

February 22, 2012

MEMORANDUM TO: Eric J. Leeds, Director  
Office of Nuclear Reactor Regulation

Michael R. Johnson, Director  
Office of New Reactors

FROM: Brian W. Sheron, Director */RA/*  
Office of Nuclear Regulatory Research

SUBJECT: CONTAINMENT LINER CORROSION WORKING GROUP  
REVIEW OF EXPERT PANEL RECOMMENDATIONS

REFERENCES: "Nuclear Containment Steel Liner Corrosion Workshop: Final  
Summary and Recommendation Report," ADAMS Accession No.  
ML112150012

The purpose of this memorandum is to document the staff's working group evaluation of the report resulting from the expert panel review of containment corrosion operating experience. This activity completes all actions requested in the Office of Nuclear Reactor Regulation (NRR) user need on containment liner corrosion (ML092881029) which highlighted issues for both operating plants and those under construction.

In response to the NRR user need request (ML093490361), the Office of the Nuclear Regulatory Research (RES) contracted Sandia National Laboratories (SNL) to assemble an expert panel to evaluate the mechanism(s) for through-wall liner corrosion that initiates at the concrete/liner interface. In addition, RES requested the expert panel to make recommendations for follow-on research. The referenced expert panel report concluded that the foreign materials in contact with the liner promote macrocell-accelerated, localized corrosion leading to penetration of the containment liner many years after construction. In their review of plant operating experience, the expert panel concluded that there was no other significant aging or degradation process. As requested, the expert panel report also included recommendations for follow-on research. The enclosure is the staff's working group evaluation of the expert panel recommendations.

The expert panel recommended follow-on research in five areas including (1) detailed liner corrosion modeling and experiments, (2) advancements in non-destructive examination (NDE) methods, (3) effects of nuclear plant design and operation, (4) concrete aging and degradation, and (5) concrete repair and corrosion mitigation. The expert panel recommendations were evaluated by a working group consisting of staff from NRR and RES, who prepared the attached path forward summary.

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In evaluating the panel's recommendations, the working group considered the significance of the information that would be obtained along with the resources required to pursue follow-on research. Alternatives to performing the recommended research, such as requesting additional information from licensees, or obtaining information through ongoing NRC efforts or industry led initiatives were considered.

As discussed in the enclosure, the working group recommends going forward with limited scope modeling of corrosion initiating at the concrete-liner interface as described in the amendment to user need request NRR 2010-002 on containment liner corrosion (December 15, 2011, ML1134900131). The purpose of this work would be to confirm that the current inspection intervals are appropriate.

With respect to the other recommendations, the working group believes that they are generally more appropriate for industry follow-up. Specifically, the working group recommends that the staff monitor industry led initiatives on the development of nondestructive examination techniques for detection of containment liner corrosion. Based on the staff review of plant construction information, the working group does not recommend detailed case studies of previous events. However, additional information may be requested from licensees. Additional information on concrete degradation will be obtained in the course of subsequent license renewal research. The effectiveness of concrete repairs, including temporary openings in pressurized water reactor containments for replacement of the reactor pressure vessel head and steam generators, will be assessed with the existing regulatory framework and required concrete inspections. The working group anticipates engaging the industry upon public release of the enclosed path forward summary. The staff will want to ascertain the status of industry NDE efforts, as well as any plans to address the remaining technical issues. During these exchanges, the staff will also seek information regarding international operation experience with liner corrosion.

The working group that reviewed the expert panel recommendations consisted of Mr. Darrell Dunn from RES/Division of Engineering, Mr. Paul Klein from NRR/Division of Engineering, Dr. Allen Hiser and Dr. Abdul Sheikh of NRR/Division of License Renewal, Dr. George Thomas of NRR/Division of Engineering.

RES has established an online quality survey to collect feedback from user offices on the usefulness of RES products and services. The URL for this survey is sent by the RES branch chief responsible for this product/service to counterparts in your office via e-mail. I would appreciate it if you would see that this short—about 5 minutes—survey is completed by the responsible manager or supervisor within the next 10 working days to present your office's views of the delivered RES product.

Should you have any questions concerning this report, please feel free to contact Darrell Dunn of my staff at 301-251-7621 or [darrell.dunn@nrc.gov](mailto:darrell.dunn@nrc.gov).

Enclosure:  
As stated

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