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Docket Nos.: 50-400
and 50-401

MEMORANDUM FOR: J. J. Kramer, Deputy Director, Division of Human Factors Safety
R. E. Cunningham, Director, Division of Fuel Cycle & Material Safety
J. P. Knight, Assistant Director for Components and Structures Engineering
W. V. Johnston, Assistant Director for Materials and Qualification Engineering
D. R. Muller, Assistant Director for Environmental Technology
W. Butler, Acting Assistant Director for Reactor Safety
L. S. Rubenstein, Assistant Director for Core and Plant Systems
R. W. Houston, Assistant Director for Radiation Protection

FROM: Thomas M. Novak, Assistant Director for Licensing, DL

SUBJECT: TRANSMISSION OF CONTENTIONS ADMITTED BY THE BOARD ON SHEARON HARRIS

The purpose of this memo is to disseminate the contentions regarding Shearon Harris which have been admitted by the Licensing Board. Brief descriptions of the contentions have been prepared and are enclosed as Enclosure 1. A preliminary identification has been made of the branch expected to have lead responsibility for each contention. The addressees are requested to confirm whether or not the match-up is appropriate, and also identify where secondary responsibility should be assigned. The contentions themselves, as written up by OELD and received last week, are enclosed as Enclosure 2. It is hoped that early focussing of attention on these issues by the individual reviewers will facilitate resolution and/or reduce the effort toward preparation of testimony. Branch positions on the contentions should be incorporated into the FES or the SER, whichever is available and appropriate.

Please contact the Project Manager, Dr. N. P. Kadambi, if you have any questions.

Original signed by:
Thomas M. Novak

Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

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Enclosures:
As stated

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DATE	1/17/83	1/1/83	1/19/83				

NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY USGPO: 1981—335-960

Enclosure 1

BOARD ACCEPTED ENVIRONMENTAL CONTENTIONS	BRANCH WITH PRIMARY RESPONSIBILITY
1. Effects of hydrilla verticillata on the reservoir.	EEB
2. Environmental effects of spent fuel storage.	AEB
3. Costs of regulatory programs.	AEAB
4. Environmental effects of cooling tower blow down.	EEB
5. Adequacy of Buckhorn Creek to satisfy water needs.	HGEB
6. Analysis of bio accumulation-plant-flowers-bees-honey-man exposure pathway.	RAB
7. Effects of a range of plant capacity factors.	SAB
8. Deficiencies in the cost/benefit analysis related to operating costs.	SAB
9. Corrections of construction and operation payroll.	SAB
10. Consideration of health effects other than cancer.	RAB
11. Health and safety effects of low level waste disposal.	METB
12. Condenser fouling by clams and barnacles.	EEB
13. Deficiencies in the mixing and dispersion models.	HGEB
14. Effects of chemical releases.	EEB

BOARD ACCEPTED SAFETY CONTENTIONS	BRANCH WITH PRIMARY RESPONSIBILITY
1. Management Capability.	LQB
2. Health effects of normal operation radiation releases.	RAB
3. Adequacy of TLD's to monitor occupational exposure.	RAB
4. Calibration and inspection of monitoring equipment.	RAB
5. Capability of monitoring equipment to determine types and amounts of specific radionuclides.	RAB
6. Steam Generator design.	RSB
7. Spent fuel storage and transportation - interaction with other CP&L nuclear plants.	AEB
8. Consequences of Jordon Lake Dam break.	HGEB
9. Adequacy of reactor water level indicator.	ICSB
10. FSAR non-compliance with NUREG-0588 (Environmental Qualification)	EQB
11. Radiation effects on polyethelene insulators.	EQB
12. Improper inspection of pipe hanger welds.	QAB
13. Water hammer effects on FW, ECCS, main steam system and their components.	ASB
14. Plastic parts of spent fuel cask valves would melt in a fire.	FCTC (NMSS)
15. Testing of shipment casks.	FCTC (NMSS)
16. Alleged bad record of prime contractor.	LQB
17. Control room design analysis.	HFEB

CAB DRAFT
10/7/82

CONTENTIONS ADMITTED

JOINT CONTENTIONS

ADMITTED

1) The applicants have not demonstrated the adequacy of their managing, engineering, operating and maintenance personnel to safely operate, maintain and manage the Shearon Harris Nuclear Power Plant as evidenced by their record of safety and performance at their other nuclear power facilities. A pattern of management inadequacies and unqualified and/or inadequate staff is likely to be reproduced at Shearon Harris Nuclear Power Plant and result in health and safety problems.

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

(a) The work of Mancuso, Stewart, Kneale, Gofman and Morgan establish~~ed~~ that the BEIR-III Report (1980 report of the National Academy of Sciences' Committee on the Biological Effects of Ionizing Radiation, entitled "The Effects on Populations of Exposure to Low-Levels of Ionizing Radiation") (1) incorrectly understood the latency periods for cancer; (2) considered only expressed dominant genetic defects rather than recessive genetic defects; and (3) failed to use a supra-linear response rather than a threshold or linear-or-less model to determine low-level radiation effects.

(b) Insufficient consideration has been given to the greater radiation effects resulting from internal-emitters due to incorrrect modeling of internal absorption of radionuclides, and underestimation of the health and genetic effects of alpha, beta and neutron radiation on DNA, cell membranes and enzyme activity. (Reference: sources cited in Eddleman 37(F).)

(c) The work of Gofman and Caldicott shows that the NRC has erroneously estimated the health effects of low-level radiation by examining effects over an arbitrarily short period of time compared to the length of time the radionuclides actually will be causing health and genetic damage.

(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.

(e) The radionuclide concentration models used by Applicants and the NRC are inadequate because they underestimate or exclude the following means of concentrating radionuclides in the environment: rainout of radionuclides or hot spots; radionuclides absorbed in or attached to fly ash from coal plants which are in the air around the SHNPP site; and incomplete mixing and dispersion of radionuclides.

(f) In computing radionuclide concentrations in the environment, less reactive rather than more reactive forms of radionuclides are used in the computation, and certain radionuclides are ignored. (Reference: Literature sources cited in Eddleman 37(10)).

2- 4) Applicants intend to rely on thermolminescent dosimeters (TLD's) as the dosimeter of record to monitor occupational radiation exposure. Because of TLD inaccuracies and their lack of realtime monitoring capability, these devices are inadequate to assure worker safety and health. Applicants should be required to use portable pressurized ionization monitors in support of workers in radiation hazard areas to corroborate the exposures indicated by the TLD's.

3- 5) Applicants intend to calibrate and inspect continuous air monitors and portable air samplers only once annually. Such infrequent inspection and calibration appears inadequate to assure the ability to provide accurate monitoring in the event of an emergency. Applicants should be required to inspect and calibrate these monitors and samplers frequently enough to assure their accuracy within plus or minus 5% in the event that they are needed.

4– 6) The radiation detection and monitoring system of SHNPP is unable to assure that in-plant and off-site emergency response personnel receive timely and accurate information necessary to protect employees and the health and safety of the public under the ALARA standard. The monitoring system is not able to promptly detect the specific radionuclides and their amounts being released inside and outside the plant.

5– 7) Applicants have failed to demonstrate that the steam generators to be used in the Harris Plant are adequately designed and can be operated in a manner consistent with the public health and safety and ALARA exposure to maintenance personnel in light of (1) vibration problems which have developed in Westinghouse Model D-4 steam generators; (2) tube corrosion and cracking in other Westinghouse steam generators with Inconel-600 tubes and/or carbon steel support plates and AVT water chemistry; (3) present detection capability for loose metal or other foreign objects; and (4) existing tube failure analyses.

CCNC CONTENTIONS

ADMITTED

6- 4) The Applicant's request for authorization to store source, special nuclear and by-product material irradiated in nuclear reactors licensed under DPR-23, DPR-66, and DPR-71, should be denied as there has been no analysis in the ER of the environmental, safety, and health effects of transportation of radioactive wastes and other material from the other reactors to SHNPP and no analysis of safety risks from long-term storage. The Applicant's reliance on 10 C.F.R. 51.20(g), including the table of Environmental Impact of Transportation of Fuel and Waste To and From One Light-Water-Cooled Nuclear Power Reactor (taken from WASH-1238), is inappropriate as the 10 C.F.R. 51.20(g) exemption only applies to the transportation of radioactive material to and from one reactor only, not from several reactors as in this instance. There needs to be a full description and detailed analysis in the ER under 10 C.F.R. 51.20(g)(1)(a)(ii), to include the contribution of such effecfs to the environmental costs of licensing the reactor, and the environmental impact under normal conditions and the risk from accidents.

7— 12) Section 2.4 of the ER is inadequate as there is no consideratin of the effects of the Jordan Lake Dam breaking on the SHNPP site. The Jordan Lake has a storage-capacity of 778,000 acre-feet of water and if it breaks the resulting flood would be greater than the probable maximum flood (PMF) that the Applicants use to determine the effects of high water on the site. The existing Buckthorn Dam will be carried away and the SHNPP reservoir dam are likely to be adversely affected. As a

+ Cape Fear intake

result there may not be adequate water to cool the SHNPP reactors and an accident might occur.

8- 14. The license should be denied as there is no consideration of the effect of hydrilla verticillata (a foreign aquatic plant now spreading throughout Piedmont North Carolina) on the on-site reservoir. Hydrilla spreads rapidly once introduced and is likely to clod intake valves, thus reducing the amount of water able to cool the reactors. If the Applicant attempts to control hydrilla's spread by banning boating and other recreational uses on the Reservoir then the prospective benefits derived from the use of the Reservoir will be reduced. If the Applicant attempts to control the spread of hydrilla by herbicides in the water or by more drastic means such as draining the Reservois and bull-dozing out the roots, the impact on aquatic life and water quality will be adverse.

CAB DRAFT
10/7/82

CHANGE CONTENTIONS

ADMITTED

9) Applicants' Environmental Report is inadequate because it does not provide a full description and detailed analysis of the environmental effects of the transportation of spent fuel to Shearon Harris from other CP&L plants, the values for such analysis of the impact under normal conditions of the transport, and the environmental risk of accidents as required by 10 C.F.R. 51.20(g)(1)(a)(ii). The values set forth in summary table S-4 do not apply here because those values apply to the shipment of a reference quantity of spent fuel from a reactor to a reprocessing plant and not those likely to occur with an Away From Reactor storage facility.

10- 44. A direct water-level indicator for the reactor is essential to assure the public health and safety. Although it may be true that there are no absolutely certain indicators, a direct, environmentally-qualified level indicator is necessary to prevent the sort of confusion about reactor water level that contributed so significantly to the accident at Three Mile Island. (FSAR TMI-18).

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10/7/82

WILSON CONTENTIONS

ADMITTED

I. MATERIAL AND/OR FINANCIAL DAMAGE TO MY COMMERCIAL ORCHARD

The first category of damages are those which might physically harm the plants and insects of the orchard ecosystem. The Applicant took great care to analyze the biological effects of cooling tower blowdown on the on-site reservoir but has neglected many non-radiological effects of the cooling tower vapor effluent on the surrounding area and has even failed to consider some radiological effects as well.

In section 3.4.2.4 the initial ER states the chlorine will be in the system 4 hrs/days; the same section of the amended ER states that chlorine will "normally" be used for two 30 min. cycles/day. This discrepancy of 100% (even allowing for the operation of just two units) is not explained. No definition of "normal" or example of "abnormal" operation is offered. No calculation of the total amount of chlorine dispersed into the atomosphere, how it would be distributed, and what impact the distribution would have is made. Therefore, (a) the extent and impact of chlorine dispersal is not adequately defined. Furthermore the reference to toxic chlororganic compounds in cooling towers is not quantified or elaborated in any way in section 5.3-4. The critical reference for this subject is not in any copies of the ER I have seen and ~~as~~ was not provided for me when I asked Mr. Zimmerman of CP&L about it on April 6, 1982 at the Environmental Review. (b) The chlororganic compounds dispersed in cooling tower evaporation may be toxic to the surrounding biosphere. Similarly, (c) The sulphuric acid and hydrogen peroxide added to correct pH may be toxic to the surrounding biosphere.

Section 5.3-4 mentions but does not specify "other chemicals" that may be added to water in the plant for various purposes. (d) These "other chemicals" could include biocides added to cooling tower water which could be toxic to be biosphere. (1f) The assumptions and models used are not provided. (2f) There is no sensible or useful measure of consumptive water used. (3f) The "synthesized" estimates of Buckhorn Creek flow (FSAR Section 2.4.1.2.1.1) are inadequate and rest on numerous false assumptions, (e.g. that rainfall in the Buckhorn Creek watershed is equivalent to that in the Middle Creek watershed).

With regard to radiologic hazards, (1g) Section 5.2.3 does not address issues of bioaccumulation in terrestial ecosystems. Other than the exposure pathway through grass and milk this issue has been neglected in the radiobiology literature, in part because it is extremely difficult to study. In some sense, then, it is a generic issue, but it cannot be ignored in this proceeding and the Applicant must

> [explain] why...operation can proceed even though an overall solution has not been found." [Commonwealth Edison Company (Byron Nuclear Power Station Units 1 and 2) LBP-80-30 12 NRC 683 (1980)].

My direct and personal interest in this contention is the pathway that involves plants, flowers, bees, and honey.

12 — III. ASSERTION THAT THE APPLICANT DOES NOT HAVE THE WILLINGNESS OR THE ABILITY TO SAFELY MANAGE A NUCLEAR POWER PLANT.

The public living near a complicated and potentially dangerous facility such as a nuclear power plant must entrust the operator of the facility with their safety. Although this trust is not qualitatively unique to nuclear power facilities, the magnitude of the potential consequences and the fact that damage may be "silent" make a quantitative difference in the degree to which the public's health and safety are in the hands of the Applicant. A regulatory body should then require of each applicant an uncommonly impressive dedication to operating with safety as their highest priority.

Unfortunately the Applicant has consistently and repeatedly demonstrated just the opposite inclination. At the time the construction permit was issued, because of deficiencies in the Applicant's management of their other nuclear plants, the Licensing Board took the unusual step of requiring at the operating license stage a full evidentiary hearing for the purpose of exploring further the Applicant's capability to manage plant operation [(LBP-79-19, 10 NRC 37, 98 (1979)]. For procedural reasons this requirement was overruled, but the same serious concerns were echoed and an alternative method of investigation of management ability, namely a review by NRC Staff, was established [ALAN-581, 11 NRC 233 (1980)]. The Applicant has filed a list of organizational and procedural changes and a list of qualifications of some personnel as part of the Staff's requirements. I am not aware of any formal response of the staff,[1/] but the Applicants document is unconvincing even when examined by itself. If, however, the actual operating records of the Applicant's plants for the period from 1979 to the present are reviewed, it is apparent that the Applicant has failed to cope with the management responsibility of running a nuclear power plant.

For example:

1. June 11, 1980; Brunswick; $24,000 civil penalty imposed for "failure to perform safety analysis on boilder" and "failure to notify the NRC in a timely manner."

2. August 27, 1980; Brunswich; $86,000 civil penalty imposed for 16 instances of "improper disposal of radioactivie materials" (materials taken to local landfills and sold to salvage companies).

3. May 1981; Robinson; $40,000 civil penalty imposed inadequate internal radioactive control procedures.

1/ However a 4/29/82 letter from Walter Hass of the Quality Assurance Branch to Robert Tedesco of the Licensing Branch conveys the impression that the major questions addressed by the ASLB in 1979 have not been corrected.

4. December 1, 1981; Robinson; $50,000 civil penalty imposed (later reduced to $5,000) for the same problem that occurred in Mya 1981 and for failure to make the called for repairs, changes in procedures, and replacement or unqualified personnel.

5. October 25, 1981; Brunswick; proposed civil penalty of $40,000 for an "unqualified radiation control technician."

Between 1978 and the present, the NRC has issued only 91 civil penalties (including those assessed against all handlers of radioactive materials in the county), and only 10 greater than or equal to $40,000. The gauge is seriousness with which the Inspection and Enforcement Branch of the NRC regards the Applicant's violations, and one need only note the nature of the offenses for which other utilities have been assessed similar fines. (NRC Annual Reports 1978-80; ENS file 1981 through April 1982).

One of the more egregious examples of the Applicant's lack of commitment ot safety seems to have escaped serious regulatory scrutiny. Since the January 19, 1976 explosion in the stack filter house of the Brunswick plant, the off-gas system has not been fully operational. This has resulted in higher levels of routine radioactive releases during normal operation, and more important, it severely compromises the ability of the plant to effectively deal with gases (both radioactive and hydrogen in accident conditions. The potential consequences of the

inability to deal with hydrogen gas have been well known for several years and have prompted a proposal regulation for augmentation of existing systems (50-PR46FR62281). The Applicant's continued operation of a facility with deficiencies in the basic off-gas system is irresponsible.

Thus, in light of the foregoing history of noncompliance, I believe that (a) The Applicant does not have the ability or the willingness to protect the public's health and safety by maintaining an adequate quality assurance and quality control program. (b) Applicant's quality assurance program seems to be affected by financial considerations and is therefore not completely independent from other departments within the company.

CAB DRAFT
10/7/82

WELLS EDDLEMAN CONTENTIONS

ADMITTED

13- 9) FSAR 3.11C ~~and the SEP~~ do$^{\text{es}}$ not establish compliance with NUREG-0558 or NRC's rules on Environmental Qualification of Electrical Equipment for the Harris Plant. ~~nor was the report referenced in 3.11C available at the LPDR prior to 14 May 1982.~~

14- 11) Applicants' FSAR and the SER and ES are deficient and in error because they do not take account of the fact that polyethylene ~~(used for cable jackets in nuclear plants, including inside the containment in high gamma radiation flux areas such as those near the reactor, hot and cold leg piping of the primary system, reactor primary coolant pumps, etc.) and~~ used as cable insulation, deteriorates much more rapidly under long-term doses of gamma radiation than ~~they do~~ when exposed to the same total dose over a much shorter period of time. (which is how these materials, PE, is tested for service in nuclear plants), as shown by the work of K. Gillen and P. Clough of Sandia Laboratories. The tests these workers conducted show that the cable jackets and insulation become embrittled by the radiation's breaking chemical bonds in these polymers (which are long groups of linked chemical units called "mers"), allowing oxidation of the plastic ~~PVC and~~ PE which makes ~~them~~ it brittle.

This accelerated embrittlement in the presence of gamma radiation and oxygen raises many significant accident and loss-of-control possibilities, due to anything that suddenly shocks cables and could thus cause embrittled insulation to fall off (e.g. earthquakes, water hammers as MSIVs close after a SCRAM, steam hammers, a worker brushing against them or striking them e.g. with a mop handle). Or the insulation could fall off under the influence of vibration, e.g. from the reactor coolant pumps, or when extremely embrittled, could fall off of its own weight. Where cables carrying control signals, power to motors for the ECCS, RHR and primary coolant, power to control pilot-operated valves, or signals from important instruments inside containment loss of cable jacketing or insulation would lead to short circuits and thus: erroneous information transmitted, failure to transmit control signals or information and instrument readings through shorted-out wires, failure to transmit power to vital safety equipment, e.g. to the RHR pumps, FCCS pumps, or reactor coolant pumps or any or all of them after a SCRAM, water hammer, earthquake, reactor trip, turbine trip, loss of feedwater, or any other event that causes vibration (e.g. normal operation of RC pumps, beginning operation of ECCS pumps or RHR pumps, HPCI or LPCI) or sudden shock. Such failures of controls, instruments and pumps would clearly compound many accident sequences, escalating trivial incidents to the Class IX level in many cases. For example, if an ordinary turbine trip led to a reactor trip and the water hammer as the MSIV closed caused cable jacketing to fall off cables supplying power to one or more reactor coolant pumps or controlling their operation, and the cables shorted out (very likely if bare) the pumps would go off, the reactor temperature would rise, and the ECCS would automatically turn on and a relief valve open to stop pressure rise on the primary system. The vibration of the ECCS pumps starting could cause more cable insulation to fall off, particularly on wires near them like their controls and power supply. If either control or power supply to the FCCS pumps failed, the undercooled reactor would not be getting much additional

out

coolant. Moreover, shorted wires could erroneously signal the operators that ECCS pumps and reactor coolant pumps were operable and working, when they were not. High radiation levels inside containment would prevent anyone from going in to look, as primary coolant escaped through the open relief valve to reduce temperature and pressure in the primary system. As a result the reactor could seriously overheat from steam voids in the core (further reducing effective cooling) and give the operators reading it another case of "failure modes the likes of which have never been analyzed" as at Three Mile Island Unit 2. In this case, provided the core pressure-temperature monitoring instrument lines had not also shorted out, the signals from them would indicate rising temperature and falling pressure; meanwhile the erroneous signals from shorted wires would be indicating the ECCS pumps were on as were all the reactor coolant pumps. It is unlikely that the operators could diagnose the situation accurately soon enough to prevent serious damage to the core. Under post-TMI instructions, they might consider it enough to leave the ECCS "on" as it was indicated to be. In such a case, the overheading core would soon get hot enough to release substantial radioactivity to primary coolant (and thus to containment via the open vent valve, standard practice now being to leave the ECCS on and blow the excess from a "solid" system out the relief valve) and to react the zircaloy fuel tubes with remaining water and steam (about 1990 F I think--can amend this to correct it) to form hydrogen. Add hydrogen to the shorted wiring and you get an explosion which would cause containment penetrations sealed with epoxy to fail suddently by reverting to the 2 chemicals which combine to make the epoxy. Heat, moisture, pressure and

radiation can all cause epoxy to fail in this way, and all would be present inside containment under the conditions described, especially during and after the pressure spike of a hydrogen ignition/explosion. Radioactive steam, halogens, noble gases and other radionuclide including cesium, which would be boiling out of the core at temperatures above 2000 F as the core continued to fail to be cooled, would then escape through the failed containment penetration(s) to the auxiliary building and/or directly to the atmosphere, perhaps penetrating to the control room also through cable trays and pathways, thus compounding difficulties for the operators still more. The potential damage to public health and safety, and the release of radioactive material to the atmosphere, easily equals or exceeds that at Three Mile Island under this scenario.

It is important to realize that where cables are thickly grouped or bunched, or inside conduits not subject to visual inspection, embrittlement, cracking and degradation of control, instrument reading and power calbes could not be readily detected, even if it had progressed very far. Any shock, even normal operation of an air pressure line, much less an earthquake, nearby plane crash, valve operating, or a worker bumping or pulling a cable on purpose or accidentially, could lead to a massive short circuit affecting numerous systems and instruments all at once. In the event that the initiating event was also part of an accident sequence, the shorted cables would likely compound the seriousness of the event, and further shocks, caused, e.g. by equipment turning on to mitigate the damage already done and problems already caused, could cause more insulation to fall off cables on which it had become embrittled, further compounding the accident. Applicants' FSAR and the SEP take no account of this possibility, do not analyze it sufficiently, do not provide enough mitigation for it, do not decree inspection standards for cables that can prevent or detect such embrittlement before it risks short circuits and their attendant risks as described and exampled above, do not provide for the use of cable insulation and jacketing that will not degrade under such radiation exposure, and otherwise fail to adequately protect the health and safety of the public.

This issue is particularly applicable to the Harris plant because of its very old design dating from the early 1970s in which many cable paths are not adequately separated ~~segrated~~ (raising the odds that degradation and embrittlement of jackets and insulation inside a larger bundle of cables won't be detected until it causes an accident or seriously compounds one). It is also particularly applicable in that Applicant CP&L has a history of delaying and failing to comply with cable separation and installation standards, e.g. at Brunswick, of delaying and being inadequate in fire protection, and in general of giving production priority over shutting plants down to cure major safety defects, e.g. at Brunswick 1977-78 and 1978-80, and continuing as CP&L petitions NPC many times to delay implementation of safety upgrades and equipment repairs and modifications at Brunswick; e.g. also at H.B. Robinson plant, see NRC inspector's anonymous comments referenced in Staff Exhibit ____, NRC remand hearing on CP&L safe management capability, Raleigh NC 1979.

15) Applicants' ER assumes a 70% DER capacity factor for the full lifetime of the units, ignoring the fact that no large Westinghouse PWR

had (as of 12/31/80) ever achieved such a lifetime capacity factor to date (large PWRs being 700 MW and over, CP&L's turnkey unit Robinson 2 having the highest lifetime DER CF at 66.5% as of that date).

Applicants' ER ignores the effect of steam generator leaks and repairs and replacement, on the plants' electrical output. These effects are large and negative as shown by the record of such plants as Surry 1 and 2, Turkey Point 3 which have had to have steam generators replaced, and the recent (winter 1981-82) experience of Duke Power Company's Oconee 1, 2 and 3 units (combined CF 29.98% for all 3 4 mos. ending 3/31/82 NCUC R8-46 Report 4/21/82, page 7) and the problems CP&L's Robinson 2 unit had in summer 1981, resulting in a limit of 50% power level until this winter, and a limit of 75% power level at present, imposed by CP&L.

The 12.31.81 lifetime DER CFs (capacity factors) of the above units are as follows (NUREG 0020, Vol 6, No. 1 of Jan 1982, latest one I have and I subscribe to NRC's document service to get it):

Oconee 1	56.8%	(38.6 for the year 1981)	
2	60.3%	(66.8, ditto)	
3	64.6%	(72.5, ditto)	
Robinson 2	65.6%	(57.1, ditto	--scheduled steam gen. replacement, 198, 1985
Surry 1	51.4%	(34.2, ditto	Surry 1, 2 and TP 3 include steam generator replacement
2	53.3%	(74.1, ditto)	
Turkey Point 3	59.5	(15.0, ditto)	
4	64.8	(74.2, ditto)	

Applicants' ER ignores the effect of steam generator design problems of Westinghouse model D steam generators, e.g. at V.C. Summer nuclear plant (very similar to Harris according to Harris FSAR), Duke Power McGuire units 1 & 2 (McGuire now limited to 50% power by NRC and

16- 22) In addition to the cost-benefit errors alleged, deficiencies and mistakes and incomplete reports to be corrected as set forth in other contentions herein, #s 15, 6=16, 17, 18 incorporated by reference herein and 19 & 20 BL&G the following contention in addition is set forth with respect to the costs and benefits of the Harris Project Units 1 and 2, reflecting ER amendment 2 filed late Mar '82 which first became available at the Wake County LPDR on 10 May 1982 (after that LPDR was closed to the public, myself included, May 3-9, 1982, as alluded to in my previous requests for extension of time to the Board): Out

(A) CP&L's Amendment 2 fuel cost estimates in Table 8.2.1-2 as amended are erroneously low, as are the fuel cost lifetime estimates in section 8.2 as amended and section 11 as amended (all in the ER).

(B) CP&L's estimates in the amended section 8 of the ER that the operating payroll at the Harris plant ~~and the construction payroll for it~~ based on only 2 units will not be decreased by any significant amount, compared to the ~~construction and~~ operation of all 4 units at the site, is not accurate. Its credibility could qualify them for a Section 8. Either the estimates filed December 18, 1981 with the originial ER (O.L. Stage) on the these matters, or the ones filed in Amendment 2, or both are in error. out

17- 29) The Board admitted that part 9 contention 29 that stated releases would exceed appendix I levels. I have spent 2 hours on the Eddleman petition and p 46 of the Board order. I do not see the Appendix I issue in there. CAB.

go back to Kelly ask what do you mean

18- 37) The work of I.D.J. Bross (Ph.D.), Rosalie Bertell (Ph.D.) and others shows that radiation exposure increases the risk not only of cancer but a host of other diseases, allergies, and causes of death including heart disease, hear attack, and others. The estimates of the numbers of such victims made by the preceding workers et al are more accurate than the estimates (if any) used by Applicants or NRC Staff or BEIR committee reports.

Applicants QA/QC program fails to assure that safety related equipment is properly inspected, i.e., the "ok" tagging of defective hanger welds at SHNPP.

19- 41) CP&L has ~~had~~ inspectors at Harris who can't even read blueprints well enough to detect such errors and discrepancies in welding of piping and vessels, design and construction of containment and other walls, support structures, etc. and safety-related pipe hangers), and correctly built and provably so (for reasons noted above, e.g.). out

20- 45) Harris cannot comply with the results of the Plant Water Hammer Experience Report, PWR S.G. (steam generator), feedwater, ECCS & Main Steam System water hammer events evaluation (including systems effect) and potential resolutions now being prepared by NRC., and the CR and NUREG reports on the water hammer question. This issue is particularly applicable to Harris because of its outdated design, materials for coolant pumps, piping and vessels, steam system generators boron injection valves flanges, nozzels e.g. MSIV, hot & cold nozzles, etc. made to outdated ASMP III and other codes per 6/7/77 letter, 6/28/77 reply from CP&L to NRC, 5/17/77 letter MA McDuffie CP&L to Rusche NRDC,

the PSAP & FSAP at p. 1B-15c, IB-2 and IB-42a (maybe these are 1 B-2 and 1-b-2 42a -- hard to read page numbers), use of unqualified welders, advanced stage of construction not allowing redesign to comply with NRC advice per the above studies and documents (thus requiring a trade between public health and safety protection from accidents, and costs to Applicants and delay of completing SHNPP), and the irregularities & deficiencies in hydrostatic and other pressure testing (use of pipes welded shut to be pressurized while the actual vessel is not under pressure, the sut welds in these test tap pipes and branches have been performed by some of Daniel International and CP&L's best welders) of such systems, and because of incomplete and inaccurate documentation of testing and materials of such equipment at SHNPP, particularly as regards the conditions under which it was stored on-site prior to installation.

21 — 64) (f) There is undue risk to the health and safety of the public since pressure valves on the casks used for spent fuel transport are likely to unseat (e.g. the 4 removed from service by GE in 1981) or the plastic components of such valves could and would melt in a fire less severe than the test basis for spent fule casks. Open the valve and out comes the coolant -- radioactive contamination -- followed by fuel overheating & melting, Cs-137 boiling. (g) the spent fu{e}le transport casks to be used by Applicants for such shipments have never been tested physically, including tests while pressurized, testes involving a heat source equivalent to the spent fuel inside them. Use of such untested casks unduly

risks public health and safety from radiation releases and accident consequences up to those given in (d) above.

22- 64) (h) NRC's computer testing of casks has not been verified by actual tests of casks now used, resulting in the risks and problems described in (g) above including accidents. (i) NRC calculations of the impace of an irradiated fuel accident in any heavily populated area exclude the first 1/4 mile from the accident, obvious flaw which leads to great underestimation of health effects since radiation levels within 1/4 mile will affect emergency response personnel and any other persons within such distance. This mistake by NRC must be corrected to comply with AEA -- NRC's rules and regulations may not conflict with the Act's "safety fist" mandate as the courts have interpreted it. (j) Applicants have failed to prove that emergency response personnel including fire deparments and police along the route(s) used for spent fuel transport to and from Harris have the equipment, training and personnel to deal with all credible accidents involving spent fuel in transit, including cask loss of coolant, loss of heat sink, and the other accidents described in (a), (b) and (d) above. Such capability and equipment and personnel and training is necessary to protect the health and safety of the public and of the emergency response personnel, numbers o whom are volunteer fire-fighters (ordinary citizens, not fulltime emergency response, police or fire personnel). (k) Applicants have failed to prove there will be adequate radiological monitoring of the spent fuel shipments to and from Harris and the routes along which such shipments are made, to assure the

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~~health and safety of the public, e.g. in the event of a leaking cask (caused, e.g. by inadequate-strength cask -- most existing ones have this problem -- sagging under its own weight, flexing under stresses of acceleration and turnign and deceleration in transit, going over bumps or potholes, tire blowout, or accident as described above in this grouping of contentions). (Most of the above is documented in the work of Fr. Marvin Resnikoff et al., most recently the CEP spent fuel study of 1982 (Council on Economic ________, New York, NY)).~~

23- 65) Because Daniel International, CP&L's prime contractor on the Harris project, has a history of building defective base mats and containments (e.g. Callaway, Wolf Creek, Farley) a complete ultrasonic re-examination of the containment and base mat, able to detect voids over 1 inch in side (any dimension over 1") therein, or another type of examination with similar capabilities to detect voids, is necessary before Harris 1 is allowed to operate. Otherwise the voids could become (thru cracking from thermal stress, concrete aging, or external impact) paths for radioactivity to leak from containment at unforeseeable times, including during rad releases inside containment, e.g. from reactor and primary system relief valves after a reactor trip or feedwater trip. out

24- 67) There is no assured disposal site to isolate the low-level radioactive wastes produced by normal operation at Harris from the environment and the public until said waste, which includes highly toxic (radiotoxic) and long-lived nuclear wastes such as Sr-90, Cs-137 and Pu-239, has decayed to virtually zero levels of radioactivity and radiotoxicity. The lack of such an assured disposal site, plus CP&L's style of operation at Brunswick which leads that plant to ave unusually high generation of low-level waste both compared to the capacity of the plant and to its electrical output, which style of operating may well prevail at Harris, means that the lack of such an assured disposal site for low-level Harris rad waste endangers the health and safety of the public under AEA and this condition having changed since the CP stage (and CP FES) due to the refusal of SC, NV and WA states to continue to accept unlimited amounts of low-level radioactive wastes; and by the enactment by Congress of laws allowing states to form compacts for low-level radwaste disposal and to exclude wastes such as SHNPP low-level radioactive wastes from states not members of such compacts. Sea disposal is not assured because EPA's proposed rule to allow disposal of low-level radioactive wastes in the oceans has not been enacted, and if enacted may be overturned by legal action or act of Congress.

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25- 75) The possibility that one or more species of clam, oyster or other marine growth 9e.g. barnacle) will prove resistant to said biocides and thus able to grow and live in the SHNPP condensers (being brought there, e.g., on a pair of pants worn wading at the beach by a person who also works around the cooling towers, or by a saboteur, or from the Harris lake in makeup water, having be introduced to any stream feeding that lake by means similar to the preceding) and thus grow and create debris to foul, block the condensers and prevent plant access to its ultimate heat sink, with serious safety consequences as above.

26- 80) The mixing models and dispersion models for radioactive gas, liquid and other radiological releases from SHNPP under 10 CFR part 20 are deficient in that they assume more complete mixing and dispersion of such radionuclides released than will actually take place, take insufficient account of rainout of such a release plume in a small area (rain precipitating the radionuclides in the plume) and thus do not assure that releases comply with 10 CFR 20. 106 and the protection of the public health & safety, including holding individual doses below 25 rem whole body & thyroid doses below 300 rem in an accident, & below 10^{-3} of the se valves in normal operation.

Deferred

27- 81) Applicants', the State's, FEMA's and other emergency response plans as approved for SHNPP are deficient because they have not been tested under 10 CFR 50.47 and Appendix F to part 50, fullscale and with the regular partial tests as specified therein, with results that show that such orlans will adequately protect the health and safety of the public during a Class IX accident at SHNPP, such as ATWS or the reactor vessel head blowing through containment as described in American Physical Society's report on nuclear accident risks of 1975.

82 & 83) A. CP&L's ER (and the DEIS and FES of NRC) take no account of the formation of carcinogenic chemicals resulting from CP&L's discharges into the Harris cooling lake, which include chlorine, ammonia, hydrazine, etc. (See ER 5.3) and from the lake into the Cape Fear River. These discharges can and will interact to form carcinogenic compounds including NCl_3, $NHCl_2$ and NH_2Cl among others. These compounds will pose a risk to anyone swimming in the lake, and anyone eating fish from the lake (due to concentration of carcinogens in the lake food chain). Any discharges of water from the lake into the Cape Fear River will put these carcinogens into water supplies of all downriver communities that draw water from the river (e.g. Lillington, etc.) and into the river food chains and fish stocks in the river and off the NC coast where the Cape Fear empties into the sea.

B. Surveys by the Haw River Assembly and others have demonstrated that substantial amounts of organic chemicals including dyes and phenol-based chemicals that become more carcinogenic after reactors with chlorine (and with chlorine, ammonia and hydrazine) are discharged into waters feeding the Cape Fear. The data compiled by UNC-CH (see, e.g. letter of May 11, 1982, Prof. Charles M. Weiss to Christina Meshaw of Corps of Engineers, Wilmington NC) do not adequately test for levels of most of these chemicals, nor does the State of NC (see printout of Haw River monitoring stations, 5-26-82, data) test for most of them. Thus, neither CP&L nor anyone else has established the actual levels of numerous organic carcinogens in Cape Fear water, nor considered the interaction of these carcinogens and other chemicals with the SHNPP discharges (e.g. chlorine, hydrazine, ammonia and other chemicals listed in E.R. section 5.3) in forming carcinogens in drinking water, and in

putting carcinogens into food chains which culminate in edible fish, mussels, seafood, (e.g. oysters, clams, shrimp) etc. taken by individuals or commercial fishing from the Cape Fear or the ocean where the Cape Fear empties (i.e. fisheries off Cape Fear, around the mouth of the river, and other places Cape Fear water disperses to). The health effects of these carcinogens, including those formed by interaction with SHNPP discharge and those made more hazardous by interaction with the same, transferred to humans who swim, wash, drink Cape Fear water, or who eat food and seafood wherein such carcinogens are concentrated biologically, has not been considered in the ER (and EIS and DEIS). Such consideration is necessary to protect the health and safety of the public.

C. State of NC water monitoring has established heavy metals in the Haw which feeds the Cape Fear River. (5/26/82 printout includes arsenic, cadmium, chromium, cobalt, lead, manganese, nickel, zinc; also Al, Cu, Fe). Interaction of SHNPP chlorine, hydrazine and other discharges with these metals could chemically mobilize them (as chlorides, hydrazides, etc.) so they will be more readily absorbed by living creatures in the food chain, and by humans drinking the water or eating the fish, seafood, etc. in said food chains in the Cape Fear and sea fisheries near its discharge (within 150 miles or wherever Cape Fear water is discernibly present, i.e. imcompletely mixed). The health effects of such mobilized toxic metals in drinking water, washing water, bathing water and food on humans have not been properly analyzed or taken into account, by CP&L or NRC Staff. All of these also include the balancing of these effects in NEPA cost-benefit, but that should be a separate contention.

29-

132) The Harris control room fails to meet regulatory requirements in NUREG 0660, NUREG 0694, and NUREG 0737 in that the control room lacks sufficient instrumentation for detecting inadequate core cooling in case of abnormal events, Applicants have not demonstrated their ability to comply with current NRC requirements for overall control room design standards. The Harris control room design and instrumentation have not been subjected to a comparative evaluation of the interaction of human factors and efficiency of operation, and the FSAR fails to document how the plant can or will be modified to meet the new criteria imposed after TMI.