Paul M. Blanch
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April 13, 1994

Mr. James Taylor
Executive Director for Operations
United States Nuclear Regulatory Commission
Washington, D. C. 20555-0001

Subject: 10 CFR 2.206 Request for Action

Dear Mr. Taylor:

As Executive Director for Operations of the NRC, I am sure that you share the same concerns for nuclear safety as I do. Recently, your Chairman, Ivan Selin, stated on Cable News Network (CNN) "*I can absolutely, unequivocally convince the general public that all known safety concerns are addressed before our plants come on-line and that we take extraordinary measures to make sure we know about these.. these safety concerns. And furthermore, they don't stay on line unless these concerns continue to be addressed.*" I fully support Ivan Selin's position however, I am not unequivocally convinced. I believe that you and your Chairman may be unaware of a major deficiency that appears to violate some of the NRC regulations.

Specifically I am referring to the potential meltdown of the fuel in the spent fuel pools for all reactors in the United States. This problem was first identified by two engineers while working at the Susquehauna Steam Electric Station (SSES) in Pennsylvania. The problem was identified to the utility (PP&L) in early 1992 and formally reported to Mr. Tim Martin, NRC Region 1 on or about November 27, 1992.

Your agency overlooked the need to inform any utilities of this problem until I contacted Mr. Ashok Thadani of NRR in early October 1993. Shortly after this conversation, the NRC issued an Information Notice (IN) informing all licensees of a potential meltdown in the spent fuel pool. This Information Notice failed to require any action on the part of licensees and no action has been taken by the licensees or the NRC to comply with the regulations your Chairman states are never violated.

The attached paper presents a brief overview of the problem, as it applies to the Susquehauna Steam Electric Station, the potential risks and the regulatory requirements which are apparently being violated. The NRC Staff has in its possession all of the analysis provided by the two engineers, the SSES analysis, and of course the NRC analysis.

It is the responsibility of each licensee to perform an operability determination for its facility(s) and this is not the responsibility of the NRC. Plant and site specific characteristics are unique and can not and should not be assessed by the NRC.

NRC Inspection Manual Part 9900: Section 4.0 of Part 9900; titled "Operable/Operability" contained within Generic Letter 91-18 states: "The determination of operability for systems is to be made promptly, with a timeliness that is commensurate with the potential safety significance of the issue." There has never been an issue identified in the nuclear power industry that has a larger potential safety significance than this issue. Radioactivity releases due to this potential event approach those of Chernobyl.

The NRC has had this information in its possession for more than one and one half years and has done little more than study the problem. I don't believe one and one half years meets the intent of "timeliness."

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I request the following actions of the NRC in accordance with the provisions of 10 CFR 2.206 titled "Request for action."

1. The NRC immediately issue an Information Notice, or other means deemed appropriate, forwarding all information in the NRC's possession to all power licensee's related to the potential spent fuel pool meltdown event discussed in the attached paper. Potential areas of operability concerns and potential non-compliance with NRC regulations must be identified to each licensee. This Information Notice must also remind the licensees of their responsibilities to perform timely operability determinations in accordance with the plant Technical Specifications and NRC Generic Letter 91-18.

2. Each licensee must immediately perform an evaluation of compliance of this potential deficiency with respect to its Current Licensing Basis. Guidance for this evaluation is provided in Generic Letter 91-18 and NRC Inspection Manual Part 9900: titled "Resolution of Degraded and Nonconforming Conditions." Again, due to the potential safety significance of this issue, timeliness is critical.

3. The NRC must deny all requests for license amendments for the expansion of spent fuel pool capacity until all of these safety concerns are fully resolved.

4. After the evaluations are performed by each licensee, the NRC may determine by analysis that this event poses little or no risk to the health and safety of the public. With proper documentation for each licensee, conducted under strict NRC procedures, the NRC may issue a Notice Of Enforcement Discretion (NOED) as provided for in 10 CFR Part 2 Appendix C.

Again, I look forward to your prompt and favorable response to this very significant safety issue and request for action.

Sincerely,

Paul M. Blanch

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cc: Senator Lieberman
Mr. David Williams
Atty. Ernest Hadley

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Potential for Spent Fuel Pool Melting with Significant Radiation Releases

A potential substantial nuclear safety hazard has been identified at the Susquehauna Steam Electric Station (SSES), a two unit nuclear power plant located in Lucerne County, Pennsylvania about 30 miles southwest of Wilkes-Barre. The plant is owned by the Pennsylvania Power & Light Company (PP&L) and others. This hazard was identified to PP&L more than two years ago and to the U. S. Nuclear Regulatory Commission (NRC) approximately a year and a half ago. To date, this hazard has not been properly addressed by either PP&L or the NRC. For over one and one half years, the NRC intentionally withheld this vital information from other Utilities.

The level of hazard is such that were an accident to occur at Susquehanna or any other nuclear plant, similar to the Three Mile Island accident, or an accident caused by some external event such as a hurricane, seismic event etc. the probability is very high that there would be numerous deaths and injuries and that the surrounding countryside would become uninhabitable for decades; in other words, an accident of Chernobyl proportions. The purpose of this summary is to explain the basic elements of this extremely complex technical issue, as well as the applicable regulatory requirements which have not been complied with by power licensees or the NRC.

Each unit in the Susquehanna plant contains a General Electric Boiling Water Reactor. Nuclear fuel is contained in reactor vessels which are housed within primary containments constructed of steel and reinforced concrete. Secondary containments (also called reactor building) surround these primary containments as well as the spent fuel pools which are located on a refueling floor common to both units. Most of the plants emergency systems as well as the system for cooling the spent fuel pools are also located inside the secondary containments.

The spent fuel pools are for storing the extremely radioactive spent fuel when it is removed from the reactors after this fuel can no longer produce power. The water in the pools serves two functions: First, it provides shielding from radiation to allow the spent fuel to be handled by the operators using remote handling equipment. Second, the water serves as the medium to transport heat away from the spent fuel to the atmosphere by way of the Fuel Pool Cooling system and the Cooling Towers or other ultimate heat sinks.

Federal Regulations require nuclear facilities to be designed to prevent undue risk to the health and safety of the operators and the general public, under the worst credible accident conditions. One of the accidents for which the facility must be designed is the "*design basis loss of-coolant-accident*" (DBA LOCA). This is a sudden and complete break of the largest diameter pipe (more than 30 inches) connected to the reactor vessel. If such a break were to occur, high pressure water and steam (approximately 1,000 pounds per square inch and 550°F) would be released into the primary containment, and numerous emergency systems would be automatically started to provide replacement cooling water to the reactor vessel and to contain the radioactive materials which could be released from the reactor.

One of the regulations which mandates the margins of safety for such an accident is Regulatory Guide 1.3 (the requirements or this "Guide" are mandatory for all US reactors). This document specifies that a substantial degree of nuclear fuel failure must be assumed in designing for the accident, and it also specifies the primary containment leakage rate which must be assumed. These required assumptions are consistent with the actual conditions which were experienced in the Three Mile Island accident. When analyses are performed using these assumptions, they reveal that for such an accident, the radiation levels inside the normally accessible reactor building would be so high as to prohibit safe operator entry.

The same accident signals automatically start the emergency systems and turns off the electrical power to the Fuel Pool Cooling System. Thus, the accident results in the loss of cooling for the spent fuel pool. In order to restart the Fuel Pool Cooling System, operators must enter the reactor building. However, as described above, radiation levels would prohibit safe operator entry and therefore, the system cannot be

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restarted.

If cooling is not restored, the water in the spent fuel pool will eventually boil. The time to boiling is dependent on the number of spent fuel bundles stored in the pool and the length of time since they were removed from the reactor. This time could be in as little as 20 hours for design fuel pool loading conditions, or as much as 55 hours for the current loading of the Unit 1 fuel pool. If the fuel pool boils, its water will rapidly evaporate, and replacement water must be provided. If it is not, within a short time the extremely radioactive spent fuel bundles, which are normally covered with water, will be uncovered. The valves which must be opened to provide this replacement water are also within the inaccessible reactor building, therefore, the replacement water cannot be provided.

The consequences of uncovering the spent fuel would be catastrophic. First, onsite and offsite radiation would soar to extremely high levels - so high as to prevent any further intervention by the operators. Nothing could be done at this point to revere the course of the accident. Without the cooling effect of the boiling water, the spent fuel in the pool would melt down, and massive amounts of airborne radioactivity would be released outside the primary and secondary containment.

Even if early in the accident the operators would resort to the heroics of entering the reactor building to restart the Fuel Pool Cooling System, the system is not designed to operate in the extreme temperature, humidity, and radiation conditions which would be present. The system will fail, since it does not possess the redundant design features present in emergency systems. Any failure would cause a complete loss of fuel pool cooling capability.

Even if the Fuel Pool Cooling System could be restarted and no failures occurred, the plant Emergency Procedures have required the operators to disconnect power to the system at 24 hours into the accident.

PP&L and the NRC have contended that another system, the Residual Heat Removal (RHR) System, could be operated to cool the spent fuel pool. But analyses and tests by PP&L have demonstrated that this system cannot cool the fuel pool under accident conditions. If it could, its valves are also in the inaccessible reactor building. Attempted operation in the manner would transport highly radioactive accident water to the fuel pool, significantly increasing the operator and public radiation exposures.

If replacement water could be provided to prevent the spent fuel from being uncovered, the temperature and humidity conditions which would be generated in the reactor building due to the boiling would cause the emergency systems to fail since none of them have been designed for these conditions. Their failure would cause additional meltdown of the fuel in the reactor and also failure of the primary and secondary containment. The condensation from the pool would cause flooding of the reactor building basement where the emergency pumps are located, thereby causing their failure if they had not already failed due to the environmental conditions.

This scenario is not science fiction. Following the Three Mile Island accident in March 1979, the containment could not be entered for nearly a year due to the radiation. The Three Mile Island spent fuel pool was never in jeopardy because it was outside the reactor building where it was not affected by the accident, and the operator had unimpeded access. If such as accident were to occur at Susquehanna and other GE reactors, the results would be disastrous.

The concern is not confined to Susquehanna. Approximately one third of the 100 or more nuclear power plants in the United States are of similar design. Pressurized Water Reactors may also be susceptible to these events. With the failure of the nuclear industry to find a safe method for high level waste storage all of these plants are expanding the spent fuel pool capacities, which will further increase the risk.

These concerns were formally reported to the NRC a year and a half ago, to date, they have not required any action at Susquehanna or any other plant. The NRC recently ruled that even though regulations have existed since long before Susquehanna was licensed which required plants to be designed for these eventualities, since neither PP&L nor the NRC identified these concerns at the time of licensing, the

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requirement to consider them now is outside the licensing basis for the plant. The NRC is treating this as a legal issues and is ignoring the safety of the general public.

This ruling goes beyond the absurd and typifies recent NRC responses to significant safety issues having generic industry wide implications. There is a great reluctance in the NRC to make any ruling which has the potential to cost money for the industry, regardless of the regulations or the risk. The NRC's ruling not only defies common sense, it violates the regulations contained in 10 CFR 50.100, 10CFR50 Appendix A (General Design Criteria), 10CFR50.49, 10CFR50.72 & 50.73, NUREG-0737, various Regulatory Guides, and numerous events established with this and other licensees, all of which have been repeatedly brought to the attention of the NRC. It also paves the way for the NRC to bury this concern in the bureaucratic morass of the backfit rules contained in 10CFR50.109.

The NRC's recent track record in similar cases has been abominable, e.g. the Thermo Lag issue, the BWR Water Level Instrument issue, Inoperable Motor Operated Valves, Rosemount Transmitters, Electrical Cable Qualification and numerous other issues. Some of these issues were addressed only after public outcry forced the NRC to reluctantly do its job. Other issues have yet to be addressed by the industry or the NRC. This issue is such a case, but with potentially much more catastrophic consequences. This is why the NRC and the plants with this design flaw must be compelled to comply with the regulations and resolve these concerns without further delay.

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