March 11, 2003

MEMORANDUM TO: Leonard D. Wert, Acting Chief
Materials Engineering Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

FROM: Jitendra P. Vora ***/RA/***
Materials Engineering Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

SUBJECT: FOREIGN TRIP REPORT: OECD/NEA CABLE TASK GROUP MEETING - PARIS, FRANCE

Attached is a foreign trip report on my participation as a chair of the OECD/NEA/IAGE Cable Task Group (CTG) meeting held in Paris, France. The purpose of the meeting was to develop a draft report on, "Research Efforts Related to Wire System Aging in Member States."

In the report, the CTG has identified technical issues related to wire system aging and safety and topics for collaborative research. Technical issues are categorized into the following five areas:

- Physical and Chemical Models of Wire System Aging
- Assessment of Fire Hazards Due to Wire System Aging
- Risk Significance of Wire System Aging
- Prognostics and Diagnostics for Installed Wire Systems
- Environmental Qualification Practices for Wire Systems

Based on the review of the past and current programs of the member states and the lessons learned from the NRC's sponsored International Conference on Wire System Aging conclusions are drawn on the aforementioned issues and recommendations are made for collaborative research.

Attachment:
Trip Report

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# Foreign Trip Report

**Subject**
OECD/NEA/IAGE Cable Task Group Meeting

**Dates of Travel, Countries and Organizations Visited**
September 26-27, 2002, OECD/NEA, Paris, France

**Author, Title, and Agency Affiliation**
Jitendra (Jit) P. Vora, Team Leader, MEB/DET/RES

**Sensitivity**
There are no sensitive issues associated with this foreign trip.

**Background/Purpose**
Nuclear facilities rely on electrical wire systems to perform a variety of functions for successful operation. Many of these functions directly support the safe operation of the facility; therefore, the continued reliability of wire systems, even as they age, is critical.

A great deal of expertise and knowledge has been gained related to the design and construction of wire systems, and how to optimize their performance. This is evidenced by the reliable performance demonstrated in the vast majority of wire systems currently installed. However, an area that has yet to be fully addressed is the impact of age degradation on the performance and reliability of wire systems after prolonged exposure to operating and environmental stressors.

To address the technical issues related to wire system aging and safety, the Working Group on Integrity of Components and Structures (IAGE), under the auspices of the Committee on the Safety of Nuclear Installations (CSNI), formed a special task group. The Task Group on Wire System Aging, also referred to as the Cable Task Group (CTG), was chartered for evaluating the current status of research in this area. Identify technical issues that remain unresolved and warrant additional research.

The purpose of my participation was to chair the IAGE Cable Task Group meeting and develop a draft report on “Research Efforts Related to Wire System Aging in Member States.”

**Abstract: Summary of Pertinent Points/Issues**
There is a continued interest worldwide in the safety aspects of wire (cable) system aging in operating nuclear power plants. Among the representatives of the OECD/NEA member states who participated in the meeting it was unanimously recognized that inspite of a matured cable industry and design and operating experience there are many outstanding technical issues related to the aging and safety aspects of installed cable systems in operating nuclear power plants. There was a total support for OECD/NEA to initiate short term collaborative research projects in the areas of diagnostics and condition monitoring and for the development of physical and chemical models for evaluating the integrity of the installed cable systems and for determining their residual lifetimes.

**Discussion**

In November 2000, the issue of wire system safety received national attention in the U.S. with the issuance of the White House Report on Wire System Safety. This report concluded that the wire system safety is an important public health and safety issue that transcends government agencies. One of the recommendations in this report is to encourage the use of collaborative research efforts to address unresolved issues.

Even with the great deal of research already completed, there are a number of important issues that remain to be resolved. In April 2002 the NRC sponsored an International Conference on Wire System Aging. At this conference experts from around the world gathered to discuss issues that still need to be resolved and the collaborative research efforts that would be most effective to address these issues. Future collaborative research on wire system safety must take into consideration the results of the completed and ongoing work relevant to the topics of interest under this program. In a continuing effort to better understand and manage the effects on electrical wire systems, national and international collaborative research efforts are being encouraged.

Initial efforts by the OECD/NEA Cable Task Group focused on the identification of issues related to wire system aging, and the review and evaluation of ongoing research to address these issues. This report documents the results of the initial efforts by the CTG and provides a preliminary list of issues related to wire system aging that need to be addressed by future research efforts. It is the intention of the CTG that this list be expanded and modified as new issues are identified to obtain a comprehensive list of issues to be addressed by the research. Interested researchers can than use this list to identify collaborative research efforts in which they would be interested in participating. Collaborative research should than be performed to resolve these issues.

The preliminary list of technical issues are categorized into five subject areas, which are:

- Physical and Chemical Models of Wire System Aging
- Assessment of Fire Hazards due to Wire System Aging
- Risk Significance of Wire System Aging
- Prognostics and Diagnostics for Installed Wire Systems
- Environmental Qualification Practices for Wire Systems

**Pending Actions/Planned Next Steps for NRC**

As a chair of the cable task group Jit Vora is expected to develop the final draft report and submit it to the OECD/NEA project manager and for him to coordinate and obtain inputs from the RISK and FIRE groups. Subsequently, the report will be submitted to the IAGE Main Working Group for comments and for discussion with CSNI in June 2003. .

**Items of Interest**

RES needs to continue to support this OECD/NEA sponsored activity and take the opportunity for initiating collaborative research with the member states in the area of wire system aging and safety.

**Attachments**

Attachment 1. IAGE Cable Task Group Members