From: Lawrence Rossbach
To: Allan.haeger@Exeloncorp.com
Date: 6/30/01 7:48PM
Subject: Additional Plant Systems questions for EPU

Attached are additional questions from our plant systems reviewers on your EPU submittals for Dresden and Quad Cities. Our plant systems review is continuing and may result in additional questions in the plant systems area. We would like to arrange a call with your staff to discuss the attached questions when your staff is available.

CC: Anthony Mendiola; Ralph Architzel; Stewart Bailey

Docket Nos. 50-237, 50-249, 50-254, 50-265

DRESDEN AND QUAD CITIES EXTENDED POWER UPRATE
REQUEST FOR ADDITIONAL INFORMATION - PLANT SYSTEMS

Unless otherwise noted, all of the following questions apply to both Dresden and Quad Cities:

30. The environmental qualification of non-metallic components, (i.e. seals, gaskets, lubricants, diaphragms, etc.) has not been addressed. Please demonstrate that plant operations at the proposed EPU level will have no impact on the environmental qualification of mechanical equipment located both inside and outside containment.

31. The impact of the increased heat load on the spent fuel pool (SFP) cooling is information we need to be able to fully evaluate your request for an extended power uprate for Dresden Units 2 and 3 and Quad Cities Units 1 and 2. The use of the terminology "planned" and "unplanned" has been used by the staff for the review of SFP heat load changes since questions arose in the mid-1990's regarding refueling practices at Millstone Unit 1. A planned offload is the offload of fuel assemblies to the SFP for any expected (or planned) reason. An unplanned offload is the offload of fuel assemblies to the SFP due to an unforeseen condition (e.g., unexpected shutdown that includes an offload). This difference in terminology was made to ensure SFP temperature evaluations accurately reflected actual licensee practices.

Section 6.3.1 of the safety analyses report notes that the EPU increases heat load on the spent fuel pool cooling system; and discusses analysis confirming the capability of the system to maintain adequate fuel pool cooling. Table 6-2 contains design conditions which are unchanged between pre- and post-uprate except using a 24 month fuel cycle for Quad Cities Units 1 and 2. The table additionally notes that the bulk pool temperature is less than 150°F for a full core off-load, with fuel pool with maximum capacity and with shutdown cooling in fuel pool assist mode. Additional staff review of the UFSAR indicates that both Dresden and Quad Cities were using different guidelines for evaluation of SFP cooling than the current staff practice noted above. These methods include evaluations of partial core offloads (normal) and full core offloads (abnormal); and additionally allow cycle-specific analyses of offloads in lieu of the bounding analyses described in the UFSAR. It is not clear to the staff what assumptions were used to support the EPU safety analyses report.

Please submit the results of additional evaluations on the impact of the increased EPU heat load on the SFP and supporting systems. Your evaluation of the spent fuel cooling system should address both the planned and unplanned offload conditions. The staff will accept either (1) bounding or (2) cycle-specific analyses, or both can be used.

31.1 Bounding Analysis

Your response for a bounding analysis should include two scenarios: planned and unplanned offloads.

A) Planned Offload Calculation

Planned offload is the offload of fuel assemblies to the SFP for any expected (or planned) reason.

Analysis conditions:

1) decay heat load is from spent fuel that is "planned" to be offloaded, either full or partial core plus heat load from an SFP with all other storage locations filled
2) bulk SFP temperature must remain below 150°F
3) worst single active failure, including common cause failures (not just one train)
4) initial conditions: highest ultimate heat sink temperature; fouled heat exchangers

If the resultant temperature is above 150°F, you should perform and submit an analysis to demonstrate that the SFP structure can withstand the new high temperature for long periods of time.

B) Unplanned Offload Calculation

An unplanned offload is the offload of fuel assemblies to the SFP due to an unforeseen condition (e.g., unexpected shutdown that includes an offload).

Analysis conditions:

1) decay heat load is based on a full core offload plus refueling load that has decayed for 36 days plus heat load from an SFP with all other storage locations filled
2) bulk SFP temperature must remain below boiling
3) no single failure needs to be considered

31.2 Cycle-specific Analysis

You can alternately opt to perform a calculation prior to every planned offload using the actual conditions at the time of the offload. The wait time for offload can be adjusted, as long as the time is not shorter than what is assumed for the fuel handling accident. For unplanned offload, you can either commit to performing the same calculation prior to offload or have a bounding calculation for unplanned offloads only, using the same guidelines as in Section 31.1 B) above.

Cycle-specific analysis conditions:

1) decay heat load based on actual number of fuel assemblies planned to be offloaded plus heat load from actual assemblies in the previously loaded into pool
2) use actual system conditions: ultimate heat sink temperature; heat exchanger fouling
3) worse active single failure, including common cause failures (not just one train)
4) bulk SFP temperature must remain below 150°F
5) include temporary modifications, if any

32. Ability to supply adequate make-up source in event of loss of SFP cooling

Considering any analyses changes, re-confirm time to boil-off is sufficient to allow mitigative actions and the make–up water required is within the system capacity in case of a complete loss of cooling to the SFP. Provide time to boil-off and boil-off rate.