NBS SPECIAL PUBLICATION 675

U.S. DEPARTMENT OF COMMERCE/National Bureau of Standards

Standards Committee Activities of the National Bureau of Standards – 1983 Highlights

NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards[1] was established by an act of Congress on March 3, 1901. The Bureau's overall goal is to strengthen and advance the Nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research and provides: (1) a basis for the Nation's physical measurement system, (2) scientific and technological services for industry and government, (3) a technical basis for equity in trade, and (4) technical services to promote public safety. The Bureau's technical work is performed by the National Measurement Laboratory, the National Engineering Laboratory, and the Institute for Computer Sciences and Technology.

THE NATIONAL MEASUREMENT LABORATORY provides the national system of physical and chemical and materials measurement; coordinates the system with measurement systems of other nations and furnishes essential services leading to accurate and uniform physical and chemical measurement throughout the Nation's scientific community, industry, and commerce; conducts materials research leading to improved methods of measurement, standards, and data on the properties of materials needed by industry, commerce, educational institutions, and Government; provides advisory and research services to other Government agencies; develops, produces, and distributes Standard Reference Materials; and provides calibration services. The Laboratory consists of the following centers:

Absolute Physical Quantities[2] — Radiation Research — Chemical Physics — Analytical Chemistry — Materials Science

THE NATIONAL ENGINEERING LABORATORY provides technology and technical services to the public and private sectors to address national needs and to solve national problems; conducts research in engineering and applied science in support of these efforts; builds and maintains competence in the necessary disciplines required to carry out this research and technical service; develops engineering data and measurement capabilities; provides engineering measurement traceability services; develops test methods and proposes engineering standards and code changes; develops and proposes new engineering practices; and develops and improves mechanisms to transfer results of its research to the ultimate user. The Laboratory consists of the following centers:

Applied Mathematics — Electronics and Electrical Engineering[2] — Manufacturing Engineering — Building Technology — Fire Research — Chemical Engineering[2]

THE INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY conducts research and provides scientific and technical services to aid Federal agencies in the selection, acquisition, application, and use of computer technology to improve effectiveness and economy in Government operations in accordance with Public Law 89-306 (40 U.S.C. 759), relevant Executive Orders, and other directives; carries out this mission by managing the Federal Information Processing Standards Program, developing Federal ADP standards guidelines, and managing Federal participation in ADP voluntary standardization activities; provides scientific and technological advisory services and assistance to Federal agencies; and provides the technical foundation for computer-related policies of the Federal Government. The Institute consists of the following centers:

Programming Science and Technology — Computer Systems Engineering.

[1]Headquarters and Laboratories at Gaithersburg, MD, unless otherwise noted; mailing address Washington, DC 20234.
[2]Some divisions within the center are located at Boulder, CO 80303.

Standards Committee Activities of the National Bureau of Standards — 1983 Highlights

Karl G. Newell, Jr.

Office of Product Standards Policy
National Bureau of Standards
Washington, DC 20234

U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, Secretary
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director

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ABSTRACT

This report summarizes NBS standards committee activities and accomplishments during calendar year 1983. It profiles NBS staff participation on outside standards committees and highlights significant technical and individual contributions made by NBS staff. In 1983, 446 staff members (or 28% of NBS' professional, scientific, and technical staff) participated in 989 standards committees of 87 national and international standards organizations.

Key Words: Annual Report; committee participation; standards committees; voluntary standards.

CONTENTS

INTRODUCTION

This report summarizes NBS participation in and contributions to national and international standards organizations during calendar year 1983. The report contains two major sections: 1) a summary and statistical analysis of NBS staff activities, and 2) highlights of significant technical and individual contributions and accomplishments made by NBS staff.

The information contained in this report was obtained through data collected by the SAMI project, using responses given on the NBS Form 83 Record of Committee Assignment (See Appendix II). The form, which is completed for each committee activity by NBS staff members, enables NBS to maintain a complete record of staff participation on standards committees. SAMI maintains a computerized data base on these activities. SAMI staff also solicited the information included in the highlights section from each NBS organizational unit.

446 NBS staff participate annually in activities of domestic and international standards bodies. This report identifies those individuals and their accomplishments. It is directed to NBS managers and to outside standards bodies as a means of indicating the many individual contributions of NBS staff to our national voluntary standards system.

In addition to participation with outside standards bodies, the highlights section of the report covers activities dealing with other standardization activities, such as the development of Law Enforcement Standards and Federal Information Processing Standards.

Participation in standardization activities provides NBS with an important avenue for dissemination of research. In turn, involvement of NBS personnel in standardization activities provides vital information on the Nation's measurement needs in such areas as public health and safety, economic development, and environmental protection. Standardization activities provide not only an outreach program, but also afford NBS scientists and engineers with an effective mechanism for interacting with their counterparts in industry and academia.

SUMMARY OF PARTICIPATION

A. Introduction

In 1983, 446 (28%) of NBS' 1,614 professional, scientific, and technical staff participated on 989 standards committees of 87 standards organizations. NBS memberships on these committees total 1,404.

The number of NBS staff participants and the average number of memberships per participant remained essentially the same as in recent years. The number of standards organizations in which the staff participated dropped from 97 in 1982 to 87 in 1983. The number of committees on which memberships were held dropped from 1,046 in 1982 to 989 in 1983. The average number of memberships per committee has increased from 1.24 in 1981 to 1.42 in 1983.

Highlights of Participation

Listed below are the highlights of the data collected by the SAMI project. Although the data suggest that there is a general decline in standards participation, the percentage of participation has remained relatively constant over the past three years--29 percent in 1981 and 1982 and 28 percent in 1983.

NBS Perspective

- The number of participants has declined over the last three years by 5 percent, while the percentage of NBS staff participation has declined by 1 percent (see Figure 1).
- The total number of memberships held by NBS participants has declined over the last three years (from 1,481 to 1,404); however, the average number of memberships per participant has remained essentially the same (see Figure 2).
- The position of the participants on the committees and the level of those committee memberships has remained the same over the last three years (see Figure 3).
- The number of standards committees in which NBS staff participated has dropped by 17.5 percent from 1981 (see Figure 4).

- The average committee tenure for 1983 was 6.5 years. The longest committee assignment was 30 years (see Figure 5).

NBS Organizational Units

- The Center for Building Technology, with 51 participants, had the largest percentage of participation by center-level organizations with 46 percent participation (see Table 1).

- The Center for Materials Science with 34 percent participation, had the largest participation with 81 participants (see Table 1).

- The Center for Fire Research had the highest number of committee memberships per participant with 5.3 (see Table 1).

- The Center for Materials Science, with 3.1. memberships per participant, had the largest number of committee memberships with 252 (see Table 1).

Outside Standards Organizations

- Fifty-two percent of all NBS memberships were on committees of one standards organization -- ASTM (see Figure 6).

- Nine standards organizations accounted for eighty-three percent of NBS committee memberships (see Figure 6).

- The largest percentage of committee memberships were in the form of "member" (71 percent) of a "subcommittee" (43 percent) (see Figure 7).

Figure 1
Number and Percentage of NBS Participants

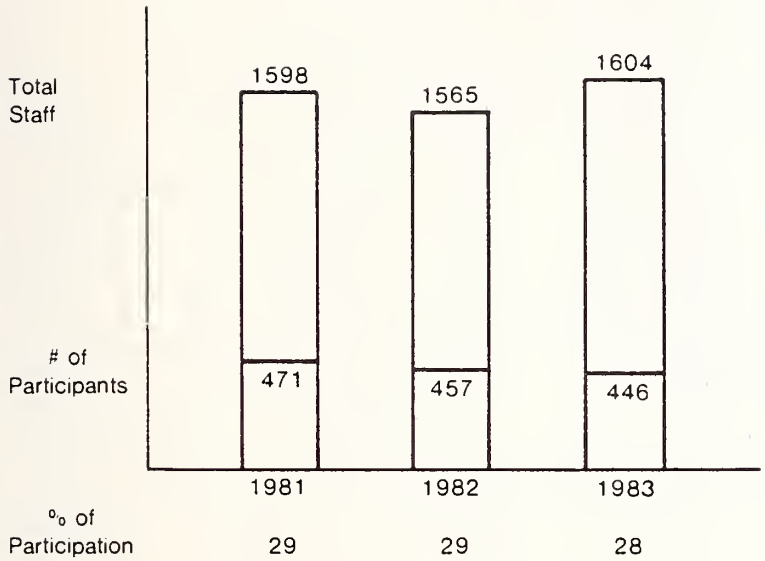


Figure 2
Number of Participants and Memberships

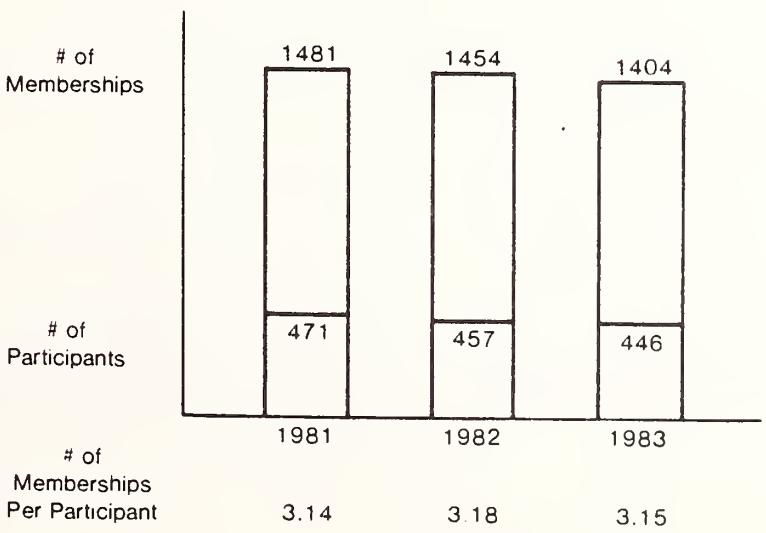


Figure 3
Number and Percentage of Memberships by Committee Levels

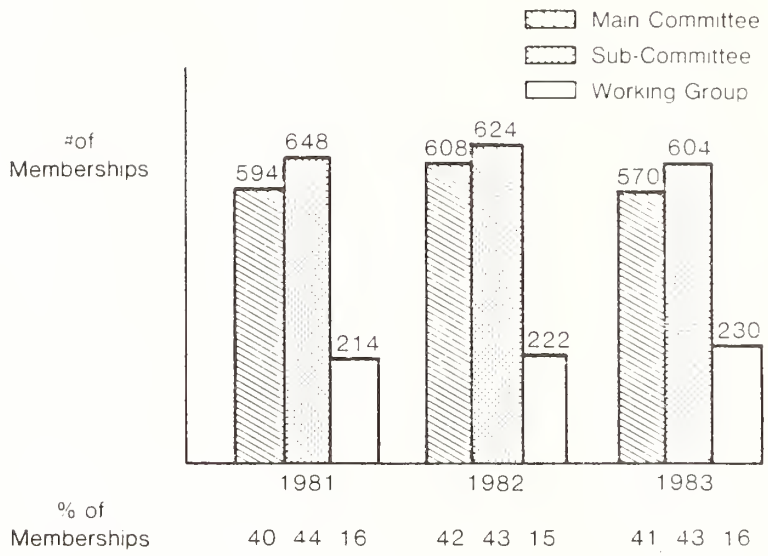


Figure 4
Number of Committees and Participants

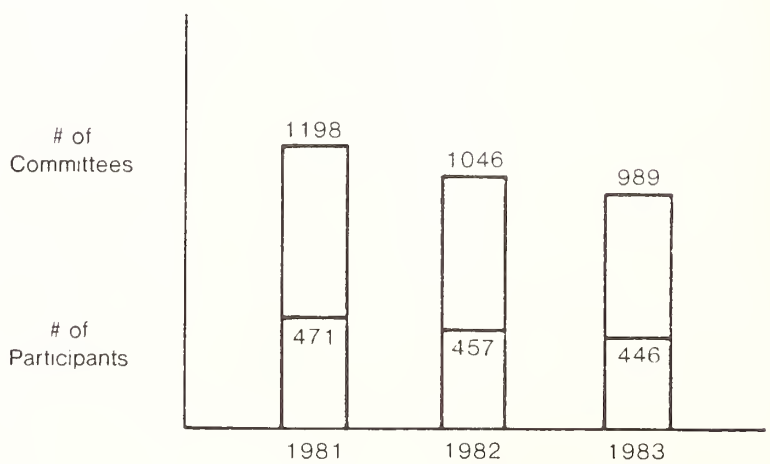


Table 1
Organizational Unit Participation Data

	No. of Staff*	No. of Participants	% Participation	No. of Memberships	No. of Memberships Per Participant
NML	710	207	29	682	3.3
CAPQ	120	19	16	62	3.3
CRR	153	31	20	99	3.2
CCP	67	19	28	45	2.4
CAC	94	35	37	137	3.9
CMS**	240	81	34	252	3.1
Other	36	22	61	87	3.9
ICST	96	38	40	111	2.9
CPST	39	15	38	31	2.1
CCSE	49	21	43	73	3.5
Other	8	2	25	7	3.5
NEL	695	173	25	528	3.1
CAM	85	10	12	18	1.8
CEEE	194	45	23	104	2.3
CME	122	24	20	58	2.4
CBT	112	51	46	182	3.6
CFR	66	22	33	116	5.3
CCE	98	15	15	41	2.7
Other	18	6	33	9	1.5
Other	113	28	25	83	3.0
Total NBS	1,614	446	28	1,404	3.15

Key to abbreviations

NEL - National Engineering Laboratory
- CAM - Center for Applied Mathematics
- CEEE - Center for Electronics and Electrical Engineering
- CME - Center for Manufacturing Engineering
- CBT - Center for Building Technology
- CFR - Center for Fire Research
- CCE - Center for Chemical Engineering

Other - Office of the NBS Director, Office of the Associate Director for Program, Budget, and Finance, Office of the Director NBS/Boulder Laboratories; and Office of Director of Administration

NML - National Measurement Laboratory
- CAPQ - Center for Absolute Physical Quantities
- CRR - Center for Radiation Research
- CCP - Center for Chemical Physics
- CAC - Center for Analytical Chemistry
- CMS - Center for Materials Science

ICST - Institute for Computer Sciences & Technology
- CPST - Center for Programming Science and Technology
- CCSE - Center for Computer Systems Engineering

* Professional, scientific, and technical staff.

** Effective November 8, the Center for Materials Science was transferred from the National Measurement Laboratory. Because the Center was a part of the laboratory for a major part of the report period, it is included with the laboratory.

Figure 5
Committee Tenure

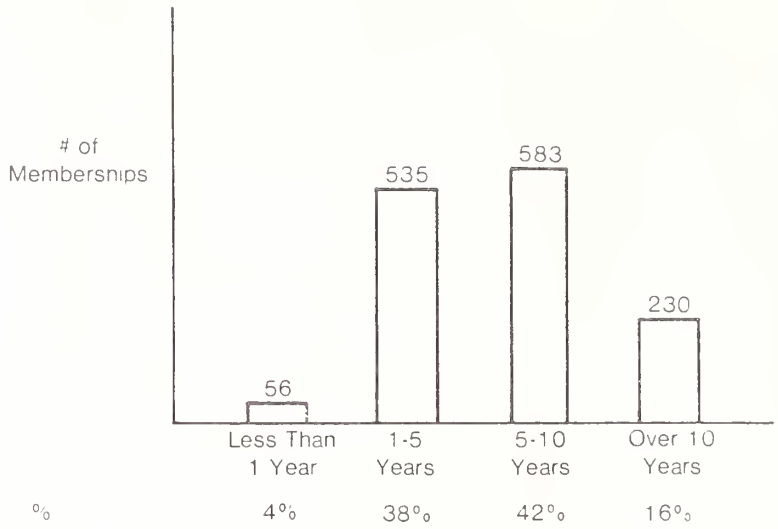


Figure 6
Number and Percentage of Memberships
by Outside Standards Organizations

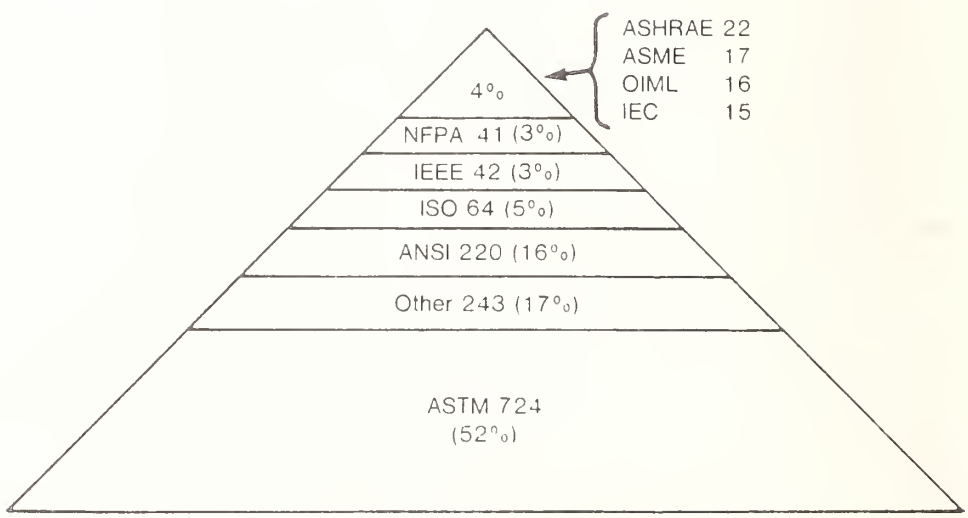
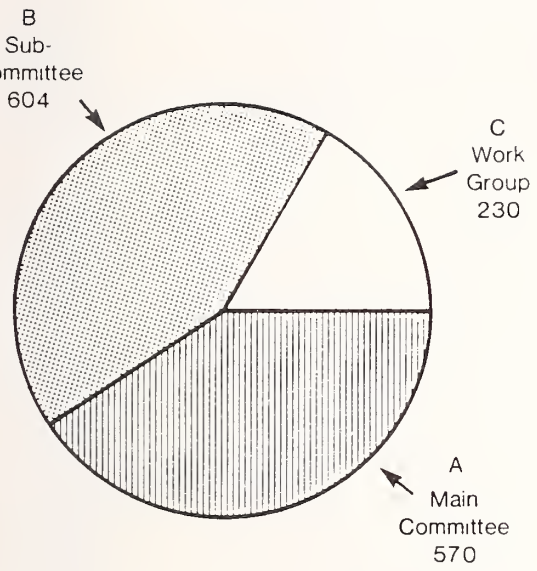
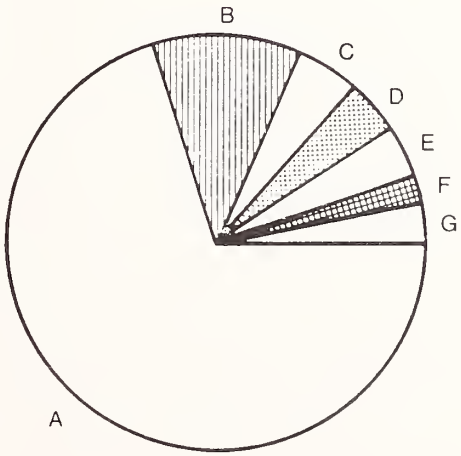


Figure 7
Level of Committee Memberships



A	Main Comm	41%
B	Sub-Comm	43%
C	Work Group	16%

1983



A	Member	992	71%
B	Chair	159	11%
C	Alternate Rep.	70	5%
D	Secretary	56	4%
E	Delegate	62	4%
F	Tech. Advisor	20	1%
G	Other	45	3%

ORGANIZATIONAL HIGHLIGHTS

In 1983, 446 NBS staff members participated in activities of 87 national and International standards-writing organizations. The following highlights technical and individual accomplishments for the year. The highlights have been selected by NBS center managers as representative of their various research areas and are limited to standards committee participation, but include highlights of significant contributions made by NBS staff to standards development in general.

OFFICE OF THE DIRECTOR

NBS Director Ernest Ambler served as Head of the U.S. Delegation to the 17th General Conference on Weights and Measures, held in Paris, October 17-21. The General Conference on Weights and Measures is the official quadrennial mechanism used by nations to reach agreement on definitions of quantities and the units by which they shall be measured. The principal technical item requiring action at this meeting was the adoption of a new definition of the meter, which now is defined as the distance light travels in a vacuum in the fraction 1/299,792,458 of a second. The conference also adopted a budget for the quadrennial period 1985-1988, and reelected half of the members of the International Committee of Weights and Measures, including Dr. Ambler.

Dr. Ambler serves as the U.S. member of the International Committee of Weights and Measures (CIPM), the 18-person committee that guides the technical work of the International Bureau of Weights and Measures and seven technical committees that report to the CIPM. Dr. Ambler serves as Chairman of one of these seven subcommittees -- the Consultative Committee on Standards for the Measurement of Ionizing Radiation (CCEMRI). The CCEMRI met in Paris to discuss its technical program in July, and the parent CIPM met in Paris on October 12 and 14, immediately prior to the 17th General Conference on Weights and Measures.

Office of Product Standards Policy (OPSP)

Dr. Stanley I. Warshaw was the U.S. representative at the 11th session of the United National Economic Commission for Europe (UNECE) Group of Experts on Standardization Policies.
Dr. Warshaw was also elected to the U.S. National Committee of the International Electrotechnical Commission (IEC), and was a delegate to the 58th General Meeting of the IEC. Dr. Warshaw also headed the U.S. delegation to the 7th International Laboratory Accreditation Conference. The primary purpose of the conference is to develop criteria and guidelines that allow for the mutual acceptance of test data between laboratories of

various accreditation systems. The United States effected a bilateral agreement for such reciprocity with the United Kingdom during this year, similar to those established with Australia and New Zealand last year.

John L. Donaldson served as the U.S. representative to DEVCO, the development committee of the International Organization for Standardization (ISO). He attended as part of the U.S. delegation, the annual meeting of CERTICO, the certification committee of ISO, and worked with the staff of ISO to analyze responses to an international survey of certification programs. Mr. Donaldson also participated in a study mission to Tokyo, Japan on the issue of authorization of U.S.-based agents for Japanese product approval systems. The study mission concluded that much remains to be done before U.S. producers have easy access to Japanese markets. Careful study of the information gained is necessary before an action plan can be drafted.

John Locke was the U.S. Delegate to meetings of Task Force C and the Editorial Committee of the International Laboratory Accreditation Conference (ILAC) held at ASTM Headquarters in Philadelphia, PA. He served as chair of working party 2 which developed a report entitled "Typical Laboratory Accreditation System Administrative Procedures and Forms." Mr. Locke participated in the work of Task Force D on "Guidelines for Development of a Quality Control Manual for Testing Laboratories." He participated in the U.S. delegation to the (ILAC) in Praque, Czechoslovakia. He also participated in a meeting of an ad hoc group of CERTICO, which was preparing the "Guide to the Establishment and Operation of Proficiency Testing Programs."

Donald Mackay received the Leo B. Moore Medal from the Standards Engineering Society (SES). The award, which is the highest presented by the SES, is for extraordinary contribution, professional achievement, and distinguished service in the field of standardization. This is the first time an NBS employee has received the award.

Sophie J. Chumas received the Standards Engineering Society's William J. Slattery Award for excellence in Standards Information. The award is bestowed on an individual whose outstanding contributions have advanced the profession of standards engineering. She was honored for maintaining the extensive collection of voluntary standards and for her 20 years of service.

OPSP staff participated in meetings of the Trade Policy Staff Committee's (TPSC) subcommittee on standards. This subcommittee is comprised of representatives of key Government agencies and is chaired by the Office of the U.S. Trade Representative (USTR). It prepares for bilateral standards-related trade

discussions with other countries, provides technical and policy input for multi-nation activities under the GATT Standards Code, and assists in the implementation of the Code in the United States.

The staff contributed a major section of a required 3-year report to Congress on the "Agreement on Technical Barriers to Trade - Standards Code." The report summarized responsibilities and accomplishments for standards-related activities covered by the U.S. Trade Agreements Act of 1979.

Walter G. Leight participated in meetings of the Industry Functional Advisory Committee (IFAC). He reported on the responsibilities assigned NBS concerning the GATT Inquiry Point, the National Center for Standards and Certification Information, and the GATT Technical Office. IFAC works with private sector representatives to assure effective technical support in bilateral and multilateral trade negotiations.

OPSP staff chairs the International Standards Task Group of the Interagency Committee on Standards Policy (ICSP). During 1983, the Group completed work on the development of "Guidelines for Agency and Employee Participation in International Standards Activities." These guidelines cover most of the activities involved in preparing for or participating in an international standards meeting and are intended to provide useful advice to the agency and employee in dealing with such activities. The guidelines have been approved by the ICSP and agencies are now taking steps to implement them.

The Standards Management Program of OPSP manages U.S. participation in the International Organization of Legal Metrology (OIML). During 1983, as in previous years, U.S. participation in OIML remains active. The following highlight U.S. initiatives taken within OIML during 1983:

- Cryogenic Meters - NBS worked with the Compressed Gas Association and the National Conference on Weights and Measures in the development of a draft OIML International Recommendation on cryogenic meters for use in measuring nitrogen, oxygen and argon. The draft includes provisions of the existing NBS Handbook 44 in use in the States, and provisions of the measurement standard used within the European Industrial Gases Committee. The first international meeting on the draft was held in December.

- Electronic Weighing Instruments - Work on the draft OIML Recommendation on electronic scales continued in 1983. NBS, in cooperation with the Scale Manufacturers Association and a U.S. working group of scale manufacturers, produced a 3rd draft Recommendation that was circulated to OIML member nations for review and was the subject of an international meeting in September. The work is important in that it will establish internationally uniform requirements for electronic scales used in trade.

- Weights - NBS developed a draft OIML Recommendation that consolidates five existing Recommendations covering various types and classes of mass standards used in trade and industry throughout the world. It will soon be circulated for comment.

- Pollution Monitoring Instrumentation - NBS, in cooperation with EPA and an established U.S. working group consisting of manufacturer and trade association representatives, organized two secretariats dealing with water pollution and with pesticides and toxic substances. Work has begun on draft OIML Recommendations covering various types of monitoring instrumentation. Drafts are expected to be issued by the end of 1983, and the first international working group meeting on the drafts has been scheduled for early 1984.

- Materials Testing Machines - NBS, in cooperation with a U.S. working group consisting of manufacturers of materials testing equipment, has completed work on two draft OIML Recommendations dealing with general performance requirements for testing machines and with requirements for tension and compression testing machines. These drafts are now out for balloting within OIML. The Recommendations are important in that they are the first international standards dealing exclusively with the testing machine itself. Work going on within ISO, for example, deals with materials tests and not with the machines themselves. A third Recommendation on verification devices for calibrating testing machines has been developed and is now undergoing review within OIML member nations. This work is expected to be completed within 1984.

- Prepackaged Products - NBS, in cooperation with a U.S. Working Group consisting of manufacturer and Government representatives, developed a draft OIML Recommendation covering the labeling of consumer type prepackaged products. The draft is intended to establish internationally uniform requirements for the labeling of prepackaged products and is important to international

trade. The draft Recommendation and other packaging topics were the subject of an OIML sponsored international symposium and technical level meeting held in Switzerland in June.

- Metrological Controls - NBS completed work on three draft OIML documents pertaining to methods by which legal metrology officials assure the correctness of instruments and measurements covered by regulation. The drafts establish general principles for conducting pattern evaluation tests and for carrying out tests to determine an instrument's correctness for use after installation and during its period of use in trade. The drafts are important in that they seek to introduce new means of control such as manufacturer self-certification or third party accreditation as alternatives to traditional and more rigid government-only testing programs. The drafts are undergoing review within a U.S. working group and will be the subject of an international meeting in April 1984.

- International Measurement Vocabulary - An international working group consisting of representatives of the OIML, ISO, IEC, and BIPM has completed work on the first edition of a joint international vocabulary of fundamental measurement terms. NBS participated in the work through OIML and IEC. The new vocabulary will soon be published by ISO and will be available for purchase through the four organizations at a cost of about 100FF.

- Achievement of Wider Publicity for OIML Proposals - In June the American National Standards Institute (ANSI) in cooperation with NBS began listing proposed OIML International Recommendations (IRs) in the ANSI biweekly Standards Action. This wider public exposure to OIML proposals gives exporters and others in the United States an opportunity to review and participate in the development of these proposals which can affect world trade of measuring instruments, related commodities and services.

NATIONAL MEASUREMENT LABORATORY

Headquarters

Dr. William H. Kirchhoff has served for the past three years as founding chair of ASTM Committee E-47, on Biological Effects and Environment Fate. During the past year, he initiated a new subcommittee activity in the area of genetic toxicology. In vitro test methods for mutagenesis are becoming increasingly important for the screening of chemicals for potential carcinogenicity. Four task groups dealing with the Ames assay, the dominant lethal assay, and the micronucleus and drosophial tests have been formed. The committee also has responsibility for development of test methods for those properties of chemicals related to their distribution in the environment and for aquatic toxicology. In August, Dr. Kirchhoff was invited to represent ASTM at a symposium on Awareness of Information Sources sponsored by the American Institute of Chemical Engineers. Dr. Kirchhoff spoke on Environmental Measurements, Standards, and Decisions.

Office of Nondestructive Evaluation (ONDE)

Dr. Leonard Mordfin was elected Chair of ISO/TC135/SC3 on Acoustic Methods of Nondestructive Testing, at the September 15, meeting in Ottawa, Canada. Recognizing the importance of nondestructive testing standards to the growth of international trade in high-quality products, the meeting attracted delegates from nine countries. In an effort to revitalize the subcommittee, Mordfin proposed a new program of work, dealing with both ultrasonic and acoustic emission test methods. The proposal was adopted and Dr. Donald G. Eitzen of the Center for Manufacturing Engineering, the U.S. delegate to the subcommittee meeting, successfully secured commitments from several of the other attendees for assistance in drafting new documents.

Center for Absolute Physical Quantities (CAPQ)

George W. Burns received the ASTM Award of Merit at ceremonies hosted by the ASTM Committee E-20 on Temperature. The award is granted to individuals for distinguished service to the cause of voluntary standardization. Mr. Burns was also named as a Fellow of the ASTM.

Center for Radiation Research (CRR)

The American Association of Physicists in Medicine (AAPM) has published in the November/December issue of the journal Medical Physics a "Protocol for the determination of absorbed dose from high-energy photon and electron beams." The Protocol was written by Task Group Group 21 of the Radiation Therapy Committee of the AAPM, of which R. Loevinger is a member. The

Protocol is based on an analysis due to Loevinger, and published by him in the same journal (January 1981) under the title, "A formalism for calculation of absorbed dose to a medium from photon and electron beams." The Protocol will be used throughout the United States to calculate the dose to patients receiving radiation therapy for cancer using photon and electron beams with energies above a few MeV.

CRR staff developed the experimental data base for the production and standardization of a 6.5-MeV appropriately monoenergetic photon beam produced by $^{19}F(p,\alpha\gamma)^{16}O$ reaction in the Center's positive-ion accelerator. The beam is to be used in the calibration of radiation-protection instruments. The data were employed by Margarete Ehrlich for determining instrument response as a function of photon energy in the range 3 to 10 MeV, and in the preparation of an addendum to the current draft standard of ISO/TC85/SC2/WG2, X- and gamma-ray reference radiations for calibrating dosimeters and dose-rate meters. The addendum is concerned with the dosimetry of the high-energy photon beams specified in the draft standard.

Daniel Polansky received the ASTM Award of Merit and designation as fellow of the society at the annual meeting of ASTM in Kansas City, MO. He was cited for his years of outstanding service to ASTM in the development of Committee E-7 on Nondestructive Testing and the standards it produced. The award recognizes his leadership and initiative in the area of voluntary standardization and his many contributions and papers in the field of nondestructive evaluation.

CRR hosted the annual meeting of ISO/TC85/SC2/WG2, on Reference Radiations, in June. Radiation experts in attendance at the meeting from England, France, Germany, and Italy discussed standards in the areas of high energy photon radiation, surface contamination, neutrons, and X-rays.

A principal accomplishment of the meeting was the completion of a new draft standard entitled "Neutron Reference Radiations for Calibrating Neutron Measuring Devices Used for Radiation Protection Purposes and for Determining Their Responses as a Function of Neutron energy." Approximately one-quarter of the "Reference Radiations" cited in this standard were developed at NBS. These include the D_2O Moderated Californium Source and the Reactor Filtered Beams.

Center for Chemical Physics (CCP)

Dr. C. J. Powell was elected Chair of ASTM Committee E-42 on Surface Analysis for 1984-86.

Dr. J. Fine has been appointed Chair of the Subcommittee on Standard Reference Materials of ASTM Committee E-42 on Surface Analysis for 1984-85.

Round robin testing of a synthetically prepared refuse-derived fuel (RDF) was carried out through ASTM Committee E-38 on Resource Recovery, and its Subcommittee E-38.01 on Energy in January and February. Jennifer C. Colbert prepared the synthetic RDF samples and arranged for their distribution and testing among 12 participating laboratories, including NBS. The results of the round robin testing showed that determinations for residual moisture, ash content, and calorific value were as precise as similar determinations made on a standard coal sample, SRM-1632a.

The data base obtained from the round robin testing helped justify the establishment of a synthetic RDF as a standard reference material. A large quantity of the synthetic RDF has been prepared and tests are underway to demonstrate its overall homogeneity. After the homogeneity of the synthetic RDF is assured, determinations will be carried out for residual moisture, ash content, and calorific value by Jennifer Colbert. These determinations will constitute the certification of the synthetic RDF.

Center for Analytical Chemistry (CAC)

Dr. John K. Taylor has been elected for a 2-year term as Chair of ASTM Committee D22 on Sampling and Analysis of Atmospheres. Previous to this, he has served as chair of its subcommittee D22.01 on Quality Assurance.

Dr. John K. Taylor served as co-chairman of an ASTM symposium on "Quality Assurance for Environmental Measurements" held at the University of Colorado at Boulder, August 8-12. He also presented the key-note address, "What is Quality Assurance?" The symposium, co-sponsored by ASTM, EPA, and NBS had an attendance of 125 persons. The papers presented will be published as an ASTM Special Technical Publication, of which Dr. Taylor is co-editor.

Work was completed in May on a round robin evaluation of the ASTM Method "Total Carbon by Combustion - Instrumental Measurement Method." NBS served as a cooperating laboratory for ASTM Subcommittee E03.01 on Ferrous Metals; CAC staff provided a number of the samples used in this study. The expertise required for the accurate measurements has been obtained through a recently re-established program for the characterization of metals for C, S, N_2, O_2, and H_2.

An evaluated compilation, "Isotopic Abundances and Atomic Weights of the Elements," has been accepted for publication, and two separate papers, "Atomic Weights of the Elements, 1981," Pure and Applied Chemistry, 55 (7), 1101-1118, 1983, and "Isotopic Compositions of the Elements," Pure and Applied Chemistry, 55 (7), 1119-1136, 1983, were published under the

auspices of the International Union of Pure and Applied Chemistry, Commission on Atomic Weights. I. L. Barnes and Thomas Murphy serve as titular members of the Commission, and Stephen Peiser of NBS serves as an associate member. All have contributed substantially to the documents. Isotope abundance and atomic weight measurements and evaluations provide fundamental information for chemical composition measurements and provide an accuracy base for many of the standards and reference materials produced by NBS.

On May 18-20, CAC and the National Committee for Clinical Laboratory Standards (NCCLS) cosponsored a workshop entitled "Direct Potentiometric Measurements in Blood" at NBS. Its purpose was to provide a forum for research scientists, manufacturers, and users of clinical instrumentation to discuss the current status and the needs of direct potentiometric measurement in blood with particular emphasis on the measurement of sodium. The workshop was hosted by CAC and chaired by William Koch. The proceedings of the workshop will be published by the NCCLS. As a result of this workshop, an effort will be made by the NCCLS subcommittee on electro-analytical methods to use materials currently available from NBS to standardize these potentiometric measurements.

Center for Materials Science (CMS)*

For U.S. flag ships, whether built in foreign countries or domestically with foreign materials, the U.S. Coast Guard is required to certify that materials produced under foreign specifications for specific components meet U.S. codes and standards. To help ensure compliance, the Coast Guard called upon NBS to analyze material specifications and develop a methodology for comparison. Dr. James G. Early carried out a detailed metallurgical evaluation of the most widely used material specifications for ships components taken from ASTM, DIN, and JIS standards. Based on these comparisons, Dr. Early developed new guidelines for comparing domestic and foreign material specifications. These guidelines will ensure that the Coast Guard, product suppliers, ship builders, and owners will have the same criteria when evaluating materials. The results of this study have been published in NBSIR 82-2481, "Analysis of Foreign and Domestic Material Specifications for Ships Components," and NBSIR 83-2692, "Evaluation Criteria for Comparing Domestic and Foreign Materials Specifications."

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* Effective November 8, 1983, the Center for Materials Science was transferred from the National Measurement Laboratory. Because the Center was a part of the Laboratory for a major part of the reporting period, it is included with the Laboratory.

Dr. James G. Early, received the Award of Merit from ASTM Committee E38 on Resource Recovery at the Committee's October meeting in Madison, WI. The award recognizes outstanding contributions to the development of standards for recovered resources. Dr. Early had previously been elected a Member-at-Large of ASTM Committee E38 and recently was named Chair of ASTM Subcommittee E38.02, on Ferrous Materials.

CMS staff reviewed the document "Recommended Reference Materials for Realization of Physicochemical Properties - Section on Optical Refraction (Refractive Index)" published by the Chemistry Division, Commission on Physicochemical Measurements and Standards, International Union of Pure and Applied Chemistry (IUPAC). A revised document was prepared by Albert Feldman of CMS, and Irving Malitson, a consultant to CMS. The revision was based on a survey of standards laboratories in Poland, the United Kingdom, France, the Federal Republic of Germany, Hungary, and the USSR, to ascertain whether any of the laboratories provided certified reference materials. Although some of the laboratories do provide a refractive index measurement service, no laboratory indicated that it supplied refractive index standards. Only NBS and the American Petroleum Institute (API) supply certified standard reference materials. The work was performed at the request of the Office of Standard Reference Materials during the first half of 1983.

A Thin Film Oxygen Uptake Test (TFOUT) has been developed by C. S. Ku and S. M. Hsu to evaluate the oxidation tendencies of automotive engine lubricants. The test procedure is currently under round robin testing in ASTM Committee D-2 on Petroleum Products and Lubricants. A procedure was developed using a catalyst package to simulate high temperature oxidation products from an automotive engine. A good correlation was found between test results and actual oxidative performance experienced in field studies. The catalyst package that was developed for the TFOUT test has been produced as a standard reference material (SRM 1817). Use of the catalyst package helps industries to avoid costly unnecessary engine tests.

Staff of CMS participated in ASTM Committee D-2 on Petroleum Products and Lubricants, LIX-8 round robin. This is part of a program to develop a standard bench test method for evaluation of the "Coefficient of Friction of Fluids." Tests were conducted on a set of 13 lubricants from the five car ASTM fuel economy test program.

A novel test method to measure frictional properties of materials has been developed by R. G. Gates and S. M. Hsu. The test procedure has been submitted to ASTM Committee D-2, Technical Division L, Joint ASTM-ASLE Committee on Industrial Lubricants,

Section XI-8, for round robin evaluation. The test procedure uses a wear-in phase with a model compound to produce constant surface roughness and contact area. The sample is then introduced and tested under constant film thickness. Results of this test have been shown to correlate with the five car ASTM fuel economy test.

NBS Special Publication 661, "Lubricating Oil Basestock Data Analysis" by S. M. Hsu, D. A. Becker, S. J. Weeks, and D. W. Brinkman was distributed within ASTM Committee D-2, Technical Division P, on Recycled Petroleum Products. This data includes 191 data tables, 240 distributional and run sequence plots, plus a complete listing of test methods. This invaluable data base will provide an universal standard for lubricating base oil production quality control world-wide for decades to come. In addition, this data base fills a vacuum in addressing the batch-to-batch quality control for re-refined base oils, a key issue in oil recycling.

A symposium on Quality Assurance of Polymeric Materials and products was sponsored by ASTM Committees D-20 on plastics and E-11 on statistical methods. Committee D-20 was chaired this year by Dr. Ronald K. Eby of the Polymer Science and Standards Division. Dr. John Barnes presented a talk, "The Role of Interlaboratory Test Programs in Quality Assurance," as part of the one-day symposium. Other speakers from the United States and abroad represented industrial, government, and university organizations and covered a wide spectrum of subjects from broad concepts to the latest in individual analysis.

Dr. R. K. Eby completed two years as Chair of ASTM Committee D-20 on Plastics at D-20's fall meeting in St. Louis, MO. D-20 is the third largest ASTM committee with most of its 700 members representing the large and rapidly growing polymer materials and products industry. In the past two years, Dr. Eby guided the standards writing activity of D-20 in response to industrial needs arising from three major sources: (1) new materials, such as anisotropic composites where previous test methods are inappropriate, (2) new structural applications in automobile components and similar aircraft components with new critical performance requirements, and (3) materials substitution, such as large shipping containers where failure modes unique to polymers must be taken into account.

A manuscript, "A New Test Method for Determining Environmental Stress-Crack Resistance of Ethylene Based Plastics" was published in the July ASTM Journal of Testing and Evaluation, by Dr. John Crissman. A new test method is proposed for the determination of the environmental stress-crack resistance of ethylene based plastics. The method incorporates features of

both ASTM Test for Environmental Stress-Cracking of Ethylene Plastics (D-1693) and Test for Environmental Stress Rupture of Type III Polyethylenes Under Constant Tensile Load (D-2552). The statistical data presented indicate that the coefficients of variation that can be expected from the new test are at least comparable to those reported earlier in round robin tests carried out using ASTM D-2552. The principle advantage of the proposed new test over both ASTM D-1693 and D-2552 is a substantial savings in the time required to collect the data.

Dr. John D. Barnes and Keith Kirby of the Office of Standard Reference Materials conducted a workshop on water vapor transmission standards with representatives of three ASTM committees in Washington, DC on January 18. The workshop addressed the needs for new Standard Reference Materials and improved test methodology. Measurements of the rate at which water vapor permeates through materials are important in characterizing packaging films, paints, and vapor retardant layers used in building insulation. The meeting participants agreed to collaborate on research in three areas: (1) assessing, by means of an interlaboratory evaluation program, the present state of the measurement system for WVTR; (2) screening candidate materials for suitability as new Standard Reference Materials; and (3) development of referee measurement methods.

Gerhard M. Brauer was elected member-at-large of the Executive Committee of ASTM Committee F-4, on Medical and Surgical Materials and Devices. Dr. Brauer is also Chair of the Subcommittee F4.02.1 on Polymeric Materials. In the past year, this Subcommittee initial task approval of standards on Degradation in Polymeric Materials and on Polytetrafluoroethylene, and established two new task forces on Polyethylene and Polyurethane.

Dr. Bruno M. Fanconi published the paper "Fourier Transform Infrared Spectroscopy of Polymers-Theory and Application" in the Journal of Testing and Evaluation. The Fourier Transform Infrared (FT-IR) technique is replacing conventional dispersive instruments in acquisition of infrared spectroscopic data, and existing standard test methods for IR spectral analysis will need to be modified. FT-IR has the advantages of greater signal-to-noise ratio and digitized data that both open up new areas of application and also provide greater sensitivity in traditional areas.

Representatives from CMS recently participated in a workshop concerned with the need for reference polyethylene for research intended to benefit technologies related to plastic pipes and fittings used in gas distribution systems. The workshop was sponsored by the Gas Research Institute with participation from

gas utilities, resin producers, pipe and fittings manufacturers, universities, independent laboratories, and NBS. The major conclusion of the workshop was that a reference polyethylene, well-characterized and readily available to all researchers, would greatly benefit intercomparisons of results of basic and applied research. It was concluded that the reference polyethylene should be one in current use in gas distribution and should be available in resin form as well as in molded pieces of the kind used by public utilities. The Standard Reference Materials program at the NBS was chosen as the mechanism by which the reference material would be procured, characterized for certain properties, warehoused and distributed. The report of the workshop will serve as the basis for implementation of a reference polyethylene material for research related to plastic pipe and fittings used in gas distribution systems.

INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

The Institute for Computer Sciences and Technology continued to work with Federal, State, and local governments, private sector organizations, and voluntary standards groups to develop standards and guidelines for computer and information processing. In 1983 the following documents were approved as Federal Information Processing Standards Publications (FIPS PUBS):

FIPS PUB 11-1	"Guideline: American National Dictionary for Information Processing;" adopts ANSI X3/TR-1-82
FIPS PUB 60-2	"I/O Channel Interface;" revision to FIPS PUB 60-1
FIPS PUB 61-1	"Channel Level Power Control Interface;" revision to FIPS 61
FIPS PUB 63-1	"Operational Specifications for Variable Block Rotating Mass Storage Subsystems;" revision to FIPS PUB 63
FIPS PUB 90	"Guideline for Optical Character Recognition (OCR) Print Quality;" adopts X3.99-1983
FIPS PUB 94	"Guideline on Electrical Power for ADP Installations"
FIPS PUB 97	"Operational Specifications for Fixed Block Rotating Mass Storage Subsystems"
FIPS PUB 98	"Message Format for Computer Based Message Systems"
FIPS PUB 99	"A Framework for the Evaluation and Comparison of Software Development Tools"
FIPS PUB 100	"Interface Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Operation with Packet-Switched Data;" based on CCITT X.25 specifications
FIPS PUB 101	"Guideline for Lifecycle Validation, Verification, and Testing of Computer Software"
FIPS PUB 102	"Guidelines for Computer Security Certification and Accreditation"

FIPS PUB 104	"Guideline for Implementation of ANSI Codes for the Representation of Names of Countries, Dependencies, and Areas of Special Sovereignty;" implements ANSI Z39.27 which adopts ISO 3166

The following standards-related publications were issued in 1983:

NBS Spec. Pub. 500-99	"Structured Testing: A Software Testing Methodology Using the Cyclomatic Complexity Metric"
NBS Spec. Pub. 500-100	"Toward an Improved FIPS Cost-Benefit Methodology, Phase I: Descriptive Models -- Data Processing Operations"
NBS Spec. Pub. 500-101	"Care and Handling of Computer Magnetic Storage Media"
NBSIR 82-2619	"Functional Specifications for a Federal Information Processing System Data Dictionary System"
NBSIR 82-2625	"A Taxonomy of Tool Features for the Ada Programming Support Environment"
NBSIR 83-2639	"Cost-Benefit Impact Study on the Adoption of the Draft Proposed Revised X3.23 American National Standard Programming Language COBOL"
NBSIR 83-2763	"Artificial Traffic Generation of ISO Transport Class IV Protocol Data Units on an IEEE 802.3 10 Megabit CSMA/CD Local Area Network"
NBSGCR 82-415	"CODASYL Query Language Flat (CQLF) Specifications"
NBSGCR 82-418	"Compiler Features: A Survey"
NBSGCR 82-419	"A Family of Data Model Specifications for DBMS Standards"
NBSGCR 83-444	"Proceedings - Workshop on Standardization for Speech I/O Technology"

Center for Programming Science and Technology (CPST)

Helen M. Wood has been appointed Vice-Chair of the International Advisory Committee Programming Language Subcommittee of American National Standards Committee X3 on Computers and Information Processing. The Programming Language Subcommittee is the U.S. Technical Advisory Group for the ISO TC97/SC5, whose scope of work includes programming languages, database languages, and computer graphics software.

In May, Martha Branstad was appointed to the executive board of the IEEE Software Engineering Standards Subcommittee. She was also appointed technical program chair of the 1984 IEEE Software Engineering Standards Application Workshop.

Josephine Walkowicz has been appointed Chair of ANSI Technical Committee X3K5 on Vocabulary for Information Processing Systems. The appointment is for a three-year term.

Functional specifications for data dictionary systems (DDS) developed by ICST with contractor assistance were adopted by ANSI Committee X3H4 on Information Resource Dictionary Systems as their base document for a voluntary industry standard. The specifications were developed to assist users in writing specifications for data dictionary systems, the software that provides for recording, storing, and processing information about data and its use. In January and May, workshops were held for users and vendors of data dictionary software to discuss and refine the specifications.

In May and September, NBS hosted meetings of the ANSI X3H4 Committee. Briefings on the specifications were held for the Ada Joint Program Office in the Department of Defense, the Department of Interior, NASA, and the Census Bureau.

NBSIR 83-2639, "Cost-Benefit Impact Study on the Adoption of the Draft Proposed Revised X3.23 American National Standard Programming Langugage COBOL," completed by ICST in April, analyzed the impact of the new standard and concluded that potential benefits will outweigh estimated costs. The study was provided to the ANSI X3 Committee on, Information Processing Systems, for its use in preparing the proposed standard.

In September ANSI/IEEE770X3.97-1983, "Programming Language Pascal," was proposed as a Federal Information Processing Standard (FIPS).

FIPS FORTRAN Interpretation 1 pertaining to nested parentheses in an expression was approved in October as an additional specification to FIPS FORTRAN. The latter standard adopts ANSI X3.9-1978.

In August, the American National Standards Institute approved IEEE Standards 729-1983, "Standard Glossary of Software Engineering Terminology," and 829-1983, "Standard for Software Test Documentatioan." CPST staff contributed to the development of both standards.

In June, the IEEE Standards Board approved IEEE Standard 828-1983, "Standard for Software Configuration Management," CPST staff contributed to the development of this standard also.

CPST staff has been participating in the development of the Graphical Kernel System (GKS) in the ANSI X3H3, Technical Committee on Computer Graphics. The GKS, forwarded to X3 for public review, included a programming language interface description for FORTRAN. Mark Skall is Chair of X3H3.4, the Task Group within X3H3 that is responsible for developing these interface descriptions (language bindings) for the standard.

Center for Computer Systems Engineering (CCSE)

Robert Rosenthal was appointed chair of the Technical Committee on Computer Communications of the IEEE Computer Society.

Miles Smid was invited to present a tutorial on the draft American National Standard for Financial Institution Key Management at a special meeting of ISO TC68/SC2/WG2 (International Organization Security Working Group) in Frankfurt, Germany in October.

Computer network standards to which ICST has made significant technical contributions advanced in international standards development organizations. Draft International Standards (DIS) 8072, "Information Processing Systems -- Open Systems Interconnection -- Transport Service Specifications," and 8073, "Information Processing Systems --Open Systems Interconnection -- Connection Oriented Transport Protocol Specification," were published in November by the International Organization for Standardization. ICST staff developed Class 2 and Class 4 specifications of the transport protocol. DIS 8072 and 8073 were adopted by CCITT as recomendations X.214 and X.224.

Workshops were held in January, May and October with representatives of network developers to plan for implementing the Class 4 transport protocol in local area networks. As a result of these discussions, the manufacturers agreed to implement a common set of options and to prepare for a multi-vendor local network demonstration in 1984. Two test sites were selected: one site will be a General Motors test bed to support the IEEE 802.4 (token bus) local area network standard; the second site will be the ICST laboratory for the IEEE 802.3 (CSMA/CD) local area network standard.

The Class 2 and Class 4 protocols were proposed as FIPS to provide for reliable transfer of data between two hetrogeneous or homogeneous computer systems.

CCSE staff contributed to the development of service and protocol specifications for the session protocol that have been published by ISO as DIS 8326 and DIS 8327 and by CCITT as recommendations X.215 and X.225. Both the transport and session standards are the work of Committee ISO/TC97/SC16, Open Systems Interconnection, which is developing a family of standards for electronic exchange of date between computer systems.

IEEE draft standards 802.2 and 802.3 for interconnecting computer equipment to local area computer networks were proposed as FIPS. CCSE staff contributed to the development of the standards.

Working with vendors of word processing equipment, CCSE staff developed a core set of formatting functions to enable documents to be moved from one word processor to another for editing without rekeying. The technique, which was developed for the Department of Navy and agreed to by the vendors, uses an intermediate character which can be assigned within the existing voluntary industry standard for information interchange. The manufacturers agreed to develop their own translation programs to handle the common codes in their particular systems. Because this development has potential application beyond the Navy, it was submitted to ANSI Committee X3L2 for consideration as a national standard.

The NBS X.25 Verification Program Description was incorporated into a document on X.25 conformance testing which was submitted to ISO/TC97/SC6 as a new work item by ANSI X3S3.7. The work item will develop procedures to determine whether equipment and services conform to CCITT recommendation X.25. The NBS Program Description provides sequences to test terminals and packet-switched networks for conformance to the joint FIPS/Federal standard that adopts a subset of the CCITT X.25 network specifications (FIPS PUB 100).

Two computer security standards to which Dennis Branstad and Miles Smid made major contributions were adopted by ANSI. ANSI X3.105-1983, "Link Encryption Standard," is based on propsed Federal Standard 1026, developed by the National Communication System, the National Security Agency and NBS. ANSI X3.106-2983, "Modes of Operation of the Data Encryption Algorithm" is based on FIPS 81. Dennis Branstad chaired X3T1, Technical Committee on Data Encryption, during the devleopment of X3.105 and was technical editor for X3.106. The standards will provide for cryptographic protection of data transmitted between terminals

and computer systems. A draft standard based on FIPS 46, "Data Encryption Standard," and cryptographic techniques developed by ICST was issued by ANSI committee X9E9. The standard specifies cryptographic methods for financial institutions to manage data encryption keys.

The Small Computer System Interface (SCSI) draft standard developed by ANSI Committee X3T9.2 is being implemented by manufacaturers of small disk drives and controllers in the U.S., Europe, and Japan. The European Computer Manufacturers Associations (ECMA) is considering a standard based on the SCSI draft that provides a common interface for connecting high performance peripherals to small computers. William E. Burr is chair of X3T9.2.

"Guidelines for Performance Assessment of Speech Recognizers," developed by David Pallett, is being considered for publication by the IEEE Speech I/O Technology Performance Evaluation Working Group of the IEEE Acoustics, Speech and Signal Processing Society's Technical Committee on Speech Processing. The Working Group was organized as a result of discussions held at the ICST sponsored Workshop on Standardization for Speech I/O Technology in 1982.

CCSE staff members have been working with the Canadian Department of Communications to develop test frames to be used by videotex/teletext vendors to assure conformance to text presentation, picture drawing, texture, color, and animation effects requirements for joint ANSI X3.110/Canadian Standard CSA T500. Published as "Videotex/Teletex Presentation Level Protocol Syntax (North American PLPS)," the standard was developed by ANSI Committee X3L2, Character Sets and Coding, in cooperation with the EIA Teletex Committee and the Canadian technical committee. CCSE staff members participated in X3L2 and, in the past, have served as vice chair, task group chairs, international representatives, and secretary.

A Workshop on Standardization Issues for Optical Digital Data Disk (OD^3) Technology was jointly sponsored by CCSE and the National Security Agency in June. The workshop focused on physical, dimensional, optoelectrical, quality and data transfer characteristics of optical disk technology.

NATIONAL ENGINEERING LABORATORY

Law Enforcement Standards Laboratory (LESL)

In 1983, the Law Enforcement Standards Laboratory completed the development of the following performance standards that will be issued by the National Institute of Justice (NIJ) as voluntary national standards as part of its Technology Assessment Program:

- NIJ Standard-0223.00, "Vehicle Tracking Devices"
- NIJ Standard-0606.00, "Portable Organic Vapor Detectors"
- NIJ Standard-0110.00, "Hand-Held Aerosol Tear Gas Weapons"
- NIJ Standard-0111.00, "Barrier Penetrating Tear Gas Munitions"

In addition, LESL completed the revisions of three previously-issued NIJ standards, to reflect changes in the state-of-the-art of commercial products:

- NIJ Standard-0104.02, "Riot Helmets and Face Shields"
- NIJ Standard-0105.01, "Crash Helmets"
- NIJ Standard-0209.01, "Personal FM Transceivers"

The National Institute of Justice published three voluntary national standards that were developed by LESL:

- NIJ Standard-0109.00, "38/357 Caliber Revolvers"
- NIJ Standard-0215.00, "Mobile Digital Equipment"
- NIJ Standard-0220.00, "Continuous-Recording Voice-Logging Tape Recorders"

LESL also continued to provide support to the National Highway Traffic Safety Administration in the implementation of standards for breath alcohol test equipment and the model specification for speed measuring radar devices.

Center for Applied Math (CAM)

Three CAM staff members, Dr. Harold Marshall, Rosalie Ruegg, and Stephen Petersen, were instrumental in the development of a "Recommended Practice for Measuring Benefits/Cost and Savings-to-Investment Ratios for Buildings and Building Systems." The recommended practice was approved by ASTM's Committee E.6, on Building Performance and Construction, and received final ASTM approval in October.

Dr. H. H. Ku and Dr. Keith R. Eberhardt have made major contributions to the use of statistical methods in the certification and use of reference materials. Dr. Ku published an article on Certified Values--What Do They Mean and How Should They Be Used?" in the September ASTM Journal of Testing and Education, Dr. Ku also spoke on "A Statistician's Role in the Preparation and Use of Reference Materials" at an ASTM seminar on "The Preparation and Use of Reference Materials for Optical Emission and X-Ray Spectrosocpy," ASTM Committee E-2, (Emission Spectroscopy), October 19, Bal Harbour, Florida.

Dr. Eberhardt is coauthor of ISO draft guide 35, "Certification of Reference Materirals - General and Statistical Principles," which has been prepared by the ISO/REMCO (Committee on Reference Materials), for publication in 1984. Dr. Eberhardt participated in the discussion of the draft at the ISO/REMCO meeting and a joint meeting of ISO/REMCO with ISO/TC69/SC6 on Statistics, September 8-14, in Geneva.

J. T. Fong of the Mathematical Analysis Division was awarded the ASTM Award of Merit, with title of Fellow "for his inspirational and enthusiastic leadership and dedicated service in promulgating fatigue research and creation of forms for technical debate through ASTM Committee E-9, on fatigue." This is the highest award given by the Society.

In addition to chairing ASTM Subcommittee E9.01 on Fatigue Research, J. T. Fong has served on Committee E-11, on Statistical Methods. He chaired the Symposium on Fatigue mechanisms sponsored by ASTM, NSF, and NBS in May and served as editor of the proceedings.

In June, during a special award ceremony at an Honors Luncheon of the 4th U.S. National Congress on Pressure Vessels and Piping Technology in Portland, Oregon, Dr. J. T. Fong was given a certificate of appreciation for service to the American Society of Mechanical Engineers (ASME) as Chair of the Materials and Fabrication Committee.

ASTM Standard Practice E917-83, "Measuring Life-Cycle Costs of Buildings and Building Systems," was published in October by ASTM. The E06.81 Subcommittee, on Building Economics, a part of the E06 Committee, on Building Performance and Construction, developed the Standard from NBSIR 80-2040, "Recommended Practice for Measuring Life-Cycle Costs of Buildings and Building Systems." The three NBS authors of NBSIR 80-2040 are Rosalie T. Ruegg, Stephen R. Petersen, and Harold Marshall.

Stephen R. Petersen developed and documented a computer program for calculating the economic worth of investments in buildings and building components. The program implements economic methods developed by NBS and ASTM Subcommittee E06.81, on Building Economics. The program is on a TRS-80 disk for use by microcomputers and is being distributed by ASTM as an adjunct to Standard Practice E917-83, on Life-Cycle Costing.

A "Recommended Practice for Measuring Benefit/Cost and Savings-to-Investment Ratios for Buildings and Building Systems" was approved in October by ASTM for publication as a Standard Practice. This Standard, developed by ASTM Subcommittee E06.81 on Building Economics, is based on NBSIR 81-2397 written by Harold E. Marshall and Rosalie T. Ruegg.

A "Recommended Practice for Measuring Net Benefits and Internal Rates of Return for Investments in Buildings and Building Systems," by Harold E. Marshall, was published as NBSIR 83-2657 in October. The ASTM Building Economics Subcommittee is using it as the basis for their next Standard Practice.

Center for Electronic and Electrical Engineering (CEEE)

J. Franklin Mayo-Wells was appointed to serve a second two-year term as a member of the American Society for Testing and Materials society-level Committee on Terminology.

Under the chairmanship of Dr. Raymond S. Turgel, three new standards developed by the American National Standards Committee C-12 on Electricity Metering were published earlier this year. These standards cover meter sockets, pulse recorders, and test fixtures. A standard for electronic (demand) registers is now in preparation. Preliminary work for bar-code identification and high voltage instrument transformers has been initiated.

Acting as Secretary of the International Electrotechnical Commission (IEC) Working Group 6 on Measurement of Power Frequency Electric Fields established by IEC TC42 on High Voltage Testing Techniques, in June 1982, Dr. M. Misakian has prepared several revisions of a draft standard for the measurement of power frequency electric fields in consultation with Working Group members. The working group met in November to work toward preparation of a final draft which will be considered for adoption by the parent technical committee in

1985. Dr. Misakian was requested to provide direction in formulating the international electric field measurement standard because of his earlier experience in drafting the U.S. (IEEE) standard for performing measurements of electric and magnetic fields in the vicinity of high-voltage ac transmission lines. The involvement in developing the U.S. standard was an outgrowth of Dr. Misakian's studies at NBS on the instrumentation, calibration, and measurement techniques for transmission line field measurements.

Dr. R. J. Van Brunt, in collaboration with Dr. W. E. Anderson, prepared a draft of a computerized bibliography concerned with electrical breakdown data in gases for the IEEE Electrical Insulation Society Committee S-32-11 on Gaseous Dielectrics. It is intended that the bibliography will serve as a guide to archival publications containing data on electrical breakdown in gases under conditions considered applicable to electrical insulation. The bibliography will be initially prepared as an NBS report and submitted later for publication in the IEEE Transactions on Electrical Insulation.

Aslan Baghdadi was appointed to chair a task force on the Automatic Determination of Oxygen and Carbon in Silicon, under the auspices of Subcommittee 4 of ASTM Committee F-1 on Electronics. The task force has recently written a draft of its first document, tentatively entitled "Determination of the Interstitial Oxygen Content of Silicon Slices by Computer-Assisted Infrared Spectrophotometry." Control of the interstitial oxygen concentration in silicon slices is a critical step in developing high-yield production processes for VLSI silicon. Dr. Baghdadi is also an active member of another task force, which is working on a method for measuring the radial oxygen variation (ROV) in silicon. Dr. Baghdadi has produced maps of the oxygen distribution over a silicon slice, which have proven to be very useful in developing an ROV method. Dr. Baghdadi has been a contributor to the work of Committee F-1 and Subcommittee 4 since 1980.

Analyses of two partially completed round robins being conducted by ASTM Committee F-1 on Electronics, being coordinated by Dr. J. R. Ehrstein, have been made by Dr. Ehrstein. These analyses have been used to develop preliminary statements of precision for ASTM Standard Method F 576, "Measurement of Insulator Thickness and Refractive Index on Silicon Substrates by Ellipsometry" and for ASTM Standard Method F 671, "Measuring Resistivity Profile Perpendicular to the Surface of a Silocion Wafer Using a Spreading Resistance Probe." The precision statements have been submitted to Committee F-1 for letter ballot. Dr. Ehrstein will continue to coordinate the round robins to completion.

Dr. J. R. Ehrstein was given a Subcommittee Performance Award by Subcommittee 6 on Electrical and Optical Measurements of ASTM Committee F-1 on Electronics at its October meeting. The award, which recognizes general effort and achievements in furthering the goals of the subcommittee, was given for extensive work in individually coordinating several round robins, acting as chief coordinator for all round robins and pilot studies of the subcommittee, development and revision of numerous subcommittee test methods, and efforts to develop new technical areas for the subcommittee.

Willie E. Phillips has submitted a draft of a new standard practice for characterizing deep levels in semiconductors by transient capacitiance to Subcommittee 6 on Electrical and Optical Measurements of ASTM Committee F-1 on Electronics. Initial comments from the subcommittee have been received and work on a revised version has been initiated.

A draft standard "Test Methods for Detecting Leaks in Enclosures for Electronic Circuits by a Bubble Test" was completed by Stanley Ruthberg for the ASTM Committee F-1 on Electronics. This represents an extensive revision of ASTM standard F-98 "Recommended Practices for Determining Hermeticity of Electron Devices by a Bubble Test."

Three draft standards, previously authored by Stanley Ruthberg on hermetic testing by radioisotope procedure, have all been approved by ASTM Committee F-1. The "Standard Method for Determining Hermeticity of Sealed Devices by a Radioisotope Test" is ASTM Standard F-985-82. The "Standard Method for Calibration of Radioisotope Hermetic Test Apparatus" is now ASTM Standard F-784-82, and the "Standard Method for Measuring the Package Attenuation Coefficient of a Sealed Device for Radioisotope Hermetic Test" has recently passed ASTM Committee ballot.

Robert I. Scace has been nominated as Chair of ASTM Committee F-1 on Electronics, for the term 1984-85. He is current Chair and previously held that post from 1968-74.

In February, F. F. Oettinger was asked by the Semiconductor Equipment and Materials Institute (SEMI) Standards Subcommittee on Ceramic Packages to lead a Task Force on Thermal Measurements of Ceramic Packages. The goal of the Task Force is to develop procedures to thermally characterize Ceramic Packages for Microelectronic Devices using Thermal Test Chips. A review paper on the status of thermal measurements of VLSI packages using test chips has been written and will be published. Interlaboratory studies are being implemented as the next step in this process.

Electronic Industries Association (EIA) Interim Standard IS-13 "THERMAL RESISTANCE TEST METHOD FOR SIGNAL AND REGULATOR DIODES (FORWARD VOLTAGE, SWITCHING METHOD)" was published in September by EIA. The standard is based on experimental and round-robin studies conducted by F. F. Oettinger several years ago. Dettinger also acted as a Technical Advisor to the initiating committee EIA JEDEC JC-22 on Diodes and Thyristors during the drafting and balloting phases of the standardization process. The test method was also incorporated in EIA RS-282-A "STANDARD FOR SILICON RECTIFIER DIODES," which is undergoing final approval.

The ASTM Subcommittee 7 of Committee F-1 on Electronics is in the process of writing a standard ball-shear test method for wire bonds used in microelectronics. G. G. Harman has been intimately involved in this work. His paper, "The Microelectronic Ball-Bond Shear Test - A Critical Review and Comprehensive Guide to Its Use" has been published to facilitate the standardization process.

A paper entitled, "Power MOSFET Temperature Measurements," which was presented by D. L. Blackburn at the June 1982 IEEE PESC and based on studies conducted by Blackburn and Berning was approved by the EIA JEDEC JC-25 Committee on Transistors for use as an industrial standard in February 1983. This paper will appear as a chapter in an EIA Standard on Power MOSFETs.

Revisions were made in ASTM Standard F617, "Standard Method for Measuring MOSFET Linear Threshold Voltage" by H. A. Schafft to correct deficiencies revealed in an interlaboratory experiment. The revised draft was approved in ballots of both the Subcommittee F-1-11 on Quality and Hardness Assurance and the Committee F-1 on Electronics.

Drs. L. F. Goodrich and F. R. Fickett published a paper to complement and explain the detail behind the ASTM "Standard Test Method for D-C Critical Current of Composite Superconductors," the first standard method developed for a superconducting critical parameter. This paper was entitled "Critical Current Measurements: A Compendium of Experimental Results" and was published in Cryogenics. The measurement procedure and parameters are explained in sufficient detail so that a technically knowledgeable person could understand the rationale and the development of the ASTM standard and use it to make accurate measurements of the critical current of research materials as well as commercial superconductors.

Dr. Douglas L. Franzen sponsored a measurement round robin on the measurement of cut-off wavelength and fundamental spot size of single mode optical fibers of telecommunications grade. Participants include NBS and about ten single mode fiber manufactuaring members of the Electronic Industries Association (EIA) Working Group P-6.6. Four different fibers, contributed

by four of the participating manufacturers are being circulated for intercomparison. The results from this round-robin will be published and will become the basis for more definitive measurement procedures for a subsequent EIA standard.

Aaron A. Sanders was appointed co-chair of the ANSI Committee Z-136.2 on Safe Use of Optical Fibers. The purpose of this committee is to draft an ANSI standard for optical fiber safety. This standard is expected to become the major national voluntary standard dealing with the safety associated with the use of optical fibers.

Aaron A. Sanders was appointed Chair of the Laser Measurements Committee of the Laser Institute of America. The purpose of the committee is to develop definitive measurement documents dealing with procedures for measuring the parameters of lasers.

Center for Manufacturing Engineering (CME)

In January, ANSI established a planning panel for Industrial Automation to coordinate existing activities, discourage duplication of standardization areas and identify needed thrusts in this newly emerging field. Robert Baird of NEMA was elected Chair and Bradford Smith of CME was elected Vice Chair.

In December, ISO organized its first standards committee devoted to Industrial Automation. TC184 at its plenary meeting in Paris voted to create subcommittees to address numerical control of machine tools, industrial robots, programming languages for NC, exchange of product definition data in digital format, and requirements and modeling for systems integration. CME staff participated in the nine member U.S. delegation attending the session. NBS selected to be the U.S. Secretariat for the Subcommittee on exchange of product definition data in digital format.

The Initial Graphics Exchange Specification (IGES) program, led by NBS, has focused the efforts of over 60 companies on the development and documentation of a means of graphics database exchange among present day CAD/CAM systems. The project's brief history has seen the evolution of the Specification into preliminary industrial usage marked by public demonstrations of vendor capability, mandatory requests in procurement actions, and a formalization into an American National Standard in September 1981. During this last year much progress has been made in expanding IGES capability in areas of mechanical part representation and for communication of electrical printed wiring board products and finite element meshes. Interest in the specification has grown in both the user and the vendor community as is evidenced by a doubling in size of attendance at regular meetings. A total of 14 subcommittees are active in two primary areas of extensions and repairs and test, evaluate and support. New items being pursued include a library function

whereby one IGES file can make an external reference to other IGES files which describe components or part assemblies. The manufacturing subcommittee is defining part features and tolerances necessary to compliment the IGES geometry specification for use as a true interface between design and manufacturing.

Center for Building Technology (CBT)

The first U.S. National Standard for driven piles, which is sponsored by the American Society of Civil Engineers, was balloted in November. The standard was developed by NBS initiative and with NBS assistance. The ASCE Committee on Foundation and Excavation Standards, which balloted the driven pile standard, is chaired by Dr. Felix Y. Yokel.

The new draft of the Federal regulations for excavation safety (29 CFR 1926, Subpart P) contains a soil classification system which was developed by CBT staff.

A draft standard on the maturity method to predict the strength gaining characteristics of concrete was developed and submitted to ASTM for ballot. This improved method will provide contractors with reliable information for removing formwork resulting in safer and more economical construction practices.

A technique for measuring the energy passing through the drill rod in the Standard Penetration Test was proposed as a new ASTM standard. The technique is used to compare data acquired by different types of drilling rods and will be used to improve the reliability of predicting the liquefaction potential of sites subjected to earthquake loads.

Provided support to the American Society of Civil Engineers in developing the first national standards for foundations and excavations. A pile standard is being balloted by ASCE. A standard for drilled shafts has been formulated and is being readied for ballot.

Design and installation criteria for soil anchors developed by CBT are incorporated in proposed ANSI Standards for Manufactured Housing.

Mr. James Barnett provided annual building energy consumption data for ten different types of commercial buildings under eight different climates. The data were generated by the use of an advanced computer simulation program called DoE 2.1B for three typical HVAC systems. The purpose of the effort is to study various options for updating ASHRAE 90-80A "Energy Conservation in New Building Design." The options studied include improvement of exterior envelope, HVAC system and equipment efficiencies, and lighting controls (especially the use of daylighting.)

Several members of the CBT are active in ISO/TC/163 on Thermal Insulation. Dr. Richard Grot was named U.S. representative to the working group of thermography methods, Dr. Tamami Kusuda was named U.S. representative to the subcommittee in steady and triennial heat conduction. Mr. Frank J. Powell organized and is operating a world-wide round-robin test series among 27 countries involving 125 guarded hot plates and heat flow meters.

Mr. Frank J. Powell was appointed as the Chair of ASTM Committee C-16 on Thermal Insulation.

A draft ANSI standard on safety colors was recently balloted by the Z535 Committee on Safety Signs and Colors. This revision is based partially on research performed at NBS and supported by OSHA. In addition, the Z535 Committee has circulated a draft standard on safety symbols. This standard, which is based largely on research performed by Dr. Belinda Collins with support from NIOSH and BoM, is expected to go to a full committee letter ballot in early 1984.

Dr. Belinda Collins has been appointed Chair of the National Fire Protection Association (NFPA) Committee on Fire Safety Symbols.

Dr. Simone Yaniv has chaired ANSI working group S12.18 on Room Noise Criteria and prepared a draft American National Standard for measuring and rating steady-state noise in rooms. She was also appointed Chair of working group 81.1 on acoustical terminology.

Mr. Thomas Bartel was appointed Chairman of two ASTM E-33.03 working groups on measurement of sound absorption.

ASHRAE Standard 103-1982 "Methods of Testing for Heating Seasonal Efficiency of Central Furnaces and Boilers" was approved by ANSI in June. This standard is based on research carried out by CBT since 1975. George Kelley and Esher Kweller were members of this ASHRAE Standards Committee.

ASHRAE Standard 1168, "Method of Testing for Seasonal Efficiency of Unitary Air-Conditioners and Heat Pumps," was approved by the ASHRAE Standards Committee in June. This standard incorporates the results of research conducted in CBT by Dr. David Didion.

Dr. James E. Hill is a member of the ASHRAE Standards Committee that oversees the development of all ASHRAE standards. In addition, he represents ASHRAE and NBS in the U.S. Technical Advisory Group for ISO/TC/180 on Solar Energy. The Systems subcommittee of ISO/TC/180 has adopted ANSI/ASHRAE Standard

95/1981, "Methods of Testing to Determine the Thermal Performance of Solar Domestic Water Heating Systems," as the basis for an international standard. This standard is based on research conducted by Dr. Hunter Fanney.

Larry W. Masters was nominated Chair of ASTM Committee E-44 on Solar Energy Conversion at the September meeting of Committee E-44. Mr. Masters has been a member of E-44 since its formation of 1978 and has served as Chair of E4.04.01, Task Group, on Absorber Materials, Chairman of E44.04 Subcommittee on Materials Performance, and Vice Chairman (Heating and Cooling Technology) of E-44.

CBT hosted a Conference on Quality Assurance of Highways and Bridges August 30-31. The conference was sponsored by the Federal Highway Administration (FHWA) in response to a study mandated by the Surface Transportation Assistance Act of 1982. A major consideration of the conference was the need for uniform standards and criteria for design and construction of highways and bridges. This included personnel training and enforcement techniques. It provided a paper on the evaluation and accreditation of laboratories that use construction standards.

At the request of CBT, the American Society of Civil Engineers (ASCE) has initiated a standards committee on Condition Assessment of Existing Buildings. the need for this activity was identified by the CBT building rehabilitation technology program whose research reports will provide resource material for the standard. Such a report is NBSIR 80-2171 "Selected Methods for Condition Assessment of Structural, HVAC, Plumbing, and Electrical Systems in Existing Buildings." J. H. Pielert is the Chair of the committee. The development of a standard is well underway.

Dr. Jon Martin chairs ASTM E6.53 Subcommittee on Materials and Processes for Rigid-Wall Relocatable Shelters. The subcommittee had four ASTM standards concerned with the durability of adhesively-bonded honeycomb sandwich panels published in 1983.

Center for Fire Research (CFR)

CFR staff members were very active at a number of meetings of the National Fire Protection Association throughout the year. Special efforts were devoted to the Safety to Life Committee; several variations of the CFR-developed Fire Safety Evaluation System (FSES) have been submitted for consideration as Appendices to NFPA 101 (Life Safety Code).

One major proposal involves a new Chapter 21 dealing with Residential Board and Care Occupancies. Supporting information was summarized in a final report, "A Fire Safety Evaluation System for Board and Care Homes" (NBSIR 83-2659) submitted to the sponsor, the Department of Health and Human Services. In

addition, a report prepared by Dr. N. E. Groner, a CFR grantee, serves as a comprehensive guide to fire emergency planning for board and care homes (NBSGCR 82-408). The guide is written in non-technical language and provides step-by-step procedures for owners and operators of board and care homes in preparing for emergencies. A user's guide for applying the fire safety evaluation system for park facilities was also prepared by a CFR grantee (NBSGCR 83-427).

A major revision of Chapters 14 and 15 of NFPA 101 (New Detention and Correctional Occupancies) has been proposed based on CFR research. CFR is in the process of field testing the Fire Safety Evaluation System in order to judge its usefulness in achieving fire safety. To date, approximately 50 organizations have asked to participate in this effort. They include two different Federal groups, 27 states, the District of Columbia, and one Canadian province. In several cases, the organizations represent large groups of institutions (e.g., Federal prisons, metropolitan jail systems, and state jails). Three to four hundred facilities are expected to be covered by the test.

At meetings of the NFPA Committee on Heat Producting Appliances, changes to the model code relating to clearances, methods of protection for combustible surfaces, and masonry chimney construction were agreed on and public comments considered. The proposed changes, based upon NBS research conducted by Richard Peacock and Joseph Loftus broadened the allowable alternatives for wall and ceiling protection and strengthened the requirements for masonry chimney by prohibiting combustible materials in contact with masonry chimneys, while at the same time simplifying the text of the standard considerably. The proposed changes were proposed for final adoption in the 1984 Standard for Chimney, Fireplace, Vents, and Solid Fuel Burning Appliances (NFPA 211).

As a member of the NFPA 13 Sprinkler Committee, Edward Budnick was directly involved in the Subcommittee revision of the Residential Sprinkler Standard. Revisions include applications of newly developed technology and innovative materials beyond the single family dwelling which was the initial scope of the standard. CFR will continue to be active in this area, with plans to examine key technical issues regarding the convective flow effects on sprinkler response time for transient fires in geometries having high aspect ratios and the performance characteristics associated with the use of thermoplastic materials for automatic sprinkler systems.

A new Standard for "Fixed Guideway Transit Systems" (NFPA 130-1983) was adopted this year based on work of a Committee formed in 1975, with Sanford Davis representing CFR. The material fire safety requirements are based in part on Standard fire test methods developed at CFR.

A joint project between CFR and the Bureau of Alcohol, Tobacco, and Firearms made progress in the development of a consensus standard for the recovery and identification of accelerants in suspected arson cases. A second interlaboratory program involving more than 50 forensic laboratories was carried out in which the participants furnished information that will be the basis for a set of guidelines for promulgation by NFPA. An extension of this project will be the preparation of a more encompassing handbook for arson accelerant analysis.

CFR staff members were active at Task Group, Subcommittee, and the twice-yearly Main Committee meetings of ASTM Committee E-5 on Fire Standards. Billy Lee reported on the effect of different ignition exposure scenarios on fire development with the proposed standard test method for a full-scale room fire test of wall and ceiling materials and assemblies. The results of 15 tests involving three ignition scenarios and six different materials were presented. As a consequence of this work, changes in the operational procedure in the proposed test are being considered for adoption in the next revision of the standard. A report (NCSGCR 83-421) prepared by a grantee, provided information on intralaboratory evaluation of the test. A report on a quarter-scale room fire test protocol was also published (NBSIR 83-2642); this may serve as a reduced-cost alternative to full scale testing.

J. Randall Lawson and William J. Parker worked with ASTM Subcommittee E-5.23 on Combustibility on the evaluation of preliminary round-robin test data for the ease-of-ignition by flame impingement test method. The test results identified several areas which resulted in variability between laboratories. A second interlaboratory test program was planned and is currently in progress.

A task group was formed in Subcommittee E.5.21 following the December 1982 meeting, to start work on developing an ASTM test based on the CFR-developed bench-scale oxygen consumption rate of heat release apparatus (cone calorimeter). Vytenis Babrauskas is heading that group, which includes laboratory representatives actively interested in setting up the test apparatus. Two commercial instrument makers have expressed an interest in constructing these units. Further development is now in progress to add a smoke-measuring capability to this apparatus, and it is anticipated that a variety of flammability data for use with mathematical models will be generated.

A report describing a versatile reference calorimeter for measuring rates of heat release and mass burning on a substitution gas burner technique has been published (NBSIR 83-2708). The rate of burning and rate of heat release of full size furniture items may also be measured in a furniture calorimeter described in NBSIR 82-2604.

A new Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source, ASTM E-970, was promulgated. Sanford Davis of CFR served as the Task Group Chair in ASTM Subcommittee E5.22.

A final report on the interlaboratory evaluation of the National Bureau of Standards Test Method for Assessing the Acute Inhalation Toxicity of Combustion Products (NBSIR 83-2678) was prepared by Barbara C. Levin, Maya Paabo and Merritt Birky. This report on the results of seven laboratories on a total of twelve materials provides the most extensive interlaboratory evaluation of any of the toxicity test methods submitted to ASTM Subcommittee E5.21, on Smoke and Combustion Products, for consideration. This interlaboratory evaluation showed the results of the CFR toxicity test method to be both reproducible across laboratories and repeatable within laboratories. A subsequent report by Arthur D. Little, Inc. for the State of New York substantiated these findings. The report has also been circulated in Subcommittee 3, on Toxic Hazards, of ISO Technical Committee 92, Fire Tests.

CFR has developed a new alpha-cellulose SRM 1006b for calibrating the primary test apparatus used for measuring the tendency of materials to smoke when exposed to a fire (ASTM E-662, NFPA 258). The prior SRM (1006a) showed a significant and continuing change with time in its smoke generation characteristics, unlike the original alpha-cellulose SRM (1006) which retained its properties until the supply was exhausted. The new material, SRM 1006b, was tested for peak specific optical density before and after it was aged six months. Its performance after aging showed no significant change when compared to the original (SRM 1006b) data.

Under the joint sponsorship of the American Society of Heating, Air Conditioning, and Refrigeration Engineers (ASHRAE) and the U.S. Veterans Administration (VA), CFR has written the first comprehensive design guide for smoke control systems in buildings. The book, entitled "Design of Smoke Control Systems for Buildings" contains a detailed discussion of the capabilities of smoke control in providing fire safety in large buildings and the techniques for designing such systems. These techniques include the equation, constants, and examples necessary for hand calculation of simple buildings and an NBS-developed computer program (available on computer tape from NTIS) for more complex building analysis. The book is currently available from ASHRAE and as NBS Handbook H-141.

Dan Gross participated as a technical expert in Working Group meetings of ISO TC 92 Subcommittee 2 on Fire Resistance in Berlin and Lyngby, Denmark. At these meetings, test methods and research projects were discussed dealing with fire resistance,

calculation methods, fire and smoke control doors, and ventilation ducts, subject areas that relate directly to research and standardization activities in the United States.

David Evans participated as a technical expert in the Working Group 1 meeting of ISO/TC21/SC5 on Fixed Fire Extinguishing Systems, in London, England, May 25-27. The active area of CFR research dealt with at the meeting was test methods to evaluate sprinkler response time. Questions over the relative importance of radiative to conductive heat transfer in the heating of sprinkler sensing elements in actual fires delayed approval of the U.S. proposed test method, which is convective heat transfer dominated. To help clarify this issue, tests are planned for FY-84 at NBS to obtain data on convective and radiataive heat transfer rates to sprinkler elements during growing enclosure fires. Work on the wet and dry alarm valve ISO standards was completed.

Dr. Jack Snell has been appointed by the National Fire Protection Association's Board of Directors to chair a new NFPA Advisory Committee on the toxicity of the products of combustion. This committee is responsible for providing guidance and recommendations to the committees of NFPA on questions and policies relating to assessing the toxicity of the products of combustion.

Dr. Fred I. Stahl of the Center for Building Technology received one of the National Endowment for the Arts' Design Research Recognition awards for his project, BFIRES: A COMPUTER SIMULATION TO PREDICT OCCUPANT BEHAVIOR DURING FIRES. This work, which was conducted between 1977 and 1981, was sponsored by the U.S. Public Health Service in conjunction with the Center for Fire Research and CBT.

Dr. Bernard Levin was honored by being invited to give two talks at the Ninth National Conference on Fire of the Australia Fire Protection Association in Sydney, Australia. His paper on Fire Safety for the Elderly and Handicapped covered the proposed Chapter 21 of the Life Safety Code that covers board and care homes and the associated Fire Safety Evaluation System for Board and Care Homes.

Center for Chemical Engineering (CCE)

Jesse Hord presented a talk entitled "Snapshot of the NBS Center for Chemical Engineering" at the 1983 Workshop and Symposium of the National Conference of Standards Laboratories. The conference was held in Boulder, CO, July 18-21. Hord described measurement standards, calibrations, test services, and measurement research activities in CCE.

AWARDS

The Silver Medal Award is bestowed for "meritorious contributions of unusual value to the Department of Commerce." The following NBS staff members received silver medal awards in 1983 for standards related activities:

Lawrence K. Eliason, LESL (NEL), for valuable contributions to the Nation's law enforcement community by developing effective law enforcement standards."

Cedric J. Powell, CCP (NML), for significant scientific achievements and leadership in surface science and standards.

Robert I. Scace, CEEE, (NEL), for outstanding contributions to the development of national and international standards for the semiconductor industry."

Bradford Smith, CME, (NEL), for the development of the Initial Graphics Exchange Specification and the control systems for an automatic work station.

The Edward Bennett Rosa Award recognizes outstanding achievements in the development of meaningful and significant standards of practice in the measurement field. The award is named after Dr. Edward B. Rosa, a physicist, who set the pace for high level achievement in the early years of the Bureau.

In 1983, the Rosa Award was presented to Robert I. Scace, (NEL) for outstanding contributions to, and creative leadership for, the development of voluntary national and international standards for the semiconductor industry.

APPENDIX I

LIST OF ACRONYMS/ABBREVIATIONS

LIST OF ACRONYMS/ABBREVIATIONS

ADA	American Dental Association
AGA	American Gas Association
ANSI	American National Standards Institute
AOAC	Association of Official Analytical Chemists
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLE	American Society of Lubrication Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BIPM	International Bureau of Weights and Measures
CAMA	Computed Automated Measurement and Control
CCIR	Consultative Committee on International Radio
CCITT	International Telegraph and Telephone Consultative Committee
CIML	International Committee of Legal Metrology
CPSC	Consumer Product Safety Commission
DDS	Data Dictionary Systems
DIN	German Institute for Standardization
DOA	Department of Agriculture
DOE	Department of Energy
ECE	Economic Commission for Europe
EEC	European Economic Community
EIA	Electronics Industries Association
EOS	Egyptian Organization for Standardization
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FIPS	Federal Information Processing Standards
FSES	Fire Safety Evaluation System
GAMA	Gas Appliance Manufacturers Association
GATT	General Agreement on Tariffs and Trade
ICSP	Interagency Committee on Standards Policy
ICSU	International Council of Scientific Unions
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ILAC	International Laboratory Accreditation Conference
IMO	International Maritime Organization
INFCO	International Standards Information Committee
ISO	International Organization for Standardization
ISONET	International Standards Information Network
ITU	International Telecommunications Union
IUPAC	International Union of Pure and Applied Chemistry
JEDEC	Joint Electron Devices Engineering Council
JEIDA	Japan Electronics Industry Development Association
NBS	National Bureau of Standards
NCCLS	National Committee for Clinical Laboratory Standards
NCSBCS	National Conference of States on Building Codes and Standards
NDT	Non-Destructive Testing
NFPA	National Fire Protection Association
NHTSA	National Highway Traffic Safety Administration
NIH	National Institutes of Health

NIJ	National Institute of Justice
NIM	Nuclear Instrument Module
NIOSH	National Institute for Occupational Safety and Health
NRSCC	National Reference System in Clinical Chemistry
NSF	National Science Foundation
NTIS	National Technical Information Service
OIML	International Organization of Legal Metrology
OMB	Office of Management and Budget
PS	Pilot Secretariat
RS	Reporting Secretariat
SACC	Standards Advisory and Coordination Committee
SAMA	Scientific Apparatus Makers Association
SAMI	Standards Assistance and Management Information
SEMI	Semiconductor Equipment and Materials Institute
SRM	Standard Reference Material
TAG	Technical Advisory Group
TPSC	Trade Policy Staff Committee
USNC/CIE	U.S. National Committee/International Commission on Illumination
USNWG	U.S. National Working Group
USTR	U.S. Trade Representative
WARC	World Administrative Radio Conference

APPENDIX II

NBS FORM 83

NBS-83
(Rev. 10-80)

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

RECORD OF COMMITTEE ASSIGNMENT

SEE REVERSE SIDE FOR INSTRUCTIONS

PLEASE TYPE OR PRINT YOUR RESPONSES

1. Purpose: ("x" one) →
   - ☐ NEW MEMBERSHIP
   - ☐ CHANGE INFORMATION PREVIOUSLY SUBMITTED
   - ☐ TERMINATION OF MEMBERSHIP (COMPLETE BLOCKS 1 - 9 ONLY)
   - ☐ OTHER *(please specify)* _____

2. Name *(last, first, initial)*	3. Organizational Code Number	4. Date
	5. NBS Mailing Address BLDG. ROOM	6. NBS Telephone Ext.

7. NBS Employment Status:

☐ FULL-TIME PERMANENT ☐ ANNUITANT ☐ OTHER *(specify)* _____

8A. This form covers the following assignment:

LEVEL *("x" one)*	NUMBER *(if applicable)*	COMPLETE NAME OF ACTIVITY
☐ PARENT COMMITTEE		
☐ SUBCOMMITTEE		
☐ TASK OR WORK GROUP		
☐ OTHER *(specify)*		

8B. If 8A is a parent committee go to No. 9. If 8A is a subgroup of a committee (e.g., a subcommittee or task group) list the higher levels below:

LEVEL	NUMBER	COMPLETE NAME
PARENT COMMITTEE		
SUBCOMMITTEE		
OTHER *(specify)*		

9. Parent Organization	10. Secretariat Organization or Country (if different from parent organization)
11. Date of Assignment *(month/year)*	12. Expiration Date of Assignment *(if any)*

13A. Type of Committee (base classification on type of committee, not organization) *("x" one)*:

NATL	*NATL/INTL	INTL	
			STANDARDS
			PROFESSIONAL/SCIENTIFIC/TECHNICAL
			INTERAGENCY OR PUBLIC ADVISORY
			OTHER *(specify)* _____

13B. *Nat'l Committee with Major Internat'l Responsibilities

IF YOU CHECKED NATL/INTL, PLEASE SPECIFY THE INTERNATIONAL COMMITTEE OR COMMITTEES WITH WHICH THE NATIONAL COMMITTEE IS CONCERNED:

_____

14. Position on Committee *("x" one)*:

- ☐ MEMBER
- ☐ CHAIR
- ☐ VICE-CHAIR
- ☐ SECRETARY
- ☐ TECHNICAL ADVISOR
- ☐ ALTERNATE REPRESENTATIVE
- ☐ DELEGATE
- ☐ OTHER *(specify)*

15. Voting Status *("x" one)*:

☐ VOTING ☐ NONVOTING

16. Type of Funding *("x" one)*:

- ☐ NBS
- ☐ OA *(specify)* _____
- ☐ NBS/OA *(specify agency)* _____
- ☐ OTHER *(specify)*

17. Key Words (FOR USE BY COMMITTEE MONITORING OFFICE)

18. Signatures of Approval

DIVISION CHIEF OR HIGHER	DATE
COMMITTEE MONITORING OFFICE	DATE

USCOMM-NBS-DC

INSTRUCTIONS

INTRODUCTION

This form serves as a record of management approval of committee activities and provides basic information which is used to compile a directory of standards committee participants and a series of special reports for NBS managers and committee participants. For further information, including definitions of terms used on this form, reference Administrative Manual Subchapter 3.02 on Standards and Professional Committees. Any questions or suggestions for improving this form should be directed to the Office of Standards Information, Analysis and Development (Division 781), which serves as the NBS Committee Monitoring Office, Technology Building, Room B-166, extension 2092.

GENERAL INFORMATION

1. A separate form should be completed for each committee. For example, if you belong to a committee and two of its subcommittees, three forms should be filled out.

2. A form should be filed as soon as possible after joining or applying for membership on a committee. Employees are responsible for completing and returning to the committee or parent organization any forms they require.

3. Additional forms should be filed to indicate changes to the original form, to renew expired memberships, and to record resignations. Forms need not be filed for internal NBS committees.

4. Copies for distribution: *the original and two copies* of the form are to be sent to the designated individuals for approval (see Approvals).

SPECIFIC COMMENTS

Blocks 1 - 6 - Minor changes such as phone extension or mailing address may be made by notifying the Committee Monitoring Office by phone (x2092) or memo (Technology Building, B-166). If you are resigning from a committee, complete only Blocks 1 - 9.

Block 10 - Name of an organization or country only, *not* an individual.

Block 11 - If you have been accredited as a delegate to a specific meeting, put the starting date of the meeting in this block. If you have been asked to serve as a delegate for an indefinite period of time, put the date you accepted the assignment in this block.

Block 13A - Interagency Committee means a committee composed wholly of employees of two or more Federal Government agencies.

Public Advisory Committee means any committee that is 1) established by Federal statute or reorganization plan; 2) established or utilized by the President; or 3) established or utilized by one or more agencies to obtain advice or recommendations for the President or for one or more Federal Government agencies. The term does not include any committee which is composed wholly of employees of the Federal Government.

Block 14 - Indicate your current position on the activity listed in Block 8A. If you serve in more than one capacity, check only the highest position held.

Block 16 - Indicate the organization which pays for your time, travel, or other expenses when you are involved in committee work.

Block 17 - DO NOT FILL OUT. FOR COMMITTEE MONITORING OFFICE USE ONLY.

APPROVALS (For further explanation of the types of representation, reference Administrative Manual Subchapter 3.02, Standards and Professional Committees.)

Block 18 - 1) *If an NBS technical representative* - Send the original and two copies of the NBS-83 to the Division Chief or higher for approval. Division Chiefs and higher level managers should sign their own forms. After approval is obtained, send the form to the Office of Standards Information, Analysis and Development, which serves as the NBS Committee Monitoring Office, for processing.

2) *If an official NBS spokesperson* - Send the original and two copies of the NBS-83 with a cover memo explaining the assignment through the Division/Center office to the MOU Director for approval. After approval, the MOU Director forwards the material to the Office of Standards Information, Analysis and Development, which serves as the NBS Committee Monitoring Office, for review and forwarding to the Director.

NOTE TO SIGNERS: Your signature indicates that:

1) the activity is directly related to the authorized functions of NBS;

2) the appointee is qualified and can devote enough time and effort to serve creditably; and

3) there are adequate resources available or in prospect to support meaningful participation.

NBS TECHNICAL PUBLICATIONS

PERIODICALS

JOURNAL OF RESEARCH—The Journal of Research of the National Bureau of Standards reports NBS research and development in those disciplines of the physical and engineering sciences in which the Bureau is active. These include physics, chemistry, engineering, mathematics, and computer sciences. Papers cover a broad range of subjects, with major emphasis on measurement methodology and the basic technology underlying standardization. Also included from time to time are survey articles on topics closely related to the Bureau's technical and scientific programs. As a special service to subscribers each issue contains complete citations to all recent Bureau publications in both NBS and non-NBS media. Issued six times a year. Annual subscription: domestic $18; foreign $22.50. Single copy, $5.50 domestic; $6.90 foreign.

NONPERIODICALS

Monographs—Major contributions to the technical literature on various subjects related to the Bureau's scientific and technical activities.

Handbooks—Recommended codes of engineering and industrial practice (including safety codes) developed in cooperation with interested industries, professional organizations, and regulatory bodies.

Special Publications—Include proceedings of conferences sponsored by NBS, NBS annual reports, and other special publications appropriate to this grouping such as wall charts, pocket cards, and bibliographies.

Applied Mathematics Series—Mathematical tables, manuals, and studies of special interest to physicists, engineers, chemists, biologists, mathematicians, computer programmers, and others engaged in scientific and technical work.

National Standard Reference Data Series—Provides quantitative data on the physical and chemical properties of materials, compiled from the world's literature and critically evaluated. Developed under a worldwide program coordinated by NBS under the authority of the National Standard Data Act (Public Law 90-396).

NOTE: The principal publication outlet for the foregoing data is the Journal of Physical and Chemical Reference Data (JPCRD) published quarterly for NBS by the American Chemical Society (ACS) and the American Institute of Physics (AIP). Subscriptions, reprints, and supplements available from ACS, 1155 Sixteenth St., NW, Washington, DC 20056.

Building Science Series—Disseminates technical information developed at the Bureau on building materials, components, systems, and whole structures. The series presents research results, test methods, and performance criteria related to the structural and environmental functions and the durability and safety characteristics of building elements and systems.

Technical Notes—Studies or reports which are complete in themselves but restrictive in their treatment of a subject. Analogous to monographs but not so comprehensive in scope or definitive in treatment of the subject area. Often serve as a vehicle for final reports of work performed at NBS under the sponsorship of other government agencies.

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