

October 8, 1999

The Honorable Greta Joy Dicus
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Chairman Dicus:

SUBJECT: DRAFT COMMISSION PAPER REGARDING PROPOSED GUIDELINES FOR
APPLYING RISK-INFORMED DECISIONMAKING IN LICENSE AMENDMENT
REVIEWS

During the 465th and 466th meetings of the Advisory Committee on Reactor Safeguards, September 1–3, 1999, and September 30–October 2, 1999, respectively, we reviewed the draft Commission paper, “Proposed Guidelines for Applying Risk-Informed Decisionmaking in License Amendment Reviews.” During our review, we had the benefit of discussions with representatives of the NRC staff and of the documents referenced.

Background

The staff recently reviewed the Union Electric Company submittal for a license amendment for the Callaway Plant, Unit 1, that would allow the use of the new Electrosleeve process to repair steam generator tubes. The license amendment request conformed to the existing license amendment process, but was not a risk-informed submittal in accordance with Regulatory Guide 1.174. The staff determined that the submittal met all the “deterministic” requirements for approval of the amendment except for a demonstration of the inspectability of the Electrosleeve repair. The staff was concerned, however, that Electrosleeve repairs would be more likely to fail during certain severe accident sequences than would unflawed tubes. The possible increase in the likelihood of failure is due to the relatively low mechanical strength of Electrosleeves at the high temperatures expected to exist in the steam generator tubes under “high-dry” (high reactor coolant system pressure and dry steam generator secondary side) severe accident conditions. This could result in an increase in the large, early release frequency.

The licensee chose not to submit its license amendment request using the voluntary, risk-informed process described in Regulatory Guide 1.174. A question then arose regarding the authority of the staff to require licensees to submit risk information when the staff believes such information is necessary for an adequate evaluation of the submittals. The staff identified this issue previously in SECY-98-300. The staff concluded that it has the requisite regulatory

authority when adequate protection is in question. The staff acknowledged, however, that there is a need for guidance on when, and to what extent, the staff can require quantitative risk information from licensees for license amendment requests that are not submitted using Regulatory Guide 1.174.

In the draft Commission paper, the staff outlined a proposed process for identifying “special circumstances” and for using risk information. The essential elements of the process are:

- Guidance for screening of license amendment requests to identify “special circumstances” which warrant evaluation from a risk perspective.
- A methodology for assessing the risk implications of potentially risk-significant license amendment requests.
- Guidelines for determining the acceptability of the licensing action which factor in risk considerations.

In the draft Commission paper, the staff does not provide specific guidance to identify the “special circumstances” beyond stating that they are circumstances “under which, if [the amendment is] approved, plant operation may pose an undue risk to public health and safety.” The staff stated that it expected that the vast majority of licensing decisions would not activate the “special circumstances” screening trigger.

Observations and Recommendations

1. We agree with the staff’s assessment that additional guidance is needed on how and under what circumstances the staff can request additional information to address issues associated with submittals not supported by quantitative risk arguments.
2. The process outlined by the staff for determining when additional information should be required is acceptable. The critical element in the process will be the selection of the criteria that define “special circumstances.”
3. The staff should be mindful not to create a process that discourages the use of risk-informed submittals. The staff’s review of all license amendment requests should include consideration of the principles in Regulatory Guide 1.174.
4. The staff should be sensitive to the potential that its guidelines for requesting quantitative risk information could be interpreted as constituting an implicit requirement for licensees to have probabilistic risk assessments associated with all licensing actions. The staff should also be careful not to inhibit adoption of new, innovative technologies.
5. The staff needs to improve its own risk and accident analysis tools in order to better judge proposed license amendments on a risk-informed basis.

DISCUSSION

The primary mission of the NRC is to ensure adequate protection of public health and safety. The staff's authority to require and use risk information to provide this assurance does not appear to be in doubt. As noted by the staff, Section 182.a of the Atomic Energy Act of 1954, as amended, provides the NRC with the authority to require the submission of information, including risk information, in connection with a license amendment request when NRC has reason to question adequate protection of public health and safety.

The approval of the use of the Electrosleeve process at the Callaway Plant was largely based on analyses of the behavior of repaired tubes under severe accident conditions. The results of these analyses showed that for most flawed tubes the reactor coolant system surge line would fail before the Electrosleeve tubes, thus depressurizing the system and preventing containment bypass. As we have noted previously, these severe accident scenarios involve complex, counter-current, stratified natural circulation flow in the hot leg and in the steam generator plenum — situations that are difficult to analyze with one-dimensional or lumped parameter codes. Tube failure predictions need to account for the relatively large uncertainties in the predicted temperatures as well as the uncertainties in the flaw distributions in the tubes.

The failure of the available technical tools to adequately deal with steam generator tube ruptures under such conditions forces conservative decisionmaking on repair and plugging criteria. Yet, support for essential research necessary to improve these tools continues to diminish due to budgetary constraints.

Sincerely,

/s/

Dana A. Powers
Chairman

References:

1. Memorandum dated August 13, 1999, from Gary M. Holahan, Office of Nuclear Reactor Regulation, NRC, to John T. Larkins, ACRS, Subject: Draft SECY Regarding Proposed Guidelines for Applying Risk-Informed Decisionmaking in License Amendment Reviews.
2. Memorandum dated August 3, 1999, SECY-99-199, for the Commissioners, from William D. Travers, Executive Director for Operations, NRC, Subject: Electrosleeve Amendment Issued to Union Electric Company for Callaway Plant, Unit 1.
3. Letter dated May 21, 1999, from M. Gray, Office of Nuclear Reactor Regulation, NRC, to Garry L. Randolph, Union Electric Company, Subject: Amendment No. 132 to Facility Operating License No. NPF-30 - Callaway Plant, Unit 1
4. Memorandum dated May 12, 1999, from Richard J. Barrett, Office of Nuclear Reactor Regulation, NRC, to Stuart A. Richards, Office of Nuclear Reactor Regulation, NRC, Subject: Probabilistic Safety Assessment Branch Input to Safety Evaluation Report on the

Change to Technical Specifications at Callaway Plant to Allow Use of Framatome Electrosleeve Steam Generator Tube Repair Method.

5. Memorandum dated May 28, 1999, from Ashok C. Thadani, Office of Nuclear Regulatory Research, NRC, to Samuel J. Collins, Office of Nuclear Reactor Regulation, NRC, Subject: Electrosleeving Repair of Degraded Steam Generator Tubes.
6. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," July 1998.
7. Memorandum dated December 23, 1998, SECY-98-300, from William D. Travers, Executive Director for Operations, NRC, for the Commissioners, Subject: Options for Risk-informed Revisions to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," December 23, 1998.
8. ACRS Report dated October 22, 1996, from T. S. Kress, Chairman, ACRS, to Shirley Ann Jackson, Chairman, NRC, Subject: Capability of the NRC SCDAP/RELAP5 Code to Predict Temperatures and Flows in Steam Generators Under Severe-Accident Conditions.