LIMITED APPEARANCE

UTILITY USERS FOR REASONABLE RATES
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April 13, 1979

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U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

In the Matter of
Public Service Electric & Gas Company, et al.
(Salem Nuclear Generating Station, Unit 1)
Docket No. 50-272

Gentlemen:

I regret the delay in the submission of my "limited appearance" written testimony; however, it has taken longer than I planned to obtain the source documents needed to corroborate my statements.

To put this entire review in the right perspective, I think it significant for the record to show that the proposed increase in storage of spent fuel capacity at the Salem Nuclear Generating Station Unit No. 1 is substantially more than any planned increase in any other, to my knowledge, reactor storage pool in the United States - an increase of approximately 440% vs. other atomic plants of 20 to 330%.

In light of my research and analysis, I am convinced that the ASLB cannot possibly recommend the approval of this amendment or application for the proposed increase of spent fuel rod assemblies to be stored at Salem Unit No. 1 and No. 2, as requested.

Neither the Nuclear Regulatory Commission Safety Analysis and Environmental Impact Analysis or the applicant's Safety Analysis Report amendments, as filed, fully address the following issues and therefore leave no alternative but to turn down this application based on your findings of facts:

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1. The amendment would permit modifications of the spent fuel storage pools at Salem Unit No. 1 and No. 2, allowing higher density of spent fuel assemblies inventoried in each pool. The water contained in each pool acts as an alleged shield against the release of radioactive isotopes to the environment. After analyzing the Final Safety Analysis Report (FSAR) 9.7.1.3 which states "Gamma radiation is continuously monitored in Fuel Handling Building." "Containment integrity will not be violated when the reactor vessel head is removed unless keff is $\leq$ 0.95. All fuel and waste storage facilities are contained and equipment designed so that accidental releases of radioactivity directly to the atmosphere are monitored....," outlined in 9.7.1.4. Then under 9.7.1.5, "A controlled ventilation system removes gaseous radioactivity from the atmosphere in fuel and waste treating areas of the fuel handling and auxiliary buildings and discharges it to the atmosphere via plant vent. Radiation monitors are in continuous service in these areas...."

   The above admission on the part of the applicant appears to show normal routine releases to the environment, taking into account the proposed 1170 fuel assemblies vs. 264- larger quantities of potential radioactive isotopes, and greater percentage of probability of larger releases, in my opinion will result in undue risk to the health and safety of the public.

2. If we look carefully at FASR, 9.7.1.1, "Borated water is used to fill the spent fuel storage pool at a concentration to match that used in the reactor cavity and refueling canal during refueling operations. The fuel is stored in a vertical array with sufficient center-to-center distance between assemblies to assure $\leq$ 0.95...." "Boric acid is added to the water to ensure subcritical conditions during refueling." Regardless of your background in nuclear engineering or nuclear chemistry, it doesn't appear that the applicant is able to maintain a consistent concentration of boron in the reactor cooling system (primary), from historical License Event Reports and that does not lead one to believe there is any assurance this can be done with any level of confidence in the spent fuel pool.

   There are many reportable occurrences of low concentration of boron and an event of higher concentration. These reports are available to the ASLB dating back to August, 1976 (During initial fuel loading and testing) through date March 22, 1979.

   What is the probability of deterioration of the racks with such fluctuation in boron centrations, sometimes higher than k_{eff} 0.95? Under 9.7.2.1, "The spent fuel storage racks are designed such that k_{eff} is limited to a value of less than 0.95 under normal circumstances when the pool is flooded with demineralized water."

3. The FSAR states, "Storage racks located in the pool are physically arranged in such a way that the assemblies are always maintained in a subcritical condition." Again, inferring a certain boron concentration which the applicant may not be able to maintain consistently. Neither the NRC Staff evaluation nor the applicant have fully evaluated the potential effect or consequences of changes in fuel design, new utilization of uranium, burn-up to be outlined later in this testimony. Therefore, this section rendered invalid.

4. The FSAR states that, "Criticality is the new and spent fuel storage areas shall be prevented by physical systems or processes." Again, certain boron concentration levels (questioned above), in light of historical mixtures at the site, and certain pump systems do not appear to substantiate a high level of confidence of performance. Under 9.4.3.1 (FSAR) please note "In the unlikely event that one spent fuel pool pump should fail, a second pump is provided for 100% redundancy."

Certainly if I'm aware of pump problems at other reactor spent fuel pools, the Board is aware of problems experienced at Turkey Point Unit 4. Under "Reportable Occurrences," May 23, 1978 the in-service spent fuel pit cooling pump shaft failed, resulting in pool water overflow contaminating two operators. A second reportable occurrence on September 11, 1978 revealed a spent fuel pit cooling pump seal failure causing radioactive contaminated water overflow again.

There is no finding of fact to substantiate 100% redundancy in the continuous operation of spent fuel pool pumps to provide either continuous heat removal or consistent boron concentrations. Neither the applicant nor the NRC has evaluated the change in fuel design described above and its potential effect and consequences. Therefore, the applicant has understated the potential consequences without evaluation.

Neither the FSAR nor the NRC "Safety Evaluation Relating to the Modification of the Spent Fuel Storage Pool - Docket No. 50-272" has addressed the change in fuel design, Reload 2 Cycle recommended by Westinghouse and 2 of 40 fuel assemblies being installed, allowing additional grams of uranium. This is a major consideration not addressed and therefore <u>invalidates all calculations</u>.

It is my understanding that DOE is starting to work intensively on stretching uranium utilization in current light water reactors. New designs include shortened refueling intervals through rapid refueling; radial reflectors; low power-density fuel cores; increased pressures, temperatures and efficiencies; vented fuel to purge fission products and fuel lattice changes. DOE is proposing uranium utilization improvements in current-generation, for near term, on fuel burnup extension to 45,000-50,000 Mwdt through fuel irradiation projects.

The Safety Evaluation assumes only unirradiated fuel assemblies with no burnable poison and a fuel loading of 44.7 grams of U_{235}. This does not now seem valid.

5. After reading correspondence dated August 7, 1978, covering radiation levels from fuel element transfer tubes, a possible radiation streaming problem that exists, due to some pipe sleeves being imbedded in one of the compartment shield walls, creates the question if this has not been experienced at a similar reactor, why is the NRC writing the applicant? If you quadruple the number of spent fuel assemblies, does this quadruple the per cent of probability of possible problem elements and pose additional chance of releasing deadly poison isotopes into the environment? If not, what is the potential increase in probability in light of changes already known to be incorporated? To the best of my knowledge, it does not appear that this has been addressed fully by the NRC evaluation.

6. In a letter dated November 28, 1978, written by A. Schwencer, Chief Operating Reactors Branch No. 1 to the applicant to the attention of F. R. Librizzi, subject: Containment Purging During Normal Plant Operation. "On September 8, 1978, the staff was advised as a matter of routine Salem Unit No. 1 has been venting the containment ...." "Should a loss-of-coolant accident (LOCA) occur during purging there could be insufficient containment backpressure to assure proper operation of ECCS." You then refer to correspondence, July 10, 1978 by Boyce H. Grier to PSE&G, Attention F. W. Schneider, subject "Inoperability of Service Water Pumps." "On January 11, 1978, Salem Generating Station Unit No. 1, ... loss of four of six installed service pumps...." Again in January, 1979, two of four pumps out of service. As I understand it, the secondary water source backup to the ECCS, is the river. Combine these facts with a statement made by an employee of the applicant that "in case of need" we can utilize water from the spentfuel pool for backup water. Due to the large potential quantities of spent fuel assemblies, complete review of potential effects as outlined in the Sandia Laboratories report "Spent Fuel Heat-up Following Loss of Water During Storage" printed September, 1978 should be reviewed carefully by your staff. This type of occurrence was not evaluated by either the NRC staff or the applicant, therein rendering the analysis invalid.

In summary, neither the NRC nor the applicant have fully addressed, evaluated, nor based their calculation of probability and consequences on the following:

(a) Criticality of the spent fuel pool with higher density uranium fuel rods (core design change) and possible defective fuel rods (similarly reported at Millstone Point in Conn., report released by NRC in March, 1977; another plant at Haidam Neck, possible situation resulted from appearance of faulty fuel units in the reactor)

(b) Inadequate means of maintaining boron concentrations (time-history analysis on fluctuation on site).

(c) No evaluation of speed-up, burnup of uranium rods and its effect on the zirconium cladding surrounding the fuel rods, deterioration, release of fission products, effect on racks, criticality and similar issues.

(d) No evaluation of increased uranium density (grams) in new fuel core design and its effect on all calculations on all issues.

(e) Loss of water incident as related above in No. 6.

I oppose the approval of this amendment and feel that the applicant should be held to the original spent fuel rack design under which the operating license was issued.

Your help in getting this information forwarded to the proper individuals would be appreciated.

Respectfully,

Michael DiBernardo

Michael DiBernardo
President, UURR