Working Meeting on Bolted Closure Joint and Polymeric Shielding Integrity for Extended Storage and Transportation

Meeting Minutes, December 3, 2012

Summary

A working meeting between BAM and SRNL to discuss bolted closure joints and polymeric neutron shielding for casks subject to extended storage and transportation was held at SRNL.

BAM had presented the status of their work on the Helicoflex metallic gaskets at the EPRI Extended Storage Collaboration Program the previous week; they provided a status of their investigations on polymeric gasket seal material systems in bolted closure joints, and on polyethylene neutron shield materials for the CASTOR V casks at the SRNL meeting. SRNL presented their work on polymeric gasket seal material systems in support of 9975 transportation/storage packages.

The discussions provided the background for an irradiation and testing plan for polymeric materials to be developed by SRNL and BAM for SRNL execution beginning in FY13 and beyond. In addition, concepts for AMPs for bolted closure joints including the bolting subcomponent were discussed.

Meeting Agenda

A copy of the meeting agenda is attached as an Appendix to these minutes. Electronic copies of the presentations made at the meeting are available from Kerry Dunn [Kerry.dunn@srnl.doe.gov] or Wanda Crouch [wanda.crouch@srnl.doe.gov].

Discussions/Statements

The following noteworthy comments/points were made during the presentations and during the pre-planning for the irradiation and testing activities for gasket and shielding polymeric materials in storage and transportation casks.

- Clearly many casks with bolted closure designs include bolting and polymeric seals. Irradiation and testing activity approach will be to select two specific designs, and consider their materials and extended service conditions to support selection of specific polymeric compounds and test exposure parameters and conditions. The two designs will be the CASTOR V design being investigated by BAM, and the most prevalent cask in the U.S. fleet (TBD).
- Many environmental and irradiation exposure parameters for the polymeric materials systems in the cask designs are time-dependent (temperature, gamma spectrum and dose rates, spontaneous neutron exposure rates, atmospheric/cover gases, hydrogen from corrosion of metals in proximity, etc). These details will need to be determined for the testing parameters.
    - Irradiation service history (with extended storage time) at the seals and shielding locations will be determined. This will be based on the radiation source term from the cask fuel inventory, and radiation transport analysis. SRNL will lead the concept for improved specification of this level of exposure under extended storage as it would follow from the fuel inventory work of Vinson/Verst under the DOE-NE task. This information is important to gauge irradiation exposure and other environmental conditions (e.g. temperature, atmosphere) for the irradiation and testing program.
- Other testing program considerations include:
    - Safety concerns need to be well-founded to justify testing activities.
    - Gamma dose rate will decrease with time; spontaneous neutron exposure rate should be relatively constant over EST.
    - Crystalline content of polyethylene makes it difficult to melt so that slump in the shielding may not occur

- o A future open-attendance workshop on AMP for bolted closure joints should be held - consider this under the ESCP International Subcommittee.
- o Reports from the SRNL and BAM program will be available to the full dry storage community

Action Items

The following table contains actions from the meeting. Several of the actions have been completed and are noted as such.

	Action Description	**Responsible**	**Target Date**
1.	Determine most abundant cask design in US and identify their polymeric (gaskets and shielding) materials and estimate their dose and temp conditions for extended storage and transportation	Vinson	January 2013
2.	Review CASTOR V cask design and consider dose/temp/materials to propose testing conditions for elastomeric seal and polymer shield materials	Volzke/Wolff	January 2013
3.	Draft Meeting Minutes; send with 'cleared' presentations	Dunn/Sindelar	January 2013
4.	Refine BAM/SRNL MOA to make generic content	Volzke	Complete
5.	Send draft BAM/SRNL MOA to BAM (Volzke) via e-mail	Dunn	Complete
6.	Send revised "final" draft BAM / SRNL MOU to BAM for review	Dunn / Hay	January 2013
7.	Develop initial draft plans (SRNL and BAM) for irradiation and testing of polymeric seal and shield material systems based on Skidmore list of phenomena and test considerations	Skidmore/Wolff	January 2013
8.	Further refine draft tests plans	Wolff/Skidmore	February 2013
9.	Send information on gamma cell to BAM	Verst/Chandler	January 2013
10.	Next ESCP meeting in May 2013 – float topic of aging behavior for bolts and AMP for bolted closures for extended storage and transportation	Volzke/Sindelar	May 2013
11.	Complete SRNL test plan for program	Skidmore	May 2013
12.	Initiate testing	Skidmore	June 2013

Appendix I

Drs. Holger Voelzke and Dietmar Wolff
BAM Federal Institute for Materials Research and Testing

Visit to the Savannah River National Laboratory
Aiken, South Carolina, USA

Monday, December 3, 2012 – Meet at Center for Hydrogen Research (CHR), Hydrogen Technology Research Laboratory (999-2W), Palmetto Room

8:30 AM	Welcome/Introductions	All
8:35	Savannah River Site DOE SNF Management Overview	Bob Sindelar
8:50	Dry Storage Initiatives for DOE SNF at SRS	Thad Adams
9:15	RAM Package Monitoring	Jeff England
9:40	BAM Aging Management in Dry Spent Fuel Cask Storage	Holger Voelzke and Dietmar Wolff
10:10	**Break**	All
10:25	Nuclear Package Materials Surveillance and Aging Management Programs	Kerry Dunn
10:45	Seal Materials Aging Activities	Eric Skidmore
11:40	Proposed aging management of bolted closure joints under EST	Andy Duncan
12:10 PM	**Lunch**	All
1:15 PM	Aging management experimentation and analysis activities for polymeric systems – test planning	Eric Skidmore
1:45 PM	Discussion	All
4:00 PM	Discussion / SRNL/BAM MOA	All
4:30 PM	**Wrap-Up and Path Forward**	All
5:30 PM	Depart	
6:00 PM	Dinner: Willcox Inn, Aiken, SC	

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