Overview of ASTM Subcommittee C26.10 on Non-Destructive Assay Techniques

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- Open process — all members have equal vote, equal voice
- Engenders public-private sector cooperation
- Process leads to widespread acceptance of ASTM International standards
- High-quality standards with strong market relevance

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Committee C26 on Nuclear Fuel Cycle

- Established in 1969
- Approximately 200 members (15% international)
- 11 countries represented on C26
- Jurisdiction over 160 technical standards
- C26 standards play a preeminent role in all aspects important to the nuclear fuel cycle, including nuclear fuel specification, spent nuclear fuel, waste materials, nondestructive assay, and repository waste packaging and storage.
- Emphasis on technical consensus leads to the development of standards that promote best practices

Committee C26 Future Meetings

Sunday January 25th 2015 - Thursday January 29th 2015
Location: Sheraton New Orleans; New Orleans, LA
Event Name: January 2015 Committee Week

Sunday June 14th 2015 - Thursday June 18th 2015
Location: Marriott Anaheim; Anaheim, CA
Event Name: June 2015 Committee Week

Sunday January 24th 2016 - Thursday January 28th 2016
Location: Grand Hyatt San Antonio; San Antonio, TX
Event Name: January 2016 Committee Week

Plans are underway to hold the June 2016 Meeting at the IAEA Headquarters in Vienna
Stay tuned….

Updates on C26.10 Activities

- Revisions of the following standards successfully balloted:
  - C1490 - Standard Guide for the Selection, Training and Qualification of Nondestructive Assay (NDA) Personnel (David Bracken, Ram Venkataraman, Tom Sampson, Wilson Noel)
  - C1455 - Standard Test Method for Nondestructive Assay of Special Nuclear Material Holdup Using Gamma-Ray Spectroscopic Methods (Tom Sampson)

Updates on C26.10 Activities

- The following standards are ready for balloting in the near future:
  - WK27292 (new standard) - Standard Guide for Nondestructive Assay of Special Nuclear Material (SNM) Holdup Using Passive Neutron Measurement Methods – Richard Mayer
  - C1316 (5 year revision) - Standard Test Method for Nondestructive Assay of Nuclear Material in Scrap and Waste by Passive-Active Neutron Counting Using the ^{252}Cf Shuffler – Stephen Croft

Updates on C26.10 Activities

New Standards being drafted

- Standard Test Method Hybrid K-edge Densitometry for Uranium and Plutonium in Solutions
- Standard Guide on TMU determination for various NDA techniques

WK24598 – Standard for Hybrid K-Edge Method for determining U and Pu Concentration in solutions

- Applicable to dissolver plant feed solutions which typically contain 50 to 400 g/l uranium and 1 to 4 g/l plutonium in the presence of fission products with β, γ activity of up to 10 TBq/l.
- Can be used for dissolver plant product solutions which contain typically 50 to 400 g/l uranium with, or without, 1 to 4 g/l plutonium
- Bringing together the community of HKED users/developers
  - Thus far: Canberra, ORNL, Korinzu, Shaw AREVA MOX
  - In the future: AREVA La Hague, ITU (Germany), IAEA

ASTM Standard Guide for Determination of TMU for various NDA Techniques

- Technical Contact: John Kirkpatrick, Canberra Industries
- Significant progress made in the last 2 meetings in 2014.
  - The uncertainty components are classified as Type A or Type B uncertainty on a case by case basis.
  - Type A uncertainties are those that are statistical in nature or can be measured (observed) directly. Type B uncertainties are those that are obtained by other means and are treated separately.
  - The methods of propagation of variances are used to combine the uncertainty components. The end user will interpret (to accept or not to accept) the results of a given NDA measurement based on the TMU
- Where possible, the guide borrows from ISO GUM. Challenges particular to NDA are addressed.
- The guide takes a first principles based approach, while remaining focused on practical implementation of the methods.
- Examples will be given for developing TMU estimates for various NDA techniques; Gamma, Passive neutron, Active neutron, Hold up, Heat based

Summary from the June 2014 Meeting of C26.10 in Jackson Hole, WY

- Participants: Jeff Gross (LLNL), Ron Jeffcoat (SRNL), Richard Mayer (DOE), Ram Venkataraman (Canberra), Joe Wachter (Canberra); Michael Soriano (BNL) and Lynn Preston (DOE) by phone for the TMU Guide discussion
- Work Item WK27292 (Neutron Hold up Guide) finalized and readied for balloting. Thanks to Richard Mayer for leading this effort.
- Much progress was made on the TMU Guide for NDA techniques.
- C1316 (^{252}Cf Shuffler Standard) discussed and is ready for balloting
- Discussion with C26.05 members; Donivan Porterfield (LANL), Mike Brisson (SRNL), Ben Karmiol (Shaw AREVA MOX) on an NDA alternative to the Alpha Spectrometry Techniques discussed in ISO21847
  - ISO21847 - Determination of Neptunium/Plutonium/Uranium-232 in uranium and its compounds. U.S. voted negative on this standard on the grounds that the method for "determining trace amounts of ^{237}Np/ is very subjective", and that the ISO standard "did not provide the context for the need to determine Pu in any of the described uranium matrices."
  - Possibility of using an isotopic code (FRAM, MGA/U) was discussed. However, in the case of ^{237}NP, the necessity to wait for ~3 months for ^{233}Pa daughter to achieve secular equilibrium was deemed a show stopper.
- Donivan Porterfield: "We don't have a standard test method for determination of Isotopics using FRAM or MGA/U? Can C26.10 consider this?"

Mark your calendar! June 2016 C26 Meeting @ the IAEA, Vienna

- Efforts underway for ASTM C26 sub-committees to meet at the IAEA in Vienna.
- Tentative dates: June 13-17, 2016
- A visit to the IAEA laboratories in Seibersdorf and to those in the Vienna International Center is a possibility.
- Presentations by IAEA folks is a possibility
- Thanks for the efforts of Jim Sprinkle (IAEA), Steven Balsley (Seibersdorf), Joe Koury (C26 Staff Manager), Dale Wahlquist (C26 Chairman)

THANK YOU ALL!!

Summary from the June 2013 Meeting of C26.10

- Several 5 year revisions of C26.10 Standards were discussed.
  - C1490 - Standard Guide for the Selection, Training and Qualification of Nondestructive Assay (NDA) Personnel – Ram Venkataraman
  - C1455 - Standard Test Method for Nondestructive Assay of Special Nuclear Material Holdup Using Gamma-Ray Spectroscopic Methods – We covered a lot of ground during the January 2013 meeting, thanks to Tom Sampson. We briefly re-visited this in June 2013 (Ram Venkataraman).
  - C1500 - Standard Test Method for Nondestructive Assay of Plutonium by Passive Neutron Multiplicity Counting – Stephen Croft, Bob McElroy
  - C1514 - Standard Test Method for Measurement of ^{235}U Fraction Using Enrichment Meter Principle – Stephen Croft

In Conclusion:

- C26.10 is active thanks to the dedication of its core members.
- Attendance at ASTM C26.10 meetings is dwindling because of travel budget restrictions.
  - In the future, tele-conferences and video conferences may be used more.
- Need participation from multiple Industrial entities and Academia.