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August 24, 1992

Atomic Safety and Licensing Board Panel
Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Docket no.50-336-OLA (design of Spent Fuel Pool)
FOL. No. DPR-65
ASLBP No. 92-665-02-OLA

Dear Administrative Judges:

We have four primary contentions:

1.That there is no basis for the NRC to contend that no significant risk is involved in the issuance of the design change that was issued to address the criticality errors found at Millstone 2.

2.That an environmental and health study needs to be done so we can know the effects from releases of varying amounts of the current allowable radioactive inventory of the spent fuel pool.

In support of contentions 1 and 2, See section A,B,C and attached affidavits of Dr. Gordon Thompson and Dr. Michio Kaku

3.That the removal of requirements for neutron flux monitors in the Millstone spent fuel pool was improper in light of the fact that before the license amendment was issued to allow no inpool criticality monitors the NRC was aware that the criticality safety margins were being questioned. Therefore we contend that without criticality monitors in that pool we will have no prior warning if a dangerous neutron multiplication were to occur.

4.That immediate action should be taken to stop NU from contaminating the new steam generators until our concerns for the safe storage of the spent and new fuel is addressed.

For the health and safety of the people, the protection of the environment, and the economic liability of the ratepayers and stockholders, We contend that immediate action should be taken by the NRC, since it is under NRC amendment # 158 that NU justifies continued operations.

Until our safety concerns are addressed, most importantly those involving the use of the "neutron-flux trap" principle as practiced at Millstone 2, we do not know that storage in the spent fuel is safe.
See Section C.and D.

The affidavits of Dr. Gordon Thompson and Dr. Michio Kaku are attached to support our contentions.

Also we submit the following section A.B.C. and D. to further support our contentions.

We also submit a brief Background review, along with our current understanding of the July 6, 1992 event in the spent fuel pool.

DS03

A. The accident senarios used in the safety analysis reports assume the use of the "neutron flux trap" principle as valid, but this principle as applied at the Millstone 2 spent fuel pool has been called into question by LER 92-003-00.

In the May 1986 safety analysis it was assumed that inadvertant criticality would not happen in the pool and therefore criticality was not considered in the accident senario or in evacuation plans for the plant.

B. The use of Boroflex as the neutron-flux trap in use in the old Region 1, which has been renamed Region A and B by amendment 158, is now considered by us to be under serious question. We need time and the assistance of the NRC to get the results of those experiments and the actual calculations used by Holtec Inc, which we have been told are the basis for redesign allowed by #158.

NU has failed us in not allowing access to what calculations they did that verified that the redesign does in fact meet safety standards. They insist that Stan Turner of Holtec, Inc has the only information upon which the safety of the redesign is based. Dr.Turner states that the inhouse runs, and calculations are propietary and neither the NRC or NU has them. Also some references in the benchmark calculations that NU submitted to us are inhouse reports. Mr Kacick was asked to send them to us, but he needs to find out if any of it is propietary before sending it.

Dr. Turner said the calculations done by him were independently verified by a Professor Vernetson at University of Florida under contract with Holtec.

Without this information that NU and Holtec have, we cannot know if the redesign improves or makes worse the criticality situation for the whole or part of region one as it is now used or as it is projected to be used.

Neither can the NRC know this since they were not given this information either. Therefore we feel the issuance of this amendment was premature.

C: This amendment allows for the continued use of the pool without regard to the added cost of removal of the contaminated new steam generator system which this license in affect permits. NU asked in their April 16th application for their request to be expedited because of their need to offload the core to begin the steam generator replacement. The cost of this replacement is over 190 million dollars. If in fact this amendment does not fully address the safe storage of spent and new fuel, NU may need to provide other means of storage for the waste currently in the pool and, if the plant is to continue operating, for waste generated during the lifetime of the plant.

If in fact the waste can no longer be stored in the pool safely, the ratepayers and stockholders need to be financiallay able to bear the cost of providing safe storage. Their choices should not be unfairly limited by failure of oversight from the NRC. In early September,1992 NU expects to be able to use refuel water which is radioactive to test the new steam generators. This will contaminate them.

If contamination is allowed, NU will need to treat the 190,000,000 dollar steam generator system investment as low-level waste if safe storage of the spent fuel is not perceived to be economical and further production of spent fuel created by the operation of Millstone 2 is considered economically and environmentally unsound.

If the cost of safely storing the fuel that Millstone 2 has generated and will generate is not considered economically or environmentally feasable by the ratepayers, stockholders and state regulatory agencies, the ratepayers and stockholders and taxpayers should not be unnecessarily burdened with unusable and unsalable contaminated steam generators, nor saddled with the cost of disposal of them as low-level waste.

They should not be denied the option of selling the steam generators to

assist them financially in providing safe storage of the current inventory of spent fuel and any other needs such as decommisioning costs that would arise in that position.

D: This license assumes that the waste generated in the next 2 cycles can be safely accomidated. With the 1st refuel cycle after renewed operations, NU looses full-core offload capabilities which they say is theira corporate and engineering policyto maintain.

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BACKGROUND

The following background is presented to point out the significance of this event and the relationship to the current contested amendment #158 and its amendment #157 which relate to matter of criticality safety margins in the spent fuel pool and plausable accident senarios.

The Millstone II power plant is a pressurized Combustion Engineering reactor. Engineering and construction was performed by Becthel Engineering Corporation. The Turbine was supplied by General Electric Corporation and is capable of producing 870 megawatts of power net.

Summer of1975, when Millstone unit 2 began operation, the spent fuel pool storage capacity was 301 spent fuel assemblies (about 1.3 full cores).

Winter 1976, because spent fuel processing plants would not be available in near future, discharged fuel was filling the pool. A capacity expansion of the pool was deemed necesary to support the engineering practice and NU corporate policy of reserving storage space in the spent fuel pool to receive an entire discharged reactor core ("full-core-offload") should it become necessary due to operational considerations.

Fall 1977, a license change allowed reracking, and the pool capacity was increased to 667 spent fuel assemblies. The storage locations or "cells" had a center to center spacing of 12.19 inches.

In1985, after the sixth offloading of 1/3rd of core the pool did not have enough room for a "full-core-offload". The core contains 217 assemblies The offloading of 1/3rd core into the spent fuel pool is referred to by the industry as a refuel cycle

On June 2,1986, the NRC issued amendment no.117 to allow storage of consolidated fuel in the spent fuel pool. The Millstone Fuel Consolidation Pilot Demonstration Program will allow 10 assemblies to be consolidated into five consolidation packages.

The process involves the coordinated dissasembly of two spent fuel assemblies and a subsequent systematic reconfiguration and repackaging of the 352 fuel rods into a consolidated spent fuel storage cask. The non-fuel bearing components (skeletons) are volume reduced and packaged into a waste container.

inter1986 NU began to utilize a region stratagy with a two region design, allowing for storage of 1112 unconsolidated fuel assemblies.

Region 1 contained the high enrichment core-offload assemblies. The rack design employed the use of neutron absorber material as "neutron flux trap."

The Boroflex poisoned fuel racks allows for 384 storage cells with a nominal center to center spacing of 9.8 inches, and 4 out of 4 pattern.

Region 2 spent fuel rack design was based on criticality acceptance criteria allowing credit for reactivity depletion in the spent fuel. This region is reserved for fuel with 85% design burnup in a storage pattern utilizing 3 out of 4 cells for storage of assemblies, and the unused blocked cell as a "neutron flux trap".
This allows 962 storage cells for 728 unconsolidated fuel assemblies, with center to center spacing of 9.0 inches, 3 out of 4 storage pattern.

Before this regionalization method was approved, the physics criteria for fuel stored in the spent fuel pool was defined by the maximum unirradiated initial enrichment of the fuel.

Nuclear Waste Policy Act of 1982 requires fuel owners to provide on-site spent fuel storage until a government repository is available.

In 1986 in their application to consolidate fuel assemblies NU stated that "current circumstances in the back-end of the nuclear fuel cycle make it necessary that fuel owners establish and implement a plan for "life-of-reactor-storage" of spent fuel"

Spring1987 Approval of consolidated fuel storage in cells of Region 1 and 2 permitted the use of region 2 blocked cells allowing 1346 storage cell to be used. 1277 cells could contain consolidated cans, and each can would contain material from two fuel assemblies (2:1 ratio).
These assemblies, before they could be consolidated must be out of the reactor for at least five years and have undergone 85% burnup.
The waste from the consolidation process (skeletons) are to be compacted into waste consolidation containers and treated as Class C+ low-level waste two assemblies.
With storage restirction, and thermal load restrictions imposed by the pool cooling system the allowable storage capacity of the spent fuel is:
10 "spare cells" for damaged fuel
362 intact fuel assemblies with les than 5 years decay
688 cells containing consolidated fuel(equivalent to 1376 assemblies)
217 empty cells in region 1 for full-core-offload
1377 occupied cells =1376 assemblies consolidated and 589 unconsolidated
1965 assemblies con and uncon.

Summer1987NU state that their review of their generic review of the hot consolidation process determined the project safe and technically acceptat NU said the process and associated risksSafety evaluation report:
On August 11, 1987, Northeast Utilities (NU) stated that they reviewed the hot consolidation process as demonstrated by the program generically and determinedthe project safe and technically acceptable. They stated that the process and associated risks and accident analyses are essentially the same regardless of the scope of consolidation. This is not true since the radioactive inventory is increased with consolidation.
On March 31,1988, the NRC issued amendment (TAC No.65274) no.128 which deleted the footnote that had limited storage of consolidated fuel to five consolidated canisters. The amendment also states that NU needs to request approval to use temporary SF storage racks for long term storage. Temporary Spent Fuel storage racks are utilized during the consolidation process and are emptied when a consolidation "run." is completed.

There were several applications and amendments applying to the removal of

critical monitors in the pool. The one applicable specifically to Millstone II was issued on May 20,1992 and for Millstone 3 April 24, 1992.

On February 14,1992, NU notified the NRC that design errors had been found in the spent fuel reracked area which contains boroflex panels. This error was found by an independent contractor who was hired to do blackness testing on the boroflex.

On February 28,1992, Aseea Brown Boveri (ABB), formerly Combustion Engineering who had designed the pool reracking, notified the NRC of their explanation for the discrepency noted by independent contractor Holtec,INC. of the inaccuracy of their fuel storage criticality calculations.

This noted discrepency put Millstone II pool out of compliance because the Keff factor was over .95.

On April 16,1992, NU applied for the amendment asking that the pool be reseccioned to allow a section just for new fuel. This in effect reduced the area available for the freshly downloaded spent fuel.

On April 28,1992 it was noted in the Federal register that the redesign entailed "No Significant Risk."

On May 28,1992, CCMN asked for a delay in issuing the amendment to give us time to see if the calculations were correct and if the risk may have been increased rather than decreased by the redesign.

On June 4,1992, NRC issued Amendment no. 128 allowing the redesign.

On July 3,1992, the SFP received as allowed by the amendment the whole reactor fuel into region A, an area approximately 40% less than what was available prior to the amendment.

On July 15,1992, CCMN members and others met with NU and were promised the calculations that NU, ABB, and Holtec did among other things.
(See letter dated July 22, 1992, and NU response August 7, 1992.)

On August 7,1992, NU claimed that the calculations done by them and ABB are not relevant to the license amendment and are refusing to give them to us. The Holtec calculations are the basis for their license amendment and NU claims that Holtec's quality assurance program did the verification.

On June 29,1992, the Atomic Safety and Licensing Board Panel gave us until

On August 5,1992 On August 5, 1992, thirty days to the date, NU filed their report with NRC on July 6,1992 event, but it is not yet available through NRC. **see below Accident Senario, Event of JULY 6,1992 **

On August 13, 1992, CCMN submitted our contentions to NRC stating that expert testimony would follow.

On August 14,1992, we were granted an extension to have our contentions filed by August 24, 1992. These contentions are contained in this document. They show that our concerns are real and we have grounds to believe that the amendment not only may not improve the situation enough to bring the pool into compliance with NRC safety margin requirements, but may in fact increase the risk and consequenses of a spent fuel pool accident.

On August 19,1992, the CCMN coordinator received a call from Judge Ivan Smith of the NRC's Atomic Safety and Licensing Board requesting that all people and organizations that are being represented by CCMN have their materials submitted not directly to his panel but by CCMN to the NRC. Our

The coordinator agreed to ensure that those who had stated that CCMN was to represent them or who were ambiguous on this matter would be approached and if they in fact wanted to represent themselves she will instruct them to state that fact in a late filing to the NRC PANEL.

She also agreed to include in CCMN correspondence the correspondence of those whom CCMN represents, and will in the future instruct them to send their materials to CCMN for submittal rather than directly to the Panel.

Today, August 24,1992 Dr Gordon Thompson and Dr. Michio Kaku have or will soon be sending their notarized affidavits to Panel directly. Because of extreme time and information constraints this is necesary. They did submit their affidavits by fax to CCMN and we are mailing them with our contentions by first class mail August 24 to those on the attached service list.

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ACCIDENT SENARIOS

Worst case senarios assume that only one thing goes wrong. In the real world this is hardly ever the case.
EVENT of July 6,1992

The fuel was moved through a canal filled with water into the Spent Fuel Pool The water in the canal was then pumped out and the top of the reactor vessel (head) lowered back in place. The reactor head was not bolted down.

On July 6th there was a loss of electric power from 1460kv line which affected the spent fuel pool cooling system among other things.

The fuel had less than 30 days to cool off from shutdown of the reactor. Also, the pool had three times as much of this hot fuel in it than is usual during a normal refueling cycle. Consequently the pool tempurature began to rise more rapidly than usual when the pool coolant system failed because of the loss of power.

The control room, to slow the rising tempurature in the pool, opened a valve to bring in more cooled water from the reactor cooling system. Because a valve had been left open in the reactor cooling system, instead of water flowing into the Spent Fuel Pool it was siphoned off. The location of the intake valve acting as a drain in this case could allow at most a drop of 3 feet in the water level which still leaves plenty of water over the Spent Fuel.

The control room did not know this had happened.
By inadvertently draining water rather adding it their action caused the temperature to rise even more rapidly in the pool. Even with this increased rise in temperature it would take more than a day before the water would begin to boil off.

There are several backup systems that can add water to the pool if the level gets too low. Even if all the regular automated systems that add water to the pool fail because of power loss and reactor shutdown, there is always the fire main from which water can be taken. Consequently loss of coolant water is not in the accident senarios considered by the NRC or the Utility. What they consider to be the worst accident is a dropped cask in the pool which causes the rupture of 500 rods. This senario happens under water and the

radiation is mostly contained in the water and the air ventilation system is automatically activated to filter what can be filtered. Consequently the worst case senario results theroreticaly in very little exposure to the public.

Even with the minor problem of power loss that occured on July 6th, several things went wrong concurrently, avalanching off the power loss event.
Only 3 days before, the pool had received a full-core-offload, therefore the pool water temperature was expected to risc rapidly without forced cooling. The pool temperature at beginning of event (8:55) was 88 degrees F and a maximun of 92 degrees F was reached at 11:15.
These temperatures were average pool temperature. We have yet to be provided the actual; temperatures for bottom and top areas of pool where the freshly offloaded core is placed. According to May 1986 safety analysis report, whcih referenced the use of the Shutdown Cooling System, Operating Procedure OP2310 that was used in June 6th event, the need for for this backup cooling system is the fact that under the then issued expansion license the cooling needs of the pool could not be met in certain conditions by th forced cooling system of the pool without Shutdown Coolant system backup..
This document did not make it clear if the boiloff that would occur in about 10 hours, was using the accident senario with the pool at capacity under design plans if Region 1 and 2 would contain maximum allowable consolidation or if this maximum heat load was calculated with Regions 1 and 2 with unconsolidated spent fuel. Also the worst case senario with an emergency offload of whole core though mentioned to come to boiloff in four hours was not analyzed in the safety anaysis for releases.

Under the new design (amendment 158) the pool has the old region 2 filled with assemblies,and the old region one stacked in such a way that there is no room for another full-core-offload The new section of region 1 called B is licensed to accept new fuel only and remains unloaded at the time of the June 6 event. We need to know the parameters of the safety analysis design for the thermal load of the pool that would lead to a boiloff of 9 3/4 hrs. and 4 hrs. respectively to know if in fact there was danger of a localized boiloff in the region a where the full-core is placed.

Our concerns about criticality exist now as we are uncertain of the errosion of the boron from the boroflex panels, the accuracy or even if boroflex has been benchmarked at all for the measurement of multiplication factor in this region of the pool. It looks like, when Keff found to be too high to meet NRC safety standards, attention was given only to placement of new fuel, and the calculation of Keff readjusted to allow space in the pool for placement of the new fuel only. The fact that Keff may not have been calculated for Region 1 in its entirety, and with a full core offload in the resection called A, may be apporaching or reached a level of Keff in that area that is not within NRC safety standards, and can be at or approaching a dangerous level.

EVENT of July 6,1992

We have pieced together the following about the event of July 6 :

1. the control room priority was restoring power after a 1460 kv line was accidentally lost during a maintenance procedure. One of their backup generators was down for maintenance, and the other started but failed to generate electricity. They had to manually transfer power from somewhere.

2 They manually opened from the control room 3 valves so a LPSI pump could suction off water from the pool, send it through one of the shutdown heat exchangers, and return it to the pool.

3. The water went from the SFpool to the reactor vessel (which had no fuel in it) and lifted off the top or head of the reactor..

4. The spent fuel water, now mixed with primary coolant water, overflowed into the fuel transfer canal that had recently been drained.

5. The sump valve had been left open in the saddle of the canal which is six to eight feet lower than the canal floor. This area had recently been pumped out.
The water then flowed into the saddle, through the open valve into a sump area 22 feet below the containment.

6. The sump pump could not handle the flow.

7. The water then backed up and overflowed onto the containment floor.

8. The workers in the containment called the control room to let them know that water was flowing from around the vessel and getting onto the floor of the building.

9. After power was restored they pumped this water back into the SFP even though it was mixed with primary coolant.

10 The NRC said there was no danger to the public but would investigate why NU took over an hour after power was restored to operate the cooling system in the pool

On August 5, 1992, thirty days to the date, NU filed their report with NRC, but the document is unavailable to the public because of delay in getting it microfiched.

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We want to be sure that that this matter before your panel gets the time and attention it needs to assure the safety and well being of the people of this area, and we look foward to your cooperation in this matter.

We hope that a hearing will be held soon and that you will expedite our requests for information and necessary action.

Sincerely

Mary Ellen Marucci

Mary Ellen Marucci,
coordinator
Cooperative Citizens Monitoring Network

AFFIDAVIT OF GORDON R. THOMPSON

Regarding

Amendment No. 158 to the Operating License for Millstone Unit 2

My name is Gordon R. Thompson. I am executive director of the Institute for Resource and Security Studies, 27 Ellsworth Avenue, Cambridge, Massachusetts. I hold bachelor degrees in science and engineering and a PhD in applied mathematics, have extensive experience with nuclear power safety issues, and have been qualified as an expert witness in proceedings before NRC licensing boards.

The focus of this affidavit is a Safety Evaluation by the NRC Office of Nuclear Reactor Regulation, dated 4 June 1992 (hereafter designated "Safety Evaluation"). The Safety Evaluation found that the proposed license amendment no. 158 involved no significant hazards considerations. That finding is in error.

The storage of spent fuel in densely packed water-filled pools represents a significant hazard. Partial or total loss of water could lead to a self-propagating exothermic reaction of zirconium alloy fuel cladding with air or steam, leading to a release to atmosphere of a substantial fraction of the long-lived radioactivity in the pool. The magnitude of that release could substantially exceed the release from a severe reactor accident.

A pool accident of this kind could be initiated by or accompanied by a reactor accident. It could be initiated by an earthquake, sabotage, the fall of a shipping cask, or by a refuelling accident that could involve criticality.

This type of accident can be essentially eliminated by the use of alternative means of spent fuel storage, including on-site dry casks. Such means are proven and available, although they may involve additional capital cost. Because such means are available, and the magnitude of the potential release is very large, it is incumbent on the NRC to ensure that all relevant licenses and license amendments are issued after explicit, thorough and public consideration of the pool accident issue.

The potential for pool accidents has been brought to the NRC's attention on a number of occasions, and limited technical analysis on this issue has been conducted under NRC sponsorship. However, the NRC has never made a

thorough, comprehensive determination of the risk posed by these accidents, either at Millstone Unit 2 or any other plant. Accordingly, the NRC has no basis for determining whether amendment no. 158 to the Millstone 2 license:

(i) involves a significant increase in the probability or consequences of an accident previously evaluated;

(ii) creates the possibility of a new or different kind of accident from any previously evaluated; or

(iii) involves a significant reduction in a margin of safety.

The Safety Evaluation claims, at pages 5 and 6, that none of these three conditions is true. However, since it offers no basis for that claim, the Safety Evaluation is in error in finding that the license amendment involves no significant hazards considerations.

With appropriate notice and resources, I can elaborate in detail upon the statements made in this affidavit.

Signed: Gordon R. Thompson

Gordon R. Thompson

Dated 24 August 1992

Sent by fax on 24 August 1992 to Cooperative Citizen's Monitoring Network, New Haven, CT, c/o fax no. 203-777-1921. Notarized copy to be sent by mail.