

From: Wang, Alan
Sent: Tuesday, February 08, 2011 9:19 AM
To: 'Jerry Burford'; 'MILLAR, DANA'
Cc: Burkhardt, Janet; Lent, Susan
Subject: GNS EPU Request for Additional Information Related to Steam Generator Tube Integrity and Chemical Engineering Branch of the Division of Component Integrity Review (ME4679)

Jerry and Dana,

By letter dated September 8, 2010 (Agencywide Documents Access and Management System, Accession No. ML1002660403), Entergy Operations, Inc. (Entergy, the licensee), submitted a request to amend the Facility Operating License No. NPF-29 for Grand Gulf Nuclear Station, Unit 1 (GGNS). The licensee proposed a license amendment request (LAR) for an extended power uprate (EPU) to increase the maximum reactor core power operating limit from 3898 megawatts thermal (MWt) to 4408 MWt.

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that the following additional information is needed for the NRC staff to complete our review of this amendment. This request for additional information (RAI) was discussed with Mr. Jerry Burford of your staff on February 3, 2011, and it was agreed that a response would be provided within 30 days of receipt of this E-mail. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-1445 or via e-mail at Alan.Wang@nrc.gov.

The following RAIs are related to the Steam Generator Tube Integrity and Chemical Engineering Branch of the Division of Component Integrity portion of the LAR review.

1. On page 2-10 of attachment 5B of its letter dated September 8, 2010, the licensee states that the qualification level peak temperature for the drywell is 340°F and the peak temperature for the EPU conditions was determined to be <340°F. However, the licensee stated that the EPU peak temperature ignores a short initial one-second transient to 347°F and that this transient would have an insignificant effect on the coating temperatures. Please discuss why the qualification testing remains bounding despite having a containment temperature that exceeds the test temperature profile.
2. In its September 8, 2010 letter, the licensee states that GGNS performed a Blackness campaign in 1999, followed by a BADGER campaign in 2007. It is not clear to the staff what surveillance approach will be implemented going forward and how it will demonstrate that the neutron absorbing material will continue to perform its intended function. As such, please discuss in detail the surveillance approach that will be used in the Boraflex monitoring program, specifically the methods of neutron attenuation testing (i.e., in-situ testing), frequency of inspection, sample size, data collection, and acceptance criteria.
3. On page 2 of attachment 1 of its September 8, 2010 letter, the licensee states that the minimum areal density of a Region I and II cell is 0.182 gm/cm² and 0.166 gm/cm², respectively. In addition, the licensee states that only the Region I minimum areal density is bounded by the uncertainty and is well above the criticality safety analysis minimum areal density assumption of 0.0133 gm/cm². It appears to the staff that the

minimum areal densities stated above for a Region I and II cell may be a typographical error. Please confirm that these values are accurate.

4. In its September 8, 2010 letter, the licensee states that the Boraflex monitoring program utilized at GGNS is described in its response to Generic Letter 96-04 dated October 16, 1996. On page 4 of attachment 2 of its October 16, 1996 letter, the licensee states that, "If gap measurements demonstrate that panels have reached equilibrium, no additional tests will be preformed." It is not clear to the staff as to what is meant by equilibrium and justification for not continuing to perform testing. Please discuss the justification for not continuing to perform testing. In addition, describe how the program acceptance criteria account for potential degradation between surveillance periods.
5. On page 1 of attachment 1 of its September 8, 2010 letter, the licensee states that, "the total panel gap as a percent of the initial panel length vs. dose follows the [4.1 percent] EPRI [Electric Power Research Institute] Boraflex shrinkage model until the dose exceeds 2.3×10^{10} rads." Further, on page 2 the licensee states that all panel losses greater than the 4.1 percent EPRI shrinkage model result occur above this dose value. Please discuss the 4.1 percent EPRI shrinkage model dose as it relates to your acceptance criteria analysis for continued operation.

6. Please discuss the extent to the Region II expansion as it relates to the degradation in the Boraflex panels in the spent fuel pool. In other words, discuss how the new Region II locations are determined and added after each Blackness and BADGER test campaign. Please provide a spent fuel pool map illustrating the current Region I and II locations.
7. Please discuss the calibration technique and reference panel used for the Blackness and BADGER campaigns. In particular, discuss the reference panel's areal density (i.e., nominal areal density, minimum design measurement areal density).
8. On pages 5 and 6 of attachment 1 of its September 8, 2010 letter, it is unclear to the staff how the fractions of panels and gap sizes in figures 2, 3, 4 and 5 correlate to the total number of panels tested and gap sizes observed and what tests (e.g., Blackness, BADGER) they came from. Please discuss the type of testing performed and total number of panels and gap sizes that correlate to these fractions in these figures.

Alan Wang

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Nuclear Regulatory Commission

Division of Operating Reactor Licensing