

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: Attendance at the American Society of Testing and Materials (ASTM)
C26.13 Repository Waste Subcommittee Meeting
Charge Number 20.01402.571; AI Number 01402.571.022

DATE/PLACE: January 21-24, 2002, Dallas, TX

AUTHOR(S): V. Jain and O. Pensado

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PERSONS PRESENT:

V. Jain and O. Pensado from the Center for Nuclear Waste Regulatory Analyses (CNWRA). In addition, the participants included technical staff from national laboratories such as Argonne National Laboratory (ANL), Idaho National Environmental Engineering Laboratory (INEEL), Pacific Northwest National Laboratory (PNNL); repository program, Bectel-SAIC; waste form producers, Savannah River Site (SRS); fuel manufacturers; utilities; and representative from Commissariat à l'énergie Atomique (CEA), France.

BACKGROUND AND PURPOSE OF TRIP:

The ASTM C26 committee meeting was held January 21–24, 2002, at the Hyatt Hotel in Dallas, Texas. ASTM C26 committee consists of several subcommittees such as C26.02 on Fuels, C26.03 on Neutron Absorber Materials, C26.05 on Analytical Test Methods, C26.07 on Mixed Waste Materials, C26.08 on Quality Assurance, Statistical Applications, and Reference Materials, C26.09 on Nuclear Processing, C26.10 on Nondestructive Assay, C26.12 on Safeguards, C26.13 on Repository Waste, and C26.14 on Remote Systems. Authors participated mostly in the ASTM C26.13 sub-committee which is primarily involved in the development of standard methods, guides, and practices for activities related to disposal of high level waste in geologic repository. This committee is working on topics such as standards for waste forms and spent nuclear fuel. The purpose of this bi-annual meeting is to define the need for standards, write standard methods, and issue standards for testing and materials. The main purpose of this trip was to participate in the revision of ASTM C 1174 "Standard Guide for Prediction of the Long-term Behavior of Materials, Including Waste Forms, Used in Engineered Barrier Systems (EBS) for Geologic Disposal of High-level Radioactive Waste" and other standards related to radioactive waste.

SUMMARY OF PERTINENT POINTS:

Staff participated in discussions related to standards for testing of materials relevant to repository waste. The development of methods such as vapor hydration test for glasses, forward reaction rate determination for glasses, spent fuel dissolution rate determination using flow through test, revision to the product consistency test on waste forms, standard guide for drying of spent nuclear fuels, and the revision of the "Standard Practice for Prediction of the Long-Term Behavior of Materials, Including Waste Forms, Used in Engineered Barrier Systems

(EBS) for Geological Disposal of High-Level Radioactive Waste" could be important to the U.S. Nuclear Regulatory Commission (NRC) in its work related to the licensing of the proposed repository at Yucca Mountain.

SUMMARY OF ACTIVITIES:

- Status of the draft procedure titled "Standard Practice for Measurement of the Glass Dissolution Rate Using the Single-Pass Flow-Through Test Method" for measuring the forward dissolution rates of waste glasses, necessary for performance assessment modeling, was presented by W. Ebert (ANL). Discussions were held on the selection of glass composition for the round robin. Ebert will mail a data sheet to the participating laboratories for this round robin in the next few weeks. The data sheet will allow each laboratory to scope the cost and schedule for participating in this round robin. CNWRA intends to participate in this round robin as a described in FY2002 operations plan.
- Discussion of the draft standard titled "Standard Test Methods for Determining the Amount of Devitrification in a Nuclear Waste Glass and for Constructing Time-Temperature-Transformation (TTT) Diagrams" was led by Carol Jantzen, Task Group Chair. No new information was presented at the meeting.
- Discussion of the draft standard titled "Standard Test Methods for Determining the Liquidus Temperature (T_L) of Waste Glasses" was led by Gary Smith (PNNL). Due to problems in reproducing test results during first round robin, the procedure was revised and a new round robin is near completion.
- Discussion of the standard vapor hydration test procedure for determining the corrosion behavior of glass was led by Gary Smith (PNNL). Round robin results for this test showed significant discrepancies. Laboratories had problems in measuring the thickness of the corroded layer. A new round robin is being initiated using a more durable glass to determine the precision and accuracy of the test method. The U.S. Department of Energy (DOE) Office of River Protection (ORP) has included vapor hydration test in the Phase B-2 contract with the River Protection Project-Waste Treatment Plant (RPP-WTP) contractor (i.e., Bechtel National, Inc.) for the vitrified low-level radioactive waste.
- Discussion and presentation on proposed additional test protocol(s) to be added to C1285, the PCT standard, was led by Carol Jantzen (SRS). She discussed round robin results that were acceptable, and indicated that the Test Method will be balloted next month. Ebert questioned the use of relative standard deviation versus standard deviation. This will be resolved after discussions with the subcommittee on C26.08 on quality assurance and statistical applications.
- Carol Jantzen (SRS) led the discussion and the incorporation of comments for the test standard titled "Physical and Chemical Characterization of Radioactive and Hazardous Wastes for Thermal Treatment Exclusive of Incineration." The test method will be balloted next month.
- A draft standard on "Standard Guide for the Characterization of Uranium Metal-Based Spent Nuclear Fuel in Support of Final Repository Disposal" was discussed. After lengthy discussions on this subject, a consensus was reached to broaden the scope of the method

to include characterization of nuclear spent fuel. Currently, this standard is focused on characterization of N-reactor fuel at Hanford. The characterization of N-reactor fuel for dry-storage is complete and there are no other users for it.

- Brady Hanson (PNNL), discussed the status of the draft Standard Test Method for "Measuring the Dissolution Rate of Spent Nuclear Fuel in Dilute Aqueous Solutions Using a Flowthrough Technique". Brady Hanson discussed in detail uncertainties inherent in this method that cause significant variations in the spent fuel dissolution rate. B. Hanson will write an extended section on uncertainties in this test method and submit the test method for balloting in coming months.
- Tom Thronton, Task group leader for the revision of ASTM C 1174-97 "Standard Practice for Prediction of the Long-Term Behavior of Materials, Including Waste Forms, Used in Engineered Barrier Systems (EBS) for Geological Disposal of High-Level Radioactive Waste" discussed the changes in the standard based on the 10CFR Part 63. Prior to the meeting, V. Jain and O. Pensado (CNWRA) provided text for performance confirmation and comments on several sections. The revision to the standard guide still needs one more round of discussion at the next meeting before balloting.
- Bob Sindelar (SRS) provided current status of the Aluminum Spent Fuel Task Group. He indicated that DOE has stopped work on melt-dilute technology for Al-clad spent nuclear fuel. A final characterization report will be issued by March 2002.
- Eric Shaber (INEEL) led the discussion on the draft standard titled "Standard Guide for Drying Behavior of Spent Nuclear Fuel." This guide addresses drying methods and their limitation in drying of nuclear fuels that have been stored in contact with water. After incorporating suggested changes and receiving input from various participants, the test method will be submitted for balloting in June 2002.

IMPRESSIONS/CONCLUSIONS:

The meeting was useful in keeping current with the ongoing ASTM activities related to repository waste. The participation at the meeting was a good opportunity to gather information and generate discussion on issues important to repository waste.

PROBLEMS ENCOUNTERED:

None.

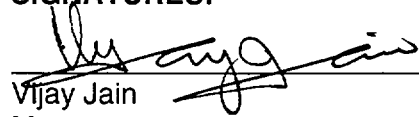
PENDING ACTIONS:

Authors will revise certain sections of the ASTM C 1174 practice guide and forward it to subcommittee task chair before the next meeting.

RECOMMENDATIONS:

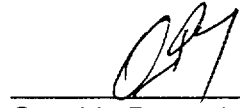
Staff should continue to participate at the ASTM C26 Committee meetings. Next meeting will be held in Salt Lake City, June 23-27, 2002.

SIGNATURES:



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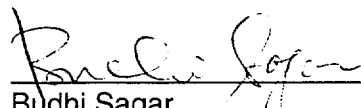
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