

June 24, 2003

The Honorable Nils J. Diaz  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SUBJECT: UPDATE TO LICENSE RENEWAL GUIDANCE DOCUMENTS: RESPONSE TO  
STAFF REQUIREMENTS MEMORANDUM DATED JULY 17, 2002

Dear Chairman Diaz:

In a Staff Requirements Memorandum (SRM) dated July 17, 2002, the Commission stated that, "The ACRS should consider providing a recommendation as to how license renewal guidance documentation should be updated to reflect supporting information, particularly with regard to time-limited aging analyses that should, as a minimum, be included in license renewal applications to maximize the efficiency of the review process and minimize requests for additional information."

The staff has been developing Interim Staff Guidances (ISGs) on various license renewal issues based on the insights gained from its review of several license renewal applications (LRAs). To date, the staff has developed 16 such ISGs in coordination with NEI, except the one on Standardized Format for License Renewal Applications, which was developed by NEI and approved by the staff. In developing our recommendations, we have taken into account these ISGs and other staff initiatives associated with enhancing the license renewal process. In addition to addressing the issue raised in the SRM, we also include recommendations to be considered in updating the license renewal guidance documents and enhancing the license renewal process.

We met with representatives of the NRC staff and NEI on June 13, 2003, to discuss the ISG process and several specific ISGs. Our Subcommittee on License Renewal met with representatives of NEI on June 11, 2003, to obtain their views on the Standardized Format for License Renewal Applications. We also had the benefit of the documents referenced.

## **RECOMMENDATIONS**

1. We agree with the guidance provided in ISGs 1 - 16. The ISG process is a major step toward improving the efficiency of the review process and reducing the number of requests for additional information (RAIs). The staff should continue to provide guidance on emerging license renewal issues through the ISG process and incorporate such guidance into the future revisions of the generic license renewal guidance documents.

2. Proposed ISG 16, "Time-Limited Aging Analyses Supporting Information for License Renewal Applications," was developed in response to our concern that some of the LRAs do not include sufficient information on time-limited aging analyses (TLAAs). This ISG is particularly responsive to the SRM, in that it directly addresses the supporting information on TLAAAs that needs to be included in LRAs. ISG 16 should be finalized and issued for use by the applicants.
3. The Generic Aging Lessons Learned (GALL) Report specifies limits for sulfate ion concentrations in below-grade water to avoid decrepitation of concrete. The staff should consider whether similar limits and guidance are needed for phosphate ion concentration.

## DISCUSSION

In the SRM, the Commission asked that we consider ways to maximize the efficiency of the license renewal review process and minimize the number of RAIs.

In some areas, the staff has found it necessary to submit similar RAIs to several applicants. This indicates that the guidance may be inadequate in these areas. The staff has, therefore, undertaken an effort to prepare ISGs to further define or clarify these areas. The intention is to incorporate these ISGs into future revisions of the guidance documents. The ISG process will improve the efficiency of the license renewal process and reduce the number of RAIs. The staff should continue with the ISG process to provide guidance on emerging license renewal issues.

To date, in coordination with NEI the staff has developed 16 ISGs to address various license renewal and process issues. Of these, proposed ISG 16 is developed in response to the concern expressed in our report of December 18, 2002, on the LRA for the North Anna and Surry Nuclear Power Stations. In that report, we stated that the applicant had not submitted its evaluations of the reactor vessel margins for pressurized thermal shock and upper shelf energy, and that such critical parameters should be included in future LRAs. This ISG also deals with the issue raised in the SRM with regard to supporting information on TLAAAs that should be included in the LRAs. This has been a troublesome area in that lack of specifics in the application has necessitated a number of RAIs. The staff should finalize ISG 16 and issue it for use by the industry in preparing future LRAs.

In advance of completion of ISGs, we would expect applicants to be aware of the staff's RAIs on previous LRAs and address them, as appropriate, before submitting their applications. Such a practice would reduce the number of RAIs. We are beginning to see this occurring in more recent applications.

We are currently reviewing the LRA for the Ft. Calhoun Station Unit 1, which is the first application to be entirely based on the generic license renewal guidance documents. We see a moderately reduced number of RAIs and a more streamlined application. We expect further efficiencies as the staff gains more experience in reviewing LRAs prepared in accordance with these documents.

We believe that the efficiency of the license renewal process will greatly improve as a result of incorporating the ISGs into the guidance documents, reviewing RAs on previous applications, and preparing LRAs in accordance with the guidance documents and the recently issued Standardized Format for License Renewal Applications.

The GALL Report specifies limits for sulfate ion concentrations in below-grade water to avoid concrete decrepitation. Such decrepitation occurs when ionic reactions convert calcium hydroxide to a more voluminous species such as calcium sulfate hydrate. Reactions with phosphate ion could lead to similar degradation. Conversion to the very stable species hydroxyapatite ( $\text{Ca}_5(\text{PO}_4)_3\text{OH}$ ) is of particular concern. The phosphate ion concentrations necessary to cause conversions to hydroxyapatite are not specified in the literature, but can be estimated from known aqueous thermochemistry. These estimates suggest that relatively low concentrations of phosphate could cause decrepitation of concrete. These estimates are based on thermodynamic considerations and could be conservative if the kinetics of the reactions are slow. Still, the potential for decrepitation by phosphate ions indicated by the thermodynamics should be addressed by the staff.

Between approval of the LRA and entering the period of extended operation, the staff has a substantial inspection workload to ensure that the licensees appropriately implement the commitments made during the review process. The staff has made an effort to identify this workload in Inspection Procedure 71003. Many licensees begin to implement these commitments soon after approval of their extended licenses. The staff needs to anticipate the resultant workload.

There are several cases in which licensees have committed to perform activities in accordance with technologies and methodologies that are still under development. Relevant examples include (1) a method for identifying incipient cable failure due to moisture treeing and (2) improved methodologies for inservice inspection methodologies of reactor coolant piping, with the sensitivity to detect flaws such as those identified at the Virgil C. Summer Nuclear Station only after they led to leakage. The staff should continue to keep abreast of these developing methodologies, evaluate them, and conduct inspections to ensure that licensees are complying with their commitments.

Current performance is of little value in predicting licensee performance many years in the future. Nevertheless, a review of the current findings of the reactor oversight process (ROP) for a given plant may yield some insights about the areas of licensee strengths and areas for future improvement and may help focus future inspection activities in areas critical to the success of license renewal (e.g., corrective action and preventative maintenance programs). In response to our request, the staff is now providing the current status of the ROP findings, as well as a broad assessment of the current material condition of the plant, during our review of each LRA.

We believe that the actions already taken or in progress, and those additional actions described here will improve the efficiency of the license renewal process and reduce the number of RAIs.

Dr. William Shack did not participate in the Committee's deliberations regarding this matter.

Sincerely,

**/RA/**

Mario V. Bonaca  
Chairman

References:

1. Staff Requirements Memorandum, dated July 17, 2002, from Anette L. Vietti-Cook, Secretary of the Commission, to John T. Larkins, ACRS, Subject: Meeting with ACRS on July 10, 2002.
2. Memorandum dated May 21, 2003, from P. T. Kuo, Office of Nuclear Reactor Regulation, to John T. Larkins, ACRS, transmitting the following Interim Staff Guidances (ISGs):
  - ISG-01, GALL Report presenting one acceptable way to manage aging effects for license renewal
  - ISG-02, Scoping of equipment relied on to meet the requirements of the station blackout (SBO) rule for license renewal
  - ISG-03, Aging management program of concrete
  - ISG-04, Aging management of fire protection system for license renewal
  - ISG-05, Identification and treatment of electrical fuse holders for license renewal
  - ISG-06, Identification and treatment of housing for active components for license renewal
  - ISG-07, Scoping of fire protection equipment for license renewal
  - ISG-08, Updating the improved license renewal guidance documents-ISG process
  - ISG-09, Identification and treatment of structures, systems, and components which meet 10 CFR 54.4(a)(2)
  - ISG-10, Standardized format for license renewal applications
  - ISG-11, Aging management of environmental fatigue for carbon/low alloy steel
  - ISG-12, Operating experience with cracking of Class 1 small bore piping
  - ISG-13, Management of loss of preload on reactor vessel internals bolting using the loose parts monitoring system
  - ISG-14, Operating experience with cracking on bolting
  - ISG-15, Revision to generic aging lessons learned aging management program (AMP) XI.E2
  - ISG-16, Time-limited aging analyses supporting information for license renewal applications
3. NRC Inspection Manual, Inspection Procedure 71003, "Post-Approval Site Inspection for License Renewal Program Applicability," dated December 9, 2002.

4. Report dated December 18, 2002, from George E. Apostolakis, ACRS Chairman, to Richard A. Meserve, NRC Chairman, Subject: Report on the Safety Aspects of the License Renewal Applications for the North Anna Power Station Units 1 and 2 and Surry Power Station Units 1 and 2.
5. U. S. Nuclear Regulatory Commission, NUREG-1801, Vol. 1, "Generic Aging Lessons Learned (GALL) Report," dated March 1, 2001.
6. A. J. Bard, R. Parsons, and J. Jordan, Standard Potentials in Aqueous Solution, Marcel Dekker Publishing Company, 1985.