

# CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

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## TRIP REPORT

**SUBJECT:** Attendance at the American Society of Testing and Materials (ASTM)  
C26.13 Repository Waste Subcommittee Meeting  
Charge Number 20.06002.01.081; AI Number 06002.081.306

**DATE/PLACE:** January 12–16, 2003, Albuquerque, New Mexico

**AUTHOR:** V. Jain

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**PERSONS PRESENT:**

V. Jain from the Center for Nuclear Waste Regulatory Analyses (CNWRA). In addition, the participants included technical staff from Nuclear Regulatory Commission, national laboratories such as Idaho National Environmental Engineering Laboratory (INEEL), Los Alamos National Laboratory, and Pacific Northwest National Laboratory (PNNL); representative from Commissariat à l'énergie Atomique (CEA), France, and Siemens AG, Germany.

**BACKGROUND AND PURPOSE OF TRIP:**

The ASTM C26 committee meeting was held January 12–16, 2003, at the Hyatt Hotel in Albuquerque, New Mexico. A copy of the meeting agenda is attached. 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. Author participated in the ASTM C26.13 subcommittee 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. The purpose of this biannual meeting is to define the need for standards, write standard methods, and issue standards for testing and materials.

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 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:

- The draft procedure titled Standard Test Method for Measurement of the Glass Dissolution Rate Using the Single-Pass Flow-Through Test Method was balloted and 24 affirmative votes with comments and one negative vote were received. Comment associated with the negative vote dealt with precision and bias statement in the standard. A round robin is underway to develop precision and bias statement.
- No new information was presented on the draft standard titled Standard Test Methods for Determining the Amount of Devitrification in a Nuclear Waste Glass and for Constructing Time-Temperature-Transformation Diagrams. Carol Jantzen, Savannah River Technology Center, Aiken South Carolina, will complete format of the test method according to ASTM guidelines and submit the method for joint committee ballot in March 2003.
- No new information was presented on the draft standard titled Standard Test Methods for Determining the Liquidus Temperature ( $T_L$ ) of Waste Glasses. The Task Group Chair is still waiting for the results from the participants in the round robin testing. To date three laboratories have completed and four laboratories are still working on round robin testing.
- Status of the standard titled Vapor Hydration Test Method for Determining the Corrosion Behavior of Glass was given by Gary Smith (PNNL). Round robin studies are complete. Subcommittee balloting resulted in several comments including one negative comment. After resolution of comments, standard test method will be submitted for full-committee ballot for approval as a standard. 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.
- John Abrefah (PNNL), briefly summarized the status of the draft standard titled Standard Guide for the Characterization of Spent Nuclear Fuel in Support of Geologic Repository Disposal. The draft standard will be revised to include discussion on high-burnup fuels.
- John Abrefah (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 Flow Through Technique. A major revision will be presented at the next meeting.
- No new information was presented 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 for Geological Disposal of High-Level Radioactive Waste because Tom Thronton (BSC), task group leader did not attend the meeting.
- No one was present to discuss the status of the standards currently being developed by Aluminum Spent Fuel Task Group. It was recommended that this task be suspended due to the lack of interest from users.

- John Abrefah (PNNL) led the discussion to incorporate joint committee ballot comments on the draft standard titled Standard Guide for Drying Behavior of Spent Nuclear Fuel. The negative comment was considered persuasive and standard will have to undergo joint committee ballot again. Text was developed and approved to resolve several comments. This guide addresses drying methods and their limitation in drying of nuclear fuels that have been stored in contact with water. John Abrefah will incorporate changes in the guide and submit for joint committee ballot in March 2003.
- C. Interrante (NRC) led the discussion on resolving joint committee ballot comments on the draft standard titled Standard Guide for Evaluation of Materials Used in Extended Service of Interim Spent Nuclear Fuel Dry Storage Systems. There was two negative votes and numerous affirmative votes with comments. There was considerable discussion on the topic of polymer degradation and the information necessary to include in the guide. All negative vote comments were dispositioned as affirmative with editorial changes and standard was approved for publication. It took over 7 years to complete the standard.

**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 provide technical and regulatory perspective to the development of international standards; and gather information and generate discussion on issues important to repository waste.

**PROBLEMS ENCOUNTERED:**

None.

**PENDING ACTIONS:**

None.

**RECOMMENDATIONS:**

Staff should continue to participate at the ASTM C26 Committee meetings. Next meeting will be held in Denver, Colorado, June 15–19, 2003.

**SIGNATURES:**

  
 \_\_\_\_\_  
 Vijay Jain  
 Manager  
 Corrosion Science & Process Engineering

1/27/03  
 \_\_\_\_\_  
 Date

CONCURRENCE:

  
\_\_\_\_\_  
Budhi Sagar  
Technical Director

1-27-2003  
Date

Attachment  
VJ:jg

**ASTM C-26 Winter Meeting  
The Hyatt Regency Albuquerque  
Albuquerque, New Mexico  
January 12 – 16, 2003**

**Meeting Agenda, January 13<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup>, and 16<sup>th</sup>, 2003  
ASTM Subcommittee C26.13, Spent Fuel and High Level Waste**

The C26.13 Full Subcommittee meeting will take place from 9:00 to 12:00 noon and 1:00 to 3:30 p.m. on Monday, January 13<sup>th</sup>. Portions of the C26.13 Subcommittee will meet jointly with C26.07 on Monday, January 13<sup>th</sup> from 3:30 to 5:00 p.m. The C26.13 Metallic Spent Fuel Task Group meeting will be held on Tuesday, January 14<sup>th</sup> from 8:00 to 10:00 a.m.; the C26.13 Spent Fuel Dissolution Task Group meeting will be held on Tuesday, January 14<sup>th</sup> from 10:00 a.m. to 12:00 noon; the C26.13 C1174-97 Revision Task Group will be held on Tuesday, January 14<sup>th</sup> from 1:00 to 5:00 p.m.; the C26.13 Commercial LWR Spent Fuel Task Group meetings will be held on Tuesday, January 14<sup>th</sup> from 1:30 to 5:00 PM and Thursday, January 16<sup>th</sup> from 8:30 a.m. to 12:00 noon; the C26.13 Aluminum Spent Fuel Task Group will be held on Wednesday, January 15<sup>th</sup> from 8:00 to 10:00 a.m.; the C26.13 Drying of Spent Nuclear Fuels Task Group will meet on Wednesday, January 15<sup>th</sup> from 10:00 a.m. to 12:00 noon and from 1:00 to 5:00 p.m. All meetings will be held at The Hyatt Regency Albuquerque Hotel in Albuquerque, New Mexico. Agenda information is also provided for C26.07 due to over lap of activities and individuals.

Monday, January 13<sup>th</sup> 9:00 AM to 12:00 Noon and 1:00 to 3:30 PM

- Introductions: Members/Visitors All
- Review/Approval of C26.13 Salt Lake City, Utah Meeting Minutes Gary Smith
- Announcements from C26 Executive and Long-Range Planning Subcommittee Meeting of Sunday, January 12<sup>th</sup>. Gary Smith
- Status of balloted draft standard titled "Standard Practice for Measurement of the Glass Dissolution Rate Using the Single-Pass Flow-Through Test Method." Bill Ebert
- Status of 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" Carol Jantzen
- Status of draft titled "Standard Test Methods for Determining the Liquidus Temperature ( $T_L$ ) of Waste Glasses". John Vienna/Gary Smith
- Status of balloted draft standard titled "Standard Test Method for Measuring Waste Glass Durability by Vapor Hydration Test." John Vienna/Gary Smith
- Status of revision to C1285, the Product Consistency Test standard. Gary Smith

Monday, January 13<sup>th</sup> 9:00 AM to 12:00 Noon and 1:00 to 3:30 PM (continued)

- Continuation of items not completed during the morning session.
- Liaison Activities with COGEMA, European Network, et al. Blauvelt/Veyer/Smith
- Membership/Administrative Items Gary Smith
  - C26.13 Terminology for inclusion in C 859 (Chuck Interrante)
  - Proposed ASTM Seminar on Accelerated Testing for Materials in Spent Nuclear Fuel Dry Cask Storage Systems Ed Kuhn/Dick Blauvelt/Gary Smith
- Non-Agenda Items All

**Agenda for ASTM Joint C26.07/C26.13 Subcommittee Meeting**

Monday, January 13<sup>th</sup> 3:30 to 5:00 PM

- Introductions: Members/Visitors All
- Approval of C26.07 Minutes from Salt Lake City, Utah Meeting Blauvelt
- Review of balloted standard titled "Physical and Chemical Characterization of Radioactive and Hazardous Wastes for Thermal Treatment Exclusive of Incineration" Jantzen
- Status of Proposed Standard Guide for Waste Form Performance Tests for LLW and LLMW Blauvelt
- Discussion of the BNL Accelerated leach test for revision Dick Blauvelt
- Non-Agenda Items All

**Agenda for ASTM C26.13 Subcommittee Task Group Meetings**

Tuesday, January 14<sup>th</sup> 8:00 to 10:00 AM

- Metallic Spent Fuel Task Group: Tom Thornton/Gary Smith
  - Review of draft standard titled "Standard Guide for the Characterization Methodology of Spent Nuclear Fuel"
  - Purpose of meeting and historical perspective of Task Group activities Thornton/Smith
  - Discussion of characterization standard guide for spent nuclear fuels All
  - Review of responsibilities All
  - Planning for independent Task Group meeting (date/location/topics) All

## Agenda for ASTM C26.13 Subcommittee Task Group Meetings

### Tuesday, January 14<sup>th</sup> 10:00 AM to 12:00 Noon

- Spent Fuel Dissolution Task Group: Brady Hanson  
 Review draft titled "Standard Test Method for Measuring the Dissolution Rate of Spent Nuclear Fuel in Dilute Aqueous Solutions Using a Flowthrough Technique"
  - Purpose of meeting and historical perspective of Task Group activities Brady Hanson
  - Status report of Draft Test Method Brady Hanson
  - Section by section review of Draft Test Method All
  - Review of responsibilities All
  - Planning for independent Task Group meeting (date/location/topics) All

### Tuesday, January 14<sup>th</sup> 1:00 to 5:00 PM

- C26.13 C1174-97 Revision Task Group: Tom Thornton/Gary Smith  
 Discussion of 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"
  - Purpose of meeting and historical perspective of Task Group activities Thornton/Smith
  - Section by section review of Draft Revision All
  - Review of action items and responsibilities All

### Tuesday, January 14<sup>th</sup> 1:30 to 5:00 PM

- Commercial LWR Spent Fuel Task Group: Chuck Interrante  
 Review of balloted standard titled "Standard Guide for Evaluation of Materials Used in Extended Service of Interim Spent Nuclear Fuel Dry Storage Systems"
  - Purpose of meeting and historical perspective of Task Group activities Chuck Interrante
  - Section by section review of Balloted Draft Guide All
  - Review of responsibilities All
  - Planning for independent Task Group meeting (date/location/topics) All

## Agenda for ASTM C26.13 Subcommittee Task Group Meetings

### Wednesday, January 15<sup>th</sup> 8:00 to 10:00 AM

- Aluminum Spent Fuel Task Group: Mac Louthan/Natraj Iyer/Bob Sindelar
- Discussion and prioritization of needed future aluminum based SNF standards:
- Purpose of meeting and historical perspective of Task Group activities Mac Louthan
- Confirmatory data for dissolution measurements All
- Flow-through dissolution for aluminum fuels All
- Drying standard for aluminum fuels All
- Drip testing standard All
- Storage criteria for dried aluminum SNF All
- ISO Standard for wet storage of aluminum clad SNF All
- Review of responsibilities All
- Planning for independent Task Group meeting (date/location/topics) All

### Wednesday, January 15<sup>th</sup> 10:00 to 12:00 Noon and from 1:00 to 5:00 PM

- Drying of Spent Nuclear Fuels Task Group: Eric Shaber/John Abrefah
- Review of balloted standard titled "Standard Test Method for Drying Behavior of Spent Nuclear Fuel"
- Purpose of meeting and historical perspective of Task Group activities John Abrefah
- Status report of Draft Test Method John Abrefah
- Section by section review of Draft Test Method All
- Review of responsibilities All
- Planning for independent Task Group meeting (date/location/topics) All

### Thursday, January 16<sup>th</sup> 8:30 AM to 12:00 Noon

- Commercial LWR Spent Fuel Task Group: Chuck Interrante
- Continued: Review of balloted standard titled "Standard Guide for Evaluation of Materials Used in Extended Service of Interim Spent Nuclear Fuel Dry Storage Systems"
- If time permits:
- Discussion of new business:
- Purpose of meeting and historical perspective relating to future activities Chuck Interrante
- List of proposed topics for Task Group activities Chuck Interrante
- Discussion on proposed topics for Task Group activities All
- New topics for consideration by this Task Group All
- Planning for independent Task Group meeting(s) (date/location/topics) All
- Adjourn C26.13 Commercial LWR Spent Fuel Task Group meeting Chuck Interrante
  
- Adjourn C26.13 Subcommittee meeting Gary Smith