August 26, 2008

MEMORANDUM TO: Kimbery Gruss, Acting Deputy Director
Technical Review Directorate
Division of Spent Fuel Storage
and Transportation
Office of Nuclear Materials Safety
and Safeguards

THRU: Michael Waters, Chief **/RA/**
Thermal and Containment Branch
Division of Spent Fuel Storage
and Transportation
Office of Nuclear Materials Safety
and Safeguards

FROM: Christopher S. Bajwa, Senior Mechanical Engineer **/RA/**
Division of Spent Fuel Storage
and Transportation
Office of Nuclear Materials Safety
and Safeguards

SUBJECT: TRIP REPORT: ASME PRESSURE VESSELS AND PIPING CONFERENCE, JULY 27-31, 2008

On July 31, 2008, at the American Society of Mechanical Engineers (ASME) Pressure Vessels and Piping (PVP) Conference in Chicago, Illinois, I presented the following technical papers:

- **A Comparison of 10 CFR 71 and the IAEA TS-R-1 Radioactive Material Transportation Regulations**
  - Co-Authors: Nancy Osgood, Earl Easton, and Ronald Pope (Consultant)
- **Risk Perspectives on Rail Transportation of Spent Nuclear Fuel**
  - Co-Author: Earl Easton
- **Potential Effects of Recent Road Transportation Accidents on Radioactive Material Shipments**
  - Co-Authors: Earl Easton, Robert Shewmaker, and Darrell Dunn (SouthWest Research , Inc.)

The first paper was presented in Session 4.1M, entitled "Regulatory and Code Considerations for Transportation and Storage of Radioactive Materials." I developed and Chaired this session, which was sponsored by the Operations, Applications, and Components (OAC) Technical Committee of the PVP Division. The session featured papers given by authors from the NRC, Savannah River National Laboratory, Argonne National Laboratory and Sandia National Laboratories.

The next two papers were presented in Session 4.2M, entitled “Thermal-2”, also sponsored by the OAC Committee. The slides for these presentations are included with the attached trip report.

Overall, nineteen technical presentations were given over five sessions sponsored by OAC under the subject of “Transportation, Storage, and Disposal of Radioactive Materials.” I attended four of the five sessions and served as a Co-Chair, for one of the sessions.

As part of my PVP Division technical committee involvement, I attended the technical committee meetings for OAC and Codes and Standards Committees (the later as the OAC liaison), the PVP 2009 and PVP 2010 Technical Program Representative (TPR) meetings, as well as an informal “brainstorming session” with the Executive Committee of the PVP Division.

This conference enabled me to interact with experts in the design, fabrication, analysis, testing, and operations aspects of radioactive material packaging, as well as become more informed on the various issues that the industry and regulatory bodies are facing today.

The conference also provided an excellent opportunity for me to broaden my understanding and knowledge of code development and, more specifically, the current practices in the storage, transportation, and disposal of radioactive material, which serves to prepare me for supporting staff positions before the public and various advisory boards to the NRC.

Thirteen NRC staff members, including Gordon Bjorkman and Peter Lien of the Division of Spent Fuel Storage and Transportation, participated in this year’s PVP conference, either as attendees, Session Chairs, paper authors, or Plenary Speaker. This is a significant increase over previous years. Laura Dudes, the Deputy Director of the Division of Engineering of the Office of New Reactors, gave a plenary speech entitled “New Reactor Licensing: Design Reviews and Engineering Issues.” Continued participation by NRC staff in Code body activities, and direct NRC support of conferences and technical meetings such as the PVP conference, will be vital in establishing the successful future of collaboration between the Regulators in the United States and other countries. It is imperative that staff have a thorough technical understanding of the bases used in establishing codes and standards. As such, NRC should seek to broaden involvement in these bodies to further the mission of ensuring the safe use of nuclear power and radioactive materials and protecting the health and safety of the public.

Next year’s conference will be held in Prague, the Czech Republic, July 26 – 30, 2009. I have been asked to serve as the Co-TPR for the OAC sessions of this conference, as well as the primary TPR for the OAC sessions at the 2010 PVP conference.

Attachments: Trip Report

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TRIP REPORT

Subject:

American Society of Mechanical Engineers Pressure Vessels and Piping (PVP) Conference

Dates and Location of Travel:

July 27-31, 2008, Chicago, Il

Author, Title, and Agency Affiliation:

Christopher S. Bajwa, Senior Mechanical Engineer,
Division of Spent Fuel Storage and Transportation

Background & Purpose of Trip:

The staff participated in the 42nd annual PVP conference and presented the following papers in 2 technical sessions sponsored by the Applications, Operations, and Components (OAC) Technical Committee:

- **A Comparison of 10 CFR 71 and the IAEA TS-R-1 Radioactive Material Transportation Regulations**
    - Co-Authors: Nancy Osgood, Earl Easton, and Ronald Pope (Consultant)
- **Risk Perspectives on Rail Transportation of Spent Nuclear Fuel**
    - Co-Author: Earl Easton
- **Potential Effects of Recent Road Transportation Accidents on Radioactive Material Shipments**
    - Co-Authors: Earl Easton, Robert Shewmaker, and Darrell Dunn (SouthWest Research, Inc.)

The slides for the above presentations are attached.

Discussion:

In total, nineteen technical presentations were given as part of the "Transportation, Storage and Disposal of Radioactive Materials" sessions and four technical presentations were provided as part of the "Regulatory and Code Considerations for Transportation and Storage of Radioactive Materials" session sponsored by the OAC Technical Committee. Sessions were held on a wide range of topics including radioactive materials (RAM) packaging structural and thermal analysis and testing, packaging materials, development and use issues, design and fabrication issues, and regulations related to transport of radioactive materials. An excerpt of the final program with the applicable sessions highlighted is attached.

Representatives from private industry, universities, international regulatory agencies, and Department of Energy (DOE) laboratories participated in the conference. Presentations were provided by staff from GE Global Research, the University of Nevada, Reno, Central Research Institute of Electric Power Industry (Japan), Argonne National Laboratory, Lawrence Livermore National Laboratory, Idaho National Laboratory, Savannah River National Laboratory, Oak Ridge National Laboratory, and Sandia National Laboratory.

Papers dealing with radioactive waste storage, transportation, and long term disposal, including both structural and thermal issues, were presented. Some of the papers included: "CFD

Simulations of an 8X8 Rod Array Inside of an Isothermal Enclosure Filled with a Rarefied Gas," "Finite Element Mesh Considerations for Reduced Integration Elements," "Long-Term Environmental Degradation of Zirconium Alloys in Contact with Spent Nuclear Fuel – a Review," "Certification of the NAC-LWT Cask for Shipment of Sodium Debris Bed Experiments," "Strain Based Acceptance Criteria for Inelastic Analysis," "Measurement and Uncertainty of Heat Flux to a Rail-Cask Size Pipe Calorimeter in a Pool Fire," and "Recent Development of Code Case on Use of Ductile Cast Iron for Transport and Storage Cask for Spent Nuclear Fuel."

This conference was beneficial for the staff as it provides a forum for experts in the fields of design, analysis, fabrication, testing, and operations of radioactive material packages to share their latest work. The conference also serves to enhance the staff's technical competence on ongoing standards activities, preparing the staff for interacting with concerned citizens and participating in litigation. The full proceedings of this conference have been published and are currently available from ASME, or from the NRC staff that attended the conference.

Next year's conference will be held in Prague, the Czech Republic, July 26 – 30, 2009. This will be the first time that the PVP Conference has been held in Europe.

Attachments: Slides from presented papers
Excerpts from PVP 2008 Final Program