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FAX MESSAGE

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Additional information on the Farley loss of spent fuel pool cooling events along with some other related events and information.

Attachment 2

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Loss of Spent Fuel Pool Cooling Events & Information

"On January 16, 1977, a two hour interruption in the power supply shut down the circulating pump. The outdoor temperature was -19°F. When normal flow was reestablished, a pipe break was discovered and the system was shut down and drained. With 225 tons of fuel in storage, the G.E. pool reached an equilibrium temperature of 115°F over a number of weeks. The humidity in the building was uncomfortably high, but otherwise this incident had no adverse impact on either plant personnel or the general public." Ref. 1 pages 4-22 and 4-23

"Staff has proposed fining Texas Utilities Electric Co. $125,000 for alleged violations connected with a 17 hour loss of spent fuel pool cooling in May [1992] at Comanche Peak-1. ... The spent fuel pool went without cooling unnoticed by control room operators until an NRC resident inspector pointed out discrepancies between control room indicators and log entires. TUEC was forced to connect the unit 1 fuel pool to cooling water from the unfinished unit 2, which had not been evaluated and accepted for use, because both unit 1 cooling trains were inoperable." Ref. 3

"On June 13, 1993, during a scheduled refueling outage, [South Texas] Unit 2 had a loss of spent fuel pool cooling. Supply and return valves for the Component Cooling Water to the spent fuel pool heat exchangers unexpectedly close during an inverter power transfer. All Unit 2 fuel had been offloaded and was in the spent fuel pool. One of two 100% capacity Spent Fuel Pool Cooling and Cleanup (SFPCC) System trains was inservice. At STP the heat sink for the SFPCC heat exchangers is provided by the Component Cooling Water (CCW) System via a common header. Any one of the three CCW trains can operate to supply heat sink for the SFPCC via a common supply header and a common return header. Each of the three CCW trains also provide ESF cooling heat sink loads independently from the common header. ...On June 12, 1993 during thermography, a hot spot in a class 1E inverter was identified and prioritized for prompt corrective maintenance work. The work required that the vital bus distribution panel be transferred to it's alternate source through a break-before-make transfer switch. On June 13, 1993, the operations staff performed reviews of affected loads before allowing work to start. The initial bus transfer occurred at 1420 hours. The work concluded about two hours later at 1635 hours. Following the 1635 return of a vital bus to it's normal source Operations personnel detected a blown fuse in a hydrogen analyzer circuit and a spike on a radiation monitor. During the next operations shift at 0315 on June 14, 1993, a reactor plant operator on round in the Mechanical Auxiliary Building, noted a higher than normal CCW discharge pressure on the 2A operating train. The control room crew identified that both the CCW 2A supply and return isolation motor-operated valves (MOV's) for the common headers for SFPCC were closed. CCW 2A flow was lower than normal, but not zero since it had still been flowing to the other designed CCW ESF loads. The valves were reopened. Evidence showed that the valves close dduring the power transfer that occurred at 1420 hours on the previous day. Spent Fuel Pool cooling was without CCW heat sink for about 13 hours, during which pool temperature rose from 99 degrees to 118 degrees F. Investigation determined that the valves re-positioned due to a relay race that occurred when the vital bus distribution panel was re-energized. The relay race occurred between the CCW surge tank level switch contacts and the relay that initiates a CCW header isolation." Ref. 4

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Loss of Spent Fuel Pool Cooling Events & Information (continued)

"On October 5, 1993, [Farley] Unit 2 had been shut down for 11 days with the reactor core offloaded to the spent fuel pool. Spent fuel pool cooling heat exchanger A was in service and aligned to [CCW] train B. A motor-operated valve test crew requested that Operations initiate a clearance to allow testing of the miscellaneous header supply valve (MOV 3047). A walkdown of the main control board confirmed that cooling water from train B was aligned to spent fuel pool heat exchanger A. Component cooling water pump B (the swing pump) was verified to be aligned to the B train in standby. However, personnel preparing this clearance order erroneously assumed that component cooling water heat exchanger A was in service when component cooling water heat exchanger B was actually in service. Therefore, the clearance order was improperly written to check closed the outlet valve (V-008B) for the in-service component cooling water heat exchanger (component cooling water heat exchanger B), along with two other valves needs to provide isolation for valve testing. About three hours after the clearance order was completed and following a shift turnover, spent fuel pool temperature had increased 40 degrees F, and at 130 degrees F the high temperature annunciator alarmed. The isolation of the in-service component cooling water heat exhcanger was discovered, and cooling flow was re-established through the B heat exchanger. Spent fuel pool temperature peaked at approximately 140 degrees F." Ref. 5

"Parts of the cooling and makeup systems for spent fuel pools are not designed as seismic class 1 systems and as such their failure is expected at relatively low seismic levels. However, the failure of cooling and makeup systems would not uncover the spent fuel assemblies for about 3 to 7 days; it is expected that some recovery action could be taken in this time period." Ref. 2 page 8-3

References

1) Nuclear Regulatory Commission, "Generic Environmental Impact Statement on Handling and Storage and Spent Light Water Power Reactor Fuel", NUREG-0404 Volume 1, March 1978

2) P. G. Prassinos, C. Y. Kimura, D. B. McCallen, R. C. Murray, Lawrence Livermore National Laboratory, and M. K. Ravindra, R. D. Campbell, P. S. Hashimoto, A. M. Nafday, W. H. Tong, EQE Engineering, Inc., Nuclear Regulatory Commission, "Seismic Failure and Cask Drop Analyses of the Spent Fuel Pools at Two Representative Nuclear Power Plants", NUREG/CR-5176, January 1989.

3) "Staff Has Proposed Fining Texas Utilities Electric Co.", Inside NRC, August 10, 1992.

4) Institute of Nuclear Power Operations, OE 6100, "Loss of Spent Fuel Pool Cooling", July 20, 1993.

5) Institute for Nuclear Power Operations, SEN-119, "Recurring Event: Undetected Loss of Spent Fuel Pool Cooling", July 28, 1994.