

MASTER

## NATIONAL STANDARDS FOR THE NUCLEAR INDUSTRY

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### ABSTRACT

Standards needs for the nuclear industry are being met by a number of voluntary organizations, such as ANS, ASTM, AWS, ASME, and IEEE. The American National Standards Institute (ANSI) coordinates these activities and approves completed standards as American National Standards.

ASTM has two all-nuclear committees, E-10 and C-26. A C-26 subcommittee, Test Methods, has been active in writing analytical chemistry standards for twelve years. Thirteen have been approved as ANSI standards and others are ready for ballot. Work is continuing in all areas of the nuclear fuel cycle.

### I. INTRODUCTION

Nuclear standards are a sign of a maturing industry. Components, fuels, and test procedures have reached the stage of development where a standard for their use or performance can be written. Standards are finding increased use as support materials for quality assurance and for audit procedures. They also serve to standardize the industry and, hopefully, to increase public confidence.

There are a number of standards writing bodies, both public and government. We are familiar with Regulatory Guides and EPA-approved procedures. Voluntary organizations such as the American Nuclear Society (ANS), American Society for Testing and Materials (ASTM), American Society for Mechanical Engineers (ASME), and others write standards, some of which are nuclear related.

All of these voluntary organizations belong to the American National Standards Institute, and it is this organization which coordinates the nation's standards writing. There

are 14 organizations writing nuclear standards, and their activities are governed by the Nuclear Standards Management Board. This board monitors organizational activity for duplication and mediates jurisdictional disputes.

With so many groups writing standards, there is a possibility that some tasks will be overlooked. ASTM Committee E-10, Nuclear Technology and Applications, has written four standards in this area. Two of these describe the methods of developing a standard task matrix, and the other two are the task matrix for the nuclear fuel cycle.

The nuclear standards written by ASTM committees are collected in one volume of the Annual Book of Standards. Volume 45 contains the work of eight ASTM committees and totals 1200 pages. The major contributors have been committees E-10 and C-26, Nuclear Fuel Cycle, each with about 450 pages of standards.

## II. ASTM NUCLEAR COMMITTEES

Committee E-10 was the first ASTM nuclear committee and now has 300 members and 10 subcommittees. Current emphasis is on radiation effects, dosimetry, applications of radioisotopes, and matrix standards.

Committee C-26 was formed in 1969 to write standards for fuels, absorbers, and moderators. Its scope was expanded in 1979 to cover the entire nuclear fuel cycle. It now has 150 members and 9 subcommittees and writes standards on waste materials, reprocessing, instrumentation, and training and certification in addition to the original tasks.

## III. ANALYTICAL CHEMISTRY STANDARDS

Although E-10 subcommittees write analytical chemistry standards for its applications, the remainder of this paper will deal with the standards activities of C-26. The analytical chemistry standards are written by Subcommittee 5, Test Methods. This group has 80 members with representation from government agencies, government laboratories, contractors, private companies, commercial analytical laboratories, and foreign companies.

This subcommittee has been writing standards for 12 years and has over 375 pages of analytical chemistry standards in Volume 45 of the Annual Book of Standards. Materials covered include  $UO_2$ ,  $UO_2 \cdot PuO_2$ ,  $UF_6$ ,  $BuC$ ,  $Ag \cdot In \cdot Cd$ ,  $PuO_2$ , and scrap and waste. These standards provide complete analytical procedures for all specification requirements. Typical of these methods is the  $UO_2$  standard. It is 46 pages in length and includes 2 methods for U, isotopic; 2 methods for O/U ratio; spectrographic and spark source spectrographic methods for impurities; and specific methods for nonmetals, moisture, surface area, gas release, and hydrogen.

Six standards have been completed by the originating task groups and are in various stages of balloting. These are the resin bead method of sample preparation for mass spectrometry,  $UO_2 \cdot Cd_2O_3$ , sodium metal, purchase specifications for x-ray fluorescence (XRF) spectrometers, soil sampling for radio-nuclide measurement, and an addition to the nondestructive assay of scrap and waste standard. These standards are balloted at the subcommittee, committee, and society levels for approval as ASTM standards. Approved standards are submitted to ANSI for approval as American National Standards.

When writing a new standard, the work starts at the task group level. Here a small group of experts work out the details of the standard and may go through several drafts before a final version is approved. Current work at this level includes methods for uranium ore concentrate and slurry, borehole sensors, soil preparation, U and Pu in soil, and U in ore by XRF.

There are other tasks to be done, and planning for these is a continuous requirement. Current plans call for work to begin soon on analytical methods related to waste disposal, isotopic and total Pu by gamma spectrometry, airborne sensors, traceability to recognized standards, and additional environmental methods.

Although Subcommittee 5 is the analytical chemistry group, other C-26 subcommittees write standards that are of value to our work. A standard on glove-box criteria has been approved, and standards on sampling methods and quality assurance in analytical chemistry laboratories are in draft form.

#### CONCLUSIONS

Nationally approved standards are of great value to the nuclear industry and to analytical chemists working in this area. ASTM Committees E-10 and C-26 provide a way to participate in the development of these standards. Standards are written to meet current needs and represent state-of-the-art technology.

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