

MEMORANDUM TO: Chairman Diaz  
Commissioner McGaffigan  
Commissioner Merrifield

May 27, 2004

FROM: Luis A. Reyes */RA/*  
Executive Director for Operations

SUBJECT: PRESSURIZED THERMAL SHOCK ANALYSES FOR RENEWAL OF  
CERTAIN NUCLEAR POWER PLANT OPERATING LICENSES

The renewal of nuclear power plant operating licenses requires evaluation of time-limited aging analyses (TLAAs) as defined in the license renewal rule, Title 10 of the *Code of Federal Regulations* (10 CFR), Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." This memorandum is to inform the Commission that the potential exists that certain license renewal applicants may not demonstrate at the time of application that the reactor vessel TLAA meets the pressurized thermal shock (PTS) screening criteria contained in 10 CFR 50.61, "Fracture toughness requirements for protection against pressurized thermal shock events," for the full 20 years of extended operation. Part 54 allows a renewal applicant to justify that the effects of aging addressed by the PTS TLAA will be adequately managed. The basis thus exists to issue the renewed licenses for an additional 20 years.

The license renewal rule provides three options in §54.21(c)(1) for demonstrating that TLAAs requiring evaluation have been assessed and that activities authorized by the renewed license will continue to be conducted in accordance with the plant's current licensing basis. The licensee can demonstrate that the analyses are already valid for the period of extended operation [§54.21(c)(1)(i)], or the licensee can revise the analyses to be valid for the period of extended operation [§54.21(c)(1)(ii)]. The third option is for the licensee to demonstrate that the effects of aging on the intended functions of the system, structure, or component will be adequately managed for the period of extended operation [§54.21(c)(1)(iii)]. This third option, which has been used by license renewal applicants in the past for other TLAAs, permits an applicant to elect not to extend the existing TLAA.

The staff is currently aware of three applicants for license renewal that may rely on managing the PTS TLAA in accordance with §54.21(c)(1)(iii) – Point Beach Unit 2 (application submitted February 27, 2004), Beaver Valley Unit 1 (submittal in September 2004), and a plant whose name was withheld from public disclosure in accordance with 10 CFR 2.790 (submittal in 2005). For all three plants, the staff expects that PTS analyses submitted for license renewal will show that the screening criteria are met for the reactor vessels for varying periods of time between 0 and 20 years of extended operation.

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If a reactor vessel is projected to exceed the PTS screening criteria, §50.61(b)(3) requires the licensee to implement a flux reduction program that is reasonably practicable to avoid exceeding the PTS screening criteria. If the flux reduction program does not prevent the reactor vessel from exceeding the PTS screening criterion at the end of life, the licensee can choose between the two options in §50.61 to meet PTS requirements. The licensee can submit a safety analysis pursuant to §50.61(b)(4) to determine what, if any, modifications to equipment, systems, and plant operation are necessary to prevent failure of the reactor vessel from a postulated PTS event. The other option is to perform a thermal-annealing treatment of the reactor vessel pursuant to §50.61(b)(7) to recover fracture toughness. Details of the approach selected are required by §50.61 to be submitted for the Nuclear Regulatory Commission (NRC) approval at least 3 years before the reactor vessel is projected to exceed the PTS screening criteria. The reactor is not allowed to operate if the requirements of §50.61 are not met.

The license renewal applicant that chooses to use the §54.21(c)(1)(iii) option for managing the reactor vessel PTS TLAA must provide an assessment of the current licensing basis TLAA for PTS, a discussion of the flux reduction program implemented in accordance with §50.61(b)(3), if necessary, and an identification of the viable options that exist for managing the aging effect in the future. The options in §50.61(b)(4) and §50.61(b)(7) provide reasonable assurance that the PTS TLAA will continue to comply with the Commission's regulations. The granting of a renewed license for an additional 20 years pursuant to Part 54 would be based on the NRC staff's review of the current licensing basis PTS analysis and on the requirement for continued compliance with §50.61. Details of the approach selected to meet the requirements of §50.61 will be submitted by the licensee for NRC approval at least 3 years prior to exceeding the PTS screening criteria.

The staff will communicate directly with the applicants for the three plants discussed above to inform them of the information needed in the license renewal application. The staff will also coordinate with the Nuclear Energy Institute's License Renewal Task Force to consider incorporating this guidance in a future update of the license renewal guidance documents.

The Office of General Counsel has reviewed this memorandum and has no legal objections.

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The license renewal applicant that chooses to use the §54.21(c)(1)(iii) option for managing the reactor vessel PTS TLAA must provide an assessment of the current licensing basis TLAA for PTS, a discussion of the flux reduction program implemented in accordance with §50.61(b)(3), if necessary, and an identification of the viable options that exist for managing the aging effect in the future. The options in §50.61(b)(4) and §50.61(b)(7) provide reasonable assurance that the PTS TLAA will continue to comply with the Commission's regulations. The granting of a renewed license for an additional 20 years pursuant to Part 54 would be based on the NRC staff's review of the current licensing basis PTS analysis and on the requirement for continued compliance with §50.61. Details of the approach selected to meet the requirements of §50.61 will be submitted by the licensee for NRC approval at least 3 years prior to exceeding the PTS screening criteria.

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