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## NBS SPECIAL PUBLICATION **650**

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

# **Standards Committee Activities of the National Bureau of Standards - 1982 Highlights**

## NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards<sup>1</sup> 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<sup>2</sup> — 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<sup>2</sup> — Manufacturing Engineering — Building Technology — Fire Research — Chemical Engineering<sup>2</sup>

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Programming Science and Technology — Computer Systems Engineering.

<sup>1</sup>Headquarters and Laboratories at Gaithersburg, MD, unless otherwise noted; mailing address Washington, DC 20234.

<sup>2</sup>Some divisions within the center are located at Boulder, CO 80303.

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# Standards Committee Activities of the National Bureau of Standards — 1982 Highlights

Karl G. Newell, Jr.

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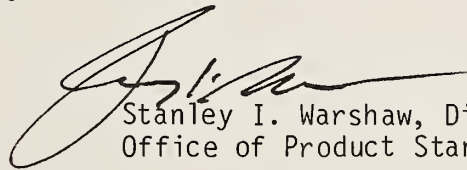
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## FOREWORD

The year 1982 brought significant changes that affected National Bureau of Standards' (NBS) responsibilities in the area of Voluntary Standards activities: 1) in May, the Department of Commerce officially transferred its Office of Product Standards Policy to NBS, and NBS reorganized its standards management activities into the new Office of Product Standards Policy (OPSP) reporting to the Director, 2) in October, the Office of Management and Budget (OMB) published a revised OMB Circular No. A-119 entitled "Federal Participation in the Development and Use of Voluntary Standards," 3) the Secretary of Commerce reconstituted the Interagency Committee on Standards Policy (ICSP) in September to consist of senior policy officials with responsibilities for standards-related programs.

This report describes the impact of the events mentioned above on NBS and characterizes NBS staff participation in standards activities during the year. The report recognizes the accomplishments of Bureau staff in standards activities in carrying out the mission of the Bureau. Both NBS and the voluntary standards system are enhanced by participation of NBS staff in the development of standards, and the public interest is thereby served. Our objective is to strengthen the voluntary standards system to ensure that it continues to develop high quality standards and maintains its position of leadership in the international standards community.



Stanley I. Warshaw, Director  
Office of Product Standards Policy



## ABSTRACT

This report summarizes NBS standards committee activities and accomplishments during calendar year 1982. It describes the management of standards activities at NBS, profiles NBS staff participation on outside standards committees, and highlights significant technical and individual contributions made by NBS staff. In 1982, 457 staff members (or 29% of NBS' professional, scientific, and technical staff) participated in 1,046 outside standards committees of 97 national and international standards organizations.

Key Words: annual report; committee participation; standards committees; voluntary standards.

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## INTRODUCTION

This report summarizes NBS standards participation and contributions during calendar year 1982. The report contains three major sections: 1) a description of how NBS manages its standards activities, 2) an overview of NBS participation on standards committees, and 3) highlights of significant technical and individual contributions and accomplishments made by NBS staff.

Resources available for participation in standards activities were again restricted in 1982, which may explain the slight decrease in participation statistics compared to 1981. It is significant, however, that the percentage of NBS technical staff involved in standardization activities remained essentially the same (29%). A slight increase over 1981 was recorded for participation in international standards activities.

Memberships in standards-writing activities totaled 1,454 (1,297 national and 157 international) during 1982 compared to 1,481 (1,327 national and 154 international) in 1981. NBS staff participated in activities of such organizations as the American Society for Testing and Materials (ASTM), the American National Standards Institute (ANSI), the International Organization for Standardization (ISO), and the National Fire Protection Association (NFPA). The most memberships are held in ASTM (729). Committee members devoted an equivalent of 2,876 days in 1982 to attending committee meetings and/or conferences (compared to an equivalent of 2,842 days in 1981). Specific details on participation and travel are discussed on page 9.

NBS staff participation in standards development activities is important to NBS because it provides an effective opportunity to disseminate, in a timely manner, the results of the research NBS conducts in its role as the Federal measurement laboratory in engineering and the physical sciences. In turn, involvement of NBS personnel in standards committee activities provides NBS with vital information on the Nation's measurement needs in such areas as environmental protection, public health and safety, and energy conservation. Standards 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.

## NBS STANDARDS MANAGEMENT

NBS uses a decentralized system for managing the participation of NBS staff in outside standards committee activities. Thus, Center Directors and Division Chiefs have primary responsibility for determining that: 1) standards activities are directly related to the authorized functions of NBS, 2) NBS committee participants are qualified and can devote sufficient time and effort to serve creditably, and 3) adequate resources are available to support meaningful participation. Division and Office Chiefs are also responsible for periodically reviewing committee assignments to determine if NBS participation is still necessary and for ensuring that their staff members meet the reporting needs and other requirements of committee participation.

The Office of Product Standards Policy (OPSP), established in May 1982, serves as the focal point for NBS standardization activities. OPSP, through its Standards Assistance and Management Information (SAMI) project, collects and disseminates information on Bureau-wide participation in outside standards activities and maintains a computerized data base on these activities. SAMI also maintains information on the estimated cost of NBS participation in standards activities. SAMI staff review all NBS travel orders and keep records on travel associated with standards committee activities.

This information is disseminated by various means, including publication of semiannual directories of NBS participants on standards committees, an annual report on the highlights of NBS participation, a series of special reports for NBS managers and participants, and quarterly reports on the costs of standards-related travel.

The purpose of collecting and disseminating this information is to provide NBS managers with data that can be used to plan programs and allocate resources and to encourage cooperation among NBS committee participants and other staff. Additionally, this information provides the basis for recognizing the contributions and accomplishments of NBS committee participants. (Appendix I describes in more detail the functions and organization of the OPSP.)

Another major element in the management of the NBS standards program is the NBS Standardization Advisory and Coordination Committee (SACC), a standing committee of the Bureau reporting to the NBS Executive Board. The Committee consists of the Associate Director for International Affairs and the Director of the Office of Product Standards Policy, both of the NBS Director's Office, and representatives of the National Measurement Laboratory (NML), the National Engineering Laboratory (NEL), and the Institute for Computer Sciences and Technology (ICST). The Associate Director for International Affairs Chairs the Committee. SACC coordinates the development or interpretation of standards-related policy within NBS, and advises the NBS Director and MOU Directors on Bureau-wide issues relative to standardization activities. (Appendix II further describes the purpose and functions of SACC.)

## OVERVIEW OF PARTICIPATION

In 1982, 457 (or 29%) of NBS' 1,565 professional, scientific, and technical staff participated on 1,046 outside standards committees (903 national, 143 international). Memberships on these committees totaled 1,454 (1,297 national, 157 international). As in past years, the most memberships were held in committees of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI), 729 and 223 respectively. NBS staff participated in the activities of 97 standards organizations (68 national, 29 international). Both the number of staff participating on outside standards committees (457) and the number of total memberships on those committees (1,454) decreased only slightly in 1982 (1981 figures - 471 and 1,481, respectively). It is interesting to note that, while the total number of organizations in which NBS staff participated decreased from 101 in 1981 to 97 in 1982, the number of international organizations increased by one. The only significant decrease in participation data recorded in 1982 was a 13 percent reduction in the total number of outside committees in which NBS staff participated: (1,046 in 1982 and 1,199 in 1981).

The statistics presented here were compiled from responses given on the NBS Form 83, "Record of Committee Assignment" (see Appendix III). This form, which is completed for each committee activity by NBS staff members, enables NBS to maintain a complete record of staff participation on standards committee participation.

Key to abbreviations used in the following charts:

NML - National Measurement Laboratory

Hq - Headquarters

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 and Technology

NEL - National Engineering Laboratory

Hq - Headquarters

CAM - Center for Applied Mathematics

CEEE - Center for Electronics and Electrical Engineering

CME - Center for Manufacturing Engineering

CBT - Center for Building Technology

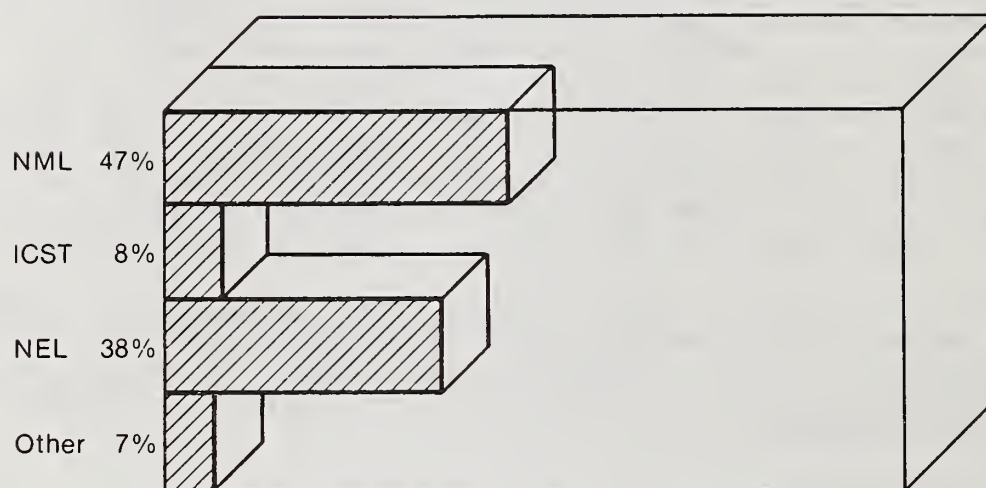
CFR - Center for Fire Research

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



# Number of NBS staff participating on standards committees



Organization	Total Staff*	Number of Participants	% Participating
NML	696	217	31
ICST	95	35	37
NEL	658	175	27
Other	116	30	26
<b>TOTAL</b>	<b>1,565</b>	<b>457</b>	<b>29</b>
NML	217	NEL	175
Hq	23	Hq	6
CAPQ	22	CAM	10
CRR	34	CEEE	43
CCP	20	CME	25
CAC	33	CBT	53
CMS	85	CFR	23
		CCE	15

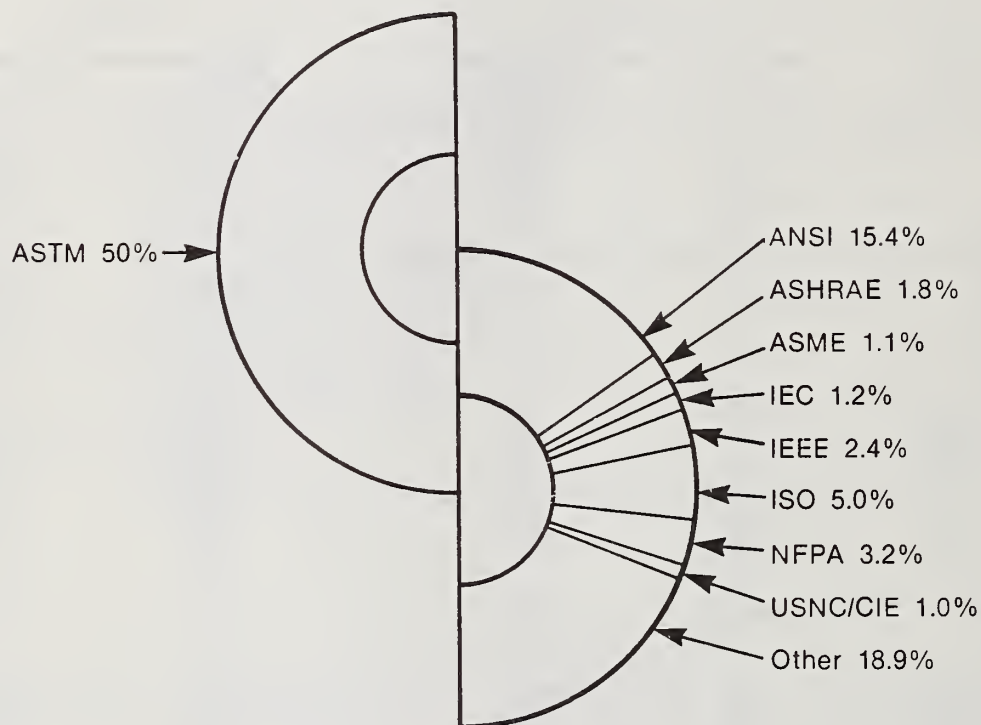
\* Professional, scientific, and technical staff.

Number of memberships on national and international committees

Organization	CY 1982		CY 1981	
	National	International	National	International
NML	636	89	738	96
ICST	82	19	95	16
NEL	500	38	485	42
OTHER*	79	11	9	0
TOTAL	1297	157	1327	154
NML	636	89	738	96
Hq	88	12	145	16
CAPQ	57	12	58	9
CRR	88	20	99	22
CCO	38	5	53	9
CAC	100	22	104	23
CMS	265	18	279	17
NEL	500	38	485	42
Hq	7	1	26	3
CAM	19	0	22	0
CEEE	96	10	91	10
CME	55	2	51	3
CBT	191	5	193	6
CFR	103	14	72	14
CCE	29	6	30	6

\* During 1982, the Office of Product Standards Policy was established in the Office of the NBS Director, which accounts for the significant increase in 1982 figures over 1981 figures. Since some standards-related activities from NEL and NML were transferred to OPSP, statistics for these groups were also affected by the change.

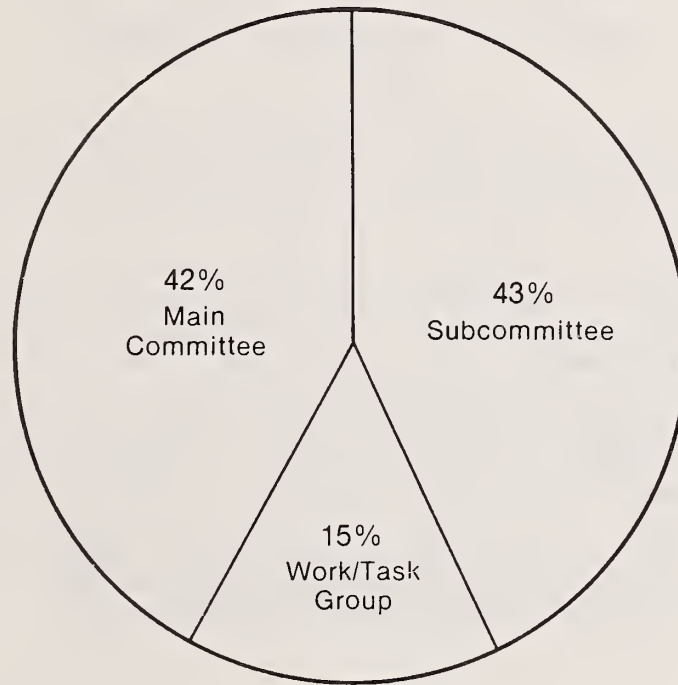
Number of memberships in selected organizations  
(with 15 or more memberships)



	ASTM	ANSI	ASHRAE	ASME	IEC	IEEE	ISO	NFPA	USNC/CIE	OTHER
NML	433	62	0	4	8	7	34	0	8	169
ICST	1	65	0	0	0	5	14	0	0	16
NEL	263	78	26	10	9	22	20	47	7	56
OTHER	32	18	0	2	0	0	4	0	0	34
TOTAL	729	223	26	16	17	34	72	47	15	275

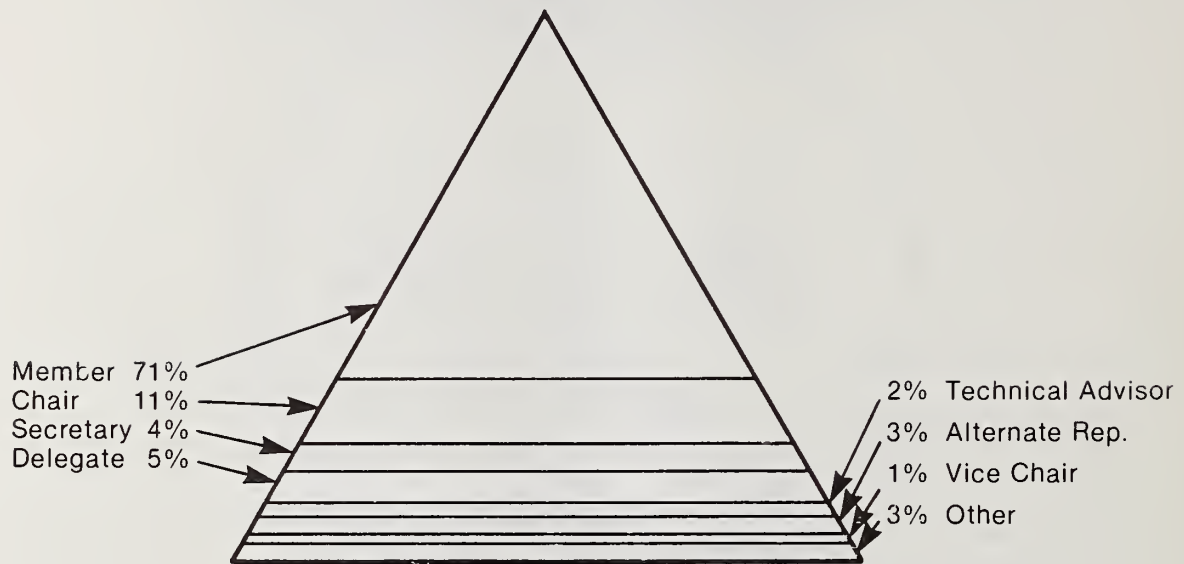


Number of memberships by committee levels



	Main Committee	Subcommittee	Work/Task Group
NML	298	328	99
ICST	23	47	31
NEL	232	228	78
OTHER	55	21	14
TOTAL	608	624	222
NML	298	328	99
Hq	45	45	10
CAPQ	27	30	12
CRR	49	35	24
CCD	18	20	5
CAC	46	56	20
CMS	113	142	28
NEL	232	228	78
Hq	4	4	0
CAM	6	9	4
CEEE	44	45	17
CME	23	17	17
CBT	100	82	14
CFR	41	52	24
CCE	14	19	2

Number of memberships by committee position



	Member	Chair	Vice Chair	Sec.	Tech. Adv.	Alt. Rep.	Delegate	Other
NML	535	80	9	36	8	3	39	15
ICST	42	8	3	3	1	23	10	11
NEL	397	61	14	12	20	19	9	
Other	58	14	0	5	3	5	3	2
<b>TOTAL</b>	<b>1032</b>	<b>163</b>	<b>18</b>	<b>58</b>	<b>24</b>	<b>51</b>	<b>71</b>	<b>37</b>
NML	535	80	9	36	8	3	39	15
Hq	72	8	3	7	1	0	4	5
CAPQ	47	7	1	7	3	0	3	1
CRR	72	14	0	9	3	3	5	2
CCP	35	5	0	2	0	0	0	1
CAC	91	7	1	4	1	0	14	4
CMS	218	39	4	7	0	0	13	2
NEL	397	61	6	14	12	20	19	9
Hq	7	0	0	0	0	0	0	1
CAM	12	3	0	1	0	0	0	3
CEEE	69	20	2	2	6	1	3	3
CME	42	6	1	2	3	2	0	1
CBT	157	21	2	8	1	3	4	0
CFR	80	8	0	1	1	14	12	1
CCE	30	3	1	0	1	0	0	0

## SUMMARY OF STANDARDS-RELATED TRAVEL

This summary illustrates the resources expended by NBS to support and strengthen the voluntary standards system by encouraging NBS staff to attend meetings to continue developing high quality standards.

NBS committee participants traveled an equivalent of 2,876 days in 1982 to attend standards committee meetings and/or conferences. This is an increase of 34 days from the 1981 total. The total number of trips was 810, up from 802 in 1981. The average domestic trip lasted three days, a foreign trip lasted six days (both identical with 1981), while the average costs were \$443 and \$1258 respectively. Standards-related travel made up 17 percent of NBS travel costs (compared to 18 percent in 1981).

	Total # of Trips			Travel Hours			Travel Costs		
	D	F	T	D	F	T	D	F	T
NML	239	40	279	5,864	1,920	7,784	92,457	44,037	136,494
ICST	130	31	161	4,184	1,544	5,728	73,963	49,084	123,047
NEL	281	56	337	6,448	2,200	8,648	124,399	67,054	191,453
Other	20	13	33	280	568	848	5,713	15,946	21,659
Total	670	140	810	16,776	6,232	23,008	296,532	176,121	472,653

The cost includes transportation, per diem, and special expenses (excludes labor).

KEY:

D - Domestic  
F - Foreign  
T - Total

## ORGANIZATIONAL HIGHLIGHTS

In 1982, NBS staff participated in the activities of 97 national and international standards-writing organizations. This participation has resulted in many significant contributions to the standards system and to the Bureau. The following description of NBS participation in standards activities is provided to highlight 1982 technical and individual accomplishments. These highlights were selected by NBS center managers as representative of their various research areas and are only a part of all of NBS' standards activities. These highlights are not just limited to standards committee participation, but include highlights of significant contributions made by NBS staff to standards development in general.

### OFFICE OF THE DIRECTOR

#### Office of Product Standards Policy (OPSP)

John L. Donaldson served as U.S. representative to INFCO, the Information Committee of the International Organization for Standardization (ISO). He was a member of and was reelected to the Management Board for ISONET, the International Standards Information Network of ISO. He attended the 14th meeting of INFCO and the 10th and 11th meetings of the ISONET Management Board. Mr. Donaldson suggested to ISONET members that certification information be introduced into ISONET, which was limited to standards information.

He also visited the Egyptian Organization for Standardization and Quality Control (EOS) to assess the status of their standards information capability and to provide a basis for determining whether a related development project should be included as part of U.S. and Egyptian cooperative agreements in scientific and technical undertakings.

Walter Leight was appointed by the ASTM Chairman of the Board to the subcommittee on the International Use of Standards of the Board's Committee on the Voluntary Use of Standards. The subcommittee is concerned with the impact of ASTM and other voluntary standards on international trade and the interrelationship with the General Agreement on Tariffs and Trade (GATT) Agreement on Technical Barriers to Trade (Standards Code). Mr. Leight was also elected Vice Chair of ASTM Committee F-15, Consumer Products.

John Locke was the U.S. Delegate to meetings of Task Force C of the International Laboratory Accreditation Conference in Australia. The following Working Group Reports were prepared with input from Mr. Locke: "Report on the Selection and Training of Assessors for Testing Laboratory Assessment," "Report on Evaluating Testing Laboratories," and "Suggested Procedures for the Operation of Proficiency Testing Programs by Laboratory Accreditation Systems."

Donald R. Mackay was appointed to a 3-year term as a member of the ASTM Standing Committee on Technical Committee Operations. This committee is responsible for reviewing and revising the regulations governing ASTM



technical committees and overseeing the operations and structure of the technical committees to achieve the most efficient operation and coverage of ASTM standards development activities.

Dr. Stanley I. Warshaw was the U.S. representative at the 7th meeting of the Government Officials Responsible for Standardization Policies of the United Nations Economic Commission for Europe (ECE) and was the U.S. representative at the 10th session of the ECE Group of Experts on Standardization Policies. Dr. Warshaw also headed the U.S. Delegation to the 1982 International Laboratory Accreditation Conference (ILAC) in Tokyo, Japan. The primary purpose of the conference was to review the work of various working parties, committees, and task forces, to concur or suggest changes to the work of these groups; and to continue efforts to provide a technical basis for the development of a system of mutual recognition of testing facilities accredited in the various countries.

OPSP staff participated actively in meetings of the Trade Policy Staff Committee (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 International Legal Metrology Program of OPSP manages U.S. participation in the International Organization of Legal Metrology (OIML). During 1982, as in previous years, U.S. participation in the OIML was active and strong. The following are notable highlights of OIML activities for the year:

o Joint OIML, ISO, IEC, BIPM Program for an International Vocabulary of Metrology. In 1980, ISO, OIML, and the International Electrotechnical Commission, (IEC), agreed to collaborate on the development of an international vocabulary of metrology that was to include some 200 basic and general terms and definitions. The International Bureau of Weights and Measures (BIPM) accepted an invitation to participate in this effort and the work has proceeded rapidly under the direction of a joint task group. Five task group meetings were held in 1982, and it is anticipated that a final draft of the new vocabulary will be completed in early 1983. At that time the draft will be sent to OIML, ISO, IEC and BIPM for final review and adoption in accordance with the working procedures of each organization. The adoption process is expected to take about a year. NBS actively participated in four of the five task group meetings held in 1982.

o OIML Certification System. The OIML ad hoc task group considering the development of an international certification system in the legal metrology field met October 5-8 in Paris. The U.S. delegation included Eric Vadelund. At the meeting, the U.S. proposed an approach to certification that received serious consideration. The plan provides a mechanism by which OIML nations may enter into agreements to accept each other's certifications for instruments and goods subject to legal controls in each country. The system can be applied to those products that are already covered by established

International Recommendations issued by OIML. The scheme can be implemented by two or more of the 47 nations who are signatories to the Treaty, and would be open to all members who could demonstrate competence to evaluate and test measuring instruments. Once agreements have been developed, the participating nations would be authorized to apply the OIML mark to instruments complying with the requirements. The U.S. proposal will be presented to the next meeting of the International Committee of Legal Metrology (CML) in May 1983.

o OIML PS4 - Measurement of Lengths, Surfaces, Angles. A meeting of the International Working Group of Pilot Secretariat (PS)4 was held October 12-15 in Paris. The U.S. was represented by David Edgerly. Of the eight nations comprising the working group, six were represented at the meeting. OIML draft Recommendations covering fabric, wire, and cordage measuring devices, and covering rigid and flexible (tapes) rules were finalized at the meeting. These devices are of considerable interest to American companies who export to Western Europe and other parts of the world. New areas of work were proposed covering area measuring devices, three-coordinate machines and line width standards, but no specific work assignments were made pending further discussions within the working group.

o OIML PS5 - Measurement of Liquid Volumes. Joint OIML/ISO meetings on static liquid measurement were held September 20-28 in Romania. Eleven nations participated in the meetings. The U.S. was represented by Eric Vadelund. The two meetings were coordinated in order to harmonize OIML and ISO efforts in developing standards relating to storage tanks; calibration methods such as strapping, optical reference line or plane techniques; triangulation; photogrammetry; and laser ranging. While ISO is primarily concerned with petroleum measurement, much of their output is transferable to other fields such as chemicals and wire, which, in addition to petroleum, are of interest to OIML governments. The meetings resulted in OIML's adoption by reference of several existing ISO standards that will be used as the legal basis for the calibration of storage tanks in those OIML nations where such measurements are carried out by government officials. The meetings are good examples of the close coordination between OIML and ISO to prevent duplication of work.

o OIML PS6 - Measurement of Gas Volumes. A meeting of the International Working Group of PS6 was held October 19-21 in Paris. David Edgerly of OPSP was a member of the U.S. delegation. Recommendations concerning diaphragm and piston meters were reviewed, and the working group established a future program of work (3 to 5 years) involving the development of OIML Recommendations in the following areas: differential pressure (orifice) meters, calibration of meters, calculation of compressibility factors of gases, performance of gas volume correction devices, calculation devices incorporated in a gas measuring system, and gas calorimeters. The United States will be responsible for the work concerning the calibration of meters and calculation incorporated in gas measurement systems.

o OIML PS7 - Measurement of Mass. Two important international meetings relating to mass were held in 1982. The first covering electronic weighing instruments was held in Paris, May 17-19. The United States, as responsible secretariat, hosted the meeting attended by 13 nations. The U.S. delegation included David Edgerly and Otto Warnlof. A second draft OIML Recommendation



on electronic weighing instruments was presented and discussed at length. Major agreement was reached on important portions of the draft, but there were considerable technical problems raised concerning design proving tests (thermal shock, mechanical shock and vibration) and operational tests (static discharge, and radiated electromagnetic energy). As a result, a third draft Recommendation will be prepared by the United States and another meeting has been scheduled for September 1983 in Washington. In the meantime, the United States is cooperating with the IEC and the Netherlands to resolve the testing issues.

The second important meeting dealing with mass was held September 13-17 in Munich. The United States and the Federal Republic of Germany co-hosted the meeting attended by 14 nations. The U.S. delegation included David Edgerly and Otto Warnlof. As a result of the meeting, the following OIML Recommendations or revisions thereof were adopted at committee level and sent to OIML for final balloting:

- 1) Metrological Regulations for Non-Automatic Weighing Machines
- 2) Metrological Regulations for Load Cells and
- 3) Gravimetric Filling Machines

o OIML PS17 - Measurement of Pollution. This is an important new area of activity within OIML. The United States has the secretariat responsibility for PS17. The Environmental Protection Agency, in cooperation with OPSP/NBS, administers the work. In 1982, the U.S. National Working Group (USNWG) for PS17 was formally organized. The activities of PS17 will be developed through this group. Over 30 persons expressed interest in participating in this work, which will involve the development of International Recommendations covering performance requirements for pollution monitoring instrumentation. Included in the USNWG are representatives from Federal agencies professional organizations and trade associations and instrument manufacturers. Under PS17, the United States is considering chairmanship of two subcommittees, Reporting Secretariat RS2 on water and RS4 on pesticides. Proposals for accepting these responsibilities are being coordinated by the National Sanitation Foundation (NSF) and the Association of Official Analytical Chemists (AOAC), respectively.

o OIML PS19 - Measurement of the Characteristics of Materials. A meeting on materials testing equipment was held May 11-15 in Paris. The United States hosted the meeting. David Edgerly attended as part of the U.S. delegation. Three draft OIML International Recommendations prepared by the United States were presented during the meeting:

- 1) General Specifications for Materials Testing Machines
- 2) Specifications for Machines for Tension and Compression Testing of Materials
- 3) Specifications for Force Measuring Instruments for Verifying the Force Indication of Materials Testing Machines.

As a result of the meeting, substantial international agreement was reached on documents 1 and 2, and they have since been balloted for committee acceptance. Another international level meeting will be necessary for document 3 dealing with proving devices.

o OIML PS26 - Medical Instrumentation. During 1982, the ASTM Committee E-41 on Laboratory Apparatus expressed its interest in serving as the US Technical Advisory Group, (TAG), for OIML PS26/RS2 and RS3 dealing with pipettes for mixing blood and for determining blood sedimentation rates. Also, a U.S. delegation consisting of Helmut Altschuler (NBS Consultant), Alan Berson, National Institutes of Health, (NIH), and Peter Seaba (University of Iowa Hospitals and Clinics) participated in the meeting of PS26/RS4 on Bioelectrical Measuring Instruments in Rostov-on-Don, USSR in May 1982. The delegation provided substantial input on draft OIML International Recommendations covering electroencephalographs and electrocardiographs that were prepared by the USSR. Improvements were made to the drafts and they will be circulated for comment to OIML member nations in early 1983.

## OFFICE OF THE ASSOCIATE DIRECTOR FOR PROGRAM, BUDGET, AND FINANCE

### Planning Office

Impacts of Voluntary Standards on Industrial Innovation and Growth, is the title of a study conducted for the NBS Planning Office by Putnam, Hays & Bartlett, Inc., of Cambridge, Massachusetts. The study, completed in 1982, developed a conceptual framework to explain the roles played by voluntary standards in the industrial growth process.

A paper developed by NBS Planning Office staff, "The Role of Government in Supporting Voluntary Measurement Standards for High-Technology Industries," was published in Research Policy. The paper discussed the role of voluntary standards in industrial growth by characterizing standards as a public good and identifying the consequent detriments of underinvestment by the private sector.

## NATIONAL MEASUREMENT LABORATORY

### Office of Nondestructive Evaluation (ONDE)

During 1982, the Office of Nondestructive Evaluation (ONDE) was able to intensify its efforts to encourage the adoption of international standards for nondestructive testing (NDT) that are largely consistent with American standards. Most of these efforts have been funneled through ASTM Subcommittee E7.91, which serves as the U.S. Technical Advisory Group (TAG) to ISO Technical Committee 135 on NDT. ONDE provided support to the TAG and Dr. Leonard Mordfin, Deputy Chief of ONDE, was appointed its vice chairman.

In a paper presented at the 10th World Conference on NDT (Moscow, Aug. 23-38), Dr. George Birnbaum, described the NDT standards most recently developed at NBS. Dr. Donald Eitzen of the Center for Manufacturing Engineering, (CME), and Harold Berger, ONDE, were co-authors of the paper. Later, Franklin Breckenridge, CME, presented a paper at the sixth International Acoustic Emission Symposium (Tokyo, Oct. 31-Nov. 3), which verified the compatibility of the NBS method for calibrating acoustic emission transducers with that used in Japan. Two Japanese scientists co-authored Mr. Breckenridge's paper.



The Bureau's Nondestructive Evaluation Program has also been playing a major role since 1980 in the Defense Department's concerted effort to upgrade its standards relating to nondestructive testing and inspection. With support from the Army Materials & Mechanics Research Center, NBS scientists and engineers recorded several noteworthy achievements during 1982. Dr. Lydon Swartzendruber of the Center for Materials Science, (CMS), completely revised and upgraded the military standard for magnetic particle testing and added a new glossary of terms relevant to this nondestructive test method. Dr. Gary Yonemura of the Center for Building Technology, (CBT), formulated a standardized test for verifying the visual acuity of radiographic interpreters; Dr. Robert Placious, of the Center for Radiation Research (CRR), is developing master artifacts that will be needed to implement Dr. Yonemura's approach. Dr. Donald Eitzen, CME, assembled a carefully evaluated glossary of general terms pertaining to nondestructive evaluation and is now expanding the glossary to include terms relating to acoustic emission testing. Dr. Gerald Blessing, CME, developed a technical plan for a calibration procedure that would reduce the uncertainties in the aluminum standard reference blocks that are used in ultrasonic testing.

The Bureau-wide program on NDT is lead by Dr. Leonard Mordfin who serves as a member of the Standards and Specifications Subgroup of the Joint Services Technical Coordinating Group on Nondestructive Inspection. The Group sponsors the Defense Conference on Nondestructive Testing. This year's Conference (Nov. 2-4, Seattle) featured a presentation by Dr. James Clifton, CBT, on "Methods for Acceptance of Building Materials."

#### Center for Absolute Physical Quantities (CA PQ)

Study Group 7 of the Consultative Committee on International Radio (CCIR) provides international recommendations and operating constraints for standard time and frequency broadcasts. In addition, this organization recommends forms of expression for time and frequency measurement results, definition of terms, and appropriate performance measures for time and frequency measurement results, definition of terms, and appropriate performance measures for time and frequency devices. In 1982, CA PQ personnel, a) contributed information to meetings of U. S. Study Group 7 preparing for the 1983 International CCIR Interim Meetings, b) served in a liaison role between Study Group 7 and current preparatory efforts in the U. S. for the 1985/1987 World Administrative Radio Conference (WARC) on the use of the geostationary orbit by various CCIR space-based services, and c) chaired an international working group studying alternatives for improved time and frequency dissemination/coordination via satellite methods.

#### Center for Radiation Research (CRR)

Louis Costrell has served as project manager for the Nuclear Instrument Module (NIM) standard that is used worldwide and for the U.S. activity involving the international Computer Automated Measurement and Control (CAMAC) standards. The seven CAMAC standards processed as standards of the Institute of Electrical and Electronics Engineers (IEEE) and of ANSI were updated in 1982 and combined into a single volume (IEEE SH08482, Library of Congress Catalog No. 8185060) together with a tutorial introduction and a glossary. These

standards were processed through ANSI Committee N42, Nuclear Instruments, and the IEEE Nuclear Instruments and Detectors Committee of which Mr. Costrell is Chair and Secretary, respectively. NBS was responsible for the coordination and direction of this activity through the interlaboratory NIM Committee chaired by Mr. Costrell.

#### Center for Chemical Physics (CCP)

Two staff members of the Surface Science Division became officers in ASTM Committee E-42, Surface Analysis in 1982. Dr. Cedric Powell was elected chair of the main Committee, and Dr. Joseph Fine was appointed Chair of the Subcommittee on Standard Reference Materials.

During 1982, ASTM Committee E-47, Biological Effects and Environmental Fate, chaired by Dr. William Kirchhoff, adopted its by-laws and published its first standard on avian toxicity. Also, on October 20, a new subcommittee dealing with in vitro test methods for environmental mutagenicity was established. In vitro test methods for the evaluation of the mutagenic properties of chemicals and materials are becoming increasingly popular for assessing the hazard potential of substances. This popularity is due in large measure to the speed with which test results are obtained in comparison with whole animal tests, the low costs associated with such tests, and the high degree of correlation between the results of some of these tests and known human carcinogens. The tests involved the determination of the extent of mutations observed in cultures of bacteria and mammalian cells when they are exposed to test substances in the presence of metabolism activators. If the efforts of this subcommittee are successful, the standards developed will be extensively used by the chemical and drug industries in the evaluation of chemical hazards.

CCP staff hosted a meeting of ASTM Committee D-32, Catalysts, May 17-19 at NBS. The activities of D-32 are focused on developing standard test methods and standard materials for catalysts used in commerce. The manufacture and the use of catalysts is a multi-billion dollar enterprise in the petroleum industry, the chemical industry, and the automotive industry. The tests and methods with which the committee is currently involved are the routine physical and chemical tests conducted by all users and producers of catalysts. These include such measurements as bulk density, crush strength, pore size, surface area, elemental chemical analysis, and tests of catalytic activity. In spite of the frequent use of such tests over a long period of time, standardization has proceeded slowly, requiring many revisions of test procedures in order to produce acceptable results in round-robin testing. One of these physical tests of single particle crush strength--a simple, quick test commonly used as a measure of the catalyst's resistance to abrasion and wear--proved to be especially difficult to standardize. The meeting at NBS offered the opportunity for some committee members to conduct a round-robin test in one laboratory with each participant observing one another's procedure. This 5-hour laboratory test uncovered one aspect of the test procedure that had not been adequately specified. The participants feel that this observation has broken a 4-year and 6-round-robin log jam.



Three staff members of the Surface Science Division have completed a surface-analysis round-robin conducted under the auspices of ASTM Committee E-42, Surface Analysis. The round-robin involved measurements of kinetic energy and relative intensity on high-purity samples of copper and gold by Auger electron spectroscopy. These measurements were made using 28 different instruments manufactured by four companies. Significant variations in kinetic energies and relative intensities were found that were much greater than the precision of each measurement. The round-robin clearly demonstrated the need for calibration methods and standards for operating procedures and data analysis. A report of the round robin test was published in the Journal of Electron Spectroscopy and Related Phenomena 25, (1982).

#### Center for Analytical Chemistry (CAC)

Dr. Robert Schaffer, a member of the Council of the National Reference System in Clinical Chemistry (NRSCC), revised two proposed NRSCC Guidelines that are presently undergoing consensus evaluation. They are "Guidelines for the Development of Definitive Methods for Use in Clinical Chemistry" (NRSCC-1T) and "Guidelines for the Development of Certified Reference Materials for Use in Clinical Chemistry" (NRSCC-3T). The NRSCC is an extension of the National Committee for Clinical Laboratory Standards (NCCLS) and employs the consensus approval process of the NCCLS.

#### Center for Materials Science (CMS)

Mario J. Cellarosi, Physicist, was elected chair of ASTM Committee C-14, Glass and Glass Products. ASTM Committee C-14 has jurisdiction over the maintenance and update of some 50 test methods, specifications, and nomenclature standards related to flat glass, containers, and technical glass products. The committee also has major responsibilities in the maintenance and development of NBS Standard Reference Materials (SRM) and related methodology.

NBS SRMs and ASTM C-14 standards are widely used by industry and commerce in research and development and productivity efforts, quality control, for the evaluation of product performance and the meeting of trade specifications. Industry projections for the next decade point to increased demand for NBS glass SRMs and related measurement practices. To meet this demand, Committee C-14, which includes over 90 industrial members, has endorsed a strengthening of ASTM/NBS/industry cooperative efforts on glass standardization. To show this support, the Committee established an industry sponsored Research Associate Program at NBS. The Committee's current list of industrial priorities on which cooperative efforts are in progress comprises 10 glass SRMs and related measurement methods.

Dr. Ronald K. Eby was elected chairman of ASTM Committee D-20, Plastics, a 695-member committee responsible for the development of standards relating to plastics and their raw materials, components, and compounding ingredients; and to finished products made from plastics such as sheets, rods, tubes, pipe, cellular materials, and molded or fabricated articles. Dr. Eby was selected to the 2-year term of office in January.

Dr. Joseph H. Flynn was appointed chair of newly reconstituted Subcommittee Section, .3007, Fundamental Thermal Properties, of ASTM E-20, Plastics, which is currently involved in the development and revision of a dozen standards and test methods. Dr. Flynn also chairs the Nomenclature Subcommittee of E-37, Thermal Measurements.

Dr. Authur Ruff became chair of ASTM Committee G-2, Erosion and Wear, in January for a 2-year term.

Dr. Leslie E. Smith was named chair of Working Group 13, Reference Materials, of Subcommittee 5 of ISO Technical Committee (TC) 61, Plastics. In order to qualify materials as certified international standards, this working group is coordinating several international round-robins involving laboratories from Japan, Federal Republic of Germany, Spain, United States, United Kingdom, and other countries. The round robins will determine intralaboratory precision of molecular weight and photochemical aging measurement methods on reference materials that have already been characterized by laboratories in the sponsoring countries.

Four staff members participated in a workshop on Dry Sand Abrasive Wear Testing, organized by ASTM Committee G-2, Erosion and Wear, held in St. Louis, Missouri on June 9. A technical paper was presented by Lewis Ives describing his studies of the effects of temperature, humidity, and sand flow rate on wear. A description was presented of the new SRM for abrasive wear testing provided by NBS in late 1982. There was considerable interest expressed by the industrial representatives present in this new capability for improved, standardized abrasive wear testing.

A new standard for solid particle impingement erosion testing received final approval in ASTM Committee G-2, Erosion and Wear. The standard, developed with NBS leadership, will become the first U.S. standard for measuring erosive wear in the laboratory, and will permit meaningful comparisons between materials and coatings in terms of their erosion resistance. Four interlaboratory test comparisons were carried out over a period of 3 years during the development of the standard. A paper was presented by Authur Ruff describing these efforts at a workshop on Erosion Testing at the December 1 meeting of committee G-2 at Williamsburg, Virginia.

The first recommended corrosion test procedure, ASTM F746, for surgical implant metals, developed by ASTM Committee F-4, Medical and Surgical Materials and Devices, was approved in 1981 and went in the 1982 ASTM Book of Standards. The Metallurgy Division participated in numerous round-robin tests over a 4-year period and provided information for a number of drafts which led to the procedure which was adopted. The test will be useful in determining pitting and crevice corrosion behavior of implant metals, and can be used in developing performance standards for metal medical devices. In conjunction with the approval of this test, Anna Fraker and A. C. Van Orden in the Metallurgy Division have prepared a SRM which can be used with the adopted procedure.



Dr. Wolfgang Haller, serving as a task force chair on interlaboratory testing, played a key role in the development and October 1982 certification of NBS Glass SRM 774 for Dielectric Constant and Loss Characteristics. Development of SRM 774 and improved methodology was carried out by NBS in collaboration with ASTM Committee C-14, Glass and Glass Products, and industrial/academic laboratories. The new standard will provide support to the expanding role of glass in electrical/electronic applications, energy conservation efforts, and evaluation of material properties.

Under the leadership of Dr. Bruce W. Christ, ASTM Task Group 28.04.03 wrote a draft standard, "Verification of Alignment Under Tensile Loading," which was successfully balloted at the subcommittee level during the summer of 1982. Development of this method was requested by the ASTM-Metal Properties Council Subcommittee on Test Methods under the Joint Committee on the Effect of Temperature on the Properties of Metals. This method is useful in at least nine existing ASTM test methods dealing with tensile testing, stress rupture testing, and uniaxial fatigue testing that refer to the need for verification of alignment. This draft standard is scheduled to undergo an ASTM E28, Mechanical Testing, Main Committee ballot in the spring of 1983.

A Task Group on the Properties of Materials at Cryogenic Temperatures has been organized under the auspices of CMS and the Metal Properties Council to develop standards for fusion magnet applications. These standards are of interest to the evolving energy technologies in the United States that require the use of superconducting magnets. The Task Group held two organizing meetings in 1982: one at the General Electric Company, Schenectady, New York, and one at NBS/Boulder.

A revision of the ANSI/American Dental Association (ADA) Specification No. 17 "Denture Base Temporary Relining Resins" has been accepted by ANSI/ADA Specification Committee, subject to approval by ANSI. This document is the first revision of the specification that was adopted originally in 1961. The revised specification is now completely independent of other specifications dealing with relining resins. The draft was written by Gehard Brauer, Dental and Medical Materials Group, Polymer Science and Standards Division.

An addendum to an existing ASTM method for the determination of molecular weight and molecular weight distribution by size exclusion chromatograph was written by Herman Wagner of the Polymer Science and Standards Division. The addendum falls under the jurisdiction of ASTM Subcommittee D-20.70, Analytical Methods of D-20 Committee, Plastics, and is expected to be adopted after a few modifications are made.

#### INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY (ICST)

In 1982, the Institute for Computer Sciences and Technology continued to develop Federal Automatic Data Processing (ADP) standards and guidelines. Significant accomplishments during 1982 included the issuance of the following Federal Information Processing Standards Publications (FIPS PUB), and other standards-related publications:

### FIPS PUBs

FIPS PUB 91, Magnetic Tape Cassette for Information Interchange, Dual Track Complementary Return - To Bias (CRB) Four-States Recording on 3.81 mm (0.50 in) Tape; adopts ANS 3.59 (1981)

FIPS PUB 93, Parallel Recorded Magnetic Tape Cartridge for Information Interchange, 4-Track, 6.30 mm (1/4 in), 63 bpm (1600 bpi) Phase Encoded; adopts ANS X3. 72-1981

### Standards Related Publications

NBS Special Publication 500-85, Executive Guide to ADP Contingency Planning

NBS Special Publication 500-86, An Architecture for Database Management Standards

NBS Special Publication 500-87, Management Guide for Software Documentation

NBS Special Publication 500-88, Software Development Tools

NBS Special Publication 500-90, The Introduction of Software Tools

NBS Special Publication 500-91, Guide to Contracting for Software Conversion Services

NBSIR 82-2482, A Survey of Software Validation, Verification, and Testing Standards and Practices at Selected Sites

NBSIR 82-2573, An Annotated Bibliography of Introductory Articles to Aid in the Selection of Small Computer Systems

### Center for Programming Science and Technology (CPST)

Dr. Leonard J. Gallagher was appointed as the International Representative for Subcommittee H-2, Database, of ANSI Technical Committee X3. This committee is nearing completion of a draft standard for database management systems based on the network data model and has recently begun work on a new project for relational systems. The key aspect of both projects is definition of abstract database syntax accessible from multiple programming languages or other application systems.

Mark Skall was invited to attend a Workshop on Certification and Validation of Graphics Standards sponsored by the European Economic Community (EEC). The workshop was held in Brussels, Belgium on October 25-29. Approximately 25 experts from seven different countries were invited to the Workshop.

James V. Upperman was appointed chair of ANSI subcommittee X3L5, Labels and File Structure. Present activities of this committee include revision of the Magnetic Tape Label Standard and development of a Data Descriptive File for Information Interchange.



Draft functional specifications for data dictionary systems (DDS) have been developed under contract for the ICST Data Management and Programming Languages Division, Data Administration Group. These draft specifications have been contributed to American National Standards Committee X3H4, which is working in this area. A DDS is a key computer software component that provides for recording, storing, and processing information about data and its usage. Use of a DDS provides benefits such as reduced duplication of data collections; better documentation of databases, files, programs and systems; improved software development and maintenance; and increased opportunities for data sharing.

Also during 1982, three highly successful technical workshops were held at NBS to address issues that were identified as fundamental to the development of the Federal DDS functional specifications. Invitations to the workshops were extended on a selective basis to Federal representatives well versed in the use of data dictionary software.

The Database Systems Study Group, the database planning and coordination committee of ANSI X3 under the chairmanship of Dr. Walter Hardgrave, has issued a report entitled, An Architectural Framework for Database Standardization, which was strongly influenced by NBS Special Publication 500-86, An Architecture for Database Management Standards. The framework supports the concept of a family of database management standards including integration of multiple data models, query languages, programming language interfaces, data dictionaries, and distributed databases. In progress under this framework are standards development projects for X3H2 (Database) to develop programming language independent database facilities for the network and relational data models and for X3H4 to develop an information resource dictionary system.

#### Center for Computer Systems Engineering (CCSE)

Specifications for the class 4 transport protocol were approved as a draft proposal in June by TC97/SC16 of the International Organization for Standardization. Developed principally by Center staff in cooperation with industry and government organizations, the specifications will become the basis of a future international network standard. ICST is also completing specifications for the class 2 transport protocol, another component in the 5-part class structure for the transport protocol as defined by ISO. These international network standards will enable computer users to develop networks from off-the-shelf products that are supported by different vendors.

Three computer input/output standards, co-authored by William Burr, CCSE, are being processed as draft proposed American National Standards. Developed by ANSI Committee X3T9, the standards are "Physical and Data Link Protocols," "Physical Interface," and "Local Distributed Data Interface (LDDI)." The latter, for use in connecting high performance computer systems to each other and to their peripheral devices, is also being proposed as a Federal Information Processing Standard (FIPS). Robert J. Carpenter and others in the Center have supported this effort through their activities in the high speed interface laboratory.

A Standards Working Group established by the Speech Processing Technical Committee of the Institute of Electrical and Electronics Engineers (IEEE) Acoustics, Speech, and Signal Processing Society met at NBS in June 1982. The group was organized to address needs for standards and guidelines for assessing the performance of speech recognition systems. These needs were identified at the Workshop on Standardization for Speech Input/Output Technology organized by the Center and held at NBS in March 1982.

Dennis Branstad and Miles Smid made major technical contributions to the development of computer security standards for the financial community. Mr. Smid was the primary government representative to ANS Committee X9E8 during the development of the Financial Institution Message Authentication Standard (ANS X9.9-1982). Dr. Branstad was the technical co-chair of ANS Committee X9A3 during the development of the American National Standard for Personal Identification Number (PIN) Management and Security (ANS X9.8-1982). Two other security standards, currently undergoing final review prior to adoption by ANSI, are based on technical work done by the Center staff. These standards, "Modes of Operation of the Data Encryption Algorithm" and "Encryption at the Physical and Link Layers of Data Communication," are also under consideration by the International Organization of Standardization.

#### NATIONAL ENGINEERING LABORATORY

##### Law Enforcement Standards Laboratory (LESL)

In 1982, 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:

- o NIJ Standard-0109.00, 38/357 "Caliber Revolvers"
- o NIJ Standard-0220.00, "Continuous-Recording Voice-Logging Tape Recorders"
- o NIJ Standard-0222.00, "Surveillance Receiver/Recorders"

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

- o NIJ Standard-0108.00, "Ballistic Resistant Protective Materials"
- o NIJ Standard-0216.00, "Control Heads and Cable Assemblies for Mobile FM Transceivers"
- o NIJ Standard-0204.01, "Fixed and Base Station Antennas"
- o NIJ Standard-0307.01, "Metallic Handcuffs"
- o NIJ Standard-0106.01, "Ballistic Helmets"
- o NIJ Standard-0501.00, "Emergency Vehicle Sirens"

LESL also completed the development of a standard for breath alcohol sample collection/storage devices, which will be issued by the National Highway Traffic Safety Administration (NHTSA). In addition, NHTSA has issued a model



specification for speed measuring radar devices based on a performance standard developed by LESL for use by State and local law enforcement agencies and manufacturers.

#### 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 Life-Cycle Costs of Buildings and Building Systems." The recommended practice was approved by ASTM's E.6 Committee on Building Performance and Constructions in 1982, and it will become an official ASTM standard as soon as it passes the Society ballot.

ASTM Standard G-970-82, "Standard Practice for Sampling Special Nuclear Materials in Multi-container Lots," will appear in the next issue of Part 45 of the ASTM Book of Standards. It was developed by the Subcommittee on Statistics of Committee G-26 CAM Nuclear Fuel Cycle, chaired by Dr. James A. Lechner of the Statistical Engineering Division. The Standard Practice deals with the choice of sampling plans for minimizing cost for a given precision, or maximizing precision for a given cost, when seeking to estimate the total amount of nuclear material in a lot consisting of many separate containers.

Special Committee 150 of the Radio Technical Commission for Aeronautics was formed in 1982 to evaluate the possibility of decreasing the standard vertical separation for aircraft above 29,000 ft. from the current 2,000 ft. to 1,000 ft. (it is already 1,000 ft. for lower altitudes). Several groups have been investigating this problem for many years, and it is hoped that the current effort will settle the matter. One group has produced a full-scale risk analysis model adapted from an earlier model applied to transatlantic flights.

#### Center for Electronic and Electrical Engineering (CEEE)

James R. Ehrstein was appointed vice chair of Subcommittee 6, Electrical and Optical Measurements, of ASTM Committee F-1, Electronics. The subcommittee is concerned with development of test methods and measurement practice standards for determining such properties of semiconductor materials as resistivity, carrier mobility and lifetime, and thickness of films. Such measurements are required for materials acceptance and for manufacturing process control purposes. Dr. Ehrstein has been a member and significant contributor to the work of Committee F-1 and Subcommittee 6 since 1969.

R. A. Lawton was elected chair of the Measurement and Analysis Technical Committee, TC-10, of the Instrumentation and Measurement Society of the IEEE. The first task of this committee is to develop a generic performance standard for waveform recorders. This committee, organized in February 1982, is the result of a seminar on waveform recorders held in October 1981, which was organized by Mr. Lawton and Norres Nahman both of the NBS/Boulder Laboratories.

Dr. Martin Misakian was selected to serve as secretary to the newly formed International Electrotechnical Commission (IEC) Working Group No. 6 established by IEC TC 42 in June 1982. This Working Group is given the responsibility of

rewriting an existing draft standard for measurement of power frequency electric fields so that it may be considered for adoption by the parent technical committee in 1985. The revisions of the draft will be made at NBS in consultation with Working Group members. 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.

Under the chairmanship of Dr. Raymond S. Turgel, ANSI Committee C-12, Electricity Metering, completed a revision and update of the "American National Standard Code for Electricity Metering," which serves as the principal guideline for revenue metering of electricity throughout the power industry. The new edition includes recently developed 320 ampere meters as well as solid-state instruments used for meter calibration.

Two staff members, Douglas Franzen and E. M. Kim, sponsored a measurement round-robin on the core diameter of optical fibers. Participants included NBS and three manufacturing members of the Electronic Industries Association (EIA) Working Group P6.6. Tested were six, 50 micrometer diameter core, graded index fibers used for telecommunication purposes. Results from the comparison are being applied to the drafting of standard EIA test procedures for core diameter. A complete description of the comparisons appears in the October 1982 issue of Applied Optics.

Drs. Douglas Franzen and Gordon Day, program co-chairs, and R. L. Gallawa (General Chair) provided the technical and organizational guidance for a Symposium on Optical Fiber Measurements held October 13-14 in Boulder. The Symposium was sponsored by NBS in cooperation with the IEEE and the Optical Society of America. The Symposium was devoted exclusively to fiber measurements and consisted of invited papers, contributed papers, and workshops led by invited panelists. The Technical Digest of papers is available as NBS Special Publication 641 (October 1982).

Drs. R. L. Gallawa (Editor), Gordon Day and M. Young were instrumental in the development of a glossary of terms pertaining to the new technology of optical fiber communications. The work is published as NBS Handbook 140, Optical Waveguide Communications Glossary. The document has been accepted by the IEEE as IEEE Standard 812-1982, "Terms and Definitions," and by the Electronics Industries Association (EIA) as RS440, "Standard Definitions and Terms."

Several staff members of CEEE have successfully guided the first standards concerning superconductors through adoption by ASTM. Two draft standards based on research performed at NBS have unanimously passed the ASTM B-1 Committee on Conductors. The first standard is "Standard Definitions of Terms Relating to Superconductors" and is derived from several publications of the CEEE staff on accurate and meaningful definitions developed for this new field. The second is "Standard Test Method for Critical Current in Composite



Superconductors" and is the first standard method ever developed for a superconducting critical parameter. This method is based on 3 years of research by the CEEE staff co-sponsored by the Department of Energy (DoE), under the direction of Alan Clark. Adoption by ASTM is expected soon. Work leading to these standards is reported in NBSIR 82-1678 "Development of Standards for Superconductors," by Alan Clark, Loren Goodrich, Fred Fickett, and J. V. Minervini.

CEEE staff arranged a meeting of the ASTM E01.08 Subcommittee on Superconductors to discuss measurements on large superconductors that carry from 600 to 6000 amperes. Alan Clark, chairman of the subcommittee, organized the meeting, held in conjunction with the Applied Superconductivity Conference in Knoxville, Tennessee on November 29. Presentations on large conductor critical current measurements and other measurement problems were presented by many of the national laboratories as well as by NBS. Discussion of the problems leading to an ASTM standard test method will guide future NBS research.

Dr. Alan Baghdadi was appointed chairman of an ASTM F-1 task force on the automatic determination of carbon and oxygen in silicon by infrared absorption. The task force had its first meeting on September 20 in Boston. This meeting was coordinated with the Standards Office of the Semiconductor Equipment and Materials Institute. All the important aspects of IR measurements of silicon wafers were thoroughly discussed. Agreement was reached in the following important areas:

1. the need for a set of standard reference materials that could be used as part of an instrument verification procedure, as zero-reference standards, and as a calibration check on the accuracy of measurements.
2. the extension of the IR technique in order to make it applicable to typical semiconductor wafers that may be as thin as 300  $\mu$ m, have a resistivity as low as 0.5  $\Omega$ cm and include a variety of back surface conditions; and
3. a statistical method for determining the random error in the measurement.

Further development of the procedure awaits the results of certain metrological steps that are at present being tested by various members of the task force.

James Ehrstein and James Lechner, of the Center for Applied Mathematics completed analysis of a round-robin in support of ASTM F-525, "Measuring Wafers of Silicon Wafers Using a Spreading Resistance Probe." The round-robin was conducted by NBS.

James Ehrstein, chaired a session on In-Process Measurements at a Symposium on Silicon Processing jointly sponsored by ASTM Committee F-1, Electronics, NBS, and Stanford University, held in San Jose, California, January 19-22.

The precision and accuracy statements, developed by Donald Novotny, from an analysis of round robin results on ASTM Standard F-66, "Standard Methods for Testing Photoresists used in Microelectronic Fabrication," and F-583, "Standard Test Method for Photoresist Cleanness-Filterability," were approved by ASTM Committee F-1, Electronics. These precision and accuracy statements appeared in the 1982 Annual Book of ASTM Standards, Part 43.

Three draft standards were completed by Stanley Ruthberg on the hermetic testing of sealed devices by radioisotope procedures for the ASTM Committee F-1 on Electronics. This effort was based on a round-robin with 10 participating laboratories which was carried out in 1975 and 1976. An analysis of the results was published in 1977 with the NBS staff member serving as co-sponsor and participant as well as being responsible for analysis. The "Standard Method for Determining Hermeticity of Sealed Devices by a Radioisotope Test" is in publication as ASTM Standard F-785-82. The "Standard Method for Calibration of Radioisotope Hermetic Test Apparatus" is in committee ballot and the "Standard Method for Measuring the Package Attenuation Coefficient of a Sealed Device for Radioisotope Hermetic Test" has been sent to the subcommittee for balloting.

A meeting in Tokyo was held (December 1981) at the initiative of Robert Scace, to open discussions on technical interactions and possible standards rationalization work between the Japan Electronics Industry Development Association (JEIDA) on the one hand and ASTM Committee F-1 on Electronics and the Semiconductor Equipment and Materials Institute (SEMI) on the other. The counterpart DIN committee on Materials for Semiconductor Technology, which has had an excellent technical relationship with ASTM and SEMI for a number of years, was also represented. As a result of this meeting copies of existing standards were exchanged and analyzed for technical differences during 1982. JEIDA representatives attended meetings of both ASTM F-1 and SEMI, and presented data on current Japanese standards development work. A second meeting was held December 6 in Tokyo to discuss the agenda of differences and to find ways in which these might be resolved.

An analysis of an NBS-organized interlaboratory experiment (for the ASTM Subcommittee F-1.11 on Quality and Hardness Assurance) revealed several deficiencies in ASTM Standard Test Methods F-617 and F-618 for measuring the threshold voltage of metal-oxide-semiconductor field-effect transistors (MOSFETs) under linear and saturated operating conditions. The ability to precisely measure threshold voltage is important because it is a basic parameter for: a) designing and applying MOSFET devices and MOS integrated circuits; b) for determining performance attributes such as speed, power, and noise margin of digital and analog circuitry, and c) determining device damage caused by ionizing radiation. This analysis will result in a revision of ASTM and military standards for threshold voltage measurement. Harry A. Schafft of CEEE Semiconductor Devices and Circuits Division is conducting this work at the request of the Defense Nuclear Agency.



### Center for Manufacturing Engineering (CME)

On September 28-30, CME hosted, at NBS, its second Workshop on Robotics Interface Standards. Attendees from government, industry, and academia met to identify areas in need of standardization activity as well as those where it would be premature. The session identified standardization opportunities in possible areas of mechanical systems, external control data, sensory interaction, safety, and communications. In the first three areas, specific robot interfaces were targeted as timely and needed. The safety group agreed that a comprehensive set of guidelines should be developed as it would more immediately address the problem. The communications group underscored the need for good quality network links to robotic systems and pointed out that much effort was already underway in the more general field. A general consensus of the workshop was that quality interface standards will help both users and vendors integrate robotics more easily into their plans for developing advanced manufacturing systems.

### Center for Building Technology (CBT)

Elizabeth J. Clark received the ASTM Award of Merit for "significant contributions to the development of standards for materials used in solar energy systems."

James G. Gross was awarded the National Conference of States on Building Codes and Standards' (NCSBCS) "Conference of States Award" in recognition of his outstanding contributions to the conference and to the building codes and standards profession. NCSBCS is an organization of delegates, with major building codes and standards responsibilities, appointed by the Governors of each of the States and U.S. territories. Mr. Gross was also named chair of the Research Subcommittee of ASTM E-6, Performance of Building Constructions, effective October. This new subcommittee is charged with the functions of encouraging building research and the dissemination of research results. It will represent E-6 in cooperative research related activities with other national and international organizations.

Dr. H. S. Lew has been named Chair of Committee 228 of the American Concrete Institute. The committee develops standards of practice for the application of non-destructive test methods in concrete construction.

James H. Pielert was appointed Chair of the newly formed American Society of Civil Engineers (ASCE) Standards Committee on Structural Condition Assessment of Existing Buildings. This standards activity was established at the request of NBS as a result of the CBT Building Rehabilitation Technology Program. This is one of five ASCE standards committees currently operating under the auspices of ANSI.

Elmer Streed, a retired member of CBT, received ASTM's Award of Merit at the May meeting of ASTM Committee E-44, Solar Energy Conversion. This award was given for Mr. Streed's leadership during the early days when Committee E-44 was formed and for his contributions to the development of several ASTM standards on solar energy.

Dr. Richard N. Wright served as secretary to the Technical Council on Codes and Standards of the American Society of Civil Engineers during 1982. This Council is responsible for planning and providing oversight for all of ASCE's standards development activities. In addition, Dr. Wright has been named chair of the Council's Committee on Standards Procedures for 1983.

A draft ASTM standard on the use of the maturity method for estimating the in-place strength of concrete, based on research conducted by Drs. Hai Lew and Nicholas Carino, has been prepared for Subcommittee C.09.02.05 (Non Destructive Testing) of ASTM Committee C-9 on Concrete and Concrete Aggregates.

The American Society of Heating and Air Conditioning Engineers (ASHRAE) approved Standard 103-1982, "Methods of Testing for Heating Seasonal Efficiency of Central Furnaces and Boilers" which is based substantially on the research of CBT's Building Equipment Division. This research is described in the following two reports: (1) NBSIR 78-1543, Recommended Testing and Calculation Procedures for Determining the Seasonal Performance of Residential Central Furnaces and Boilers, October 1978; (2) NBSIR 80-2110, Recommended Testing and Calculation Procedures for Estimating the Seasonal Performance of Residential Condensing Furnaces and Boilers, April 1981. These procedures were developed for the Department of Energy for use in the mandatory Appliance Labeling Program. In February, the Gas Appliance Manufacturers Association (GAMA) organized and began their efficiency certification program for oil and gas furnaces. They are using these same testing procedures.

ASHRAE recently formed Standard Project Committee 115P to develop a standard method of testing dedicated water heating heat pumps. The testing procedure developed at NBS will be a significant factor in the development of this standard.

The National Solar Heating and Cooling Demonstration Act of 1974 required the National Bureau of Standards to develop interim performance criteria for solar heating and cooling systems within 90 days of the enactment of the law. It also required NBS to develop definitive performance criteria at the completion of the demonstration program. During 1982, the latter requirement was met by the publication of NBS Building Science Series 147, Performance Criteria for Solar Heating and Cooling Systems in Residential Buildings. This report is expected to be a primary basis for building codes and standards covering residential solar heating and cooling systems.

In February 1982, NBS Building Science Series 140, Analytical and Experimental Analysis of Procedures for Testing Solar Domestic Hot Water Systems was published. This report describes more than three years of research which was the basis for ASHRAE Standard 95-1981, "Methods of Testing to Determine the Thermal Performance of Solar Domestic Water Heating Systems." It is the first solar energy standard adopted that requires the testing of a complete solar system rather than individual components.



CBT research on materials for use in solar energy systems provided the technical bases for two new ASTM standards:

- 1) E861-82, "Practice for Evaluating Thermal Insulation Materials for Use in Solar Collectors" and,
- 2) E862-82, "Practice for Screening Polymeric Containment Materials for the Effects of Heat Transfer Fluids in Solar Heating and Cooling Systems."

These standards were developed under the auspices of ASTM Committee E-44, Solar Energy Conversion. The research leading to the standards' development was supported by the Office of Solar Heat Technologies of the Department of Energy.

Dr. William Kovacs from the Geotechnical Engineering Group of CBT conducted research on the Standard Penetration Test (SPT). The research has been used to update the current ASTM standard for performing a soil boring investigation test which is used in about 90 percent of all foundation engineering investigations in the United States. In addition, a new companion standard for energy measurement of the SPT hammer has been proposed based on NBS work. Articles on the most recent work were published in the ASCE Journal of the Geotechnical Engineering Division (April 1982) and in the ASTM Geotechnical Testing Journal (May 1982).

Drs. Felix Yokel and Riley Chung developed criteria for shallow soil anchors used in foundations for manufactured homes. The work was published as NBS Building Science Series 142 and has been widely distributed throughout the manufactured home industry as well as to regulatory agencies. At present, NBS is working on a task group appointed by the chairman of ANSI Committee A225, Manufactured Home Installations, to refine and revise the provisions of Chapter 3 of the ANSI "Standard for Manufactured Home Installations," which deals with foundations.

American National Standard A-58, "Minimum Design Loads for Buildings and Other Structures," was published in September by the American National Standards Institute. The A58 Committee represents a broad spectrum of interests in building construction. CBT serves as the Secretariat to the A58 Committee, and is responsible for managing and coordinating A58 standard revisions. The new A58 standard incorporates many findings of CBT research programs on structural loads and several staff members have made significant contributions to it.

The revised A-58 standard is used as a basic resource by model building codes and is an example of the cooperation that can be achieved among the many parties having interest in building technology in the public and private sectors.



### Center for Fire Research (CFR)

Dan Gross received the S.H. Ingberg Award from ASTM Committee E-5, Fire Standards, at the Committee's June meeting in Toronto. The award, established in 1969, recognizes achievements in fire research including the development of standards relating to fire tests. It is named for Simon H. Ingberg, the pioneering engineer who helped develop and establish many of the basic fire test methods during a distinguished NBS career which started prior to World War I. Mr. Gross was also named Recording Secretary of ASTM E-5 on Fire Standards.

As part of a project sponsored by the Department of Health and Human Services, the Fire Safety Evaluation System (FSES) for Board and Care Homes was completed, field tested, and submitted to NFPA for inclusion in the Life Safety Code, NFPA 101. This system provides a method for assessing the capability of residents and staff to evacuate the home, for determining the minimum level of safety required for a particular occupancy, and for evaluating and equivalency of design features in terms of minimum requirements. Dr. Bernard Levin was awarded the 1982 Martin Van Hook Service Award of the National Association of Private Residential Facilities for the Mentally Retarded in recognition of his work on the preparation of this system.

An evaluation system for prisons, based on an approach similar to that followed in the Fire Safety Evaluation System for Board and Care Homes, has also been developed. The 1982 Life Safety Code has adopted "A Recommended Method of Calculating Expected Level of Smoke in a Smoke Removal Equipped Cell Block," developed jointly by Leonard Y. Cooper and Harold E. Nelson. Dr. Nelson and Mr. Cooper were also participants in the development of the 1982 NFPA 204M "Guide for Smoke and Heat Venting" which was prepared by the NFPA Committee on Building Construction.

Dr. Barbara C. Levin was appointed as a member of the U.S. Technical Advisory Group (TAG) to Subcommittee 3 (Toxic Hazards in Fire) of ISO TC 92, Fire Tests. The TAG is responsible for establishing a U.S. consensus position on proposed ISO TC 92 standards actions including fire modeling, analytical methods, biological assay test methods and guidance documents.

At a meeting of the NFPA Committee on Heat Producing Appliances, changes to the model code relating to clearances and methods of protection of surfaces for reduced clearances were agreed upon. The proposed changes based on DOE/CPSC sponsored research conducted by Richard Peacock and Joseph Loftus (NBSIR 82-2506) broadened the allowable alternatives for wall and ceiling protection systems. The proposed changes to the code will be printed by NFPA for public comment prior to final adoption which is anticipated in the fall of 1983.

Strengthening the cooperative efforts between CFR and NFPA was the subject of meetings held at NBS and NFPA during the year. The President and principal Vice-Presidents of NFPA were briefed on the CFR programs and discussed future applications of FSES, coordination of CFR projects with the newly-formed NFPA Research Foundation, and continuation of a NBS contract with NFPA on fire investigations.

Dr. Clayton Huggett, a member of the NFPA Standards Council, served on a subcommittee of the Council charged with developing guidance for NFPA Technical Committees on means of considering the threat due to the toxicity of combustion products in NFPA fire safety codes and standards. The report of the subcommittee was submitted to the NFPA Board of Directors in December 1982. Dr. Huggett served on a similar Task Force established by the National Institute of Building Sciences to consider methods of dealing with combustion product toxicity in the building codes.

CFR staff members were very active at Task Group, Subcommittee, and the twice-yearly Main Committee meetings of ASTM Committee E-5, Fire Standards. The proposed standard test method for a full-scale room fire test of wall and ceiling materials and assemblies, based in large part on research conducted by William J. Parker, is scheduled to be printed as a proposal in Part 18 of the 1982 Annual Book of ASTM Standards. The CFR work was supplemented by a grant to the University of California (Berkeley), which provided a report on the evaluation of the test method. As part of CFR's study of room fire testing, a quarter-scale room fire test has been developed as an alternative when full-scale testing is impractical. Using the quarter-scale test, finalized by Billy Lee, the set-up time and cost associated with fire testing in a full-size room may be reduced considerably.

J. Randall Lawson and William J. Parker recently published a report describing an ease-of-ignition test based on direct flame impingement which may be used to measure the time to ignition of interior finish materials. This test, which is currently being considered in ASTM Committee E-5.12, Openings, and has undergone preliminary round-robin testing, may also be used to provide data for computer modeling of fire growth in compartments.

Vytenis Babrauskas completed a report, describing the development of a bench-scale rate-of-heat-release apparatus ("Cone Calorimeter") suitable for testing furnishing and construction materials in the vertical and horizontal orientations. Based on the simple oxygen consumption principle originated in CFR, this test was described at the December 1982 Research Review Session of ASTM E-5, Fire Standards, and subsequently submitted for E-5 consideration. Other presentations at the Research Review Session were by Margaret Harkleroad on a new concept in flame spread testing and by William J. Parker on a review of ASTM E-84.

A final report was prepared by Barbara C. Levin, et al, summarizing the development of a screening test procedure for assessing acute inhalation toxicity of combustion products. This test provides determination of "LC<sub>50</sub>" concentrations and analytical and physiological measurements based on the burning of a small quantity of material in a furnace under specified conditions. Such data may subsequently be combined with information on actual product use (quantity, configuration, ignition and burning characteristics, building design and occupancy) to evaluate potential toxic hazard. This screening test protocol is being prepared in ASTM format for consideration by ASTM E-5.21, "Smoke and Combustion Products." Dr. Clayton Huggett serves as the principal member of this Subcommittee.



The CFR-developed Flooring Radiant Panel Test (ASTM E-648) will form the basis for a working draft of an ISO Draft International Standard for flammability testing of textile floor coverings. ISO TC 38 on Textiles has an interest in the method which is referenced in the NFPA Life Safety Code and in U.S. model building codes, and is used widely by government and industry.

The United States hosted a meeting of ISO TC 92, Fire Tests, and TC 92 SC 1, Reaction to Fire, during the week of October 4-8, at the Factory Mutual Conference Center in Norwood, Massachusetts. A total of 47 delegates representing 13 countries attended these meetings and reached conclusions on international standards and draft proposals including those dealing with ignitability, flame spread, smoke generation, and fire doors. Daniel Gross, chair of the U.S. Technical Advisory Group, helped arrange the meetings and served as leader of the U.S. delegation to TC 92; other CFR personnel attending were Dr. Alexander Robertson and William Parker.

Dan Gross participated as a technical expert in Working Group meetings of ISO TC 92 SC 2 at the Fire Research Station, England, in May. 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 U.S.

Dr. Alexander Robertson participated as a technical expert in Working Group meetings of ISO TC 92 SC 1 at DANTEST in Copenhagen in May. These Working Groups are actively processing test standards and draft proposals dealing with ignitability, flame spread, rate of heat release, smoke generation and noncombustibility; these topics parallel similar research and standardization activities in the United States. Dr. Robertson was also active in his role as consultant to the U.S. Coast Guard which participates in the International Maritime Organization (IMO). IMO, which adopts fire test methods for qualifying marine materials for merchant vessels, is considering the new radiant panel test method developed by Dr. Robertson for testing and qualifying interior finish materials for surface flame spread.

#### Center for Chemical Engineering (CCE)

Dr. Ared Cezairliyan was the recipient of the 1981 Heat Transfer Memorial Award of the American Society of Mechanical Engineers. The award was given for Dr. Cezairliyan's sustained record achievement in the experimental determination of thermophysical properties of materials at very high temperatures, for his development of unique and very fast measuring techniques at high temperatures and for his leadership in the international thermophysical properties research community.

Dwain E. Diller was appointed to the American Gas Association (AGA) Special Committee to update AGA-3, the U.S. National Standard for the custody transfer of natural gas.

The American Society for Testing and Materials (ASTM) has issued "Methane Thermophysical Property Tables" as ASTM Standard D-3956. The standard is based entirely on NBS Technical Note 653 by Robert D. Goodwin of the Thermophysical Properties Division. NBS data for propane, normal butane, and isobutane have been submitted to ASTM Committee D-3 for standardization.

The U.S. gas industry has undertaken a major research program to significantly upgrade the U.S. standard for custody transfer of natural gas, known as AGA-3 (ANSI/API 2530). The measurements on which AGA-3 is based were taken in the 1920's and 1930's, in addition, the price of gas has increased by a factor of 10 or more in the intervening years putting a higher premium on accuracy. The Gas Research Institute is funding a project in CCE which uses a mass-based gas flow measurement system to test the accuracy and reproducibility of results from a series of orifice meter components specially made for this and related projects. Thus far over 1000 data points have been taken in the range of 800,000 to 4,000,000 bore Reynolds number. These data increase greatly the experimental orifice discharge coefficients available for developing a new flow measurement standard.

The Center has completed the initial phase of a program to develop an extensive database of orifice meter parameters in water flows. These data will allow calculation of the values of orifice meter discharge coefficients which are expected to form the basis for revision of current ANSI and ISO standards. The program is sponsored by the American Petroleum Institute.

CCE, with assistance from the Center for Chemical Physics, is preparing a series of measurement standards for custody transfer of liquefied natural gas (LNG). The work is sponsored by the Groupe International des Importateurs de Gaz Naturel Liquéfie (GIIGNL). The standards will be published in the form of a series of Measurement Handbooks covering such topics as: heating values of natural gas and its components; density of LNG based on composition, temperature, and pressure; flow measurement of LNG; liquid level determination in tanks in ships and on shore; direct reading LNG densimeters; etc. The first of the series will be ready for publication in the fall of 1983.



## 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 1982 for standards related activities:

Dr. Harold E. Nelson, CFR, (NEL), for the development of an innovative fire safety evaluation system that provides a means of evaluating alternative arrangements to achieve compliance with the provisions of the Life Safety Code for hospitals, nursing homes and intermediate care facilities.

Dr. Geoffrey J. C. Frohnsdorff, CBT, (NEL), for the formation of a building materials program that has provided the technical basis for eight ASTM standards covering the use of new materials in solar energy systems. These standards led to significant improvement in the reliability of solar energy systems.

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 the high level of achievement in the early years of the Bureau.

In 1982, the Rosa Award was presented to Elmer H. Eisenhower, (NML) for significant contributions to the development of standards and measurement quality assurance programs designed to assure the accuracy of ionizing radiation measurements that are relied upon to protect workers and the general public from exposure to ionizing radiation.

APPENDIX I

THE OFFICE OF PRODUCT STANDARDS POLICY

## OFFICE OF PRODUCT STANDARDS POLICY

In May 1982, OPSP was transferred within the Department of Commerce to the Office of the Director, NBS. At the same time, the scope and responsibilities of OPSP were broadened to encompass the formulation and implementation of policy on national and international legal metrology in addition to similar responsibilities in the areas of standards and laboratory accreditation. As a result of this consolidation of standards-related functions, OPSP is in a position to provide leadership in the development and implementation of unified coherent Federal standardization policies. Internally, OPSP is organized into four programs. The programs and their major responsibilities are described below.

### Standards Code and Information Program

- o Fulfills assigned responsibilities under the General Agreement on Tariffs and Trade (GATT) Standards Code and the U.S. Trade Agreements Act of 1979, including the following:
  - Maintaining U.S. "Inquiry Point"
  - Providing information on proposed foreign regulations, including a 24-hour announcement service 301-921-3200
  - Distributing copies of regulations on request
  - Identifying proposed U.S. regulations that affect trade and sending them to the GATT Secretariat in Geneva
  - Assisting U.S. interests in preparing comments on foreign regulations
- o Operates the National Center for Standards and Certification Information and maintains a reference collection of standards, purchasing specifications, regulations, and other standards-related information.
- o Exchanges standards-related information with National and international organizations.

### Standards Management Program

- o Manages U.S. participation in the International Organization of Legal Metrology (OIML), an intergovernmental body whose aim is to harmonize national legal requirements covering measurements in commerce, industry and public health.
- o Administers the DOC Voluntary Product Standards Program.
- o Supports OPSP federal standards policy and coordination responsibilities providing the secretariat for the Interagency Committee on Standards Policy (ICSP) and assisting agencies in developing their standards programs.
- o Supports OPSP responsibility concerned with liaison with U.S., foreign national, and international standards bodies.



- o Collects and disseminates information on NBS staff participation in outside standards organizations.

#### Laboratory Accreditation Program

- o Operates the National Voluntary Laboratory Accreditation Program which provides national recognition of competent testing laboratories.
- o Coordinates with U.S. certification systems on matters related to competence of testing laboratories.
- o Develops proficiency testing programs to evaluate laboratory competence.
- o Conducts public workshops on testing methods that will serve as the basis for recognizing competence.
- o Represents the United States at meetings of the International Laboratory Accreditation Conference.

#### Weights and Measures Program

- o Sponsors the National Conference on Weights and Measures as a national forum for the promotion of uniformity and effectiveness in state and local weights and measures programs.
- o Supports the system of state weights and measures laboratories in order to provide traceability to National standards.
- o Develops performance requirements for laboratory and field weighing and measuring devices.
- o Develops test procedures for use by weights and measures officials.
- o Designs, develops, and coordinates technical training programs for state and local officials and laboratory metrologists.

APPENDIX II

THE NBS STANDARDIZATION ADVISORY AND COORDINATION COMMITTEE

## THE NBS STANDARDIZATION ADVISORY AND COORDINATION COMMITTEE (SACC)

This NBS Standing Committee was established in February 1978 by the NBS Director to provide continuing guidance and surveillance of the Bureau's standardization activities. Because of the reorganization of OPSP with its broad responsibilities for standards policy development and implementation, SACC revised its charter in May 1982, to recognize the role of OPSP. The revised purposes and functions of SACC are given below.

### Purposes

- (1) To advise the Director and MOU Directors on Bureau-wide issues relating to NBS participation in standardization activities.
- (2) To provide Bureau-wide representation in the development of recommendations for NBS standards policies and procedures.
- (3) To assist the Director and MOU Directors to ensure that NBS standards participation is effective and efficient.
- (4) To provide a mechanism for Bureau-wide input into analysis of standards-related developments outside the Bureau that have implications for NBS.
- (5) To encourage cooperation and the exchange of information among MOU's concerning standards-related activities.

### Functions

- (1) To evaluate the services of the Bureau-wide management information system on NBS participation in standards activities and to ensure that MOU requirements for information are met.
- (2) To provide a forum for bringing generic issues arising from NBS participation in standards activities to the appropriate level of NBS management for consideration.
- (3) To participate in the development of guidelines for NBS participation in domestic and international standards activities and recommend them to the Director and the MOU Directors.
- (4) To serve as a mechanism through which the NBS Director and MOU Directors can maintain a comprehensive oversight of NBS participation in the standards activities of private sector organizations and an awareness of the effects of these activities on NBS and the outside organizations involved.
- (5) To provide a forum to assess the effectiveness of policies and practices followed by NBS participants in standards activities.



- (6) To provide a mechanism for evaluating the effects of OMB and other Administration directives on standards activities, and for advising the Director on the nature of any NBS response to such directives.
- (7) To alert the Director and the MOU Directors to standards activities outside NBS that may have implications for NBS.
- (8) To provide, when appropriate and timely, a coordinate NBS response to proposed standards policy initiatives and policy revisions developed in the public and private sectors.

APPENDIX III

NBS FORM 83

# RECORD OF COMMITTEE ASSIGNMENT

## PLEASE TYPE OR PRINT YOUR RESPONSES

1. Purpose: ("x" one)  ☐ NEW MEMBERSHIP ☐ TERMINATION OF MEMBERSHIP (COMPLETE BLOCKS 1 - 9 ONLY)  
☐ CHANGE INFORMATION PREVIOUSLY SUBMITTED ☐ 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) \_\_\_\_\_

9A. This form covers the following assignment:

LEVEL ("x" one)	NUMBER (if applicable)	COMPLETE NAME OF ACTIVITY
<input type="checkbox"/> PARENT COMMITTEE		
<input type="checkbox"/> SUBCOMMITTEE		
<input type="checkbox"/> TASK OR WORK GROUP		
<input type="checkbox"/> 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):	13B. *Nat'l Committee with Major Internat'l Responsibilities															
<table border="1"> <thead> <tr> <th>NATL</th> <th>*NATL/INTL</th> <th>INTL</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <p>STANDARDS PROFESSIONAL/SCIENTIFIC/TECHNICAL INTERAGENCY OR PUBLIC ADVISORY OTHER (specify) _____</p>	NATL	*NATL/INTL	INTL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>IF YOU CHECKED NATL/INTL, PLEASE SPECIFY THE INTERNATIONAL COMMITTEE OR COMMITTEES WITH WHICH THE NATIONAL COMMITTEE IS CONCERNED:</p> <p>_____</p>
NATL	*NATL/INTL	INTL														
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														

14. Position on Committee ("x" one):	16. Type of Funding ("x" one):
<input type="checkbox"/> MEMBER <input type="checkbox"/> TECHNICAL ADVISOR <input type="checkbox"/> CHAIR <input type="checkbox"/> ALTERNATE REPRESENTATIVE <input type="checkbox"/> VICE CHAIR <input type="checkbox"/> DELEGATE <input type="checkbox"/> SECRETARY <input type="checkbox"/> OTHER (specify) _____	<input type="checkbox"/> NBS <input type="checkbox"/> OA (specify) _____ <input type="checkbox"/> NBS/OA (specify agency) _____ <input type="checkbox"/> OTHER (specify) _____
15. Voting Status ("x" one):	
<input type="checkbox"/> VOTING <input type="checkbox"/> NONVOTING	

17. Key Words (FOR USE BY COMMITTEE MONITORING OFFICE)	18. Signatures of Approval	
	DIVISION CHIEF OR HIGHER	DATE
	COMMITTEE MONITORING OFFICE	DATE



## 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.

APPENDIX IV

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
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BIPM	International Bureau of Weights and Measures
CAMA	Computer Automated Measurement and Control
CCIR	Consultative Committee on International Radio
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
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
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



NRSCC	National Reference System in Clinical Chemistry
NSF	National Science Foundation
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

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