.393

(2) RELATED CORRESPONDENCE

UNITED STATES OF AMERICA

April 12, 1984

NUCLEAR REGULATORY COMMISSION

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, Unit 1)	Docket 50-400 OL ASLBP No. 82-468-01 OL

Wells Eddleman's Response to
Applicants' Interrogatories Re 9, 11, and 132(c)(2)

This response is timely under extension agreed to by Applicants' attorney Baxter.

RESPONSE TO GENERAL INTERROGATORIES

G1(a) see specific responses for answer or objection. (b) see specific responses.

2(a) see specific responses. No page citationmeans whole document. (b) see (a). 3(a) and (b) See specific Responses. U. I don't know. Analysis incomplete.

RESPONSE TO SPECIFIC INTERROGATORIES

(*L) 9-10(a) Analysis not complete; see UCS 2-7-84 petition re EQ for some examples. Basically, underqualified or unqualified equipment, safety-grade or not, can, by failing (e.g. shorting o ut, changing resistance or resistivity, failing to transmit current or signals, distorting signals, water hammer, air hammer, etc.) cause other failures. The appropriate mathematics involve catastrophe theory and the theory and science of x cascaded systems in sophisticated analyses; common sense and great patience and a large memory is more or less enough for more ordinary analyses. The point is that a signgle failure or one or more ordinary, "routine" or perhaps

D803

apparently unrelated failures can set off a cascade of events leading to a serious accident. TMI-2's accident is a good example. Silly attempts to blow out an ion exchange column that seemed to be clogged, got water loose in control systems that tripped the reactor and feedwater, putting the auxiliary feedwater that was valved shut into a vital position. Upon the failure of that the reactor overheated, the PORV vented as it should, stuck as it shouldn't, went undetected (small break LOCA) and within 4 hours there was a general emergency and soon thereafter offsite radiation releases of undetermined amount. In sum, systems interaction allows Keystone Kops events in Rube Goldberg machines like nuclear power plants. You ignore it at your and everyone else's peril. Adequate treatment of interaction of so many items and systems is extremely difficult.

(b). Send me a copy of 10 CFR 50.49(b) and you can get an answer. There's no (b) in my 1983 copy of 10 CFR, at 50.49.

(c) I'll try to find a better cite for both.

9-11(a). Comparison of (a) similarity of the systems (b) effects on one system versus another (c) similarity of effects on one system versus another (d) conservatism and analysis of similarities and differences. (b) virtually all of them, as far as I know, which are "qualified" by comparison or which have not been adequately qualified as I have defined or used the phrase "adequately qualified".

9-12(a) Assuming that temperatures would not exceed certain values, based on inadequate or misleading information or opinion or conclusions. (b) I'll try to find a reference. (c) All those whose temperature tolerance, or the temperature tolerance of critical parts, components or systems within them, was established by inference. See UCS 2d supplemental petition of Feb 1984.

(d) If Bonzon or the UCS document don't identify them, I'm not sure I know.

9-13(a) I haven't got a complete all-inclusive definition other than the plain meaning of the words. But the meaning includes use of methods that separate different stresses or conditions (e.g. being wet, exposed to steam, at high temperature or in a varying temperature field, being x exposed to a high radiation field after long exposure at lesser radiation levels, being penetrated or touched by radioactive material, being physically impacted by debris of missiles, being exposed to oxygen or nitrogen or air, etc) which the item or system might be or is exposed to simultaneously.

(b) Analysis currently incomplete, but just look at it and you can see that it doesn't comply with the above. For actual accidents, you underestimate radiationfields on much equipment, ignore immersion of many items of equipment, and ignore systems interactions and simultaneous exposures and exposure interactions such as those described in response to (a) above and in answers to 9-3 and other past interrogatories.

(c) I haven't found any that I think <u>isn't</u> subject to this problem so far. Given CP&L's "we only do what someone makes us do" attitude toward testing and analysis of equipment, I'd infer from that that it applies to all the equipment at SHY which might come into play or be exposed to radiation, water, heat, steam, etc in an accident or in normal operation.

9-14(a) Analysis incomplete. It includes that the effects or long-term exposure to a given dose are greater than the effects of the same dose more rapidly delivered in a test procedure. It also includes radiolytic interactions in high radiation fields and chemical interactions and physical interactions (e.g. cracking of insulation, radiolysis of it and xxxxx chemical interactions with the exposed parts and radiolytic products or radicals). I can't begin to list all the ways CP&L understates radiation effects, but try the above plus the previously cited works of Gillen etal, Clough etal, Bonzon, UCS, etc.

(b) All insulators or materials of polymeric structure the same or similar to those having experienced the identified effects; also metals, semiconductors, anything that can be damaged by radiation, so far as I know.

9-15(a) Differences. (b) Look at the test reports. Any difference is sufficient to identify an item, and you can do it as easily as I can. I don't have a list ready to hand now. If I find or make or get one, I'll supply it.

9-16(a) Configuration means the relative position of things one to another. Orientation means which directions things face, or more simply, which end (or side or corner) is up, down, facing or not facing something, etc. (b) virtually all of it. I don't recall any such analysis by CP&L.

9-17(a) To the extent that SHNPP's program incorporates anything criticized in any such criticism, or fails to do anything the criticism says it should, of course it does. It's silly for me to act like CP&L and commission a piece of paper specifically designed to say things about the plant that CP&L wants to hear.

(b) Analysis incomplete. You can figure it out as easily as I can, I'd hope, if you're competent.

(c) I haven't checked this. NRC regulatory standards for EQ are inadequate, which is why the UCS keeps suing them, filing for relief, etc.

11-13(a) Free radicals produced in smaller numbers would be more likely to interact with intact insulating molecules rather than other free radicals. Radiation can also further energize or split free radicals, creating a synergistic effect.

(b) These reactions are fairly complex, I believe, but are basically oxidation, depolymerization, etc. I need more into to give a more complete description.

(c) radiation from induced radioactivity. By spreading out the low-dose radiation, and maintaining a low-but-above-background dose rate when direct radioactive contamination or direct radioactivity is absent.

(d) secondary emission after impact of radiation. The secondaries are at lower energy, thus lower dose rates; also they originate inside the material they emanate from, e.g. insulators or things near them.

(e) try a physics or chemistry (polymer chemistry) a text.

11-14(a) Look at 13(d) above. Reradiation means radiation resulting from impact of or interaction with radiation. (b) Look at (c) in 13 above. (c) Jacketing of the cable or insulator. See (c) above. (d) see 13(c) above. (e) see (e) above.

11-15(a) I haven't had a chance to check yet and still get my other work done. (b) Did I say that these effects are bounded by the gamma effects? I'm not sure that's true. Analysis continues.

11 - 16(a) Common sense. Cracks propagate pretty xxx fast (or can) when they form. Such failures are random in the sense that they cannot be individually well predicted in time without excessive effort, and maybe not even then. More frequent inspection is supported by the opinions of non-witness experts I have talked to, though I consulted none of them to make this answer and object to identifying them -- no showing CP&L can't obtain info on this matter by other means. I'll look for documents. (b) Analysis incomplete.

RESPONSES ON 132(C)(II)

(a) You can do it as easily as I can. I haven't had time to do it yet. (b) You haven't provided the info necessary to do this. Your DCRDR re this is illegible. But the DCRDR does say what's on the panels, and that was put into the contention. Your failure to provide information does nothing to justify your position. (c) Isn't it obvious? Even 20-20 vision isn't adequate to read small lights or meters, and information overload as your own DCRDR says, is a

problem. (d)(e) Haven't had time yet.

7(a) Info needed not yet provided by you. (b) Look at your attachment 1 (I can't believe this is a serious question). The operator console "19" is directly [illegible] through panels 1 and 2 from panel 6. On this scale drawing, operator console 19 is directly through panels 2 and 3 from panel 7. I amend my answer to say the view of 6 and 7 is blocked by 1, 2 and 3 therefore.

8. Until you provide more info, I can't provide more detail.

9. Analysis continues when I have more time. If you can't read information or it can't be coordinated in an accident so that the info is not useful or timely or accurately available (e.g. as described in the contention) you are violating GDC 1 by not having your equipment safely designed and able to perform its functions, if the problem is caused by the equipment layout. Setting this layout into concrete before the NRC finished reviewing your nonstandard DCRDR is also a mistake: mismanagement, and bad design to the extent it does not rectify mistakes made that are identified or expressed in the contention.

10. Have you ever observed a fluorescent bulb at partial voltage, partial power, or when current is interrupted. It does these things. I'd hope CP&L would know that much.

11. That's the opinion of an eye doctor (name not recalled) who examined my depth perception, and who regularly examines airline pilots and Air Force pilots and pilot trainees, or did in 1976 and years previous to that.

12. Given my general health, I have set no specific date. I'll do it when I can, and I'll let you know when I've done it and we can set a place and time.

13. Not that it's relevant, but it's a tape of Helen Caldicott, I believe addressing nuclear power, weapons and related insanities. It's been a long time since I looked at it.

ATTEST: The above is true to the best of my present knowledge and belief, 2-12-84 Wells Eddleman