

DOCKETED  
JUL 30 1982

July 28, 1982

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
THE CLEVELAND ELECTRIC	)	Docket Nos. 50-440
ILLUMINATING COMPANY, <u>et al.</u>	)	50-441
	)	
(Perry Nuclear Power Plant,	)	
Units 1 and 2)	)	

APPLICANTS' ANSWER TO SUNFLOWER  
ALLIANCE, ET AL. JULY 13, 1982,  
MOTION TO SUBMIT ADDITIONAL CONTENTION

On July 13, 1982, Sunflower Alliance, et al. ("Sunflower")  
filed a motion for leave to amend its petition for leave to  
intervene. Sunflower would have the Licensing Board admit the  
following late contentions:

Sunflower Alliance et al. . . . .  
contends that the NRC Staff has not  
correctly calculated the dose levels to  
real human beings from routine emissions  
from the Perry Nuclear Power Plant,  
rendering the long term environmental and  
health effect calculations invalid.

Sunflower Alliance et al. also con-  
tends the cost benefit analysis has been  
skewed in favor of licensing PNPP by the  
failure to include the value of locally  
grown and consumed food and nursery crops

to the local and larger N.E. Ohio economy,  
in its analysis.

Motion, at 2. The latter contention is discussed separately at the end of this memorandum.

As justification for its untimely filing, Sunflower cites the Draft Environmental Statement ("DES") for Perry Nuclear Power Plant ("PNPP"), NUREG-0884 (March, 1982), and the opinion of the United States Court of Appeals for the District of Columbia Circuit in Natural Resources Defense Council, Inc. v. United States Nuclear Regulatory Commission, No. 74-1586 (April 27, 1982) (Table S-3 decision). As the purported basis for the contention, Sunflower makes six generalized assertions regarding low level radiation.

The contention is patently untimely. Neither the DES, nor NRDC v. NRC, supra, nor any of the six assertions made by Sunflower in any way justify this tardly filing. Moreover, Sunflower has demonstrated no basis for the contention. The six assertions made by Sunflower in its Motion either are grounded on "studies" that already have been dispositively rejected as being without scientific merit, or are assertions that are mistaken as to the facts, or simply do not logically lead to the conclusion urged by Sunflower. The motion for leave to amend, therefore, must be denied.

### The Contention Is Untimely

As with many of its previous motions to add new contentions, Sunflower does no more than make pro forma statements that it has met its burden of demonstrating timeliness. Here, however, it is particularly plain that Sunflower has not made the necessary showing.

In determining whether a late filed contention is untimely, the Licensing Board must balance the following five factors:

- (i) Good cause, if any for failure to file on time.
- (ii) The availability of other means whereby the petitioner's interest will be protected.
- (iii) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.
- (iv) The extent to which the petitioner's interest will be represented by existing parties.
- (v) The extent to which the petitioner's participation will broaden the issues or delay the proceeding.

10 C.F.R. § 2.714(a)(1).

As for the first and perhaps most important of the factors -- whether Sunflower has shown "good cause" for its untimely filing -- Sunflower has provided absolutely no legitimate basis from which the Licensing Board can find the requisite "good

cause." Sunflower cites NRDC v. NRC, supra, and the promulgation of the DES as "good cause" for its untimely filing. Neither can possibly suffice.

Applicants are at a complete loss on how NRDC v. NRC, supra, has any relevancy to the submitted contention, much less on how it serves as "good cause." As discussed by Applicants in "Applicants' Answer to Ohio Citizens for Responsible Energy Motion to Resubmit Contention 15," filed June 16, 1982, the Appeals Court in NRDC v. NRC, supra, held that the NRC improperly used a zero-release value in computing the environmental costs associated with the storage and disposal of radioactive wastes in geologic repositories. Answer, at 6. The submitted contention deals with "routine emissions from PNPP." The two topics are entirely unrelated. The decision in no way can serve as "good cause" for the untimely filing.

Sunflower also cites the DES as "good cause." Sunflower cites no section or page of the DES; it does not even deign to inform the Licensing Board or the parties exactly what in the DES it believes to constitute "good cause." Rather, it blithely assures us that the "recently issued Perry DES . . . constitute[s] abundant good cause for late filing." Motion, at 2. This lack of specificity, in and of itself, precludes the Licensing Board from finding that Sunflower has demonstrated "good cause." The Licensing Board cannot possibly find "good cause" when Sunflower leaves the Licensing Board and the

parties to guess at what in the DES suddenly has brought this "new" issue to Sunflower's attention.

The section in the DES which is most closely related to the contention is § 5.9.3.1.2 (Public Radiation Exposure), which discusses the models and calculations used by the NRC for computing radiation doses. It is readily apparent from reviewing the section that Sunflower's true quarrel is not so much with anything in the DES, as it is with the underlying calculational techniques and assumptions used in computing releases and doses. These techniques and assumptions are specified in the references cited in the DES -- Regulatory Guide 1.109<sup>1/</sup> and NUREG-0016.<sup>2/</sup> See DES § 5.9.3.1.2 and Appendix D. Virtually all the disagreements Sunflower has with how the NRC computes dose levels to humans from routine reactor emissions can be traced directly or indirectly to the methodology and assumptions of Regulatory Guide 1.109 and NUREG-0016.<sup>3/</sup>

---

<sup>1/</sup> Regulatory Guide 1.109, "Calculations of Annual Doses to Man From Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 C.F.R. 50, Appendix I," October 1979 (Rev. 1).

<sup>2/</sup> NUREG-0016, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents From Boiling Water Reactors (BWR-GALE Code)," January, 1979 (Rev. 1). NUREG-0016 often is referred to simply as the GALE Code or BWR-GALE Code.

<sup>3/</sup> NUREG-0016 establishes the means used for determining the releases from routine operation, while Regulatory Guide 1.109 sets forth the calculations used for computing dose rates to humans from such releases.

The DES, of course, is only the latest in a long line of documents indicating that PNPP routine emission dose calculations for PNPP are based on Regulatory Guide 1.109 and NUREG-0016. For example, the PNPP FSAR clearly indicates its reliance on NUREG-0016 in computing routine radioactive releases from PNPP. See § 11.2.3.4 (release rates of radioactive materials in liquid effluents are "calculated with the GALE Code and are based on the assumptions and parameters provided in NUREG-0016"); § 11.3.3.3 (release rates of radioactive materials in gaseous effluents are "calculated with GALE computer code and are based on the assumptions and parameters provided in NUREG-0016"). Similarly, the FSAR cites Regulatory Guide 1.109 for the methodology used to calculate doses resulting from the gaseous radioactive plume. See § 12.4.4.4. The PNPP ER-OL also cites NUREG-0016 in identifying the methodology used to calculate routine release rates. See § 3.5.2.4 and § 3.5.3.3 (LWR-GALE Code of NUREG-0016 used to calculate release rates of radioactive materials in liquid effluents); § 3.5.3.3 (release rates of radioactive materials in gaseous effluents "based on assumptions and parameters provided in [NUREG-0016]"); Tables 3.5-2 and 3.5-3 (Calculated Releases of Radioactive Materials in Gaseous Effluents -- PNPP Units 1 and 2); Table 3.5-4 (Calculated Releases of Radioactive Materials in PNPP Liquid Effluents); Appendix A3.5 (BWR-GALE Code used to calculate release values in above Tables). And as

in the FSAR, the ER-OL clearly identifies Regulatory Guide 1.109 as the basis for computing dose rates from routine operation radiation releases. See § 5.2.2 ("The analysis of impacts due to gaseous emissions and liquid effluents from PNPP was performed using the models, assumptions, and parameters described in NRC Regulatory Guide 1.109, Revision 1.").

The DES provides absolutely no new information on the type of radioactive materials being considered, or the methodology and assumptions used to compute radioactive release rates and the resulting dose rates to humans. This information is contained in NUREG-0016 and Regulatory Guide 1.109, and the use of NUREG-0016 and Regulatory Guide 1.109 is documented clearly in the PNPP FSAR and ER-OL. Sunflower thus has been on notice since it originally moved to intervene of the methodology and assumptions being used to calculate low level release and dose rates.<sup>4/</sup> It cannot now -- a year and a half later -- use the promulgation of the DES as an expedient excuse for raising an

---

<sup>4/</sup> Arguably, a DES could identify certain plant specific assumptions and computational inputs which might not have been identified in earlier documents. Here, however, Sunflower, despite its assertion to the contrary, has not challenged any PNPP specific assumption or computational input. Rather, it makes a generalized attack on the NRC methodology contained in NUREG-0016 and Regulatory Guide 1.109. This methodology has been widely published and known for many years, and the use of the methodology for PNPP has been documented clearly in the FSAR and the ER-OL. There simply is nothing new in the DES upon which Sunflower can hang its hat for the purpose of raising this issue.

issue which it easily could and should have been aware of when it originally intervened.<sup>5/</sup>

Sunflower not only was put on notice by the PNPP FSAR and ER-OL, but the use of NUREG-0016 and Regulatory Guide 1.109 in computing release and dose rates was clearly established and well documented NRC practice years before Sunflower's intervention. For example, Regulatory Guide 4.2, "Preparation of Environmental Reports For Nuclear Power Plants" (Rev. 2, 1976) (NUREG-0099), tells applicants to use Regulatory Guide 1.109 for computing doses. Id. at § 5.2.4.2. And Regulatory Guide 1.112, "Calculation of Releases of Radioactive Materials In Gaseous and Liquid Effluents From Light-Water-Cooled Power Reactors" (1976), tells applicants to use NUREG-0016 for computing releases. See also NUREG-0800 (formerly NUREG-75/087), "Standard Review Plan" (1981), § 11.1, 11.2, and 11.3 (NUREG-0016 to be used for computing releases). Thus, at the time of its intervention, Sunflower had the benefit of express citations in the underlying licensing documents, as well as

---

<sup>5/</sup> As shown by the documents cited in Sunflower's motion, and discussed at greater length in this answer, the issue of whether the NRC correctly computes routine operation radioactive release and dose rates has been extensively commented upon for many years. See, e.g., NUREG-0668, "Staff Review of Radiological Assessment of the Whyl Nuclear Power Plant," (June, 1980), and documents cited therein. It is by no means a recent issue. Sunflower cannot contend -- and does not do so -- that it was not or should not have been aware of the overall issue when it originally intervened.

long established and published statements of NRC practice -- both sources clearly indicating reliance upon NUREG-0016 and Regulatory Guide 1.109 in computing release and dose rates.

Sunflower here is in a position analogous to that of petitioners in Wisconsin Electric Power Co. (Koshkonong Nuclear Plant, Units 1 and 2), CLI-74-45, 8 A.E.C. 928 (1974). In Koshkonong, intervenor petitioners argued that they should not have to file their contentions until after issuance of the DES and the SER. The Commission found the argument "without merit." Id. at 929. As noted by the Commission, petitioners had available to them a wealth of data filed by the applicants, including the preliminary safety analyses and environmental reports, from which they could formulate their contentions. Id.

As with the petitioners in Koshkonong, Sunflower had available to it a wealth of data at the time it filed its motion to intervene. This wealth of data included precise and detailed identification of the methodology and assumptions being used to calculate routine operation low level radiation release and dose rates. This information was contained in the PNPP FSAR and ER-OL, as well as in long-standing and well documented NRC practice. Sunflower could and should have raised its challenge then. It chose not to do so. Sunflower cannot now cite the DES as a basis for amending its original petition to intervene any more than petitioners in Koshkonong

were entitled to file a "general petition" to be followed with specific contentions after issuance of the DES.<sup>6/</sup>

Among the assertions upon which Sunflower "bases" the contention, are cited two works by Ernest Sternglass and a West German study of the Whyl Nuclear Power Plant. Sunflower does not claim that these serve as "good cause" for its untimely filing. But even if Sunflower were to proffer these items as "good cause," it is readily apparent that they are far too dated to justify this tardy filing.

Ernest Sternglass has been alleging for over a decade that the NRC does not correctly assess the effects of low level radiation. The crux of his message, and the data and calculations upon which he "bases" his conclusions, have been widely documented for many years. See, e.g., Trustees of Columbia University in the City of New York, ALAB-50, 4 A.E.C. 849 (1972) (discussed infra); Report of the Advisory Committee on the Biological Effects of Ionizing Radiation, "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation," ("BEIR I", 1972) at 178-79 (discussed infra). Sunflower has cited nothing with regard to Ernest Sternglass that was not already well known at the time of the filing of its petition for leave to intervene.

---

<sup>6/</sup> If the Licensing Board admits this contention, Sunflower will have achieved through procedural maneuvering exactly what was expressly denied to petitioners in Koshkonong. The same policy considerations that underlie Koshkonong are applicable here.

The Heidelberg Study of the Whyl Nuclear Power Plant (discussed infra) also cannot serve as "good cause" for this untimely filing. The Study was published in 1978, well before Sunflower's intervention. In June, 1980, the NRC published NUREG-0668, "Staff Review of Radiological Assessment of the Whyl Nuclear Power Plant," an extensive analysis and rebuttal of the Study's conclusions.<sup>7/</sup> The Study also was the subject of a 1980 Commission decision in Metropolitan Edison Co. (Three Mile Island, Unit 2), CLI-80-3, 11 N.R.C. 519, 531-32. Sunflower cannot now, two years after publication of the NUREG, and four years after publication of the Study, use the Study as "good cause" for an untimely filing.

In sum, Sunflower has made no showing of "good cause" for this tardy attempt to add yet another contention to this proceeding at this late date.<sup>8/</sup>

---

<sup>7/</sup> "Heidelberg Study" in fact is a misnomer. The NRC was informed after publication of the NUREG that the University of Heidelberg was not associated with the Study, but that the Study had been prepared by a group of graduate students and junior faculty members opposed to nuclear power, and illegally published under the University's name. See letters to Denwood F. Ross attached as Appendix A.

<sup>8/</sup> Although the contention expressly is limited to whether the NRC correctly calculates dose levels, Sunflower also refers to "health effects" several times in its Motion. To the extent that the Licensing Board reads the Motion as including health effects of low level radiation, it must be noted that Sunflower identifies nothing in the DES which could serve as "good cause" for litigating health effects in this proceeding. Indeed, the only citation by Sunflower which could even arguably serve as a basis for such a contention is Cancer Mortality Changes Around Nuclear Facilities in Connecticut by Ernest Sternglass. The

(Continued Next Page)

As for the remaining factors to be balanced by the Licensing Board pursuant to 10 C.F.R. § 2.714(a)(1), although Sunflower's interest in this issue will not be represented by any of the other parties, Sunflower has available to it another means to pursue this issue by way of comments to the NRC staff on the DES. Sunflower also has failed to show that it will assist in developing a sound record or that the admission of this issue will not delay the proceeding. In light of the many inaccuracies in the Motion (discussed supra and infra),<sup>9/</sup> and the generally vague and confusing language of the Motion, Sunflower has demonstrated that it cannot "reasonably be

---

(Continued)

paper, however, predates Sunflower's intervention by several years. Moreover, Sternglass' widely publicized arguments in this area date back to the late sixties, see BEIR I, supra.

The general question of whether the NRC correctly assesses the health effects of low level radiation has been widely publicized since the sixties. This cannot by any stretch of the imagination be considered a recent issue. BEIR I, upon which the NRC relies extensively for its health effects conclusions, was published in 1972. And the issue of whether health effects issues can be litigated was dealt with by the Commission in Public Service Company of Oklahoma (Black Fox Station, Units 1 and 2), CLI-80-31, 12 N.R.C. 264 (1980) -- over half a year before Sunflower's intervention. Thus, even if Sunflower here is attempting to litigate the health effects of low level radiation doses, there simply is no way it can demonstrate "good cause" at this late date.

<sup>9/</sup> In this regard, it is worth noting that Sunflower raises many factual arguments (such as the purported failure to consider alpha emitters or long lived nuclides) that are resolved dispositively in applicable sections of the FSAR, ER-OL or DES. See infra.

expected to assist in developing a sound record." Indeed, Sunflower's misunderstanding of basic principles, see infra, and its reliance on studies and sources that already have been shown conclusively to be without scientific merit, see infra, strongly suggest that Sunflower's participation would more likely result in a waste of time and effort than to any serious consideration of the issue.

Applicants also strongly disagree with Sunflower's blithe assurance that admission of this issue will not delay the licensing hearing. Although the submitted contention is without merit, low level radiation nevertheless is a highly complex subject that will require extensive preparation of expert testimony, and undoubtedly will involve substantial discovery. Of necessity, admission of this contention will cause delay. But, perhaps most importantly, this is but the latest in a string of new contentions submitted by intervenors. (And as intervenors recently have informed the Licensing Board and Applicants, more new contentions purportedly based on the SER are on their way.) Cumulatively, there can be no doubt whatsoever that these new contentions will delay the proceeding. Intervenors should not be permitted to avoid their burden as to delay through this piecemeal submission of new contentions.

Sunflower Has Demonstrated  
No Basis For the Contention

Section 2.714(b) of the NRC's Rules of Practice requires petitioners to establish bases, with reasonable specificity, for contentions they seek to litigate. Sunflower has failed to demonstrate the requisite basis and specificity for the submitted contention.

Sunflower begins its discussion of the contention with an assertion that is patently incorrect:

Actual radiation doses from nuclear power plant gaseous and liquid effluents to real fetuses, infants, children and adults have never been measured and precisely determined. Computerized models based on expected releases are used by the NRC and EPA to estimate radiation doses to hypothetical individuals at the boundary of the Perry Nuclear Power Plant.

This simply is wrong. The Environmental Protection Agency has conducted numerous surveys around nuclear power plants to measure the actual radiation released by plants during routine operation. These studies date back at least to 1977, and include surveys in the vicinity of the following nuclear power plants: Arkansas, Beaver Valley, Browns Ferry, Brunswick, Calvert Cliffs, Cook, Cooper, Crystal River, Davis Besse, Dresden, Duane Arnold, Fitzpatrick and Nine Mile Point, Fort Calhoun, Haddem Neck, Edwin I. Hatch, LaCrosse, Maine Yankee and Millstone Point. Many of these EPA surveys are cited and summarized in NUREG-0668, "Staff Review of 'Radiological

Assessment of the Whyl Nuclear Power Plant'" (June, 1980), at pages 6-1 - 6-19.

Sunflower also makes six numbered assertions in support of the contention. None of these assertions, discussed separately below, can serve as a basis for the contention.

(i) The overwhelming [sic] evidence that the rates of infant mortality, cancer and birth defects resulting from exposure to low level radiation are much higher than previously expected. Example: (Cancer Mortality Changes Around Nuclear Facilities In Connecticut Ernest Sternglass 1979.)

At the outset, it should be noted that the assertion is irrelevant to the contention submitted by Sunflower. The contention contends that the NRC incorrectly assesses dose levels to humans, and, therefore, that the NRC's environmental and health effect calculations are invalid. The contention does not assert that the NRC incorrectly assesses the health effects of a given radiation dose. The reference to Ernest Sternglass' paper thus is misplaced.

Assuming, however, that the Licensing Board somehow reads a health effects issue into the contention (that is, that the NRC does not correctly assess the health effects of given low level radiation doses), the reference to the Sternglass article still fails to provide a basis.<sup>10/</sup>

---

<sup>10/</sup> Whether or not a basis exists for a health effects contention, it is clear that Sunflower cannot use the Sternglass article as "good cause" for its late filing. See note 8,

(Continued Next Page)

As noted, Sternglass has been alleging for over a decade that the NRC fails to assess correctly the health effects of low level radiation. Over this period, Sternglass has achieved a reputation for giving little heed to rigorous scientific methodology, but, instead, for misusing data time and time again to fit his preconceptions. In this regard it is worthwhile noting the Appeal Board decision in Trustees of Columbia University in the City of New York, ALAB-50, 4 A.E.C. 849 (1972), aff'd sub nom., Morningside Renewal Council, Inc. v. Atomic Energy Commission, 482 F.2d 234 (2d Cir. 1973), cert. denied, 417 U.S. 951 (1974), in which the Appeal Board rejected Sternglass' allegation that operation of the reactor would increase infant mortality. The Appeal found that the "allegations were not substantiated by the facts which [Sternglass] presented in their support, and are premised at best on a highly questionable use of those facts." Id. at 857. The Appeal Board went on to make the following observations:

As we have earlier indicated, the Appeal Board is of the opinion that Dr. Sternglass' assertions have no valid scientific foundation. We find that the methodology employed is deficient, that many of the assertions are inconsistent and even self-contradictory, and his statistical methodology and selective sampling techniques are not scientifically credible.

---

(Continued)

supra. Nor is there anything in the DES which could serve as "good cause" for such a contention.

Id. at 859.

Based on the foregoing, we conclude that Dr. Sternglass' statistical methodology and selective sampling techniques are not scientifically credible and, indeed, raise serious questions as to whether his presentation is consistent with even a moderate degree of scientific responsibility.

Id. at 862.

Similar rejections of Sternglass' testimony can be found in Long Island Lighting Co. (Shoreham Nuclear Power Station), ALAB-156, 6 A.E.C. 831, 850 (1973) (citing Columbia University decision), and Toledo Edison Company (Davis-Besse Nuclear Station), 4 A.E.C. 571, 585 (1971) (Sternglass' conclusions unfounded and unsubstantiated). See also Punnett v. Carter, 621 F.2d 578, 583-86 (3d Cir. 1980) (rejecting Sternglass testimony because of the questionable nature of many of his assumptions and the resulting imprecision of his calculations).

Sternglass' creative use of data also has been noted by the National Academy of Sciences in BEIR I, supra, at 178-79:

It is clear that the correlations presented in support of [Sternglass'] hypothesis depend on arbitrary selection of data supporting the hypothesis and the ignoring of those that do not. In several regards, the data used by Sternglass appear to be in error. One of the most vital assumptions in the model -- that without the atomic tests the infant mortality rate would have continued to fall in a geometrically linear fashion -- is without basis either in theory or in observation of trends in other countries and other times.

See also BEIR III, at 561 (Sternglass' allegations regarding effect of low level radiation on infant mortality unsubstantiated).

The public record is replete with similar criticisms of Sternglass' methodology and credibility. It is particularly worthwhile noting the observations made by the Public Health Service on the Sternglass paper cited by Sunflower. In a letter by Dr. Charles E. Land of the Environmental Epidemiology Branch to Representative James C. Cleveland, the following observations are made with regard to Cancer Mortality Changes Around Nuclear Facilities In Connecticut:

In my judgment this paper is of no value as a guide to the possible carcinogenic risks from radioactive isotopes emitted by nuclear power plants. The paper is logically incoherent and lacking in the balance and scrupulous consideration of alternative explanations that are required of a serious scientific work. The paper is heavily laden with polemics in which selected facts and analogies have been presented in a way designed to push a particular point of view, namely that increased cancer mortality has been caused by radioactive emissions from nuclear power plants in Connecticut and elsewhere.

. . . . .

One of the difficulties in reviewing this paper is that the violations of good scientific practice in it are so many and so varied that it would be a vast undertaking to explicate each one. I have highlighted what I consider to be a few of the major problems, but there are numerous others also.

I am a statistician, professionally concerned with the logic of scientific inference. For the past 5 years or so I have worked principally on

epidemiologic investigations of the relationships between radiation dose and cancer incidence and mortality in populations exposed to ionizing radiation, mainly the Japanese A-bomb survivors but also other irradiated populations. I am deeply concerned about radiation-induced cancer and other hazards of radiation exposures, and feel that the use of nuclear and radiologic technology should be based on a careful assessment of risks. Papers such as the reviewed one by Sternglass contribute only confusion to this process, and in fact, impede it by deflecting investigative resources from the work at hand.

The letter is attached as Appendix B. Also included in Appendix B is a letter by Dr. Rowe, Deputy Administrator for Radiation Programs, to Representative Cleveland critical of the Sternglass paper.

The Licensing Board is entitled to make at least a threshold determination of whether a source cited as the basis for a contention has any credibility whatsoever. Otherwise, intervenors could cite the most frivolous and uneducated statements of personal opinion as bases -- which, if sufficient, would completely undermine the Commission's basis requirement. The Licensing Board recognized as much in its Special Prehearing Conference Memorandum and Order, LBP-81-24, 14 N.R.C. 175 (July 28, 1981), in its discussion of Jeff Alexander. Id. at 225. The Licensing Board there indicated that it was dissatisfied with the lack of information regarding the foundation for Mr. Alexander's opinion, as well as the unclear evidence of "his status as a marine biologist and

expert on clams." Id. The Licensing Board correctly concluded, that "[t]here is little doubt . . . that [it] could reject [the Corbicula] contention for its lack of basis." Id. Likewise, there is little doubt here that the Licensing Board could (and should) reject Sunflower's implicit assertion that Sternglass' opinions are of sufficient scientific credibility that they can serve as the basis for a health effects contention.

Ernest Sternglass' opinions about the health effects of low level radiation have been well known for over a decade. His conclusions and methodologies have been rejected by reputable scientists (including the National Academy of Sciences) time and time again as unscientific and based on selective manipulation of data. Simply put, Sternglass' opinions are little more than polemics coated with a scientific and statistical gloss designed to persuade the lay public that there may be something to his arguments. In fact, his "studies" invariably are shown to be without any scientific basis.

Although Sternglass professes to be an expert on low level radiation, the above cited sources are but a handful of the numerous decisions and studies that have rejected Sternglass' assertions of expertise, and have found his methodology to be unsound and without credibility. These decisions and studies compel the conclusion that whatever Sternglass may be, he is not an "expert" whose opinions can serve as the basis for a contention.

Sternglass' lack of scientific credibility is too well documented for the Licensing Board to admit a health effects contention merely on the basis of an offhand citation to a 1979 paper by Sternglass. The Licensing Board should not admit an unarticulated contention based on an unexplained citation to an author and paper wholly lacking in scientific credibility. Even assuming that the Licensing Board somehow reads a health effects contention into Sunflower's motion, the contention should be denied as being without basis.<sup>11/</sup>

(ii) The linear relationship between radiation and health effects tending of [sic] show that there is no safe level of radiation exposure. BEIR III Low-Level Radiation From Hiroshima To Three Mile Island Ernest Sternglass.

Applicants are unclear what Sunflower is attempting to get at by way of this statement, or how this statement is relevant to the contention.

Linearity between radiation exposure and health effects is an underlying assumption of NRC regulations and analyses, as is clearly reflected in the DES. Section 5.9.2.1.1 of the DES contains the following statement:

---

<sup>11/</sup> It must be emphasized that the foregoing discussion with regard to Sternglass is made only with a view to the possibility that the Licensing Board might read a health effects contention into Sunflower's Motion. Applicants do not believe that the motion reasonably can be read to be making a health effects contention, and believe that the Sternglass citation thus is irrelevant.

In estimating the health effects resulting from . . . offsite . . . exposures as a result of normal operation of this facility, the NRC staff used somatic (cancer) and genetic risk estimators that are based on widely accepted scientific information. Specifically, the staff's estimates are based on information compiled by the National Academy of Science's Advisory Committee on the Biological Effects of Ionizing Radiation (BEIR I). The estimates of the risks to workers and the general public are based on conservative assumptions (that is, the estimates are probably higher than the actual number). The following risk estimators were used to estimate health effects: 135 potential deaths from cancer per million person-rems and 258 potential cases of all forms of genetic disorders per million person-rems. (emphasis added)

This clearly indicates that the NRC is assuming a linear relationship between radiation and health effects (135 potential cancer deaths and 258 potential genetic disorders cases per million person-rems). The above cited passage also is consistent with BEIR I, upon which the NRC bases its findings. See id., at 89 (use of linear hypothesis for determining somatic effects of ionizing radiation) and at 51, 59 (use of linear interpolation for assessing genetic effects from ionizing radiation).

It also should be noted that, contrary to the implication of Sunflower's assertion, the DES does not assume that routine operation radiation releases have zero adverse health effects. In fact, consistent with the linearity assumption, the DES finds that exposure of the general public to radioactive effluents and transporation of fuel and waste from the

operation of PNPP will cause about 0.008 cancer deaths and about 0.014 genetic disorders over the life of the plant. See § 5.9.3.2.

Sunflower's assertion thus not only is irrelevant, it does not identify a disputed issue. The tacked on citations to BEIR III and Sternglass<sup>12</sup>/do not appear to add anything.

(iii) Two reports by German Scientists state that the exposures to real people living in the vicinity of nuclear plants has been underestimated by factors anywhere from 10 to 10,000 times. ("Tutorium Umweltschutz An Der Universitat Heidelberg Radiologisches Gutachten Zum Kernkraftwerk Wyl" and "Radiation Exposure and Health Damage Due To Nuclear Power Production -- The Question of Standards and The Need For Comparative Health Damage Analysis" Institut Fur Energie Und Umweltforschung, Heidelberg, Germany)

The Heidelberg Study, see note 7, supra, was published in 1978. It received considerable attention at the time, and was carefully analyzed by the NRC. The results of the analysis were published in June, 1980, in NUREG-0668, "Staff Review of 'Radioecological Assessment of the Wyl Nuclear Power Plant.'" The NUREG identified numerous deficiencies in the Heidelberg

---

<sup>12</sup>/ The garbled Sternglass citation seems to be a reference to Secret Fallout: Low-Level Radiation From Hiroshima To Three-Mile Island. The bulk of the book originally was published in 1972 under the title of Low-Level Radiation, with chapters added in 1980 after Three-Mile Island.

BEIR III was published in 1979 (typescript ed. 1980).

Study, which led to the rejection of the Study's conclusion. Most importantly, actual measurements of radiation concentrations near operating nuclear power plants showed actual doses far lower than those estimated in the Heidelberg Study. See page 14-15, supra.

The NRC has reviewed carefully the Heidelberg Study, and has published a detailed statement of why the conclusions of the Study are incorrect. This statement includes empirical evidence flatly inconsistent with the Study's conclusions. Sunflower has identified nothing in NUREG-0668 it believes to be incorrect, or demonstrated any basis for rejecting the NUREG's findings. In sum, Sunflower has cited nothing which in any way challenges the grounds upon which the NRC rejected the Heidelberg Study. It thus has failed to provide any basis for the contention through its citation to the Study.<sup>13/</sup>

(iv) All the radionuclide materials from the plant have not been considered in the dose commitment calculations (especially alpha emitters).

This assertion is wrong. All detectable emitted radionuclide materials are considered in the dose commitment calculations (including alpha emitters).

---

<sup>13/</sup> And, as noted supra, the Study clearly is far too dated to serve as "good cause" for this untimely filing.

The basis for calculating routine operation emissions is NUREG-0016, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents From Boiling Water Reactors (BWR-GALE Code)." The BWR-GALE Code does not disregard any radionuclides that are released in detectable quantities. The BWR-GALE Code is based on data generated from operating reactors, field tests, laboratory tests, and plant-specific design considerations. Sunflower has cited no basis for concluding that the BWR-GALE Code does not accurately compute all detectable radionuclides which will be routinely released from PNPP.

The BWR-GALE Code measures transmutation products, which would include any released alpha emitters.<sup>14/</sup> See NUREG-0016 § 3.4.1. The only transuranic isotope that the BWR-GALE Code identifies as released in detectable quantities is Np-239 -- a beta emitter. See *id.*, Table 2-2, at 2-5. The BWR-GALE Code does not identify any alpha emitter that is released in detectable quantities. Sunflower has cited nothing which in any way indicates that detectable alpha emitters routinely are released from PNPP that somehow are not accounted for in the BWR-GALE Code.<sup>15/</sup>

---

<sup>14/</sup> All alpha emitters are transuranic isotopes. But many transuranic isotopes, particularly those on the lower end of the periodic table, are beta emitters.

<sup>15/</sup> The fact that no alpha emitters are considered in the environmental assessment is clear in the PNPP ER-OL, which does

(Continued Next Page)

The fact that no detectable alpha emitters are released from PNPP during routine operation is not surprising once the relevant section of the PNPP FSAR is referenced. In relating the design-basis concentration of transuranic isotopes in reactor water, § 11.1.3 of the FSAR makes the following observation:

Except for Np-239, trace concentrations of transuranic isotopes have been observed in only a few samples where extensive and complex analyses were carried out. The predominant alpha emitter present in reactor water is Cm-242 at an estimated concentration of  $10^{-6}$  Mci/g or less, which is below the maximum permissible concentration in drinking water applicable to continuous use by the general public. The concentration of alpha emitting plutonium radioisotopes is more than one order of magnitude lower than that of Cm-242.

No detectable alpha emitters will be released during routine operation of PNPP for the simple reason that the concentration of alpha emitters in reactor water is exceedingly low -- indeed, virtually nonexistent (as the FSAR notes, the concentration level is lower than in ordinary tap water). Sunflower's incorrect assertion that radionuclides (especially alpha emitters) have not been considered in computing dose calculations thus cannot serve as a basis for the submitted contention.

---

(Continued)

not list any alpha emitters among the radionuclides used for the dose commitment calculations. See ER-OL, Tables 3.5-2, 3.5-3 and 3.5-4.

(v) estimates of expected doses are calculated for radionuclides ingested during that year, ignoring the long lived nuclides already stored in the body.

This assertion by Sunflower is wrong. As the DES clearly indicates:

The annual dose commitment is calculated to be the total dose that would be received over a 50-year period, following the intake of radioactivity for 1 year under the conditions existing 15 years after the station begins operation.

DES § 5.9.3.1. See also DES Appendix D, paragraph 1.

This is consistent with Regulatory Guide 1.109, which requires that a 50-year period be used. See id. at 1.109-2 ("[D]ose factors are based on continuous intake over a one-year environmental exposure period and an associated dose commitment extending over a 50-year period from initiation of intake.")

It thus is readily apparent that the effects of long lived nuclides are considered in calculating dose commitments. Sunflower's incorrect statement obviously cannot serve as a basis for the contention.

(vi) Radiation doses from groundwater contaminated by deposition of air-born radioactive materials are ignored.

Sunflower has demonstrated absolutely no basis for its assertion that there is ground water contamination from radiation releases during routine operation of PNPP. Sunflower has not even shown the mechanism through which its postulated ground water contamination supposedly occurs.

The radiation exposure pathways used to calculate dose rates are listed and described in detail in Regulatory Guide 1.109. These are the pathways through which the NRC believes persons may be exposed to radiation originating in a nuclear power plant reactor. See generally DES § 5.9.3.1. The pathways are described both in Regulatory Guide 1.109, at pages 1.109-2 - 1.109-8, and in the PNPP ER-OL, § 5.2.4.1 (Liquid Pathways), § 5.2.4.2 (Airborne Pathways), § 5.2.4.3 (Direct Radiation From Facility).<sup>16/</sup> Ground water contamination is not one of those pathways.

Sunflower has cited no basis for its assertion that ground water contamination from routine emissions is an actual phenomenon, much less that ground water contamination is a radiation exposure pathway. The NRC has reviewed carefully the mechanisms through which humans are exposed to routine radiation releases, and has not found ground water contamination to be one of those mechanisms. Sunflower must identify some basis for challenging that finding if it expects this issue to be litigated in this proceeding. It has identified no such basis, and this issue, therefore, cannot be admitted.

---

<sup>16/</sup> There is nothing in the DES discussion of radiation exposure pathways that is not already fully set out in Regulatory Guide 1.109 and the ER-OL.

The Food and Nursery Crops Contention Must  
Be Denied As Untimely and Without Basis

Sunflower makes a second contention:

Sunflower Alliance et al. also contends the cost benefit analysis has been skewed in favor of licensing PNPP by the failure to include the value of locally grown and consumed food and nursery crops to the local and larger N.E. Ohio economy, in its analysis.

Motion, at 2.

It is not altogether clear what Sunflower means by this contention. In light of the subject matter of Sunflower's Motion, the most reasonable interpretation seems to be that Sunflower believes that locally grown and consumed food and nursery crops somehow will be damaged or made inedible by low level radiation emitted during routine PNPP operation. Sunflower cites absolutely no basis for this extraordinary assertion.

Even assuming that low level radiation would affect plant life in the vicinity of PNPP, the failure of the DES to consider such an effect cannot serve as "good cause" for this untimely filing. Section 5.2.3.1 of the PNPP ER-OL clearly states that there will be no damage to plant life from routine emissions:

Radiation doses received by terrestrial biota from external exposure (cloud immersion and contaminated land surfaces) are expected to be similar to those received by man. While the doses within the site boundaries would be somewhat higher than those received off the

site, they would be within the same order of magnitude and are considered to be quite small. Similarly, based on experience at other nuclear power plants and calculations performed for the PNPP, internal doses received by man from gaseous and particulate releases are expected to be small. The same is expected to hold true for doses received by other terrestrial organisms.

There is a direct correlation between the biological complexity of an organism and its sensitivity to radiation. Because the doses received by man, a very complex organism, are not expected to pose any hazard, the operation of the PNPP Units 1 and 2 will not result in any radiological hazard to the terrestrial fauna inhabiting the PNPP site and its vicinity.

The amount of radiation that could be delivered to plants by effluent releases from PNPP Units 1 and 2 is estimated to be significantly less than that requiring any concern. The effects of radiation on plants can range from a slight inhibition of growth to death, depending on the dose rate and the total dose received. A flora sensitivity range is given in Table 5.2-1; the information was obtained from Woodwell and Sparrow. A number of the vegetation types listed in the table are found at the PNPP. The table shows that the amount of radiation required for even slight growth inhibition in plants is extremely high and well in excess of the radiation expected to be released from PNPP Units 1 and 2.

Sunflower thus was on notice at the time of its original intervention that the environmental assessment of PNPP was predicated on a finding that routine emissions from PNPP would not damage local plant life. The fact that the DES essentially reiterates this conclusion, see infra, is not a new development which can be used as "good cause" for this untimely filing.<sup>17/</sup>

---

<sup>17/</sup> For the reasons discussed on pages 12-13, supra, Applicants also contend that Sunflower has other means to pur-

(Continued Next Page)

The contention also is without basis. In this regard, it is not only worth noting the above quoted language in the PNPP ER-OL, but also the applicable section in the DES:

Depending on the pathway and the radiation source, terrestrial and aquatic biota will receive doses that are approximately the same or somewhat higher than humans receive. Although guidelines have not been established for acceptable limits for radiation exposure to species other than humans, it is generally agreed that the limits established for humans are sufficiently protective for other species.

Although the existence of extremely radiosensitive biota is possible and increased radiosensitivity in organisms may result from environmental interactions with other stresses (for example, heat or biocides), no biota have yet been discovered that show a sensitivity (in terms of increased morbidity or mortality) to radiation exposures as low as those expected in the area surrounding the facility. Furthermore, at all nuclear plants for which radiation exposure to biota other than humans has been analyzed (Blaylock), there have been no cases of exposure that can be considered significant in terms of harm to the species, or that approach the limits for exposure to members of the public that are permitted by 10 CFR 20. Inasmuch as the 1972 BEIR Report (BEIR I) concluded that evidence to date indicated no other living organisms are very much more radiosensitive than humans, no measurable radiological impact on populations of biota is expected as a result of the routine operation of this facility.

---

(Continued)

sue this issue, that Sunflower's intervention cannot reasonably be expected to assist the Licensing Board, and that admission of this contention would delay this proceeding.

DES § 5.9.3.3 (Radiological Impacts on Biota Other Than Humans).18/

Sunflower has cited nothing in support of its assertion that plant life would be damaged or made inedible through routine emissions from PNPP. The contention should be denied as untimely and without basis.

---

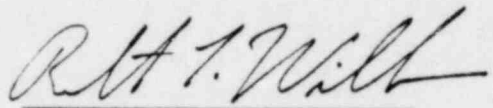
18/ It should be noted that the DES does consider the impact of crop damage in assessing the economic and societal consequences of severe accidents. See DES § 5.9.4.1.4.4. Such postulated accidents, of course, involve much greater radiation releases -- a wholly distinct situation from the routine low level radiation emissions at issue here. It is worth observing, however, that the NRC does not ignore damage to crops where such damage may be a real possibility.

Conclusion

For the stated reasons, the submitted contentions are untimely and without basis. Sunflower's motion for leave to amend its petition for leave to intervene should be denied.

Respectfully submitted,

SHAW, PITTMAN, POTTS & TROWBRIDGE

By: 

Jay E. Silberg, P.C.  
Robert L. Willmore

Counsel for Applicants

1800 M Street, N.W.  
Washington, D.C. 20036  
(202) 822-1000

Dated: July 28, 1982

APPENDIX A

65 HEIDELBERG 1. 10. 11. 1981

Postfach 105760  
Im Neuenheimer Feld 234  
Telefon: 06221 / 562648  
CLEAR

102 APR 6 1981 2 41

Denwood F. Ross Jr., Director  
Division of Systems Integration  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

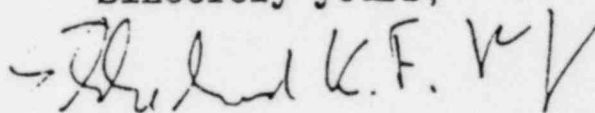
Dear Mr. Ross!

Having read the Staff Review of "Radioecological Assessment of the Wyhl Nuclear Power Plant" (NUREG-0668), I feel obligated to straighten out some misconceptions as to the source of the original "Heidelberg Report". This report was not prepared by the Department of Environmental Protection of the University of Heidelberg as stated in the introduction of your staff analysis (there exists, in fact no such Department), but rather by a group of graduate students of Biology with the help of a few junior faculty members of the Departments of the Chemistry and Physics. They were not authorized by any official organ of the University to publish a report of their study; in fact there exists a letter written by a member of the Department of Environmental Physics as early as March 1, 1976 stating clearly that no member of that Department was to participate in the preparation of a report by this group.

In a letter dated July 31, 1978, the president of this University stated clearly that it was illegal for the study group to publish any report using the name of the University without authorization by a Department head or other University official. Such authorization was never obtained by the group.

It is obvious that a bunch of students setting out to do "research" to prove their philosophy right inevitably come up with data based more on fantasy than facts. Under these circumstances it is informate that your agency had to go through the pains having to referee such silly claims. On the other hand, I suppose the political impact of such "studies" is so great as to warrant such a serious and meticulous analysis your office has done.

Sincerely yours,

A handwritten signature in dark ink, appearing to read 'Ekkehard K. F. Bautz', followed by a large, stylized checkmark or flourish.

Ekkehard K. F. Bautz Ph. D.

Dean, Faculty of Biology

J. Narrog  
in



MINISTERIUM  
FÜR ARBEIT, GESUNDHEIT UND SOZIALORDNUNG  
BADEN-WÜRTTEMBERG

Ministerium für Arbeit, Gesundheit und Sozialordnung Baden-Württemberg  
Postfach 1050 - 7000 Stuttgart 1

Mr.  
Dennwood F. Ross Jr., Director  
Division of Systems Integration  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission

Washington, D.C. 20555



Stuttgart, den 11<sup>th</sup> November 1980

P am Eingang 8  
im Innenhof

Fernsprecher 7338  
Durchwahl (07 11) 00 73-

Aktenzeichen: VII/5-3412.15.1/80  
(Bitte bei Antwort angeben)

Dear Mr. Ross,

I would like to send you some comments on draft report NUREG-0668  
"Staff Review of Radioecological Assessment of the Wyhl  
Nuclear Power Plant".

My office is part of the licensing agency for the Wyhl Nuclear  
Power Plant and I am responsible for the assessment of the  
radiological impact on the environment in regard to the li-  
censing procedure.

Therefore the draft report NUREG-0668 gave rise to my pre-  
liminary comments, a detailed statement follows from the  
Gesellschaft für Reaktorsicherheit (GRS) in the course of  
the BMI-NRC Agreement.

1. General remarks

The referred Heidelberg Report entitled "Radioecological  
Assessment of the Wyhl Nuclear Power Plant" was not pre-  
pared or published by the University of Heidelberg (see  
title of NUREG-0668) or the Department of Environmental  
Protection of the University of Heidelberg (see page 1-1)  
but only by a private connection of opponents against  
nuclear energy at the University of Heidelberg. These

- 2 -

Dienstgebäude: Ratschuhplatz 30 - Fernsprecher Vermittlung (07 11) 00 73-1 Telex 712 548  
Ref. Gruppe III R (Sicherheit in der Kerntechnik) Lange Straße 1 A - Fernsprecher 07 11/20 20-1 DW 20 10

- 2 -

opponents were not authorized to use the name of the University of Heidelberg (see the enclosed copy of the letter of the University of Heidelberg, dated from 29<sup>th</sup> July 1980 and the copy of the referred part of the judgment - altogether encl. 1).

Furthermore the "Radioecological Assessment of the Wyhl Nuclear Power Plant" is less a serious scientific report but rather a public relations paper of opponents against nuclear energy. All European institutions, which dealt with this report, came to similar statements (see encl. 2, 3 und 4).

## 2. Source terms

The radioactive releases referred in the Heidelberg Report are the proposed numbers of the licensee. There is no chance that these numbers will be authorized. In the last years we have authorized only numbers, which were lower than these proposals especially with regard to noble gases and liquid releases.

For the planned Wyhl reactor a holdup in the waste gas system and the evaporation of liquid radioactive waste was foreseen from the beginning.

Furthermore it should be mentioned in connection to table 2.2 that the corresponding average measured releases, Ci/yr from all Westgerman nuclear power plants with an electrical output of more than 250 MW, are not higher than the numbers of the US-plants. These are the following plants: Gundremmingen, Lingen, Obrigheim, Stade, Würgassen, Biblis A, Biblis B, Neckarwestheim, Brunsbüttel, Isar.

- 3 -

The numbers of the average measured releases (January 1977 to December 1978) are:

Airborne Releases, Ci/yr				Liquid Releases, Ci/yr	
Noble Gases	J 131	Particulates	H 3	Mixed fission and corrosion products	H 3
1500	0,01	0,01	15	0,4	100

The single numbers are reported in encl. 5.

### 3. Meteorological data for the site Wyhl.

The meteorological Wyhl-report of Prof. Diem, University of Karlsruhe, dated from 24<sup>th</sup> May 1974 was a sufficient base for all meteorological data needed for a diffusion calculation. Certainly the measuring data from the site were taken but within a period of a few months.

Furthermore there are a lot of data from the 160 m meteorological mast reported under various views in the following years from time to time (e.g. see encl. 6). By some efforts it had been possible to get sufficient meteorological data. Our experts proceeded in such a way. But they obtained a peak concentration value of less than a half of the number reported in the Heidelberg report. That is probably the reason why the Heidelberg team has no interest in procuring all available meteorological information.

### 4. Environmental monitoring data

In Germany an environmental surveillance is performed at each nuclear power plant both by the licensee and the experts of the corresponding agency - fixed in federal regulations. The results of the environmental surveillance

- 4 -

never showed numbers in the magnitude of the estimated concentration values of the Heidelberg report for Cs 137, Cs 134 and J 131. In general the measured values are far below the low dose limits of the Radiation Protection Ordinance (see encl. 7).

Yours sincerely

*J. Narrog*  
J. Narrog

Encl.: 7

APPENDIX B



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE  
NATIONAL INSTITUTES OF HEALTH  
BETHESDA, MARYLAND 20814

NATIONAL CANCER INSTITUTE

The Honorable James C. Cleveland  
House of Representatives  
Washington, D.C. 20515

Dear Mr. Cleveland:

At Dr. Upton's request I have reviewed the manuscript by Dr. Ernest J. Sternglass, entitled "Cancer mortality changes around nuclear facilities in Connecticut," and presented at a Congressional Seminar on Low-Level Radiation, February 10, 1978. In my judgment, this paper is of no value as a guide to the possible carcinogenic risks from radioactive isotopes emitted by nuclear power plants. The paper is logical, incoherent and lacking in the balance and scrupulous consideration of alternative explanations that are required of a serious scientific work. The paper is heavily laden with polemics in which selected facts and analogies have been presented in a way designed to push a particular point of view, namely, that increased cancer mortality has been caused by radioactive emissions from nuclear power plants in Connecticut and elsewhere.

Cancer mortality data are subject to a number of influences, e.g., changes in the age and racial makeup of populations, differences in socio-economic class, urbanization, and industrialization which may increase or decrease rates. Random variation is an even more important factor, particularly when small populations are involved. By ignoring these other important factors, it is not difficult to select rates to show an increasing cancer trend associated with almost any environmental factor. Dr. Sternglass's presentation, and his past work on similar subjects, indicate that the necessary care to control for these other factors has not been taken.

Another of the logical inconsistencies in this paper concerns the types of cancer investigated. In the first few pages, the discussion centers around levels of strontium 90, a bone-seeker, and the estimated radiation dose to the bone marrow for children drinking milk from certain dairies. Reference is made to studies linking childhood leukemia with fetal x-ray, and childhood and adult leukemia with the radiation exposures received by the Japanese A-bomb survivors. It is curious, then, that the discussion of death rates does not mention childhood cancer, nor leukemia at any age, but is confined to mortality at ages 50 or older from cancers of the lung, female breast, and pancreas. That is, the case for there being unusually

heavy exposures to sensitive tissues is made in such a way as to suggest an increased hazard in terms of childhood leukemia, and perhaps other childhood cancers and adult leukemias, but apparently there is no evidence of such increased risk. Instead, we are told that other radiogenic cancers, whose causal relationship to the discussed exposures seems tenuous at best, have increased due to these exposures. In fact, adult mortality from cancers of the lung, breast, and pancreas has been increasing steadily for a number of years; smoking, dietary factors, drug use, and changing patterns of diagnosis have all had something to do with this.

One of the difficulties in reviewing this paper is that the violations of good scientific practice in it are so many and so varied that it would be a vast undertaking to explicate each one. I have highlighted what I consider to be a few of the major problems, but there are numerous others also.

I am a statistician, professionally concerned with the logic of scientific inference. For the past 5 years or so I have worked principally on epidemiologic investigations of the relationships between radiation dose and cancer incidence and mortality in populations exposed to ionizing radiation, mainly the Japanese A-bomb survivors but also other irradiated populations. I am deeply concerned about radiation-induced cancer and other hazards of radiation exposures, and feel that the use of nuclear and radiologic technology should be based on a careful assessment of risks. Papers such as the reviewed one by Sternglass contribute only confusion to this process, and in fact, impede it by deflecting investigative resources from the work at hand. We trust this information will be helpful in your response to Ms. Juliette Zivic.

Yours sincerely,

*Charles E. Land*

Charles E. Land, Ph.D.  
Environmental Epidemiology Branch  
3C07 Landow Building  
Bethesda, MD 20014

C.P.A.

AUG 2 1978

Honorable James C. Cleveland  
House of Representatives  
Washington, D.C. 20515

Dear Mr. Cleveland:

This is in response to your letter of July 11, 1978. The Office of Radiation Programs has informally reviewed the report by Dr. E. J. Sternglass entitled "Mortality Changes Around Nuclear Facilities in Connecticut." It is unfortunate that a report of this kind, which was presented to a lay audience without any scientific review, has received the widespread discussion in newspaper articles to which you referred.

Dr. Sternglass has been presenting similar reports for the last 10 years which, on careful analyses, have been shown by a number of reputable scientists to be based on a highly selective and very biased use of mortality data. In every case we have found that Dr. Sternglass only uses data which support his pronounced views which are usually directed against nuclear power.

We believe the public health questions surrounding nuclear power and other sources of population exposure to radiation are too important to be treated irresponsibly. Because of this importance, we asked the National Academy of Sciences to review all recent findings concerning radiation health effects. Their report, which is due this fall, will include a discussion of Dr. Sternglass' reports. While I have no advance knowledge of Academy findings, I would be surprised if they placed much credence in his allegations. Certainly, to date, no reputable scientists have published any reports verifying his analyses.

Sincerely yours,

/s/

W. D. Rowe, Ph.D.  
Deputy Assistant Administrator  
for Radiation Programs (AW-458)

bcc: ORD  
Bob Dexter  
M. Thatcher  
AW  
AL

AW:460:H.Nelson:mwc 7-21-78 (CM02, 1021 380)  
CONTROL: AL-4580 DUE: 7-26-78  
RETYPE: mwc 8-2-78

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
THE CLEVELAND ELECTRIC	)	Docket Nos. 50-440
ILLUMINATING COMPANY, <u>ET AL.</u>	)	50-441
	)	
(Perry Nuclear Power Plant,	)	
Units 1 and 2)	)	

CERTIFICATE OF SERVICE

This is to certify that copies of the foregoing "Applicants' Answer to Sunflower Alliance, et al. July 13, 1982, Motion to Submit Additional Contention," were served by deposit in the U.S. Mail, First Class, postage prepaid, this 28th day of July, 1982, to all those on the attached Service List.



Robert L. Willmore

Dated: July 28, 1982

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
THE CLEVELAND ELECTRIC	)	Docket Nos. 50-440
ILLUMINATING COMPANY, <u>et al.</u>	)	50-441
	)	
(Perry Nuclear Power Plant,	)	
Units 1 and 2	)	

SERVICE LIST

Peter B. Bloch, Chairman  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dr. Jerry R. Kline  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. Frederick J. Shon  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Christine N. Kohl, Chairman  
Atomic Safety and Licensing  
Appeal Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dr. John H. Buck  
Atomic Safety and Licensing  
Appeal Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Gary J. Edles, Esquire  
Atomic Safety and Licensing  
Appeal Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Atomic Safety and Licensing  
Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Atomic Safety and Licensing  
Appeal Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Docketing and Service Section  
Office of the Secretary  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Stephen H. Lewis, Esquire  
Office of the Executive  
Legal Director  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Ms. Sue Hiatt  
OCRE Interim Representative  
8275 Munson Avenue  
Mentor, Ohio 44060

Daniel D. Wilt, Esquire  
P. O. Box 08159  
Cleveland, Ohio 44108

Donald T. Ezzone, Esquire  
Assistant Prosecuting Attorney  
Lake County Administration Center  
105 Center Street  
Painesville, Ohio 44077

John G. Cardinal, Esquire  
Prosecuting Attorney  
Ashtabula County Courthouse  
Jefferson, Ohio 44047

Terry Lodge, Esquire  
915 Spitzer Building  
Toledo, Ohio 43604