intervenors.

It is significant that the intervenors never modified their request to reduce its scope. The question remains, however, whether the Board nevertheless should have insisted—in the interest of achieving a complete record on the points addressed by Mr. Jaye—that at least some of the requested data be produced (either in the form sought or in a different form). We conclude not. Given the other evidence available to the Board, none of the material was sufficiently significant to the issue of fuel cycle costs to warrant a hearing delay of even modest proportions while it was being obtained and scrutinized.

Mr. Jay's testimony on projected fuel cycle costs was both clear and comprehensive. His direct testimony (fol. Tr. 1255) included a qualitative description of a series of analytical models used to make cost predictions in each of the phases of the cycle, a series of life-of-the-plant cost projections for each fuel cycle phase, and estimates of upper levels of cost risk both for individual phases of the cycle and for the phases in combination. On cross-examination he was able to answer in substantial detail the vast majority of the questions he was asked regarding the fuel cycle, his assumptions, and specific aspects of his models (Tr. 1261-1346, 1367-1407). At one point, he presented verbally what amounted to a flow diagram of that portion of the analysis dealing with fuel reprocessing costs, stating his assumptions and the numerical input values that were used (Tr. 1341-46). He later offered to deal similarly with each of the other separate phases of the entire program, but was not asked to do so.

Our review of the cross-examination of Mr. Jaye has revealed that, except with respect to one minor matter,⁷ there was only one general area in which the witness could not provide answers to the intervenors' questions. This concerned the range of error that might be inherent in the models he used.⁸

⁷ The witness was unable to say what figure he had factored into his model to represent the percentage of uranium in a particular year coming from open-pit and underground sources (Tr. 1299). He furnished other information in this regard, however, and the intervenors did not specifically pursue the matter (*ibid.*).

⁸ See Tr. 1325, 1330-31, 1383-84, 1390-91

used in nuclear power contracting and (2) the gross national product deflator. Mr. Jaye's associates developed estimates of long-term escalation in the general economy and thus projected the future course of the GNP deflator. The analyses involved the utilization of the historic correlation mentioned above to predict, from the projected changes in the GNP deflator, the projected changes in the indices.

Mr. Jaye was able to furnish the projected changes in the GNP deflator (Jaye, p. 8, fol. Tr. 1255; Tr. 1288). And he discussed the historic correlations which had been developed between the movement of that deflator and the particular indices.⁹ But, when the intervenors questioned him concerning the strength of these historic correlations, Mr. Jaye was unable to furnish from memory certain correlation coefficients or standard errors of estimate. Either would have indicated for each index, in mathematical terms, precisely how good the correlation was. He pointed out, however, that those values were not part of the models as such (Tr. 1338) and that they could be calculated on the basis of public information (Tr. 1325, 1338) because the intervenors knew which indices were involved (Tr. 1330).

In any event, the answers which Mr. Jaye was unable to provide would have done no more than refine the description of the error ranges of the models. These ranges had been touched upon by him in another fashion. Specifically, he had described a number of contingencies or changes in circumstances which might occur in various phases of the fuel cycle and the particular cost differences for each phase likely to eventuate from those contingencies or changed circumstances (Jaye, pp. 13-15). And, in addition, he testified to the cumulative increase in fuel cycle costs which would likely result if all of the potential risks he had mentioned were to occur (*id.*, pp. 15, 17). He also evaluated the likelihood of occurrence of the totality of the cumulative increases (*id.*, pp. 15-17). While Mr. Jaye's inability to have provided the mathematical quantities formally related to error might have taken on more than minimal significance in the absence of such analysis, it does not do so here, where the subject of possible error in the models' projections and numerical estimates thereof had been specifically addressed by the witness through another mechanism.

Moreover, in addition to that specific consideration of error, the record provides yet another and quite independent measure of the accuracy of the applicant's fuel cycle cost predictions. Specifically, the range of values advanced by the applicant encompassed the fuel cycle cost value prepared by the

⁹ He was not asked to furnish the numerical expression of those correlations, nor was he asked to state precisely what estimated changes in the indices resulted from the use of the correlations.

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