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August 10, 1982

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
CAROLINA POWER & LIGHT COMPANY)
AND NORTH CAROLINA EASTERN)
MUNICIPAL POWER AGENCY) Docket Nos. 50-400 OL
) 50-401 OL
(Shearon Harris Nuclear Power)
plant, Units 1 and 2))

APPLICANTS' RESPONSE TO "JOINT CONTENTIONS
OF INTERVENTORS" DATED JULY 13, 1982 --
CONTENTION II.d. (HEALTH EFFECTS)

At the Prehearing Conference held on July 13-14, 1982, Petitioners Chapel Hill Anti-Nuclear Group Effort (CHANGE)/Environmental Law Project (ELP), Conservation Council of North Carolina (CCNC), Kudzu Alliance (Kudzu) and Wells Eddleman proposed a number of joint contentions which combined and superceded various contentions previously proposed by the four Petitioners -- "Joint Contentions of Intervenors" dated July 13, 1982 ("Joint Contentions"). The second contention offered jointly by the four Petitioners was a six-part "Health Effects" contention ("Contention II"). Joint Contentions at 3-4. While Applicants did not object to the admission of paragraphs a, b, c, e and f of Contention II, the Board afforded Applicants an

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opportunity to review the new information in paragraph II.d. and to file a response in writing. Tr. 246. The NRC Staff opposed Contention II in its entirety.^{1/} Tr. 247-50.

Contention II.d. states the following proposition:

The long term somatic and genetic health effects of radiation releases from the [Harris] facility during normal operations, even where such releases are within existing guidelines, have been seriously underestimated for the following reasons:

* * * * *

(d) Substantial increases in cancer mortality rates have been observed in the vicinity of nuclear facilities. Sternglass, "Cancer Mortality Changes Around Nuclear Facilities in Connecticut", February, 1978.

Applicants object to the admission of Contention II.d. as a litigable issue in this proceeding. As the Commission is certainly well aware there have not been "substantial increases in cancer mortality rates" in the vicinity of nuclear power plants. While "studies" to the contrary have been touted by

^{1/} Applicants are in general agreement with the policy considerations underlying the position articulated by NRC Staff counsel at the Prehearing Conference, i.e. the issue of possible long-term somatic and genetic health effects of routine radiation releases from nuclear plants, within the guidelines established by Commission regulations, is not particularly related to the Harris Plant but rather is a generic issue more appropriately resolved in rulemaking. Unfortunately the Commission decision in Public Service Company of Oklahoma (Black Fox Station, Units 1 and 2), CLI-80-31, 12 N.R.C. 264 (1980) held that health effects from routine radioactive emissions are not barred from individual licensing adjudicatory proceedings. As will be discussed infra the Commission decision in Black Fox did, however, provide guidance to the Licensing Boards regarding the admission of health effects contentions for litigation in adjudicatory proceedings.

Ernest Sternglass for over a decade -- including the 1978 Connecticut study referenced in Contention II.d. -- all such studies and Sternglass' unscientific methodology have been universally discredited in numerous fora, including Commission adjudicatory proceedings. Thus, Intervenors have not provided an acceptable basis for proposed Contention II.d. nor have Intervenors met the requirements set forth in Black Fox for admission of a contention on health effects from routine radioactive emissions.

While the Commission in Black Fox held that health effects contentions were not barred from adjudicatory proceedings, it also found, as a matter of policy, "unnecessary litigation should be avoided." Black Fox, supra, 12 N.R.C. at 277. The Commission stated that "[i]t serves no useful purpose to litigate this [health effects] issue when there is no serious contest as to the result." Id. The Commission's decision not to prohibit, by rule, the litigation of health effects contentions in individual licensing proceedings was strongly influenced by the passage of some five years since the Appendix I environmental record had been developed and the belief that "'present thinking' be brought to bear in determining whether radioactive emissions to unrestricted areas from light water nuclear power plants pose an unacceptable environmental risk." Id. The Sternglass reference, in contrast, represents stale, unscientific, discredited "thinking" and cannot be the basis of a health effects contention in light of the Commission's admonition in Black Fox.

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 and for misusing data time and time again to fit his preconceptions. His studies and methodology have been litigated before Atomic Safety and Licensing Boards in adjudicatory proceedings and each time found wanting. 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), the Appeal Board rejected Sternglass' allegation that operation of the reactor would increase infant mortality. The Appeal Board 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.

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 and methodology can be found in Long Island Lighting Co. (Shoreham Nuclear Power Station), ALAB-156, 6 A.E.C. 831, 850 (1973) (citing Columbia University), and Toledo Edison Company (Davis-Besse Nuclear Power 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 and unscientific use of data also has been noted by the National Academy of Science in the Report of the Advisory Committee on the Biological Effects of Ionizing Radiation ("BEIR"), "The Effects on Populations of Exposure To Low Levels of Ionizing Radiation," (1972), at 178:2/

2/ The Commission relied on the 1972 BEIR Report in developing the Appendix I guidelines. As will be demonstrated infra, the 1978 Sternglass Connecticut study uses the same unscientific methodology rejected in the 1972 BEIR Report. In Black Fox the Commission stated that absent evidence to the contrary the Boards could rely on the health effects estimates in the 1972 BEIR Report. 12 N.R.C. at 277. There is no reason in logic why the Commission's endorsement of the 1972 BEIR Report should not apply equally to the rejection of Sternglass and his unscientific methodology by the BEIR Advisory Committee.

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 Report of the Advisory Committee on the Biological Effects of Ionizing Radiation, "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation," (1980), 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 to note the observations made by the U.S. Public Health Service on the Sternglass paper cited by Intervenors. In a letter by Dr. Charles E. Land of the Environmental Epidemiology Branch, U.S.P.H.S., 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 A. Also attached as Appendix B is a letter by Dr. Rowe, Deputy Administrator for Radiation Programs, Environmental Protection Agency, to Representative Cleveland that is critical of the 1978 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 factually inaccurate statements of personal opinion as bases -- which, if

sufficient, would completely undermine the Commission's basis requirement. This is particularly true for a health effects contention in light of the admonition to the Boards by the Commission in Black Fox regarding "unnecessary adjudication" where "there is no serious contest as to the result."

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 merit.

Although Sternglass professes to be an expert on low level radiation, the above cited sources constitute authoritative rejection of Sternglass' assertions of expertise, having 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 on health effects in an NRC adjudicatory proceeding. Thus the Board should reject

Contention II.d. as utterly lacking in basis and as failing to meet the requirements for a health effects contention articulated in Black Fox.

Respectfully submitted,

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DATED: August 10, 1982



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH
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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 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.

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

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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,

ISI

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

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RETYPED: mwc 8-2-78