UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY,	)	Docket Nos. 50-440 50-441
DUQUESNE LIGHT COMPANY,	)	(Operating License)
OHIO EDISON COMPANY,	)	
PENNSYLVANIA POWER COMPANY,	)	
and THE TOLEDO EDISON COMPANY	)	
	)	
(Perry Nuclear Power Plant, Units 1 and 2)	)	

7/6/81

APPLICANTS' BRIEF ON CONTENTIONS

At the Special Prehearing Conference held on June 2-3, 1981, the Licensing Board asked Applicants and the Staff to submit briefs commenting on changes to the contentions made by Sunflower Alliance, et al. ("Sunflower") and Ohio Citizens for Responsible Energy ("CCRE") and on the new contention introduced by Tod Kenney ("Kenney"). Tr. 293-99, 526, 610-12, 626, 628-30.[1] For the most part, the changes were in the nature of additional information not earlier provided in either petitions or briefs; Kenney introduced his only contention orally at the Special Prehearing Conference. Tr. 594-95.

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1 At Applicants' request, the date for filing this brief was set for July 3, 1981. Tr. 628-29. Since that date was a Federal holiday (a fact unbeknownst to Applicants at the time), the brief is filed July 6, 1981. 10 CFR §2.710.

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The purpose of this brief is to comment on the new information presented, both from the point of view its timeliness and also as to its adequacy as a basis for the contentions.

The question of timeliness is important. The Commission's Rules of Practice require that a petition for leave to intervene set forth the contentions and the bases therefore with reasonable specificity. The rules provide a specific opportunity to file a later amendment to the petition to meet these requirements. 10 C.F.R. §2.714(b). In this proceeding, the Licensing Board, by Memorandum and Order dated April 9, 1981, required each petitioner to file an amended petition no later than 25 days before the Special Prehearing Conference. The Memorandum and Order also required each party and petitioner to file a brief in support of or in opposition to the contentions that were being advanced. That brief was due seven days prior to the Conference. None of the petitioners filed a brief in support of its contentions.[2] Thus, the information presented for the first time, orally, at the Special Prehearing Conference was, in effect, the petitioners' third opportunity to take a bite at the apple.

Petitions for leave to intervene, which contain the contentions and the bases therefor, may be amended at any time.

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2 Sunflower did file a "Special Prehearing Conference Brief" (dated May 22, 1981). However this brief did not discuss Sunflower's submitted contentions.

10 CFR §2.714(a)(3). However, amendments which are filed later than 15 days before the Special Prehearing Conference are acceptable only if the presiding officer is able to find, among other things, a showing of good cause for being late. Id. Sunflower did not even attempt to show good cause for the late presentation of new information at the Special Prehearing Conference. Thus, Applicants contend that none of the information put forth for the first time at the Special Prehearing Conference by Sunflower, which failed to meet its previous obligations under section 2.714(b) and the Licensing Board's April 9, 1981, order, can be used as bases for the various contentions advanced.

Kenney did not show good cause for his failure to provide any contentions in his petition, for his failure to file a amended petition, for his failure to file a special prehearing conference brief, or for the untimeliness of the submittal of his only contention, which was presented at the second day of the Special Prehearing Conference.[3] Applicants therefore object to the admissibility of Kenney's new contention.

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3 Kenney referred to a recent magazine article in support of several parts of his contention dealing with Applicants' emergency plans. Tr. 597, 605-609. While that article might arguably be considered cause for an untimely attempt to amend or support parts of the contention, it is clearly not the reason or the cause for Kenney's untimely submission of a contention in the first instance. Moreover, as will be more particularly discussed below, the magazine article does not provide an adequate basis for any parts of the contention and is in fact unrelated to much of the contention.

OCRE submitted a "Post-Special Prehearing Conference Brief", dated June 12, 1981, ten days after the Special Prehearing Conference. The OCRE representative, Jeff Alexander, stated in that brief that he was unable to submit his special prehearing conference brief on time because he was preparing for his final examinations which were held April 21-29, and that he was involved in an "ongoing experiment" as part of his Master's thesis requirements.

OCRE did not request leave to file the special prehearing conference brief late, or give any indication that it even intended to file such a brief. In fact, at the Special Prehearing Conference, the Licensing Board noted that the petitioners/intervenors would not have a further opportunity to argue their contentions after the Conference. Tr. 295. Waiting until after the other parties have filed their briefs in accordance with the Licensing Board's order, failing to appear at the Special Prehearing Conference (or to have a representative prepared to discuss the issues), and then submitting an untimely and unauthorized pleading, should not be tolerated by the Licensing Board.

None of OCRE's good cause arguments provides an excuse for filing an untimely brief or for not informing the Licensing Board of its intent to file a late brief. The special prehearing conference brief was due on May 26 (7 days before the Special Prehearing Conference). Mr. Alexander's final

examinations were completed on April 29. While his "on-going experiment" may have taken a substantial amount of Mr. Alexander's time, he was on notice from the date he received the Licensing Board's April 9, 1981 Memorandum and Order that the special prehearing conference brief had to be filed by May 26. OCRE's failure to inform the Licensing Board of any schedule problems until June 10 should alone be sufficient grounds to reject OCRE's June 10 brief.

The Commission's recent Statement of Policy on Conduct of Licensing Proceedings, 46 Fed. Reg. 28533 (May 27, 1981), is particularly apt here. The Commission stated:

> Fairness to all involved in NRC's adjudicatory procedures requires that every participant fulfill the obligations imposed by and in accordance with applicable law and Commission regulations. While a board should endeavor to conduct the proceeding in a manner that takes account of the special circumstances faced by any participant, the fact that a party may have personal or other obligations or possess fewer resources than others to devote to the proceeding does not relieve that party of its hearing obligations. Id. at 28534.

The Commission went on to state that a board should consider the imposition of sanctions against the offending party. One of a number of sanctions specifically mentioned by the Commission was for the Licensing Board to "refuse to consider a filing by the offending party." Id. OCRE's Post-Special Prehearing Conference Brief should not be accepted by the Licensing Board.

Following is a discussion of the admissibility of the contentions which have been presented, taking into consideration the new information presented at the Special Prehearing Conference and in OCRE's untimely brief. Applicants will not repeat in the discussion of each contention its objections to the consideration of this new information on the grounds of untimeliness and failure to show good cause. Applicants also reaffirm the positions advanced in their May 22, 1981 briefs on the contentions of Sunflower and OCRE, and will not repeat those arguments here.

I. CONTENTIONS OF SUNFLOWER ALLIANCE, ET. AL.

Contention 1 (Emergency and Evacuation Plans). Tr. 174-225.

Sunflower's Contention 1 is a series of conclusions without supporting bases, i.e., that the emergency and evacuation plans suffer from "inadequacy of notification plans; deficiencies in radiation exposure measurement techniques, insufficient practical workability; no agreement with local response organizations as to cost and implementation of plans and inadequate notification and information to media and residents within the ten (10) and fifty (50) mile radii." Applicants' argument was (and is) that no bases have been stated for the series of broad conclusary allegations, and the contention should therefore be rejected.

At the Special Prehearing Conference, Applicants suggested that this contention might have been intended to relate to the state and local (county) emergency plans, which had not yet been completed, rather than Applicants' on-site emergency plan described in Section 13.3 and Appendix 13A of the Perry Final Safety Analysis Report (FSAR), Vol. 16. The attorney for Sunflower, however, said he had in mind the plan contained in the FSAR.[4] Also, as discussed below, facts cited at the prehearing conference by Sunflower's attorney came from that section of the FSAR.

The only factual basis asserted by Sunflower at the Special Prehearing Conference was that there are only 150 school buses available for evacuation in the emergency planning zone. While there are a sufficient number of buses in the neighboring area,[5] Sunflower alleges there is no agreement for the use of the buses. Tr. 176-7.

Applicants agreed to admit that specific issue as a contention, Tr. 188-203, but Sunflower rejected the suggestion, preferring to stay with their contention as written:

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4 "MR. WILT: . . . They have an Exhibit 13A in the Appendix of the FSAR. I thought that was the plan. If that's not the plan, this is new to me." Tr. 210.

5 At page 21 of Appendix D to Applicant's emergency plan (FSAR, Appendix 13A, Vol. 16), Applicants state that 150 buses serve schools within the emergency planning zone, and that there are approximately 400 school buses in Lake County, northern Geauga County, and western Ashtabula County plant. The FSAR states that it would be necessary to draw on many of these 400 buses.

> MR. WILT: . . . I think the contention as I have written it, artfully or not, is perfectly clear. It puts them on notice as to what we're trying to say and what we're talking about, namely, that their plan is no good. Tr. 210 (emphasis added).
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> * * *
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> . . .they don't have a plan that works, and that's as specific as we have to get. Tr. 210 (emphasis added).
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> * * *
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> So I would state to the board that the contention as set forth in the first filing of Sunflower should be admitted. Tr. 210-11.

Sunflower, in effect, wants to say nothing more than "their plan is no good" at this stage of the proceedings, and then conduct a general inquiry, Tr. 189, to see if they can come up with something on discovery to justify the contention, Tr. 210. This, of course, is diametrically opposed to the Commission's Rules of Practice, which require a contention to be accompanied by a basis, prior to discovery, rather than allowing intervenors into a proceeding to conduct a fishing expedition in hopes of coming up with support for an unfounded allegation.

Sunflower, having failed to identify the aspects of Applicants' emergency plan in Appendix 13A of the FSAR which are defective, and the bases for the conclusions that they are defective, and having rejected the Licensing Board's attempts to frame more specific contentions, Tr. 181-83, insists on pressing its original contention as framed in its petition. That contention does not comply with the specificity and basis

requirements of section 2.714(b), and must therefore be disallowed.[6]

Contention 2 (Financial Capability; See also OCRE Contention 7). Tr. 233-300; 249-50; 453-7.

Sunflower's Contention 2 involves allegations as to the Applicants' financial capability to construct, operate, and decommission the Perry plant.

As stated at pages 4 and 5 of Applicants' May 22 brief, the Applicants' financial capability to construct the plant is outside the scope of an operating license proceeding.[7]

As to the question of plant operation, Sunflower presented no basis in its petition for the contention that Applicants "lack the financial capability of operating Units 1 and 2." During the course of the Special Prehearing Conference,

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6 Kenney joined the discussion of this contention, primarily on the subject of radiological monitoring, Tr. 178-9, 211-13, 215-24, but later included that concern in a contention of his own. Tr. 595-609. Sunflower did not adopt Kenney's comments, preferring to stay with its contention as originally worded.

The NRC Staff, in its brief filed on July 6, 1981, supported the admission of a Sunflower contention involving financing of the local (off-site) emergency plan. However, since Sunflower neither raised that subject, nor showed any interest in adopting it, see, e.g., Tr. 189,210, it would be inappropriate to admit the issue as a Sunflower contention.

7 It should also be noted that Sunflower's concerns about the costs of construction are "principally financial in nature," rather than related to health and safety or the environment. Tr. 248-9.

Sunflower argued that, because the costs of constructing the plant had exceeded original estimates, the companies would somehow be financially incapable of operating the plant. But their arguments were all conjecture and guesswork. For example, Sunflower stated that The Cleveland Electric Illuminating Company ("CEI") had considerable difficulties in cash flow." Tr. 238. But no explanation was given as to what those cash flow difficulties were. Sunflower then suggested that "there is an extremely strong possibility that the capital structure of Cleveland Electric Illuminating is beginning to suffer." Tr. 240. But Sunflower did not say the company was, in fact, suffering, nor did it provide any basis in fact to support the allegation that the company's capital structure was not sound,[8] or that the unsoundness would somehow adversely affect CEI's ability to operate the plant.

In sum, Sunflower is arguing that, because of increased construction costs, there are "changes in circumstances" that have "doubtless occurred in Cleveland Electric Illuminating's cash flow ability." Tr. 243. Sunflower did not know this to be the case; it was only guessing,[9] and it therefore wanted to

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8 Sunflower's only attempt to support the allegation was a reference to a report by the General Accounting Office which (a) had nothing to do with a utility's ability to operate a completed plant, and (b) had nothing to do with CEI. Tr. 239-40.

9 In fact, Sunflower guessed wrong about the financial condition of CEI. The company has one of the highest bond ratings among the nation's utilities, with an AA rating by

"reexamine" the issue. Tr. 243. But equally significantly, Sunflower did not relate the alleged cash flow problem to the ability to operate the plant.

The contention must therefore fail for lack of basis. A utility's financial structure will improve, and improve considerably, when a nuclear plant is completed and begins generating power. It is placed into the utility's rate basis, and it generates revenues from operations. It is thus rather extraordinary to suggest that a utility would not have the financial capability to operate a completed nuclear plant, and one would expect the suggestion to be accompanied by an explanation of how such a state of affairs would be likely to come about. No such explanation was given.

As to the third aspect of this contention, Sunflower provided no basis for its blanket assertion that "Applicants lack the financial capability to decommission the facilities and protecting them after decommissioning." Sunflower acknowledged that the Public Utilities Commission of Ohio ("PUCO") has established a policy for setting up decommissioning funds that "apparently is becoming the standard accounting and rate making

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Moody's, an AA- rating by Standard and Poor, and an AA rating from Fitch. CEI's sound financial condition was reflected by the current effective yields of CEI bonds traded on the open market, and the interest paid on recently issued preferred stock. CEI's commercial paper ratings are among the highest in the country. Tr. 453-7.

procedure of the PUCO." Tr. 245. Sunflower then seems to argue that delays in the completion of the Perry facility coupled with inflation mean that "the decommissioning costs are not and cannot be adequately addressed." Tr. 246. Justification or support for this argument is not provided. Where the financial qualifications issue in general has been labelled by the Commission as of "limited usefulness",[10] the admission of financial qualification contentions based on sheer speculation serves little useful purpose.

OCRE's Contention 7 deals with the related issue of premature decommissioning. OCRE's representative had no new information to shed on this issue. Tr. 249-251. This contention should also be denied.

Contentions 3, 4 and 5 (Need for Power; See also OCRE Contention 10). Tr. 300-3; 462-534.

Sunflower's Contentions 3, 4 and 5 and OCRE's Contention 10 all argue that Applicants have overestimated the need for the Perry facilities and have not adequately considered alternatives such as conservation, cogeneration, load management, rate structure changes, and interconnections.

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10 Public Service Company of New Hampshire (Seabrook Station, Units 1 and 2), CLI-78-1, 7 NRC 1, 19 (1978). In addition, the Commission is considering the complete elimination of financial qualifications as a hearing issue. See SECY-81-168, Proposed Rulemaking to Reduce or Eliminate Requirements with respect to Financial Qualifications for Power Reactors. (May 13, 1981)

Applicants' response to these contentions as set forth in the May 22 briefs was that the proposed alternatives were clearly unreasonable in the context of an operating license proceeding and therefore were inappropriate issues under the National Environmental Policy Act. Applicants continue to believe that NEPA does not require consideration of alternatives to a completed facility, especially where there has been a full NEPA review at the construction permit stage.

Sunflower presented additional (although not new) information at the Special Prehearing Conference to support consideration of these issues. Sunflower's basic argument was that Applicants' load forecasts had been significantly lowered since the issuance of the construction permits. See, e.g., Tr. 462-463. Sunflower cited Applicants' annual load forecasts submitted to Ohio state agencies, indicating that these forecasts had been reduced in succeeding years. See, e.g., Tr. 519-521.

There is no doubt that Applicants have revised their load forecasts. For example, Applicants' 1973 forecast for 1983 peak load was 18,529 MW, while the 1980 forecast for 1983 was 12,768 MW. Environmental Report - Operating License Stage ("ER-OL"), vol. 1, p. 1.1-11. What Sunflower did not recognize is that Applicants have similarly revised the capacity which would be available to meet the forecasted load. These revisions included the termination of 4332 MW of capacity

originally scheduled for operation in the 1981-1983 period[11] as well as delays in in-service dates for the Perry units and other new generating capacity.[12]

Sunflower has presented no basis for a contention that the Perry units are not needed or could be replaced by some alternative. At the Special Prehearing Conference, Sunflower did refer to the testimony of Richard Rosen in a Pennsylvania state proceeding. According to Sunflower

> Mr. Rosen indicated at that time, which was March, 1980, that the Beaver Valley plant, which of course is not in contention here, and the two Perry plants, all three of which were under construction at the time, were not necessary in part because of the fact that CEI and the other partners in those construction ventures would become over base loaded, for all intents and purposes, by the inclusion of those plants on their capacities.

Tr. 470. It is worth noting that in this same Pennsylvania proceeding, Mr. Rosen subsequently changed his conclusions, stating

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11 The Davis-Besse Units 2 and 3 (906 MW each) were originally scheduled for operation in June 1981 and January 1983. Erie Units 1 and 2 (1260 MW each) were originally scheduled for operation in January 1982 and December 1983. These units have been terminated. ER-OL, vol. 1, p. 1.1-9 and Table 1.1-8.

12 At the time that the Environmental Report-Construction Permit Stage was prepared in 1973, the Perry units were scheduled for operation in April 1979 and April 1980 respectively. Current schedule calls for operation in 1984 and 1988. Other units scheduled to begin operation in this time period were also delayed. ER-OL, vol. 1, p. 1.1-9 and Table 1.1-8.

> If one weighs all factors at this time from the point of view of potential cost to consumers, cautiously weighing in the unlikely possibility that demand growth rates will be significantly above 2%, the most prudent program from the standpoint of cost to consumers involves completion of Perry I . . . ."[13]

It is also important to observe that the PUCO has explicitly rejected Mr. Rosen's recommended construction program.

> [T]he alternative construction program [Mr. Rosen] now recommends for CAPCO, which involves an unbelievable reliance on oil-fired peaking units, casts doubt on the credibility of his entire study, even if it were found to have application in this case.[14]

Thus the very agency charged with regulating Ohio utilities has rejected the same arguments put forth by Sunflower here.

While Sunflower asserted that "the economic benefit of having the plant operable and on line [in 1984 for Unit 1 and 1988 for Unit 2] has, for all intents and purposes, vanished as of this date, or is becoming more and more foreseeable as to

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13 Sur-Rebuttal Testimony of Richard A. Rosen on behalf of the Pennsylvania Office of the Consumer Advocate (August 5, 1980), Before the Pennsylvania Public Utility Commission, Docket 1-79070315, Investigation Upon the Commission's Own Motion into the Delay in the CAPCO Construction Schedule.

14 In The Matter of The Application of The Cleveland Electric Illuminating Company for Authority to Amend and Increase Certain of its Filing Schedules Fixing Rates and Charges for Electric Service, Case No. 79-537-EL-AIR, and In The Matter of the Complaint and Appeal of The Cleveland Electric Illuminating Company from Ordinance No. 1673-79 of the Council of the City of Cleveland, Case No. 79-774-EL-CMR, Opinion and Order, dated July 14, 1980, p. 29.

the economic unviability of the facilities," Tr. 466-7, Sunflower provided neither specificity nor basis for this assertion. The strongest support for its allegation was that some of the "dissenting literature in the area" stated that

> the cost of, for instance, coal versus the costs of nuclear are extremely competitive, that depending on the region of the country, coal generally has an advantage.

Tr. 468. This allegation, in addition to ignoring marginal costs, see Tr. 469, does not even address the specifics of the situation at hand, i.e. the Applicants and their service territories.

The contentions must therefore be rejected. Even if Applicants' NEPA argument is not adopted, the intervenors have provided neither specificity nor basis for allegations concerning any aspects of the balance to be struck at the operating license stage, i.e.,

> the operating and maintenance costs, plus the environmental costs, including safety costs, that are associated with operating and [fuel] loading, as opposed to whatever financial benefits there are . . . ."

Tr. 472.

Contention 6 (Spent Fuel Storage Pond Release). Tr. 304-16.

Contention 6 is a good illustration of a contention that lacks both specificity and basis, and demonstrates the need for

complying with those requirements in the Commission's regulations. The contention in Sunflower's petition was that there has been inadequate consideration of "a possible major radiation release accident in the spent fuel storage pond."[15] Applicants' May 22 brief objected to the contention on grounds of lack of specificity and basis, noting that Sunflower had failed to identify or quantify the "major radiation release accident", had failed to explain how the undefined accident would impact emergency plans, and had failed to explain how the health and safety of residents would be endangered.

At the Special Prehearing Conference, Sunflower alleged that the loss of circulation of the cooling water in the pond, for "several hours" could cause a "very severe radiation release," Tr. 305-7, and that the pond would boil over, like a pot boiling on a stove, and release contaminated water to the environment, Tr. 307, 312, 314. Sunflower gave no basis for its far-fetched statements. Sunflower completely ignored the information in the FSAR which describes the spent fuel pool cooling system, including the redundant circulating pump/heat exchanger trains and the multiple sources of make-up water. FSAR, §9.1.3, Vol. 13. Without a basis for its allegations, the contention fails to meet the requirements of section 2.714(b).

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15 Sunflower's "Petition for Leave to Intervene", dated March 15, 1981, p. 6.

Contention 7 (Hydrogen Control; See also OCRE Contention 5). Tr. 320-323, 561-62.

The Licensing Board ruled that these two contentions, related to hydrogen control, will not be considered in the absence of a further showing by Sunflower and OCRE in accordance with the Commission's Memorandum and Order in Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), CLI-80-16, 11 NRC 674 (1980). Tr. 320-3. No such showing has been made. OCRE's June 10 brief addresses this contention, but makes no attempt to meet the showing required by CLI-80-16.

Contention 8 (Licensing of Two Units). Tr. 323-34.

This contention has disappeared as a potential issue. Sunflower, after listening to an explanation of how NRC licenses are issued, agreed that it was not a factual contention, Tr. 331, but rather an attempt to seek assurances that Unit 2 would not be licensed to operate before completion of construction. Tr. 331-2. Since NRC regulations prohibit licensing under those circumstances, the issue raised has been resolved.

Contention 9(1) (Construction Quality Assurance). Tr. 337-49.

Contention 9(1) is the first two and one half sentences of Sunflower's Contention 9. Tr. 342. That contention begins as follows:

> Petitioners allege that Applicants have demonstrated throughout the construction process their inability to comply with the Quality Assurance Program established by both the Commission and the Applicants. Applicants' construction practices, as demonstrated in the Commission's own inspection reports, are totally inexecusable. Petitioners allege that Applicants have not constructed Perry in accordance with applicable standards and that there are the following but by no means the only deficiencies:
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> A) . . .
> B) . . .
> C) . . .
> D) . . .

The plain reading of Contention 9 is that the first two sentences are part of a general background allegation leading up to four more specific allegations (A-D) which were encompassed within the general scope of the first two sentences. Sunflower surprised everyone at the special prehearing conference by alleging that the first two sentences were totally independent of the remainder of Contention 9, and that they had to do with a "voluntary stop work order" which "stopped construction at the Perry plant for a good six months before that deficiency was corrected." Tr. 339-40. There was no hint in the wording of the contention to suggest this issue. As a result, Applicants and the Staff were caught unawares, and neither had briefed the issue. This particular incident graphically demonstrates the need to require petitioners to state their contentions with specificity, and to provide bases, so as to give adequate notice to the Licensing Board and the other participants.

Although Applicants, as stated above, have generally pointed to petitioners' failure to show good cause for submitting untimely information, this contention presents peculiar circumstances that bear mentioning. Daniel Wilt, Sunflower's counsel in this proceeding, wrote to U.S. Senator John Glenn on November 1, 1979, about the work stoppage. Mr. Wilt included with that letter summaries of all of the NRC inspection reports issued during the period of time relevant to the work stoppage. Mr. Wilt's unique and intimate knowledge of the events surrounding this allegation, coupled with the curiously misleading phrasing of Contention 9, makes it highly unlikely that a finding of good cause for the late presentation of this contention could be made. In any event, Sunflower has not even attempted a showing of good cause. For that reason alone, Contention 9(l) should be rejected.

Other reasons also mandate its rejection. The contention falls far short of providing the necessary specificity. Nowhere does Sunflower identify the parts of the Perry facility that are deficient for not having been constructed "in accordance with applicable standards", nor do they specify the "applicable standards" which have not been met.

The contention is also deficient in that it lacks adequate basis. Sunflower has provided Applicants with 24 inspection reports, with a total of 309 pages, covering a three-year period between early 1978 and early 1981. Most of the information bears no relationship to the work stoppage. Sunflower has

not provided any citations to the portions of the documents which arguably form a basis for Contention 9(1). By no rational logic can this be construed as providing the bases, with reasonable specificity, required by section 2.714(b) for the allegations that Applicants have not constructed the plant in accordance with applicable standards.

Sunflower's Contention 9(1) refers to a period early in the construction of the Perry plant, in January and February of 1978, when NRC inspections indicated certain instances where the Perry quality assurance program was being improperly implemented. CEI immediately issued stop work orders in five safety-related areas. These were documented in a letter dated February 8, 1978, from NRC to CEI, known as an Immediate Action Letter. CEI immediately engaged in corrective actions, which resulted in an improved quality assurance program, implemented to NRC's satisfaction. All work done prior to the stop work orders was reinspected to assure compliance with NRC standards.

Work was resumed on the first of the five stop work areas on February 18, 1978. Work in other areas resumed on March 17, 1978 and April 14, 1978. On May 15, 1978, work resumed in the last of the work areas.[16]

In a letter dated March 5, 1980, from the NRC to Senator Glenn (attached hereto as Attachment 1) that was prompted by

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16 Sunflower referred to this as a six-month work stoppage. Tr. 339-40.

Mr. Wilt's letter to Senator Glenn, William J. Dirks, Acting Executive Director for Operations, stated:

> . . . Subsequently [to the stop work orders], CEI took aggressive actions to correct deficiencies, including a complete revision of the Perry Quality Assurance Program from the corporate level to the detailed site working procedures; a restructuring of the QA/QC organization, including the replacement of a number of management level QA/QC personnel with more capable individuals; a major change in the site construction organization to provide more effective control of site contractors; and transfer of the engineering and scheduling functions and personnel from the corporate headquarters to the site. Our Region III office instituted an augmented inspection program for the Perry plant to review in detail the revised QA program, to assure that the requirements of the new program were effectively implemented, and to assure that the construction which had been completed under the previous program was acceptable.
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> Inspections subsequent to the issuance of the Immediate Action Letter indicate that the performance of CEI improved measurably. This is evidenced by the fact that 36 noncompliances were identified by Region III at Perry in 1978 (22 of which were cited in the first six months), and only nine noncompliances were found in 1979.

Thus, the record does not support Sunflower's allegation that the plant has not been constructed in accordance with applicable standards. More to the point, however, at this stage of the proceedings, is that Sunflower has not presented a legally adequate contention. The contention is far too broad to meet the Commission's specificity requirements and, as a result, presents an issue impossible to litigate. As bases, Sunflower off-handedly submits three years' worth of inspection reports, failing even to cite the relevant portions. Given the detailed prior knowledge of this issue by Sunflower's counsel,

there can certainly be no good cause for the late submission of these reports. Sunflower has not met the requirements of section 2.714(b), and the contention must be rejected.

Contention 9(2) (Nozzle Cracking). Tr. 349-52.

Sunflower did not respond to Applicants' May 22 brief on this contention, other than to admit that they did not know whether or not the contention has a basis. Tr. 351.

Contention 9(3) (Geologic Fault; See also OCRE Contentions 11(a) and (b)). Tr. 352-63.

The only new information provided by Sunflower was the occurance of a "mild tremor" last year. Tr. 353. Sunflower did not, however, allege that the tremor exceeded the Perry plant's seismic design criteria and, in fact, admitted that it was not alleging a deficiency with the plant. Tr. 356-7.

With respect to OCRE Contention 11(a) and (b), OCRE argued that a new fault had been discovered subsequent to the construction permit hearing. Tr. 360. However, the existence of this fault was discussed in the FSAR, and OCRE was not able to allege any deficiencies in the Applicants' treatment of the fault in the FSAR. Tr. 363. Thus, the contentions should not be allowed for the reasons stated in Applicants' May 22 briefs.

OCRE's June 10 brief (p. 6), appears to admit that Contention 11 is a challenge to 10 CFR Part 100 and then

"suggests that a waiver of those regulations might be in order under 10 CFR sec. 2.758(b)." That regulation establishes explicit procedures for petitioning that a Commission regulation be waived. OCRE has made no attempt to comply with those procedures.

Contention 9(4) (Cooling Tower Asbestos). Tr. 364.

Sunflower was unable to provide a basis for this contention. Tr. 364.

Contention 9(5) (Porous Concrete). Tr. 364-5.

Sunflower had no response to Applicants' May 22 briefs.

Contention 9(6) (Operations of Davis-Besse). Tr. 365.

The last two sentences of Contention 9 relate to the operation of the Davis-Besse facility. Sunflower withdrew that contention. Tr. 365.

Contention 10 (Decommissioning). Tr. 365-72.

Sunflower added nothing, and had no response to Applicants' May 22 brief on this contention. Sunflower clarified that the last allegation in the contention, that Applicants have "failed to establish satisfactorily financial protection to protect the public during the decommissioning process", is the same issue as that raised in Sunflower's Contention 2. Tr. 371-2.

Contention 11 (ECCS Testing). Tr. 372-387.

In this contention, Sunflower lists five ECCS areas or items which they allege "have not been completely tested." As stated in Applicants' brief, this contention is an impermissible challenge to the Commission's regulations in 10 C.F.R. §50.46 and Appendix K to Part 50.

Section 6.3 of the FSAR, Vol. 12, contains a description of the Perry ECCS and design bases, including a discussion of the system design and performance evaluation. In section 6.3.1.1.1, the FSAR states:

> The functional requirements (for example, coolant delivery rates) specified in detail in Table 6.3-1 are such that the system performance under all LOCA conditions postulated in the design satisfies the requirements of paragraph 50.46. "Acceptance Criteria for Emergency Core Cooling System for Light Water Cooled Nuclear Power Reactors" of 10 C.F.R. 50.

In section 6.3.3, "Performance Evaluation," the FSAR states that:

> The performance of the ECCS is determined through application of the 10 C.F.R. 50 Appendix K evaluation models and then showing conformance to the acceptance criteria of 10 C.F.R. 50.46. NEDO-20566 (Reference 1), "General Electric Company Model for Loss-of-Coolant Analysis In Accordance with 10 C.F.R. 50 Appendix K" provides a complete description of the methods used to perform the calculations. These methods are summarized herein.

Thus, section 6.3 of the FSAR describes how the Perry ECCS meets the NRC's performance standards embodied in its regulations. At the Special Prehearing Conference, Sunflower was unable to point out any aspects of the regulations which it alleged would not be met by the Perry ECCS. Tr. 383-85.

Sunflower stated that the basis for the contention was section 1.5.1.2 of the FSAR (Vol. 1). Tr. 373. Nothing in that section (or elsewhere) suggests that NRC's ECCS regulations are not being met, or even that completion of the tests is required for licensing the plant.

Sunflower has provided no bases for its Contention 11.

Contention 12 (Cooling System Cracks and Corrosion). Tr. 327-91.

Sunflower withdrew this contention in favor of OCRE's Contention 13. Tr. 391.

Contention 13 (BWR Scram System). Tr. 391-3; 394-7.

Sunflower was unable to explain this contention, provide a basis, or respond to Applicants' May 22 brief. Tr. 396-7.

Contention 14 (Airplane Crash Probabilities). Tr. 397-410.

In its original contention, Sunflower alleged that an unidentified airport near the plant "intends to expand," and that the probability analysis in the FSAR for airplane crashes does not account for the increased air traffic. At the Special Prehearing Conference, Sunflower identified the airport as the Lost Nation Airport, Tr. 397, but provided no additional information. Sunflower did not elaborate on the extent of the expansion, nor did it explain how an expansion of activities at the Lost Nation Airport would adversely affect Applicants' analysis.

The FSAR describes Lost Nation Airport as being 15 miles southwest of the plant site, with an estimated annual activity of about 70,000 movements. The airport management would like to continue to expand operations at Lost Nation, but no definite growth plans are anticipated at present. FSAR, §2.2.2.5, pp. 2.2-11 - 2.2-12 (Vol. 1).

The crash probability analysis is found at section 3.5.1.6 of the FSAR, pp. 3.5-11 - 3.5-11a (Vol. 6). It was performed in accordance with the NRC's standard criteria for determining air crash probabilities as outlined in the NRC's Standard Review Plan 3.5.1.6. According to the NRC criteria, an airport more than 10 miles away from a plant does not contribute significantly to the air crash probability for the plant unless it has more than $1000d^2$ movements per year, with d being the distance from the site in miles. For the Lost Nation Airport, the limiting amount of activity would be $1000 \times (15)^2$ or 225,000 movements. This is over 300 percent of the current level of activity at Lost Nation.

These figures were discussed at the Special Prehearing Conference. Sunflower had no response. Tr. 408-10. Sunflower has not met the requirements of 10 CFR §2.714 as to this contention; it should be denied.

Contention 15 (Anticipated Transients Without Scram). Tr. 414-18.

Sunflower provided no new relevant information pertaining to this contention. Applicants would note, however, that ATWS is now the subject of an on-going rulemaking proceeding. Subsequent to the Special Prehearing Conference, the Commission, on June 16, 1981, voted to publish for comment its rulemaking proposals.

Contention 16 (Electrical Wiring). Tr. 418-19.

This contention was withdrawn by Sunflower. Tr. 418-19.

Contention 17 (Containment Vessel Buckling). Tr. 419-30.

Sunflower shed no additional light on this contention. As to Sunflower's allegation that final testing of the containment vessel had not yet been conducted, Sunflower had no basis for suggesting that the tests would be improperly conducted, or that there was reason for concern about the outcome of the tests. Tr. 421-22. Sunflower was not even able to identify the tests it had in mind. Tr. 429-30. Applicants continue to object to this contention for lack of basis.

Contention 18 (Control Rod Ejection). Tr. 430.

The contention was withdrawn by Sunflower. Tr. 430.

Contention 19 (Cooling Lake). Tr. 430.

The contention was withdrawn by Sunflower. Tr. 430.

Contention 20 (ECCS Pump Sunction Line). Tr. 431-34.

Sunflower provided no new information. The contention alleged a blockage of water which would cause the emergency sump pump to operate unreliably. The Perry containments do not have sump pumps, and Sunflower was unable to explain where they thought the blockage would occur. Tr. 434. The contention must fail for lack of basis.

Contention 21 (Diesel Generator Reliability; See also OCRE Contention 2). Tr. 434-35, 437-43.

Neither Sunflower nor OCRE provided additional information. Applicants object to both contentions for the reasons stated in Applicants' May 22 briefs. It should be noted that the Commission decision reviewing Florida Power & Light Co. (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-603, 12 NRC 30 (1980), was issued on June 15, 1981. CLI-81-12, 13 NRC _____. ALAB-603 was cited by OCRE as support for its contention. The Commission decision did not address diesel generator reliability per se, but held that ALAB-603 did not establish station blackout as a design basis event.

Contention 22 (Valve Indication) and 23 (Coating and Cleaning Stainless Steel Components). Tr. 443.

Both contentions were withdrawn by Sunflower. Tr. 443.

II. CONTENTIONS OF OHIO CITIZENS FOR RESPONSIBLE ENERGY

Contention 1 (Clam Biofouling) Tr. 444-445, 538-545.

OCRE's Contention 1 raises the issue of certain Asiatic clams (corbicula fluminea) causing biofouling in the Perry units' "source of process water". Applicants' May 22 brief pointed out that OCRE had provided no basis for the presence of corbicula in the vicinity of the Perry facility. OCRE's June 10 brief merely

> declares the statement that "[t]here is at least a fifty percent chance that Lake Erie is suitable of [sic] corbicula" is based upon the research of Jeff Alexander of the University of Dayton.

We are left to wonder as to the nature and applicability of this research, and how it can serve as a basis for alleging that the area of Lake Erie in the vicinity of the Perry facility might be suitable for corbicula growth.

Applicants respectfully submit that an adequate basis for the contention has not been provided.

Contention 2 (Diesel Generator Reliability).

See discussion of Sunflower Contention 21.

Contention 3 (Radiation Blocking Agent) Tr. 559.

This contention was accepted by Applicants and the Staff.

Contention 4 (Steam Injury) Tr. 446-447, 559-560.

Applicants' objection to this contention was based on its lack of any relevance to the Perry facility in that it dealt with a pre-operational event involving a pressurized water reactor, prior to fuel loading, involving (according to OCRE) "technicians and maintenance workers." OCRE's June 10 brief (p. 3) now asserts that

> The issue is neither site- nor reactor-specific. It is a generic technical safety issue, i.e. steam valve maintenance programs are common to all LWR's.

OCRE fails to provide any basis for this unsupported assertion.

OCRE's June 10 brief states, without explanation or support, that the "technicians and maintenance workers" injured in the Sequoyah accident, while not reactor operators, were "vital in the event of problems arising outside the control room." Again, OCRE has provided no indication that the injured workers at Sequoyah were in any way a part of the plant staff involved in operating that plant. As noted in Applicants' May 22 brief, the accident at Sequoyah occurred before fuel loading. Tennessee Valley Authority has informed Applicants that the individuals involved in the accident were not in fact a part of the plant staff, but instead were TVA craft workers involved in the construction of the plant and not its operation.

OCRE's June 10 brief also raises at least one new issue, clearly outside the scope of its original contention 4. OCRE now

> suggests that unplanned steam discharges can harm the fittings and seals within the valves.

OCRE then suggests "internal inspection [of valves] prior to reconnection to the pressure boundary." This claim is unrelated to OCRE's original contention 4, which dealt with the question of personnel loss from steam accidents. Aside from the absence of any showing of good cause for belatedly raising this issue at this time, the lack of any relevance between this new assertion and the Sequoyah accident underlying OCRE's original claim, and the failure to provide a basis, this claim is also a challenge to the Commission regulations. See 10 CFR §50.55a(g)(3)(iii)-(v), which references Section XI of the ASME Boiler and Pressure Vessel Code. For all these reasons this new issue should be rejected.

Contention 5 (Hydrogen Bubbles) Tr. 561-562.

See discussion of Sunflower Contention 7.

Contention 6 (Reactor Pressure Vessel Cracking) Tr. 562-569.

Applicants' May 22 brief pointed out that this contention must be rejected for violating the Commission's Indian Point

rule. Consolidated Edison Co. of New York (Indian Point Unit No. 2), CLI-72-29, 5 AEC 20 (1972). Neither OCRE's arguments at the Special Prehearing Conference nor its June 10 brief made any attempt to provide the "special circumstances" required by Indian Point. Nor has OCRE provided any specificity as to the alleged defects in the pressure vessels or the tests that are performed. And OCRE has also failed to show why the contention is not a challenge to the Commission regulation setting forth the requirements for in-service inspection programs.

OCRE's June 10 brief merely argues that the Perry pressure vessels would break before they would leak, thus negating an in-service inspection program based on moisture detection devices. The relevance of the chain of argument is that

> OCRE assumes Applicant's inservice inspection program will rely chiefly on moisture detection devices to alert operators of cracks.

OCRE June 10 brief, p. 5 (emphasis added). OCRE provides no basis for this assumption, which in fact is false. As Applicants' pointed out in their May 22 brief, the requirements for the in-service inspection program for the reactor pressure vessels are specified by Commission regulation, 10 CFR §50.55a(g)(3), which in turn references Section XI of the ASME Boiler and Pressure Vessel Code. Section XI provides that the in-service inspection program will utilize a material surveillance program (see FSAR, vol. 11, §5.3.1.6) as well as volumetric (ultrasonic), surface penetrant, and visual

examinations (see FSAR, vol. 11, §5.2.4). See Section XI, Table IWB-2600-1.

OCRE's June 10 brief repeats, without further elaboration, the claim in its original contention that Applicants might not be able to repair any cracks found in the pressure vessels after irradiation and that Applicants "should identify the technology/procedure [they] will rely on to affect such repairs." In fact Applicants have identified these procedures. As stated in the FSAR, vol. 11, §5.2.4, p. 5.2-36,

> The repair procedures for Class 1 components will comply with the requirements of Article IWB-4000 of Section IX [of the ASME Boiler and Pressure Vessel Code].

The reactor pressure vessels are Class 1 components. FSAR, vol. 11, p. 5.2-37.

Contention 7 (Premature Decommissioning).

See discussion of Sunflowe. Contention 2.

Contention 8 (Computer Surveillance of Reactor Pressure Vessel) Tr. 569-571.

OCRE did not respond to Applicants' opposition to this contention, either at the Special Prehearing Conference or in its June 10 brief.

Contention 9 (Machining Defects in Reactor Pressure Vessel) Tr. 571-573.

OCRE's only elaboration of this contention was the statement that

> OCRE essentially wants to know what tests will be performed on the pressure vessel and there must be evidence that these tests will be proper tests.

Tr. 571. As pointed out in Applicants' May 22 brief, p. 13, further testing is already provided for and will be carried out in accordance with applicable ASME Code requirements. OCRE has not even alleged that this testing is inadequate, let alone provided a basis for that allegation.

Contention 10 (Demonstrable Need).

See discussion of Sunflower Contentions 3-5.

Contention 11 (Plant site) Tr. 573-590.

See discussion of Sunflower Contention 9(3) with respect to Contentions 11(a) and 11(b). With respect to Contentions 11(c) and 11(d), OCRE provided no responses to Applicants' opposition, either at the Special Prehearing or in its June 10 brief.

Contention 12 (CANDU Alternative) Tr. 590-594.

OCRE has provided no new arguments in support of this contention.

Contention 13 (Pipe Break - Scram Discharge Volume). Tr. 594.

This contention was admitted by the Licensing Board. Tr. 594.

III. CONTENTION OF TOD KENNEY

Kenney presented a fourteen-part contention orally, for the first time, during the second day of the Special Prehearing Conference. Tr. 595-603. Applicants requested, and the Licensing Board agreed, that Kenney be required to submit his contention in writing, along with the bases therefore, to give the other parties opportunity to respond. Tr. 603-7. In addition, the Licensing Board required Kenney to provide a showing of good cause as to why the contention was being submitted so late. Tr. 596.

On June 8, 1981, Kenney submitted a document entitled, "Intervenor's Amended Contention," which was a list of fourteen items related to Applicants' emergency plan contained in Appendix 13A of the FSAR, Volume 16. The only reason cited by Kenney as cause for the belated submission of his contention was an article from the May 16, 1981, Pittsburgh Post Gazette concerning "new research on the recalculation of the effects of nuclear radiation on people done by Dr. Edward Radford." The prehearing conference brief which the Licensing Board directed

the parties to file--and which Kenney did not file--was due on May 26, 1981. Kenney's failure to explain why this "new information" was not raised in the May 26 briefs or at some time prior to June 8 remains unexplained. Kenney's last minute citation of the Radford information can hardly constitute good cause for his subsequent lapses.

Furthermore, the Radford information has no bearing on evacuation plans -- the subject of the contention. Kenney's June 8 filing describes the new information as follows:

> Dr. Radford believes that the probabilities for contracting any form of cancer after irradiation will be quadrupled.

Yet evacuation requirements are not dependent on the results of Dr. Radford's "new research." Rather they are established by NRC regulation, 10 CFR §§50.33(g), 50.47(c)(2), 50.54(s)(1), and Appendix E to Part 50, and by statute, NRC Authorization Act for Fiscal Year 1980, Pub. L. No. 96-295. Thus, any challenge to the NRC's evacuation requirements is a challenge to NRC regulations and Congressional mandate not appropriate in this proceeding.

Finally, the "new information" is largely unrelated to the contention. At the prehearing conference, Kenney stated that, "a majority of these points I bring up are concerning new information," Tr. 596-97, and in his filing he stated that "many of the concerns deal directly with new information."

However, only four of the fourteen items presented (items 1, 4, 5, 6) even assert a relationship to the "new information." Kenney makes no attempt to show how Dr. Radford's dissenting views on the effects of radiation form a basis for, or even relate to, these parts of his contention for which he cites "new information." Thus, the article concerning Dr. Radford falls far short of constituting a showing of good cause for Kenney's untimely contention.[17]

Following are discussions of each of the fourteen items of Kenney's contention.

1. Kenney alleges that the definition of "Affected Person," FSAR, App. 13A, §1.0(2), p. 1-1, Vol. 16, is deficient, requires recalculation, and renders Applicants' emergency plan "fatally defective." The definition reads as follows:

> 2. Affected Person - Individual who has been physically injured or radiologically exposed as a result of an accident to a degree requiring special attention, e.g., first aid, or personnel decontamination.

---

17 As will be discussed below, Kenney's allegations are so lacking in specificity, as well as being deficient in other respects, that the Licensing Board need not address the merits of the "new information" brought forth by Kenney. At the special prehearing conference, Kenney cited an article in the May 22, 1981, issue of Science, Tr. 596-7, which discussed the views of Dr. Edward Radford on the risks associated with exposure to radiation. A follow-up article in the June 19, 1981, issue of Science discussed the reactions of Dr. Radford's peers to his ideas, and put a rather different light on the information relied upon by Kenney. Science reported much disagreement with Dr. Radford's theories, and no support. Copies of both articles are attached as Attachments 2 and 3.

Kenney has not explained how or why this definition, as used in the emergency plan, causes the plan to be fatally defective. There is nothing to recalculate, as alleged by Kenney, because the definition does not involve a calculation. Kenney also alleges that the definition does not state how decontamination will be "facilitated." The purpose of a definition is not to explain how an action (i.e., decontamination) is to be facilitated. The contention makes no sense.

Since Kenney has not explained how the definition adversely affects the emergency plan, and has provided no basis for such an explanation, the contention should not be admitted.

2. This contention says simply that the definition of "Contaminated Are ", Id., §1.0(10), p. 1-2, is "deficient." Kenney does not explain how, why, or in what respects the definition is deficient. Nor does he provide a basis. Also, as in item 1 above, he has not explained how or why the definition renders the plan defective. Applicants object to this contention for lack of specificity and basis.

3. Kenney here alleges that the definition of "Dose Projection," Id., §1.0(14), p. 1-2, is deficient because it is not calculated with off-site monitors with "continuous readout of current ionizing radiation." Kenney appears to have misread the definition. What Kenney is describing is a current measurement of dose, not a projection of dose. The dose projection, based on the types and quantities of radioactive materials released and the appropriate meteorological transport

and dispersal parameters, is used to estimate and predict in advance the doses that may subsequently occur for purposes of determining the appropriate protective action to be taken. Kenney has given no explanation of why the definition of dose projection is deficient, and how such deficiency affects the emergency plan.

4. This contention alleges that the definition of "Emergency Action Levels," Id., §1.0(15), p. 1-3, is deficient and should be "recalculated." Applicants' definitions are in accordance with 10 C.F.R. Part 50, App. E, ¶IV(c) and, as cited in the definition, the emergency action levels are consistent with Appendix 1, "Basis for Emergency Action Levels for Nuclear Power Facilities," to NUREG-0654/FEMA-REP-1, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November, 1980. Kenney has failed to explain which levels are deficient and why. The contention is unmanageable; it lacks basis and specificity, and must therefore be disallowed.

5. Kenney next alleges that the definition of "Plume Exposure Pathway", Id., §1.0(36), p. 1-5, is deficient, and "that the pathway would have to be enlarged." In addition to the fact that Kenney does not explain how it is deficient, or give the basis for this proclamation, the definition of the plume exposure pathway emergency planning zone is contained in

the Commission's regulations at 10 C.F.R. §§50.33(g), 50.47(c)(2), 50.54(s)(1) Appendix L. Thus, the contention lacks basis and specificity, and is an impermissible challenge to the Commission's regulations.

6. This contention alleges that the definition of "Protective Action Guides", Id., §1.0(42), p. 1-6, is deficient, and that the guides have to be "recalculated." Again, Kenney has not related the definition to the emergency plan, has not explained how the definition renders the emergency plan defective, has not identified the deficient guides, has not explained how any such guides are deficient, and has provided no basis for the allegation. The contention must be rejected for lack of specificity and basis.

7. In item 7 of the contention, Kenney seems to be making two separate allegations with respect to the emergency planning zones (EPZ). The first allegation is that the plume exposure pathway EPZ must be "changed and enlarged." As discussed in response to item 5 of Kenney's contention, above, the EPZ is defined in the Commission's regulations, and this allegation is therefore an impermissible challenge to the regulations.

The second allegation is somewhat confusing. Kenney alleges that the monitoring program in the second EPZ, or ingestion pathway EPZ, should include human monitoring. The

monitoring program is set up to monitor crops, dairy cows, water, and other relevant components of the ingestion exposure pathway to detect increased levels of I-131 as early as possible in the food chain. Its purpose is to detect contamination prior to ingestion so as to prevent exposure to humans, not to use humans as a monitoring indicator. Applicants' monitoring program is in accord with the criteria in NUREG-0654, FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," which is incorporated into the Commission's emergency plan regulations, 10 C.F.R. §50.47(b). Kenney has given no explanation or basis for his contention that Applicants' emergency plan is defective because humans are not used as monitors in the ingestion pathway EPZ.

8. Kenney here states that Applicants' "Emergency Classifications" are defective, but lists only one alleged defect, i.e., that Applicants make no mention of deploying monitoring teams during a Classification 2 emergency (Alert). Kenney has apparently overlooked the descriptions of assessment actions in the FSAR, App. 13A, §6.2, Vol. 16. At §6.2.2, p. 6-8, the FSAR states that radiation monitoring teams will be dispatched for Alert classification emergencies. The contention therefor lacks basis and should be excluded.

9. Kenney alleges that the off-site monitoring program should include monitors which provide continuous readout

indications. Kenney gives no explanation of why this is necessary, or even preferable, as compared to the off-site monitoring program described in the FSAR. Applicants' monitoring program conforms to the criteria in NUREG-0654, FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," which is incorporated into 10 C.F.R. §50.47. The emphasis there is on the ability to predict and project doses based on meteorological data and effluent release data so as to determine the appropriate corrective action to take. The information provided by fixed monitors would not leave time to implement protective actions. To the extent instantaneous readouts are necessary, e.g., to confirm projected dose rates, mobile teams will be dispatched to the appropriate areas. Fixed monitors which may or may not be within the plume area on a given day cannot be relied upon for this information. This contention should be disallowed for lack of basis.

10. Kenney next alleges that Applicants should provide for stockpiling potassium iodide at two hospitals. Applicant have previously agreed to the admission of a similar contention (CCRE Contention 3). However, for the reason discussed earlier related to lack of timeleness and failure to make a showing of good cause, Applicants object to the admission of this contention.

11. Kenney alleges that the emergency plans are "fatally defective" because agreements with local communities are not "formally reached and therefor not binding." Kenney fails to tell us which agreements he believes are not binding and why that renders the plan fatally defective. The contention must be rejected for lack of basis.

12. Kenney's next allegation is that the plan is "fatally defective" because there is no provision for "payment to local communities for planning or maintenance of the evacuation plans." Nowhere is there a requirement of either NRC or the Federal Emergency Management Agency for payment to be made to local communities. The contention is outside the scope of this proceeding. Furthermore, Kenney has provided no explanation as to why such payments are required.

13. The next allegation is that Applicants "may suffer financial difficulty and would therefore be hampered in safely operating the nuclear facility." Kenney states that the "Muny Light anti-trust suit case" would be "a factor which would influence this." This allegation has nothing to do with evacuation plans, supposedly the subject of this contention. Applicants have objected to a similar contention (Sunflower Contention 2) as discussed earlier in this brief. Kenney's allegation is even more amorphous. Kenney has provided no explanation as to why the "Muny Light anti-trust suit case" would conceivably impact on the safe operation of the Perry

facilities. Applicants object to this contention on the grounds that it lacks both basis and specificity.

14. The last allegation, that the human population is not part of the radiological monitoring program, is essentially the same as item 9 above, and is inadmissible for the same reasons.

Respectfully Submitted,

SHAW, PITTMAN, POTTS & TROWBRIDGE

By _____
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Washington, D.C. 20036
(202) 822-1000

Dated: July 6, 1981

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ATTACHMENT 1

MAR 5 1980

The Honorable John Glenn
United States Senate
Washington, DC 20510

Dear Senator Glenn:

This is in response to your letter dated November 29, 1979, which requested that the NRC review and reply to a letter from Mr. Daniel D. Wilt concerning the construction of the Perry Nuclear Power Plant. In his letter Mr. Wilt raised specific questions regarding the construction practices of the licensee, Cleveland Electric Illuminating Company (CEI), and the inspection approach used by the NRC at Perry.

With regard to the Commission practices concerning correction of construction defects, it is NRC policy that construction defects be corrected prior to issuance of the Operating License. Defects found during inspections are brought to the licensee's attention through formal enforcement actions, which may take the form of written notices of violation or agreements to stop-work depending on the severity of the defects.

Mr. Wilt's letter discussed the Immediate Action Letter of February 8, 1978 issued by our Region III office which confirmed halting of safety related construction activities at the Perry site and the steps to be completed prior to resumption of work. This Immediate Action Letter resulted from findings of significant deficiencies in site construction practices and the Perry Quality Assurance Program during Region III inspections in January and early February 1978. Following issuance of the Immediate Action Letter our Regional Director met with the President of CEI to discuss the importance of top management involvement in the Perry project and the need for broad and timely corrective action. Subsequently, CEI took aggressive actions to correct deficiencies, including a complete revision of the Perry Quality Assurance Program from the corporate level to the detailed site working procedures; a restructuring of the QA/QC organization, including the replacement of a number of management level QA/QC personnel with more capable individuals; a major change in the site construction organization to provide more effective control of site contractors; and transfer of the engineering and scheduling functions and personnel from the corporate headquarters to the site. Our Region III office instituted an augmented inspection program for the Perry plant to review in detail the revised QA program, to assure that the requirements of the new program were effectively implemented, and to assure that the construction which had been completed under the previous program was acceptable.

Inspections subsequent to the issuance of the Immediate Action Letter indicate that the performance of CEI improved measurably. This is evidenced by the fact that 36 noncompliances were identified by Region III at Perry in 1978 (22 of which were cited in the first six months), and only nine noncompliances were found in 1979.

In Mr. Wilt's reference to the July 1979 inspection, he stated that the report noted a "complete breakdown in the inspection verification program by CEI." The NRC inspection report referred to one specific site contractor, Newport News Industrial Corporation (NNIC), and did not refer to a complete breakdown of the CEI program. Both CEI and NRC identified problems with the NNIC work at Perry during early 1979, and were working to correct the problems. In September 1979, CEI stopped all NNIC on-site work and cancelled the NNIC contracts for installation of the Nuclear Steam Supply System (NSSS). In October 1979, CEI contracted with General Electric (the NSSS equipment supplier) to complete the NSSS installation work, which is now approximately 20 percent complete. The NSSS installation work has been stopped since September, while CEI and NRC assure that the General Electric work procedures are acceptable and that GE has assigned qualified personnel to perform the work.

Mr. Wilt's letter also raised questions concerning the NRC's inspection program, particularly with regard to the fact that the NRC inspectors do not observe all site construction activities. As explained to Mr. Wilt during his November 1978 meeting with Region III personnel, the purpose of the NRC inspection program is to provide assurance, through a sampling inspection program, that the licensee and its contractors are performing safety-related construction and inspection activities in accordance with NRC requirements. This is done through reviews of the licensee and contractor quality assurance programs and selected work procedures; review of the qualifications of selected personnel performing construction and inspection activities; and by direct observation of certain construction and inspection activities. The areas selected for review and observation by the NRC inspectors are determined by established NRC inspection procedures and by the judgment of the inspectors, based on their experience and training in specialized technical areas and on their knowledge of problems which have been identified at other sites. When problems are noted, the inspection sample is broadened.

Mr. Wilt refers to a 1978 GAO study as indicating that the NRC sees only 7 percent of the actual construction. This, in fact, is not what the GAO report states. Rather, GAO reported that inspectors spend about 7 percent of their inspection time observing tests. Mr. Wilt failed to recognize that additional inspection time is devoted to observing completed construction and work in progress. Our records show that more than 25 percent of the NRC inspectors' time at the Perry site during the 18 month period discussed in Mr. Wilt's letter was spent in observation of work activities. In view of the need to review in detail all of the completely revised site QA programs and work procedures during the same period, 25 percent is considered an appropriate allocation of the inspectors' on-site time for observation of work activities.

The NRC observes those activities that are considered to be most important to safety. It turns out that the NRC observes less than 1 percent of all of the work that takes place on-site.

The NRC's approach to safety is not dependent on 100 percent observation of work by NRC. NRC requires that a formalized quality assurance program be implemented by the licensee and that the licensee audits the effectiveness of that program. Supplementing the inspection approach previously described is the redundancy designed in safety systems. In addition, all safety related components and structures are tested prior to the start of operations, and the testing program continues through the life of the plant. Many of these tests are observed and reviewed by NRC inspectors.

The NRC Resident Inspector Program presently provides for placing a full-time resident inspector at the Perry Site in mid-1980. That move will increase the number of direct inspection hours. The resident inspector will continue to be supported by specialist inspectors from the Regional Office.

I hope this will be useful in responding to Mr. Wilt's inquiry. Please contact this office if we can be of any further assistance.

Sincerely,

/s/

William J. Dircks
Acting Executive Director
for Operations

bcc:
Cleveland Electric and Illuminating Co.
P.O. Box 5000/55 Public Square
Cleveland, Ohio 44202
ATTN: Mr. D. R. Davidson, Vice President, Engineering

EDO

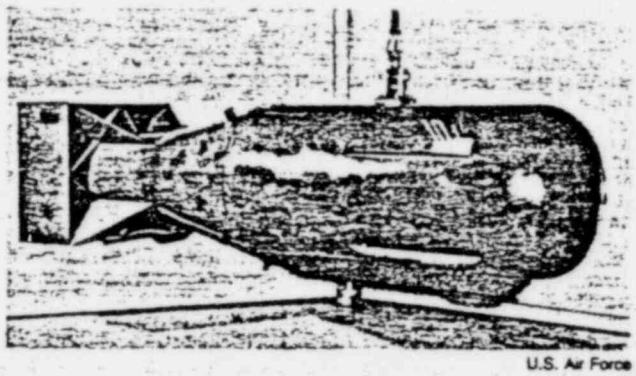
WPU:DLM	RCI:IE	A/D:RCI:IE	D:RCI:IE	ELD	A:DD:IE	D:IE
2/20/80	REShewmaker	GWReinmuth	HDFreeburg	JMurray	DThompson	VStello
Job F	2/21/80	2/ /80	2/21/80	2/22/80	2/ /80	2/ /80

ATTACHMENT 2

New A-Bomb Studies Alter Radiation Estimates

The basis of 15 years of radiation research may be in error; radiation toxicity may be understated

Some of the most important data on the effects of nuclear radiation on humans may be wrong, according to new research being done at the Lawrence Livermore weapons laboratory in California and the Oak Ridge National Laboratory in Tennessee. The new findings are far from welcome, as one consultant in this work says, for all the revisions "are moving in the wrong direction"—a direction that will worry the advocates of nuclear power. Government physicists have recalculated the data on the radiation fields created by the atomic blasts at Hiroshima and Nagasaki and produced some unexpected results. Their statistics show that most of the cancer caused by those bombs came from low LET gamma rays,* suggesting that this common type of radiation is more hazardous than had been assumed before.



U.S. Air Force

Did it produce neutrons or mostly gamma rays?

Duplicate of the bomb that hit Hiroshima

The impetus for the revision comes primarily from Livermore, where physicists William Loewe and Edgar Mendelsohn last year used a computer to reconstruct the two explosions. Their findings are being checked and complemented by a group at Oak Ridge led by George Kerr. He began work on a similar project in 1977, shelved it, and then returned to the task in earnest when Loewe's data became known. Dean Kaul of Science Applications, Inc., in Chicago also carried out some early calculations that sparked interest in the issue. Kerr, Kaul, and Jess Marcum of Research and Development Associates in Santa Monica, California, have been funded by the Defense Nuclear Agency to explore the problem and check some of the old assumptions which have not yet been reexamined.

Although they differ in some of the details they stress, all of these scientists agree that the accepted figures for high LET (neutron) radiation at Hiroshima are grossly overstated. For example, the neutron radiation at a distance of 1180 meters from the epicenter of the blast appears to have been overestimated by a factor of 6 to 10. Since the effects on human health remain the same, one must conclude that the gamma rays were more toxic than had been thought.

If this research proves correct—and it has survived a few peer challenges already—it will necessitate the rewriting of many basic documents on the hazards of radiation, including the chief attempt to define such risks published in 1980 by the National Academy of Sciences. That study, the work of the Committee on the Biological Effects of Ionizing Radiation (the BEIR report), was fraught with controversy on this very question.

Although much of the BEIR report was released to the press in May 1979, the Academy decided to recall and rewrite it because of dissension among the authors. Some of them, led by Columbia University biophysicist Harald Rossi, argued that the paper overstated the cancer-causing effects of low LET radiation. Their arguments leaned heavily on Japanese data and particularly on the thesis that many of the cancers in Hiroshima were produced by high LET neutron radiation.

Using the old Hiroshima radiation data as evidence, Rossi argued that the BEIR committee should lower the cancer risk estimates published in an earlier BEIR report in 1972. Instead, the committee raised the risk estimates. Rossi considered this an alarmist move and withdrew his support from the document. In the end, the Academy felt compelled to write a report that effectively split the difference between Rossi's point of view and that of his chief adversary, the committee chairman, Edward Radford, an epidemiologist at the University of Pittsburgh. The risk estimates in the final report of July 1980 were not as high as Radford argued they should be nor even as high as those in the 1972 report. Neither Radford nor Rossi endorsed the document.

Rossi concedes that the Livermore calculations may do away with the evidence for his theory that neutrons were responsible for the high cancer incidence in Hiroshima. But he does not expect to alter his general view that the hazards of radiation are exaggerated. Radford, in contrast, says the new Hiroshima data vindicate his position and invalidate Rossi's. Furthermore, Radford considers the BEIR 1980 report obsolete and expects that the probabilities it gives for the risk of dying of cancer after exposure to gamma radiation will be doubled. Likewise, he thinks the probabilities for contracting any form of cancer after irradiation will be quadrupled.

The importance of the new research is that it completely changes the scheme of radiation doses that people are supposed to have received in Japan, particularly in Hiroshima. Until now, it was thought that the Hiroshima blast was unique in that it produced a large field of fast neutrons, a high LET form of radiation. Neutron radiation is considered more dangerous than low LET radiation, a category that includes x-rays, electrons, and gamma rays. Its singular presence in Hiroshima was said to make the cancer risk found there anomalous. Most of the radiation people encounter is not of this kind. The wastes from nuclear reactors, for example, emit gamma rays. Thus, a

*The terms "low LET" and "high LET" (for linear energy transfer) refer to the physical quality of the ray. Low LET radiation loses relatively little energy as it travels along its course, and includes electrons, gamma rays, and x-rays. High LET radiation loses energy more rapidly as it travels, and includes beams of neutrons and protons.

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number of scientists have always considered Hiroshima a special, high-risk case, and in studying the peacetime hazards of radiation, they have discounted some of the cancer data from that city.

As it happens, the cancer mortality data from Hiroshima are the most valuable in the world. Unlike the data from Nagasaki, they are abundant enough to reveal a clear relationship between doses of radiation received and ill effects. That relationship is defined by a linear equation: an increase in dose above the natural background radiation correlates with a proportional increase in ill effects. The pattern suggests that any increase in radiation, no matter how small, directly increases the risk of getting cancer. The mortality data from Nagasaki are sketchier, making them susceptible to a variety of interpretations. The significant point is that if the new bomb calculations are accurate, the data from Nagasaki and Hiroshima can be combined and treated as a single, coherent pattern of response to low LET radiation. It is too early to say precisely what that pattern will look like, because now the doses must be recalculated for each radiation victim. But most of the researchers who spoke to *Science* said the new data would probably increase the risk estimates for gamma radiation.

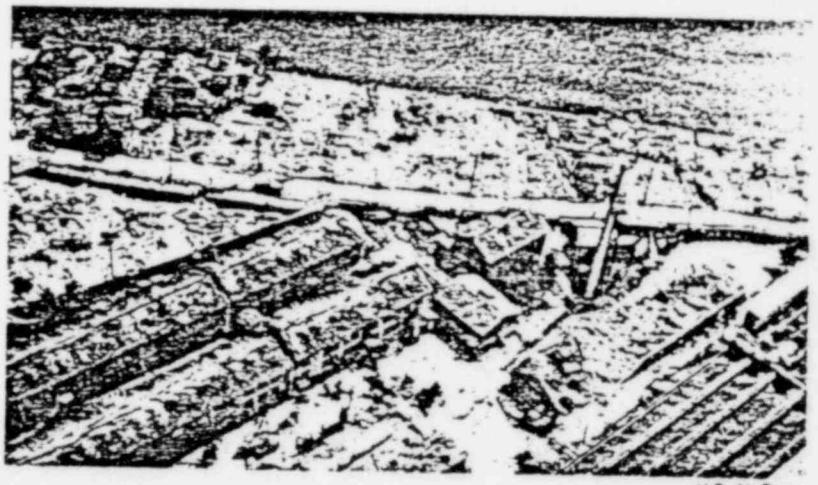
Radford, an advocate of this point of view, claims that the argument over Hiroshima and its mortality data has been a distraction from the main body of scientific evidence. He says the 1980 BEIR report miscalculated in emphasizing mortality data so heavily, for death certificates do not give a very accurate reading of the number of cancers or even cancer deaths in a community. Radford thinks it was a mistake to pay so much attention to Rossi's theory about deaths in Hiroshima, for he claims the theory is contradicted by "90 percent" of the epidemiological data on record. He is pleased that the Hiroshima data may now look consistent with all the rest.

"The implications are far reaching for health regulation and nuclear power in this country in general," says David Auton, a physicist in the office of target and damage assessment of the Defense Nuclear Agency. His office is funding the research at Oak Ridge that may confirm the new dose estimates. As he describes the situation, the health physics community faces a nasty dilemma, if the new bomb data are accurate. On one hand, the standard-setters may adhere to Rossi's principle, which maintains that many of the cancers produced in Hiroshima were caused by fast neutrons. But the number of neutrons thought to have been present is now so small that one must account for their effects by increasing the estimate of their potency. The resultant killing power of neutrons is "incredible," Auton says. Industrial safety rules would have to be revised, reducing exposure limits for neutron radiation to one-tenth of the present limits. For critical jobs, companies would have to employ ten times as many people.

On the other hand, the health physics community may abandon the Rossi principle and conclude that nearly all the cancers in Hiroshima were produced by gamma rays, not neutrons. That news will not be welcome either.

Auton wishes frankly that someone else were funding this research, which he thinks is important for future health and energy policy. His office is doing it because "nobody else was interested." The controversy has been brewing for at least 4 years, for that is how long it has been since a government consultant first raised serious questions about the validity of the Hiroshima data. According to Auton, however, it was just 5 months ago that he was approached by Harold Wyckoff, chairman of a special committee assigned to study this question for the National Council on Radiation Protection and Measurements. It is a private organization that collects and publishes radiation risk information. Since no other agency would fund the research, Auton says, he agreed to have the Defense Department pick up the tab for work being done at Oak Ridge, and thus come up with some answers for Wyckoff. The funding began about a month ago.

"This work is of marginal interest to us and we really can't afford to spend very much money studying civil effects," Auton says, but it is important to resolve the uncertainties. It might make more sense for the Department of Energy or the Nuclear Regulatory Commission to pay for this work, and "the electric power people really should be interested," according to Auton. It is important that the new research be credible. Auton agrees that it would be best if the sponsor were an independent group not associated with the weapons program or the nuclear industry.



U.S. Air Force

Hiroshima, 1945

Some concrete buildings survived the blast.

Arthur Upton, the former director of the National Cancer Institute and an expert in radiobiology, has followed this controversy closely since he learned of the new bomb data last fall. It is an important issue, he says, and should be the subject of more research, sponsored by a neutral scientific organization such as the joint U.S.–Japanese Radiation Effects Research Foundation. If the new dose estimates are correct, Upton says, "I am not sure one can substantiate the Rossi thesis." It may remain important for radiobiology, for there are differences in the way that plants and animals respond in the laboratory to high and low LET radiation. Upton agrees with Radford that the new data greatly strengthen the argument that there is no "safe" level of exposure to radiation, in that every incremental bit of exposure increases the chances of injury.

One of the curious aspects of this research is the manner in which it was published. The record serves as a compelling argument for declassifying as much as possible of what is done at government labs, for many of the assumptions in this case might have been challenged sooner had the underlying data been available for scrutiny.

The Rosetta stone of Japanese radiation dosimetry is known as T65D, which stands for tentative dose estimates compiled in 1965. The figures were assembled by physicist John Auxier of Oak

Ridge in a painstaking analysis of measurements made during and after the Japanese blasts, interviews with the bombardiers, and a test explosion in the Nevada desert. Some of his work was classified because it described in detail the makeup and radioactive output of the Little Boy (Hiroshima) and Fat Man (Nagasaki) bombs. Auxier's methods of computing the doses, which underlie 15 years of research on health effects in Japan, were never described in detail. In 1977, however, the government published a quasi-technical narrative by Auxier (*Ichiban*, Energy Research and Development Administration, TID 27080) giving some additional information on Auxier's methods.

As questions about these figures arose in the late 1970's, the National Council on Radiation Protection (NCRP) asked Auxier to justify his estimates with more supporting information. After working on this project for several months, Auxier explained that he could not reproduce all the data because some had been lost. He explained to *Science* that when Oak Ridge was reorganized in 1972, he was moved from one place to another, and his old classified files were left behind in his laboratory. Auxier says that the records division at Oak Ridge made a mistake in shipping the files: the valuable data were sent to the shredder.

The NCRP continued to ask for confirmation of the T65D numbers because they had become important in the debate on the hazards of radiation and because new data were becoming available. In 1976, the Los Alamos Scientific Laboratory in New Mexico, a weapons design center, released an estimate of the radioactive output of the Hiroshima bomb for the first time. The figures were not published, but given in a private letter to C. P. Knowles of Research and Development Associates, who was trying to help the Defense Nuclear Agency pin down the precise explosive power of the Fat Man bomb. This is one of the key uncertainties in the record; some say the blast equaled the power of 12.5 kilotons of TNT, and others say it may have been as potent as 15 kilotons. Several people in the weapons and biophysics community soon obtained copies of the letter, including Kerr at Oak Ridge and Kaul at Science Applications. Using the new data and computer techniques not available when Auxier did his research, Kaul and Kerr in separate projects came up with numbers that were at odds with the T65D results.

Kerr's laboratory is the best equipped and best funded for this expensive computer work, Kaul says, and for that reason it has been given the primary responsibility for reviewing the old numbers. Kerr's task is complicated by the fact that he is in a sense Auxier's successor at Oak Ridge and works just down the hall from this senior official whose work he has been asked to review.

Auxier, meanwhile, says that his data are the best available, not likely to be changed much by the work of latter-day

Technology Transfer Reappraised

Transfer of technology from industrialized countries to developing countries emerged in the 1970's as a highly charged issue in the so-called North-South dialogue. Less-developed countries protested that control of technology by the industrialized North keeps them in a state of technological dependence.

A report* just issued by the Organization for Economic Cooperation and Development (OECD) in Paris questions major assumptions on which the technology transfer debate has been conducted. It argues that technology transfer has been mutually beneficial for industrialized and for developing countries, or at least some of them.

The report notes that technology transfer has helped a group of "industrializing" developing countries to participate, on stronger terms, in the world trading system. These include Brazil, Mexico, South Korea, Taiwan, Hong Kong, and Singapore.

The report's main challenge to the notion of technological dependence is its assertion that "technological monopolies are temporary," that change is propelled by a "technology cycle." New technology introduced in one country is transferred under tight control first to other developed countries and then to less-developed countries. As licensing and sale of the technology spreads, it becomes standardized.

Proof that this process is working is seen in the rise in imports by industrial countries of manufactured goods from developing countries. Moreover, some industrializing countries are themselves exporting technology, mostly in the form of turnkey plants and equipment.

Feedback from technology transfer also affects industrial countries. The impact has been most conspicuous in the decline of traditional industries, notably clothing, footwear, and light manufacturing, that have faced offshore competition. Loss of jobs has created a protectionist backlash that includes criticism of technology transfer. But, says the report, technology transfer has benefited the United States and other OECD countries by creating export markets for their capital-goods industries during a period of slow growth.

By focusing on the industrializing countries, the report offers a selective view of the problems facing developing countries. It does note in passing that for the poorest countries, the cost of imported oil, trade deficits, and foreign debt make the outlook bleak. Even for the industrializing countries, the burden of energy costs, deficits, and debt have "led to pessimism regarding future financing of development."

The report was prepared by the staff of OECD, which is essentially a club of governments of western industrial nations plus Japan. OECD serves as a data gathering and intergovernmental policy-planning organization. It is, therefore, not surprising that the report assesses technology transfer mainly from the sellers' point of view.

In broad terms, what the report's authors say is occurring is a major restructuring of the international industrial system. For the industrial countries an "adaptive strategy" is counseled. With a two-way trade in industrial products now established, the North can retain its comparative advantage only by keeping its "innovatory capacity" at a high level. Pressure to transfer R & D activities to developing countries will build as their scientific infrastructures strengthen. The report borrows from Lewis Carroll to observe that industrial countries must "keep running to stay in the same place."—JOHN WALSH

North/South Technology Transfers: The Adjustments Ahead, Organization for Economic Cooperation and Development, Paris, 1981. $12.

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revisionists. His judgment is widely respected. As the grand old man in this field, he is in a position to influence funding decisions on new research. Auxier told *Science* there is no need for an independent review of the discrepancies between his data and Kerr's, expressing an opinion which may have made it difficult to get the present review started. Auton, the Defense Nuclear Agency official who makes the funding decisions, says that he has great respect for Auxier's work, a respect based as much on Auxier's standing in the community as on his ability to "drag out corroborative data."

Kerr has never published any of his work outside the laboratory, he says, because he prefers to be "timid" about it. Earlier controversies have taught him to move cautiously in matters as important as this, and he still thinks there could be some weaknesses in the new bomb data.

This stalemate existed for several years until the summer of 1980 when Loewe decided to rework the calculations. He started the project because the old Hiroshima data and Rossi's recent warnings about the potency of neutrons worried people in the lab. Livermore scientists are involved in weapons research and are frequently exposed to neutron radiation. They wanted to know more about the dangers. Loewe's investigation, completed last October, found both the Hiroshima data and Rossi's principle to be unsubstantiated. Loewe argues that there is no evidence showing that neutrons were present in significant quantities in Hiroshima.

Loewe, Kerr, Auxier, and others in this controversy will present their arguments at a meeting sponsored by the Radiation Research Society on 31 May in Minneapolis. Auton calls it "the beginning of an important dialogue," one which he probably will not be able to attend because the new Administration has reduced the bureaucracy's travel allowances. But Auton hopes the meeting will lead to a general and independent review of the issues. "If the weapons folks" make it a strictly internal project, he says, "I just have a concern that nobody will believe the results."

—ELIOT MARSHALL

Science Adviser Post Has Nominee in View

The job, turned down by several candidates, may now be offered to a man who is not a member of the science establishment

The choice of science adviser to President Reagan has been narrowed down to a single candidate: George A. (Jay) Keyworth, a 41-year-old physicist from the Los Alamos Scientific Laboratory. Although the job had not formally been offered to Keyworth as of this writing, Administration officials expect an announcement by the end of May, but caution that something could still go awry even at this late stage of the selection process.

When Keyworth's name came up as a potential candidate late in April, it drew a mixture of surprise and unease from the scientific establishment. The surprise stems from the fact that Keyworth is virtually unknown outside his field. And the unease is related to the fact that his candidacy was being vigorously supported by Edward Teller, the so-called "father of the hydrogen bomb," and Harold Agnew, president of General Atomics and former director of Los Alamos. Both are well known for their hawkish defense views.

Those who know Keyworth describe him as smart and personable. His research has been concerned mostly with nuclear structure and low-energy nuclear reactions, and for the past 3 years he has directed the physics division at Los Alamos. One scientific colleague, Arthur Kerman of MIT, describes Keyworth as "a very good scientist who is a lot broader than his background would indicate."

Outsider causes unease

Candidate George Keyworth

His background does not, however, include service on the usual round of government science committees. Hence he has little experience with federal science policy and has made few links to the scientific establishment. "He doesn't provide any channel between the national (scientific) community and the White House," complains one veteran of science and government affairs.

Such concerns are abruptly dismissed by Keyworth's supporters. Although he "lacks obvious credentials, that doesn't mean he will not do a superb job," says one. Agnew scoffs that "he has all the right credentials—all he doesn't have is 20 years membership in the club." In a telephone interview with *Science*, Agnew also said that he thinks much of the unease about Keyworth is simply due to the fact that he is an outsider—"If you get a bunch of chickens together and you put in a new rooster, they start clucking and running around," he remarks.

As for Keyworth's shortage of links to the scientific establishment, Agnew says that "defense will be the thrust of this Administration, and somebody who has the respect of the people in the defense labs is needed." He adds: "For the past four years, you have had a geologist in charge, and the defense community has suffered."

How did somebody from outside the traditional ranks of candidates for science adviser get selected? Keyworth says he was approached about the job early in April, and "it came as a surprise to me." The post was formally offered in March to Arthur Bueche, head of research and development at General Electric, but he was forced to turn it down for personal reasons. Several other people were subsequently sounded out about

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ATTACHMENT 3

New A-Bomb Data Shown to Radiation Experts

Conference goers are impressed with the revised picture of Hiroshima, but foresee little change in risk estimates

Minneapolis. Physicist William Loewe spoke at the annual meeting of the Radiation Research Society here on 31 May and gave the first public presentation of the work he and Edgar Mendelsohn have done at the Lawrence Livermore National Laboratory. They have drastically revised the estimates of radioactive fallout from the Hiroshima and Nagasaki atomic bombs. The most important single finding they reported was that no neutron radiation of any statistical significance was present at Hiroshima, suggesting that nearly all the bomb-related cancers were produced by gamma rays. If correct, this means there are no good human data for judging the toxicity of neutron radiation.

The audience was receptive, and several old hands said they found Loewe's work impressive. No general consensus was reached on whether or not Loewe's data should replace the old estimates of atomic radiation prepared in 1965 by John Auxier of the Oak Ridge National Laboratory.

Most of the participants agreed on one thing, however: they were unhappy with the way the news of the possible revision was reported, and they were annoyed by the interpretation given by University of Pittsburgh epidemiologist Edward Radford, who has said that it may be necessary to double or quadruple the risk figures for getting cancer after exposure to radiation (*Science*, 22 May, page 900). Speaker after speaker echoed the theme sounded early in the meeting, that not enough work has been done to permit a conclusion such as the one Radford reached. Harold Wyckoff, chairman of a task force created in 1976 expressly to review this problem for the National Council on Radiation Protection and Measurements (NCRP), said, "I would strongly disagree with anyone using this data to determine risk coefficients." It is too early to do that, he said.

Loewe agreed that it would be wrong to draw broad conclusions based on his preliminary work, but he did tell the Minneapolis *Tribune* that he thought the new data will have a negligible impact on risk figures. Others, such as Warren Sinclair, president of the NCRP and an organizer of the meeting, were stronger in their denunciation of Radford, suggesting that the new Livermore data may even make radiation look less harmful than before.

If the sponsors of the meeting were unhappy with the way Loewe's work was presented to the public, other members were as unhappy with the way the information had been circulated (or not circulated) within the community. Perhaps the most outspoken was Seymour Jablon, the National Academy of Sciences' staff officer for joint U.S.–Japanese research on late effects of atomic radiation. He is a veteran observer.

Jablon rose during the general discussion to make three points. The NCRP has known since 1976 that there might be flaws in the Japanese data, he pointed out. "Meanwhile, the EPA is busy setting [occupational radiation] standards; other people interested in standards have been making noises. It really is urgent that we get on with this job. . . . Given the unique experience at Hiroshima and Nagasaki and the tens of millions of dollars which have been spent trying to accumulate the human biological data, it really is appalling to think that we stand here, 36 years later, debating orders of magnitude in the doses." He pleaded with federal officials present to give aid to complete the research quickly and shore up the $100 million investment in Japanese data.

> "Given the unique experience at Hiroshima . . . it really is appalling to think that we stand here, 36 years later, debating orders of magnitude in the doses," Seymour Jablon said.

Second, Jablon said, "I think it's going to be absolutely necessary in this murky situation that any dosimetry system that is finally decided upon be reasonable in terms of biological influences that we know about. . . . And since the problem is of wider scope than merely physics, perhaps it would be advisable to consider adding some biological expertise to the [NCRP] task force."

Third, Jablon said, "I think that the way this whole problem developed is very unfortunate. Most of us, certainly I, heard about the problem . . . by word of mouth. The next thing was to receive pieces of paper which were not for publication, quotation, or citation. . . . I am told the Japanese Diet is about to have a debate on the subject, and still there is nothing published that one can point to and rebut or accept or whatever."

NCRP President Sinclair responded by saying that there was already one biologist on the NCRP task force, and that he would consider adding more when an attempt is made to extrapolate health effects from the bomb data. One of the physicists who has been at work on the problem the longest, George Kerr of Oak Ridge National Laboratory, said that he thought the data had not been published sooner because they were not strong enough to stand up to peer review. (Two relevant papers have now been submitted to *Health Physics* as technical notes: "Revised dose estimates at Hiroshima and Nagasaki," by Loewe and Mendelsohn, and "Implications of new Hiroshima and Nagasaki dose estimates: Cancer risks and neutron RBE," by Tore Straume and R. Lowry Dobson.)

Radford, who is not a member of the Radiation Research Society, skipped the meeting. He expressed disappointment, however, at the attitude that "we can't say anything until we have everything in hand," as he described it. According to Radford, that attitude can be used to delay reaching any conclusion: "It's what the tobacco industry did for years with the epidemiological evidence relating cancer to smoking. They just said,

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'Well, that last study wasn't perfect, so we'll ignore it.' "

The net effect of the new research, Radford insists, is not hard to summarize: the radiation data for the two cities of Hiroshima and Nagasaki are now likely to come out looking very similar. "You can state that as a general principle," says Radford, "and I do state it. That being the case, they confirm the fact that it was primarily gamma rays that produced the cancers, and that the neutrons, for all practical purposes, contributed so little that they're not important."

Radford believes that the Livermore data strengthen his argument that a linear no-threshold model is the correct one for describing the carcinogenic effects of exposure to low levels of radiation. And if this is correct, he says, the risk estimates published by the National Academy of Sciences in its 1980 report on the Biological Effects of Ionizing Radiation (BEIR) should be restated. He thinks the risks for contracting fatal cancer from radiation should be doubled. He would fix the risk at 250 to 500 excess deaths per rad of increased radiation per 1 million people, not 100 to 250 deaths, as he says BEIR and other documents have fixed it. Radford would also like to see the risks stated in terms of cancer incidence, not mortality, so as to recognize that real injury is done by cancers which do not necessarily kill. Including these figures, Radford says, would make it necessary to further raise the main risk coefficient used in the BEIR report.

Loewe did not discuss Radford's interpretation at the meeting, except to say that he could not understand how such views could be supported. Loewe said he did not see how one could draw a straight line through the old or new radiation effects data. Indeed, two scientists from Livermore who have been working in conjunction with Loewe, Tore Straume and R. Lowry Dobson, presented a paper suggesting that the new bomb data may lower the risk estimates for low doses of gamma radiation. They, too, were skeptical of all that Radford had said.

So many variables have been cited in this controversy that it may be worthwhile explaining just which data belong to whom. Radford, first of all, has done no new research on this issue. He is an epidemiologist with strong opinions on the subject, and he has seized upon Loewe's work as fresh evidence to support his view that many documents understate the hazards of low-level radiation. Radford also says that in defending this outlook he is working against the professional bias of health physicists, which, he claims, is to minimize the dangers of radiation.

Harald Rossi is a Columbia University biophysicist who challenged Radford's views as alarmist when both were serving on the BEIR committee. (Radford was the chairman.) Rossi argued that the hazards of gamma radiation were exaggerated, and he cited the Japanese bomb data to support his case. As part of this thesis, Rossi put forward the idea that many of the fatal cancers at Hiroshima had been caused by neutrons, not gamma rays. Neutron radiation is found rarely in nature, and as a practical matter it is of concern only to people exposed to nuclear weapons and the innards of operating nuclear plants. Rossi's work prompted the NCRP to send out a special advisory to weapons laboratories warning them that their safety standards might be inadequate because neutrons might be more dangerous than had been thought. That was 3 years ago.

Loewe and Mendelsohn were swept into this debate in 1979 because they worked at Livermore, a weapons lab, and were concerned about the NCRP advisory. Livermore did not change its safety standards, but it did finance some computer work by Loewe and Mendelsohn, who attacked the evidence for Rossi's thesis. Their calculations, now made public, do not demonstrate that neutrons are safe. They simply show that neutrons were so scarce in the Japanese blasts that one cannot measure their effects with accuracy. At the same time, the Livermore work significantly *increases* the estimate of gamma radiation in Hiroshima and slightly *decreases* the gamma radiation in Nagasaki.

Using this data, Dobson and Straume have made preliminary new estimates of the toxicity of gamma and neutron radiation. Their paper concludes, among other things, that if one uses the total cancer deaths as a guide, low doses of gamma radiation look less harmful than before. (Other statistical guides produce different results.) They also suggest that it may still be possible to blame the small number of neutrons in Hiroshima for many of the cancer fatalities. Asked about this part of the Straume-Dobson paper, Rossi said he considered it just "an interesting exercise," no more. He believes that if the Livermore data are correct, they will make it impossible to say anything conclusive about neutrons in Hiroshima.

An important caveat applies to all of the recent work on radiation in Japan: it does not include corrections for changes in the shielding provided by buildings or by body tissue. According to Jess Marcum, a contractor for Oak Ridge for a review of the data, significant revisions of the Livermore dose estimates may be necessary before one can reach a conclusion on toxicity. Marcum says he has spent about 1 month researching shielding by buildings and has discovered that the estimates of gamma doses in many cases will have to be lowered. In the area of interest, 1000 to 1700 meters from the epicenter of the blast, Marcum calculates that indoor gamma ray doses will have to be reduced by a little more than 60 percent. The net effect, he believes, will be to make gamma doses for individuals in Hiroshima about the same as in the old estimates produced at Oak Ridge in 1965, while the Nagasaki doses will be lower than the 1965 figures.

According to Jess Marcum, significant revisions of the Livermore dose estimates may be necessary before one can reach a conclusion about toxicity.

In addition, George Kerr of Oak Ridge is recalculating the shielding effect of body tissue for certain "target" organs such as the breast, thyroid, colon, and so on. Marcum reports second hand (Kerr is in Europe) that the net effect of this final adjustment may be to produce no change in the leukemia risk factors for the two cities, but to increase slightly the risk for breast cancer, bringing the latter into agreement with U.S. medical data on breast cancer caused by x-rays. If true, this is an "extraordinary conclusion," Marcum says, because it will give credibility to the research done by Loewe, Marcum, and Kerr, as well as to the Japanese epidemiological data.

One of the few things that is clear in all this is that Livermore's research has irreversibly toppled the status quo. It also seems clear that the federal government would be well advised to finance the work necessary to bring a new estimate of radiation dosimetry into focus as quickly as possible.—ELIOT MARSHALL

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
CLEVELAND ELECTRIC ILLUMINATING COMPANY, Et Al.	)	Docket Nos. 50-440 50-441
	)	(Operating License)
(Perry Nuclear Power Plant, Units 1 and 2)	)	

CERTIFICATE OF SERVICE

This is to certify that copies of "Applicants' Brief On Contentions", dated July 6, 1981, were served upon those persons on the attached service list by deposit in the United States mail, postage prepaid, this 6th day of July, 1981

Bruce W. Churchill

Dated: July 6, 1981

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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	)	

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