

The Role of ASTM in Radioanalytical Method Development and Promulgation

By

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The American Society of Testing and Materials (ASTM) was established in 1898. Within ASTM there are several committees that write and develop consensus standards dealing with the measurement of radioactivity in various matrices. Those most closely allied with the work of the BAER Conference participants are committee D19 on water, subcommittee D19.04 on Radioactivity in Water chaired by David E. McCurdy (demccurdy@aol.com), and committee C26 on the Nuclear Fuel Cycle, in particular task group C26.05.01 environmental methods chaired by Norbert W. Golchert (ngolchert@anl.gov), of subcommittee C26.05 on Test Methods for the Nuclear Fuel Cycle.

ASTM is a consensus standards organization meaning that all standard test methods, practices and guides must be developed and approved by the committees responsible for the standards; these committees are comprised of members representing industry, university, government and private sector. Membership in a specific committee is by application and approval of the existing committee members. Membership entitles one to vote on all standards considered by the relevant committee and a free hard copy or CD-ROM of any ASTM volume. The ASTM membership application and additional information including D19.04 and C26.05.01 is available through the ASTM web site: “www.astm.org.”

The use of standards developed by consensus standards organizations by US federal agencies is encouraged where possible by the National Technology Transfer and Advancement Act (Public Law 104-113). The Office of Management and Budget Circular A-119 (63 FR 8545 – February 19, 1998) lays out the requirements for federal agencies and establishes NIST as the coordinating body for this mandate.

Method (standard) development and publication requirements of D19 and C26 differ slightly. All D19.04 test methods must undergo round robin testing prior to approval by and publication by ASTM. However, due to the rigorous testing and statistical evaluation required by D19, test methods published by D19.04 are likely to be accepted by the USEPA and other state regulatory agencies. The purpose of C26.05, Test Methods for the Nuclear Fuel Cycle, is closely tied to the international specifications for nuclear fuel. Due to the limited audience, test methods published by C26.05 may rely on single-operator test results, although round-robin results are preferred. Many C26.05 procedures have close ties to international methods promulgated by ISO.

As indicated by the sponsoring committee, the D19.04 charter is the “Development of standards and practices for determining gross and specific radionuclide concentrations in water, water-formed deposits and other environmental media using chemical and instrumental measurements,” while C26.05.01 deals with the analysis of radionuclides in environmental and other samples, e.g., soil, air and bioassay.

The status of current methods and the progress of proposed methods in development (Z-method numbers) will be discussed in this paper. The methods for D19.04 are listed below by task group.

The D19.04.01 Task Group on Measurement of Radioactivity:

The Task Group Leader is Donovan R. Porterfield and he can be contacted at dporterfield@lanl.gov. The standards for this task group are as follows:

D1890-96	Standard Test Method for Beta Particle Radioactivity of Water
D1943-96	Standard Test Method for Alpha Particle Radioactivity of Water
D3084-96	Standard Practice for Alpha-Particle Spectrometry of Water
D3648-95	Standard Practices for the Measurement of Radioactivity
D3649-98a	Standard Test Method for High-Resolution Gamma-Ray Spectrometry of Water
D4962-95e1	Standard Practice for NaI(Tl) Gamma-Ray Spectrometry of Water.

The D19.04.02 Task Group on Fission/Activation Products:

The Task Group Leader is Frank L. Krowzack and he can be contacted at frank.krowzack@exeloncorp.com. The standards for this task group are as follows:

D4107-98	Standard Test Method for Tritium in Drinking Water
D4785-00a	Standard Test Method for Low-Level Iodine-131 in Water
D4922-94e1	Standard Test Method for Determination of Radioactive Iron in Water
D5411-93(1999)	Standard Practice for Calculation of Average Energy Per Disintegration (E) for a Mixture of Radionuclides in Reactor Coolant
D5811-00	Standard Test Method for Strontium-90 in Water.

The D19.02.03 Task Group on Heavy Radionuclides:

The Task Group Leader is Ann H. Mullin and she can be contacted at ahmullin@usgs.gov. The standards for this task group are as follows:

D2460-97	Standard Test Method for Alpha-Particle-Emitting Isotopes of Radium in Water
D2907-97	Standard Test Methods for Microquantities of Uranium in Water by Fluorometry
D3454-97	Standard Test Method for Radium-226 in Water
D3865-97	Standard Test Method for Plutonium in Water
D3972-97	Standard Test Method for Isotopic Uranium in Water by Radiochemistry
D5072-98	Standard Test Method for Radon in Drinking Water
D5174-97	Standard Test Method for Trace Uranium in Water by Pulsed-Laser Phosphorimetry
D6239-98a	Standard Test Method for Uranium in Drinking Water by High-Resolution Alpha-Liquid-Scintillation Spectrometry

D19.04 standards under development are as follows:

Z2932Z	Test Method for Sequential Americium, and Plutonium in Water
Z2933Z	Test Method for Curium in Water
Z2934Z	Test Method for Americium in Water
Z2936Z	Test Method for Radioactive Nickel in Water
Z2937Z	Test Method for Iodine-129 in Water
Z2940Z	Test Method for Low Energy Gamma-Ray Spectrometry
Z4557Z	Test Method for 99Tc in Water
Z4558Z	Test Method for Gross Alpha in Water
Z8822Z	Test Method for Gross Alpha and Gross Beta by Liquid Scintillation Counting (LSC)
Z8823Z	Guide to Use of Cadmium Zinc Telluride (CZT) Detectors for Gamma Spectrometry

The radioanalytical methods for C26.05.01 are as follows:

The Task Group Leader is Norbert W. Golchert and he can be contacted at ngolchert@anl.gov.
The standards for this task group are as follows:

C1000-00	Standard Test Method for Radiochemical Determination of Uranium Isotopes in Soil by Alpha Spectrometry
C1001-00	Standard Test Method for Radiochemical Determination of Plutonium in Soil by Alpha Spectroscopy
C1163-98	Standard Test Method for Mounting Actinides for Alpha Spectrometry Using Neodymium Fluoride
C1205-97	Standard Test Method for The Radiochemical Determination of Americium-241 in Soil by Alpha Spectrometry
C1284-94	Standard Practice for Electrodeposition of the Actinides for Alpha Spectrometry
C1387-98	Standard Guide for Determination of Technetium-99 in Soil
C1402-98	Standard Guide for High-Resolution Gamma-Ray Spectrometry of Soil Samples
C1473-00	Standard Test Method for Radiochemical Determination of Uranium Isotopes in Urine by Alpha Spectrometry
C1475-00	Standard Guide for Determination of Neptunium-237 in Soil
C998-90(2000)	Standard Practice for Sampling Surface Soil for Radionuclides
C999-90(2000)	Standard Practice for Soil Sample Preparation for the Determination of Radionuclides

C26.05.01 standards under development are as follows:

Z8034Z	Test Method for Radiochemical Determination of Strontium-90 in Soil
ZxxxxxZ	Standard Guide for the Determination of Gaseous Tritium Content of the Atmosphere.

Both the D19.04 and C26.05.01 need new members and laboratories for single operator testing and round robin testing. If you are interested in becoming a new member or in participating in the single operator and/or round robin testing please contact David E. McCurdy for D19.04 or Norbert W. Golchert for C26.05.01 as described above.