

May 25, 2006

MEMORANDUM TO: Jennifer L. Uhle, Deputy Director
Materials Engineering
Division of Fuel, Engineering and Radiological Research, RES

FROM: Joseph Muscara, Senior Technical Advisor /RA/
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SUBJECT: MEETING SUMMARY FOR THE CHARLESTON, SC MEETING
TO CONTINUE PLANNING AN INTERNATIONAL COOPERATIVE
GROUP AND RESEARCH PROGRAM FOR PROACTIVE
MATERIALS DEGRADATION MANAGEMENT

On May 11 to 13, 2006, staff from the Office of Nuclear Regulatory Research and contractors from Pacific Northwest National Laboratory, held a third meeting in Charleston, South Carolina to plan an international cooperative group and research program focused on conducting research and sharing results for implementing Proactive Materials Degradation Management (PMDM) programs. Participants (see enclosed attendance list) were from a range of countries and organizations including the United States, Canada, Belgium, Korea, Japan, Czech Republic, and Taiwan. Participants represent utilities, regulators, manufacturers, universities, and research laboratories. This activity is supported by the Commission's SRMs M041108AB and M060206A.

The purpose of the meeting was to continue to plan and organize an international cooperative research program and group whose function would be to develop and conduct a broad-based research program that can provide the technical basis for any organization to develop and implement proactive materials degradation management (PMDM) programs, or provide regulatory guidance for same. In particular, the main focus was to continue the development (initiated during the previous meeting) by the international community of a broad-based research program plan and overview that would identify the research needed for PMDM that would potentially become part of the cooperation. The meeting was opened (agenda enclosed) by Dr. Joseph Muscara of the Office of Nuclear Regulatory Research at the Nuclear Regulatory Commission (NRC) who provided welcoming remarks, meeting objectives and initiated introductions of meeting participants. He then made a presentation (handout enclosed) to introduce some of the proactive materials degradation assessment (PMDA) work that has been sponsored by the NRC. In particular, his presentation gave an overview of the NRC's PMDA program that assembled a panel of experts which used a Phenomena Identification Ranking Table (PIRT) technique to evaluate degradation phenomena for thousands of PWR

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and BWR components. He discussed the motivation, scope, approach, and some of the findings of this study, including the expert panel's assessment of research needs. Dr. Muscara continued with a discussion of the need and benefits for international research cooperation, and provided a summary of the activities and progress made in the previous planning meeting related to development of a broad-based research program plan. Dr. Muscara indicated that the main focus of this meeting is to continue development of the plan including short write-ups of key research issues and needs. Dr. Allen Baum (NRC consultant) followed and provided a discussion and detailed list of research needs as identified in the NRC's expert panel report from the PMDA study. Following these presentations, five meeting attendees made short presentations related to activities within their organizations, their interests and research needs, and potential research that some of them might provide to the cooperation. The above presentations and discussions were completed by mid-afternoon on May 11, 2006.

Following the above presentations and continuing to the end of the meeting at Noon on Saturday May 13, 2006, the meeting attendees separated into three focus groups to discuss specific research issues, define research needs, and write summaries to further the development of an international broad plan for PMDM research. The three focus groups addressed the areas of 1) mechanisms and materials, 2) inservice inspection techniques and continuous monitoring, and 3) mitigation/repair/replacement. The mechanisms and materials focus group discussed an extensive number of issues that make-up about twenty research topics. It was decided that the key major areas relate to crack initiation, crack growth, and aging effects. Thus three overview papers will be prepared for these areas. Many of the specific issues will fall under one of these areas, and summaries for the specific issues will be written and incorporated under these main areas. Other issues span a number of areas, and in these cases, stand-alone summaries will be prepared. Assignments were made for different meeting participants to write, and for others to review, the various papers over the next several weeks and before the next planning meeting. The inservice inspection and continuous monitoring focus group discussed a number of research issues and needs, and wrote draft summary papers on 1) detection and evaluation methods for micro/macro cracks, 2) detection and characterization of materials degradation precursors, and 3) continuous monitoring for detecting LWR materials degradation. The focus group on mitigation/repair/replacement prepared draft summary papers on 1) surface modification techniques to improve the stress corrosion cracking (SCC) and fatigue resistance, 2) surface coatings for corrosion and SCC mitigation, 3) modification of water chemistry, and 4) welding optimization for microstructural control and stress/strain modification to improve hot cracking and SCC resistance.

The meeting was successful because it continued to raise interest in the international community for participating in an international cooperative research program for PMDM; one additional group indicated its intent to participate. The meeting was also successful because considerable progress was made towards the development of the broad-based research plan overview for the cooperative PMDM research program and group. The next working meeting for the international cooperative group and research program for PMDM is tentatively planned for September 2006 in Europe.

Enclosures:

1. List of Attendees for May 11 to 13, 2006 Public Meeting Agenda
2. Agenda
3. Copy of handout for Dr. Joseph Muscara's Presentation

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