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SUBJECT: Comments on util loss of spent fuel pool cooling licensing basis. NRC 940316 states link between loss of SFP cooling events & design basis LOCA & LOOP events postulated by Part 21 repts cannot be considered. Links exist as listed.

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*Joe Shea 1/4/91*

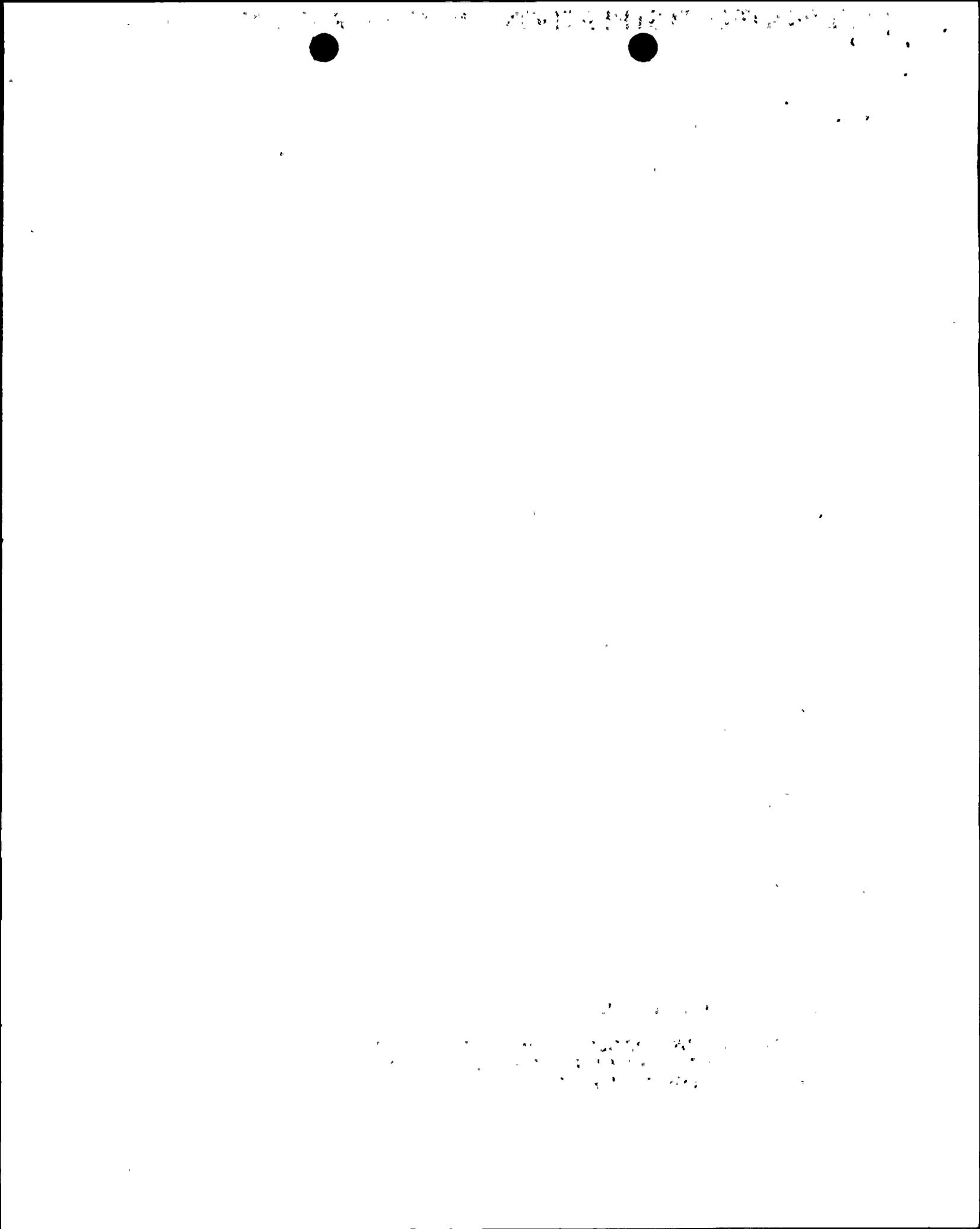
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March 21, 1994

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**SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2  
DOCKET NOS. 50-387 AND 50-388  
COMMENTS ON SSES LOSS OF SPENT FUEL POOL COOLING LICENSING BASIS**

By letter dated March 16, 1994, the NRC stated that "the link between loss of SFP cooling events and design basis loss of coolant accidents (LOCA) and/or loss-of-offsite power (LOOP) events postulated by the authors of the Part 21 report cannot be considered within the original licensing basis of SSES." However, such links in fact exist in numerous places within the SSES licensing basis. For example:

- 1) The analysis for the ultimate heat sink, as reported in the SSES FSAR, assumed a spray pond sized to concurrently handle the post-LOCA RHR Service Water (RHRSW) System and Emergency Service Water (ESW) System heat loads for the accident unit, the RHRSW and ESW System heat loads from safe shutdown of the non-accident unit, and ESW makeup to two (2) boiling spent fuel pools during the thirty day period following the design basis LOCA/LOOP event. Therefore, spent fuel pool boiling in conjunction with a LOCA and LOOP is discussed within the SSES licensing basis.
- 2) The non-Class 1E Fuel Pool Cooling System and Service Water System pumps are not listed in the Tables in SSES FSAR Chapter 8 among the power loads carried by the emergency diesel generator-supplied safety buses. Therefore, any LOOP within the SSES licensing basis also results in the immediate loss of spent fuel pool cooling as indicated in the SSES licensing basis.
- 3) By letter dated May 24, 1993 (PLA-3978), PP&L reported to the NRC staff that "In the LOCA condition, the normal SFP cooling system will automatically be shed from the plant electrical system, along with other non-safety related equipment, to permit the startup of the large ECCS pumps on the LOCA unit." Therefore, a DBA LOCA will immediately result in loss of spent fuel pool cooling even if offsite power is available.
- 4) By letter dated January 17, 1989 (PLA-3132), PP&L reported to the NRC staff that SSES emergency procedures had been revised to implement a manual shedding of non-Class 1E loads in the reactor building following a LOCA. PP&L stated "that this load shed is effected by exercising 2 breakers in the turbine building, and has the effect of creating a Loss of Offsite Power conditions in the reactor building, a situation which has been previously analyzed." Therefore, even if the Fuel Pool Cooling System could be restored following a LOCA event (Item 3 above), the Fuel Pool Cooling System would be lost shortly thereafter due to this manual load shed, which is within the SSES licensing basis.

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5) Section 50.59 of 10CFR50 states "A proposed change, test, or experiment shall be deemed to involve an unreviewed safety question (i) if the probability of occurrence or consequences of an accident previously evaluated in the safety analysis report may be increased; or (ii) if a possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report may be created; or (iii) if the margin of safety as defined in the basis for any technical specification is reduced." The 50.59 evaluation performed by PP&L for the procedure revision which manually sheds non-Class 1E loads in the reactor building (Item 5 above) determined that no unreviewed safety question (USQ) was involved. However:

- a) IF the only boiling spent fuel pool event within the SSES licensing basis is that resulting from a seismic event, then the manual load shed creates a new malfunction.
- b) IF loss of spent fuel pool cooling is within the SSES licensing basis (and it is clearly within the licensing basis for at least the seismic event), then the manual load shed increases the probability of that event to 1.0.

Had PP&L fulfilled its legal obligations in 1988/1989, this USQ condition would have been brought to the attention of the NRC staff and the licensing basis for spent fuel pool cooling following a LOCA would have been properly established at that time. For the NRC to now take the position that the link between loss of spent fuel pool cooling and the DBA LOCA does not exist within the SSES licensing basis is to reward the licensee for not having complied with the legal requirements of Section 50.59 of 10CFR50.

6) In March 1983, a PP&L engineer (Mr. P. Hill) was asked to review FSAR Change Notice #624 involving changes to the SSES FSAR Appendix 9A discussion for boiling spent fuel pools resulting from a seismic event. When Mr. Hill asked about the effects of vapor and condensation on safety related equipment in the reactor building, the PP&L Engineering response was "This is an inappropriate format to ask questions. Comments were requested initially and none received. Furthermore, no budget exists with which to fund the engineering time required to respond to these questions." Had PP&L fulfilled its legal obligations in 1983, the licensing basis for spent fuel pool cooling following design basis events may have been properly addressed at that time. As a minimum, the design problem in the Standby Gas Treatment System, in which the original fusible links would have isolated the system if the spent fuel pool boiled, should have been identified and remedied in 1983 instead of existing until August 1993.

7) By letter dated March 7, 1994, the NRC staff informed PP&L of its decision that boiling of both spent fuel pools following a seismic event is within the SSES licensing basis and requested PP&L to evaluate the performance of the Standby Gas Treatment System in this event. By letter dated March 16, 1994, the NRC staff informed the undersigned that if "the standby gas treatment system is unable to perform as specified in the licensing basis, the licensee would be required to take certain actions required by the regulations."

The DBA LOCA and DBA LOCA/LOOP are design basis events within the SSES licensing basis. These events and the performance of structures, systems, and components to mitigate the consequences of these events are discussed in the SSES FSAR and NRC SER. If these structures, systems, and components are unable to perform as specified in the licensing basis (i.e., as described in the SSES FSAR and SER), should the licensee be required to take certain actions required by the regulations? If this answer is YES, then how, within the SSES licensing basis, are the decay heat loads from the two spent fuel pools handled following a DBA LOCA



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and DBA LOCA/LOOP? If this answer is that both restoration of fuel pool cooling and makeup to a boiling fuel pool are outside the SSES licensing basis for these design basis events, then how can these plants continue to operate without a formal justification for interim operation? The DBA LOCA and the DBA LOCA/LOOP each result in the immediate loss of spent fuel pool cooling on at least one unit. If neither restoration of cooling nor makeup to a boiling spent fuel pool are within the licensing basis for these design bases events, then how is Section 50.34 of 10CFR50 satisfied? Either restoration of cooling or fuel pool boiling occurs in these events.

In a presentation on March 14, 1994 and by letter dated March 16, 1994, the NRC staff communicated to us the conclusion that loss of spent fuel pool cooling following DBA LOCA and/or DBA LOOP events was outside the SSES licensing basis, and that this conclusion was based on a review of applicable regulations, the SSES FSAR, and the NRC SER. The listing of 'applicable regulations' cited in the presentation and in the letter omitted several relevant regulations, including:

- 8) General Design Criterion 61, as outlined in Reg Guide 1.13, requires that fuel storage systems be designed to assure adequate safety under normal and postulated accident conditions. The NRC staff apparently concluded that the only postulated accident applicable to the spent fuel pool design was the seismic event described in SSES FSAR Appendix 9A. GDC 61 and Reg Guide 1.13 are general requirements applicable to any reactor type - BWR, PWR, or HTGR. The seismic event is explicitly discussed in Reg Guide 1.13 because the spent fuel pool is vulnerable to an earthquake for all reactor types no matter where the pool is physically located. By placing the spent fuel pools within secondary containment, PP&L subjected the spent fuel pools to the postulated accidents applicable to secondary containment in addition to the seismic event applicable to all spent fuel pools. The postulated accidents affecting secondary containment are described in the SSES FSAR and SER. Therefore, these postulated accidents also apply to the spent fuel pools.
- 9) General Design Criterion 63 requires that the fuel storage system be provided with the ability to detect loss of heat removal capability. Section 50.49 of 10CFR50, Reg Guide 1.89 and Reg Guide 1.97 require that instrumentation used to manually initiate safety actions or monitor the effectiveness of manual safety actions be qualified for all operating and accident conditions for which the manual safety actions may be necessary. Following a DBA LOCA or DBA LOCA/LOOP event, either restoration of spent fuel pool cooling or makeup to a boiling spent fuel pool will be required. As a minimum, monitoring fuel pool temperature and level would be necessary. The fuel pool level and temperature instrumentation at the time of our Part 21 report did not comply with these requirements.
- 10) Section 50.49 of 10CFR50 requires that electric equipment important to safety be qualified for their application. These applications cover safety related electric equipment (Class 1E) and non-safety related equipment (non-Class 1E) whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions by safety related equipment. PP&L's evaluations to date have identified numerous failures of safety related components from the high temperature, humidity and flooding conditions which result from a boiling spent fuel pool. Therefore, the non-safety related components of the Fuel Pool Cooling System (or the RHR Fuel Pool Cooling Assist mode) must be qualified per Section 50.49 since the boiling spent fuel pool is known to prevent satisfactory accomplishments of safety functions by safety related equipment.

- 11) General Design Criterion 4 requires that "Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing and postulated accidents, including loss-of-coolant accidents." The SSES design is not in compliance with GDC 4 because the Fuel Pool Cooling System, which performs the important to safety function of preventing spent fuel pool boiling, is not designed for the post-LOCA environment. Additionally, since the SSES design does not provide for either restoration of spent fuel pool cooling or makeup to a boiling spent fuel pool following a DBA LOCA or DBA LOCA/LOOP event, the analyzed reactor building heat loads are non-conservative.
- 12) Paragraph (b) (2) of Section 50.34 of 10CFR50 requires that each FSAR contain "A description and analysis of the structures, systems, and components of the facility, with emphasis upon performance requirements, the bases, with technical justification therefor, upon which requirements have been established, and the evaluations to show that safety functions will be accomplished. The description shall be sufficient to permit understanding of the system designs and their relationship to safety evaluations." The cooling of irradiated fuel in the spent fuel pool is a safety function. Since the SSES licensing basis does not provide for either restoration of spent fuel pool cooling or makeup to a boiling spent fuel pool following a DBA LOCA or DBA LOCA/LOOP event, PP&L is not in compliance with Section 50.34 of 10CFR50.

During the March 14, 1994 presentation, there was considerable debate on the applicability of Reg Guide 1.3 and NUREG-0737 to the determination of doses to operators performing manual actions following the postulated DBA LOCA event. In particular, the dose contribution from airborne sources did not have to be considered for operator actions in the reactor building according to the NRC staff. We call your attention to an NRC letter dated April 23, 1984 to PP&L in which the location of two sampling units on the refueling floor was challenged because the habitability study in support of this location had neglected the dose from air contamination. By letter dated June 4, 1984, PP&L reported that a new study which considered airborne radioactivity (based on primary containment leakage of 1% per day) indicated that access to the sample units would be prevented. PP&L committed to relocate these sample units to low radiation areas. Therefore, airborne radioactivity resulting from a primary containment leakage rate of 1% per day has been applied to evaluating operator access for manual actions inside secondary containment at SSES.

Section 50.100 of Part 50 to Title 10 of the Code of Federal Regulations states:

"A license or construction permit may be revoked, suspended, or modified, in whole or in part, for any material false statement in the application for license or in the supplemental or other statement of fact required of the applicant; or because of conditions revealed by the applicant for license or statement of fact or any report, record, inspection, or other means, which would warrant the Commission to refuse to grant a license on an original application."

During the presentation on March 14, 1994, the NRC staff indicated that loss of spent fuel pool cooling resulting from a DBA LOCA or DBA LOCA/LOOP event was not considered during the initial licensing for SSES because the licensee had failed to explicitly address this issue in the FSAR and the NRC had failed to detect this omission. During this presentation, the NRC staff indicated that the SSES licenses would not have been granted had the spent fuel pool cooling concerns for the DBA LOCA and DBA LOCA/LOOP events been known. Therefore, Section 50.100 of 10CFR50 is applicable to the issues we identified in our Part 21 report.



THE UNIVERSITY OF CHICAGO  
DIVISION OF THE PHYSICAL SCIENCES  
DEPARTMENT OF CHEMISTRY

RESEARCH REPORT NO. 100

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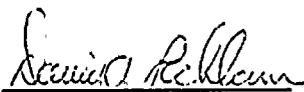
We strongly disagree with the position stated by the NRC staff in the presentation that Section 50.109 applies to this situation since the staff is not contemplating new or revised regulations, just compliance with the regulations in effect at the time of initial licensing. The definition of 'current licensing basis' outlined by the NRC staff in the March 14 presentation also seemed to conflict with the definition and usage published in numerous recent NRC documents, such as NUREG-1412, "Foundation for the Adequacy of the Licensing Bases." In these documents, 'current licensing basis' includes the information in the regulations in addition to the information in the FSAR and the SER. This distinction is important because the SSES design failed to comply with numerous regulations, including those cited above, at the time of initial licensing. The regulations have not changed since that time, but the non-compliance has been identified in our Part 21 report and subsequent submittals. This is a compliance issue, not an "adequate protection" or "safety enhancement" issue.

We believe that the NRC staff's current position was reached without benefit of the information provided by this letter. We respectfully request that the Safety Evaluation Report planned by the NRC on this issue be delayed until the NRC staff has considered this additional information.

We appreciate your consideration of our comments on this issue. Please contact us if there are any questions regarding these comments.

Sincerely,

  
David A. Lochbaum

  
Donald C. Prevatte  
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