June 28, 1996

NOTE TO: John F. Stolz, Director
Project Directorate I-2
Division of Reactor Projects - I/II

FROM: Eugene V. Imbro, Director
Project Directorate I-2
Division of Reactor Projects - I/II

SUBJECT: SPENT FUEL POOL SURVEY - HARRIS UNIT 1

In response to your revised guidance memorandum on the subject of "Follow-up Action Regarding Spent Fuel Pool Licensing Basis Review," dated June 21, 1996; I have attached a copy of the PM Survey on Spent Fuel Pool Practices and Current Licensing Basis for the Shearon Harris Nuclear Power Plant, Unit 1, plant.

Enclosure:
As stated

cc: Joe Shea

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Docket No. 50-400

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SHEARON HARRIS - UNIT 1, NUCLEAR POWER PLANT
SPENT FUEL POOL PRACTICES AND CURRENT LICENSING BASIS

A. SYSTEM DESIGN: (ref- plant's Design & Basis Document DBD # 110, and FSAR Section 9.1)

The spent fuel storage facility is located in the Fuel Handling building. FSAR Section 9.1.2.2 states that there are one **new** fuel pool and three **spent** fuel pools, interconnected by mean of a main transfer canal with runs the length of the fuel handling building (FHB). The FHB is split in two storage facilities: the North-end storage facility consisting of pools A & B, and the South-end facility consisting of pools C & D. A bridge crane is used to transport the spent fuel to spent fuel racks and later to the cask. This procedure is carried out with spent fuel totally submerged. Currently, spent fuel is stored in fuel pools A & B (South-end) and are cooled by the two independent trains of spent fuel pool cooling system. Pools C & D (North-end) have not been used for spent or new fuel storage and their cooling systems are not yet piped in.

The staff SER dated Nov/83 stated that fuel may be stored in combination of 6x10, 6x8, and 7x7 PWR rack modules and that the maximum storage capacity of the two spent fuel pools is 3024 PWR assemblies, which is more than 19 PWR cores. Each spent fuel facilities (North-end and South-end) is designed to be cooled by **two** 100 percent independent trains, cooling and clean up systems (FPCCS) with equipment to remove the particulate and dissolved fission and corrosion products resulting from the spent fuel.

By design, each FPCCS is comprised of two fuel pools, a transfer canal, two fuel pool heat exchangers, two cooling pumps, with strainers, demineralizer, demineralizer filter, purification filter, two water purification pumps, skimmers with one skimmer pump and associated fuel pool strainer & skimmer filter.

Cooling pump: Two existing horizontal centrifugal pumps are non-1E, installed in separate lines to assure that pumping capacity is only partially lost should one pump become inoperative. This also allows maintenance on one pump while the other is in operation. Each of the fuel pool pump is powered from separated power sources (with capability to connect to emergency diesel generator on loss of offsite power.)
Heat exchanger: shell and straight tube type, are cooled by a non-essential loop of Component Water Cooling system.
Normal makeup water to the fuel pool is supplied by the Seismic Cat I RWST and Demineralized Water system (see FSAR 9.2.3.2). A backup system for filling the fuel pool is available thru flexible hoses, ESW, and RWST lines and their existing vent lines for emergency connection to the Seismic Cat I emergency service water system, the source for emergency makeup water.

B. SUMMARY OF CLB REQUIREMENTS RE: SPENT FUEL POOL DECAY HEAT REMOVAL/REFUELING OFFLOAD PRACTICES

1. Technical Specification limits are provided for:

TS 3.9.3: A minimum decay time of 100 hours before moving fuel.

TS 3.9.11: At least 23 feet of water shall be maintained above the irradiated fuel.

TS 3.9.12: Two independent Fuel Handling Building Emergency Exhaust System Trains shall be operable.

2. The maximum heat load in the pool under refueling conditions is limited to 44.4 x 10^6 Btu/hr for the full core offload case - all pools. [FSAR Table 9.1.3-1A]

3. Fuel pool temperature is limited to 142 °F for end-of-cycle refuelings with one fuel pool cooling pump operating. This temperature applies to core offloads up to and including full core refuelings and is less than the pool concrete design temperature of 150 °F. [FSAR Table 9.1.3-2 and FSAR section 9.1.3.1]

Under true emergency conditions, such as a complete loss of spent fuel pool cooling with a full core in the SFP, fuel temperature rise from 150 °F to boiling (approximately 4.5 hours) has been reviewed and found acceptable. [Calculated from FSAR Table 9.1.3-2]

4. Decay time is controlled by Technical specifications.

5. No other implicit or explicit prohibitions exist within the CLB against performing a full core offload for any given refueling outage. (See discrepancies below)

<u>Discrepancies:</u>

1. Table 9.1.3-1A (and other paragraphs - see 9.1.3.3) calls the full core offload case "abnormal" even though it may be a regular practice at Harris to offload the full core. The licensee should review the FSAR against their operating practice and make editorial changes to the appropriate FSAR sections to avoid confusion.

C. SUMMARY OF COMPLIANCE WITH CLB REQUIREMENTS AND COMMITMENTS

(1) Offload Practice: The FSAR did not address the use of full-core offloads as routine evolution, however, the FSAR provides heatload tables to document spent fuel pool (sfp) heatloads for different anticipated refueling strategies, currently referred to as normal (1/3 core offload) and abnormal (full-core offload). The resident inspectors observed (IR 95-17, pg 22), from previous refueling outages, that the fuel pool cooling system was adequately designed to remove the residual heat generated from a freshly removed full-core. In addition, the licensee has in place plant procedure OMP-003, Outage Shutdown Risk Management, which contains sections that assure that adequate cooling and support systems are available during various refueling outage activities where maximum sfp heatloads are encountered. These assessments are outage specific and include time-to-boil calculations assuming loss of all cooling capabilities, and the current process for "controlling" heatloads is to perform the sfp heatload analysis with adequate conservatism to bound all expected scenarios. The fuel pool heatload assessments are included in the scope of this procedure. The maximum total sfp heatload calculated for the October 1995 refueling outage 6 was 26.5 MBTU/hr and the FSAR maximum abnormal heatload (full-core offload plus existing inventory) value was 44.4 MBTU/hr.

The resident inspectors observed (IR 50-400/95-15 dated November 3, 1995, page 7) during refueling No. 6 activities, that fuel offload and reload activities in accordance with fuel handling procedure FHP-014, Rev 6, Fuel and Insert Shuffle Sequence.

(2) Fuel Pool Level: Control room and local alarms are provided to alert the operator of high and low pool water level, and high temperature in the fuel pools. The licensee has in place procedures OST-1021 (Modes 1&2), OST-1022 (Modes 3&$), and OST-1033 (Modes 5&6) to require verification of sfp level once per shift. This is more frequent than the 7 day frequency required by TS 4.9.11. The inspectors had observed (IR 50-400/95-15 date November 3, 1995, page 7) that during refueling No. 6, the licensee's fuel offload and reload activities were in accordance with fuel handling procedure FHP-014, Rev 6, Fuel and Insert Shuffle Sequence, and FHP-020, Refueling Operations [e.g., fuel handling equipment, including refueling bridge crane, hoist, and load cell had been properly tested, inspected, and calibrated, prior to fuel movement, as required by plant procedures,] and that operators maintained the refueling cavity water level at 23 feet above the reactor vessel flange during fuel movement.

(3) Water Temperature: The licensee monitors sfp temperatures every 4 hours and records them on Operations BOP logs. This monitoring provides guidance for operating sfp cooling pumps and these cooling pumps are run intermittently to keep sfp temperature between 85°F and 105°F. The resident inspectors has witnessed (IR 95-17, pg 22, dated 12/11/95) two refueling outages and at

various point has verified that pool temperatures were below the pool design temperature of 150 °F)

(4) Decay Time: The licensee has in place procedure GP-009, Refueling Cavity Fill, Refueling and Drain of Refueling Cavity (Modes 5-6-5), step 5.3.1.19.a verifies that the reactor has been subcritical for at least 100 hours prior to fuel movement. This was a TS requirement and has been relocated to the Plant Procedure PLP-114, Relocated TS and Design Basis Requirements.

(5) Controlling of specific activity in the spent fuel pools: The specific activity imposed by the FSAR was calculated assuming the fuel pools were filled to capacity (7298 bundles) and the crud attached to each bundle was homogeneously mixed throughout the pools and canals. As of 3/96 the licensee has 1695 fuel bundles (1195 BWR-Brunswick, 276 PWR-Robinson, and 224 PWR-Harris) stored in the A and B spent fuel pools. The licensee stated that they routinely perform radiological surveys of the FHB operating floor and continuous airborne activity devices and general area radiation devices are in place to monitor these areas.

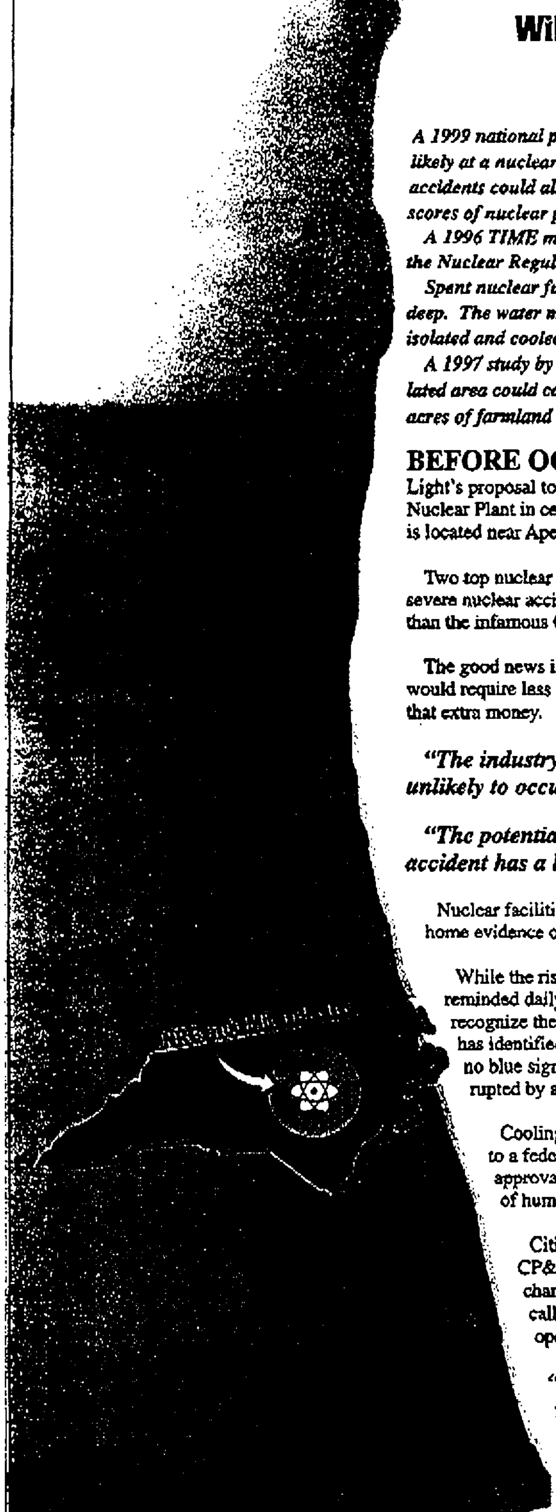
SPENT FUEL STORAGE DATA TABLE

Facility	Name: SHEARON HARRIS	Unit: 1
Licensee's SFP Contact	Name: David Baksa, System Engineer	Phone: C/o Donna Alexander 919-362-3190
SFP Related Tech. Specs.	Parameter(s): Licensed Thermal Power SFP Level SFP Boron Concentration Decay time in Reactor Vessel	Limiting Value or Condition: 2775 MWt (100% rated core pwr) 23 ft above top of stored fuel 2000 ppm minimum (currently 2304) 100 hrs (TS 3.9.3)
SFP Structure	Location: in Fuel Handling Building	Seismic Classification of SFP Structure and Building: Seismic Cat 1, Quality Group C Standards
	Volume of SFP(s): (FSAR Table 9.1.3-2) Pool A: 403,200 gals Pool B: 403,920 gals Pool C: 191,480 gals Pool D: 147,804 gals	SFP Temperature for Stress Analysis: 150 °F
Leakage Collection	Liner Type: Stainless steel	Leakage Monitoring: Floor & Equipment drain sumps and pumping systems to collect & transfer FPCCS leakage to waste management system. Alarms: Hi sump level in C/R, two alarms for low level (1st alarm at 24 ft) A low flow alarm (flow to the pool) is provided to warn of interruption cooling flow.
Drainage Prevention	Location of Bottom Drains: There is no built-in drain connection. Draining and syphoning of the spent and new fuel pools via piping or hose connection to these pools or transfer canals is precluded by the locations of penetrations, limitation on hose length, or administrative controls on hose usage, and termination of piping penetrations flush with the liner.	Elevation of Gate Bottom Relative to Stored Fuel: (see FSAR pg 9.1.3-6a): Cooling water return piping terminate at 279'-6", spent fuel pools suction piping exits at 278'-6", new fuel pool exits at 277'-6", skimmer suction piping exits the pool at 285"-3". The normal pool water level is 284'-6" (top of spent fuel is 260") TS 5.6.2 requires pools to be maintained to prevent inadvertent drainage of the pools below 277'
Siphon Prevention	Lowest Elevation of Connected Piping Relative to Fuel: 277'-6" for new fuel cooling piping exit.	Anti-Siphon Devices: by limiting the skimmer hose to 5', the skimmer system return piping enters the pool at 5' below normal water level. (FSAR page 91.3-6a)
Make-up Capability	Safety-Related Source: Backup to RWST for filling the fuel pool is normally available from demineralized water system; and through flexible hoses, ESW and RWST lines and their existing vent lines for emergency connection to ESW system, the source for emergency makeup water.	Seismic Classification and Quality Group: RWST: Seismic Category I. ESW: Seismic Category I.
	Normal Source: from seismic Cat 1 RWST. also from Demineralized water system which passes ≈ 6% of the cooling flow thru the demineralizer.	
Reactivity	Limits on K_{eff} and Enrichment: (9.1.2.3) Keff ≤ 0.95 under all conditions when flooded with unborated water (TS 5.6.1a)	Soluble Boron Credit for Accidents: Neutron absorbing material is encapsulated into the stainless steel walls of each stage cell (9.1.2.1).

Facility	Name: SHEARON HARRIS	Unit: 1
Reactivity Control	Solid Neutron Poisons: (Table 9.1.2-1) PWR Poison: 0.020 BWR Poison: 0.0103	No. of Fuel Storage Zones: (Ref: FSAR Section 9.1.2.1): The max storage capacity of the three spent fuel pools (A, B, C) is 3704 PWR assemblies, and the total for both spent and new fuel pools (A, B, C, and D) is 4184 assemblies. The spent fuel pools are designed for the storage of both PWR and BWR fuel from other CP&L nuclear plants. The 7x7 PWR rack modules are interchangeable with 11x11 BWR rack modules as these rack cover the same floor space. The actual number and types of assemblies stored will vary.
Shared or Split SFPs	No. of SFP(s): Pool A: (Ref: FSAR Section 9.1.2.1): The max storage capacity of the three spent fuel pools (A, B, C) is 3704 PWR assemblies, and the total for both spent and new fuel pools (A, B, C, and D) is 4184 assemblies. The spent fuel pools are designed for the storage of both PWR and BWR fuel from other CP&L nuclear plants.	No. of SFPs Receiving Discharge from a Single Unit: Since Refuel Outage No. 6 (10/95), the number of spent fuel assemblies stored in SFPs are:(/Ed Wills of CP&L 3/4/96) 1365 BWR from Brunswick 224 PWR from Robinson 336 PWR from Harris (was 224 as of 5/95) (plus 1 basket for 2 Harris damaged rods) TS 5.3.6 states that the new and spent fuel pools are designed for a storage capacity of 1832 PWR fuel assemblies and a variable number of PWR and BWR storage spaces in 48 interchangeable 7x7 PWR (10.5" center to center) and 11x11 BWR (6.25" center to center) racks.
SFP Design Inventory Cases	Normal: Table 9.1.3-2: (≈ 2/3 core plus fuel from other plants)	Emergency/Abnormal: (≈1-2/3 core plus fuel from other plants)
SFP Design Heat Load (MBTU/Hr) and Temperature (°F)	Normal: North-end pools / South-end pools 13.35 MBTU/hr / 5.417 MBTU/hr 137 °F* / 126 °F* * with one cooling loop operating Maximum:	Emergency/Abnormal: North-end pools / South-end pools 39.02 MBTU/hr / 5.417 MBTU/hr 142 °F* / 110 °F* * w/ one cooling loop operating
SFP Cooling System	No. of Trains: 2, 100 percent	Licensed to Withstand Single Active Component Failure: Yes
	No. of SFPs Served by Each Train: 2 pools	Qualification: Seismic Cat 1, Quality Group
Electrical Supply to SFP Cooling System Pumps	Qualification and Independence of Power Supply: Independent class 1E	Load Shed Initiators: Undervoltage or SI to start Emergency Diesel Generator
Backup SFP Cooling:	System Name: N/A There are two independent, 100% capacity, cooling systems to each spent fuel storage facility	Qualification: N/A
SFP Heat Exchanger Cooling Water	System Name: Components Cooling Water System (FSAR Section 9.2.2)	Qualification: Seismic Cat 1.
Secondary Cooling Water Loop	System Name: Service Water System (9.2.2)	Qualification: Seismic Cat 1.
Ultimate Heat Sink	Type: Auxiliary Reservoir (preferred source). Main Reservoir is back up source.	UHS Design Temperature: 95 °F (pg 9.2.2-1)
SFP Cooling System Heat Exchanger Performance	Design Heat Capacity: 2.11 MTBU/hr	Type: Shell & Tube
	SFP Side Flow (lb/hr or GPM): 2.256 MBTU/hr	Cooling Water Flow (lb/hr or GPM): 2.68 MBTU/hr
	SFP Temperature: 120 °F (Table 9.1.3-2)	Cooling Water Inlet Temp: 105 °F (Table 9.1.3-2)

Facility	Name: SHEARON HARRIS	Unit: 1
	SFP Cooling Loop Return Temp: 113 °F	Cooling Water Outlet Temp: 110 °F
SFP Related Control Room Alarms	Parameter(s): high level/ low level/ lo-lo level	Setpoint: 284.75'/ 284'/ 282'
Location of Indications	SFP Level: Annunciators mounted on SFP alarm panels in FHB. hi level alarm for floor/equip drain is in Control Room (see page 9.1.3-6b)	SFP Temperature: Panel F-P9 in FHB, and in C/R: pool A on ALB-23, pool B on ALB-23,
SFP Cooling System Automatic Pump Trips	Parameter(s): None	Independence: Yes- Two 100% independence systems
SFP Boiling	Staff Acceptance of non-Seismic SFP Cooling System Based on Seismic Category I SFP Ventilation System: N/A	Off-site Consequences of SFP Boiling Evaluated: None found If Yes, Was Filtration Credited:
SFP/Reactor System Separation	Separation of SFP Operating Floor from Portion of Aux. or Reactor Bldg. that Contains Reactor Safety Systems: Yes- SFPs are located in a separate fuel handling building that does not house Rx safety system components.	Separation of Units at Multi-Unit Sites: Separate pools interconnected by mean of a main transfer canal with runs the length of the Fuel building.
Heavy Load Handling	SFP Area Crane Qualified to Single Failure Proof Standard IAW NUREG-0612 and/or NUREG-0554: Yes- NUREG-0612 (see SER-10/86)	Routine Spent Fuel Assembly Transfer to ISFSI or Alternate Wet Storage Location: Received spent fuel assemblies from Brunswick and Robinson plants
Operating Practices	Administrative Control Limit(s) for SFP Temperature during Refueling: 142 °F (w/maximum abnormal heatload)	Administrative Control Limits for SFP Cooling System Redundancy and SFP Make-up System Redundancy: w/ minimum of one SFP cooling loop.
	Frequency of Full-Core Off-loads: All prior outages	Administrative Controls on Irradiated Fuel Decay Time prior to Transfer from Reactor Vessel to SFP: 100 hours by TS 3.9.3, also plant procedure GP-009, Refueling Cavity fill, refill, and cleaning (Mode 5-6-5.)
	Type of Off-load Performed during Most Recent Refueling: full-core offload	For Units with Planned Refueling Outages Scheduled to Begin before April 30, 1996, Type of Off-load Planned for Next Refueling and Planned Shutdown Date: full-core offload

A Special Alert from NC WARN



Nuclear Safety Nuclear Profits

Will CP&L reject public concerns about its massive high-level waste build-up?

A 1999 national public opinion poll found that over 66% of U.S. residents believe another serious accident is likely at a nuclear reactor in this country. However, until recently, few people realized that major nuclear accidents could also result from "spent" reactor fuel – high-level waste – now being stored in pools of water at scores of nuclear power plants.

A 1996 TIME magazine cover story cast new light on the potential for accidents from spent fuel storage, and on the Nuclear Regulatory Commission's decades-long inability to adequately safeguard the public.

Spent nuclear fuel is so highly radioactive it must be stored for up to five years in pools of cooling water 40 feet deep. The water must be constantly circulated to dissipate the intense heat. After five years, the waste must be isolated and cooled by either water or air for another 10,000 years or more to protect people and the environment.

A 1997 study by Brookhaven National Laboratories concluded that a waste pool accident near a highly populated area could cause over 140,000 cancer deaths, $500 billion in property damage and contaminate 1.7 million acres of farmland beyond recovery.

BEFORE OCTOBER OF 1998, members of the general public knew nothing of Carolina Power & Light's proposal to create the nation's largest stockpile of highly radioactive waste fuel at the Shearon Harris Nuclear Plant in central North Carolina. Much of the waste would come from other CP&L reactors to Harris, which is located near Apex and Cary, on the southern edge of – and upwind from – the Triangle area.

Two top nuclear safety experts warn that CP&L's waste expansion would substantially increase the chance of a severe nuclear accident which – due to the enormous concentration of radioactivity at Harris – could be far worse than the infamous Chernobyl disaster in 1986.

The good news is that a proven alternative storage plan would greatly reduce the risk of a nuclear accident, and would require less than a one percent reduction in net profit for CP&L. The bad news: So far, CP&L wants to save that extra money.

"The industry does not have sufficient data to support the claim that a spent fuel accident is unlikely to occur." — David Lochbaum, Union of Concerned Scientists

"The potential consequences of a severe accident far outweigh any argument that such an accident has a low probability of occurring." — Gordon Thompson Ph.D.

Nuclear facilities rely on highly complex systems which are susceptible to technical and human error; close-to-home evidence of this reality are the three emergency shutdowns of the Harris reactor in early 1999.

While the risk of a nuclear accident at Harris may seem unlikely, people within 10 miles of the plant are reminded daily, by the blue evacuation signs and large yellow sirens, that the industry and the government recognize the potential for an emergency. Due to the far greater mass of radioactivity in waste pools, the NRC has identified a 50 mile radius from the plant as the potential impact zone for a waste accident. But there are no blue signs or specified evacuation routes to designate this broader area, so if radio or television is interrupted by an alert about the nuclear plant, we're on our own.

Cooling pools for spent fuel were not designed for long-term use; the original plan was to ship the waste to a federal repository every two or three years. Now, with a federal waste site years or decades from approval, Harris could well be stockpiling high-level nuclear waste for decades. Certainly the probability of human or mechanical errors leading to a waste accident increases over time.

Citizens and organizations across the region responded to news of the waste expansion by contacting CP&L and local officials. The public flooded CP&L's Email line to the point where the company changed the CEO's address. Eleven local governments and several news editorial boards joined the call for a full and open review of the project. CP&L then repeatedly promised – in public – to openly address all safety and environmental concerns.

"All concerns brought to CP&L will be addressed before CP&L moves ahead with the project. ... There will be no approval until all safety issues are resolved."
— John Caves, Supervisor of Corporate Regulatory Affairs, CP&L, *Chapel Hill Herald*, Jan 2, 1999

But as soon as two independent nuclear safety experts began their analyses, CP&L reversed itself. Instead of justifying its plan in front of experts and the public, the company launched a major legal and public relations offensive, seeking to block a full airing of the safety issues. Even energy giant Duke Power joined rival CP&L's efforts to persuade elected officials across the region to "support CP&L." Some of the lobbying – through use of CP&L's multi-million dollar "charitable contributions" fund, may have crossed the line into felony bribery; a current investigation may reveal more on this.

A public hearing on the waste expansion plan would be required if CP&L merely asked for it; instead CP&L even challenged Orange County's right to raise concerns, and claims the NRC's closed-door examination is sufficient. An NRC licensing board broke tradition and agreed that certain issues raised by Orange would have to be further examined. But, with its long history of bias favoring the nuclear industry, it is unlikely the NRC will ultimately deny CP&L the license amendment unless ordered to by the courts.

However, CP&L now realizes its corporate image is at stake, and soon the company will have to compete for its customers in a deregulated electricity market. NC WARN, the Chatham Nuclear Action Group, and citizens organizing in Apex and across the region are convinced the

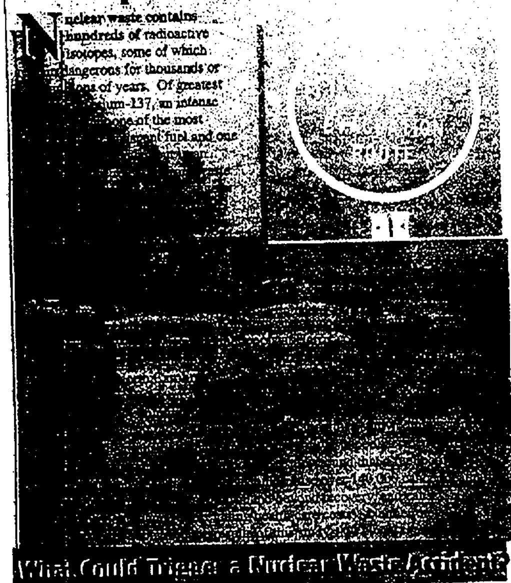
1999 Emergency Shutdowns at Harris

January 14
A worker error tripped a series of fail-safes, causing the plant to stop completely. Crews spent the day checking for damage that can occur from a sudden stop.

March 5 and 6
A steam valve that must open to let impurities and debris out of the steam generators failed to operate. The next day, a second such valve failed. Officials had to bring the plant down to

H/2

Consequences of an Accident



Nuclear waste contains hundreds of radioactive isotopes, some of which [illegible] dangerous for thousands or [illegible]lions of years. Of greatest [illegible]um-137, an intense [illegible] one of the most [illegible] spent fuel and one [illegible]

What Could Trigger a Nuclear Waste Accident?

EARTHQUAKE: Could fracture pools; damage pipes or pumps. Harris waste building located on narrow rock ridge. Fault-line runs next to spent fuel building.

SABOTAGE / TERRORISM: Security weaker for waste building than for reactor. Cooling deliberately cut off could start waste fire or meltdown. NRC test-cases repeatedly show nuclear facilities are vulnerable.

HUMAN ERROR:
- Nuclear chain reaction possible if crane operators put assembly in wrong rack.
- Crane drops waste assembly: CP&L would take this risk 4700 extra times under its plan.

REACTOR ACCIDENT: With interconnected cooling system, reactor accident would likely lead to waste pool accident.

TORNADOES / HURRICANES: Damage normal cooling, electrical systems; pools overheat.

NRC InACTION

No wonder CP&L prefers NRC's "rigorous and independent" review instead of a full airing of safety issues:

- The NRC is notorious for its bias toward the industry. But the *Washington Post* reported in 1999 that Republican US Senators threatened a 25% staff cut unless NRC becomes even more industry-friendly.

- The US Government Accounting Office (GAO) warned in 1999 that NRC is already failing to protect public safety: "NRC has not taken aggressive enforcement action to force [nuclear plants] to fix long-standing safety problems on a timely basis."

- In May 1999, NRC abolished its "Watch List" of the least-safe nuclear plants, weakened regular plant safety reviews, and stopped issuing in-depth safety ratings for plants.

- The Union of Concerned Scientists has documented a litany of near-disasters in the nuclear industry. Among them, NRC allowed a nuclear plant in Michigan to operate 13 years with both pipes for emergency core cooling water completely severed.

- For 20 years, NRC has refused to consider several types of risks of severe nuclear waste storage accidents. NRC does not require probabilistic risk analyses for waste accidents as for reactors, although NRC's own studies admit the potential for disastrous waste pool accidents.

- NRC staff claims the Harris expansion poses no additional risk, even though there would be twice as much crane handling of very heavy waste assemblies.

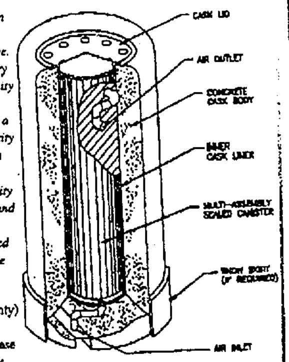
"CP&L and the NRC staff would apparently conclude that the probability of losing (Russian Roulette) is not increased whether one or two turns are taken … Their logic is simply wrong. The probability of a fuel handling accident at Harris will nearly <u>double</u> if the license amendment request is granted."
— David Lochbaum,
Union of Concerned Scientists

- NRC gave Three Mile Island a very high safety rating immediately prior to the 1979 accident. In the late 1980's, the NRC estimated that there is a 45% chance of a reactor meltdown accident in the U.S. within 20 years.

"I believe in nuclear power, but after seeing the NRC in action, I'm convinced a serious accident is not just likely, but inevitable."
— George Galatis,
former Senior Engineer at Northeast Utilities, quoted in *TIME*, March 4, 1996

There is a Safer Alternative

"Dry storage of spent fuel is a proven option that poses a lower level of hazard than high-density pool storage. The NRC has approved a range of dry storage designs. Similarly, low-density pool storage was once a common practice at nuclear plants and poses a lower level of hazard than high-density pool storage. CP&L could employ a spent fuel storage strategy which combines dry storage with low-density pool storage. If properly designed and implemented, this strategy would dramatically reduce the hazard posed by present and proposed fuel storage arrangements at Harris."
(Excerpted from Dr. Gordon Thompson's report for Orange County)



This plan would greatly decrease handling of waste assemblies and the chance of a dropped 3,000 pound fuel assembly and resulting accident. Also, it would eliminate transport of this deadly material, and would keep assemblies spread out, thus reducing the threat of a catastrophic accident created by packing over 8,000 assemblies into interconnected pools at the Harris plant. CP&L already uses this method for part of the waste produced at its Robinson nuclear plant in South Carolina.

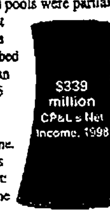
"Since there are no moving parts such as fans, pumps or blowers, a dry storage facility is less expensive to maintain. There is no risk of mechanical breakdowns." —CP&L Fact Sheet on Dry Storage at the Robinson Nuclear Plant

Dry cask storage of waste over five years old avoids the tight packing of thousands of assemblies in pools. Thus, it avoids the dangerous reaction between water, air, zirconium and enormous heat. Once waste has cooled for several years in widely spaced racks in pools **at the generating reactors,** *it should be moved into dry storage at those sites. In dry casks, heat from the fuel assemblies is dissipated by simple air convection.*

What Cost for the Safer Plan?

Throughout early 1999, CP&L stated many times in public that, since it believed pool storage to be as safe as dry storage (which even the NRC disagrees with), the second and deciding factor was money. Although dry casks cost much less to maintain than cooling the waste in pools, CP&L would save money up-front since the two unused pools were partially built in the 1980's.

CP&L has refused to release its cost calculations, but NC WARN estimates that switching to the safer plan described above would cost CP&L – at most – an additional $2 million per year for a 15 year period. This represents a tiny fraction of CP&L's after-tax profits, which were $339 million in 1998 alone. It also pales in comparison to CP&L's public relations and marketing budget estimated at $30 million annually. The company expended $7 million last year in well-aimed charitable donations, which are used to create goodwill and a favorable political environment for pursuit of CP&L's corporate policies.



CP&L CEO William Cavanaugh's total compensation in 1998 was over $5.3 million. (*Charlotte Observer*, July 25, 1999)

CP&L Avoiding Scrutiny of Safety Issues

The NRC system heavily favors CP&L, which can hide information and block public hearings even after issues are legally certified for investigation. Neither local nor state governments have an official voice in this issue, although resolutions calling for open review and withdrawal of the waste plan carry much weight regarding CP&L's corporate citizenship.

After failing to prevent Orange County's right to raise safety questions, CP&L next claimed none of Orange County's formal concerns were worth further review or a public hearing. NRC staff agreed 100% with CP&L on this – as they usually do. But, in an important break in tradition, another arm of the NRC, the Atomic Safety & Licensing Board, ruled against CP&L on 2 out of 3 issues open at this time, a ruling which should require a public hearing. The NRC board called for further review of the chance of an accidental nuclear reaction, plus the issue of CP&L's disposal of key safety documents on the piping to cool the pools. Orange's other issues were postponed until NRC does medium-level assessment of environmental problems with CP&L's plan.

Nevertheless CP&L won a key victory by keeping the heat loss issue out of public hearings for the time being. CP&L has submitted information repeatedly to the NRC showing that its existing cooling system would not be able to cool all the waste in the four pools. Then after Orange County had filed legal papers on the issues, CP&L announced it had successfully re-calculated the heat loads, but refused to provide the details of this "re-calculation." The NRC board went along with CP&L anyway.

CP&L then asked for, and received, an NRC "hybrid hearing" that prevents a full hearing until another round of CP&L legal arguments is defeated. CP&L seems to be doing everything possible to prevent public hearings or disclosure of other information it prefers not to reveal.

"This disturbs people around the area. What is it that CP&L may be hiding … why can't they deal with the experts' concerns?"
Harold Taylor, Chatham Nuclear Action Group

CP&L: We Won't Buy It!

A Petition for Nuclear Democracy & Safety

Against the caution of nuclear safety experts, CP&L is proposing to create the largest stockpile of "spent" nuclear fuel in the nation at the Shearon Harris plant in Wake County.

Despite the protestations of many local governments and citizens, CP&L has refused to publicly address numerous safety issues raised by world-renowned nuclear experts.

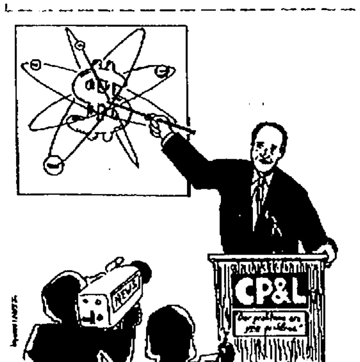
A safer and proven storage plan would greatly reduce the risk of a severe nuclear accident, and would cost CP&L less than a 1% reduction in its annual profits.

North Carolina residents will soon be able to choose their electricity provider from a range of companies across the nation.

If CP&L moves forward with its dangerous and unnecessary waste expansion plan, **I will choose another electricity provider as soon as deregulation allows** — one which exhibits corporate citizenship and prioritizes public safety rather than maximum profits.

Signature	City

Not legally binding. All members of a family can sign.
Petition will be used to persuade CP&L to adopt the safer plan.
Please return to NC WARN PO Box 61051, Durham, NC 27715-1051
(copy this petition, blow it up and pass it to your friends!)



THE PUBLIC'S VOICE CAN MAKE THE DIFFERENCE, as proved when North Carolina recently cancelled the ill-conceived, 12-year effort to force a seven-state "low-level" nuclear waste dump at a politically-chosen site on the Wake and Chatham border. Now the challenge is to prevent a far larger amount of deadly radioactivity from being imported into the heart of North Carolina.

TAKE ACTION

Help persuade CP&L to choose a safer plan.

1) **Help with the petition drive. Contact NC WARN for more forms or copies of this paper.**

2) **Send a SHORT message to CP&L to let them know your concerns or that you're signing the petition to choose another electricity provider.**
Phone: 919-546-4579 Fax: 919-546-4073
Address: PO Box 1551, Raleigh, NC 27602
E-mail: john.caves@cplc.com
scotty.hinnant@cplc.com

3) **Become a member of NC WARN with a tax-deductible contribution: PO Box 61051, Durham, NC 27715-1051. Help offset CP&L's Big Money advantage.**

4) **Attend a vigil at the Harris plant: October 17 at 4pm. Contact NC WARN for details.**

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Newsletter design by: Mia Kirsh, Viewfinder Desktop Publishing 9/99

NC WARN (Waste Awareness & Reduction Network), *is a member-based nonprofit working to protect communities and the general public from the increasing health damage associated with toxic and radioactive pollution.*
NC WARN, P.O. Box 61051, Durham, NC 27715-1051
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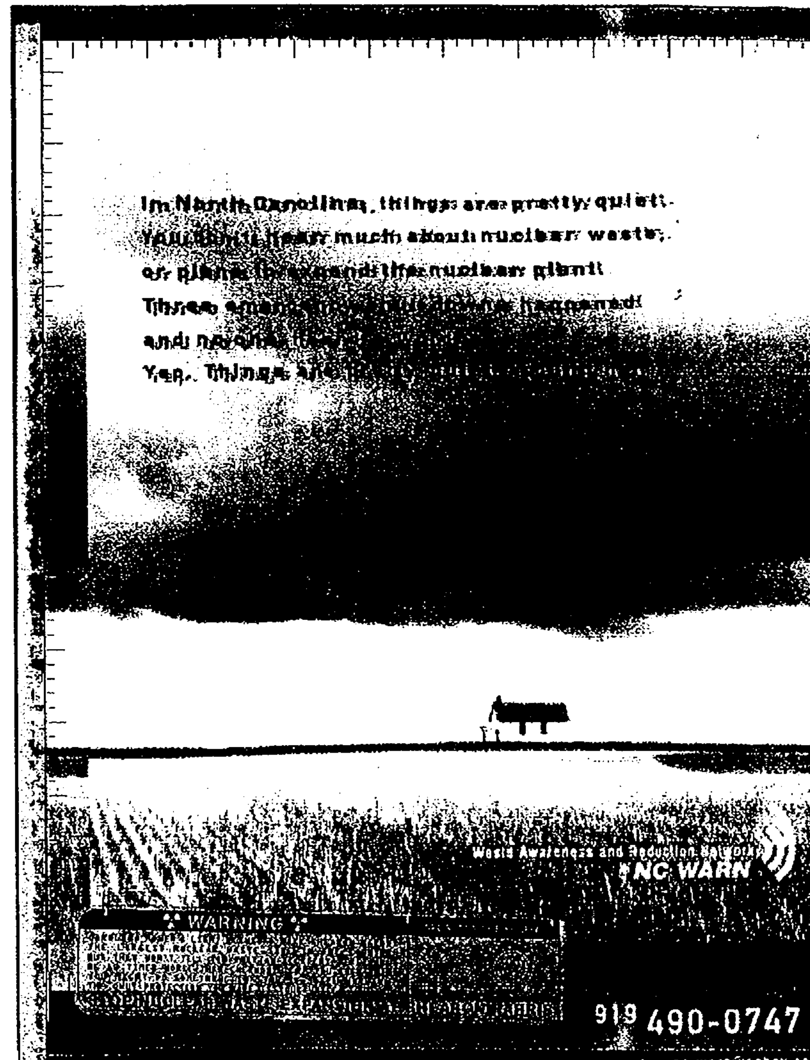


Largest U.S. High-level Waste Site: Key Safety issues

CP&L's application for a nuclear waste expansion has been reviewed by two internationally known nuclear safety experts. Dr. Gordon Thompson is an Oxford-educated scientist who has worked for governments and other organizations in Europe and throughout the Western Hemisphere. David Lochbaum was a consultant to the nuclear power industry for 17 years, is now with the Union of Concerned Scientists and is author of the book **Nuclear Waste Disposal Crisis.** *Although they worked separately, Thompson and Lochbaum concur with each other's findings. This article is based on their analyses.*

"SPENT" NUCLEAR FUEL WILL BE HAZARDOUS for tens of thousands of years. For the first five years after removal from a reactor, it is so highly radioactive and intensely hot, it must be stored in special pools of water 40 feet deep, which must be constantly circulated to dissipate the heat and shield workers from radiation.

The Harris fuel building contains two cooling pools (A & B) which already store spent fuel and two other pools (C & D) with partially completed plumbing, plus a pool for unloading waste fuel shipping casks. All these areas are interconnected by transfer canals which can be temporarily separated by gates. Spent fuel bundles (or assemblies) would be stored in pools A through D and moved by crane through the canals.

The waste fuel storage racks in pools A and B hold the waste much closer together than originally designed for. CP&L's plan for pools C and D further reduces the cooling space around each assembly.

High-density pool storage of spent fuel creates the potential for a severe accident from loss of cooling or through a nuclear reaction, including meltdown.

High-density pool storage of spent fuel creates the potential for a severe accident from loss of cooling or through a nuclear reaction, including meltdown.

To prevent an uncontrolled nuclear chain reaction, thin neutron-absorbing shields must separate each waste fuel assembly. Both new pools would eventually be filled literally wall to wall with waste packed so tightly that there would be less than a half inch for cooling water between assemblies. If the neutron shield fails due to a production defect, is damaged (for example, if the loading crane dropped a fuel assembly) or is damaged in a fire, a nuclear chain reaction could result. A chain reaction could also occur if a spent fuel assembly which was discharged from the reactor within five years is mistakenly placed into the wrong rack.

If cooling is interrupted by sabotage, terrorism, accident or natural disaster, the cooling water can boil away in about 13 hours (CP&L's estimate). Since the water is also a radiation shield, the waste pool area could become too radioactive for workers to enter safely.

Any or all of the spent fuel pools at Harris could have a severe fire or steam-zirconium reaction if waste assemblies are even partially uncovered. If even partially exposed to air, waste assemblies can overheat so much that the zirconium coating reacts with water, air or steam to create a heat-producing reaction (a fire). The fire would vaporize radioactive Cesium-137, which would easily escape from the waste fuel, and it could melt the neutron shields, allowing an out of control nuclear chain reaction even if cooling water is restored.

Water remaining around the bottom of the waste fuel assemblies would block air flow, leading to even greater build-up of heat than if all water were gone. Under CP&L's tight packing of assemblies in pools C and D, waste assemblies out of the reactor for up to 10 years could still start a runaway heat-producing reaction. Although partial pool drainage is more likely than total loss of water and would always precede complete drainage, NRC has avoided consideration of risks from partial drainage since this problem was first identified in March of 1979.

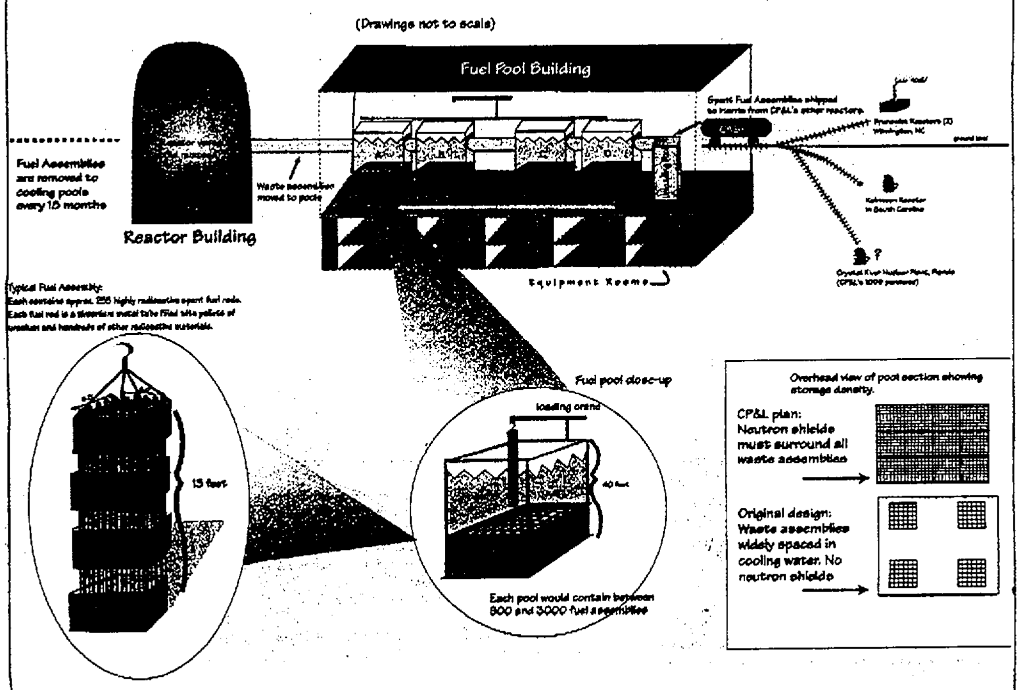
The new Harris pools were originally designed to operate with their own complete set of independent cooling, electrical and back-up power systems. CP&L now proposes to cool all four pools and provide back-up power using only the reactor's systems – systems also critical to reactor safety. This configuration would increase the potential for reactor accidents, especially in the event of loss of off-site power (nuclear facilities rely on off-site power in case anything happens to cause the reactor to shut down suddenly; power grids are vulnerable to weather interruptions and possibly Y2K). If a reactor accident occurred, cooling of the fuel pools would be interrupted and the spent fuel building would be contaminated. Personnel could no longer gain access to the plant to restore cooling flow. ***Thus, a reactor accident would likely be followed by pool failure,*** which would release much more Cesium-137 and other long-lived radioisotopes than would the reactor accident.

CP&L documents show the company considered building the independent cooling and power systems as originally called for; all these options were rejected, apparently to save money.

CP&L threw away key waste pool safety documents. Without them, the condition of the piping embedded in concrete under the new pools for the past 16 years cannot be verified to national engineering standards. Faulty piping welds could lead to loss of pool cooling.

"Because of the possible penalties of mistakes and accidents, you simply have to take the safest direction. We're living with a very risky situation ... everything has to keep going just right in order to avoid serious problems."
— Professor David Martin,
NC State University (retired),
specialist in nuclear reactor physics and nuclear safety studies.

"Spent" Nuclear Fuel at Shearon Harris



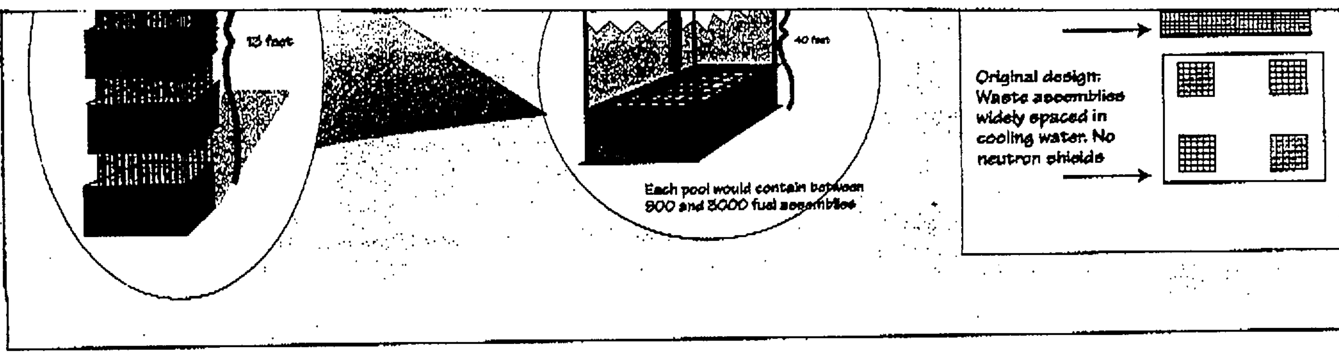
fixed the problem.

March 12
Crews discovered they were unable to regulate the water level that stocks the steam generator. The outage had the plant down for a full week.

plan with the safer one. *Please add your voice to the growing call for CP&L to demonstrate good corporate citizenship by reducing the risk of a severe accident at the Harris Nuclear Plant, rather than greatly increasing that risk.*

"We are already living with a threat from that reactor and the existing waste pools. CP&L should not expand the risk to the people of this area."
— Rev. Carrie Bolton, Pittsboro

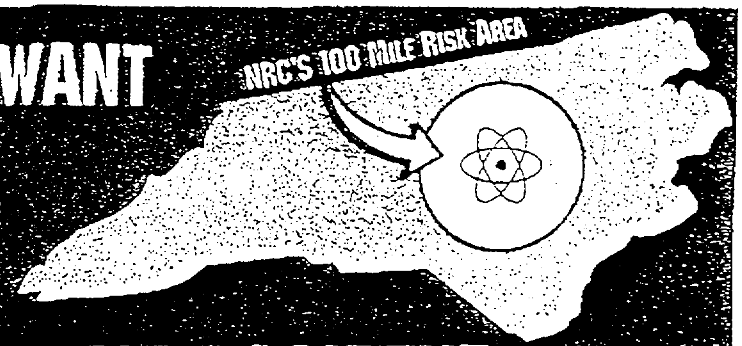
Joe -
This was in the Fuquay Independent yesterday as a flyer.



HARRIS

Joe and Bob,
FYI
Not sure where this first appeared. [Probably] a small local paper. I thought you might want a copy – Susan [illegible]

CP&L DOESN'T WANT YOU TO KNOW...



A CHERNOBYL-SCALE ACCIDENT IS POSSIBLE IF THE SHEARON HARRIS NUCLEAR PLANT BECOMES THE LARGEST U.S. HIGH-LEVEL NUCLEAR WASTE SITE

Doubling high-level waste pools at the Harris Plant would create a larger stockpile of long-lived radioactivity than released at Chernobyl

Importing waste from 2 other plants (the reason for the proposed expansion) increases the risk and severity of a major accident.

The Nuclear Regulatory Commission admits a major waste pool accident would threaten a 50-mile radius

Numerous "near miss" accidents have already occurred in the U.S. Waste pools were not designed for long-term storage; waste will be a threat for 10,000 years.

NC WARN is calling on CP&L to step beyond regulations which block public input to the decision.

NC WARN has identified serious technical concerns about CP&L's unprecedented cooling system and safety plan: it appears that this would be the only 4-pool waste system in the U.S.

NUCLEAR SAFETY IS *NOT* A PRIVATE MATTER:

1. Send this entire page to CP&L with a short handwritten note: Urge C.E.O. William Cavanaugh to commit to a genuine public process:
   PO Box 1551, Raleigh 27602-1551, 919-546-6111 Fax 546-3210 e-mail: bill.cavanaugh@cplc.com
2. Let the media and your county officials know this is important to you.
3. Help NC WARN press the technical and legal challenge with a tax-deductible contribution.

NC WARN
Waste Awareness & Reduction Network
PO Box 61051, Durham, NC 27715-1051
(919) 490-0747 /Fax (919) 493-6614 e-mail: NC-WARN@POBOX.COM

Chatham Record

United States Nuclear Regulatory Commission

Office of Public Affairs, Region II
61 Forsyth Street, Suite 23T85, Atlanta, GA 30303
Tel. 404-562-4416 or 4417 Fax 404-562-4980
Internet: kmc2@nrc.gov or rdh1@nrc.gov

No: II-99-50
Contact: Ken Clark or Roger Hannah

FOR IMMEDIATE RELEASE
(Tuesday, October 19, 1999)

ASLB TO HEAR LIMITED APPEARANCE STATEMENTS DECEMBER 7 & 8 ON CP&L REQUEST TO INCREASE SPENT FUEL STORAGE AT HARRIS

An Atomic Safety and Licensing Board will hear limited appearance statements in Raleigh, North Carolina, on Tuesday, December 7, and in Chapel Hill on December 8 in connection with a proceeding involving Carolina Power & Light Company's request to the U. S. Nuclear Regulatory Commission to increase the spent fuel storage capacity of its Shearon Harris nuclear power plant near Raleigh.

On December 23, 1998, CP&L asked the NRC to amend the Harris plant's operating license to place two additional, unused spent fuel pools in service. The Board of Commissioners of Orange County, North Carolina, petitioned to intervene. A three-member ASLB granted the Commissioners' petition and is in the process of conducting a hearing on the merits of the request.

Persons not a party to the proceeding will be permitted to make an oral statement setting forth his or her position on matters of concern related to the proceeding. These statements do not constitute testimony or evidence, but may help the Board and/or the parties in their deliberations in connection with the issues.

Persons who have submitted a timely written request to make an oral limited appearance statement will be given priority over those who have not. In order to be considered timely, written requests to make an oral statement must be mailed, faxed or sent by e-mail so as to be received by the close of business (4:30 p.m. EST) on Monday, November 29. The request must specify the date (Tuesday, December 7, or Wednesday, December 8) and the session on that day (afternoon or evening) during which the requester wishes to speak.

Written requests to make an oral statement should be sent to:

MAIL - Office of Secretary
Rulemakings and Adjudications Staff
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

FAX - (301) 415-1101

E-MAIL - hearingdocket@nrc.gov

(MORE)

1/13

A copy of the written request to make a limited appearance statement should also, using the same method of service, be sent to the Chairman of the licensing board as follows:

MAIL - Administrative Judge G. Paul Bollwerk, III
Atomic Safety & Licensing Board Panel
Mail Stop T-3F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555 - 0001

FAX - (301) 415-5599

E-Mail: - gpb@nrc.gov

The time allotted for each statement normally will be no more than five minutes, but may be further limited, depending on the number of written requests to speak and/or the number of persons present at the designated times.

The ASLB will hear oral limited appearance statements on the following dates at the specified locations and times:

Tuesday, December 7 - Jane S. McKimmon Conference Center
North Carolina State University
Corner of Gormon Street and Western Avenue
Raleigh, North Carolina
Afternoon - 1:00 p.m. - 4:00 p.m. (EST)
Evening - 7:00 p.m. - 9:30 p.m. (EST)

Wednesday, December 8 - *Southern Human Resources Center*
Main Meeting Room
2505 Homestead Road
Chapel Hill, North Carolina
Afternoon - 1:00 p.m. - 4:00 p.m. (EST)
Evening - 7:00 p.m. - 9:30 p.m. (EST)

Interested persons may also submit written limited appearance statements at any time by addressing them to those indicated for receipt of requests for time to make oral statements.

#

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For hard copy, refer to PDR Folder: FOIA 99-367

FOIA Name & Number: Jim Warren 99-367

[redacted]: Appendix G: 4-27 copyrighted docs.