

032

DOCKETED
USNR

'84 NOV -8 AM 1:08

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of:

COMMONWEALTH EDISON COMPANY

(Byron Nuclear Power Station,
Units 1 and 2)

)
)
)
)
)

Docket Nos. 50-454 OC
50-455 OC

INTERVENORS' SUPPLEMENTAL BRIEF ON APPEAL

DOUGLASS W. CASSEL, JR.
TIMOTHY W. WRIGHT, III
109 North Dearborn
Suite 1300
Chicago, IL 60602
(312) 641-5570

Attorneys for Intervenors
Rockford League of Women
Voters and DAARE/SAFE

November 6, 1984

8411090268 841106
PDR ADOCK 03000454
G PDR

DS03

TABLE OF CONTENTS

Table of Authorities	iii
Introduction	1
Statement of the Case	3
Argument	6
I. The Licensing Board Erred by Failing to Focus on Whether Defects Overlooked by Inspectors were of "Possible Safety Consequence"	6
A. The BRP Did Not Focus on Whether Inspectors Overlooked Defects of "Possible Safety Consequence"	7
B. The Remanded Licensing Hearing Likewise Did Not Focus on Whether Inspectors Overlooked Defects of "Possible Safety Consequence"	8
C. The Board Did Not Allow Intervenors to Take Issue with Whether the BRP Should Have Focused on the Most Safety Significant Inspection Attributes and Elements	10
II. The Board Below Erred in Excluding Evidence Relevant to the Ultimate Issue in the Hearing	11
A. The Board Erred By Refusing to Receive the Testimony of Dr. Bleuel	11
1. The Board committed prejudicial error by applying an improper and prejudicial standards to late- filed testimony	13
a. <u>Good cause</u>	14

b.	Whether late information would significantly broaden <u>the hearing</u>	16
c.	Would that position be covered by another <u>party</u>	17
d.	Availability of other means whereby the Petitioners' interest will <u>be protected</u>	17
e.	The extent to which the participants' participation may reasonably be expected to assist in developing a sound <u>record</u>	17
2.	The Board applied an improper and restrictive standard in excluding Dr. Bleuel's testimony	18
3.	The Board erred in refusing to receive Dr. Bleuel's testimony as rebuttal testimony	19
B.	The Board Erred by Excluding Certain Portions of Dr. Ericksen's Testimony	20
C.	The Board Erred By Excluding the Testimony of an Authorized Nuclear Inspector, Present at the Byron Site During BRP Activities.....	22
III.	The Board's Ruling Respecting the Quality of Work at Byron, Based on Design Evidence, Is Reversible Error Due to a Lack of Due Process and Fundamental Fairness.....	23
A.	The Board Below Relied on the Design of Byron in Finding the Quality of Work Acceptable.....	24
B.	The Board Improperly Excluded Evidence on the Byron Station Design Relating to the BRP.....	26
IV.	The BRP Was Also Fatally Flawed for Failure to Define Criteria for Judgment Clearly at the Outset or, in the Alternative, to be Subjected to Independent Review.....	29
Conclusion.....		30

TABLE OF AUTHORITIES

Cases

<u>Ohio Bell Telephone Co. v. Public Utilities</u> <u>Commission</u> , 301 U.S. 292 (1937)	25
---	----

NRC Decisions

<u>Commonwealth Edison Company (Byron Nuclear Power</u> <u>Station, Units 1 and 2) ALAB-770</u> , 19 NRC 1163 (1984)	3, 11
<u>Wisconsin Electric Power Co. (Point Beach Nuclear</u> <u>Plant, Unit 2) CLI-73-4</u> , 6 AEC 6 (1973)	11, 24

Statutes

Atomic Energy Act, §182 42 U.S.C. §2232(a)	11
Administrative Procedure Act 5 U.S.C. §556(d)	25

Regulations

10 CFR Part 2:

2.714	18, 19
2.740	25
2.743	25

10 CFR Part 50:

50.57(a)	2
50.57(a)(3)	6

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of:)
COMMONWEALTH EDISON COMPANY) Docket Nos. 50-454
(Byron Nuclear Power Station,) 50-455
Units 1 and 2))

INTERVENORS' SUPPLEMENTAL BRIEF ON APPEAL

INTRODUCTION

This case comes before the Appeal Board on Intervenor's Rockford League of Women Voters and DAARE/SAFE ("Intervenors") objections to the October 16, 1984, Supplemental Initial Decision of the Licensing Board ("Board"). That decision granted authority for issuance of an operating license for the Byron Nuclear Power Station ("Byron"). This memorandum supplements the March 12, 1984 brief of Intervenor on the pending appeal, over which this Appeal Board has retained jurisdiction. */ The Board, in its initial decision, ruled in Commonwealth Edison Company's ("Applicants") favor on all issues except quality assurance. In its remanded hearing the Board heard additional evidence on the

*/ This Supplemental Brief incorporates by reference two of the three additional grounds for license denial stated in Intervenor's original Brief on Appeal. These grounds are that the Board below erroneously denied Intervenor the right to litigate the need for power and alternative energy source issues, and the Board's error in its decision on the seismology contention.

Byron Reinspection Program ("BRP") and in its supplemental initial decision ruled in favor of the Applicant on the quality assurance issue. Accordingly, the Board set aside its January 13, 1984, order barring the Director of Nuclear Reactor Regulations from issuing an operating license for Byron and authorized that a license be issued subject to a determination by the Director that the applicant is in compliance with 10 C.F.R. 50.57(a).

The Board's decision to authorize the issuance of an operating license for Byron is erroneous in at least four respects: (1) it failed to focus on whether inspectors overlooked defects of safety significance; (2) it barred the introduction of relevant evidence bearing on this and other ultimate issues before the Board; (3) it was unfair in relying heavily on design evidence proffered by Sargent & Lundy to determine the quality of work, while excluding Intervenor's design evidence; and (4) it failed to call for an independent evaluation of the safety significance of the discrepancies found in the BRP.

When the evidentiary record of the remanded hearing is objectively considered it becomes clear that Byron should not have received its operating license. The BRP, as constituted, did not overcome the significant shortcomings found initially in Applicant's quality assurance program, nor did it demonstrate the quality of safety-related work at Byron. For reasons stated herein, the Board's order in its supplemental initial decision should be reversed.

STATEMENT OF THE CASE */

In its Initial Decision, the Board recognized that some reinspection program could provide the necessary assurance that Byron is safe to operate. However, the Board felt that the reinspection program then underway did not provide that assurance; the Board had "no confidence in the program" itself. (I.D. p. 5; see also ¶D-435.) Not only could the NRC staff not vouch for the program (I.D. ¶D-416), but the Board independently questioned its efficacy and validity. (I.D. ¶¶D-435-438.)

On May 7, 1984, this Appeal Board, in remanding the case, ordered:

... a further hearing to permit a full exploration of the significance of the program in terms of whether there is currently reasonable assurance that the Byron facility has been properly constructed. Stated otherwise, the focus of the inquiry should be upon whether, as formulated and executed, the reinspection program has now provided the requisite degree of confidence that the Hatfield and Hunter quality assurance inspectors were competent and, thus, can be presumed to have uncovered any construction defects of possible safety consequence. **/

(Emphasis added.)

Thus, this Appeal Board properly directed that the hearing focus on the "possible safety consequence" of any defects overlooked by inspectors. Unfortunately, neither the Byron Reinspection Program nor the remanded hearings did so.

*/ Because the Appeal Board is familiar with this case, this statement will omit much of the procedural history and other information stated in the Initial and Supplemental Initial Decisions.

**/ ALAB-770 at 27-28.

The reopened hearings on quality assurance and the BRP were held between July 23-August 24, 1984.

Intervenors proffered the testimony of five witnesses, of whom three were ultimately allowed to testify, and only one of whose testimony was received in full. */ One witness, Charles Stokes, testified on the adequacy of the engineering evaluations performed by Sargent & Lundy and questioned the use of undocumented engineering judgments. (Stokes, ff. Tr. 10,770; S.I.D. ¶D-13.) He also proffered testimony concerning design issues, including design issues related to the BRP. The Board declined to receive this portion of his testimony. (Stokes, ff. Tr. 10,770.)

Another witness, Dr. Eugene Ericksen, presented testimony primarily on the statistical validity of the BRP to demonstrate work quality. He also offered testimony that a statistically sound reinspection program would impose higher reliability requirements for inspections of greater safety significance. However, the Board declined to receive that portion of his testimony. (Ericksen, ff. Tr. 11,045.)

Intervenors also offered the testimony of two other witnesses. One witness, Dr. William Bleuel, was an expert in reliability engineering with 25 years of practical experience in

*/ That witness, Professor Dev Kochhar, questioned the adequacy of certain suspect assumptions used by the Applicant in the formulation of the BRP. Those assumptions included establishing the first 90 days as the period to examine inspectors; allowing the findings of the original inspector to be known by the reinspector; and allowing the contractors to reinspect their own work. (Kochhar, ff. Tr. 10,538.)

the defense, aerospace, and computer industries. He, too, proffered testimony that a reinspection program designed to focus on whether Byron is safe to operate would have been differently structured, or at least that the data from the one conducted by Applicant would have to be reoriented. Again, the Board declined to receive his testimony. The final proffered witness, Sargent Podworny, was an Authorized Nuclear Inspector at Byron during the reinspection activities. (Bleuel, ff. Tr. 10,764; S.I.D. ¶D-13.)

Subsequent to the close of the record in the reopened hearings, Intervenor filed their "Motion to Reopen the Record in the Byron Licensing Proceeding to Include the Byron Station Design As An Issue."

On October 16, 1984, the Board issued its Supplemental Initial Decision, concluding that Applicant had now prevailed on the quality assurance contention, and that the evidence on remand had now overcome all of the quality assurance shortcomings the Board originally found and discussed at length in its initial decision. Additionally, the Board indicated that it intended to deny Intervenor's Motion to Reopen the Record, and would supply a memorandum and order to that effect at a later time. */

*/ On November 5, 1984, the day before this brief was due to be served, Intervenor received the Licensing Board's opinion on that motion. Intervenor plan to respond to it at oral argument.

ARGUMENT

- I. THE LICENSING BOARD ERRED BY FAILING TO FOCUS ON WHETHER DEFECTS OVERLOOKED BY INSPECTORS WERE OF "POSSIBLE SAFETY CONSEQUENCE."

The Board below failed to heed this Appeal Board's direction to focus on whether defects overlooked by inspectors were of "possible safety consequence." That direction properly reflected the mandate of the Atomic Energy Act that no operating license issue without a finding that the operation of a nuclear plant "will provide adequate protection to the health and safety of the public," 42 U.S.C. §2232(a), as well as the commission's regulatory standard requiring a finding that

There is reasonable assurance (i) that the activities authorized by the operating license can be conducted without endangering the health and safety of the public ...

10 C.F.R. §50.57(a)(3)

The central issue on remand was whether the new evidence sufficiently cured or overcame the quality assurance failures identified in the initial decision such that there is now reasonable assurance that inspectors did not overlook construction defects of "possible safety consequence." In the remanded hearing, the burden of proof was on Applicant to demonstrate such reasonable assurance. However, neither the BRP nor the remanded hearings focused on whether inspectors overlooked defects of "possible safety consequence."

A. The BRP Did Not Focus On Whether Inspectors Overlooked Defects Of "Possible Safety Consequence."

The Byron reinspection program made no effort to focus on the "possible safety consequence" of the reinspected work: it sampled every inspection in the first 90 days -- without regard to safety significance -- by every fifth inspector -- without regard to the safety significance of his assignments. Yet the Board below held that, "These results, coupled with the adequacy of the sample, can be extrapolated to the conclusion that all Hatfield and Hunter work at the Byron Station is adequate for the purposes of the design." S.I.D. ¶D-200. What is more surprising is that the Board seemingly went beyond the scope of Hatfield and Hunter to state that, "The Board accepts the results of the Sargent and Lundy analyses as supportive of the acceptable quality of work at the Byron site." Id. ¶D-203.

Had the BRP been properly designed to focus on whether inspectors overlooked defects of "possible safety consequence," it should (and presumably would) have been designed differently in several key respects. For example, a BRP designed to focus on safety consequences:

- . would not have omitted any reinspections whatever of two of the eleven Hatfield attributes that could be reinspected, and five of the forty-eight Hunter elements that could be reinspected. (S.I.D. ¶D-51)
- . would not have reinspected relatively few inspections in some categories of greater safety significance than those which were heavily reinspected (e.g., Ericksen, Amended Attachment B, ff. Tr. 11,045). This point is one of engineering judgment and simple common sense, as well as formal statistical methodology.

- . would not have omitted a failure modes and effects analysis (see discussion of testimony of Dr. William Bleuel, below).

It is thus not surprising that even Applicant's work quality expert, Mr. Laney, testified on cross-examination that he could not, based on the February 1984 BRP report alone, infer that the quality of Hatfield and Hunter work at Byron was adequate. (Tr. 9378-79.) He was also uncertain as to what inference, if any, could be drawn even after the BRP's June, 1984 supplement. (Tr. 9379.)

In contrast, the Board accepted the BRP as an indication of the quality of work at Byron despite the fact that disproportionate numbers of reinspections focused on documentation inspections that had no direct safety consequences. (See Ericksen Amended Attachment B, ff. Tr. 11,045.) It was thus predictable that discrepancies in these inspections would be found not to have direct safety significance. The Board below could not have inferred, based on the record, that comparable proportions of reinspections of other kinds of inspections - of greater safety significance, according to Applicant's Mr. Tuetken, - would also show no discrepancies of safety significance. (Tuetken, cross-examination, Tr. 8539-45; Intervenor's Ex. R-1, ff. Tr. 11,033; Ericksen Amended Attachment B, ff. Tr. 11,045.)

B. The Remanded Licensing Hearing Likewise Did Not Focus On Whether Inspectors Overlooked Defects Of "Possible Safety Consequence."

Not only did the BRP not focus on the safety significance of inspection activities, the remanded hearing itself was

continually prevented by the Board from achieving such a focus.
(See generally, S.I.D. ¶D-32.) The Board below said as much:

Thus we address for the first time in this decision an effort by Intervenor to take the inspector qualification issue where the Board will not follow. The reinspection program was formulated and implemented as a device to validate the qualifications of suspect inspectors. It was not a direct work quality inspection. It will be necessary to make this point repeatedly in the sections below.

S.I.D. ¶D-32

The Board failed to realize that in order to proceed from a sample of reinspected work to a valid inference that inspectors did not overlook defects of "possible safety consequence," one must consider not only the safety significance of any discrepancies detected in the sample, but also the "possible safety consequence" of the sample itself. For example, at one extreme, if the sampled reinspectors had reinspected only documentation, no safety significant discrepancies would have been detected. Yet that would provide little or no assurance that the plant is safe. Nonetheless the Board consistently refused to receive expert testimony by Dr. Bleuel and Dr. Ericksen that made this basic point.

At a minimum, Intervenor argued below that before an inference can validly be drawn regarding the work quality of safety significant hardware at Byron, a rearrangement of the BRP's existing data would be necessary. Applicant's witness, Mr. Tuetken, had categorized all the inspections and attributes performed by Hunter, Hatfield and PTL according to four categories

of safety significance. Those categories ranged from "most important to safety," "second most important," "third most important," and "least important to safety." Tuetken, cross-examination, Tr. 8539-45; Intervenor's Ex. R-1, ff. Tr. 11,033; Erickson Amended Attachment B, ff. Tr. 11,045. If the BRP results had been reoriented according to Mr. Tuetken's classifications, those results would have revealed whether an inference is indeed permissible that any defects overlooked by inspectors were not of "possible safety significance." Once the data was reorganized in this fashion, additional inspections of safety significant hardware or certain reinspections of attributes that could have been reinspected (but were not) may have been necessary to derive a sample base from which a valid inference of work quality of safety significant components could have been made (Erickson, ff. Tr. 11,045.)

C. The Board Did Not Allow Intervenor's To Take Issue With Whether The BRP Should Have Focused On The Most Safety Significant Inspection Attributes and Elements.

Not only did the BRP and the hearing not focus on defects of "possible safety consequence," the Board below repeatedly would not permit Intervenor's to present evidence that the BRP, to support valid inferences that Hatfield and Hunter inspectors did not overlook defects of safety consequence, should have focused on the most safety significant inspection attributes and elements. (See generally, S.I.D. ¶D-32.) The Board also prevented Intervenor's from questioning the design of the BRP and its secondary attempt to infer work quality. (Bleuel, rejected

testimony, Tr. 10,769; Ericksen, excluded testimony, Tr. 11,045.) By excluding Intervenors' testimony regarding the effective design of a BRP to show the quality of work of greatest "possible safety consequence," or alternatively the reorientation of the data to show whether a valid inference of such work quality might be made, the Board below effectively prevented Intervenors from introducing evidence focusing on the work quality of the most safety significant work.

II. THE BOARD BELOW ERRED IN EXCLUDING EVIDENCE RELEVANT TO THE ULTIMATE ISSUE IN THE HEARING.

The ultimate issue in the remanded hearing, as acknowledged by the Board below and this Appeal Board, is whether reasonable assurance exists that the Byron facility has been properly constructed. S.I.D. ¶D-8; 19 NRC 1163, 1178. The Board is obliged to receive relevant evidence bearing on the ultimate issue, and to refuse to do so is reversible error. */ In excluding the testimony of Intervenors' witnesses, the Board committed reversible error.

A. The Board Erred By Refusing To Receive The Testimony Of Dr. Bleuel.

Intervenors presented the testimony of Dr. William Bleuel, Ph.D, a reliability and design assurance engineer with 25

*/ Refusing to receive relevant evidence on the ultimate issue is analogous to refusing the right to participate in the resolution of an issue. See generally, Wisconsin Electric Power Co. (Point Beach Nuclear Plant, Unit 2), CLI-73-9, 6 AEC 6, 7 (1973) for the latter point.

years' experience in design and quality assurance. The relevancy of Dr. Bleuel's testimony was not disputed, although its probative value was questioned. The Board ruled that the testimony did not meet the standards of late-filed information and that there were also no overriding considerations necessitating admission. (See Tr. 10,743 and ff. pages.)

The purpose of Dr. Bleuel's testimony was to suggest that the Byron Reinspection Program does not provide reasonable assurance that the plant was constructed or will be operated safely. (Bleuel, Tr. ff. 10,765, at 3.) Dr. Bleuel based his opinion on three grounds, all of which were clearly relevant to the proceeding:

- (1) Applicant failed to employ a failure modes and effects analysis, a basic tool of reliability engineering, in formulating and implementing the program.
- (2) In its engineering evaluation of discrepancies, Applicant at the outset failed to define exactly the criteria for determining failure, or, in the alternative, to retain an independent firm with no direct economic or institutional stake in the outcome to perform an after-the-fact reliability assessment.
- (3) The program's assumption that inspectors would perform least well during the initial three months is inconsistent with Dr. Bleuel's 25 years of professional experience.

See generally, Bleuel rejected testimony, Tr. 10,765

Dr. Bleuel's proffered testimony on his first point - the absence of a failure modes and effects analysis - so directly summarizes the heart of Intervenor's case that seven of his answers bear quotation at length. His answers 8 through 14 (and the accompanying questions) were, in excerpted form, as follows:

Q.8. What is failure modes and effects analysis?

A.8. Failure modes and effects analysis is a tool of reliability engineering. Essentially it entails three steps: first, identifying each of the possible ways (modes) in which a system could fail; second, analysing the effects of each such failure mode; and third, categorizing the failure modes according to their effects. For example, they may be critical (e.g., pose a threat of death due to excessive radiation); major (e.g., pose a threat of temporary plant shutdown with attendant economic costs); or minor (e.g., cosmetic).

. . .

. . . .
The importance of failure modes and effects analysis is that it enables the analyst to focus, not on individual items viewed in isolation, but on the item in the context of the system as a whole, based on thorough understanding of its systemic interactions and their relative importance.

The practical value of failure modes and effects

analysis is, first, that it enables one to focus resources (inspectors, engineering analysis, managerial attention) on the critical failure modes (taking into account both their criticality and their likelihood). Second, it both permits and demands the application of stricter standards (such as statistical reliability standards) to the critical modes then are applied to less important modes.

Q.9. Was failure modes and effects analysis utilized in the Byron Reinspection Program?

A.9. No, the documents which I have reviewed contain no evidence of this analysis having been done.

Q.10. In what respect did the Reinspection Program fail to use failure modes and effects analysis?

A.10. In many respects. Most fundamentally, the Reinspection Program, as designed and implemented, neither concentrated resources and effort, nor utilized stricter criteria, for the components of the most critical failure modes at Byron. Indeed, there appears to have been no effort in the original program even to identify, analyze or categorize critical failure modes, let alone to act on such analysis.

Q.11. What is the significance of this failure?

A.11. This failure may be understandable in light of the program's primary purpose as stated by Edison, namely, to determine whether inspectors, who may not have been properly qualified, nevertheless performed capably.

However, with respect to the Program's second (and apparently not initial) purpose -- namely, to demonstrate that the quality of work at Byron is adequate to provide reasonable assurance that the plant can be operated safely -- the absence of any failure modes and effects analysis is a serious flaw. In my opinion, without performing a failure modes and effects analysis, one cannot have reasonable assurance that adequate reliability of the plant and its associated safety requirements can be achieved.

Q.12. How might a failure modes and effects analysis have been incorporated into the Byron reinspection program?

A.12. To accomplish this purpose credibly, a wholly different approach would have been required. Rather than spread reinspection resources randomly among inspectors, without regard to the relative safety significance or systemic impact of the work they inspected, the program would have begun by identifying the most safety significant failure modes, and the components involved in each.

This task is achievable. For example, Byron's Startup Coordinator, Mr. Richard Tuetken, at his deposition and upon request of intervenors' counsel, categorized all the Hatfield procedures and PTL and Hunter attributes according to their safety significance, in categories 1, 2, 3, and "Least," ranging, respectively, from the first rank of safety significance, to the second and third ranks, to least important. (A copy of Mr. Tuetken's categorizations, which has previously been

marked for identification as Intervenor's Exhibit R-1, is attached as Attachment B to my testimony.)

Mr. Tuetken's categorization is not, of course, a failure modes and effects analysis, since it does not expressly and thoroughly identify the failure modes to which each procedure or attribute might contribute, or their effects and systemic interactions. Nonetheless, it is a useful starting point for a credible safety analysis of Byron.

With that qualification, one may use Mr. Tuetken's categorizations for Hatfield, for example, to illustrate how a reinspection program could have been properly designed to show the adequacy of the work at Byron for safety purposes.

Such a program would have focused on the Hatfield procedures in Mr. Tuetken's safety category No. 1, namely, cable pan hangers, cable installation, cable terminations, equipment modifications, visual weld inspection, and exposed conduit. The other fifteen Hatfield procedures would have received relatively less attention.

More specifically, such a program would have ensured, for the category 1 procedures, for example, a greater sample size than for other procedures; additional training and supervision for the reinspectors of those procedures; more engineering evaluations of discrepancies (i.e., evaluation either of all discrepancies or of a larger sample of the discrepancies than for less important procedures); more thorough

engineering evaluation (e.g., reinspection of other welds subject to load redistribution effect due to the failure of the weld originally reinspected); and stricter engineering evaluation criteria (e.g., more conservative ratios of actual to allowable stress).

Moreover, Mr. Tuetken's categories might have been refined, with even greater scrutiny given to the most critical sub-categories. For example, his category of visual weld inspections might have been divided into highly stressed welds on critical safety components, less highly stressed welds on critical safety components, highly stressed welds on less critical components, and lightly stressed welds on less critical components.

Q.13. Would such a failure modes and effects analysis also have affected the statistical reliability assessment of the program?

A.13. Yes. For the most critical procedures, in addition to ensuring larger sample sizes than for less important procedures, one would use stricter statistical standards. If Military Standard 105D were to be used, for example, then one would use Inspection Level III rather than Inspection Level II, a higher than usual confidence level, and a higher than usual reliability standard. In fact, the statistical requirements demanded by NASA during my quality control work for Endevco went beyond the minimum requirements of Military Standard 105D.

The reliability required for the overall vibration measurement system for the Surveyor satellite was 99.9, and for the transducer, cable and pieces of the amplifier the reliability requirements were at least 99.999.

Of equal importance is the fact that in a failure modes and effects analysis, reliabilities would not be calculated for individual procedures or attributes in isolation from others (as Edison's Reinspection Program Report does in Chapter VII). Rather, the question would be the reliability of the particular system. To obtain the reliability for the system, one would multiply the reliabilities of the individual components. Since these reliabilities are less than 1.0, the system reliability would be lower than the reliabilities for the individual components. However, since failure modes in actuality occur by systems, the system reliability would, more accurately than any individual component's reliability, predict the likelihood of a safety-significant failure. In my opinion, Edison erred seriously by failing to calculate reliabilities for systems.

Q.14. Does the Supplemental Report of June 1984 remedy the failure of the February, 1984 Reinspection Program Report to employ failure modes and effects analysis?

A.14. No. The Supplemental Report moves in the right direction. For example, it includes analysis of additional welds selected on the basis of being highly stressed. However, rather curing the deficiencies, these partial steps merely illustrate what is wrong with the entire Reinspection Program.

For instance, in the case of the highly stressed welds, it is not clear that an effort was made to select welds that were highly

stressed on the most safety significant components, let alone the most highly stressed welds throughout an entire system identified as critical through a failure modes and effects analysis.

Thus, while the Supplemental Report properly recognizes that the original Report's engineering evaluation of the most visually discrepant welds missed the point, the Supplemental Report, too, misses the point to the extent it selected welds for evaluation based on their degree of stress rather than on their safety significance.

Moreover, the degree of inspection and engineering ~~scrutiny~~ of all reinspected procedures and attributes should have been based, not merely on which inspector happened to inspect them, or on their visual appearance, or on their degree of stress, but on their relative safety significance, i.e., the extent to which any discrepancy in the particular procedure or attribute would contribute to failure of a critical system, as determined by a failure modes and effects analysis.

Thus, Dr. Bleuel's testimony on this point went directly to whether the BRP, as designed and implemented, provides reasonable assurance that inspectors did not overlook construction defects of "possible safety consequence." (His second and third points are discussed below.) His testimony was thus clearly within the scope of the remanded hearing and should have been admitted both as direct and rebuttal evidence.

1. The Board committed prejudicial error by applying an improper and prejudicial standard to late-filed testimony.

The Board below subjected the prefiled testimony of Dr. Bleuel to an incorrect and overly strict standard, which accordingly resulted in the exclusion of the testimony, to the prejudice of Intervenor. The overly strict standard employed by the Board below was in conflict with that previously employed by this same Board when faced with a similar request.

On April 25, 1983, Intervenor made an oral request to present the testimony of John Hughes on matters pertaining to quality assurance and quality control ("QA/QC") at Byron. (See Transcript, April 25, 1983, Tr. 5313-36.) With the permission of the Board, Intervenor was granted leave to serve a written statement by Mr. Hughes on the Board and parties, and to file a written motion at a later time. The Board suggested that because the request to offer additional QA/QC testimony was made after the time set aside for Contention 1A and late in the schedule of the hearing, a decision on whether to allow the testimony would be based upon a consideration of a relaxed application of the standards for reopening the record. (Tr.

In contrast, as discussed below, the Board applied stricter standards to the admission of Dr. Bleuel's testimony.

The way in which the Board handled the two very similar situations is puzzling, and cannot be justified by simply categorizing Dr. Bleuel's testimony as "expert testimony." Given the Board's initial concern respecting the BRP, Dr. Bleuel's testimony presents an even more compelling case for admission under the standard employed in the Hughes case.

Nonetheless, even under the more rigid standard the Board applied to Dr. Bleuel, it should have received his testimony in the remanded hearing. The Board analyzed whether to accept his testimony under a modified version of the standard for accepting late-filed contentions:

First, we address the standards for accepting late-filed contentions and information in the standards and contention and evidence. If those standards are not met, then we might move to another consideration, and that is despite all of the failures of the five standards for late-filed contentions and evidence, are there other overriding reasons which we would accept new issues and new evidence on?

Licensing Board, Tr. 10,743

a. Good cause

In analyzing whether there was good cause for late filing, the Board ruled that in its view a "higher showing of good cause has to be made when you are bringing late expertise in, as compared to newly discovered facts." (Tr. 10,744)

In the first place, Dr. Bleuel's testimony was "late" only in a limited sense. He first came forward to intervenors' counsel

on July 24, 1984. Counsel promptly informed the Board on July 24, 1984. Intervenors' prefiled testimony was not due until August 13, 1984, on which date Intervenors filed Dr. Bleuel's proposed testimony. The only "deadline" missed by Dr. Bleuel was the date, prior to the hearings, by which Intervenors were to inform Applicant of all proposed witnesses.

In the second place, to the limited extent it was late, this was not the fault of Intervenors. They had made a diligent search, on an expedited schedule, for expert witnesses. Dr. Bleuel came forward to them as a volunteer on the first day of the hearings.

Counsel for Intervenors, in response to an inquiry regarding good cause for being late, stated:

Dr. Bleuel came forward to Intervenors on or about the first day of the resumed hearings, as I indicated previously He telephoned first Mr. Campbell and then he had a discussion with Ms. Judson on the 23rd. I found out about it the evening of the 23rd of July, informed the Board, as I recall, on the morning of the 24th.

See generally, Tr. 10,415-10,416

Notwithstanding this explanation, the Board concluded that, "simply what you did is you were late in getting your expert. And you have not carried the burden of good cause." (Licensing Board, Tr. 10,744.)

This contrasts with the Board's earlier decision to receive Mr. Hughes testimony. Mr. Hughes had consented to be a witness the day before counsel for Intervenors made their oral motion. (Motion at 2. In the case of Dr. Bleuel, Intervenors' counsel

represented he first learned of Dr. Bleuel the night before he made the Board and all parties aware, and well before any of Intervenors' witnesses' testimony was due. The equities suggest the Board erred in ruling against Intervenors on the good cause inquiry.

b. Whether late information would significantly broaden the hearing

The Board suggested that this inquiry involves "whether late information would significantly broaden the hearing, broaden the issues." (See Transcript, 10,745.) The Board ruled that if it were to accept Dr. Bleuel's testimony, it would broaden the proceeding and would extend the proceeding. Tr. 10,745. The Board weighed this factor against admitting Dr. Bleuel's testimony.

Intervenors do not agree. Dr. Bleuel's testimony covered three points:

- 1) Edison failed to employ a FMEA.
- 2) No criteria employed at the outset, or alternatively, no independence.
- 3) BRP assumption that inspectors would perform least well during initial three months is inconsistent with his professional experience.

The issues raised by Dr. Bleuel are direct criticisms of the BRP and attack both the formulation and the execution of the BRP. It is clear that the second and third issues would not have broadened the parameters of the remanded hearing, which focused on the BRP. As to the first issue, the need for failure modes and effects analysis, that would in no way have broadened the hearing beyond the fundamental issue of whether the BRP provides reasonable assurance that Byron is safe to operate. Moreover, as

discussed above, Intervenor argued below that, without unduly prolonging the proceeding, at least a reorientation of the existing BRP data would have sufficed to illumine whether the BRP can justify the inferences sought to be drawn from it by the Applicant and the Board.

- c. Would that position be covered by another party

The Board below ruled that much of Dr. Bleuel's testimony was unique, and no other party would cover his points. The Board weighed this point in favor of receiving the testimony. Intervenor agree.

- d. Availability of other means whereby the petitioners' interests will be protected

On this point, the Board ruled that, "there is probably no other satisfactory avenue for the Intervenor to bring its concern raised by Dr. Bleuel's testimony to the attention of the licensing authority, federal government, except through this Board." Tr. 10,747. The Board ruled in Intervenor's favor on this point, but reasoned that this factor receives much less weight when the party proffering the testimony does not show good cause for lateness. Id.

- e. The extent to which the participants' participation may reasonably be expected to assist in developing a sound record

The Board proceeded to analyze this factor with respect to Dr. Bleuel's testimony, and determined it must balance the due process considerations of what happens when the Applicant's right to have a prompt resolution of this hearing is

in conflict with developing a full record.

After a lengthy discussion of whether Dr. Bleuel's testimony would assist in developing a sound record, the Board ruled that it did not believe that the testimony of Dr. Bleuel could make a contribution to the record. Tr. 10,760. Intervenors strongly disagree. Dr. Bleuel's testimony would have focused precisely on what the BRP and the Board below did not: defects of "possible safety consequence." By increased sampling of more safety significant inspection procedures, and subjecting them to stricter statistical reliability standards, Dr. Bleuel would have made possible a reliable finding on whether the Byron plant is - or is not - safe.

The Board below went to great pains to exclude the testimony of Dr. Bleuel from the remanded hearings. */ As a result, Intervenors' ability to put on an effective case was seriously prejudiced.

2. The Board applied an improper and restrictive standard in excluding Dr. Bleuel's testimony.

As stated earlier, the Board employed a very strict standard in analyzing the admissibility of Dr. Bleuel's testimony. That standard was derived from 10 CFR Part 2, §2.714, "Intervention." That section lays out the requirements to be met when one desires to participate as a party and has filed a

*/ The Board did acknowledge that "we are specifically not accepting Licensee's point that Failure Modes and Effects Analysis is not feasible, because that would be an issue to be determined on cross-examination rather than should it be accepted or not." Tr. 10,750-51.

written petition for leave to intervene. 10 CFR §2.714. Dr. Bleuel was a witness for Intervenors, not an Intervenor on his own accord. Accordingly, use of that standard was error and effectively barred Intervenors from presenting relevant and probative evidence on what was clearly defined as the ultimate issue in this case.

3. The Board erred in refusing to receive Dr. Bleuel's testimony as rebuttal testimony.

Counsel for Intervenors, in his motion to admit the testimony of Dr. Bleuel, also requested that the testimony be admitted for purposes of rebuttal. The Board declined to do so. The Board's refusal was plain error, and as a result of that error, Intervenors have been prejudiced. The three points raised by Dr. Bleuel were unquestionably rebuttal evidence. The Board said as much:

First, it does tend to be rebuttal. He is not bringing a new issue. He just says the way they said they did it is not the way it should be done. And he is certainly entitled to his opinion.

Tr. 10,756

After admitting that the rules for rebuttal evidence in NRC hearings are ad hoc, the Board concluded that Dr. Bleuel simply was not able to make a contribution to the hearing. Tr. 10,756-10,757. For the reasons stated above, Intervenors disagree.

Moreover, the Board's refusal to allow Dr. Bleuel's testimony in rebuttal is especially unfair in light of the Board's permitting a witness for Applicant with similar credentials (Mr. Hansel) to testify. Like Dr. Bleuel (who has no nuclear exper-

ience), Mr. Hansel had very little nuclear experience. Both men nonetheless had extensive relevant experience in the aerospace and defense fields. The Board chose to rely extensively in its Supplemental Initial Decision on Mr. Hansel's testimony, yet refused to permit Intervenors even to present Dr. Bleuel, a witness with comparable practical experience (and superior professional degrees) in rebuttal. As a result, for example, the Board relied on Mr. Hansel's experience in upholding use of the initial 90-day period for sampling purposes (S.I.D. ¶66), thereby rejecting Intervenors' witness Dr. Kochhar as lacking in practical experience, while at the same time refusing to permit Dr. Bleuel to rely on his own extensive business experience to rebut Mr. Hansel. This was unfair.

H. The Board Erred By Excluding Certain Portions Of Dr. Ericksen's Testimony.

In granting applicant's motion to strike portions of Dr. Ericksen's testimony, the Board below committed error and, again, prejudiced Intervenors.

The excluded portions of Dr. Ericksen's testimony were necessary to fully address whether the sample reinspected was adequate to provide reasonable assurance that the plant could be operated safely. Dr. Ericksen criticized Applicant's conclusions because in its statistical analysis, Applicant failed to distinguish elements which were most important to safety from elements which were less important or to distinguish elements which were easy to inspect from elements which were difficult to inspect. The Board excluded this testimony even though

Applicant's witness, Dr. Singh, admitted that he did not apply stricter standards for elements based on their safety significance (Tr. 9059, 9072-74). The Board offered the following justification for its exclusion of this portion of Dr. Ericksen's testimony:

Dr. Ericksen does not have sufficient factual understanding of the history and purposes of the Reinspection Program to express an opinion as to how it should have been designed. Nor does he have the expertise to make the judgments that he has about the initial design of the Reinspection Program ... the tenor of these questions and answers, as was the case with Dr. Bleuel, was how the program should have been originally designed. And it is not formulated to attack the inferences that Commonwealth Edison draws from the results.

Tr. at 11,026

However, Dr. Ericksen's excluded testimony, like Dr. Bleuel's, did attack the inferences that Applicant drew by indicating that Applicant's inferences could not be drawn absent a properly structured program. The fact that the testimony was phrased, in part, in terms of improved program design does not render it irrelevant to program evaluation.

In addition, the exclusion of this portion of Dr. Ericksen's testimony could not be based on limits in the scope of his expertise, for two reasons. First, Dr. Ericksen's recommendations were based on the document indicating how Applicant's witness, Mr. Teutken, one of the principal engineers in charge of the Byron plant, classified inspection procedures and attributes by safety. (Intervenors Ex. R-1.) Second, Dr. Ericksen used objective data on the varying discrepancy rates among different

inspections in the program in order to justify the need to classify inspection elements according to difficulty. (Ericksen, tr. following 11,045, Table 4.) Thus, Dr. Ericksen's statistical expertise was properly informed by both engineering expertise and engineering data.

Dr. Ericksen's testimony was thus not only properly before the Board in the remanded hearing, it was directly relevant to whether or not the BRP properly focused on the "possible safety consequence" of discrepancies.

By excluding this portion of Dr. Ericksen's testimony along with Dr. Bleuel's testimony, Intervenors were foreclosed from making an essential point in their case in chief (and in rebuttal) -- namely, whether the BRP should have focused on truly safety significant types of inspections in order to make a valid inference regarding whether inspectors overlooked construction defects of "possible safety consequence." Without that focus, as Dr. Bleuel stated, the BRP cannot provide reasonable assurance that the Byron plant can be operated safely.

C. The Board Erred By Excluding The Testimony Of An Authorized Nuclear Inspector, Present At The Byron Site During BRP Activities.

The Board also rejected the proffered testimony of Intervenors' witness, Sargent Podworny. Mr. Podworny was an Authorized Nuclear Inspector at Byron, employed by the insurance company under contract to the Hunter Corporation, the piping contractor at Byron. As such, Mr. Podworny was responsible for final, or near final, sign-off on certain Hunter documentation

packages, including those for 14 of the Hunter attributes listed in Exhibit B to Applicant witness Del George's pre-filed testimony. (See Intervenor's Memorandum In Support of Their Motion To Include Their Proposed Issue No. 1, filed July 30, 1984.)

Based on Mr. Podworny's allegations, the National Board of Boiler and Pressure Vessel Inspectors conducted an audit at Byron, the purpose of which "was to determine the confidence in the quality of work at the Byron Station." (Tr. 9921.) The Board's preliminary report, discussed in the arguments at the hearing, made at least two "findings which will impact on the hardware." (Tr. 9922.)

Nonetheless the Board declined to receive Mr. Podworny's testimony. (Tr. 10,146 et seq.) While one may debate the weight of his testimony, it was error not at least to receive it into the record.

III. THE BOARD'S RULING RESPECTING THE QUALITY OF WORK AT BYRON, BASED ON DESIGN EVIDENCE, IS REVERSIBLE ERROR DUE TO A LACK OF DUE PROCESS AND FUNDAMENTAL FAIRNESS.

The Board committed reversible error by relying upon and making findings on the plant design and design margin, while explicitly ruling that design was not an issue and denying Intervenor's (but not Applicant) an opportunity to present their evidence on design. Intervenor's were thus barred from presenting evidence on the Byron plant design which would have raised questions about the design margin so heavily relied upon by the Board below. (See generally S.I.D. ¶141-196; e.g., ¶¶189, 190.) The

Board's reliance on the "margin inherent in design" is further unfair in light of its denial of Intervenor's Motion To Reopen the Record To Include The Byron Station Design As An Issue." */

Both the Atomic Energy Act and the Administrative Procedure Act require that all parties - not just Applicant - "have the right to an opportunity to participate in the resolution of properly contested issues." Wisconsin Electric Power Co. (Point Beach Nuclear Unit 2) CLI-73-4, 6 AEC 6, 7 (1973). (See I.D. ¶D-423.)

The Board below did not include the Byron station design as an issue in the remanded hearing, and Intervenor's allegations of design defects were excluded. Therefore, it was inappropriate for the Board to make findings based on design and design margins. Moreover, the Board's action deprives Intervenor of their constitutional, statutory and regulatory rights to a fair hearing. **/ This is especially so where, as here, the Board's findings on the alleged quality of the work relied so heavily on the plant's original design.

A. The Board Below Relied On The Design Of Byron In Finding The Quality Of Work Acceptable.

The Board relied heavily on the design of the Byron plant in order to reach its findings on the quality of work at

*/ See note p. 5, supra.

**/ E.g., Ohio Bell Telephone Co. v. Public Utilities Com'n, 301 U.S. 292, 300, 304-5 (1937) (constitutional due process); 5 U.S.C. §556(d) (Administrative Procedure Act rights to present evidence, to cross-examine and to rebut); 10 CFR §2.740 and 2.743 (NRC regulations establishing rights to discovery, to present evidence and rebuttal evidence, and to cross-examine.)

Byron. The Board stated:

The Board was initially suspicious of the absence of any design-significant discrepancies from all of those analyzed. Sargent & Lundy attributes this absence to the Byron design and, as explained by the Sargent & Lundy panel, is an inherent consequence of the design process.

S.I.D. ¶D-189

Subsequently, the Board accepted "the results of the Sargent & Lundy analyses as supportive of the acceptable quality of work at the Byron site." (S.I.D. ¶D-203.)

Yet, even as the Board made findings based on the "extensive margin incorporated in the Byron design," id. at ¶D-189, it simultaneously refused to receive Intervenors' evidence on design defects as a "general attack on the design of the Byron Station." See generally Tr. 10,687-739.

The Board addressed this contradiction in a single footnote in the supplemental initial decision:

Intervenors assert that because design is not an issue in this proceeding, the Licensing Board can make no findings with respect to conservative loadings, assumptions or margin used in the Byron design. Although the adequacy of the general design of the Byron plant was not an issue, the Sargent & Lundy discrepancy evaluations clearly do fall under the ambit of the remanded proceeding. Sargent & Lundy's evaluation necessarily considered loadings, assumptions and margins used in the design. And, as noted by the Licensing Board, the issue of design criteria is relevant to the extent that the criteria are used in the evaluation of the discrepancies noted in the BRP. Tr. 10,668-87. Thus, to the extent that these factors were used in the Sargent & Lundy evaluations, information on loadings,

assumptions and margins was properly received into evidence, and findings based upon that evidence may be made. Accordingly, the Board may properly find that the un rebutted evidence on loadings, assumptions and design presented by Mr. McLaughlin and Mr. Laney lend support to their conclusion on the adequacy of the Hatfield and Hunter work.

S.I.D. ¶D-189, footnote 10

While the general design of the Byron plant was not an issue in the remanded hearings, the Board erred in not analyzing at least those design defects which related to the BRP. For the same reason, the Board erred in denying Intervenor's Motion to reopen the record for an independent design review, at least to the extent that review would have addressed the design of systems affecting the electrical work (done by Hatfield) and the piping work (done by Hunter) at Byron.

B. The Board Improperly Excluded Evidence On The Byron Station Design Relating To The BRP.

The Board excluded portions of Intervenor's expert witnesses' testimony on design defects found in the Byron station design criteria. See generally, Tr. 10,686-739. While some of the defects alleged by Intervenor's expert witness may fall outside of the scope of the BRP, others have an impact on the analyses performed in the BRP. For example, question and answer number 19 was stricken from the testimony of Intervenor's expert witness. That testimony read:

Q19: Do you have other concerns with the design criteria?

A19: Yes. In Section 37.2.1, relating to mechanical component supports such as Hunter pipe supports,

there is a listing of design effects that are to be ignored when performing calculations, for example, torsional stresses, axial self weight and assumptions that all masses are lumped at the shear center. The stresses are small, but they are non-conservative. If these stresses were added to the calculations, I believe, some of them would fail. This same problem occurred at Diablo, namely, ignoring minor but non-conservative design effects. At Diablo the NRC required that all the minor stresses be included and all calculations where minor stresses were ignored be recalculated. I have included a summary of these procedures and the procedures themselves as Attachment 3 to my testimony.

If, in fact, certain non-conservative design effects were omitted at the design phase, then that omission would affect the so-called "very generous design margins inherent in the design process." (S.I.D. at 11.) The testimony should have been admissible on that basis alone. Another basis of admissibility is as rebuttal evidence. This testimony rebuts that of the Sargent & Lundy engineers who testified to alleged design margins. Id.

Another portion of Intervenor's expert witness testimony that was stricken involved questions and answers Nos. 29-33, which relate to Sargent & Lundy analyses of the safety significance of discrepancies initially inspected by Pittsburgh Testing Laboratory ("PTL"). (Tr. 10,686-739.) Board's reasoning in striking those portions of the testimony was that it had defined "the scope of hearing with respect to PTL to be the three companies, Systems Control, Hunter and Hatfield." Tr. 10,727. */

*/ The Board also ruled that the testimony was not admissible on alternative grounds such as its view of the credibility and competency of the Sargent & Lundy engineers who performed all of the analyses for safety significant defects in the BRP. (footnote continues on next page)

However, the Board had not been clear, at the outset in its Pretrial Order, on whether PTL was included in the scope of the hearing. Any confusion on this issue should thus be resolved in favor of Intervenor. The Board acknowledged:

... we did not in so many words say that we will bring Pittsburgh Testing Laboratory into the reopened hearing limited to their inspection activities at Systems Control and Hatfield
.... I am of the opinion that the Applicant was quite correct in interpreting what could have been a better, clearer order on our part,
... we should have written that better.

Yet based on a fair interpretation of that order, Intervenor had prepared portions of testimony on the legitimate understanding that PTL was included in the scope of the remanded hearings. As a matter of basic fairness, Intervenor's interpretation of an admittedly vague pretrial order should not, during the hearing itself, have been construed to exclude testimony. It would hardly have burdened the applicant to respond to such testimony, since PTL was included in the scope of the BRP and Applicant's engineers did evaluate and disposition the PTL discrepancies. In sum, the Board should have admitted the evidence on PTL, both as a matter of fairness and on the issue of the credibility of Applicant's engineering witnesses. Intervenor were prejudiced by the Board's action and denied a fair hearing.

(footnote continued from previous page)

This was error. The evidence was relevant at least to the credibility of the Sargent & Lundy witnesses. Evidence that Sargent & Lundy did not use adequate care in dispositioning a PTL discrepancy would justify concern that adequate care may not have been applied in other similar analyses performed by Sargent & Lundy.

IV. THE BRP WAS ALSO FATALLY FLAWED FOR FAILURE TO DEFINE CRITERIA FOR JUDGMENT CLEARLY AT THE OUTSET OR, IN THE ALTERNATIVE, TO BE SUBJECTED TO INDEPENDENT REVIEW.

At several points during the hearings, Intervenors objected to the lack of independence in the engineering evaluation of the safety significance of discrepancies detected in the BRP.

Intervenors' point was perhaps best summarized by Dr. Bleuel, in the following portion of his rejected testimony:

A. 15 (continued):

. . .

A basic tenet of quality assurance is that the criteria for determining failure should be clearly defined before any evaluations of success or failure are actually conducted. Otherwise the criteria, especially in a highly judgmental context, can generally be defined during the course of the evaluation to guarantee success regardless of the actual reliability of the system being evaluated. No charge of bad faith need be made to support this practical lesson from my years of experience in the field.

Q.16. How did the failure to specify evaluation criteria at the outset affect the reliability of the engineering evaluations for the reinspection program?

A.16. I have not analyzed the specific engineering criteria and methods utilized by Sargent & Lundy to evaluate the Byron Reinspection Program; nor would I be competent to do so. Rather, I am making a universal point, based on extensive business experience in design assurance and quality assurance, that criteria for evaluations of success or failure -- no matter who conducts the evaluations -- should be clearly defined at the outset, if the evaluations are to be deemed reliable.

The point has particular force where, as here, the choice of criteria and methods for the evaluation is highly judgmental. A reading of the Reinspection Program Report shows plainly that such was the case here.

Appendices C and D to the Report concern the engineering evaluations of discrepancies. Of three types of evaluations (Categories X, Y and Z defined in Appendices C and D of the Report, excerpts from which are appended as Attachment C to my testimony), Category 4 is expressly described as evaluation based on engineering judgment. In the case of subjective discrepancies, of 4,132 total discrepancy evaluations, 3,074 fell in this category; of 2117 Hatfield subjective discrepancy evaluations, 2064 were in this category of evaluation by judgment. (Table C-2, p. C-4, in Attachment C to my testimony.)

Judgment was likewise involved in the evaluations in categories X and Z, least significantly in subjective category

X where the principal judgment was simply that certain types of weld discrepancies did not reduce weld strength, and most significantly in category Z, which involved evaluation by engineering calculations. Such calculations, of course, require the exercise of considerable judgment as to both the criteria and the methods for the evaluation.

Recent testimony in this case by Sargent & Lundy engineers McLaughlin and Kostal, which has been brought to my attention by intervenors' counsel, illustrates the use of judgment in such calculations. In the case of the Reinspection Program, I am advised that the testimony suggests that individual welds on a component were evaluated by calculations which did not necessarily entail reinspection of other welds subject to load redistribution effects (unless, by coincidence, those other welds happened to have been captured in the Reinspection Program sample). (McLaughlin testimony, Transcript at 9154-56; Kostal testimony, Transcript at 10,238-10,240.) In contrast, for purposes of preparing his testimony on the engineering evaluations of Systems Control Corporation weld discrepancies, Mr. Kostal selected certain cases in which load redistribution effects were calculated, and any welds thereby affected were visually reinspected. (Transcript at 10,238-10,240.)

Now, in the testimony just cited, both engineers expressed their judgment that these additional calculations and reinspections were not necessary, but that is precisely my point. They so determined by an exercise of judgment -- one of many such judgments which permeate engineering calculations. If this judgment were to govern the evaluations, it (along with many

others) should have been clearly stated at the outset. The very fact that Mr. Kostal felt it desirable to perform these additional calculations and reinspections for his testimony suggests that it is not irresponsible to raise legitimate questions about the validity of the particular judgment.

In short, the criteria and methods for evaluation should have been clearly specified before any reinspection results were received, especially because the engineering evaluations were highly judgmental.

Q.17. Is there any acceptable alternative to clearly defined criteria for success or failure at the outset?

A.17. Yes. In cases where the criteria for success or failure are not clearly defined at the outset, an acceptable alternative is to have the evaluation conducted by an independent entity with no economic or institutional stake in the outcome. This avoids the situation of the "rabbit guarding the cabbage patch."

Intervenors' counsel has asked me to review NRC Chairman Nunzio Palladino's February 1, 1982 letter to Congressman John Dingell, concerning criteria for an independent design review of the Diablo Canyon nuclear power plant. I have reviewed the letter (Attachment D to my testimony). In my opinion, the criteria set forth therein appear adequately to describe an acceptable degree of independence for review in a case, like this one, in which the criteria for success or failure are not clearly defined at the outset and are highly judgmental. I refer particularly to the following

language in Chairman Palladino's response to the portion of Congressman Dingell's question 1 which asked for a definition of the term, "independent":

Independence means that the individuals or companies selected must be able to provide an objective, dispassionate technical judgment, provided solely on the basis of technical merit. Independence also means that the design verification program must be conducted by companies or individuals not previously involved with the activities at Diablo Canyon that they will now be reviewing.

Sargent & Lundy, of course, has been extensively involved in the design, prior partial evaluations of, and advice concerning the activities at Byron which it was asked to evaluate in the Reinspection Program. It has a direct economic and institutional stake in the outcome, both of the Reinspection Program and of this licensing proceeding. If engineering evaluation were to show serious safety problems at Byron, and Byron were not to be licensed, the firm, which according to press reports has recently laid off engineers due to loss of business resulting in part from cancellations of other nuclear power plants, might lose business at Byron. Its business at Edison's Braidwood plant, also designed by Sargent & Lundy and quite similar to Byron, would likewise be in question, and its reputation might be jeopardized, threatening further loss of business.

None of this is to impugn in any way the integrity of Sargent & Lundy. I am merely pointing out that Sargent & Lundy is not in any real sense, or in the sense of Chairman Palladino's definition, "independent" for purposes of engineering evaluations of the work at Byron.

In sum, based on my extensive business experience in design assurance and quality assurance, when the criteria for success or failure are not clearly defined at the outset, the evaluation must be done by a firm which is independent, if the evaluation is to be deemed reliable. Here the evaluation was done by a firm which is plainly not independent, and the evaluation therefore should not be deemed reliable.

Q.18. Does the NRC Staff review of Sargent & Lundy's engineering evaluations supply the necessary degree of independent review?

A.18. No. The evaluation itself, not merely a limited, partial review of the evaluation, must be independent, if it is to be relied upon.

* * *

For the foregoing reasons, as stated by Dr. Bleuel, the often highly judgmental criteria and methods used by Sargent & Lundy should not be considered a reliable basis for evaluating the safety significance of discrepancies, since they were neither clearly defined at the outset nor applied by independent reviewers.

Conclusion

The Licensing Board committed reversible error in issuing the Byron operating license. The Board failed to focus on items of "possible safety consequence" in ruling that Applicant had met its burden of "reasonable assurance." That conclusion is not supported in the record.

More importantly, the Board deprived Intervenors of their due process rights to a fair hearing. Accordingly, the Supplemental Initial Decision, insofar as it authorizes an operating license for Byron, should be reversed.

November 6, 1984

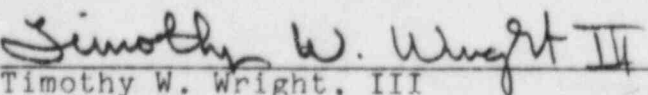
Respectfully submitted,

Douglass W. Cassel, Jr.
Timothy W. Wright, III

For Service:
Douglass W. Cassel, Jr.
Timothy W. Wright, III
109 North Dearborn, #1300
Chicago, IL 60602
(312) 641-5570

Attorneys for Intervenors Rockford
League of Women Voters and DAARE/
SAFE

By:


Timothy W. Wright, III

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of:)
)
COMMONWEALTH EDISON COMPANY) Docket Nos. 50-454
) 50-455
(Byron Nuclear Power Station,)
Units 1 and 2))

CERTIFICATE OF SERVICE

I hereby certify that on this 6th day of November, 1984, I served copies of Intervenor's Supplemental Brief on Appeal on each of the parties listed below by having said copies placed in envelopes, properly addressed and postaged (first class), and depositing them in the U.S. mail at 109 North Dearborn, Chicago, Illinois 60602, except that Messrs. Rosenthal, Gotchy, Wilbur, Lewis and Gallo were served via overnight delivery and Mr. Miller was served personally.

Alan S. Rosenthal, Chairman
Administrative Judge
Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory
Commission
Washington D.C. 20555

Dr. Reginald L. Gotchy
Administrative Judge
Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory
Commission
Washington D.C. 20555

Howard A. Wilbur
Administrative Judge
Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory
Commission
Washington D.C. 20555

Ivan W. Smith, Chairman
Administrative Judge
Atomic Safety and Licensing
Board
U.S. Nuclear Regulatory
Commission
Washington D.C. 20555

Dr. A. Dixon Callihan
Administrative Judge
Atomic Safety and Licensing
Board
U.S. Nuclear Regulatory
Commission
Washington D.C. 20555

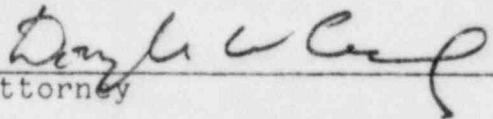
Dr. Richard F. Cole
Administrative Judge
Atomic Safety and Licensing
Board
U.S. Nuclear Regulatory
Commission
Washington D.C. 20555

Michael Miller, Esq.
Isham Lincoln & Beale
Three First National Plaza
Chicago, IL 60602

John Streeter
U.S. Nuclear Regulatory
Commission
Region III
Office of Inspection &
Enforcement
799 Roosevelt Road
Glen Ellyn, IL 60137

Stephen Lewis, Esq.
Office of General Counsel
U.S. Nuclear Regulatory
Commission
Washington D.C. 20555

Joseph Gallo, Esq.
Isham Lincoln & Beale
1120 Connecticut Avenue N.W.
Room 325
Washington D.C.



Attorney

November 6, 1984