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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

October 28 1983

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

Glenn O. Bright
Dr. James H. Carpenter
James L. Kelley, Chairman

In the Matter of CAROLINA POWER AND LIGHT CO. et al. (Shearon Harris Nuclear Power Plant, Units 1 and 2)	Dockets 50-400 OL 50-401 OL ASLBP No. 82-468-01 OL

Joint Intervenors' Response to Applicants' Motion for Summary Disposition on Contention II

This response is filed under an extension of time approved by Applicants' attorney Baxterand Staff attorney Barth, orally approved by Judge Bright in Judge Kelley's absence, of 2 days.

Joint Intervenors recognize that for purposes of this proceeding, facts we do not here refute are deemed admitted. But we emphasize that we do not concede that Applicants' "facts" are actually true.

We here concentrate on the "General Facts", none of which appears to be accurate. We stand on our discovery responses, but add the following:

As to "General Fact"("GF"hereinafter) 1, claiming that long-term somatic and genetic health effects have not been seriously underestimated, it appears to rest on Fabrikant's affidavit at pp 76-78. Fabrikant claims that Gofman's "worst case" is a 40% increase in cancers per rad (p.77). But Gofman himself, in citing his cancer estimates vs. BEIRs (Radiation and Human Health, 1981,p.314, gives the following estimates:

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Gofman's Table (p.314) of Cancer Deaths per Million Person-Rem	
BEIR (1979, p.342) " relative risk"*	177-353
BEIR (1979, p.342) "absolute risk"*	70-124
UNSCEAR (p.414, 1977)	100
Gofman	3,771

*methodologies

It is very obvious from the above that Gofman's estimate for a "population of mixed ages" (Gofman, p.314) such as would be living around the Shearon Harris Nuclear Power plant, is more than ten times the highest of the BEIR estimates. Applicants fail to refute this fact. If the real cancer rate is more than ten times as high (ten times as many deaths result, as Gofman states, ibid.), that is a "serious underestimate". Applicants' misstatements in affidavits or otherwise cannot paper over this disputed issue of fact.

Applicants' own affidavit (Fabrikant, p.78) gives Gofman's genetic damage estimate as 3.2 to over 18 times BEIR-III's estimates. If Gofman is right, the underestimate is serious.

Gofman is not the only author to make such estimates, though we had not received documentation cited below until about a week ago. Rosalie Bertell (Journal of Japanese Scientists, 18 (2), p.16ff (1983), copy appended hereto) gives age and sex-adjusted estimates of excess cancers per 10,000 man(sic)-rem, 5.3 to 15.8 times UNSCEAR(s 1977 estimates and about 2 to over 5 times BEIR-III's estimates. While Joint Intervenors believe Gofman's approach (non-age-adjusted) reflects the cancer and other radiation-induced health effects that would be seen in a real population (which is not full of healthy 25-year-olds only, but includes all ages, both sexes, and all kinds of people), this estimate also refutes Applicants' GF 1.

Applicants persist (Fabrikant at 76-78) in comparing cancer deaths and genetic defects resulting from Harris to the level of such

expected in the general population, and arguing the increase isn't much. Of course, it is to those who die or are otherwise harmed. But it is also inappropriate, as the cost@benefit balance in this case is not between the Harris Nuclear Plant and all other causes of cancer or genetic damage, but between the Harris plant's claimed electricity output, and the cancer deaths and other damage (e.g. genetic) resulting from its operation. Applicants should be arguing that the deaths are "worth it" to get the electricity. But in that argument, an increase of 10 or more times in the deaths (Bertell, op. cit., quotes Gofman's estimates as 12 to 14 times BEIR*III's for cancer deaths), or genetic defects (up to 18 times, per Applicants' rendering of Gofman, see p.2 above), could tilt the balance. Applicants simply fail to address this issue.

The same Bertell article cited above (p.2) also shows that looking at deaths 11-30 yrs. BEIR-III limited the latency period considered, after exposure, only. Bertell's paper (p.1, bottom) points out that this method leaves out "leukemias, lymphomas, bone or brain cancers expected to occur prior to the '11 years after exposure' cut-off. It also fails to count those tumors which occur more than 30 years after exposure." This succinctly refutes "GF" #2, which claims that BEIR-III "correctly understood the latency periods for cancer". The estimates of BEIR-III are clearly based on incorrect assumptions, including no more cancers after 30 years, and no cancers before 11 years after radiation exposure.

Another paper by Bertell (received last week), Radiation Exposure and Human Species Survival (Environmental Health Review 6/1981, pp43-52, points out that BEIR-I and III fail to deal with "The question of mild mutations, slow degradation of the gene pool, and slow species death(associated) with increased nuclear technology" as raised by Hermann Muller (J. Am. Pub Health Assn, 1964, her reference 1)

Applicants' support of "General Facts" 4,5,6 and 7 is of the "you haven't proved it enough to convince US" variety. Both Drs. Morgan (whose qualifications and record, including heading both the ICRP and the NCRP, are at least as impressive as Dr. Fabrikant's), and Gofman believe that a supralinear hypothesis is more consistent with low-level radiation exposure's actual health effects, than is the BEIR-III analysis. See Gofman 1981, pp 334-7,372-379,380-385,467-468, 673-679, 697, and 401-402; Morgan 1978 (Bulletin of Atomic Scientists, 40:30-40, Sept 1978). Applicants claim (Fabrikant affidavit at 36) that Morgan is wrong because he relies on the work of Mancuso, Stewart, Kneale and others, which they claim is "thoroughly discredited". But, since a health physicist of Morgan's stature relies on some of this work (his conclusion on M*S*K is that the criticisms do not undercut the basic conclusion that low-level radiation is more dangerous than had been believed, see e.g. 1978 op cit above), it is not correct to say that this work is "discredited". Rather, the problem appears to arise from the nuclear industry's desire to discredit its critics. Applicants' witness Fabrikant claims (p.37) that all the authorities relied on by Joint Intervenors are simply giving "the authors' current personal interpretation of old data which have been available for years or decades", and thus are wrong. But what BEIR*III does is the same thing, relying heavily on the A-bomb survivors and other "old data" and giving its authors' interpretations. Applicants do not acknowledge the scientific controversy between Morgan, Gofman, Bertell et al as a real issue, but the citations to scientific papers given above and in Joint Intervenors' discovery responses are real issues of fact. Applicants' affiant's opinion otherwise is just an opinion, not a fact.

Applicants' "GF" #8 rests on wishful thinking, i.e. that there will be found some cures for cancer and (all) genetic defects so that the long-term health effects of the radioactive emissions from fueling (and mining, milling, converting and fabricating fuel for) Harris and running it will just vanish at some point. Applicants offer no facts to show that such cures will be found, beyond the amount of money spent in research on these issues. Much money could be spent on perpetual motion machine research also, but that doesn't mean one can be found (or that if one were "found" it would be economical or affordable or workable). Likewise for future cancer and genetic research: there is no guarantee that a workable, affordable and practical cure for these problems will be found. Applicants admit the central fact: health effects of nuclear plants continue long after the nuclear plant shuts down. Their arguments don't alter this fact -- they just seek to prevent it from being looked at.

As to GF #9, Morgan observed in a review of Sternglass' work on the cancer rates near Shippingport, PA, that there wasn' t good enough data to prove the case one way or another, but that the nuclear plant was the logical source for increased radioactive material localized in that area (See Bull.At. Sci., 1978 article cited above). Recent news reports say that cancer rates near the Savannah River Plant (a federal nuclear facility also claimed by its operators to be operating safely) have soared and are among the highest in South Carolina; before opening of SRP, cancer rates in those same areas were among the lowest in South Carolina.

As to "GF" 10, Applicants fail to show that the NRC translation 520 estimates would not exceed NRC's even after NUREG*0668's alleged errors were "corrected". Further, NUREG-0668 isn't a final document. It has not been peer reviewed. Applicants appear to think that's OK when a document favors their position.

"GF" 11 and 13 are inaccurate as stated in the references to NRC Translation 520. NRC claims that they just use the elements ignores the fact that elements occur in valence states, which does affect their reactivity and thus their chemical uptake by living organisms. NRC's statement, plus the Washington Post 11/11/79, if anything add credence to the contention that NRC ignored the more chemically reactive forms of radionuclides in its models.

"GF" 12 relies on an affidavit claiming health effects will be LESS when radionuclides are transported into the lungs. This contradicts Applicants' affidavit by Wayne Lei (re Eddleman 80, 9/1/83) at page 2 which states "a larger dose of radiation will be received by inhalation of gaseous particulates than from any other possible distribution pathway." Applicants can't have it both ways. They are also silly to suggest that a radionuclide attached to a microparticulate from coal-fired power production (e.g. 0.2 microns) would increase the size of the particulate enough to measurably affect its likelihood of being brought into the lung (e.g. to the alveoli) or retained there.

"GF" 14 is a basic misreading of the contention. The omission of dose from some nuclides (which Applicants admit is done) is PART of the underestimate in NRC models. Applicants do not disturb the basic fact that omitting nuclides from dose estimates makes those estimates less (See, e.g. LEAF study of Wisconsin radionuclides exposure, Methodologies for the Study of Low-Level Radiation, as cited in our discovery responses.)

"GF" 15 is directly contradicted by published papers by Bertell and others as cited in our discovery to Applicants. Since it relates to 37B more than to Joint II, we adopt here Eddleman's Response to Summary Disposition on 37B.

"GF" 16 is simply the opinion of Applicants' affiant and a number of groups like BEIR (Though some members of BEIR, like Radford, believe that BEIR underestimates). Applicants seem to believe that no scientific controversy exists when a majority opinion is one way and a few scientists go the other. Both the 1981 Nobel Prize in Physiology and Medicine (to a scientist whose Prize-winning work was ridiculed when she originally published it), and the example of scientists from Copernicus and Galileo to Einstein show how illogical this is. The controversy is about facts, not just opinions, and the fact that scientists disagree shows there are genuine issues of fact.

Contrary to"Specific Facts" 20 and 21, genetic and radiation damage to workers at the plant does affect the public, both by intermarriage (via offspring) and because the workers are people too.

"SF" 22 is pretty well demolished by Gofman, as shown on discovery.

"SF" 23 ignores alpha emitters and assumes that all Harris radiation releases will be "normal", an unsupported idea.

"SF" 25 is clearly false. Alpha emitters have serious health effects, the mostobvious being lung cancer from inhalation of alpha emitters or particles to which alpha emitters are attached.

"SF" 28 is irrelevant given the radiation-related components of other diseases, though this is morerelevant to Eddleman 37B.

"SF" 29,30 and 31 are false or irrelevant. Chromosome damage in humans has been detected at very low radiation doses. Not every genetic effect has the same proportionality to dose that other genetic defects may have. SHNPP "routine" operation seems to imply no accidents of a minor nature, but actual operating nuclear plants have such accidents often and sometimes release radiation in excess (e.g. CP&L's Brunswick plant was fined by NRC for unmonitored uncontrolled release of radiation).

"SF" 32 is contradicted by the MSK studies and Gofman's study of the Hanford radiation data, both of which have been published in the peer-reviewed scientific literature. Of note, Gofman took the doubling dose approach in his peer-reviewed article in Health Physics on the Hanford workers. Gofman shows (Radiation and Human Health, 1981, pp 364-366) that this is equivalent to his cancer-dose methodology in his 1981 book, using a simple conversion. Thus, Applicants are wrong to claim that Gofman's methodology has been discredited.

"SF"s 37 (and especially 38) are opinions, not facts. If the claims "do not serve as a basis for questioning the BEIR analyses", why did Applicants stipulate to the admissibility of Joint Contention II?

"SFs" 41-43 are based on misreading of our discovery responses. We cited specific facts, not the overall views of various authors, as supporting our view.

"SF" 46 is directly contradicted by Gofman, 1981 op cit, pp846-847. Gofman says the "mutational component" concept is wrong and also critiques the BEIR estimates on other grounds.

"SF" 47 is contradicted directly by Bertell, Environmental Health Review, June 1981 (copy appended) p.43.

"SF" 48 ends with a false conclusion "scientific evidence does not warrant adoption" of supralinearity. Proof beyond a reasonable doubt is not an appropriate standard for conservative estimates of radiation health effects. Rather, the higher estimates suggested by the data should be used.

"SF"s 49 and 50 are judgments of Applicants and their affiants, not facts. There is no scientific "consensus" on radiation health effects, and the idea that a majority view of scientists would determine facts is silly.

"SFs" 51-453 again are based on misreadings of Joint Intervexnors' discovery.

"SF" 54 is directly contradicted by NRC Translation 520 and is nor covered by the "refutation" of NUREG-0668.

"SF" 55 is a conclusion/opinion contradicted by Gofman and Morgan, at least as to the accuracy of BEIR's consideration of alpha radiation. See our discovery responses.

"SF" 56 makes no sense. If the sources cited do not support the contention, why did Applicants stipulate to admitting it?

"SF" 58 is wrong in that K.Z. Morgan, when on a commission of inquiry into Sternglass' allegations re Shippingport PA, observed that the defect was that there wasn't good enough health record-keeping to confirm or deny Sternglass' basic charge that the reactor was leading to radiation-induced health effects near it.

"SF" 60 is not true; some authorities (e.g. Morgan) regard Johnson's work as credible.

"SF" 61 supports 37B in that pain and suffering of victims of radiation induced diseases is not considered in Harris NEPA cost-benefit analysis, but that is Eddleman's contention.

"SF" 62 is emphatically false, see GF 1 above for details.

"SF" 63 is false, see Bertell, J. Japanese Sci., though it appears Applicants didn't know of this cite (as we didn't) when they filed their motion. Bertell has also made such estimates.

"SF" 64 is most false, see Gofman 1981 p.314 as cited under GF 1.

"SF" 65 is incomplete: the range of underestimate given by Gofman is from a minimum of about 3x up to about 20x.

"SF" 66 is irrelevant: The health effects of Harris plant radiation are properly compared to its alleged benefit, electridty.

"SF" 67 is just "GF" 8 restated: it's refuted above.

"SF" 71 is false in that normal operation of Harris is assumed.

"SF" 72 is contradicted by Applicants' stipulation to Joint II(c)

"SF" 73 is irrelevant, except insofar as the calculational parameters and dose conversion factors are underestimates as explained in NRC translation 520, and to that extent it is false and misleading.

"SF" 74 is false, see e.g. "GF" 12, p.6 above.

"SF" 7~~2~~9 is wishful thinking, not a fact; further, under supralinearity this imbalance would lead to an increase in effects (higher effects per rem at lower-than average dose would more than offset lower effects per rem at higher than average dose, since the slope of the dose-response curve is declining as dose increases).

"SF" 87 shows that, contrary to "GF" 12, there was NO consideration of fly ash by Applicants or Staff in dose estimates. Lei affidavit for Applicants, p.2 9/1/83 (cited above re "GF" 12) contradicts this alleged "fact~~x~~": Applicants vs. Applicants, one must be wrong.

"SF" 82 is false, see Thuillier article cited by Eddleman in opposing summary disposition of Eddleman 80.

"S~~F~~" 83-84 are not so,e.g. deposition on food and particles remaining there is not taken into account.

"SF" 88 is false in its second sentence (or misleading) in that radionuclides adsorbed on ash particles won't increase size significantly enough to interfere with entrance into the deep lung.

"SF" 89 is false because macrophages tend to eat these insoluble particles in the lung (see Aranyi et al, as cited in discovery).

*NOTE: Daniel F. Read advised me 10-27 by phone that he is seeking an extension of time until 10-31 to file Joint Intervenors' memorandum of law in response to summary disposition on Joint II. He stated he had tried assiduously to reach me earlier, without success.

For the Joint Intervenors,

Wells Eddleman

LIST OF MATTERS IN DISPUTE ON JOINT CONTENTION II

In deference to my typing speed and the press of time, I request the following be accepted as such a list, as detailed briefly in Joint Intervenors' response to Summary Disposition on Joint II:

Alleged General Facts 1 thru 16 inclusive are in dispute.

Specific facts 89,88,87,84,83,82,79,74,73,72,71,67,66,65,64, 63,62,61,60,58,56,55,54,53,52,51,50,49,48,47,46,43,42,41,38,37,32, 31,30,29,28,25,23,22,21, and 20 are in dispute or misleading and/or irrelevant as stated in the Response to Summary Disposition on Joint II.

The most critical disputes are:

1. Gofman gives estimates of cancer death risk more than 10 times those of BEIR-III, not 1.4 times (Rad & Human Health 1981, p.314).

2. Both Gofman's and Bertell's estimates of cancer deaths, and Gofman's estimates of genetic health effects, due to radiation are significantly higher than those of BEIR-III, NRC or Applicants.

3. The work of the authors cited to support Joint Contention II (for admission and on discovery) is not discredited, e.g. the eminently qualified health physicist K.Z. Morgan credits supralinearity, the higher risk shown by the Mancuso-Stewart-Kneale studies, etc.

4$. Applicants improperly seek to compare radiation-related health effects of Harris nuclear plant operation to other health effects, instead of to the "Benefit" of Harris electricity.

5. NRC models do use less reactive forms of radionuclides in figuring transfer factors.

6. Health effects from radiation associated with operation of Harris will last for millions of years; the 100-1000 year period considered, or the 40-year period of operation, both give less effects.

7. Applicants misread specific facts cited on discovery (e.g. by Rossi, Radford) as statements of support for Joint Intervenors' overall position. Science is a matter of facts, not an opinion poll.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of CAROLINA POWER & LIGHT CO. Et al.) Dockets 50-400
Shearon Harris Nuclear Power Plant, Units 1 and 2) and 50401 O.L.

CERTIFICATEOF SERVICE

I hereby certify that copies of Joint Intervenors' Response to Summary Disposition Motion on Joint Contention II, W& E Response (ditto) on 37B, W.E. Motion to Compel Discovery of NrC Staff HAVE been served thi 28 day of October 1983, by deposit in the US Mail, first-class postage prepaid, upon all parties whose names are listed below, except those whose names are marked with an asterisk, for whom service was accomplished by same means, enclosing one copy of referenced documents to the Board, Staff OELD and Applicants, and 3 copies to NRC Docketing and Service

*Judges James Kelley, Glenn Bright and James Carpenter (1 copy each)
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